REQUEST FOR PROPOSALS

UTAH DEPARTMENT OF TRANSPORTATION

4 Interchanges on Bangerter HWY (SR-154)

Project No. S-0154(12)11

Salt Lake County

INSTRUCTIONS TO PROPOSERS (ITP)

Addendum 1 - September 29, 2016

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1 —INTRODUCTION

This Request for Proposals (RFP) is issued by the Utah Department of Transportation (the Department) to seek competitive design-build Proposals (Proposals) for the 4 Interchanges on Bangerter Highway (SR-154**)** (the Project). Proposals are invited from, and will be considered from, only those parties (Proposers) who have been notified of their inclusion on the Short-List. A complete and responsive Proposal will contain all required elements detailed is this ITP.

The RFP includes the following components:

- Instructions to Proposers (ITP)
- Part 1 – Agreement
- Part 2 – General Provisions
- Part 3 – Quality Program
- Part 4 – Project Design and Construction Requirements
- Part 5 – Special Provisions and Exceptions
- Part 6 – Third-Party Agreements
- Part 7 – Contract Drawings
- Part 8 – Engineering Data
- Part 9 – Warranty Provisions
- Reference Documents (RD)

The Contract Documents include Parts 1 through 9. The Proposal will also be a Contract Document to the extent set forth in Part 1.3 (Order of Precedence).

1.1. Department Project Goals

The Project goals are as follows:

Minimize Impacts to Bangerter Highway and Provide Mobility through the Project (MOT)

Provide continued and effective flow of traffic through the Project and for each interchange during construction. Use innovative design and construction techniques to deliver the Project with the least possible impacts to the traveling public while maintaining or exceeding the standards for quality. Implement a comprehensive construction phasing and maintenance of traffic (MOT) plan that maintains continuous access to businesses, residences, and schools; provides safe routing for pedestrians and school children; maintains existing vehicle movements throughout construction; and minimizes delay (including duration of impact) to traffic during construction of the Project.

Provide a Technical Approach that Exceeds Project Requirements

Exceed the Department's standards for design and construction to provide additional value to the Project, such as improved functionality and quality, reduced long-term maintenance, elimination of design exceptions and an increased service life. As appropriate, use innovative techniques and methods to provide increased value for the Project. Approach to design and construction should minimize or eliminate risk to the Department, specifically schedule risk associated with right-of-way limitations.

Minimize risk to, and effectively coordinate with Third Party Entities

Minimize Third Party facility relocations and mitigate impacts to Third Parties with an emphasis made to minimize or eliminate impacts to the U.S. Bureau of Reclamation's (USBOR) aqueduct at 9000 South, 7000 South, and 5400 South. Demonstrate effective methods for communicating, coordinating, and partnering to reduce impacts to their Facilities, reduce potential for impacts to the Project schedule, and promote a positive working relationship.

1.2. General Project Description and Obligations of Design-Builder

1.2.1. General Project Description

The Project will consist of designing and constructing four grade separated interchanges at 5400 South, 7000 South, 9000 South and 11400 South. The Project's general key elements consist of (but are not limited to); Maintenance of Traffic (MOT) at each interchange; providing safe facilities for pedestrian and bicycle traffic during and after construction (including pedestrian bridge near 7000 South interchange); Portland Cement Concrete Pavement (PCCP) replacement; protection of the US Bureau of Reclamation (USBOR) Aqueduct; protection and/or relocation of existing utilities.

1.3. RFP Requirements and Proposal Contents

1.3.1. Proposal Contents

The Proposal shall consist of a Technical Proposal and Price Proposal. The Technical Proposal contents are set forth in Appendix ITP-A. The Price Proposal contents are set forth in Appendix ITP-B. Appendix ITP-C includes forms required for the Technical Proposal and Price Proposal.

1.3.1.1. Contract Documents –Design-Builder's Proposal

To the extent set forth in Part 1.3 (Order of Precedence), the Proposal will become part of the Contract Documents. The "Executive Summary and Summary Statement" and Appendix A (Legal and Financial Information) will not become part of the Contract Documents.

The information and completed forms in the Technical Proposal will become part of the Contract. The information in the Price Proposal will also be incorporated into the Contract Documents.

1.3.1.2. Commitments in Technical Proposal

The verbiage used in each Proposal will be interpreted and evaluated by the Department based on the level of commitment provided by Proposer. No consideration will be given to tentative or ambiguous commitments. For example, phrases containing "we may" or "we are considering" will not be considered in the evaluation process because they do not indicate a firm commitment by the Design-Builder.

1.3.2. Proposal Contents and Required Forms

Any failure to provide all the information and all completed forms (in Appendix ITP-C) in the format specified in Appendices ITP-A and ITP-B may result in the Department's rejection of the Proposal. All blank spaces in the Proposal forms must be filled in as noted, and no content changes may be made to the Proposal forms.

1.3.3. Property of the Department

All documents submitted by the Proposer in response to this RFP become the property of the Department and will not be returned to the Proposer, except for the protected records as described in Section 2.8 (Government Records Access and Management Act (GRAMA)). The concepts and ideas in the information contained in the Proposal submitted by the Proposer also become the property of the Department upon payment of the stipend. See Section 2.9 (Proposal Stipend).

1.3.4. Federal Requirements

Funding for this Project includes no federal funds. Certain Contract requirements that are included with federally funded Projects have been included in the Contract Documents for this Project.

1.3.5. Errors

If the Proposer identifies any mistake, error, or ambiguity in the RFP at any time during the procurement process, it is the duty of the Proposer to notify the Department of the recommended correction in writing, in accordance with Section 2.5 (Proposer Questions).

1.4. Definitions

Refer to Contract Documents, Part 1, Appendix A (Acronyms and Definitions List) for the various abbreviations, acronyms, and terms used but not defined herein.

1.5. Improper Conduct

1.5.1. Prohibited Activities

If the Proposer or anyone representing the Proposer offers or gives any advantage, gratuity, bonus, discount, bribe, or loan of any sort to the Department or any of its employees, agents or representatives at any time during this procurement process:

A. The Department will immediately disqualify the Proposer.

B. The Proposer forfeits its Proposal Bond.

C. The Proposer is not entitled to any stipend.

D. The Department may sue the Proposer for damages.

1.5.2. Noncollusive Proposal Certification (Form NC)

By submitting its Proposal, each Proposer and each person signing on behalf of any Proposer certifies as to its own organization, under penalty of perjury, that to the best of their knowledge and belief:

A. The prices in the Proposal have been arrived at independently without collusion, consultation, communication, or agreement with any other Proposer or with any competitor for the purpose of restricting competition.

B. Unless required by law, the prices that have been quoted in the Proposal have not been and will not be knowingly disclosed by the Proposer, directly or indirectly, to any other Proposer or competitor before opening of Proposals.

C. No attempt has been made or will be made by the Proposer to induce any other person, partnership, or corporation to submit or not to submit a Proposal for the purpose of restricting competition.

D. The named Proposer(s) has not, whether directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action to restrain free competitive bidding in connection with this Proposal.

The Department considers no Proposal for award nor makes no award where there has not been compliance with this section, except as follows:

E. If the Proposer cannot make the foregoing certification, the Proposer must furnish with the Proposal a signed statement that describes in detail the reasons why the certification cannot be made.

F. The Project Director, or designee, determines that such disclosure was not made for the purpose of restricting competition.

None of the following requires a disclosure within the meaning of Section 1.5.2 (B):

G. A Proposer has published price lists, rates, or tariffs covering items being procured.

H. A Proposer has informed prospective customers of proposed or pending publication of new or revised price lists for such items.

I. A Proposer has sold the same items to other customers at the same prices being bid.

A Proposal made by a corporation, joint venture, or other partnership is considered authorized by the board of directors of the Proposer. Authorization is defined as signing and submitting the Proposal, and includes the following declaration of noncollusion on the part of the corporation:

Utah Department of Transportation
Noncollusive Proposal Certification

I declare under penalty of perjury under the laws of the United States and the State of Utah that neither I, nor to the best of my knowledge any member or members of my firm or company, have either directly or indirectly restrained free competition on this Project by entering into any agreement, participating in any collusion, or otherwise taking any action unauthorized by the Utah Department of Transportation with regard to this Contract.

Signing the Proposal certifies compliance with all provisions of the above Noncollusive Proposal Certification. The Proposer shall also sign and submit Form NC (Noncollusion Affidavit) in Appendix ITP-C (Forms). See Appendix ITP-A (Technical Proposal Instructions).

1.6. Language Requirement

Conduct all correspondence regarding the RFP, Proposal, and the Contract in English. If any original documents required for the Proposal are in any other language, provide an English translation. The English version takes precedence in the event of conflict with the original language.

1.7. Proposal and Contract Award Schedule

1.7.1. Anticipated Schedule for Proposal and Contract Award Process

The following is the anticipated schedule for this procurement. The Department reserves the right to alter these dates. All deadlines areas shown in Table ITP-1, prevailing (Daylight or Standard) Mountain Time, unless otherwise noted.

TABLE ITP-1
PROPOSAL AND CONTRACT AWARD SCHEDULE

Event	Time	Date	Location
Issue Draft RFP		8/18/16	
Draft Industry Review Meeting	Assigned by Department	9/8/16	Region 2
Issue Final RFP		9/15/16	
One-on-One Meetings with Proposers	Assigned by Department	10/5/16	Region 2
One-on-One Meetings with Proposers	Assigned by Department	10/19/16	Region 2
One-on-One Meeting with Cities and USBOR	Assigned by Department	10/26/16	Region 2
One-on-One Meetings with Proposers	Assigned by Department	11/14/16	Region 2
Last day for initial submittal of an ATC	5:00 PM	11/9/16	
Last day for Department Responses to initial ATC requests	5:00 PM	11/17/16	
One-on-One Meetings with Proposers	Assigned by Department	11/28/16	Region 2
Last day for Resubmittal of ATCs	5:00 PM	11/29/16	
Last day to submit or resubmit Pass/Fails; Last day to respond to resubmit ATCs	5:00 PM	12/05/16	
Receipt of Proposers' Questions and Clarifications by Department (due date)	5:00 PM	12/1/16	
Issue Date for Final Clarification & Addenda	5:00 PM	12/8/16	
Submittal of Technical & Price Proposals (Proposal Due Date)	2:00 PM	12/22/16	Central Const. Desk
Submittal of Escrowed Proposal Documentation (due date)	1:00 PM	1/10/17	Central Construction
Selection of and Notification of Design-Builder (anticipated date)		1/23/17	

Selected Proposer Escrow Documentation Review	8:00 AM	1/25/17	Central Construction
Notice of Award (anticipated date)		1/26/17	
Proposer Teams' Proposal Debriefings (anticipated date)	TBD	2/16/17	Central
Contract Execution (anticipated date)		2/15/17	
Issuance of Notice To Proceed (NTP) (anticipated date)		2/16/17	

1.7.2. Proposal Due Date

Deliver the completed Proposal to the addressee at the address specified in Section 2.7.1 (Submission Requirements), no later than as shown in Table ITP-1 prevailing (Daylight or Standard) Mountain Time, on the date specified in Section 1.7.1 (Anticipated Schedule for Proposal and Contract Award Process) for Submittal of Proposals.

Note that the initial submittal of an Alternative Technical Concept (ATC) must be submitted by the date shown in Table ITP-1 for the Department's consideration. Table ITP-1 identifies the last day that any revision to a previously submitted ATC may be submitted to the Department and the Proposer be assured of the Department's response.

Also, note to assure a "Pass" is achieved for all Pass/Fail criteria, the Department highly encourages early submittal of each Pass/Fail criteria, except for the Legal and Financial Pass/Fail criteria, as the unacceptable Pass/Fail's may require multiple submittals prior to the Proposal Due Date to achieve a "Pass." Table ITP-1 identifies the last day that a Pass/Fail may be submitted to the Department and the Proposer be assured of the Department's response to the Pass/Fail prior to the Proposal Due Date.

1.8. The Proposer's Organization

1.8.1. Changes to Proposer's Organization

In order for a Proposer to remain qualified to submit a Proposal after it has been placed on the Short-List (unless otherwise approved in writing by the Department), Proposer's organization as identified in its Statement of Qualifications (SOQ) must remain intact for the duration of the procurement process. To change the organization represented in the SOQ by adding, substituting for, or deleting a Principal Participant, Key Personnel, and/or Designer, request written permission to do so from the Department at least as soon as possible prior to submitting the Proposal. If the request is to add or substitute a member to the organization, submit with the request that information specified for Principal Participant, Key Personnel, and/or Designer, in the RFQ, as applicable. If the request is to delete a Principal Participant, submit information as may be required by the Department to show that the changed team still meets the RFQ criteria (Pass/Fail and quality). Submit any changes to Key Personnel as soon as possible after release of the RFP.

Any change in Key Personnel must meet the Department's standard of "equal to" or "better than" the qualifications of the individual who was submitted in the Proposer's (SOQ).

1.8.2. Pre-Qualification and Joint Ventures

It is the responsibility of each Proposer to ensure that they are pre-qualified through the UDOT Construction Department and, if applicable, applied for joint venture status with the UDOT Construction Department.

If a Proposer is planning on submitting as a joint venture, it is the responsibility of the Proposer to ensure that they have applied for joint venture bidding through the Department prior to submitting a Proposal in response to the RFP. If applicable, the Proposers are to follow the instructions regarding joint venture bidding: http://www.udot.utah.gov/go/jvbid

Furthermore, all short-listed teams will be required to be pre-qualified through the Construction Department prior to submitting their Proposals in response to the RFP. The list of all currently pre-qualified bidders can be found at the following webpage: http://www.udot.utah.gov/go/prequal

If a Proposer's name, with which they intend to Contract under, is not on the list, they will be required to follow the instructions to apply for pre-qualified status: http://www.udot.utah.gov/go/prequalapp

Proposers need to allow the Department a minimum of 10 Working Days, from the time that all required information is received, to process the Proposer for either pre-qualification status or joint venture status. Please note that these pre-qualification/joint venture requirements are separate from the RFQ and RFP processes and must be completed independently of them.

1.9. Organizational Conflicts and Ineligible Firms

The Proposer accepts responsibility for being aware of the requirements of 23 Code of Federal Regulations (CFR) 636.116 and will include a full disclosure of all potential organizational conflicts of interest in the Proposal.

By submitting its Proposal, each Proposer agrees to make an immediate and full written disclosure to the Department, if an organizational conflict of interest is thereafter discovered. Include a description of the action that the Proposer has taken or proposes to take to avoid or mitigate such conflicts. If an organizational conflict of interest is determined to exist, the Department may, in its discretion, cancel the Contract. If the Proposer was aware of an organizational conflict of interest prior to the award of the Contract and did not disclose the conflict to the Department, the Department may terminate the Contract for default.

No firm that is ineligible for State contracts may be part of any Proposer's team. It is the responsibility of the Proposer to determine eligibility of its team members. In addition, the following firms participated in development of the RFP and may not be part of any Proposer's team:

A. Horrocks Engineers
B. WCEC Engineers
C. HDR
D. Avenue Consultants
E. Integra Realty Services
F. ESI
G. RB&G
H. Gilmore Consulting Services
I. West Ridge Construction Services
J. Kraemer North America
K. Bowen Collins & Associates

2 —PROCUREMENT PROCESS

2.1. Method of Procurement

This RFP is issued and administered pursuant to authority provided in Utah Code §§ 63G-6a-106, 63G-6a-1402 and Utah Administrative Code Rule R916-3. The Contract will be a Design-Build (DB) contract procured using best value as a basis of selection. The intent of the Department is to award the Contract to the responsive Proposer whose Proposal provides the best value to the State, taking into consideration the price and evaluation criteria identified herein.

The Department procurement process for the Project involves two phases:

A. Request for Qualifications (RFQ) and submittal of Statements of Qualifications, and the subsequent determination of the Short-List.

B. Request for Proposals (RFP) from the Short List and submittal of Proposals, and the subsequent selection of the Design-Builder from the Proposers.

The Proposal evaluation will be based on both Pass/Fail criteria and a combined evaluation of price and technical evaluation criteria.

2.2. Pre-Proposal Informational Meetings

At any time prior to the Proposal Due Date, the Department may hold joint informational meetings (with all Proposers or with individual Proposers). If an individual informational meeting is offered to one or more Proposers, it will be offered to all Proposers.

The Department intends to conduct One-on-One meetings with each Proposer to discuss issues regarding the RFP.

2.2.1. One-on-One Meetings

The Department intends to conduct One-on-One meetings with each Proposer to discuss issues regarding the RFP and Proposer's ATCs. The Department reserves the right to disclose to all Proposers any issues raised during the One-on-One meetings, except to the extent that the Department determines, in its sole discretion, that such disclosure would impair the confidentiality of an ATC or would reveal a Proposer's confidential business strategies.

One-on-One meetings, as shown in Table ITP-1 with the Department will be made available to each Proposer. Each meeting will be held independently with each Proposer. The Department will assign the time and place and notify the Design-Builder. The One-on-One meetings are subject to the following:

A. The meetings are intended to provide Proposers with a better understanding of the RFP.

B. The Department will only discuss a Proposal or ATC with the submitting Proposer.

C. Proposers are not permitted to seek to obtain commitments from the Department in the meetings or otherwise seek to obtain an unfair competitive advantage over any other Proposer. No aspect of these meetings is intended to provide any Proposer with access to information that is not similarly available to other Proposers, and no part of the evaluation of Proposals will be based on the conduct or discussions that occur during these meetings.

D. Nothing stated at any pre-Proposal meeting or included in a written record or summary of a meeting modifies the ITP or any other part of the RFP unless it is incorporated in an Addendum issued pursuant to Section 2.6.1 (Addenda).

E. Official minutes for the meetings will not be kept.

F. The Design-Builder is required to submit an agenda for the meeting at least 48-hours prior to each scheduled meeting. Indicate the disciplines that need to be in attendance.

G. The Design-Builder is required to notify the Department of the discipline leads that need to be in attendance

Persons attending the One-on-One meetings are required to sign an acknowledgment of the foregoing rules. Attendance at meetings remotely via phone or internet conference will not be allowed.

2.2.2. Other Meetings

Additional meetings may be requested by the Department in writing to the Proposers.

2.3. Examination of RFP Package and Work Site

It is the sole responsibility of the Proposer to examine, with appropriate care and diligence prior to submitting its Proposal, the RFP and all conditions which may in any way affect its Proposal or performance under the Contract (if awarded), including final design. This includes responsibility for investigating the condition of existing facilities and the Project Site, including undertaking all activities sufficient to familiarize itself with the surface and subsurface conditions affecting the Project. The Proposer's receipt of Department-furnished information does not relieve the Proposer of such responsibility.

The Department encourages each Proposer to perform additional soil borings and other exploratory investigations on the Project Site, as appropriate, subject to the Proposer securing required permits, rights of entry, or approvals. The submission of a Proposal shall be considered *prima facie* evidence that the Proposer has made the above-described examination and is satisfied as to the conditions to be encountered in performing the Work and as to the requirements of the Contract. Failure by the Proposer to so examine and inform itself shall be at its sole risk, and the Department will provide no relief for any error or omission. Change orders for differing site conditions will not be considered for lack of field investigations during the RFP period.

2.4. Receipt of the Request for Proposal Documents and Other Information

The RFP and other information may be obtained by Proposers who have been notified of their inclusion on the Short-List from the person designated as the Department point of contact in Section 2.4.1 (Department-Designated Point of Contact). The Department will provide access to the RFP on the Project Portal.

2.4.1. Department-Designated Point of Contact

Submit all Project communications (including Request For Clarification's and ATC's) electronically to the Department's point of contact indicated below. Mark all communication with the "4 Interchanges on Bangerter Highway (SR-154)" and "Procurement—Sensitive":

ATTN: **Marwan Farah, PE, Project Director**
UDOT Region 2
2010 South 2760 West
Salt Lake City, UT 84104
Project Email: Bangerter4InterchangesRFP@interchange.udot.utah.gov
Project Portal: https://interchange.udot.utah.gov/cp/12566/4bangerterRFP/SitePages/Home.aspx

The Department will not consider any communication delivered through methods other than those specified in this Section 2.4.1.

2.4.1.1. Communication and Project Portal

The Design-Builder shall only use the communication method described in this Section 2.4.1.1.

The Department established an Interchange (SharePoint) portal method for communication between the Proposers and the Department. All communications regarding the Project and the procurement must be addressed to the Department's designated point of contact identified in Section 2.4.1 (Department-Designated Point of Contact) of this RFP and must be transmitted through the Project Portal by emailing it to the Project Email above. Only communications and submittals posted on the Department's Project Portal will be recognized as being sent by the Proposer and received by the Department unless explicitly stated otherwise in this RFP. The Department will post all communications for procurement, including all Addenda to the RFP and responses to requests for clarifications (RFC's) on the Project Portal. Instructions to obtain access to the Project Portal are included in the RFQ.

2.4.2. Identification of Proposer Authorized Representative

Identify in the Technical Proposal an individual authorized to act on behalf of, and to receive documents, communications, and notices for, the Proposer relating to this procurement ("Proposer Authorized Representative"). If the Proposer Authorized Representative is changed after submission of its Proposal, provide the Department's Designated Point of Contact with the name and address of such new Proposer Authorized Representative, on Form C (Single Point of Contact). Failure to identify a Proposer Authorized Representative in writing may result in Proposer failing to receive important communications from the Department. The Department is not responsible for any such failure.

2.4.3. Rules of Contact

The following rules of contact apply during the Contract procurement process, which began upon the date of issuance of the RFQ and will be completed upon the earliest to occur of (a) execution of the Contract, (b) rejection of all Proposals, or (c) cancellation of this procurement. These rules are designed to promote a fair, unbiased, and legally defensible procurement process. Contact includes face-to-face, telephone, e-mail, text, and formal written communications.

The specific rules of contact are as follows:

A. Proposer and its team members may not communicate with another Proposer or its team members with regard to this RFP or either team's Proposal, with two exceptions:

   1. Subcontractors that are shared between two or more Proposer teams may communicate with their respective team members, so long as those Proposers

establish a protocol to ensure that the Subcontractor will not act as a conduit of information between the teams; and

2. Contact among Proposer teams is allowed during Department-sponsored informational meetings.

B. The Proposers will correspond with the Department regarding this RFP only through the Department's Designated Point of Contact and the Proposer's Authorized Representative.

C. Proposers may not contact Department employees (including department heads, members of the evaluation committee[s], and any official who will or who will potentially participate in the decision to award the Contract) regarding the Project, except through the process identified in Section 2.4.3. (Rules of Contact) Also, Proposers may not contact any stakeholder staff regarding the Project, including employees of:

1) US Bureau Of Reclamation

2) Jordan Valley Water Conservancy District (JVWCD)

3) Cities

a) Taylorsville City

b) West Jordan City

c) South Jordan City

4) Salt Lake County, and

5) Program Management Team as specified in Section 1.9

D. Any communication determined to be improper may result in disqualification, at the sole discretion of the Department.

E. Any official information regarding the Project will be disseminated from the Department on Department letterhead and signed by the Department Designated Point of Contact or through the Project Portal.

F. The Department will not be responsible for or bound by any oral exchange or any other information or exchange that occurs outside the official process specified herein.

2.5. Proposer Questions

Review the RFP and any addenda issued by the Department prior to the Proposal Due Date, and request written clarification or interpretation of any perceived discrepancy, deficiency, ambiguity, error, or omission contained therein, or of any provision that Proposer fails to understand clearly. Failure of Proposer to so examine and inform itself places the Proposer at the sole risk, and the Department will provide no relief for error or omission.

The Department will consider questions submitted in writing by Proposers regarding the RFP, including requests for clarification and requests to correct errors. All questions must be received by the Department at the Project Email specified in Section 2.4.1 (Department Designated Point of Contact) no later than the date specified in Section 1.7.1 (Anticipated Schedule for Proposal and Contract Award Process). Questions received after the deadline will be answered at the sole discretion

of the Department. All questions must be submitted on Form CF (RFP Comment Form) in electronic format using Microsoft Word.

2.6. Addenda and Responses to Questions

2.6.1. Addenda

The Department reserves the right, in its sole discretion, to revise, modify, or change the RFP and/or procurement process at any time before the Proposal Due Date. The Department issues such revisions through issuance of an Addendum to the RFP. Any such revisions are bound into and included as part of the Contract only if issued through an Addendum. The Department is responsible for providing Addenda only to the Short-Listed Proposers; persons or firms that obtain the RFP from sources other than the Department bear the sole responsibility for obtaining any Addenda issued by the Department for the Project.

Acknowledge receipt of all Addenda and answers to Proposer questions in the Proposal Letter Form, and verify that the Proposal meets the requirements of the addenda. Failure to acknowledge such receipt may cause the Proposal to be deemed nonresponsive and be rejected. The Department reserves the right to hold group meetings with Proposers and/or One-on-One meetings with each Proposer to discuss any Addendum or response to requests for clarifications. The Department does not anticipate issuing any Addendum later than the date listed in Table ITP-1. However, if the need arises, the Department reserves the right to issue Addenda after such date. If the Department finds it necessary to issue an Addendum after such date, then the cover letter to that specific addendum will set forth any relevant processes or response times necessitated by the Addendum.

2.6.2. Correspondence and Information

No correspondence or information from the Department or anyone representing the Department regarding the RFP or the Proposal process generally has any effect unless it is communicated in accordance with Section 2.4.3 (Rules of Contact).

2.6.3. Responses to Questions

The Department will provide written responses to questions received from Proposers as specified in Section 2.5 (Proposer Questions). Summaries of the questions (without attribution) and responses will be sent to all Proposers. The responses will not be considered part of the Contract, but may be relevant in resolving any ambiguities in the Contract. Inquiries resulting in any modifications to this RFP will be documented in Addenda and will be considered part of the Contract.

2.7. Submission of Proposals

2.7.1. Submission Requirements

Submit Proposals in accordance with the ITP and the following requirements:

A. Enclose the Technical Proposal in one or more sealed containers clearly marked with the name of the Proposer and the words “4 Interchanges on Bangerter Highway (SR-154)” see Appendix ITP-A (Technical Proposal Instructions). Deliver the Technical Proposal to:

Utah Department of Transportation, Attn: Phil Ellsworth
UDOT Contract Administrator (Consultant)
4501 South 2700 West, Fourth Floor
Salt Lake City, UT 84114

Submit the Price Proposal in accordance with Appendix ITP-B.

B. Clearly indicate that this submittal is a Proposal for the "4 Interchanges on Bangerter Highway (SR-154**)**" Department Project No. S-0154(12)11, and clearly mark the Proposer's name and address on the outside of the containers.

C. When sent by U.S. mail or private carrier (e.g., Federal Express, United Parcel Service), send the sealed containers in accordance with this ITP to the Department at the address of and in care of the official specified in this Section 2.7 (Submission of Proposals), in whose office the containers are to be received no later than the time and date specified in Section 1.7.1 (Anticipated Schedule for Proposal and Contract Award Process). In the alternative, a Proposal may be hand-delivered by the Proposer prior to the time and date specified in Section 1.7.1 (Anticipated Schedule for Proposal and Contract Award Process) to the official designated by the Department in Item (A), above.

D. Where certified copies are required, stamp the document or cover with the words "Certified True Copy" and have the stamp oversigned by the Proposer's designated point of contact.

E. It is the responsibility of each Proposer to obtain a receipt (if they so choose), from the Department, acknowledging delivery of the Proposer's Proposals.

2.7.2. Responsive Proposal

Submit a Proposal that provides all the information required by this ITP and its accompanying appendices. Failure to do so may result in disqualification of the Proposal.

Submit the Proposal in the official format that is specified by this ITP and its accompanying appendices, and sign each hardcopy of the Proposal submitted to the Department.

Proposals may be considered non-responsive and be rejected for any of the following reasons:

A. The Proposal is submitted on a paper form or disk other than that furnished or specified by the Department; it is not properly signed; the Proposal Letter Form (in Appendix ITP-C) is altered except as contemplated herein; or any part thereof is deleted from the Proposal package.

B. The Proposal is illegible or contains any omission, erasure, alteration, or item not called for in the RFP or contains any unauthorized addition, conditional or alternate Proposal, or other irregularity of any kind, and the Department determines that such irregularity makes the Proposal incomplete, indefinite, or ambiguous as to its meaning.

C. The Proposer proposes something contrary to the RFP without prior written approval from the Department and the Department does not accept the contrary proposed item.

D. The Proposer adds any provision reserving the right to accept or reject an award or to enter into a Contract following award.

E. The Proposer attempts to limit or modify the form of any bond; the Proposal Guaranty is not provided; and/or requested information deemed material by the Department is not provided.

F. The Proposer fails to achieve a "Pass" rating on any Pass/Fail criteria or sub-criteria.

G. The Department determines the Proposal to be non-responsive in any other respect.

2.7.3. Withdrawal of a Proposal; Proposal Validity Period

A Proposer may withdraw its Proposal only by a written and signed request that is received by the Department prior to the specified time for submitting Proposals. Notify the Department in accordance with Section 2.7.1 (Submission Requirements). Following withdrawal of its Proposal, the Proposer may submit a new Proposal, provided that it is received prior to the specified time for submitting Proposals.

Proposals remain valid for 90 Calendar Days following the Proposal Due Date (the "Contract Award Period"), which period is subject to extension by mutual agreement of the Department and the Proposer(s). No Proposer may withdraw its Proposal prior to the end of the Contract Award Period. Following expiration of the Contract Award Period, a Proposer may withdraw its Proposal without liability unless it has previously been notified of its selection by a Notice of Award issued in accordance with Section 6.1 (Contract Award). The contents of any Proposal that is withdrawn remain the property of the Department. Except as specifically permitted by this ITP or as approved in writing by the Department, any Proposer that withdraws all or any part of its Proposal shall forfeit its Proposal Guaranty.

2.7.4. No Public Opening of Proposals

There will be no public opening of Proposals. After the specified time for submitting Proposals, all Proposals will be opened in the presence of two or more Department-designated individuals and reviewed for responsiveness to the requirements of the RFP.

2.7.5. Late Proposals

The Department will not consider any late Proposals. Proposals received after the deadline for submittal of Proposals will be returned to the Proposer, unopened.

2.8. Government Records Access and Management Act (GRAMA)

The Department will maintain a nonpublic process for the duration of this procurement. Pursuant to Subsection §63G-2-305(6) of the GRAMA, all records related to this procurement, including, but not limited to Statements of Qualifications (SOQs), evaluation, and Short-List procedures, Proposals, evaluation, and selection procedures, and any records created during the evaluation and selection process will remain nonpublic records until the Contract has been executed by all necessary officials of the Design-Builder and the Department.

The Government Records Access and Management Act (GRAMA), Utah Code Ann., §63G-2-101 et seq., provides in part that certain records are protected if properly classified.

Proposers are responsible for determining which information, if any, they wish to be protected under a Claim of Business Confidentiality, and are responsible for taking appropriate action to do so. An entire proposal may not be protected under a Claim of Business Confidentiality.

To protect information under a Claim of Business Confidentiality, the Proposer must, at the time the information is provided to the Department, include a Claim of Business Confidentiality on Form BC. It is the responsibility of the Design-Builder to complete Form BC in accordance with Subsection §63G-2-309.

If nothing in the Proposal is being protected under a Claim of Business Confidentiality, indicate on Form BC by stating "NA" on the submitted form.

2.9. Proposal Stipend

By submitting a Proposal in response to the RFP, submitting an executed Stipend Agreement, Form SA (Stipend Agreement), and accepting the stipend, the Proposer acknowledges that the Department reserves the right to use any ideas or information contained in the Proposal in connection with any Contract awarded for the Project, or in connection with a subsequent procurement.

The Department will offer a stipend in the amount of $300,000 to each unsuccessful Proposer. To qualify as an unsuccessful Proposer, a Proposer will have:

A. Received a rating of "Pass" on all Pass/Fail criteria and an overall technical rating of at least Acceptable (-) for each overall evaluation criteria category.

B. Submitted a responsive Price Proposal.

If the Proposer choses to accept the stipend, the Proposer shall provide an executed Stipend Agreement, Form SA (Stipend Agreement) provided in Appendix ITP-C (Forms), within 10 Days of date of Proposer debrief.

If the procurement is cancelled prior to the Proposal Due Date, each Proposer has the option, to attend an interview (if the Department chooses to conduct interviews) and deliver to the Department the work product of its Proposal preparations to date. There is no specific format required for such work product.

Each Proposer that chooses to attend such an interview and deliver its work product may be paid a portion of the stipend amount, at the Department's discretion, for the work product. The Department pays no portion of the stipend amount if a Proposer chooses to not attend the interview or not deliver its work product.

2.10. Build Alternative

The Base Build and Build Alternative as defined in Part 4-01 – (Project Configuration) are described and should be priced in accordance with ITP Appendices A and B.

Submit a price for the Base Build and Build Alternative. The Base Build and the Build Alternative will only be awarded if it does not exceed Project funding.

Include the Base Build and the Build Alternative in the Proposal Project schedule.

3 —ALTERNATIVE TECHNICAL CONCEPTS (ATC)

3.1. ATC Goals and Eligibility

Sections 3.1 (ATC Goals and Eligibility) and 3.2 (Pre-Proposal Submission of ATC) set forth a process for pre-Proposal review of Alternative Technical Concepts (ATCs) that conflict with the requirements for design and construction of the Project, or otherwise require a modification of the technical requirements of the Project. This process is intended to:

A. Allow Proposers to incorporate innovation and creativity into the Proposals.
B. Allow the Department to consider Proposer ATCs in making the selection decision.
C. Avoid delays and potential conflicts in the design associated with the deferring of reviews of ATCs to the post-award period.
D. Obtain the best-value for the public.

ATCs eligible for consideration hereunder are limited to those deviations from the requirements of the RFP that result in performance and quality of the end product that is equal to or better than the performance and quality of the end product absent the deviation, as determined by the Department in its sole discretion. The Department will not consider ATCs on the following:

A. Pavement section
B. Bangerter Highway under 11400 South
C. Modifications of Time Components
D. Geosynthetic Reinforced Soil (GRS) Abutments
E. Overhead sign structure design dimensions
F. Location of landings/ramps for the pedestrian bridge

A concept is not eligible for consideration as an ATC if, in the Department's sole judgment, it is premised upon or would require:

A. A reduction in Project scope, performance, or reliability.
B. The addition of a separate Department project to the Contract (such as expansion of the scope of the Project to include additional roadways).
C. An increase in the amount of time required for Completion Deadlines.

Any ATC that, if implemented, would require further environmental evaluation of the Project, may be allowed, provided that the Proposer bears the schedule and cost risk associated with such additional environmental evaluation. If the Proposer is not able to obtain the approvals necessary to implement the ATC, the Proposer is obligated to develop the Project in accordance with existing approvals and without additional cost or extension of time.

Any ATC that has been pre-approved may be included in the Project, subject to the conditions set forth herein.

If a Proposer is unsure whether a concept is consistent with the requirements of the RFP or if that concept would be considered an ATC by the Department, the Department recommends that Proposer submit such a concept for review as an ATC. If a concept is submitted as part of the Proposal that the Department considers to be an ATC, and the Proposer has not received prior ATC approval, the Proposal may be considered non-responsive or the Proposer will be required to revert back to the RFP.

3.2. Pre-Proposal Submission of ATC

Proposers may submit an ATC for review to the Department in accordance with Section 2.4.1.1 (Communication and Project Portal), until the applicable last date and time specified in Section 1.7.1 (Anticipated Schedule for Proposal and Contract Award Process). Submit all ATCs in writing, with a cover sheet identifying the Proposer and stating "4 Interchanges on Bangerter Highway (SR-154) — Confidential ATC." Clearly identify the submittal as a request for review of an ATC under this ITP; any submittal not clearly designated as an ATC is not treated as an ATC by the Department.

Include in the electronic ATC submittal a narrative description of the ATC and technical information, including drawings and other information as necessary, as described below. It is the responsibility of the Proposer to confirm the Department's receipt of any ATC submittals prior to the deadline.

3.2.1. Pre-Proposal Requirements

Each ATC submission shall include the following on Form ATC-S (Alternative Technical Concept Submittal):

A sequential ATC number identifying the Proposer and the ATC number (submit multipart or multi-option ATCs as separate individual ATCs with unique sequential numbers). Name the ATC with the following format: ATC #_ Design_Builder Name_ Description.

A. A description and conceptual drawings of the configuration of the ATC or other appropriate descriptive information.
B. References to requirements of the RFP that are inconsistent with the proposed ATC, an explanation of the nature of the deviations from said requirements, and a request for approval of such deviations.
C. The locations where, the ATC will be used on the Project.
D. The analysis justifying use of the ATC and why the deviation, if any, from the requirements of the RFP should be allowed. Explain in detail how the ATC will be used and why the ATC is a benefit to the Project.
E. A preliminary analysis of potential impacts (both during and after construction) including but not limited to user impacts, risks, quality, Right-of-Way, geotechnical, utilities, environmental permitting, local community, safety, design-life, and life-cycle Project and infrastructure costs, including impacts on the cost of repair, maintenance, and operation.

In addition, each ATC submission that proposes materials or material-related processes that are not typically used by the Department, the Design-Builder shall submit information or specifications that address the following:

G. Provide information if this material was used on a State transportation project
H. Provide information about the maintainability and longevity
I. Describe field inspection methods and requirements related to placement activities
J. Describe field and/or laboratory testing methods
K. Describe field and/or laboratory testing frequencies
L. Provide acceptance criteria for the product(s) and any associated Work
M. Provide a discussion and description of all related issues, requirements, and processes for controlling the quality of the Work.

3.2.2. ATC Disclosures

Do not make any public announcement or disclosure to Third-Parties concerning any ATC until after pre-approval (including conditional pre-approval) has been obtained. Following pre-approval (including conditional pre-approval), if a Proposer wishes to make any announcement or disclosure to Third-Parties concerning any ATC, do so by first notifying the Department in writing of its intent to take such action, including details as to date and participants, and then obtaining the Department's prior Approval to proceed with the announcement.

If implementation of an ATC requires approval by a Third-Party (e.g., a governmental authority), the Proposer takes full responsibility for, and bears the full risk of, obtaining any such approvals after award of the Contract and submission of data; provided, however, that the Department retains its role as liaison with any governmental authorities, as more particularly described in the Contract Documents and as may be applicable. If any required Third-Party approval is not subsequently granted with the result that Proposer is required to comply with the original RFP, Proposer is not entitled to a Change Order for additional compensation or time under the Contract, as applicable.

If the Department determines, based on a proposed ATC or otherwise, that the RFP contains an error, ambiguity, or mistake, the Department reserves the right to modify the RFP to correct the error, ambiguity, or mistake, regardless of any impact on a proposed ATC.

3.2.3. Department Review of Submission of ATCs

The Department may request additional information regarding a proposed ATC at any time and will respond to each Proposer regarding its ATC on or before the applicable last date set forth in Section 1.7.1 (Anticipated Schedule for Proposal and Contract Award Process), provided that the Department has received all required and requested information regarding such ATC.

The Department anticipates that it will provide a response within five Working Days of receiving an ATC. Responses will be limited to one of the following statements:

A. The ATC is acceptable for inclusion in the Proposal.

B. The ATC is not acceptable for inclusion in the Proposal.

C. The ATC is not acceptable in its present form, but may be acceptable upon the satisfaction, in the Department's sole discretion, of certain identified conditions which must be met or clarifications or modifications that must be made through a submittal of a revised ATC.

D. The ATC is conditionally accepted in its present form and may be included in the Proposal upon satisfaction, in the Department's sole discretion, of the identified conditions, clarifications, or modifications.

E. The submittal does not qualify as an ATC but may be included in the Proposal because it appears to be within the requirements of the RFP.

F. The Department requires additional time to further review the ATC, and expects to provide a response to the Design-Builder on *(Date)*.

Approval of an ATC will constitute a change in the specific requirements of the Contract Documents, as applicable, associated with the Approved ATC for the specific Proposer. Each Proposer, by submittal of its Proposal, acknowledges that the opportunity to submit ATCs was offered to all Proposers, and waives any right to object to the Department's determinations regarding acceptability of ATCs.

The Department's rejection of a pre-Proposal submission of an ATC will not entitle Proposer to an extension of the Proposal Due Date or the date that the ATCs are due; however, the foregoing shall not limit the Department's absolute and sole right to modify the Proposal Due Date or any other date in connection with this procurement.

The Department anticipates that its comments provided to a Proposer will be sufficient to enable the Proposer to make any necessary changes to an ATC. However, if a Proposer wishes additional clarifications regarding necessary changes, the Proposer may provide a written request for clarifications under Section 2.5 (Proposer Questions).

3.2.4. Incorporation of ATCs into the Contract Documents

Following Award of the Contract, any ATC that was pre-approved by the Department and incorporated in the Proposal by the successful Proposer is included in the Contract Documents, as applicable. If the Department responds to any ATC by stating that it would be acceptable if certain conditions were met, those conditions become part of the Contract Documents, as applicable. The Contract Documents are conformed after award, but prior to execution of the Contract, to reflect the ATC, including any Department conditions thereto. Notwithstanding anything to the contrary herein, if Proposer does not comply with one or more Department conditions of pre-approval of an ATC or Proposer fails to obtain a required Third-Party approval of an ATC, the Proposer bears all risk and costs associated with not incorporating the pre-approved ATC and is obligated to comply with the original requirements of the RFP without additional cost or extension of time as set forth in the Contract, as applicable.

During negotiation of the final terms of the Contract (prior to execution of the Contract), any ATC from unsuccessful Proposers may, in the Department's sole discretion, be presented to the selected Proposer for possible incorporation in the Contract Documents, as applicable. In addition, following execution of the Contract, any ATC from unsuccessful Proposers may, in the Department's sole discretion, be presented to the selected Proposer as a Change Order in accordance with the Contract, as applicable.

Whether and when additional Right-of-Way (ROW) or New Environmental Document would be required to implement a Proposer's ATC, Proposers are advised that they shall be solely responsible for all costs and impacts to the Completion Deadlines associated with the acquisition of any such ROW or obtaining any such New Environmental Document.

3.2.5. ATC Confidentiality

Subject to the provisions of GRAMA, ATCs and all communications regarding ATCs remain confidential until the Department decides to select a Proposer or cancel the procurement, at which time all confidentiality rights, if any, are of no further force and effect except as otherwise allowed under GRAMA and applicable law. By submitting a Proposal, Proposer agrees, if it is not selected, to the disclosure of its work product to the successful Proposer when receiving the stipend.

4 —PROPOSAL REQUIREMENTS

See Appendix ITP-A (Technical Proposal Instructions) for outline of Proposal, format, and page limits.

4.1. Legal Authority and Licensing Requirements

Obtain the proper licenses as required by applicable Federal and State laws, rules, and regulations. Provide evidence of proper licensing prior to execution of the Contract by the selected Proposer.

4.2. Currency

Provide the pricing information in the Price Proposal in U.S. currency (dollars) only.

4.3. Proposal Guaranty

4.3.1. Proposal Guaranty Requirements

A Proposal Guaranty is required to accompany any Proposal that is submitted for the Project.

Provide a Proposal Guaranty in the form of an electronic guaranty bond, issued under the legal name of the Proposer or Joint Venture, or provide evidence of securing a cashier's or certified check, for 5 percent of the total amount of the Contract Price made payable to the Utah Department of Transportation and issued from a surety company listed on the United States Department of Treasury Circular 570 before the specified date and time for bid opening.

A. Use Department approved surety clearing house for electronic guaranty bond.

B. Use current version of the UDOT EBS program.

The Proposal Guaranty guarantees that the Proposer will enter into a Contract within a specified period of time and will furnish the required performance and payment bonds. The amount of the Proposal Guaranty will be 5 percent of the Contract Price.

4.3.2. Return of Proposal Guaranty

A Proposal Guaranty presented in the form of a certified bond check, if not forfeited, will be returned as follows:

A. For all Proposers other than the apparent responsive best-value and second-best-value responsive proposers, immediately following the announcement of the apparent best-value determination.

B. For the apparent second-best-value Proposer, if it is not awarded the Contract, ten Working Days after the Contract is executed with the best-value Proposer.

C. For the successful Proposer, after satisfactory Payment and Performance Bonds have been furnished and the Contract has been executed.

A Proposal Guaranty presented in the form of a bond will be returned only upon the request of an unsuccessful Proposer after execution of the Contract. A Proposer is not released from the Proposal obligation because of an alleged error in the preparation of the Proposal unless the Department returns the Proposal Guaranty.

4.3.3. Rights Reserved

Each Proposer understands and agrees, by submitting its Proposal, that the Department reserves the right to reject any and all Proposals, or any part of any Proposal, and that, without written consent of the Department, the Proposal may not be withdrawn during the Contract Award Period (as defined in

Section 2.7.3 (Withdrawal of a Proposal; Proposal Validity Period)) or at any time prior to execution and delivery of the Contract if the Proposer has received Notice of Award.

Each Proposer further understands and agrees that it forfeits its Proposal Guaranty if it should:

A. Withdraw any part, or all, of its Proposal except as specifically permitted by this ITP or as approved in writing by the Department.

B. Refuse or be unable to enter into the Contract, as provided under this Section 4.3.

C. Refuse or be unable to furnish adequate and acceptable Performance and Payment Bonds.

D. Refuse or be unable to furnish adequate and acceptable insurance, as provided herein.

E. Refuse or be unable to furnish the Proposal information (in Appendix ITP-A), all pricing information specified (in Appendix ITP-B), or Best-and-Final-Offer (BAFO) documents (in the event of a BAFO).

The Proposer understands that any material alteration of documents specified in this Section 4.3 (Proposal Guaranty) or of the form of the Proposal Bond, other than that requested, will render the Proposal non-responsive.

4.4. Escrowed Proposal Documentation

Requirements regarding the contents of the Escrowed Proposal Documents (EPDs) are set forth in Contract Documents Part 2, Section 23.1 (Escrowed Proposal Documents).

Deliver the Escrowed Proposal Documentation (EPD) together with the signed Escrow Agreement, into escrow not later than the date specified in Section 1.7 (Proposal and Contract Award Schedule). The Proposer may use a third party or the Department to act as the escrow holder. In either scenario Form EPD must be completed.

Deliver a copy of the signed Escrow Agreement (Form EPD, in Appendix ITP-C) within the same time period to:

Utah Department of Transportation
Salt Lake City Construction Division Desk
4501 South 2700 West—Fourth Floor
West Valley City, UT 84119

4.5. Proposal Signatures, Quantities, and Costs

4.5.1. Required Signatures

The Proposer's Authorized Representative is required to sign the Proposal Letter Form (in Appendix ITP-C) and the Price Proposal Cover Sheet (Form PP, also in Appendix ITP-C). If the Proposer is a joint venture (JV), all members of the JV board are required to sign. If any signatures are provided pursuant to a power of attorney, provide the original or a certified copy of the power of attorney together with evidence of authorization.

4.5.2. Quantities of Proposal Documents

Provide the following quantities of the Proposal documents:

A. Price Proposal: one original and a complete set of Escrowed Proposal Documents (see Appendix ITP-B).

B. Technical Proposal (including the Design-Builder's Proposal and Pricing Information and the Supplemental Selection Information): Submit originals and copies as described in Appendix ITP-A (Technical Proposal Instructions). The electronic copy should have the files broken out into the separate sections of the Proposal, as identified in Table ITP-A-1.

4.5.3. Cost of Preparing Proposal

The Proposer bears the cost of preparing the Proposal and any other costs incurred at any time before or during the Proposal process, including costs incurred for any interviews, with the exception of any costs paid in accordance with Section 2.9 (Proposal Stipend).

4.6. Obligation to Award

The Department is under no obligation to award the Contract to the Proposer submitting the lowest priced Proposal or to any Proposer that has been included on the Short-List, or to award the Contract at all.

4.7. Additional Submittals Before Contract Execution

In addition to the copies submitted pursuant to Section 4.5.2 (Quantities of Proposal Documents), the selected Proposer may be required to submit an original and three certified copies of the Technical Proposal (see Appendix ITP-A), the Price Proposal (see Appendix ITP-B), and any BAFO documents to the Department prior to Execution for inclusion in the Contract.

4.8. Resource Availability

The Department is concerned that the resources in terms of people, equipment, material, and supplies planned to be used on the Project (if awarded to the Proposer) be available to the Proposer and not be also committed to other projects. Accordingly, the Proposer is required to:

A. Declare that, to the extent within Proposer's control, if awarded the Contract, the Proposer agrees to reserve the resources shown or indicated in the Proposal for the Project.

B. Declare that the Proposer commits to undertake all reasonable efforts to provide all the Key Personnel identified in its Proposal on a full-time basis for the periods necessary to fulfill their responsibilities.

C. Proposer's statements regarding availability of personnel extend to design personnel. See Form CR (Commitment to Assign Identified Resources to Project) (in Appendix ITP-C).

5 —PROPOSAL EVALUATION

The Department expects to establish a fair and uniform basis for the evaluation of the Proposals in compliance with all applicable legal requirements governing this procurement as well as complying with relevant policies and procedures within the Department. The evaluation and selection process will follow the Department's *Design-Build Selection Manual of Instruction* which is available on the Department's public website.

The Best Value Proposal will be the Proposal which, in the judgment of the Department, best meets the goals of the Project and associated evaluation criteria in the most cost-effective manner as determined through a qualitative evaluation of the Technical Proposal, including Base Build Price + Build Alternative (within the Project funding) + Time (in accordance with ITP Appendix B).

Many of the technical elements to be evaluated are highly important to the Department and could justify selecting as Best Value Proposal with a highly rated Technical Proposal which does not include the lowest cost Price Proposal. This will include the analysis and assessment of added value components of each Proposal. The Department may conduct an independent added value analysis which may result in a + or – dollar value that is considered in conjunction with the Technical and Price Proposal in making a Best Value selection. However, it is unlikely that a Proposal would be selected if the associated Price Proposal is more than ten percent higher than the Proposal with the lowest Price Proposal.

The key areas will be considered in determining added value as follows:

- Maintenance of Traffic
- Elimination of design exceptions
- Risk reduction in schedule criticality

5.1. Evaluation Criteria

5.1.1. Pass/Fail Criteria

Each Proposal is required to achieve a rating of "Pass" on every Pass/Fail Criteria or sub-criteria listed in Sections 5.1.1.1 through 5.1.1.5 to receive further consideration. Failure to achieve such a "Pass" rating will result in the Proposal being declared non-responsive as described in Section 2.7.2 (Responsive Proposal).

Proposers are encouraged to submit the following pass/fail criteria, except for the Legal and Financial Pass/Fail criteria, for Department review and comment prior to the due date for the Pass/Fail criteria:

5.1.1.1. Key Personnel

The Key Personnel requirements are as follows. The following Key Personnel and qualifications were required to be submitted with the SOQ. Submit with the Proposal the Organizational Chart only, do not resubmit the Key Personnel. Identify the Key Personnel on the Organization Chart.

A. **Project Manager:** Must have the authority to represent, make decisions for, and oversee the performance of the Design-Builder. Should demonstrate a minimum of ten years experience managing at least three projects with similar cost, size, type of work, and complexity as this Project, including Projects on bridges and freeways, including interchanges in urbanized areas. The Project Manager should demonstrate experience managing Projects with funding limitations, compressed timelines, Third-Party coordination, and community information requirements. The Project Manager

can hold only this one Key Personnel position. Emphasize Design-Build experience and extensive project management experience with demonstrated collaboration with the owner.

B. **Design Manager:** Must be a Utah-registered professional engineer, at time of contract award, whom is an employee of the Designer and should demonstrate a minimum of ten years experience in managing design for highway and interchange projects with similar scope and complexity as this Project. Emphasize experience in Design-Build, highways, bridges, and interchanges in urbanized areas and projects of similar size, type of work and complexity.

C. **Structures Design Manager:** Must be a Utah-registered professional engineer, at time of contract award, and should demonstrate at least ten years experience in all aspects of bridge design including steel and concrete superstructures, emphasize experience in innovative structures construction techniques that result in high quality projects.

D. **Construction Manager:** Should demonstrate a minimum of ten years experience in managing the site work of similar highway interchange and bridge construction projects. Experience should include work of the nature anticipated in the Project, and emphasize Design-Build, public and environmental sensitivity, utility relocation, demonstrated collaboration with the owner, and maintenance of traffic.

E. **Traffic Operations Manager:** Should demonstrate a minimum of five years experience in maintenance of traffic. Should have experience dealing with highways, interchanges, rerouting of arterials and collector streets, implementing traffic management strategies emphasizing projects of similar size and type. This individual should have the decision-making authority to address real-time traffic control concerns and be able to make changes immediately. Experience should include work of the nature anticipated in the Project, including Design-Build experience. Must be a Utah-registered Professional Engineer and registered Professional Traffic Operations Engineer, at time of Contract Award.

F. **Traffic Control Maintainer:** Should have a minimum of five years demonstrated experience in this role, on at least 3 projects of a similar size, type of work, and complexity as this Project, including five years working on Projects on highways in urbanized areas where Maintenance of Traffic (MOT) was significant. Experience should include work of the nature anticipated in the Project.

G. **Third Party Manager:** Should demonstrate a minimum of eight years experience in Third Party coordination and compliance on large, complex transportation projects. The Third Party Manager should have experience in coordination with Third Parties, preferably those involved with the Project, and effectively communicating with design engineers and construction staff regarding requirements of the associated agreements. Emphasize Design-Build experience with demonstrated collaboration with the owner.

H. **Construction Quality Manager**: Should demonstrate at least eight years of experience in highway construction in quality assurance/quality control activities, including preparation and implementation of quality plans and procedures for construction. Demonstrate ability to coordinate with Department provided Quality Assurance. Emphasize and identify specific quality training and certifications. The Construction Quality Manager can hold only this Key Personnel position. Emphasize Design-Build experience and coordination with UDOT Quality Assurance.

5.1.1.2. Legal

The legal Pass/Fail requirements are as follows:

A. Provision of a properly completed and executed Proposal Letter Form (in Appendix ITP-C).

B. Provision of evidence that the Key Personnel required to hold professional licensure within the State hold the required licenses or that they have the capability to obtain licensure prior to award of the Contract. Include a copy of the relevant license(s).

C. Provision of all other specified forms and documents properly completed, signed (if required), and that do not identify any adverse information; forms and documents must comply with all requirements.

D. No change in the Principal Participants and Key Personnel listed in the Proposer's SOQ since submission of the SOQ, unless previous advisement of any such change by the Proposer to the Department and a true and correct copy of the consent of the Department to such change is included in the Proposal.

The Proposer shall submit:

E. **Proposal Letter and Related Documents:**

1. Proposal Letter Form, in the form included in Appendix ITP-C (Forms), constituting a firm offer to the Department valid for the number of days specified in said form. The Proposal Letter is to be executed by the Proposer and, if the Proposer is a joint venture (JV), must also be individually signed by each JV member. The Proposer must include evidence of authorization for each signatory, as described in Section 5.1.1.2 (D) (Evidence of Authorization);

2. If the Proposer is a JV, joint and several liability statements signed by each JV member and stating that the JV member is jointly and severally liable for any and all of the duties and obligations of the Proposer assumed under the Proposal and under any Contract arising therefrom, should its Proposal be accepted by the Department. Each JV member must also agree, for the benefit of the Department, to take such action as may be required to avoid dissolution of the JV while any Contract obligations remain outstanding, unless the Department has agreed in writing to such dissolution; and

3. A form of a guaranty will be provided by the Proposer if requested by the Department, concurrently with execution and delivery of the Contract by the Proposer.

F. **Certifications and Affidavits:**

1. Form BC (Claim of Business Confidentiality) identifying confidential information contained in the Proposal, following the instructions provided in Section 2.8 (Government Records Access Management Act (GRAMA)).

2. Form NC (Noncollusion Affidavit) in Appendix ITP-C (Forms), certifying that the Proposal is not the result of, and has not been influenced by, collusion, signed by the Proposer. If the Proposer is a joint venture, this form must also be submitted by each joint venture member;

3. Form IC (Certificate Regarding Ineligible Contractors, in Appendix ITP-C (Forms)), signed by the Proposer and each Principal Participant;

4. Form OC (Opinion of Counsel) in Appendix ITP-C (Forms), certifying that the Proposal as submitted has been reviewed and all items are genuine, accurate, and complete, and if not originals, are true and correct copies of originals, and that all signatures on such items are genuine.

5. Form SR (Statement of Representations in Proposal), indicating that representations made in the Proposal are true and accurate.

G. **Subcontractor Information and Certifications:**

1. Form NS (Named Subcontractors) in Appendix ITP-C (Forms), identifying Major Subcontractors (Subcontractors performing 5% or more of the value of the Work) and Major suppliers (suppliers providing products and materials valued in excess of 5% of the value of the Work), and including the percentage of the Proposal Price that represents anticipated Subcontractor and supplier participation (not specific dollar value of participation).

2. Form IS (Certificate Regarding Ineligible Subcontractors, in Appendix ITP-C (Forms)), signed by each Subcontractor listed on Form NS, except that Principal Participants shall instead provide Form IC, as noted above.

H. **Evidence of Authorization**

The documentation for this requirement does not need to be submitted again and will be retained from the SOQ unless modified or if changes have been made by the Proposer that would facilitate a resubmittal of the documentation. However, the Proposer must make sure the following have been addressed:

1. Submit notarized Power of Attorney for each Principal Participant authorizing the Principal Participant's representative to sign for that Principal Participant; and

2. Submit notarized Power of Attorney from each Principal Participant authorizing the Proposer's designated point of contact, as identified in the Proposer's Cover Letter, to sign documents for and on behalf of the Proposer's organization;

3. If any Power of Attorney states that it is revocable, it shall specifically state that revocation shall not be effective until written notice has been provided to the Department.

4. Evidence of proper licensing for all Major Contractors to conduct business and perform associated contract Work in the State of Utah;

5. If the Proposer has already been legally constituted, provide full details of the organizational structure and supporting organization/formation documents including a copy, as applicable, of articles of incorporation, limited liability company operating agreement in addition to any joint venture agreement or partnership agreement as applicable; or

6. If the Proposer has not yet been legally formed, provide a brief description of the proposed legal structure and draft copies of the underlying documents, including:

   a) All significant terms of any incorporation, joint venture, limited liability company, or partnership, including the rules relative to the

administration of such incorporation, joint venture, limited liability company, or partnership, including dealing with deadlock situations;

b) Description of how the incorporation, joint venture, limited liability company, or partnership will operate administratively and technically; and

c) A teaming agreement or comparable document setting forth the equity members' agreement to form the organization.

5.1.1.3. Financial

The financial Pass/Fail requirements are as follows:

A. Provision of Proposal Guaranty meeting the RFP requirements provided in Section 4.3 (Proposal Guaranty).

B. Provision of updated financial information, showing that the Proposer has the financial capacity to undertake design and construction of the Project, including the capability of effectively managing any unanticipated cash flow needs of the Project.

C. Provision of all other specified forms and documents, properly completed and signed (if required), and compliance with any other financial requirements.

The Proposer must provide the following:

D. Financial statements for the Proposer and equity members of Proposer for the three most recent fiscal years, audited by a certified public accountant in accordance with generally accepted accounting principles (GAAP). If the Proposer is a newly formed entity and does not have independent financial statements, financial statements for the equity owners will be sufficient (and the Proposer shall expressly state that the Proposer is a newly formed entity and does not have independent financial statements). Financial statements must be provided in U.S. dollars. If audited financials are not available for an equity owner, the Proposal shall include unaudited financials for such member, certified as true, correct, and accurate by the chief financial officer or treasurer of the entity. Required financial statements shall include:

1. Opinion Letter (Auditor's Report);
2. Balance Sheet;
3. Income Statement;
4. Statement of Changes in Cash Flow; and
5. Footnotes.

E. If any entity for which financial information is submitted as required hereby files reports with the Securities and Exchange Commission, then such financial statements shall be provided through a copy of their annual report on Form 10K. For all subsequent quarters, provide a copy of any report filed on Form 10-Q or Form 8-K which has been filed since the latest filed 10K. Provide information regarding any material changes in financial condition for Proposer and each of its equity members for the past three years and anticipated for the next reporting period. If no material change has occurred and none is pending, the Proposer and/or equity member, as applicable, shall provide a letter from its chief financial officer or treasurer so certifying.

F. If financial statements are prepared in accordance with principles other than U.S. GAAP, provide a letter from the certified public accountant of the applicable entity, discussing the areas of the financial statements that would be affected by a conversion to U.S. GAAP, should be provided.

G. Provide a letter from the chief financial officer or treasurer of the entity or the certified public accountant for each entity for which financial information is submitted, identifying all off balance sheet liabilities.

H. If a Proposer has been advised that a guaranty will be required but has not previously submitted financial statements for the guarantor, financial documents and associated documents for the guarantor for the periods specified in the RFQ and meeting the requirements specified in the RFQ.

I. A description and detailed breakdown of each element of cost that comprise the Compensable Project Overhead, including information and back-up documentation used to develop the lump sum cost.

5.1.1.4. Other

The Pass/Fail requirements include provision of all required forms included in Appendix ITP-C (Forms), properly completed and signed (if applicable), and provision of all information specified in Appendices ITP-A and ITP-B, in the manner, format, and detail specified, without alteration of the forms, except as expressly permitted by the instructions.

5.1.2. Technical Evaluation Criteria

The technical evaluation criteria detailed below will be evaluated and rated with special attention given to the desired qualities expressed in the statement of each criteria. No Proposal that receives a technical rating of Unacceptable for any overall technical evaluation criteria category will be selected for award.

The ITP evaluation criteria present the relative importance of the technical evaluation criteria relative to the Project goals. The weighting in those criteria denoted as “Critical” are approximately three times the weight of “Important”. The criteria denoted as “Significant” are approximately twice the weight of “Important”.

5.1.2.1. Maintenance of Traffic (Critical)

<u>Goal</u>:

Minimize Impacts to Bangerter Highway and Provide Mobility through the Project (MOT)

Provide continued and effective flow of traffic through the Project and for each interchange during construction. Use innovative design and construction techniques to deliver the Project with the least possible impacts to the traveling public while maintaining or exceeding the standards for quality. Implement a comprehensive construction phasing and maintenance of traffic (MOT) plan that maintains continuous access to businesses, residences, and schools; provides safe routing for pedestrians and school children; maintains existing vehicle movements throughout construction; and minimizes delay (including duration of impact) to traffic during construction of the Project.

Submittals:

Narratives

A. Provide an overall description of the proposed maintenance of traffic and construction phasing including a summary of proposed innovations. Focus on an approach that is designed to minimize disruption and maximize safety for the Project. **(Critical)**

B. Include a traffic impact and mitigation plan for maintenance of traffic for each construction stage. Include descriptions of detours and plans for full or partial roadway closures. **(Significant)**

C. Include a description of maintaining access to properties and a description of an approach that minimizes impacts to business accesses, residences, pedestrians, and schools. **(Important)**

Plans

D. Provide plans showing maintenance of traffic and construction sequencing/phasing; including any necessary temporary construction. **(To be evaluated with the Narratives)**

E. Provide a pedestrian access plan that provides for safe pedestrian routing and includes safe routes for school children to cross the project. **(To be evaluated with the Narratives)**

5.1.2.2. Technical Approach (Significant)

Goal:

Provide a Technical Approach that Exceeds Project Requirements

Exceed the Department's standards for design and construction to provide additional value to the Project, such as improved functionality and quality, reduced long-term maintenance, elimination of design exceptions and an increased service life. As appropriate, use innovative techniques and methods to provide increased value for the Project. Approach to design and construction should minimize or eliminate risk to the Department, specifically schedule risk associated with right-of-way limitations.

Submittals:

Narratives

A. Provide a description that minimizes or eliminates schedule risks to the Department; include any commitments to provide Project schedule float on critical parcels. Provide milestones in the schedule for all right-of-way limitation dates. **(Critical)**

B. Provide a description of any design exceptions that have been eliminated. The Department's priority for the design exceptions is below. **(Critical)**

1. Proposed 6% grade at 5400 South and/or proposed 6% grade at 9000 South
2. Reduced outside shoulder width along Bangerter Highway (SR-154) at 11400 South on-ramps
3. Reduced shoulder width SB on ramp at 5400 South
4. Reduced inside shoulder for high mast lighting and overhead guide signs at each

interchange

5. Not meeting minimum K-value for the sag at 11400 South
6. Reduced inside shoulder width on Bangerter Highway (SR-154) under Old Bingham Highway

C. Describe proposed Project elements that promote improved system functionality, improved quality and safety, increased life of Project elements, and reduced long-term maintenance. **(Critical)**

D. Provide an overall description of the proposed design enhancements and innovations that reduce risk. **(Significant)**

E. Provide a description to mitigate risks for the Bingham Creek culvert. **(Important)**

Plans

F. Include plan sheets, profiles, typical sections, situation and layout drawings, and details as necessary to demonstrate the proposed design enhancements. **(To be evaluated with the Narratives)**

1. Do not simply re-propose the Preliminary Engineering Concept (PEC) Plans provided as reference, instead provide plans for design enhancements or improvements to that plan. If the Proposal is to forward the design shown in the Reference Documents without modification, then state that in the narrative. Clearly identify where the Proposal Plans differ from the PEC Plans.

G. Provide proposed Proposal Project schedule, including ROW, design and construction activities, in PDF and XER formats. **(To be evaluated with the Narratives)**

1. Do not show or submit any price information with the Proposal Project schedule; include price information only in the Price Proposal (see Appendix ITP-B).

5.1.2.3. Third Party (Significant)

Goal:
Minimize risk to, and effectively coordinate with Third Party Entities

Minimize Third Party facility relocations and mitigate impacts to Third Parties with an emphasis made to minimize or eliminate impacts to the U.S. Bureau of Reclamation's (USBOR) aqueduct at 9000 South, 7000 South, and 5400 South. Demonstrate effective methods for communicating, coordinating, and partnering to reduce impacts to their Facilities, reduce potential for impacts to the Project schedule, and promote a positive working relationship.

Submittals:

Narratives

A. Provide an overall description of the potential impacts to existing Third Party facilities and the proposed Third Party mitigation and relocation strategies including a summary of proposed innovations to avoid, or mitigate impacts to the Third Party facilities.

Include a description of methods to mitigate risk to the Project from Third Party facility and utility relocations. **(Critical)**

B. Provide an approach to coordinating with the Jordan Valley Water Conservancy District (JVWCD) and USBOR for design and construction of Project elements within the USBOR aqueduct easement. **(Significant)**

1. Include a description of the communication and construction strategies with JVWCD and the USBOR to obtain approvals for design and construction affecting the USBOR aqueduct Easement, including other impacts affecting the USBOR aqueduct Easement.

C. Include a description of Third Party, Department, and Design-Builder communication and coordination that will facilitate scheduling of the Third Party Utility Work, coordinate the design and construction, and expedite the preparation of Supplemental Agreements. **(Significant)**

Plans

D. Provide a Utility conflict matrix identifying Third Party Utility impacts, relocations, and mitigation strategies. **(To be evaluated with the Narratives)**

E. Provide plan sheets identifying potential impacts to Third Party Utilities and the anticipated mitigation of those impacts. **(To be evaluated with the Narratives).**

F. Include activities in the Proposal Project schedule that represent the scheduling of Third Party Work and coordination with the Department, including Supplemental Agreement preparation and execution. **(To be evaluated with the Narratives)**

5.1.3. Price Proposal

Submit Pricing Information as part of the Price Proposal in accordance with Appendix ITP-B (Price Proposal Instructions) for the Project.

Base the Price Proposal on the following assumptions:

A. Contract execution is in accordance with timeframes in Section 6.2 (Execution of Contract). The Design-Builder completes the Work on or before the Completion Deadline.

5.1.3.1. Evaluation Criteria

Specific information to be submitted is identified in Appendix ITP-B (Price Proposal Instructions). The following criteria are considered in the price evaluations:

A. Bid Amount for Award Consideration

Specify the sum for which the Work is performed according to the RFP (the Contract Amount).

The Department reserves the right to reject any Proposal if it determines that the Price Proposal is significantly unbalanced to the potential detriment of the Department.

An unbalanced Proposal is considered to be one (a) which is front-end-loaded or (b) for which the line item amounts or amounts shown in the Price Allocation do not reflect reasonable actual costs, plus a reasonable proportionate share of the Proposer's anticipated profit, overhead costs, and other indirect costs that are anticipated for the performance of the items in question.

The numbers in the cents column may not have any decimal positions (i.e., no fractional cents).

A Price Proposal is deemed unacceptable if the Department determines, in its sole discretion, that the Price Proposal fails to conform to the conditions of the RFP in any manner, including, but not limited to, if the Price Proposal:

B. Is significantly unbalanced relative to the Scope of Work.

C. Does not provide all information in conformance with the ITP.

D. Contains inaccurate, incomplete, and/or unreasonable prices on the Price Allocation (Form PA, in Appendix ITP-C).

The Contract Amount on Form PA becomes the Contract Amount in the executed Contract, unless the Escrowed Proposal Documentation submitted hereunder is subsequently found to have been inaccurate, incomplete, or noncurrent as of the effective date of the certification, in which case the Department is entitled to an adjustment of the Contract Amount, including profit or fee, to exclude any sum by which the Contract Amount was increased because of the defective data.

5.2. Evaluation Guidelines

5.2.1. Price Reasonableness Analysis

Proposers are advised that the Department will independently analyze the price reasonableness and estimate the cost of the Work to ascertain the basis of pricing and to determine whether the proposed price is fair and reasonable.

5.2.2. Technical Evaluation Criteria

Using the evaluation criteria of Section 5.1 (Evaluation Criteria), the technical evaluation criteria, sub-criteria, and elements (not the Pass/Fail criteria) will be evaluated in accordance with the guidelines provided in this Section 5.2.2 (Technical Evaluation Criteria).

The technical evaluation criteria and the overall Proposal will be rated by a qualitative—descriptive (adjectival) method. The following adjectival ratings will be used in the evaluation of each technical evaluation criteria and the technical rating of the overall Proposal:

Exceptional: The Proposer has demonstrated a complete understanding of the subject matter and the Proposal provides exceptional value according to the Project Goals. The Proposal communicates an outstanding commitment to quality by a highly skilled team in all aspects of the Work. The Proposal outlines a strong approach to mitigating Project specific risks and inspires confidence that all Contract requirements will be met or exceeded. The Proposal contains significant strengths and minor Weaknesses, if any

Good: The Proposer has demonstrated a strong understanding of the subject matter and the Proposal advances the Project goals to a high level. The Proposal communicates a commitment to quality by an experienced team in all aspects of the Work. The Proposal defines an approach to mitigating Project specific risks with little risk that the Proposer would fail to meet the requirements of the Contract. The Proposal contains strengths that outweigh Weaknesses.

Acceptable: The Proposer has demonstrated an adequate understanding of the subject matter and the Proposal meets the Project goals. The Proposal communicates a commitment to quality Work by a qualified team. Project specific risks have been

identified and the Proposer has a reasonable probability of successfully completing the Work. The Proposal contains strengths that are offset by Weaknesses.

Unacceptable: The Proposer has not demonstrated an understanding of the subject matter and the Proposal presents an approach which does not address the goals of the Project. The Proposal fails to meet stated requirements and/or lacks essential information. The commitment to quality is not adequate, with Work performed by unqualified or unproven teams. Project specific risks are not addressed, and the Proposal generates little confidence that the Project requirements can be met. The Proposal contains Deficiencies, significant Weaknesses and minor strengths, if any.

In assigning ratings, the Department may attach a plus sign ("+") or a minus sign ("-") to any rating to better differentiate the ratings in order to more clearly differentiate the Proposals (e.g., "Exceptional -" and "Good +").

The term "Deficiency," as used herein, means a material failure of a Proposal to meet an RFP requirement or a combination of weaknesses in a Proposal that increases the risk of unsuccessful Contract performance to an unacceptable level.

5.3. Proposal Revisions; Best and Final Offers

The Department reserves the right to hold discussions and to issue one or more requests for Proposal revisions or best and final offers (BAFO), but is under no obligation to do so. The Department may make its selection and award based only on the initial Proposals. If any Proposer requested by the Department to submit a Proposal revision or a BAFO fails to provide a Proposal revision or a BAFO, or delivers a Proposal revision or BAFO that is deemed unacceptable or late, the Department shall have the right to consider as valid such Proposer's initial or previously revised Proposal and to award the Contract to such Proposer based on its initial or previously revised Proposal. All terms and conditions of the Instructions to Proposers applicable to Proposals shall also be applicable to Proposal revisions and BAFOs except as otherwise specified in the request for Proposal revisions or BAFOs.

5.4. Best Value Determination

The Department has determined that award of the Contract based on a best-value determination provides the best opportunity to obtain the right Design-Builder to ensure a successful Project.

The Department's procedures for the evaluation and selection of Proposals are designed to provide a comprehensive evaluation of the technical Proposal that, when combined with price, will result in the selection of the appropriate Design-Builder.

In making this selection, the Department evaluates the evaluation criteria and assigns an overall technical rating for each Proposer. However, it is unlikely that a Proposal would be selected if the associated Price Proposal is more than 10% higher than the Proposal with the lowest Price Proposal.

5.5. Debriefings

Unsuccessful Proposers are welcome to submit a written request to be debriefed. To ensure that the request is granted, submit it to the Department within a reasonable time. Debriefings are provided at the earliest feasible time after a Proposal is selected for award. A procurement official familiar with the rationale for the selection decision conducts the debriefing.

The debriefing is required to:

A. Be limited to discussion of the unsuccessful Proposer's Proposal and may not include specific discussion of a competing Proposal.
B. Be factual and consistent with the evaluation of the unsuccessful Proposer's Proposal.
C. Provide information on areas in which the unsuccessful Proposer's Technical Proposal had weaknesses or deficiencies.

Debriefing may include a summary of the rationale for the selection decision, highlighting such things as strengths, weaknesses, risks, innovations, or enhancements.

5.6. Post-Selection Meetings

The Department may meet with the selected Proposer prior to award at any time after selection.

6 —CONTRACT AWARD AND EXECUTION

6.1. Contract Award

Unless the Department rejects all Proposals or cancels this procurement, the Contract may be awarded to the Proposer that is responsive to the RFP and that provides the best value to the State of Utah, as determined by the Department's Selection Official in accordance with Section 5 (Proposal Evaluation). The Department provides Notice of Award to the successful Proposer in the form of a letter mailed to the address shown on the Proposal, stating that the Proposal has been accepted and the Contract has been awarded. Within 10 Calendar Days after the Department issues the Notice of Award, the selected Proposer is required to notify the Department in writing of the name and address of its agent for service of legal process in Utah and provide the Department, in writing, Proposer's Federal Internal Revenue Service Employer Identification Number or, if Proposer is an individual with no employer identification number, Proposer's Social Security Number. The Proposer is prohibited from changing that authorized agent without giving prior written notice to the Department. Within 15 Calendar Days after the Department provides the selected Proposer with Notice of Award, the selected Proposer is required to deliver to the Department the following items:

A. An original and three certified copies of Volumes 1 through 4 of the Technical Proposal and supplemental information (if requested by the Department) in the format specified in Appendix ITP-A (Technical Proposal Instructions), Table ITP-A-1.

B. Price Proposal (including the Supplemental Price Information, if any) in the format specified in Appendix ITP-B (Price Proposal Instructions) (see Section 4.7 (Additional Submittals before Contract Execution)).

C. Revised Proposal documents, if applicable.

D. Required Payment and Performance Bonds in accordance with Part 2 Section - 27 (Surety Bonds).

E. Insurance certificates.

F. Employment Status Verification (refer to Part 2 Section-14.1(Observing Laws, Rules, and Regulations), Article E);

G. Health Insurance Coverage Certification and Actuary Statement, for the Design-Builder and all identified Subcontractors (at all tiers) with an anticipated subcontract value of $750,000 or more, to be provided on company letterhead (refer to Part 2 Section - 14.1(Observing Laws, Rules, and Regulations), Article H);

H. The fully executed Contract Documents, together with evidence (if not previously provided) as to the authority, power, and capacity of the signatory to bind the Proposer to the Contract.

I. Evidence that the Designer and Contractor are properly licensed, if not previously provided.

J. All other information required as directed in the Notice of Award letter issued by the Department.

Failure to comply with the above may result in cancellation of the Notice of Award and forfeiture of the Proposal Guaranty. Proposers are informed recent laws and Utah Administrative Code require the Design-Builder and its Subcontractors to certify compliance with qualified "Health Insurance Coverage" requirements and to participate and use the "Employment Verification Status" for the hiring of employees after 7/01/09, which will be required for Contract execution and subsequent Subcontractor acceptance. Proposers are advised to ensure their team members meet these requirements prior to submitting their Proposal in order to avoid cancellation of the Contract as a result of non-compliance.

Refer to Contract Documents Part 1 (Agreement) for a sample of the Agreement that the selected Proposer is required to sign. The Department will use the information in the Proposal to complete the Agreement, and then give the completed Agreement to the selected Proposer to sign the agreement, attach the exhibits, and return it to the Department.

At the time of the return of the executed Contract, the successful Proposer is required to furnish a Payment Bond and a Performance Bond in accordance with Part 2-Section 27 (Surety Bonds), each in a sum equal to the amount specified. The surety and form of the Bonds must be acceptable to the Department.

6.2. Execution of Contract

Execute the Agreement, Part 1(Agreement) of the Contract Documents, provide other required documents including Payment and Performance Bonds, and comply in all respects with the statutory provisions relating to the Contract within 15 Calendar Days of receiving the Contract Documents from the Department.

In case of failure or refusal on the part of the successful Proposer to deliver the duly executed Agreement and other required documents to the Department within the 15 day period, the amount of the Proposal Guaranty may be forfeited and paid to the Department. If the Agreement is not executed by the Department within 45 Calendar Days following receipt from the successful Proposer of the signed Agreement and other required documents, the Proposer is granted the right to withdraw the Proposal without penalty.

If the Department or the successful Proposer fail to execute and deliver the Agreement within the time periods identified above, award of the Contract may be made to the next apparent best-value Proposer, or the Work may be re-advertised and completed under a different contract or otherwise, as the Department may decide.

The Contract does not take effect until the Agreement has been fully signed and executed by all of the parties thereto.

7 —PROTESTS

This section sets forth the protest process with respect to this RFP.

7.1. Written Protests Only

All protests must be in writing, and will follow the requirements in Utah Code Sections 63G-6a-1601 et seq. Deliver a copy of any protest to:

Executive Director
Utah Department of Transportation
4501 South 2700 West, 1st Floor
Box 141245
Salt Lake City, Utah 84114-1245

Any protest not set forth in writing within the time limits specified in §63G-6a-1602 is null and void and will not be considered.

7.2. Protest Contents

All Protests must include:

A. The name, telephone number and address of the Proposer;
B. The Project number;
C. The reasons for the protest;
D. All documentation and evidence supporting the protest

The Protest Official will not be obligated to postpone the Submittal of Proposals due date or selection announcement in order to allow a protestor an opportunity to correct a deficient protest or appeal, unless otherwise required by law or regulation.

8 —DEPARTMENT RIGHTS AND DISCLAIMERS

8.1. Department Rights

The Department may investigate the qualifications of any Proposer under consideration, may require confirmation of information furnished by a Proposer, and may require additional evidence of qualifications to perform the Work described in this RFP. The Department reserves the right, in its sole and absolute discretion, to:

A. Reject any or all Proposals.
B. Issue a new RFP.
C. Cancel, modify, or withdraw the entire RFP.
D. Cancel the award of any Contract before execution without liability.
E. Issue Addenda, supplements, and modifications to the RFP.

F. Modify the RFP process (with appropriate notice to Proposers).

G. Solicit subsequent Proposal Revisions from the Proposers.

H. Appoint an Evaluation and Selection Committee and evaluation teams to review Proposals, and seek the assistance of outside technical experts in Proposal evaluation.

I. Approve or disapprove the use of particular Subcontractors and/or substitutions and/or changes to said Subcontractors from those identified in the SOQ.

J. Revise and modify, at any time before the Proposal Due Date, the factors it considers in evaluating Proposals and to otherwise revise or expand its evaluation methodology. If such revisions or modifications are made, the Department circulates an Addendum to all Proposers on the Short-List setting forth the changes to the evaluation criteria or methodology. The Department may extend the Proposal Due Date if such changes are deemed by the Department, in its sole discretion, to be material and substantive.

K. Hold meetings and exchange correspondence with the Proposers responding to this RFP to seek an improved understanding and evaluation of the Proposals. If individual informational meetings are held, the Department affords all Proposers an opportunity to participate in such meetings.

L. Seek or obtain data from any source that has the potential to improve the understanding and evaluation of the Proposals.

M. Waive weaknesses, discrepancies, informalities, omissions or minor irregularities in Proposals, and seek and receive clarifications to a Proposal.

N. Disqualify any Proposer that changes its proposal or organization (as represented in its SOQ) without written approval from the Department.

O. Hold the Proposals under consideration for the duration of the Contract Award Period.

P. Refuse to consider a Proposal, once submitted, or reject a Proposal if such refusal or rejection is based upon, but not limited to, the following:

1. Failure on the part of a Principal Participant to pay, satisfactorily settle, or provide security for the payment of claims for labor, equipment, material, supplies, or services legally due on previous or ongoing contracts with the Department (or State);

2. Default on the part of a Principal Participant or Designer under previous contracts with the Department (or State);

3. Unsatisfactory performance of previous work by the Proposer, a Principal Participant, and/or Designer under previous contracts with the Department (or State);

4. Debarment or suspension under Department or Federal regulations to the Proposer, a Principal Participant, and/or Designer;

5. Submittal by the Proposer of more than one Proposal in response to this RFP for the same Work under the Proposer's own name or under a different name;

6. Existence of an organizational conflict of interest or evidence of collusion in the preparation of a Proposal or bid for any Department design or construction contract by (a) the Proposer, Principal Participant, Major Contractor, or Designer and (b) other Proposers or bidders for the Contract;

7. Uncompleted work or default on a contract in another jurisdiction for which the Proposer or a Principal Participant is responsible that, in the judgment of

the Department, might reasonably be expected to hinder or prevent the prompt completion of additional work if awarded;

8. Any other reason affecting the Proposer's ability to perform, or record of business integrity; and/or

9. The Proposer is not otherwise qualified and eligible to receive an award of the Contract under applicable laws and regulations.

8.2. Department Disclaimers

This RFP does not commit the Department to enter into a Contract, nor does it obligate the Department to pay for any costs incurred in preparation and submission of Proposal(s) or in anticipation of a Contract. By submitting a Proposal, a Proposer disclaims any right to be paid for such costs, except for any costs paid in accordance with Section 2.9 (Proposal Stipend).

In no event is the Department to be bound by, or liable for, any obligations with respect to the Work or the Project until such time (if at all) as the Contract, in form and substance satisfactory to the Department, has been executed and authorized by the Department and approved by all required authorities and, then, only to the extent set forth in a written Notice To Proceed.

In submitting a Proposal in response to this RFP, the Proposer is specifically acknowledging these disclaimers.

REQUEST FOR PROPOSALS

UTAH DEPARTMENT OF TRANSPORTATION

4 Interchanges on Bangerter HWY (SR-154)

Project No. S-0154(12)11

Salt Lake County

INSTRUCTIONS TO PROPOSERS

APPENDIX A:
TECHNICAL PROPOSAL INSTRUCTIONS

Addendum 2 - October 6, 2016

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1—GENERAL INSTRUCTIONS

This Appendix A provides specific instructions for preparing Technical Proposals for the Utah Department of Transportation (Department) 4 Interchanges on Bangerter Highway (SR-154).

Submit the information required by this Appendix A of the Instructions to Proposers (ITP) in the organization and format specified herein.

Organization. Organize the Technical Proposal in separate tabbed sections or volumes in accordance with Table ITP-A-1 (Outline for Submittal of Technical Proposal). Provide the Proposal in three-ring binders, with each binder within each set numbered in "X of Y" fashion. Also label each Proposal set with either "Original" or the Copy number of the Proposal set; label each binder in each set.

Forms. All forms named herein are found in Appendix ITP-C, unless otherwise noted.

Text, Type font, and Pages. Format text in a standard font, a minimum of 10 points in height, and single-spaced. Use 8½ -inch x 11-inch white paper, with simple lettered or numbered dividers for each section. Number each page in each volume consecutively (i.e., 1-1, 1-2,…; 2-1, 2-2…; etc.), and center page numbers at the bottom of each page.

Non-text Items. Submit drawings and sketches on 11-inch x 17-inch and/or 8 ½ -inch x 11-inch white paper. Submit one Proposal Project schedule on 24 -inch x 36 -inch or 22 –inch x 34 –inch paper, folded and inserted in an envelope or a similar holder that is incorporated into the original volume.

Only submit color photographs, renderings, and brochures that are adequately bound and suitably protected for handling and circulation during review.

Readability. Present information clearly and concisely. Documentation that is difficult to read may be rejected and may lead to disqualification.

Reproducibility. Provide information that is easily reproducible by normal black and white photocopying machines.

Submittal. Provide the Proposal in hard copies and electronic format, and limit number of pages as required in Table ITP-A-2.

2—FORMAT AND ORGANIZATION OF THE TECHNICAL PROPOSAL

The Technical Proposal shall be prepared in accordance with Table ITP-A-1 (Outline for Submittal of Technical Proposal), with covers on the Proposal documents entitled as follows:

[NAME OF PROPOSER]

TECHNICAL PROPOSAL

Volume _____
(Enter title from Table ITP-A-1)

Proposers shall submit a complete and total Proposal including previously submitted Pass/Fail elements, ATCs, and accompanying Department responses and Approval documentation.

3—EXECUTIVE SUMMARY

The Executive Summary is intended for presentation to, and review by, the Department prior to selection of the Design-Builder, and may be released to the news media after selection. Therefore, do not include any information regarding price or any other sensitive or confidential information.

3.1 EXECUTIVE SUMMARY

Include sufficient information in the Executive Summary to familiarize reviewers with the Proposer's Project approach and its ability to satisfy the legal requirements of the Contract. Highlight those items that, in the opinion of the Proposer, represent significant value to the Department and that may distinguish the Proposal from others.

At a minimum, the Executive Summary shall include the following sections:

A. **Legal.** A description of the Proposer's form of organization, identifying the percentage interest held by each of the Principal Participants with a direct equity interest in the Proposer, the lead entity, and all entities that will have joint and several liability for the Contract or that will provide guaranties (if required) to the Department.

B. **Financial.** Information regarding Proposer's financial strength and capability of undertaking and completing the Work.

C. **Technical.** Summary of the project approach and concepts to be utilized in connection with the Work, specifically addressing how the Proposer will forward UDOT's goals for the project.

4—ALTERNATIVE TECHICAL CONCEPTS (ATC) AND BUILD ALTERNATIVE FOR VOLUME 4 OF THE TECHNICAL PROPOSAL

4.1 ALTERNATIVE TECHICAL CONCEPTS

Prepare and Submit:

A. Submit Form ATC-S (Alternative Technical Concept Submittal).

B. Submit the Department's response letter Approving inclusion of any ATC.

4.2 BUILD ALTERNATIVE INFORMATION

The Build Alternative consists of removal of the existing "Thru-Turn" intersection at 5400 South and 4015 West and replacing it with a standard signalized intersection.

Prepare and Submit:

A. Summary of the Work proposed to be completed for the Build Alternative. Include the following information (Limited to 2 pages, not including plan sheets):

1. A description of the Build Alternative and supporting information describing the construction of the Build Alternative;

2. A detailed description of all the Work required to complete the Build Alternative;
3. The proposed schedule and phasing for completing the Build Alternative as defined in Part 2 (General Provisions).

TABLE ITP-A-1
OUTLINE FOR SUBMITTAL OF TECHNICAL PROPOSAL

Proposal Volume Section	*Volume and Section Titles and Required Information*
	EXECUTIVE SUMMARY
VOL. 1	**LEGAL AND FINANCIAL INFORMATION (PASS/FAIL)**
Sec. 1	Proposal Letter Form: Form BC (Claim of Business Confidentiality) Form C (Single Point of Contact) Form NC (Noncollusion Affidavit) Form IC (Ineligible Contractors) Form LC (Lobbying Certificate) Form OC (Opinion of Counsel) Form NS (Named Subcontractors); and Licensing information. Form IS (Ineligible Subcontractors) Form SR (Statement of Representations) Form CR (Commitment Resources) Relevant Professional Licenses
VOL. 2	**TECHNICAL PROPOSAL INFORMATION**
Sec. 1	**Maintenance of Traffic** Description of the proposed maintenance of traffic and construction phasing including a summary of proposed innovations. Focus on an approach that is designed to minimize disruption and maximize safety for the Project Traffic impact and mitigation plan for maintenance of traffic for each construction stage. Include descriptions of detours and plans for full or partial roadway closures. Description of maintaining access to properties and a description of an approach that minimizes impacts to business accesses, residences, pedestrians, and schools.
Sec. 2	**Technical Approach** Description that minimizes or eliminates schedule risks to the Department; include any commitments to provide Project schedule float on critical parcels. Provide milestones in the schedule for all right-of-way limitation dates. Provide a description of any design exceptions that have been eliminated. Description of the proposed Project elements that promote improved system functionality, improved quality and safety, increased life of Project elements, and reduced long-term maintenance. Description of the proposed design enhancements and reduction in risk, including a summary of proposed innovations Description to mitigate risks for the Bingham Creek culvert

TABLE ITP-A-1
OUTLINE FOR SUBMITTAL OF TECHNICAL PROPOSAL

Proposal Volume Section	*Volume and Section Titles and Required Information*
Sec. 3	**Third Party** Description of the potential impacts to existing Third Party facilities and the proposed Third Party mitigation and relocation strategies including a summary of proposed innovations to avoid, or mitigate impacts to the Third Party facilities. Include a description of methods to mitigate risk to the Project from Third Party facility and utility relocations An approach to coordinating with the Jordan Valley Water Conservancy District (JVWCD) and USBOR for design and construction of Project elements within the USBOR aqueduct easement. 1. Include a description of the communication and construction strategies with JVWCD and the USBOR to obtain approvals for design and construction affecting the USBOR aqueduct Easement, including other impacts affecting the USBOR aqueduct Easement. Description of Third Party, Department, and Design-Builder communication and coordination that will facilitate scheduling of the Third Party Utility Work, coordinate the design and construction, and expedite the preparation of Supplemental Agreements.
VOL. 3	**Plan Sheets***
Sec. 1	**Maintenance of Traffic** MOT and construction sequencing and phasing Plan Pedestrian access plan
Sec. 2	**Design** Plan sheets, profiles, typical sections, situation and layout drawings strategy, and other details as necessary
Sec. 3	**Third Party** Matrix identifying Third Party impacts, relocations, and mitigation strategies Plans identifying potential impacts to Third Parties
VOL. 4	**ATC AND BUILD ALTERNATIVE INFORMATION**
Sec. 1	**Alternative Technical Concepts (ATC's)** Form ATC-S (Alternative Technical Concept Submittal) Department Approval letter with each Form ATC-S
Sec. 2	**Build Alternative** Summary of the Build Alternative
APP. A	**LEGAL AND FINANCIAL CONFIDENTIAL INFORMATION (PASS/FAIL)**
Sec. A.1	**Legal Confidential Information for Appendix A** Notarized Powers of Attorney; (if required) If consortium or joint venture, evidence of joint and severable liability; (if required) Organizational Documents (if Required)
Sec. A.2	**Financial Confidential Information for Appendix A** Financial Statements; CFO or Treasurer Letter Additional Financial Documents;
APP. B	**PASS/FAIL ELEMENTS**
Sec. B.1	**Pass/Fail Elements for Appendix B** Key Personnel Form KP (Key Personnel) Department Approval letter, as applicable, with each Pass/Fail Element

TABLE ITP-A-1
OUTLINE FOR SUBMITTAL OF TECHNICAL PROPOSAL

Proposal Volume Section	*Volume and Section Titles and Required Information*
APP. C	**SCHEDULE**
Sec. C.1	**CPM Schedule .xer**
Sec. C.2	**Microstation Design Files .dgn**

* Plan sheets are not required to be separated by goal. Provide plan sheets to clearly demonstrate the goals as described in ITP. Include CPM Schedule plot and summary of milestones with this volume.

TABLE ITP-A-2
TECHNICAL PROPOSAL PAGE LIMITS AND NUMBER OF COPIES

Proposal Volume	*Page Limit**	*Number of Copies***
Executive Summary	3 pages total (8 ½" x 11")	One Original and 10 Copies bound together with Volumes 1 and 2.
Volume 1 – Legal & Financial	Limited to the Forms and Letters required.	One Original and 1 Copy. Bind together in the Original and the Copy 1 of 10, with the Executive Summary, and Volume 2.
Volume 2 – Technical Proposal	A maximum of 60 single sided pages (including a maximum of 8 pages 11" x 17"), with the sole exception of tabbed dividers, cover letters, the executive summary, required forms, and appendices.	One Original and 10 Copies bound together with the Executive Summary, and Volume 1.
Volume 3 – Plan Sheets	Limited to the technical content required, no page limit.	One Original and 10 Copies bound separately from the other Volumes. One Original - For the Proposed Project Schedule only one 36 x 24 full-sized plot copy is required.
Volume 4 – ATC Information	Limited to the ATC Information required, no page limit.	One Original and 10 Copies bound separately from the other Volumes.
Appendix A – Legal & Financial Confidential	Limited to the Forms, Letters, and other required elements, no page limit.	One Original bound separately from the other Appendices. May be sealed and marked "Confidential" and addressed to Renee Spooner.
Appendix C – Electronic Files & Schedule .xer	Limited to the Electronic Files requirements, no page limit.	4 USB Flash Drive included with Volume 2, copies 1 of 10 through 4 of 10.

*The Department does not commit to review any information in appendices or exhibits other than that which it requires to be provided, and the Proposal evaluation process will focus on the requested Proposal elements. Proposers must limit the information provided in the Proposal to that which is required in the RFP. Any additional pages or appendices will be removed from the Proposal and returned to the Proposer.

All Volumes and Appendices must also be provided in electronic format on USB Flash Drive with a separate PDF (and other required format files) for each Proposal **volume and section as shown in Table ITP-A-1. Legal and Financial Confidential elements may be included on a separate USB Flash Drive and included in the sealed envelope marked "confidential."

REQUEST FOR PROPOSALS

UTAH DEPARTMENT OF TRANSPORTATION

4 Interchanges on Bangerter HWY (SR-154)

Project No. S-0154(12)11

Salt Lake County

INSTRUCTIONS TO PROPOSERS

APPENDIX B:

PRICE PROPOSAL INSTRUCTIONS

Addendum 2- October 6, 2016

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1—INTRODUCTION

This Appendix ITP-B specifies the pricing information to be submitted by all Proposers. The information will include the Price Proposal Cover Sheet and the other documents associated with the Proposer's price, such as the Escrow Agreement, Proposal Guaranty, Bonds, and Letter of Subcontractor Intent.

The Proposer shall submit all information as specified herein, using the forms and formats specified. Alterations to the forms will be permitted only as specifically allowed in writing by the Department. All forms named herein are found in Appendix ITP-C (Forms), unless otherwise noted.

2—PRICE PROPOSAL

The Proposer shall provide a Price Proposal using the forms listed herein and provided in Appendix ITP-C, and the UDOT Electronic Bid System (EBS) for confidential submittal of price information. Failure to provide the requested information on the forms and in the format specified may result in the Department declaring the Price Proposal nonresponsive.

Upon award, the Price Proposal of the selected Proposer will be incorporated into the Contract, Part 10 (Design-Builder Proposal).

The Price Proposal shall consist of the forms provided in Appendix ITP-C:

A. Form PP (Price Proposal cover sheet) (Submitted with the Escrowed Proposal Documents).

B. Form LSI (Letter of Subcontractor Intent) (Submitted with the Escrowed Proposal Documents).

C. Form EPD (Escrow Agreement) (Submitted with the Escrowed Proposal Documents).

D. Form PA (Price Allocation) (Submitted through UDOT EBS, with the Escrowed Proposal Documents, and submit a copy to the Department after Notice of Award).

E. Form UC (Utility Costs) (Submitted with the Escrowed Proposal Documents, successful Proposer to submit a copy to the Department after Notice of Award).

F. Form BA (Build Alternative) (Submitted with the Escrowed Proposal Documents, successful Proposer to submit a copy to the Department after Notice of Award).

G. Proposal Guaranty (Submitted in the form of a check or through UDOT EBS).

2.1 PRICE PROPOSAL SUBMITTAL

The Proposer shall submit Form PP and Form EPD (provided in Appendix ITP-C) outside of the sealed Escrowed Proposal Documents and deliver them along with the Escrowed Proposal Documents. All other forms, including Form LSI (Provided in Appendix ITP-C) shall be sealed with the Escrowed Proposal Documents and delivered at the time specified in Table ITP-2 in ITP Section 1.7 (Proposal and Contract Award Schedule).

The Proposer shall submit the price information shown on Form PA (Price Allocation) provided in Appendix ITP-C, through the UDOT EBS. Instructions for using the UDOT EBS can be accessed at the following website: http://www.udot.utah.gov/go/bidopeninfo

The Proposer shall securely attach Form PP to the outside of the package containing the forms listed in the preceding paragraph of this Section 2.1 (Price Proposal Submittal). The Proposer shall ensure that all persons signing the Proposal Letter Form sign Form PP (Price Proposal) provided in Appendix ITP-C.

2.2 LETTER OF SUBCONTRACTOR INTENT (FORM LSI)

The Proposer shall complete and submit Form LSI for each subcontractor that the Proposer intends to subcontract with. The Form LSI must be included as specified in the above Section 2.1 (Price Proposal Submittal).

2.3 PRICE ALLOCATION (FORM PA)

The Proposer shall complete and submit the information on Form PA (Price Allocation) provided in Appendix ITP-C, in compliance with the following instructions:

A. Submit the information on Form PA through the UDOT EBS.

B. Provide a lump-sum price for each item listed on Form PA; the items listed on Form PA included in the Contract Amount, are Payment Items, and are to be used in developing the cost-loaded Project Baseline Schedule, which will include discrete schedule activities for payment (see Part 2, Sections 11.1 (Project Baseline Schedules) and 12.1 (Schedule of Values)).

C. For the Mobilization Payment Items on Form PA provide lump—sum prices that are no greater than 5% of the Contract Amount.

D. The Contract Amount must be the total price to complete all Work.

E. The Build Alternative (line item 11 on Form PA) must be the total price from Form BA to complete all Work for the Build Alternative.

2.4 UTILITY COSTS (FORM UC)

The Proposer shall complete and submit the information on Form UC (Utility Costs) provided in Appendix ITP-C. Provide a lump-sum price for each item listed on Form UC; the items listed on Form UC, included on Form PA, are Payment Items, and are to be used in developing the cost-loaded Project Baseline Schedule, which will include discrete schedule activities for payment (see Part 2, Sections 11.1 (Project Baseline Schedules) and 12.1 (Schedule of Values)).

2.5 BUILD ALTERNATIVE (FORM BA)

The Proposer shall complete and submit the information on Form BA (Build Alternative) provided in Appendix IPT-C. Provide a lump-sum price for each item listed on Form BA. If the Build Alternative is exercised, then the items listed on Form BA, summarized on Form PA, are Payment Items and are to be used in developing the cost-loaded Project Baseline Schedule, which will include discrete schedule activities for payment (See Part 2, Sections 11.1 (Project Baseline Schedules) and 12.1 (Schedule of Values)).

3—PROPOSAL GUARANTY

The Proposer shall submit the Proposal Guaranty according to ITP-4.3 (Proposal Guaranty) via

cashier's check, certified check, or through the UDOT EBS by entering a Bond Authorization Code when submitting their bid.

4—ESCROWED PROPOSAL DOCUMENTS

The Proposer shall submit one signed original of Form EPD (Escrow Agreement) provided in Appendix ITP-C, which includes escrow instructions, to the address and by the time specified in ITP-4.4 (Escrowed Proposal Documentation), in accordance with Part 2, Section 23.1 (Escrowed Proposal Documents).

The Proposer should keep a second signed original and deliver a third signed original of Form EPD and the Escrowed Proposal Documentation into escrow with an escrow agent of the Proposer's choosing.

4.1 PROJECT-WIDE UTILITY RELOCATIONS

4.1.1 Utility Costs Included in the Utility Relocations Proposal Line Item

The project intent is to protect in place existing Utility facilities and minimize utility relocations wherever possible. If a Utility relocation is required, the associated cost of the relocation shall be provided out of the Price Proposal costs for the respective utility. Provide lump-sum prices in Form UC (Utility Costs) and Form BA (Build Alternative), for Utility relocations associated with the Build Alternative, for each Utility relocation indicated below in Table ITP-B-1 (Allocation percentages for Utility Relocation Costs). Compute the amount for utility relocation using the following guidelines:

A. Design-Builder Relocation Cost Obligation for the Approved concepts in the Design-Builders Proposal, is the proportion shown in Table ITP-B-1 (Allocation percentages for Utility Relocation Costs) and is the sum of the following costs that are related to a particular utility relocation:

   1. The total cost of design, whether it is done by the Design-Builder, the Utility Owner, or agents of the Utility Owner;

   2. The total cost of construction, including all labor, materials, tools, equipment, and supervision, whether it is done by the Design-Builder, the Utility Owner, or agents of the Utility Owner (but specifically excluding the costs in any way related to maintenance of traffic and traffic control when performed by or on behalf of the Design-Builder); and

   3. Utility Owner indirect costs, including but not limited to, management, overhead, attendance at coordination meetings, design, review of designs prepared by the Design-Builder, inspection, testing, and oversight (these may include labor, materials, and equipment).

B. The utility relocation costs identified in Form UC should be equal to the Design-Builder's cost obligation identified in Table ITP-B-1 (Allocation Percentages for Utility Relocation Costs). The utility relocation costs in Form UC subtotal to Items 6, 7, and 8 in Form PA.

   1. *Item 6: Utility work performed by the Design Builder* – Enter the total amount for Utility Work to be directly performed by the Design-Builder, including Design-Builder's miscellaneous costs.

   2. Item 7: *Department's cost share responsibility for Utility Work performed by*

Third-Parties – Enter the total amount of the Department's cost share responsibility based on the allocation percentages in Table ITP-B-1 for Utility Work performed by Third-Parties. No negative amounts are permitted for the Department's cost share responsibility Utility Work performed by Third-Parties line item. Proposers are advised not to include anticipated Department's cost share responsibility Utility Work performed by Third-Parties costs within other items of the Contract, as unbalancing occurs and the Proposal may be rejected.

3. Refer to Reference Documents for Third Party cost estimates based on the provided concept. These costs are estimates that will be made available to Proposers by addenda to use as they choose in their preparation of their Proposal.

4. *Item 8: Third-Parties' cost share responsibility for Utility Work performed by Design-Builder* – Enter the total amount of Third-Parties' cost share responsibility based on the allocation percentages in Table ITP-B-1 for Utility Work performed by the Design-Builder. This cost is a percentage of the cost listed in Item 7 on Form PA. Enter this value as a negative number/credit (it represents reimbursement from Third-Parties to the Department for Utility Work performed by the Design-Builder).

5. *Items 9a and 9b: Utility Work Cost Share Adjustment* – EBS does not accept negative values. If the total of lines 6, 7, and 8 are positive, input the value into line item 9a and enter 0.01 on line item 9b. If the total of lines 6, 7, and 8 are negative, input the value as a positive number into line item 9b and enter 0.01 on line item 9a. If a value other than 0.01 is entered on 9b, the Department will manually adjust the bid amount for award consideration to account for the correct value. There must be a value of 0.01 in at least one of line items 9a or 9b.

C. The Utility relocation costs for the Build Alternative identified in Form BA (line items 3, 4, and 5) should be equal to the Design-Builder's cost obligation identified in Table ITP-B-1 (Allocation Percentages for Utility Relocation Costs).

1. *Item 3 (3a through 3g): Utility work performed by the Design Builder* – Enter the total amount for Utility Work for each Utility to be directly performed by the Design-Builder, including Design-Builder's miscellaneous costs.

2. Item 4 (4a through 4g): *Department's cost share responsibility for Utility Work performed by Third-Parties* – Enter the total amount of the Department's cost share responsibility based on the allocation percentages in Table ITP-B-1 for Utility Work performed by Third-Parties for each Utility. No negative amounts are permitted for the Department's cost share responsibility Utility Work performed by Third- Parties line items. Proposers are advised not to include anticipated Department's cost share responsibility Utility Work performed by Third- Parties costs within other items of the Contract, as unbalancing occurs and the Proposal may be rejected.

3. Refer to Reference Documents for Third Party cost estimates based on the provided concept. These costs are estimates that will be made available to Proposers by addenda to use as they choose in their preparation of their Proposal.

4. *Item 5 (5a through 5g): Third-Parties' cost share responsibility for Utility Work performed by Design-Builder* – Enter the amount of the Third-Parties' cost share responsibility for each Utility based on the allocation percentages in Table ITP-B-1 for Utility Work performed by the Design-Builder. This cost is a percentage of the cost listed in Item 4 on Form BA. Enter this value as a negative number/credit (it represents reimbursement from Third-Parties to the Department for Utility Work performed by the Design-Builder), if no credit is due for a Utility enter $0.01.

D. Design-Builder Miscellaneous Costs are the total costs incurred by the Design-Builder related to a particular utility relocation for traffic control, maintenance of traffic, line and grade survey, maintenance during construction, coordination with the Utility Owner or agents thereof, and testing and inspection by the Department, including the cost of design oversight and reviews if the design is done by the Utility Owner, but excluding the cost of design or construction if the design or construction is performed by the Design-Builder which cost is included in the Design-Builder Relocation Cost above.

4.1.2 Utility Cost Allocations

No negative amounts are permitted for the Utility Relocations line item. Proposers are advised not to include anticipated Utility Relocation costs within other items of the Contract, as unbalancing occurs and the Proposal may be rejected.

Design Builder is not responsible to include costs for advance utility relocations coordinated by UDOT on Form PA. Design Builder is responsible to work around and coordinate with the advanced utility relocation work.

The following Table ITP-B-1 (Allocation Percentages for Utility Relocation Costs) indicates the responsibilities and cost participation rates to be accounted by the Design-Builder.

Utility relocation incentives and disincentives will be applied as described in Part 2, Section 20.4 (Utility Relocation Incentive/Disincentive). Betterments are not included in Table ITP-B-1; see Part 4-19 (Utilities) for a list of potential betterments.

Table ITP-B-1 – Allocation Percentages for Utility Relocation Costs

ID	*Utility Company*	*Notes*	*Interchange*
01	**AT&T Corp**	***Private Company***	**All Interchanges**
	Type of Agreement	Master Utility Agreement	
	Design Relocation	Design Builder	
	Construct Relocation	Design Builder except for furnishing cables and hand holds and pulling and splicing	
		AT&T Corp to furnishing cables and hand holds and pulling and splicing	
	UDOT's Cost share	50%	
02	**CenturyLink QC**	***Private Company***	**All Interchanges**
	Type of Agreement	Statewide in lieu of Master Utility Agreement & Project Agreement	
	Design Relocation	CenturyLink QC	
	Construct Relocation	CenturyLink QC	
	UDOT's Cost share	50%	
03	**Comcast Cable**	***Private Company***	**All Interchanges**
	Type of Agreement	Master Utility Agreement	
	Design Relocation	Comcast Cable	
	Construct Relocation	Comcast Cable	
	UDOT's Cost share	50%	
04	**Daybreak Secondary Water**	***Private Company***	**11400 South**
	Type of Agreement	Master Utility Agreement	
	Design Relocation	Design-Builder	
	Construct Relocation	Design-Builder	
	UDOT's Cost share	100%	
05	**First Digital Telcom**	***Private Company***	**All Interchanges**
	Type of Agreement	Master Utility Agreement	
	Design Relocation	Design-Builder	
	Construct Relocation	Design-Builder except cable/pedestal procurement, pulling, and splicing	
		First Digital Telecom to furnish cable/pedestal procurement, pulling, and splicing	
	UDOT's Cost share	50%	
06	**Granger Hunter Imp. District**	***Local Service District***	**5400 South**
	Type of Agreement	Master Utility Agreement	
	Design Relocation	Design-Builder	
	Construct Relocation	Design-Builder	
	UDOT's Cost share	100%	
07	**Kearns Improvement District**	***Local Service District***	**5400 South**

Table ITP-B-1 – Allocation Percentages for Utility Relocation Costs

ID	*Utility Company*	*Notes*	*Interchange*
	Type of Agreement	Master Utility Agreement	
	Design Relocation	Design-Builder	
	Construct Relocation	Design-Builder	
	UDOT's Cost share	100%	
08	**Manuel Bros., Inc.**	***Private Company***	**All Interchanges**
	Type of Agreement	Master Utility Agreement	
	Design Relocation	Design-Builder	
	Construct Relocation	Design-Builder	
	UDOT's Cost share	50%	
09	**MCI Communication Services (Verizon Business)**	***Private Company***	**5400 South**
	Type of Agreement	Master Utility Agreement	
	Design Relocation	Design-Builder	
	Construct Relocation	Design-Builder except cable and pedestal procurement, pulling, and splicing	
		MCI Communication Services to provide cable and pedestal procurement, pulling, and splicing	
	UDOT's Cost share	50%	
10	**Questar Gas Company**	***Private Company***	**All Interchanges**
	Type of Agreement	Statewide Utility Relocation Agreement	
	Design Relocation	Questar	
	Construct Relocation	Questar	
	UDOT's Cost share	50%	
11	**Rocky Mountain Power**	***Private Company***	**All Interchanges**
	Type of Agreement	Statewide Utility Relocation Agreement and Project Agreement Number 1	
	Design Relocation	Rocky Mountain Power	
	Construct Relocation	Design-Builder trenching, conduit, and bedding material for all underground Utility Work	
		Rocky Mountain Power except trenching, conduit, and bedding material for all underground Utility Work	
	UDOT's Cost share	100% at 11400 South 83% at 9000 South 50% at 7000 South 60% at 5400 South	
12	**South Jordan City**	***Municipal Corporation***	**11400 South**
	Type of Agreement	Master Utility Agreement	
	Design Relocation	Design-Builder	
	Construct Relocation	Design-Builder	

Table ITP-B-1 – Allocation Percentages for Utility Relocation Costs

ID	*Utility Company*	*Notes*	*Interchange*
	UDOT's Cost share	100%	
13	**South Valley Sewer District**	***Political Subdivision***	**11400 South**
	Type of Agreement	Master Utility Agreement	
	Design Relocation	Design-Builder	
	Construct Relocation	Design-Builder	
	UDOT's Cost share	100%	
14	**Syringa Networks, LLC**	***Private Company***	**All Interchanges**
	Type of Agreement	Telecommunications Facility Exchange Agreement	
	Design Relocation	Design Builder except fiber design	
		Syringa Networks, LLC to provide fiber design	
	Construct Relocation	Design-Builder except fiber procurement and fiber pulling and splicing	
		Syringa Networks, LLC – fiber procurement, pulling, and splicing	
	UDOT's Cost share	100% of UDOT's design and construction	
		Syringa Networks, LLC responsible for 100% of fiber design, fiber procurement, pulling and splicing	
15	**Taylorsville City**	***Municipal Corporation***	**5400 South**
	Type of Agreement	Master Utility Agreement	
	Design Relocation	Design-Builder	
	Construct Relocation	Design-Builder	
	UDOT's Cost share	100%	
16	**Taylorsville Bennion Improvement District**	***Special Improvement District***	**5400 South**
	Type of Agreement	Master Utility Agreement	
	Design Relocation	Design-Builder	
	Construct Relocation	Design-Builder	
	UDOT's Cost share	100%	
17	**United States Department of the Interior Bureau of Reclamation and**	***United States of America***	**5400 South, 7000 South, 9000 South**
	Jordan Valley Water Conservancy District	***Local Service District***	
	Type of Agreement	Project Agreement	
	Design Relocation	Design-Builder	
	Construct Relocation	Design-Builder	
	UDOT's Cost share	100%	
18	**City of West Jordan**	***Municipal Corporation***	**7000 South, 9000 South**
	Type of Agreement	Master Utility Agreement	
	Design Relocation	Design-Builder	
	Construct Relocation	Design-Builder	

Table ITP-B-1 – Allocation Percentages for Utility Relocation Costs

ID	*Utility Company*	*Notes*	*Interchange*
	UDOT's Cost share	100%	
20	**Zayo Group LLC.**	***Private Company***	**All Interchanges**
	Type of Agreement	Master Utility Agreement	
	Design Relocation	Design-Builder	
	Construct Relocation	Design-Builder except cable/pedestal procurement, pulling, and splicing	
		Zayo Group LLC cable/pedestal procurement, pulling, and splicing	
	UDOT's Cost share	50%	
	Design-Builder Miscellaneous Costs (DBMC) (all utilities herein)	100% of costs to be included in DB's Bid	

The Design-Builder shall be bound to Utah Law per Utah Code 72-6-116, unless otherwise specifically noted in the master agreement between UDOT and each third party utility company, in-case of discrepancy the executed Master Agreement shall govern.

4.1.3 Utility Relocation Incentive/Disincentive

The utility relocation incentive/disincentive applies to those utility companies listed as being responsible for the relocation design/construction of their facilities and is described in Part 2, Section 20.4 (Utility Relocation Incentive/Disincentive).

5— BID AMOUNT FOR AWARD CONSIDERATION

The Bid Amount for Award Consideration includes the Base Build and the Build Alternative (as described in Part 4 (Project Configuration)), Time Components, and associated Utility Costs. The Proposer shall submit the Price Proposal including betterments on the "Submittal of Proposals" date specified in Table ITP-2. The Proposer shall provide pricing for design and construction of the Base Build and the Build Alternative. If the Base Build, Utility Costs, and Build Alternative cannot be priced at or below the Project funding, the Department may not exercise the Build Alternative.

6—PROPOSAL GUARANTY

The Proposer shall submit the Proposal Guaranty according to ITP 4.3 via cashier's check, certified check, or through the UDOT EBS by entering a Bond Authorization Code when submitting their bid.

7—ESCROWED PROPOSAL DOCUMENTS

The Proposer shall submit one signed original of Form EPD (Escrow Agreement) provided in Appendix ITP-C, which includes escrow instructions, to the address and by the time specified in Section ITP-4.4 (Escrowed Proposal Documentation), in accordance with Part 2, Section 23 (Records).

The Proposer should keep a second signed original and deliver a third signed original of Form EPD

and the Escrowed Proposal Documentation into escrow with an escrow agent of the Proposer's choosing.

8—FORMAT FOR SUBMITTAL OF PRICING DOCUMENTS

Organize and submit the Price Proposal in the format shown in Table ITP-B-1 (Price Proposal Format), except submit Form EPD per ITP-4.4 (Escrowed Proposal Documentation).

TABLE ITP-B-2 PRICE PROPOSAL FORMAT

Proposal Section	*Description*	*Appendix B Section Reference*
1	Form PP (Price Proposal Cover Sheet) (Submitted with Escrowed Proposal Documents)	2.1
2	Form LSI (Letter of Subcontract Intent) (Submitted in the sealed Escrowed Proposal Documents)	2.2
3	Copy of Form EPD (Escrow Agreement) (original goes to escrow agent)	4
4	Form PA (Price Allocation) (Submitted through EBS, with the Escrowed Proposal Documents, and submit a copy to the Department after Notice of Award)	2.3
5	Form UC (Utility UC) (Submitted with the Escrowed Proposal Documents, and submit a copy to the Department after Notice of Award)	2.4
6	Proposal Guaranty (Submitted through UDOT EBS)	3

9—TIME SUBMITTAL REQUIREMENTS

9.1 SUMMARY

A. This contract contains a procedure for bidding contract time which is part of the Price + Time proposal process, and which provides an incentive/disincentive to the Design Builder for completing the Project and Project Milestones within the time established by the Design Builder and submitted through EBS.

B. This section describes how the time components are to be priced, and how time is used to provide an incentive/disincentive to the Design Builder for timely completion of Project and Project Milestones.

There is no physical work to be accomplished under this item. Time is a bid item, but it is not a pay item. No payment will be made under the time related bid items

9.2 TIME COMPONENT

A. Determine the proposal price for the time component as follows.

1. Measure time in consecutive Calendar Days
2. Start and Finish Milestones
   a. Project – The Start Milestone is defined as March 6, 2017. The Finish Milestone is Substantial Completion as defined in Part 1, Appendix A.

b. 5400 South Interchange – The Start Milestone is the 5400 S Interchange Start Date as defined in Part 1, Appendix A, this cannot start before the Project Start Milestone. The Finish Milestone is the 5400 S Interchange Completion Date as defined in Part 1, Appendix A.

c. 7000 South Interchange – The Start Milestone is the 7000 S Interchange Start Date as defined in Part 1, Appendix A, this cannot start before the Project Start Milestone. The Finish Milestone is the 7000 S Interchange Completion Date as defined in Part 1 (Agreement) and Appendix A.

d. 9000 South Interchange – The Start Milestone is the 9000 S Interchange Start Date as defined in Part 1, Appendix A, this cannot start before the Project Start Milestone. The Finish Milestone is the 9000 S Interchange Completion Date as defined in Part 1, Appendix A.

e. 11400 South Interchange – The Start Milestone is the 11400 S Interchange Start Date as defined in Part 1, Appendix A, this cannot start before the Project Start Milestone. The Finish Milestone is the 11400 S Interchange Completion Date as defined in Part 1, Appendix A.

3. Determine the time components to complete the Project based upon Table ITP B-3 (Time Components) considering all requirements of the Contract. To determine the number of consecutive Calendar Days for column F, count the number of consecutive Calendar Days between the Start Milestone and Finish Milestone; include the day of the Start Milestone and Finish Milestone in the number of consecutive Calendar Days. In determining the Proposed Calendar Days for column F, a time suspension between the Start Milestone and the Finish Milestone is not allowed.

3. When determining the number of consecutive Calendar Days for column F in Table ITP-B-3 (Time Components), make certain that the Work can be accomplished within the minimum and maximum number of Calendar Days indicated in columns E and F. Bids with Calendar Days that are outside the corresponding limits in column E and F are considered non-responsive. A Proposal Project schedule that shows a completion date prior to the minimum limit in column D is considered responsive; however, the Proposer shall adjust to the minimum number of Calendar Days in column D for the purpose of calculating the Time component of the bid.

4. Multiply time related cost-rate in Column C by the Calendar Days in column F and enter amount into the respective items in EBS bid file.

B. If the Bidder does not submit a bid for the time components in EBS, the Department will consider the proposal non-responsive.

C. Negative amounts are not permitted for the time related bid items.

D. Bidders are advised not to spread anticipated time costs within other items of the contract, as unbalancing will occur and the bid proposal may be rejected.

TABLE ITP-B-3 TIME COMPONENT

	A	B	C	D	E	F

Project Component	Start Milestone	Finish Milestone	Time Related Cost Rate (Dollars per Calendar Day)	Minimum Calendar Days	Maximum Calendar Days	Proposed Calendar Days
Project (Note 2)	March 6, 2017	Substantial Completion Deadline (See Note 1)	5,000	365	606	
5400 S Interchange	5400 South Interchange Start Date	5400 South Interchange Completion Date (See Note 1)	5,000	115	606	
7000 S Interchange	7000 South Interchange Start Date	7000 South Interchange Completion Date (See Note 1)	10,000	115	256	
9000 S Interchange	9000 South Interchange Start Date	9000 South Interchange Completion Date (See Note 1)	5,000	115	606	
11400 S Interchange	11400 South Interchange Start Date	11400 South Interchange Completion Date (See Note 1)	7,500	115	606	

Note 1: Refer to Part 2, Section 20 (Incentives, Disincentives, and Damages)
Note 2: Project Component includes all Work as defined in Part 1, Appendix A (Acronyms and Definitions List)

REQUEST FOR PROPOSALS

UTAH DEPARTMENT OF TRANSPORTATION

4 Interchanges on Bangerter HWY (SR-154)

Project No. S-0154(12)11

Salt Lake County

INSTRUCTIONS TO PROPOSERS
ITP-C:
FORMS

Addendum 5 - October 27, 2016

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Form SR	Statement of Representations in Proposal
Form UC	Utility Cost – Revised Addendum 5

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FORM ATC-R: ALTERNATIVE TECHNICAL CONCEPT RESPONSE (TO BE COMPLETED BY UDOT)

Project Name: **Project Number:** **Pin Number:** **Design-Builder:**		**Date Received:** **Date Responded:**	

Subject:

RFP Reference:

Reviewer Comments

Analysis: This solution (is or is not) equal or better than the RFP.

Disposition: Match ITP 3.2.3 – Choose one of the responses A thru F):

A. The ATC is acceptable for inclusion in the Proposal.

B. The ATC is not acceptable for inclusion in the Proposal.

C. The ATC is not acceptable in its present form, but may be acceptable upon the satisfaction, in the Department's sole discretion, of certain identified conditions which must be met or clarifications or modifications that must be made through a submittal of a revised ATC.

D. The ATC is conditionally Approved in its present form and may be included in the Proposal upon satisfaction, in the Department's sole discretion, of the identified conditions, clarifications, or modifications.

E. The submittal does not qualify as an ATC and may be included in the Proposal because it appears to be within the requirements of the RFP.

F. The Department requires additional time to further review the ATC, and expects to provide a response to the Design-Builder on __(Date)__.

FORM ATC-R: ALTERNATIVE TECHNICAL CONCEPT RESPONSE (TO BE COMPLETED BY UDOT)

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FORM ATC-S: ALTERNATIVE TECHNICAL CONCEPT SUBMITTAL

Design-Build Project		**Proposer**	
		ATC No.	

DESCRIPTION - Attach conceptual drawings, include supporting information, as appropriate

RFP REFERENCES – The section(s) of the RFP that the ATC is deviating from.

LOCATION - The locations where the ATC will be used on the Project.

FORM ATC-S: ALTERNATIVE TECHNICAL CONCEPT SUBMITTAL

ANALYSIS/JUSTIFICATION – The analysis justifying use of the ATC and why the deviation, if any, from the requirements of the RFP should be allowed. Explain in detail how the ATC will be used and why the ATC is a benefit to **the Project.**
POTENTIAL IMPACTS – A preliminary analysis of potential impacts (both during and after construction) including but not limited to user impacts, risks, quality, Right-of-Way, geotechnical, utilities, environmental permitting, local community, safety, design-life, and life-cycle Project and infrastructure costs, including impacts on the cost of repair, maintenance, and operation.

FORM ATC-S: ALTERNATIVE TECHNICAL CONCEPT SUBMITTAL

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FORM BA: BUILD ALTERNATIVE

Line No.	Utility ID	Activity		Lump Sum Prices
1		Design		$ -
2		Construction		$ -
3		Utility Work Performed by the Design-Builder (subtotal 3a through 3g)		$ -
3a	02	Century Link	$ -	
3b	08	Kearns Improvement District	$ -	
3c	10	MCI Verizon	$ -	
3d	11	Questar	$ -	
3e	12	Rocky Mountain Power	$ -	
3f	15	South Valley Sewer District	$ -	
3g	16	Syringa	$ -	
		Amount to Add to CONTRACT AMOUNT if Build Alternative is exercised (Total of Items 1 - 3)		**$ -**
INNOVATIVE CONTRACTING - (the following values are not included in the Contract Amount but are included in the evaluation of the Price Proposal and used for administration of the Utility cost share):				
4		Department's cost share responsibility for Utility Work performed by Third-Parties (subtotal 4a through 4g)		$ -
4a	02	Century Link	$ -	
4b	08	Kearns Improvement District	$ -	
4c	10	MCI Verizon	$ -	
4d	11	Questar	$ -	
4e	12	Rocky Mountain Power	$ -	
4f	15	South Valley Sewer District	$ -	
4g	16	Syringa	$ -	
5		Third-Parties' cost share responsibility for Utility Work performed by Design-Builder (credit/negative $) (5a through 5g)		$ -
5a	02	Century Link	$ -	
5b	08	Kearns Improvement District	$ -	
5c	10	MCI Verizon	$ -	
5d	11	Questar	$ -	
5e	12	Rocky Mountain Power	$ -	
5f	15	South Valley Sewer District	$ -	
5g	16	Syringa	$ -	
6		**Total Price for Build Alternative (enter on Form PA line item 11) (Total of Items 1-5)**		**$ -**

Form BC

Claim of Business Confidentiality

Name of Proposer: _____

Pursuant to Utah Code Ann. §§ 63G-2-305(1) and (2), and in accordance with Utah Code Ann. § 63G-2-309, the undersigned asserts a claim of business confidentiality to protect the following information submitted in response to this RFP.

This claim is asserted because this information requires protection as it includes:

☐ Reason A: Trade secrets as defined in Utah Code Ann. § 13-24-2(4) and referenced in Utah Code Ann. § 63G-2-305(1).

☐ Reason B: Commercial information or nonindividual financial information as defined in Utah Code Ann. § 63G-2-305(2)

This statement of reasons supporting the claim of business confidentiality applies to the following information in this response:

DOCUMENT	PAGE	¶	REASON ("A" or "B" above, plus a detailed explanation)

_____ _____
Signature Date

_____
Printed Name and Title

Please use additional sheets if needed. Provide a redacted version of each document identified above, clearly marked "REDACTED VERSION" on all pages.

FORM C: SINGLE POINT OF CONTACT

Proposer's Name: _____

Primary Point of Contact: _____

Company Affiliation: _____

Address: _____

_____

_____

Office Telephone Number: _____

Cell Telephone Number: _____

E-Mail Address: _____

Secondary Point of Contact: _____

Cell Telephone Number: _____

FORM CF: RFP COMMENT FORM

Proposer: _____ **Sheet No.** ____ **of** ____ **Sheets**

Part No.	*Section No.*	*Comment(s)*	*Reserved for Department Response*

Proposer: _____ _____ _____

Sheet No. ____ of ____ Sheets

Part No.	***Section No.***	***Comment(s)***	***Reserved for Department Response***

FORM CR

COMMITMENT TO ASSIGN IDENTIFIED RESOURCES TO PROJECT

Proposer's Name: _____

Understanding the Department's concern that the personnel resources specifically represented and listed in this Proposal actually be assigned to the Contract (if awarded to this Proposer) and not also be committed to other projects, _____ (Name of Proposer) commits that the personnel resources shown in the Proposal, including Key Personnel, will be available to the extent within this Proposer's control. If awarded the Contract, Proposer further commits that Project staff will be available full or part time, whichever is required to meet the Contract requirements, and that Key Personnel will be committed to the Project to fulfill the responsibilities as described in the Contract and will not change without written agreement from the Department.

In making this commitment, Proposer includes the following reservations: (If made without reservation, enter "NONE").

Signed: _____

Printed Name: _____

Title: _____

Date: _____

(To be executed by the Proposer Authorized Representative)

FORM EPD: ESCROW AGREEMENT

THIS ESCROW AGREEMENT (this Agreement) is made and entered into this _____

day of _____, 20____, by and among _____
(Proposer) and _____

(Escrow Agent) with reference to the following facts:

1. The Utah Department of Transportation (the Department) has issued a Request for Proposals to furnish the design of and to build the UDOT 4 Interchanges on Bangerter Hwy (SR-154**)** Project (the RFP);
2. The Proposer has submitted to the Department a proposal (the Proposal) in response to the RFP;
3. As part of the Proposal, the Proposer is submitting one copy of the Escrowed Proposal Documentation (EPD) in accordance with Part 2 (General Provisions), Section 23 (Records) of the Contract Documents.; and
4. The Proposer is employing the services of the Escrow Agent to act as the escrow holder with regard to the EPD, and the Escrow Agent has agreed to serve as escrow holder under the terms and conditions provided in this Agreement.

NOW THEREFORE, the parties hereby agree as follows:

1. **Deposit.** The Proposer hereby deposits the EPD with the Escrow Agent. The Escrow Agent hereby acknowledges receipt of such EPD, and such EPD shall be held in escrow under the terms and conditions of this Agreement;
2. **Holding of Escrowed Proposal Documentation.** The Escrow Agent shall hold the Escrowed Proposal Documentation in escrow in a designated area at_____. The EPD shall be stored in an area which is locked at all times. The Escrow Agent shall allow access to the EPD, from time to time, only to designated representatives of the Department and the Proposer for purposes of joint review of the EPD by the Department and the Proposer. No access shall be given to either representative from the Department or the Proposer unless representatives from both are present. The Escrow Agent shall provide such access to the Department and the Proposer during the Escrow Agent's business hours upon reasonable advance notice. Marwan Farah or his/her successor, is authorized to request access on behalf of the Department and _____<insert Proposer PM name>____, or his/her successor, is authorized to request access on behalf of Proposer. The Department or the Proposer may change its authorized representative by providing written notice to the other parties. The Escrow Agent shall allow access to only those individuals who are designated in written notices from the authorized representatives designated above;
3. **Release of Escrowed Proposal Documentation.** The Escrow Agent shall release the Escrowed Proposal Documentation as follows:
   a) If the Department does not enter into a contract with Proposer, the Escrow Agent shall release the EPD to the Proposer upon delivery by the Department of a certificate from Marwan Farah, the Department's Project Director certifying that the Department has determined not to enter into a contract with Proposer; or if the Proposer is not the Selected Design-Builder;
   b) If the Department enters into a contract with Proposer, Escrow Agent shall release the EPD to the Proposer upon delivery by the Department of a certificate of release from Marwan Farah the Department's Project Manager..

FORM EPD: ESCROW AGREEMENT

4. **Representation and Warranty.** The Proposer represents and warrants that, prior to delivery of the Escrowed Proposal Documentation to Escrow Agent, the EPD was personally examined by an authorized representative of Proposer and that it meets the requirements of the RFP, including the requirements of Contract Documents, Part 2 (General Provisions) and is sufficient to enable a complete understanding of the interpretation of how Proposer arrived at its Price Proposal;

5. **Rights of Escrow Agent.** If conflicting demands are made or notices serviced upon the Escrow Agent with respect to this escrow, the parties hereto expressly agree that it shall have the absolute right at its election to do either or both of the following:

   a) Withhold and stop all further proceedings in, and performance of, this escrow; or

   b) File a suit in interpleader and obtain an order from the court requiring the parties to interplead and litigate in such court their several claims and rights among themselves;

6. **Notices.** All notices that may or are required to be given or made by either party hereto to the other shall be in writing. Such notices shall be either personally delivered or sent by registered mail, postage prepaid, to:

   If to the Proposer: _____

   _____

   Attn: _____;

   If to the Department: Region 2
   2010 South 2760 West
   West Valley City, UT 84104
   Attention: Marwan Farah, P.E. Project Director

   If to the Escrow Agent: _____

   _____

   Attn: _____;

   or to such other addresses and such other places as any party hereto may from time to time designate by written notice to the others;

8. **Counterparts.** This Agreement may be executed in one or more counterparts, all of which together shall be deemed an original;

9. **Headings.** The title headings of the respective paragraphs of this Agreement are inserted for convenience only, and shall not be deemed to be part of this Agreement or considered in construing this Agreement;

10. **Governing Law.** The laws of the State of Utah shall govern this Agreement; and

11. **Attorney's Fees.** If either the Escrow Agent or Proposer commences or engages in any action by or against the Department directly or indirectly arising out of or in connection with this Agreement, the prevailing party shall be entitled to have and recover from the losing party

FORM EPD: ESCROW AGREEMENT

reasonable attorney's fees and other costs incurred in the action and in preparation for said action and any subsequent appeal.

IN WITNESS WHEREOF, the parties hereto, each intending to be legally bound by this writing, have caused this Agreement to be executed the date first above written.

PROPOSER _____

By: _____

Title: _____

The escrow provided for in this Agreement is hereby accepted, only to the extent of the escrow provisions, by the Escrow Agent.

_____

By: _____

Title:_____

FORM IC: CERTIFICATE REGARDING INELIGIBLE CONTRACTORS

Certification Regarding Debarment, Suspension, Ineligibility, and Voluntary Exclusion from Transactions Financed in Part by the U.S. Government

I, _____, _____,
Name of Certifying Officer *Title of Certifying Officer*

hereby certify that _____
Name of Contractor

(1) Is not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation by any Federal department or agency or from participation in this Project;

(2) Has not within a three-year period preceding this Proposal been convicted of or had a civil judgment rendered against it for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statues, or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Is not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in Paragraph 2 of this certification; and

(4) Has not within a three-year period preceding this Proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

If any Principal Participant is unable to certify to any of the statements in this certification, such prospective Principal Participant shall attach an explanation to this certification.

I hereby certify and affirm the truthfulness and accuracy of the above statement, and I understand that the provisions of 31 United States Code (U.S.C.) §3801 *et seq*. (Administrative Remedies for False Claims and Statements) are applicable hereto.

_____ _____
Signature of Certifying Officer *Name of Contractor*

_____
Street Address

_____
City, State, ZIP Code

_____
Telephone Number

FORM IC: CERTIFICATE REGARDING INELIGIBLE CONTRACTORS

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FORM IS: CERTIFICATE REGARDING INELIGIBLE SUBCONTRACTORS

Certification Regarding Debarment, Suspension, Ineligibility, and Voluntary Exclusion for Lower-Tier Covered Transactions

(1) The prospective lower-tier participant (Subcontractor) certifies, by submission of its Proposal, that neither it nor any of its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this Project by any Federal department or agency.

(2) Where the prospective lower-tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to its Proposal.

Signed: _____

Name (Print): _____

Company: _____

Date: _____

FORM KP: KEY PERSONNEL INFORMATION

Proposer: _____ **Sheet No.** ____ **of** ____ **Sheets**

Position	*Name*	*Education and Professional Registration*	*Parent Firm Name*
Project Manager			
Design Manager			
Structures Design Manager			
Construction Manager			
Traffic Operations Manager			
Traffic Control Maintainer			
Third Party Manager			
Construction Quality Manager			

FORM LC: LOBBYING CERTIFICATE

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) **No Federal appropriated funds have been paid or will be paid by or on behalf of the undersigned**, to any person for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with the awarding of **ANY** Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan or cooperative agreement.

(2) **If any funds other than Federal appropriated funds have been paid or will be paid** to any person for making lobbying contacts to an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with **THIS** Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions [as amended by "Government-wide Guidance for New Restrictions on Lobbying," 61 Federal Regulations 1413 (1/19/96). *Note: Language in Paragraph (2) herein has been modified in accordance with Section 10 of the Lobbying Disclosure Act of 1995 (Public Law [P.L.] 104-65, to be codified at 2 U.S. Code (U.S.C. 1601, et seq.), as amended by the Lobbying Disclosure Technical Amendments Act of 1998 (P.L. 105-166)].*

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S.C. (as amended by the Lobbying Disclosure Act of 1995, as amended by the Lobbying Disclosure Technical Amendments Act of 1998). Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

Note: Pursuant to 31 U.S.C. §1352(c)(1)-(2)(A), any person who makes a prohibited expenditure or fails to file or amend a required certification or disclosure form shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each expenditure or failure.

The Proposer/Design-Builder, _____, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Proposer/Design-Builder understands and agrees that the provisions of 31 U.S.C. §3801, et seq., apply to this certification and disclosure, if any.

Date: _____

Company Name: _____

Signature: _____

Name (Print): _____

Title: _____

NOTE: THE DESIGN-BUILDER IS REQUIRED, PURSUANT TO FEDERAL LAW, TO INCLUDE THE ABOVE LANGUAGE IN SUBCONTRACTS OVER $100,000 AND TO OBTAIN THIS

FORM LC: LOBBYING CERTIFICATE

LOBBYING CERTIFICATE FROM EACH SUBCONTRACTOR BEING PAID $100,000 OR MORE UNDER THIS CONTRACT.

FORM LSI: LETTER OF SUBCONTRACTOR INTENT

_____ intends to subcontract Work to
(Proposer)

_____
(Subcontractor/Consultant)

For the <Project Name> Project, to perform the following type(s) of Work:

_____

_____

_____

_____

_____

_____

The minimum value of the Subcontract is $_____.

For the Proposer:

_____
(Signature)

_____
(Printed Name)

_____
(Title)

_____
(Date)

For the Subcontractor/Consultant:

Confirmed by:

_____
(Signature)

_____
(Printed Name)

_____
(Title)

_____
(Date)

FORM NC: NONCOLLUSION AFFIDAVIT

Proposer: _____

[Duplicate or modify this form as necessary so that it accurately describes the entity making the Proposal and is signed on behalf of the Proposer and, if the Proposer is a joint venture, on behalf of all joint venture members as well as the Proposer.]

STATE OF _____, COUNTY OF _____

Each of the undersigned, being first duly sworn, deposes and says that _____ is the _____ of _____ and _____ is the _____ of _____, which entity(ies) are the _____ of _____, the entity making the foregoing Proposal, that:

The Proposal is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation;

The Proposal is genuine and not collusive or sham;

The Proposer has not directly or indirectly induced or solicited any other Proposer to put in a false or sham Proposal, and has not directly or indirectly colluded, conspired, connived or agreed with any Proposer or anyone else to put in a sham Proposal or that anyone shall refrain from proposing;

The Proposer has not in any manner, directly or indirectly, sought by agreement, communication or conference with anyone to fix the Proposal Price or any component of the Proposal Price, of the Proposer or any other Proposer, or to fix any overhead, profit, or cost element included in the Price Proposal, or of that of any other Proposer, or to secure any advantage against the Department of anyone interested in the proposed Contract;

All statements contained in the Proposal are true; and, further,

The Proposer has not, directly or indirectly, submitted its Proposal Price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company, association, organization, proposal depository or any member or agent thereof to effectuate a collusive or sham Proposal.

_____	_____
(Signature)	*(Signature*
_____	_____
(Printed Name)	*(Printed Name)*
_____	_____
(Title)	*(Title)*

Subscribed and sworn to before me this _____day of _____, 201__.

Notary Public in and for) .....

) SS .....

said County and State) .....

[Seal] My commission expires: _____.

FORM NS: NAMED SUBCONTRACTORS

Proposer: _____ **Sheet ____ of _____ Sheets**

Specialty/ Assignment & Percentage of Work	*Subcontractor Name and Contact*	*Address of Head Office*	*Telephone and Fax Numbers*	*For Last Two Projects: Project Name, Owner, Owner Contact Name, and Telephone & Fax Numbers*	
				Project 1	*Project 2*

FORM NS: NAMED SUBCONTRACTORS

Proposer: _____ **Sheet ____ of _____ Sheets**

Specialty/ Assignment & Percentage of Work	*Subcontractor Name and Contact*	*Address of Head Office*	*Telephone and Fax Numbers*	*For Last Two Projects: Project Name, Owner, Owner Contact Name, and Telephone & Fax Numbers*	
				Project 1	*Project 2*

For more Subcontractors, use back of page as necessary.

FORM OC: OPINION OF COUNSEL

[Letterhead of Independent Law Firm or In-House Counsel]

Utah Department of Transportation (the Department)

_____

_____

Attn: _____

Re: _____, Proposer

Request for Proposals (RFP) for <Project Name>Project, Project No. <Z-000(00)> (Contract)

Gentlemen:

[Describe relationship to Proposer and its joint venture members, general partners, and any other entities whose approval is required in order to authorize delivery of the proposal.] This letter is provided to you pursuant to ITP-A3.1(B)(4) of the Instructions to Proposers Appendix A contained in the RFP.

In giving this opinion, we have examined _____. We have also considered such questions of law and have examined such documents and instruments and certificates of public officials and individuals who participated in the procurement process as we have deemed necessary or advisable.

In making this response, we have assumed that all items submitted to us or reviewed by us are genuine, accurate, and complete, and if not originals, are true and correct copies of originals, and that all signatures on such items are genuine.

Subject to the foregoing, we are of the opinion that:

1. *[Opinion regarding formation and existence of Proposer and each of its joint venture members and general partners]*.
2. *[Opinion that the Proposer has power and is duly authorized to execute and deliver the Proposal and Contract]*.
3. *[Opinion that the Proposal has been duly and validly executed and delivered, and constitutes a legal, valid, and binding obligation of the Proposer and its joint venture members and /or general partners to enter into the Contract, if awarded]*. *[Updated opinion stating that the Contract has been duly and validly executed and delivered]*.
4. *[Opinion that all required approvals have been obtained with respect to execution and delivery of the Proposal and Contract; and that the Proposal and Contract do not conflict with any agreements to which Proposer or its joint venture members and/or general partners are a party or with any orders, judgements, or decrees by which Proposer or its joint venture members and/or general partners are bound]*.

[Signature of Counsel]

_____ _____

Signature *Date*

FORM PA: PRICE ALLOCATION

Line No.	Activity	Days (input into EBS)	This column not input into EBS	Lump Sum Prices (input into EBS)
1	Compensable Project Overhead		$ -	
2a	Design - 5400 South		$ -	
2b	Design - 7000 South		$ -	
2c	Design - 9000 South		$ -	
2d	Design - 11400 South		$ -	
3	Mobilization (Not to exceed 5% of Contract Amount)		$ -	
4a	Construction - 5400 South		$ -	
4b	Construction - 7000 South		$ -	
4c	Construction - 9000 South		$ -	
4d	Construction - 11400 South		$ -	
5	Project Aesthetics & Landscaping Enhancements (this is for enhancements only and amount does not include baseline aesthetic treatments)		$ 400,000	
6	Utility Work performed by the Design-Builder - Subtotal from Form UC line A		$ -	
			CONTRACT AMOUNT (Total of Items 1 - 6)	**$ 400,000**
INNOVATIVE CONTRACTING - (the following values are not included in the Contract Amount but are included in the evaluation of the Price Proposal and used for administration of the Utility cost share):				
7	Department's cost share responsibility for Utility Work performed by Third-Parties - Subtotal from Form UC line B		$ -	
8	Third-Parties' cost share responsibility for Utility Work performed by Design-Builder (credit/negative $) - Subtotal from Form UC line C		$ -	
	Utility Work Cost Share Adjustment If total of lines 7-8 is positive enter value in line 9a If total of lines 7-8 is negative enter value in line 9b			
9a	9a Positive Value (Total of Items 7 - 8); enter 0.01 if 9b is used			$ -
9b	9b Negative Value (Total of Items 7 - 8); enter 0.01 if 9a is used; enter negatives as a positive value into EBS			$ -
10a	Time Component - Project (Based on column F multiplied by column C From ITP Table B-3) Maximum Days 606, Minimum Days 365		**$5,000**	$ -
10b	Time Component - 5400 S Interchange (Based on column F multiplied by column C From ITP Table B-3) Maximum Days 606		**$5,000**	$ -
10c	Time Component - 7000 S Interchange (Based on column F multiplied by column C From ITP Table B-3) Maximum Days 256		**$10,000**	$ -
10d	Time Component - 9000 S Interchange (Based on column F multiplied by column C From ITP Table B-3) Maximum Days 606		**$5,000**	$ -
10e	Time Component - 11400 S Interchange (Based on column F multiplied by column C From ITP Table B-3) Maximum Days 606		**$7,500**	$ -
11	Build Alternative (Total from line 6 on Form BA)			
			(Total of Items 9 - 11)	**$ -**
			BID AMOUNT FOR AWARD CONSIDERATION (Total of Items 1-6 & 9-11)	**$ 400,000**

FORM PP: PRICE PROPOSAL COVER SHEET

Proposer: _____

This Price Proposal is submitted in response to the Request for Proposals (as it may have been amended), dated _____, 20____, and includes the following:

Section 1: Form PP (Price Proposal Cover Sheet)

Section 2: Form PPS-P (Proposal Periodic Payment Schedule)

Section 3: Form LSI (Letter of Subcontractor Intent)

Section 2: Form EPD (Escrow Agreement)

Section 5: Form PA (Price Allocation), Form BA (Build Alternative Price Allocation)

Section 6: Proposal Guaranty – submitted in the form of a check or entered through UDOT EBS

Signatures of Parties Signing Proposal Letter Form:

Signatures:	*Representing:*	*Date:*
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

PROPOSAL LETTER FORM

Proposer: _____

Address: _____

_____

Telephone: **(_____)** _____

Contractor's License: **No.*** _____ **Classification*** _____

** Not Required When Proposing on Federal-Aid Projects*

To the Utah Department of Transportation:

The undersigned Proposer submits this proposal (the Proposal) in response to that certain Request for Proposals (RFP) for design and construction of the Region 1,2,3,4 UDOT <Project Name> (the Project), issued on _____, 20____, by the Utah Department of Transportation (the Department). This Proposal constitutes an offer to furnish and deliver all the materials and to do all Work and labor required for the design and construction of the Project for the total Proposal Price stated in the Price Allocation (Form PA).

The following individuals are authorized to enter discussions on behalf of the Proposer in connection with this RFP, the Project, and the Contract: _____

_____.

The Proposer agrees:

(A) To keep this Proposal firm for 90 days after the Proposal Due Date without unilaterally varying or amending its terms and without any member or partner withdrawing or any other change being made in the composition of the Proposer's team as submitted, without first obtaining the prior written consent of the Department, which consent may be withheld in the Department's sole discretion;

(B) To execute the form of Contract and to furnish the Payment and Performance Bonds and other documents as required by the RFP within 10 days of the date of the delivery of said form of Contract, conformed for execution, to the successful Proposer by the Department, and, failing to do so, to forfeit the accompanying check or Proposal Bond to the State as liquidated damages, in which case the Department Deputy Director may proceed to award the Contract to others;

(C) To commence Work within 30 days, or such additional time as may be allowed in writing by the Deputy Director, after issuance of a Notice To Proceed under the Contract, and to complete the Work by the completion deadlines specified in Part 1 (Agreement); and

(D) To design and construct the Project and to guarantee all Work performed in accordance with the Contract Documents.

PROPOSAL LETTER FORM

The Proposer declares that it is the only entity or party interested in the Proposal as Principal and that its officers, employees, subsidiaries, or parent corporations, its Principal Participants members, and the officers, employees, subsidiaries, or parent corporations of said Principal Participants:

(Check appropriate box.)

☐ Have not in any way participated in any activities in restraint of trade, or been debarred with relation to public contracts either in the State of Utah or any other state of the United States or on any federally assisted contract during the five-year period immediately preceding this Proposal, or either directly or indirectly entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this Contract.

☐ Have participated in activities in restraint of trade with relation to public contracts either in the State of Utah or any other state of the United States or on any federally assisted contracts during the five-year period immediately preceding this Proposal or entered into collusion, or restraint of free competitive bidding on this Contract, but is of the opinion that it is a responsible Proposer entitled to the award of a contract involving public moneys and attach hereto an explanation of the restraint of free trade, restraint of free competitive bidding, or collusion.

The Proposer certifies that it has examined the Site of the proposed Work and has carefully examined and is fully familiar with all of the provisions and documents in the RFP (collectively, the RFP Documents), and is satisfied that such provisions provide sufficient detail regarding the Work to be performed and do not contain internal inconsistencies; that it has carefully checked all the words, figures, and statements in this Proposal; that it has conducted such other field investigations and additional design development which are prudent and reasonable in preparing this Proposal, including a thorough review of all of the RFP Documents; and that it has notified the Department of any deficiencies in or omissions from any RFP Documents or other documents provided by the Department and of any unusual site conditions observed prior to the date hereof.

The Proposer has (____) has not (____), participated in a previous contract or subcontract subject to the equal opportunity clause, as required by Executive Orders 11246, 10925, and 11114 as amended, and that it has (____) has not (____) filed with the Office of Federal Contract Compliance Program all reports due under the applicable filing requirements.

The Proposer has received, understands, and has fully considered all materials posted on the Project Website (www.udot.utah.gov/go/bidopeninfo.com) and the following Addenda and set of questions and answers to the RFP:

Addendum 1 (dated _____)

Addendum 2 (dated _____)

Addendum 3 (dated _____)

Addendum X (dated _____)

Questions and Answers Distribution (issued on _____)

[List other Addenda and other sets of questions and answers, if applicable.]

PROPOSAL LETTER FORM

Each, every, and all of the representations made by the Proposer in the enclosed Proposal are true and correct, and all statements made in the Statement of Qualifications previously delivered to the Department are true and correct as of the date hereof, except as otherwise specified in the Proposal. The Proposer agrees that such Statement of Qualifications, except as expressly modified by the Proposal, is incorporated in the Proposal as if fully set forth herein.

All costs and expenses incurred in preparing this Proposal and participating in the RFP process will be borne solely by the Proposer, except to the extent that the Proposer receives any stipend in accordance with the RFP.

The undersigned affirms that the information provided herein is true and accurate and that any misrepresentations are made under penalty of perjury.

Organization: _____

By: _____ Title: _____

If Proposer is a joint venture, provide signatures by all joint venture members:

JV Member: _____

By: _____ Title: _____

JV Member: _____

By: _____ Title: _____

JV Member: _____

By: _____ Title: _____

JV Member: _____

By: _____ Title: _____

STATE OF _____)

) ss

COUNTY OF _____)

Subscribed and sworn to me on this _____ day of _____, 201__.

_____, **Notary** Public.

My commission expires _____.

PROPOSAL LETTER FORM

(This page is intentionally blank.)

FORM SA: STIPEND AGREEMENT

Proposer: _____

THIS STIPEND AGREEMENT (the Agreement) is made and entered into as of the _____ day of _____, 20____, by and between the State of Utah, acting by and through the Utah Department of Transportation (Department), and _____, a _____ (Proposer), with reference to the following facts:

A. On _____, 20____, the Department issued a Request for Proposals (RFP) for design and construction of the Project No. S-0154(12)11 (the Project), pursuant to procurement authority granted in Utah Code §63-56-36.1.

B. The RFP requires each Proposer to execute and deliver a Stipend Agreement to the Department by the date specified in the RFP.

NOW, THEREFORE, Proposer hereby agrees as follows:

1. Definitions.

All capitalized terms and acronyms used but not defined in this Agreement have the respective meanings set forth in the Instructions to Proposers (ITP) included in the RFP.

2. Work Product.

2.1 The Department hereby retains Proposer to prepare and submit, in response to the RFP and any Best and Final Offer (BAFO) request by the Department, a Proposal and BAFOs that conform in all material respects to the requirements of the RFP and the requests for BAFOs, as determined by the Department, are timely received by the Department, and satisfy the provisions of Section 3.1 below.

2.2 All work performed by Proposer and its team members pursuant to this Agreement shall be considered work for hire, and the Work Product (as defined below) shall become the property of the Department without restriction or limitation on its use. Neither Proposer nor any of its team members shall copyright any of the material developed under this Agreement.

2.3 Proposer agrees that all Work Product is, upon receipt by the Department, the property of the Department. The term "Work Product" shall mean all submittals made by Proposer during the RFP process, including the Proposal, exchanges of information during the pre-proposal and post-proposal period, and any BAFO, and shall specifically include [alternate technical concepts (ATCs)][options] submitted for Department review in accordance with the RFP. However, the term "Work Product" shall specifically exclude (a) Escrowed Proposal Documentation (EPD) and (b) patented rights in previously existing proprietary technology.

2.4 In consideration for the Department's agreement to make payment hereunder, Proposer agrees that the Department shall be entitled to use all Work Product, without any further compensation or consideration to the Proposer, in connection with the RFP and any requests for BAFOs, the Contract Documents, the Project, and future procurements by the Department. Notwithstanding the foregoing, the Department shall not be entitled to use information submitted by Proposer to the Department that has been specifically designated as confidential business information in accordance with ITP.2.6 and that the Department determines is

FORM SA: STIPEND AGREEMENT

exempt from disclosure under the Government Records Access and Management Act (GRAMA), unless the RFP otherwise provides.

2.5 The Department acknowledges that the use of any of the Work Product by the Department or the Design-Builder is at the sole risk and discretion of the Department and the Design-Builder, and shall in no way be deemed to confer liability on the unsuccessful Proposer.

2.6 In accordance with the ITP Section 2.9 and Utah Administrative Code, Rule R916-3-6, _____(Proposer) is awarded a stipulated fee ("stipend") in the amount of $300,000 as consideration for the use of the ideas and technical solutions in _____(Proposer's) proposal.

3. Compensation and Payment.

3.1 Compensation payable to Proposer for the Work Product described herein shall be a maximum of $300,000 if all of the following conditions are met:

a. Proposer's Technical Proposal (including any BAFOs) has achieved a rating of "Pass" on all Pass/Fail evaluation factors and an overall qualitative rating of at least "Acceptable" for all technical evaluation factors;

b. The Proposer has submitted a responsive Price Proposal; and

c. Proposer's Proposal (including any BAFOs) was not selected for award.

3.2 In its sole discretion, the Department may pay compensation to Proposer, in an amount to be determined by the Department, for the Work Product described herein if the procurement is cancelled prior to the Proposal Due Date. Proposers will be provided the opportunity, at their option, of attending an interview and delivering to the Department the Work Product of their Proposal preparations to date. There is no specific format required for such Work Product. Those Proposers that choose to attend the interview and deliver their Work Product may be paid a portion of the stipend amount that the Department deems to be appropriate consideration for the Work Product. No portion of the stipend amount will be paid if a Proposer chooses not to attend the interview or chooses not to deliver its Work Product.

3.3 If the Department awards the Contract to Proposer, Proposer will not be entitled to compensation hereunder.

3.4 Any payment of compensation owing hereunder will be made (i) within 30 days after receipt of a proper invoice submitted to the Department under this Section 3.4 or (ii) if an Award is made, when any complaint against Award is administratively and judicially resolved. Such invoice may not be submitted until one business day after the earlier to occur of (a) posting of the notice of Award, or (b) cancellation of the procurement.

4. Indemnities.

4.1 Subject to the limitations contained in Section 4.2 below, Proposer shall indemnify, protect and hold harmless the Department and its directors, officers, employees, and contractors from, and Proposer shall defend at its own expense, all claims, costs, expenses, liabilities, demands, or suits at law or equity arising in whole or in part from the negligence or willful misconduct of Proposer or any of its agents, officers, employees, representatives, or Subcontractors, or breach of any of Proposer's obligations under this Agreement.

FORM SA: STIPEND AGREEMENT

4.2 This indemnity shall not apply with respect to any claims, demands, or suits arising from use of the Work Product by the Department or its contractors.

5. Compliance With Laws.

5.1 Proposer shall comply with all Federal, State, and local laws, ordinances, rules, and regulations applicable to the work performed or paid for under this Agreement and covenants and agrees that it and its employees shall be bound by the standards of conduct provided in applicable laws, ordinances, rules, and regulations as they relate to work performed under this Agreement. Proposer agrees to incorporate the provisions of this paragraph in any subcontract into which it might enter with reference to the work performed pursuant to this Agreement.

5.2 The Proposer agrees (a) not to discriminate in any manner against an employee or applicant for employment because of race, color, religion, creed, age, sex, marital status, national origin, ancestry or disability of a qualified individual with a disability; (b) to include a provision similar to that contained in subsection (a) in any subcontract except a subcontract for standard commercial supplies or raw materials; and (c) to post and to cause Subcontractors to post in conspicuous places available to employees and applicants for employment, notices setting forth the substance of this clause.

6. Assignment.

Proposer shall not assign this Agreement without the Department's prior written consent. Any assignment of this Agreement without such consent shall be null and void.

7. Miscellaneous.

7.1 Proposer and the Department agree that Proposer, its team members, and their respective employees are not agents of the Department as a result of this Agreement.

7.2 All words used herein in the singular form shall extend to and include the plural. All words used in the plural form shall extend and include the singular. All words used in any gender shall extend to and include all genders.

7.3 This Agreement, together with the RFP, as amended from time to time, the provisions of which are incorporated herein by reference, embodies the entire agreement of the parties with respect to the subject matter hereof. There are no promises, terms, conditions, or obligations other than those contained herein or in the RFP, and this Agreement shall supersede all previous communications, representation, or agreements, either verbal or written, between the parties hereto.

7.4 It is understood and agreed by the parties hereto that if any part, term, or provision of this Agreement is by the courts held to be illegal or in conflict with any law of the State of Utah, the validity of the remaining portions or provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the Agreement did not contain the particular part, term, or provisions to be invalid.

7.5 This instrument may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

7.6 This Agreement shall be governed by and construed in accordance with the laws of the State of Utah.

FORM SA: STIPEND AGREEMENT

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

STATE OF UTAH by UTAH DEPARTMENT OF TRANSPORTATION

WITNESS:

_____ _____

_____ _____

Approved for Execution: Date: _____

_____
UDOT Project Manager

Approved as to availability of funds:

_____

Approved as to form and legal sufficiency:

_____
Assistant Attorney General

_____
[Signature of Corporation or LLC]

_____
[Signature of Joint Venture or Partner]

FORM SA: STIPEND AGREEMENT

WITNESS:

_____ _____
Proposer Name

_____ _____
Federal ID # or Social Security #

By_____

Member Name_____

By_____ (Seal)

Title:_____

_____
Printed Name

By_____

Member Name_____

By_____ (Seal)

Title:_____

_____
Printed Name

By_____

Member Name_____

By_____ (Seal)

Title:_____

_____
Printed Name

FORM SA: STIPEND AGREEMENT

(This page is intentinally blank.)

Form SR

Statement of Representations in Proposal

Name of Proposer: _____

I, the undersigned, declare that:

1. I am an authorized agent of the Proposer and have authority to submit this statement on behalf of the Proposer.
2. The information and representations provided in this Proposal is true and accurate to the best of my knowledge.
3. Proposer has read the Request for Proposals (RFP) in its entirety and agrees unconditionally to meet all required elements.
4. The Proposer's Proposal is genuine; not made in the interest of, or on behalf of, any undisclosed person, firm, or corporation.
5. Proposer understands and accepts that the approval or rejection of Proposer's request is within the sole discretion of the Utah Department of Transportation and that there is no legal commitment until all due diligence has been performed and a properly authorized contract has been duly and properly executed.
6. Proposer agrees to report immediately in writing to the Utah Department of Transportation any changes to the information contained herein at any time while Proposer's Proposal is under consideration.
7. The information contained in this Proposal and any part thereof, including all documents and instruments delivered or to be delivered to the Utah Department of Transportation is true, accurate and complete. This Proposal includes all information necessary to ensure that the statements therein do not in whole or in part mislead the Utah Department of Transportation as to any material fact.
8. Proposer agrees that, if chosen as the selected Design-Builder, Proposer will abide by all statements in this Proposal.

Signature _____ Date _____

Name & Title _____

FORM UC: UTILITY COSTS

Line No.	Form PA No.	Utility ID	Activity	This column not input into EBS	Lump Sum Prices (to be entered into Form PA)
	6	Utility Work performed by the Design-Builder			
		01	AT&T Corp.	$ -	
		02	CenturyLink	$ -	
		03	Comcast Cable	$ -	
		04	Daybreak Secondary Water	$ -	
		05	First Digital Telcom	$ -	
		06	Granger Hunter Improvement District	$ -	
		07	Kearns Improvement District	$ -	
		08	Manuel Bros., Inc.	$ -	
		09	MCI (Verizon Business)	$ -	
		10	Questar Gas Company	$ -	
		11	Rocky Mountain Power 5400 S (exclude Build Alternative)	$ -	
		11	Rocky Mountain Power 7000 S	$ -	
		11	Rocky Mountain Power 9000 S	$ -	
		11	Rocky Mountain Power 11400 S	$ -	
		12a	South Jordan City	$ -	
		12b	South Jordan City Betterment	$ -	
		13	South Valley Sewer District	$ -	
		14	Syringa Networks, LLC	$ -	
		15	Taylorsville City	$ -	
		16a	Taylorsville Bennion Improvement District	$ -	
		16b	Taylorsville Bennion Improvement District Betterment	$ -	
		17	US Bureau of Reclamation	$ -	
		18a	West Jordan City	$ -	
		18b	West Jordan - 7000 South Sanitary Sewer Repair		
		18c	West Jordan City Betterment - 7000 South	$ -	
		18d	West Jordan City Betterment - 9000 South	$ -	
		19	Zayo Group	$ -	
		20	Welby Jacobs Canal	$ -	
A	6		**Subtotal to be entered on Form PA Item 6a (Subtotal of Utility Work performed by the Design-Builder)**		$ -
	7	Department's cost share responsibility for Utility Work performed by Third-Parties			
		01	AT&T Corp.	$ -	
		02	CenturyLink	$ -	
		03	Comcast Cable	$ -	
		05	First Digital Telcom	$ -	
		08	Manuel Bros., Inc.	$ -	
		09	MCI (Verizon Business)	$ -	
		10	Questar Gas Company	$ -	
		11	Rocky Mountain Power 5400 S (exclude Build Alternative)	$ -	
		11	Rocky Mountain Power 7000 S	$ -	
		11	Rocky Mountain Power 9000 S	$ -	
		11	Rocky Mountain Power 11400 S	$ -	
		14	Syringa Networks, LLC	$ -	
		19	Zayo Group	$ -	
B	7		**Subtotal to be entered on Form PA Item 7 (Subtotal of Department's cost share responsibility for Utility Work performed by Third-Parties)**		$ -
	8	Third-Parties' cost share responsibility for Utility Work performed by Design-Builder (credit/negative $)			
		01	AT&T Corp.	$ -	
		02	Century Link	$ -	
		03	Comcast Cable	$ -	
		05	First Digital Telcom	$ -	
		08	Manuel Bros., Inc.	$ -	
		09	MCI (Verizon Business)	$ -	
		10	Questar Gas Company	$ -	
		11	Rocky Mountain Power 5400 S (exclude Build Alternative)	$ -	
		11	Rocky Mountain Power 7000 S	$ -	
		11	Rocky Mountain Power 9000 S	$ -	
		11	Rocky Mountain Power 11400 S	$ -	
		14	Syringa Networks, LLC	$ -	
		16b	Taylorsville Bennion Improvement District Betterment	$ -	
		18b	West Jordan City Betterment - 7000 South	$ -	
		18c	West Jordan City Betterment - 9000 South	$ -	
		19	Zayo Group	$ -	
C	8		**Subtotal to be entered on Form PA Item 8 Subtotal of Third-Parties' cost share responsibility for Utility Work performed by Design-Builder (credit/negative $))**		$ -

REQUEST FOR PROPOSALS

UTAH DEPARTMENT OF TRANSPORTATION

4 Interchanges on Bangerter HWY (SR-154)

Project No. S-0154(12)11

Salt Lake County

CONTRACT DOCUMENTS
PART 1—AGREEMENT

Addendum 4 - October 20, 2016

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APPENDICES

Appendix A Acronyms and Definitions List

DESIGN-BUILD AGREEMENT

THIS DESIGN-BUILD CONTRACT is made and executed in *four (4)* original counterparts this ____ day of _____, 201_ between the Utah Department of Transportation (the "Department") first party, and _____, (the "Design-Builder") second party, with reference to the definitions set forth in Part 1, Appendix A (Acronyms and Definitions List) and the following facts:

RECITALS

A. The Department desires to make improvements to four interchanges on Bangerter Highway (at 5400 South, 7000 South, 9000 South, and 11400 South) in Salt Lake County, Utah, as further described in Part 4, Section 1 (Project Configuration). These improvements shall be implemented in accordance with commitments in the State Environmental Studies (SES).

B. An SES for Bangerter Highway (SR-154); Environmental for Four Locations (Bangerter Highway and 5400 South) dated June 21, 2016 received final approval from Randy Park dated June 27, 2016. Also, an SES for Bangerter Highway (SR-154); Environmental for Four Locations (Bangerter Highway and 7000 South) dated April 28, 2016 received final approval from Randy Park dated May 4, 2016. Also, an SES for Bangerter Highway (SR-154); Environmental for Four Locations (Bangerter Highway and 9000 South) dated May 31, 2016 received final approval from Randy Park dated June 1, 2016. Also, an SES for Bangerter Highway (SR-154); Environmental for Four Locations – 11400 South Interchange dated June 6, 2016 received final approval from Randy Park dated June 7, 2016. The results of the assessments find that this project will NOT cause significant environmental impacts. The final RFP encompasses environmental commitments and mitigation measures set forth in the above referenced documents.

C. The parties intend for the Contract to be a lump-sum, design-build contract obligating the Design-Builder to perform all Work necessary to complete the Project by the deadlines specified herein for the Contract Amount, subject only to certain specified limited exceptions. This is not a Federal Aid Project.

D. If the Design-Builder fails to complete the Project within the time limitations set forth in the Contract Documents or in the event of a Closure not permitted under the Contract Documents, the Department will suffer substantial losses and damages. The Contract Documents therefore provide that the Design-Builder shall pay the Department substantial Liquidated Damages or disincentives if such completions are delayed and shall pay the Department disincentives in the event of a Closure not permitted under the Contract Documents.

E. The Department and the Design-Builder both intend for the Design-Builder to assume full responsibility and liability with respect to the Project, and the Department and the Design-Builder both intend for the Design-Builder to indemnify and hold harmless the Department and others with respect to any defects in the Project.

NOW, THEREFORE, in consideration of the sums to be paid to the Design-Builder by the Department, the foregoing premises and the covenants and agreements set forth within the Contract Documents, the parties hereto agree as follows:

1) CONTRACT COMPONENTS; INTERPRETATION OF CONTRACT DOCUMENTS

1.1 Certain Definitions

Refer to Part 1, Appendix A (Acronyms and Definitions List) for the meaning of various terms and capitalized words used in the Contract Documents.

1.2 Contract Documents

The term "Contract Documents" shall mean the documents listed in Section 1.3 (Order of Precedence), including all appendices and attachments thereto. The Contract Documents contain the entire understanding of the parties with respect to the subject matter hereof and supersede all prior agreements, understandings, statements, representations and negotiations between the parties with respect to its subject matter.

1.3 Order of Precedence

Each of the Contract Documents is an essential part of the Contract, and a requirement occurring in one is as binding as though occurring in all. The components of the Contract Documents are intended to be complementary and to describe and provide for a complete Contract. In the event of any conflict among the Contract Documents, the order of precedence, from highest to lowest, shall be as set forth below:

1. Part 1 (Agreement)
2. Part 2 (General Provisions)
3. Part 6 (Third-Party Agreements)
4. Proposal provisions that exceed the requirements of Part 4 (Project Design and Construction Requirements) as determined by the Department
5. Appendix to Part 4-15 (Roadway)
6. Part 4 (Project Design and Construction Requirements)
7. Proposal provisions that exceed the requirements of Part 7 (Contract Drawings) as determined by the Department
8. Part 7 (Contract Drawings)
9. Proposal provisions that exceed the requirements of Part 5 (Special Provisions and Exceptions) as determined by the Department
10. Part 5 (Special Provisions and Exceptions)
11. Proposal provisions that exceed the requirements of Part 3 (Quality Program) as determined by the Department
12. Part 3 (Quality Program)
13. Proposal provisions that exceed the requirements of Part 9 (Warranty Provisions) as determined by the Department
14. Part 9 (Warranty Provisions)
15. Part 8 (Engineering Data)
16. Appendix to Part 4-06 (Geotechnical)
17. The Proposal to the extent it meets the requirements of the Contract Documents

Proposal provisions that exceed the requirements of the Contract Documents are those that are in addition to or more advantageous to the Department than those contained in the Contract Documents as determined at the sole discretion of the Department.

The body of a Part takes precedence over any conflicting provisions contained in exhibits, attachments or documents incorporated by reference in that Part.

If an Approved ATC or conditionally Approved ATC is incorporated in the Proposal, the ATC shall have the priority of an amendment to the Contract Documents to which the ATC applies.

If there are any conflicts in standards adhere to the standard with the highest priority.

If there is a conflict among or between any provision(s) of the Contract Documents that cannot be resolved by an order of precedence, the Design-Builder shall notify the Department and the Department will determine, in its sole discretion, which requirement(s) applies.

Part 8 (Engineering Data), Geotechnical Investigations, constitutes a Contract Document only to the extent that it includes information that the Design-Builder is entitled to rely on pursuant to Part 2, Section 4 (Differing Site Conditions).

The "Executive Summary and Summary Statement" and Appendix A (Legal and Financial Information) will not become part of the Contract Documents.

1.3.1 Amendments

The Contract shall be amended only by a written instrument duly executed by the parties or their respective successors or assigns.

1.4 Reference Documents (RD)

RDs are for information only and are not Contract Documents to be relied upon by the Design-Builder. The Department has provided RDs, including a conceptual design, to the Design-Builder as part of the RFP for the convenience of the Proposers and the Design-Builder. The Department acknowledges that the Design-Builder may elect to use the RDs in its discretion; however, both parties agree that the Department has not analyzed, gathered, or developed the RDs for accuracy or sufficiency for use, and they may include errors, omissions, inconsistencies, inaccuracies, deficiencies, or other defects. The Design-Builder has no right to rely on the RDs or to assume that the conceptual design is feasible and is a reasonable engineering approach to the Project. The Design-Builder acknowledges that it has other means available to it in gathering, verifying or developing the information provided in the RDs, or in otherwise developing information that may be contained in the RDs and that its failure to employ such efforts necessarily assumes accepting the risk that the RDs are not accurate, complete, or otherwise sufficient for the Design-Builder's purposes. The Design-Builder acknowledges that it prefers such assumption of risk rather than incurring the costs necessary to gather, verify, or otherwise develop the information necessary to confirm or rectify, or otherwise rely on the information provided in the RDs. The Design-Builder agrees that the RDs are not Contract Documents, and that it has assumed any and all risks associated with its use of the RDs for any purpose whatsoever, and that such risks have been accounted for in the Contract Amount.

1.5 Interpretations

In the Contract Documents, where appropriate

1. The terms "General Provisions," "Contract terms," and "Contract requirements" shall be interchangeable, subject to Section 1.3 (Order of Precedence).
2. The singular includes the plural and vice versa.
3. Words not otherwise defined that have well-known technical or construction industry meanings are used in accordance with such recognized meanings.
4. References to Persons include their respective permitted successors and assigns and, in the case of Governmental Persons, Persons succeeding to their respective functions and capacities.
5. Words of either gender include the other gender where appropriate.
6. Use of the word "includes," "including," "included," and "include" shall be deemed to be followed by the words "but not limited to."
7. Headings and organization within the Parts are for convenience only.
8. Portions of the Contract Documents may be written in the imperative. In sentences using the imperative, unless otherwise specifically stated, the subject "the Design-Builder" is

implied, and it is understood the Design-Builder shall perform such Work, comply with the requirements of, furnish such material, or take such action. The word "shall" is also implied, and when implied or stated is to be considered mandatory and pertain to requirements or actions of the Design-Builder.

9. Unless otherwise specified, lists contained in the Contract Documents defining the Project or the Work shall not be deemed all-inclusive.
10. Unless otherwise specified, references to Sections, Appendices, Attachments, and Exhibits are to the document which contains such references.

The Design-Builder acknowledges and agrees that it had the opportunity and obligation, prior to submission of its Proposal, to review the Contract Documents and to bring to the Department's attention any conflicts or ambiguities contained in them. The Design-Builder further acknowledges and agrees that it has independently reviewed the Contract Documents with legal counsel, and that it has the requisite experience and sophistication to understand, interpret and agree to the particular language of the Contract Documents. Accordingly, in the event of an ambiguity in or dispute regarding the interpretation of the Contract Documents, the Contract Documents shall not be construed against the Person that prepared them, and shall be considered as drafted by both parties. The Department's final answers to the questions posed during the proposal process for the Contract shall in no event be deemed part of the Contract Documents except to the extent that the Department has made changes to the Contract Documents in response to such questions.

1.6 Referenced Standards, Codes or Criteria

Except as otherwise specified in the Contract Documents or otherwise directed by the Department, references to standards, codes, or criteria, or to the latest version of standards, codes, or criteria, shall mean the latest version in effect on the RFP Issued Date.

1.7 Omission of Details; Clarification by the Department

The Design-Builder shall not take advantage of any apparent error, omission, ambiguity, inconsistency, inaccuracy, deficiency, inadequacy, or other defect in the Contract. Should it appear that the Work to be done or any matter relative thereto is not sufficiently detailed or explained in the Contract Documents, the Design-Builder shall apply to the Department in writing for such further written explanations as may be necessary and shall conform to the explanation provided. The Design-Builder shall promptly notify the Department of all errors, omissions, ambiguities, inconsistencies, inaccuracies, deficiencies, inadequacies, or other defects that it may discover in the Contract Documents, and shall obtain specific instructions in writing from the Department before proceeding with the Work affected thereby. Any such errors, omissions, ambiguities, inconsistencies, inaccuracies, deficiencies, inadequacies or other defects that are known or should have been known by the Design-Builder are not subject to the change provisions in Part 2, Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work).

1.8 Computation of Days

References to "days" or "Days" contained in the Contract Documents shall mean Calendar Days unless specified otherwise. If the date to perform any act or give any notice specified in the Contract Documents (including the last date for performance or provision of notice "within" a specified time period) falls on a Saturday, Sunday, or Legal Holiday, such act or notice may be timely performed on the next succeeding day that is not one of the above weekend days or Holiday. Notwithstanding the foregoing, requirements contained in the Contract Documents relating to actions to be taken in the event of an emergency and any other requirements for which it is clear that performance is intended to occur on a Calendar Day, including Saturday, Sunday, and Legal Holidays, shall be required to be performed as specified, even though the date in question may fall on one of the above Days.

Documentation submitted after 4 p.m. Mountain Time on a Friday or a day prior to a Department Holiday will not be processed until the following Working Day. If the Department is required to respond within a specified number of Days, Days will not begin to be assessed until after 8 a.m. the next Working Day.

1.9 Standard for Approvals

In all cases where Approvals, acceptances or consents are required to be provided by the Department or Design-Builder, and unless the exercise of sole discretion is expressly allowed, such Approvals, acceptances, or consents shall not be withheld unreasonably.

2) DESIGNATION OF, AND COOPERATION WITH REPRESENTATIVES

2.1 Designation of Representatives

Concurrently with execution hereof, the Department and the Design-Builder shall each designate an individual or individuals who shall be authorized to make decisions and bind the parties on matters relating to the Contract Documents. Such designations may be changed by a subsequent writing delivered to the other party in accordance with Section 3 (Notices and Communications). The parties may also designate technical representatives who shall be authorized to investigate and report on matters relating to the construction of the Project and negotiate on behalf of each of the parties but who do not have authority to bind the Department or the Design-Builder.

2.2 Cooperation

The Design-Builder shall cooperate with the Department and all representatives of the Department designated as described above.

3) NOTICES AND COMMUNICATIONS

3.1 Delivery of Notices

Notices under the Contract Documents shall be in writing and sent via the project email followed by a hard copy to the following addresses (or to such other address as may from time to time be specified in writing by such Person):

3.1.1 Design-Builder's Point of Contact

All correspondence with the Design-Builder shall be sent to the Project Manager or as otherwise directed by such Project Manager. The address for such communications shall be

[Information to be inserted from Design-Builder's Proposal]

Name: _____

Address: _____

City: _____ State: _____ Zip code: _____

Telephone number: _____

E-mail address: _____

Fax number: _____

3.1.2 Department's Primary Contact

All communications to the Department shall be marked with the Department's Project identification number and shall be delivered to the Department's Project Manager, with copies to such additional Persons as may be designated by the Department's Project Manager, at the address set forth below:

ATTN: **Marwan Farah, PE, Project Director**
UDOT Region 2
2010 South 2760 West
Salt Lake City, UT 84104
Project Email: Bangerter4InterchangesRFP@interchange.udot.utah.gov

3.2 Receipt of Notices

Notices shall be deemed received when actually received via email, in the office of the addressee (or by the addressee if personally delivered) or when delivery is refused, as shown on the receipt of the U.S. Postal Service, private carrier or other Person making the delivery. Notwithstanding the foregoing, all other notices received after 9:00 a.m. Mountain Time (as applicable) shall be deemed received on the first Working Day following delivery.

3.3 Copies of Correspondence to the Department

The Design-Builder shall copy the Department on all written correspondence pertaining to the Contract between the Design-Builder and any Person other than the Design-Builder's Subcontractors, consultants and attorneys.

4) TIMES WITHIN WHICH PROJECT SHALL BE COMPLETED

4.1 Time of Essence

Time is of the essence in the performance of the Contract.

4.2 Notice to Proceed (NTP)

The Design-Builder shall begin performance of the Work after receipt of NTP issued by the Department.

4.3 Prerequisites for Start of Construction

The Design-Builder shall not start construction (or recommence construction following any suspension) of any portion of the Project until all the following events have been fully satisfied with respect to the Work proposed to be constructed:

1. The Department has issued NTP.
2. All insurance certificates, OCIP enrollments, and Payment and Performance Bonds required to be delivered to the Department hereunder have been submitted to the Department as applicable and remain in full force and effect.
3. All Governmental Approvals necessary for construction of such portion of the Project have been obtained and all conditions of such Governmental Approvals that are a prerequisite to commencement of such construction have been performed.
4. All necessary rights of access for such portion of the Project have been obtained.
5. Baseline Schedule Approved by the Department as required by Part 2 (General Provisions)

6. Schedule of Values Approved by the Department as required by Part 2 (General Provisions)
7. Site-specific Safety Plan
8. Quality Management Plan Approved by the Department as required by Part 3 (Quality Program)
9. Environmental Protection Program Approved by the Department as required in Part 4-05 (Environmental Compliance)
10. Traffic Management Plan, Approved by the Department as required in Part 4-10 (Maintenance of Traffic)
11. Released for Construction Documents have been issued for that portion of the Work.
12. Any additional conditions for construction set forth in the Contract Documents have been fully satisfied.

4.4 Completion Deadlines

The following are the completion deadlines for the Project.

4.4.1 Substantial Completion Deadline

The Design-Builder shall achieve Substantial Completion within ____ Calendar Days from March 6, 2017. Substantial Completion must be achieved no later than November 2, 2018. Said deadlines for Substantial Completion, as it may be extended hereunder, are referred to as the "Substantial Completion Deadline".

4.4.2 Physical Completion Deadline

The Design-Builder shall achieve Physical Completion no later than 60 Days from receipt of Notice of Substantial Completion. Said deadline for Physical Completion, as it may be extended hereunder, is referred to as the "Physical Completion Deadline."

4.4.3 Contract Completion Deadline

The Design-Builder shall achieve Contract Completion no later than 60 Days from receipt of Notice of Physical Completion. Said deadline for Contract Completion, as it may be extended hereunder, is referred to as the "Contract Completion Deadline."

4.4.4 No Time Extensions

Except as otherwise specifically provided in Part 2, Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work), the Department shall have no obligation to extend any Completion Deadline, and the Design-Builder shall not be relieved of its obligation to comply with the Project Schedule and to achieve the applicable Completion Deadlines for any reason.

4.5 Project Milestones

The following are the milestones for the Project.

4.5.1 Start Milestones

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A. 5400 South Interchange Start Date

This is defined in Part 1 Appendix A (Acronyms and Definitions List).

B. 7000 South Interchange Start Date

This is defined in Part 1 Appendix A (Acronyms and Definitions List).

C. 9000 South Interchange Start Date

This is defined in Part 1 Appendix A (Acronyms and Definitions List).

D. 11400 South Interchange Start Date

This is defined in Part 1 Appendix A (Acronyms and Definitions List).

4.5.2 Completion Milestones

A. 5400 South Interchange Completion Date

The Design-Builder shall achieve 5400 South Interchange Completion Date within ____ consecutive Calendar Days from the 5400 South Interchange Start Date. This is defined in Part 1 Appendix A (Acronyms and Definitions List). 5400 South Interchange Completion Date must be achieved no later than the Substantial Completion Deadline.

B. 7000 South Interchange Completion Date

The Design-Builder shall achieve 7000 South Interchange Completion Date within ____ consecutive Calendar Days from the 7000 South Interchange Start Date. 7000 South Interchange Completion must be achieved no later than November 17, 2017. This is defined in Part 1 Appendix A (Acronyms and Definitions List).

C. 9000 South Interchange Completion Date

The Design-Builder shall achieve 9000 South Interchange Completion Date within ____ consecutive Calendar Days from the 9000 South Interchange Start Date. This is defined in Part 1 Appendix A (Acronyms and Definitions List). 9000 South Interchange Completion Date must be achieved no later than the Substantial Completion Deadline.

D. 11400 South Interchange Completion Date

The Design-Builder shall achieve 11400 South Interchange Date within ____ consecutive Calendar Days from the 11400 South Interchange Start Date. This is defined in Part 1 Appendix A (Acronyms and Definitions List). 11400 South Interchange Completion Date must be achieved no later than the Substantial Completion Deadline.

5) COMPENSATION AND PAYMENT LIMITATION

5.1 Contract Amount

As full compensation for the Work and all other obligations to be performed by the Design-Builder under the Contract Documents, the Department will pay to the Design-Builder the lump sum amount of $_____ *[to be inserted from Design-Builder's Proposal]*. Such amount, as it may be adjusted from time to time to account for Change Orders, is referred to in the Contract Documents as the "Contract Amount." The Contract Amount may be increased or decreased only by a Change Order issued in accordance with Part 2, Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work) or by a Contract amendment. The Contract Amount includes the *[Base Build or the Base Build and the Build Alternative based on Project funding.]*

5.1.1 Items Included in Contract Amount

The Design-Builder acknowledges and agrees that, subject only to the Design-Builder's rights under Part 2, Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work), the Contract Amount includes payment for performance of each and every portion of the Work.

The Design-Builder shall provide a fully functional Project that meets the Contract requirements within the Project Limits defined in Part 7 (Contract Drawings) and shall provide all new elements, including all those for which requirements are included in Part 4 (Project Design and Construction Requirements), except as otherwise specifically excluded in the Contract Documents.

5.2 Schedule of Payment

5.2.1 Limitations on Payment

In no event shall the Department have any obligation to pay the Design-Builder any amount that would result in payment for any Activity in excess of the value for the Activity identified in the Approved Schedule of Values. The Department does not have the obligation to pay the Design-Builder for any Nonconforming Work.

6) KEY PERSONNEL

Project Key Personnel were identified in the RFQ, submitted by the Design-Builder in their SOQ for the Project, for which Sections will be included as a Contract Document as further described in Part 2, Section 8.8 (Key Personnel).

The Design-Builder shall not change any Key Personnel without prior Department Approval and as described in Part 2 (General Provisions).

7) FACILITIES AND SPACE REQUIREMENTS

Items Provided by the Department: The Department will provide office space for the Design-Builder's Project Management, design and field staff for the Project as detailed below. Office facilities, location and size will be at the Department's sole discretion.

1. 10 Number of lockable offices
2. 45 Number of cubicle/workstations
3. 2 Number of conference rooms for Design-Builder's exclusive use
4. 1 Number of conference rooms for shared Design-Builder and Department use
5. Break room
6. Computer network infrastructure (wiring infrastructure)

Facilities and Items Provided by the Design-Builder: The Design-Builder will provide its own router, switches, computer equipment, printers, copiers/plotters, phones, office supplies, appliances (refrigerator, microwave, etc.) and vehicles, except as otherwise specifically noted in the Contract Documents. At the Design-Builder's discretion, the Design-Builder may elect to provide separate field office space.

SIGNATURES

This instrument may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

IN WITNESS WHEREOF, the parties have executed the Contract as of the date and year first set forth above.

Attest: UTAH DEPARTMENT OF TRANSPORTATION

_____ _____

UDOT Administrative Secretary Director of Transportation

Approved:_____

UDOT Contract Administrator

<DESIGN BUILD COMPANY NAME>

_____ _____

Witness to Design-Builder Company Representative Design-Builder Company Representative

REQUEST FOR PROPOSALS

UTAH DEPARTMENT OF TRANSPORTATION

4 Interchanges on Bangerter HWY (SR-154)

Project No. S-0154(12)11

Salt Lake County

PART 1, APPENDIX A – ACRONYMS AND DEFINITIONS LIST

Addendum 2 - October 6, 2016

1. Acronyms and Abbreviations

Interpret acronyms and abbreviations used in the Contract as follows:

ACRONYMS	
Abbreviation	***Title or Description***
AAN	American Association of Nurserymen
AAR	Association of American Railroads
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ADA	Americans with Disabilities Act
ADT	Average Daily Traffic
AGC	(Utah) Associated General Contractors
AI	Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AMRL	AASHTO Materials Reference Laboratory
ANLA	American Nursery and Landscape Association
ANSI	American National Standards Institute
API	American Petroleum Institute
APL	Accepted Products Listing
ARA	American Railway Association
AREA	American Railway Engineering Association
AREMA	American Railway Engineering and Maintenance-of-Way Association
ASCE	American Society of Civil Engineers
ASLA	American Society of Landscape Architects
ASSE	American Society of Safety Engineers
ASTM	American Society for Testing and Materials (ASTM) International
ATC	Alternative Technical Concept
ATMS	Advanced Traffic Management System
AWG	American wire gauge
AWPA	American Wood Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Association
BMP	Best management practice
CAR	Corrective Action Report
CCTV	Closed circuit television
CFR	Code of Federal Regulations
cfs	Cubic feet per second
CMS	Changeable Message Signs
CPM	Critical Path Method
CQM	Construction Quality Manager
CSI	Construction Specification Institute
CT	Department’s Communication Team
DB	Design-Build
DBE	Disadvantaged Business Enterprise
DEQ	Department of Environmental Quality

ACRONYMS	
Abbreviation	***Title or Description***
DQM	Design Quality Manager
ECMP	Environmental Compliance and Monitoring Plan
ECS	Environmental Control Supervisor
EEO	Equal Employment Opportunity
EIS	Environmental Impact Statement
EMR	Environmental Monitoring Report
EPP	Environmental Protection Program
EPTP	Environmental Protection Training Plan
SES	State Environmental Study
ESS	Environmental sensor sign
EUSERC	Electric Utility Service Equipment Requirements Committee
FDC	Field Design Change
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration, U.S. Department of Transportation
fps	Feet per second
FRA	Federal Railroad Administration
FSS	Federal Specifications and Standards
GRAMA	Government Records Access and Management Act, Title 63, Title 2
GRC	galvanized rigid conduit
GSA	General Services Administration
HDPE	High-density polyethylene
HMA	Hot-Mix Asphalt
HMWM	High Molecular Weight Methacrylate
I or I-	Interstate (Highway)
IACR	Interstate Access Change Request
ID	identification
IMP	Incident Management Plan
IMSA	International Municipal Signal Association
ISO	International Organization for Standardization
ITE	Institute of Traffic Engineers
ITP	Instructions to Proposers
ITS	Intelligent transportation system
JV	Joint Venture
LLC	Limited Liability Company
MMF	multi-mode fiber
MOI	Manual of Instruction
MOT	Maintenance of Traffic
MSE	Mechanically-Stabilized Earth
MUTCD	*Manual on Uniform Traffic Control Devices*
N/A	Not applicable
NCHRP	National Cooperative Highway Research Program
NCR	Non-conformance report
NDC	Notice of Design Change
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association

ACRONYMS	
Abbreviation	***Title or Description***
NESC	National Electric Safety Code
NFPA	National Fire Prevention Association
NRC	National Research Council
NTP	Notice To Proceed
NVLAP	National Verification Laboratory Acceptance Program (Bureau of Standards)
OCIP	Owner Controlled Insurance Program
OSHA	(U.S.) Occupational Safety and Health Administration
OTDR	optical time domain reflectometer
OVT	Owner Verification Testing
PCA	Portland Cement Association
PCC	Portland Cement Concrete
PCCP	Portland Cement Concrete Pavement
PCI	Precast/Prestressed Concrete Institute
PCO	Potential Change Order
PDA	Pile Driving Analysis
PDPL	Performance Data Products Listing
PI	Public Involvement
PIP	Public Involvement Plan
PM	Project Manager
POC	Point of Contact
psf	Pounds per square foot
PTI	Post-Tensioning Institute
PUE	Public Utility Easement
QA	Quality Assurance
QC	Quality Control
RCM	UDOT Region Communication's Manager
RCO	Request for Change Order
RCP	Request for Change Proposal
RFC	Released for Construction
RFI	Request(s) for Information
RFP	Request for Proposal
RFQ	Request for Qualifications
RMP	Rocky Mountain Power
RMS	Ramp Metering Station
ROD	Record of Decision
ROW	Right-of-Way
RWIS	Roadway Weather Information System
SAE	Society of Automotive Engineers
SDDM	Structures Design and Detail Manual
SMA	Stone Matrix Asphalt
SMF	single-mode fiber
SOQ	Statement of Qualifications
SOV	Schedule of Values
SPMT	Self-Propelled Modular Transporters
SPUI	Single-Point Urban Interchange
SR	(Utah) State Route

ACRONYMS	
Abbreviation	***Title or Description***
SSPC	The Society for Protective Coatings
SUE	Subsurface Utility Engineering
SWPPP	Storm Water Pollution Prevention Plan
TBD	To Be Determined
TCE	Temporary Construction Easement
TIA	Time Impact Analysis
TMP	Traffic Management Plan
TMS	Traffic Monitoring Station
TOC	(UDOT) Traffic Operations Center
TRB	(NRC) Transportation Research Board
UCRY	Utah Central Railway
UDAQ	Utah Division of Air Quality, UDEQ
UDEQ	Utah Department of Environmental Quality
UDOT	Utah Department of Transportation
UDWQ	Utah Division of Water Quality, UDEQ
UHP	Utah Highway Patrol
UL	Underwriters Laboratory, Inc.
UPDES	Utah Pollution Discharge Elimination System
UPRR	Union Pacific Railroad
USACE (or COE)	U.S. Army Corps of Engineers
USAS	United States of American Standards Institute
USBOR	U.S. Bureau of Reclamation
USC	United States Code
USDOT	U.S. Department of Transportation
UTA	Utah Transit Authority
VIDS	video image detection system
VMS	variable message sign
WBS	Work Breakdown Structure
WIM	weigh-in-motion
WWPA	Western Wood Products Association

2. Definition of Terms and Phrases

Interpret the following phrases and capitalized terms used in the Contract as follows:

Term	*Meaning*
5400 South Interchange Start Date	The date Interchange Work begins on the 5400 South and Bangerter Interchange, excluding the Build Alternative (if exercised), demolition of homes identified in Part 4-14 (Right-of-Way), potholing, and geotechnical investigation. Also excluded is clearing, grubbing, and traffic control associated with the Rocky Mountain Power Utility Work. Work may not begin any earlier than March 6, 2017.
5400 South Interchange Completion Date	The date the 5400 South and Bangerter Highway Interchange is complete in accordance with the requirements defined in Part 2, Section 13.1.1.1 (Interchange Completion), excluding the Build Alternative (if exercised).
7000 South Interchange Start Date	The date Interchange Work begins on the 7000 South and Bangerter Interchange, excluding demolition of homes identified in Part 4-14 (Right-of-Way), potholing, and geotechnical investigation. Work may not begin any earlier than March 6, 2017.
7000 South Interchange Completion Date	The date the 7000 South and Bangerter Highway Interchange is complete in accordance with the requirements defined in Part 2, Section 13.1.1.1 (Interchange Completion)
9000 South Interchange Start Date	The date Interchange Work begins on the 9000 South and Bangerter Interchange, excluding demolition of homes identified in Part 4-14 (Right-of-Way), potholing, and geotechnical investigation. Also excluded is clearing, grubbing, and traffic control associated with the Rocky Mountain Power Utility Work. Work may not begin any earlier than March 6, 2017.
9000 South Interchange Completion Date	The date the 9000 South and Bangerter Highway Interchange is complete in accordance with the requirements defined in Part 2, Section 13.1.1.1 (Interchange Completion).
11400 South Interchange Start Date	The date Interchange Work begins on the 11400 South and Bangerter Interchange, excluding demolition of homes identified in Part 4-14 (Right-of-Way), potholing, and geotechnical investigation. Also excluded is clearing, grubbing, and traffic control associated with the Rocky Mountain Power Utility Work. Work may not begin any earlier than March 6, 2017.
11400 South Interchange Completion Date	The date the 11400 South and Bangerter Highway Interchange is complete in accordance with the requirements defined in Part 2, Section 13.1.1.1 (Interchange Completion).
Abandonment	After a Utility Company has decommissioned a Utility, the Work necessary for each Utility (including appurtenances) for a Utility that is not removed, using proper Utility Company and/or industry procedures (e.g., flushing, capping, filling with grout or sand) or other procedures Approved by the Department. Design-Builder is responsible to coordinate with the Utility Company when it is necessary for the Utility Company to be involved in the decommissioning of a Utility (including appurtenances).
Acceleration Cost	The meaning set forth in Part 2, Section 16.6.2 (Limitation on Acceleration Costs and Delay Damages).
Actual Cost	Design-Builder's direct Cost to provide labor, material, equipment (owned or invoiced rental), and administrative overhead necessary for the Work; excludes

Term	*Meaning*
	profit.
Addenda / Addendum	Supplemental addition, deletions, and modifications to the provision of the RFP after the advertisement date of the RFP.
Affidavit requesting Contract Completion	As described in Part 2, Section 13.6 (Request for Contract Completion).
Affiliate	(i) Any Person that directly or indirectly through one or more intermediaries controls, or is controlled by, or is under common control with the: (A) Design-Builder or (B) any Principal Participant; and (ii) Any Person for which 10 percent or more of the equity interest in such Person is held directly or indirectly, beneficially, or of record by the: (A) Design-Builder, (B) any Principal Participant, or (C) any Affiliate of the Design-Builder under clause (i) of this definition. For purposes of this definition, the term "control" means the possession, directly or indirectly, of the power to cause the direction of the management of a Person, whether through voting securities, by contract, family relationship, or otherwise.
Alternative Technical Concept	The Design-Builder's written request to conduct Work that differs from the design, construction, and/or technical requirements of the Contract, which was included with the Proposal and Approved by the Department.
Approval	Formal conditional determination in writing by the Department's Project Manager that a particular matter or item is good or satisfactory for the Project. Such determination may be based on requirements beyond those set forth in the Contract Documents and may be subject to Changes in the Work as defined in Part 2, Section 16.
As-Built Documents	Documents that reflect all changes made in the drawings and specifications during the construction process, and show the exact dimensions, geometry, and location (including alignment points) of all elements of the Work completed under the contract.
Award	The Department's acceptance of a Proposal after selection and review of the Design-Builder's EPD.
Betterment	As related to Utilities, a Betterment is generally defined as the upgrading; (e.g., increase in capacity) of a Utility being relocated that is not attributable to the construction of the Project or is made solely for the benefit of and at the election of the Utility Company (not including a technological improvement which is able to achieve such upgrade at a cost equal to or less than the cost of a "like for like" replacement or relocation). The use of new materials or compliance with current standards in the performance of the Utility Work is not considered a Betterment. As related to Third Parties, a Betterment is generally defined as an upgrading (e.g., increase in capacity or update of design of work) or additional work that is conducted for the Third-Party and is not required by construction of the Project and is solely requested for the benefit of the Third Party.
Calendar Day	Any day shown on the calendar, beginning and ending at midnight.
Certification	A written document or affidavit officially declaring confirmation of a statement or information as being true, accurate, or genuine.
Change Order	As defined in Part 2, Section 16.1.1 (Change Orders).

Term	*Meaning*
Claim	A separate demand by the Design-Builder for: (i) a time extension that is disputed by the Department, or (ii) payment of money or damages arising from work done by or on behalf of the Design-Builder in connection with the Contract that is disputed by the Department. A claim will cease to be a Claim upon resolution thereof, including resolution by delivery of a Change Order or Contract amendment signed by all parties.
Claims Review Board	A board established by the Department to hear and review unresolved Design-Builder claims as described in Part 2, Section 22.5 (Claims Review Board)
Closure	Any Full Closure or Partial Closure as defined in Part 4-10 (Maintenance of Traffic).
Commission	The Utah Transportation Commission.
Compensable Project Overhead	The lump sum overhead that shall consist of those overhead costs that are in proportion to the time required to complete the work. Compensable Project Overhead shall not include costs that are not related to time, including but not limited to, mobilization, licenses, permits, and other charges that may only be incurred once during the Contract. Compensable Project Overhead shall not apply to subcontractors of any tier, suppliers, fabricators, manufacturers, or other parties associated with the Design-Builder.
Compensable Project Overhead Rate	The Compensable Project Overhead divided by the number of Calendar Days required between NTP and the Contract Completion Date in the Proposal.
Completion Deadline	The date when certain Contract Work is specified to be complete, as defined in Part 1 (Agreement).
Construction Limit	Area within the existing highway right-of-way or construction easements as shown on the ROW Drawings in Part 7 that defines the area available for access by the Design-Builder in accordance with the Contract Documents.
Construction Subcontractor	A subcontractor on the Design-Builder's team that will be responsible for part of the construction of the Project.
Contaminated Groundwater	Extracted groundwater including contaminants above legally-permitted discharge levels so as to require treatment prior to re-use or disposal. Contaminated groundwater, which may legally be re-used without treatment, including use for dust control, or which merely requires dilution prior to re-use or disposal, shall specifically be excluded from the definition.
Contract Amount	The lump sum contract price, which shall initially be the sum of the individual lump-sum amounts as shown on Form PA (Price Allocation) in the Proposal.
Contract Completion	As defined in Part 2, Section 13 (Project Acceptance).
Contract Drawings	The drawings included in Part 7 (Contract Drawings).
Contract or Contract Documents	Written agreement between the Department and the Design-Builder establishing the obligations of the parties for the performance of the Work prescribed. The Contract/Contract Documents include the documents identified in Part 1, Section 1.2 (Contract Documents), all of which constitute one instrument.
Contract Price	See Contract Amount.
Control Point	The meaning set forth in Part 3, Section D (Construction Control Point Inspection).
County	The County or Counties where Work is located.

Term	*Meaning*
Critical Path	The series of activities that determine the Project's Substantial Completion Deadline; a delay to any of these activities could delay the finish date of the entire Project. The Department defines the Critical Path as the Longest Path.
Day	The meaning set forth in Part 1, Section 1.8 (Computation of Days).
Debarment	Action taken by the Department or federal government pursuant to regulations that prohibits a person or company from performing work on a public project.
Defect or Defective Condition	Nonconforming Work.
Delay Damages	As defined in Part 2, Section 16.6.2 (Limitation on Acceleration Costs and Delay Damages).
Department	The Utah Department of Transportation.
Department-Directed Change	A change requested by the Department through a Form C-107.
Design-Build	A project delivery methodology by which the Department contracts with a single firm that has responsibility for the design and construction of a project under a single contract with the Department.
Design Documents	Released for Construction Documents, Design Milestones, and Final Design as defined in Part 3 (Quality Program).
Design-Build Contract	The Design-Build Contract for the 4 Interchanges on Bangerter Highway (SR-154**)** executed by the Department and the Design-Builder including all amendments thereto.
Design-Builder	The individual or legal entity contracting with the Department for the performance of the Work.
Design-Builder-Related Entities	The Design-Builder, Subcontractors, their employees, agents and officers and all other entities and individuals for whom the Design-Builder may be legally or contractually responsible.
Designer	The Principal Participant, Subcontractor, or in-house designer that has primary responsibility for design services for the Project.
Differing Site Conditions	As defined in Part 2, Section 4 (Differing Site Conditions)
Directive Letter	The letter as described in Part 2, Section 16.1.2 (Issuance of a Directive Letter) issued by the Department requesting or regarding a change in Work.
Disadvantaged Business Enterprise (DBE)	A for-profit small business concern as defined in 49 Code of Federal Regulations (CFR) Part 26.
Disincentive or Disincentive Assessment	As defined in Part 2, Section 20 (Incentives, Disincentives, and Damages).
Dispute	Any disagreement between the Department and the Design-Builder arising out of or relating to the Contract Documents, the Work, or the Project, including Claims, disagreements resulting from a change, a delay, a Change Order, any other written orders, or oral orders from the Department, including any direction, instruction, interpretation, or determination by the Department. Dispute does not include claims that are not actionable against the Department by the Design-Builder.
Disruption Damages	The meaning set forth in Part 2, Section 16.6.2 (Limitation on Acceleration

Term	***Meaning***
	Costs and Delay Damages).
Engineer	The UDOT Deputy Director, acting directly or through a duly authorized representative, usually the Resident Engineer or Contract Engineer, responsible for engineering and administration of the contract. A Consultant Engineer hired by the Department for construction project management is considered an extension of the Department and has the same responsibility and authority as a Resident Engineer.
Environmental Compliance	Conformity in fulfilling all of the requirements, provisions, commitments, and restrictions of all applicable Environmental Laws, all Governmental Approvals obtained in connection with the Project, all environmental commitments contained in the Environmental Documents pertaining to the Project, all provisions of Part 4-05 (Environmental Compliance) of the RFP (which includes the Standards for Environmental Compliance contained in Table 5B-1, the Environmental Protection Program (EPP), the Environmental Protection Training Plan (EPTP), and the Environmental Compliance Monitoring and Reporting Plan (ECMP)), and all applicable Federal, State, and local rules and regulations.
Environmental Documents	The 4 Interchanges on Bangerter Highway (SR-154**)** Environmental Documents.
Environmental Laws	All Laws now or hereafter in effect relating to the environment or to emissions, discharges, releases, or threatened releases of Hazardous Substances into the environment, including into the air, surface water or groundwater, or onto land, or relating to the manufacture, processing, distribution, use, treatment, storage, disposal, transport, or handling of Hazardous Substances or otherwise relating to the protection of public health, public welfare, or the natural environmental (including protection of nonhuman forms of life, land, surface water, groundwater, and air), including the statutes listed in the definition of Hazardous Substances; the National Environmental Policy Act, as amended, 42 U.S.C. §§ 4321 et seq.; the Occupational Safety and Health Act, as amended, 29 U.S.C. §§ 651 et seq.; and the Hazardous Materials Transportation Act, as amended, 49 App. U.S.C. §§ 1801; the Endangered Species Act, as amended, 16 U.S.C. §§ 1531 et seq.; the Clean Water Act, 33 U.S.C. §§ 1251, et seq.; the Safe Drinking Water Act, 42 U.S.C. §§ 300f, et seq.; the Migratory Bird Treaty Act, 16 U.S.C. §§ 703 et seq.; and the Eagle Protection Act, 16 U.S.C. § 668, each as amended.
Equal or Better Change Order	The meaning set forth in Part 2, Section 16.2 (Equal or Better Change Orders).
Equipment	All machinery, tools, apparatus, and the fuels, lubricants, batteries, and other supplies and parts needed to use, operate, and maintain these items for use in constructing and completing the work.
Escrow Proposal Documentation	The documentation described in Part 2, Section 23.1 (Escrowed Proposal Documents).
Final Acceptance	As described in Part 2, Section 13 (Project Acceptance).
Force Account Change Order	The meaning set forth in Part 2, Section 16.4 (Force Account Change Orders).
Force Majeure	As defined in Part 2, Section 15.5 (Force Majeure Events).
Governmental Approval	Any approval, authorization, certification, consent, decision, exemption, filing, lease, license, permit, agreement, concession, grant, franchise, registration or

Term	***Meaning***
	ruling, required by or with any Governmental Person in order to design and construct the Project.
Governmental Body	Any federal, state, local, or foreign government; any political subdivision; or any governmental, quasi-governmental, judicial, public, or statutory instrumentality, administrative agency, authority, body, or entity.
Governmental Person	Any federal, state or local government and any political subdivision or any governmental, quasi-governmental, judicial, public or statutory instrumentality, administrative agency, authority, body or entity. The term includes the State and agencies and subdivisions thereof, other than the Department.
Hazardous Substance	Any of the following: (i) Substance, product, waste or other material of any nature whatsoever which is or becomes listed, regulated, or addressed pursuant to the Comprehensive Environmental Response, Compensation and Liability Act, 42 USC Section 9601, et seq. ("CERCLA"); the Hazardous Materials Transportation Act, 49 USC Section 1801, et seq.; the Resource Conservation and Recovery Act, 42 USC Section 6901 et seq. ("RCRA"); the Toxic Substances Control Act, 15 USC Sections 2601 et seq.; the Clean Water Act, 33 USC Sections 1251 et seq.; the Clean Air Act, 42 USC Sections 7401 et seq.; all as amended, or any other federal, state or local statute, law, ordinance, resolution, code, rule, regulation, order or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic or dangerous waste, substance or material, as now or at any time hereafter in effect; (ii) Any substance, product, waste or other material of any nature whatsoever which may give rise to liability under any of the above statutes or under any statutory or common law theory based on negligence, trespass, intentional tort, nuisance or strict liability or under any reported decisions of a state or federal court; (iii) Petroleum or crude oil excluding de minimis amounts and excluding petroleum and petroleum products contained within regularly operated motor vehicles; (iv) Asbestos or asbestos-containing materials in structures and/or other improvements on or in the Site (other than mineral asbestos naturally occurring in the ground); and (v) Lead or lead-containing materials in structures and/or other improvements on or in the Site.
Holidays	As defined in Part 4-10 (Maintenance of Traffic)
Incidental Utility Work	All of the following types of work necessary for the construction of the Project (or undertaken for the convenience of the Design-Builder's construction operations): temporary relocations, relocations of service lines, protection in place of Utilities, removal of abandoned Utilities, abandonment of Utilities, the adjustment of Utility appurtenances (e.g., manholes, valve boxes, and vaults) for line and grade upon completion of roadway work, and removal of Asbestos Cement (AC) pipe including handling, disposal, abatement, and cost to meet DEQ requirements.
Indemnified Parties	Collectively, the Department and its agents, consultants, and their respective successors and assigns and their respective shareholders, officers, directors, agents and employees.

Term	*Meaning*
Inspector	An authorized representative of the Department assigned to inspect Work and materials.
Instructions to Proposers (ITP)	The RFP Document identified as Instructions to Proposers.
Interchange Completion	As defined in Part 2, Section 13.1.1.1 (Interchange Completion)
Interchange Work	All duties and services to be furnished and provided by Design-Builder as required by the Contract Documents to construct an interchange, including construction Quality Control, Quality Assurance, Relocation, installation, supervision, testing, verification, labor, materials, equipment, documentation and other efforts necessary or appropriate to achieve Interchange Completion except for those efforts which the Contract Documents specify will be performed by the Department or other Persons. Interchange Work includes alterations, amendments, or extensions made by Change Order or other written orders of the Department.
Items of Archeological or Biological Significance	Historical, archaeological or paleontological objects, features, sites, human remains, or migratory avian species.
Key Personnel	The persons listed in Part 2, Section 8.8 (Key Personnel), subject to revision in accordance with Part 2 (General Provisions).
Law or Laws	Any statute, law, regulation, ordinance, rule, judgment, order, decree, permit, concession, grant, franchise, license, agreement, directive, guideline, policy requirement or other governmental restriction or any similar form of decision of or determination by, or any interpretation or administration of any of the foregoing by, any Governmental Body, which is applicable to or has jurisdiction over the Project or the Work, whether now or hereafter in effect. Herein, "Laws" does not include Governmental Approvals.
Lead Principal Participant	The person who is designated by the Design-Builder as having the lead responsibility for managing the Design-Builder's organization.
Lien	Any pledge, lien, security interest, mortgage, deed of trust or other charge or encumbrance of any kind, or any other type of preferential arrangement (including any agreement to give any of the foregoing, any conditional sale or other title retention agreement, any lease in the nature of a security instrument, and the filing of or agreement to file any financing statement or other instrument intended to perfect a security interest).
Liquidated Damages	As defined in Part 2, Section 20.3 (Liquidated Damages and Closure Disincentives).
Major Contractor	A principal participant, designer, subconsultant, or subcontractor responsible for performing more than 15 percent of the design, or subcontractor responsible for performing more than 20 percent of the Project or contract Work.
Master Utility Agreement	An initial agreement between the Department and any Utility Company that is affected by the Project, under which the parties set forth (1) scope and framework for accomplishing Utility relocations necessary for the Project; (2) allocation and responsibility for the design and construction work between the Design-Builder and the Utility Company; and (3) Utility Company's requirements, including, but not limited to, time frames and commitments for design, material acquisition, engineering review, and construction activities with respect to relocation work. Each Master Utility Agreement has specific terms that provide how the relocation work is paid for and by whom.
Necessary Project	A change to the Project Configuration that is necessary to meet the requirements

Term	***Meaning***
Configuration Change	of the Contract Documents as a result of an error, omission, inconsistency, inaccuracy, deficiency or other defect in the Project Configuration (with the understanding that a change shall be deemed "necessary" only if the error, omission, inconsistency, inaccuracy, deficiency or other defect creates a problem in which the Design-Builder is unable to meet the Contract requirements without a material change in the Project Configuration).
New Environmental Document	Any of the following: (i) A new Governmental Approval of the same type as an Environmental Document; or (ii) A renewal, revision, modification or amendment to one or more of the Environmental Documents.
Nonconforming Work	Work performed that does not meet the requirements of the Contract Documents. Nonconforming Work shall include the failure to perform administrative or management tasks in accordance with the requirements of the Contract Documents.
Notice of Award	Written notice issued to the Design-Builder by the Department that occurs after the Department has reviewed the selected Design-Builder's Escrow Proposal Documents.
Notice of Physical Completion	As defined in Part 2, Section 13.5 (Notice of Physical Completion).
Notice To Proceed	A written notice issued by the Department to the Design-Builder to begin Contract Work, as defined in Part 1, Section 4.2 (Notice To Proceed).
Oversight	As described in Part 2, Section 3.5.2 (Oversight, Audit, Inspection, and Testing by the Department and Others)
Owner Verification Testing (OVT)	Sampling, testing, and inspection performed by the Department or its representative, at a defined frequency, or the purpose of verifying the integrity of the process.
Payment Activities	As defined in Part 2, Section 12.1.2 (Payment Activities)
Payment Bond	The approved form of security executed by the Design-Builder and its Surety or Sureties and furnished to the Department to guarantee payment of all persons named in Utah Code Section 63-56-504(1)(b), with respect to the complete design and construction of the Contract; See Part 2, Section 27 (Surety Bonds)
Payment Item	Lump Sum items in Form PA of the Design-Builder's Proposal
PCO Notice	The potential change order notice as described in Part 2, Section 16.3.4 (Procedures for Design-Builder-Initiated Lump Sum Change Orders)
Performance Bond	The approved form of security executed by the Design-Builder and its Surety or Sureties and furnished to the Department to guarantee completion and full execution of the Work under the Contract; See Part 2, Section 27 (Surety Bonds)
Person	Any individual, corporation, company, voluntary association, partnership, trust, unincorporated organization, or Governmental Person, including the Department.
Physical Completion	As defined in Part 2, Section 13.4 (Physical Completion)
Physical Completion Deadline	The date set forth in Part 1, Section 4.4 (Completion Deadlines)
Plan	An Approved Contract drawing showing the location, type, dimensions, and

Term	*Meaning*
	details of the specified Work. a. **Standard Drawing**: A detailed drawing approved for repetitive use; b. **Working Drawing:** A supplemental design sheet or similar data that the Design-Builder is required to submit to the Department, such as shop drawings, erection Plans, falsework Plans, framework Plans, cofferdam Plans, and bending diagrams for reinforcing steel.
Preliminary Engineering Concept	Conceptual plans developed for bidding purposes; included in the Reference Documents.
Principal Participant	Any of the following: a. A general partner or joint venture member of the Design-Builder; and/or b. An individual or entity holding (directly or indirectly) a 15% or greater interest in the Design-Builder.
Profile Grade	The trace of a vertical plane intersecting the top surface of the proposed wearing surface, usually along the longitudinal centerline of the roadbed. Profile grade means either elevation or gradient of such trace according to the context.
Project	The 4 Interchanges on Bangerter Highway (SR-154**)** as described by the Contract Documents. The 4 interchanges are defined as follows: All Work associated with a specific interchange on the Project as described in Part 4-01 (Project Configuration). The specific interchanges are 5400 South and Bangerter Highway (includes the Build Alternative if exercised), 7000 South and Bangerter Highway, 9000 South and Bangerter Highway, and 11400 South and Bangerter Highway.
Project Baseline Schedule	As defined in Part 2, Section 11.1 (Project Baseline Schedule)
Project Configuration	The mandatory elements of the Project set forth in Part 4-01 (Configuration), subject to Approved modifications thereto contained in the Proposal, where such Approval was obtained in accordance with the Contract.
Project Director	The person, identified in Part 1, Section 3.1.2 (Department's Primary Contact), designated by the Department to direct the Project and to receive delivery of notices to the Department.
Project Float	As defined in Part 2, Section 11.4 (Project Float).
Project Manager	The Design-Builder's authorized representative in responsible charge of the Work.
Project Schedule	Any of the accepted schedules as defined in Part 2, Section 11.1 (Project Baseline Schedule), determined based on context.
Project Site or Site or Work Site	The parcels of ROW identified on the ROW Drawings in Part 7 (Contract Drawings) or upon which the Project is to be constructed and installed, and all other areas in the vicinity used by the Design-Builder for construction Work. For purposes of indemnification, safety and security requirements, and payment for use of equipment, the term "Project Site" and "Site" also includes (i) any areas on which Relocation Work is performed and (ii) any property being temporarily used by the Design-Builder for storage of equipment and/or construction Work.
Proposal	The Design-Builder's written response to the Department's Request for

Term	*Meaning*
	Proposals (RFP) for the Project by the Department.
Proposer	An individual or legal entity submitting a Proposal in response to the Department's Request for Proposals (RFP).
Quality Acceptance Program	The QC, QA, Oversight, and associated activities performed by the Design-Builder and the Department and their interrelationships to ensure that all work complies with the contract.
Quality Assurance (QA)	All planned and systematic actions to certify and provide evidence of compliance that all Work complies with the requirements of the Contract Documents and that all materials incorporated in the Work, all equipment used, and all elements of the Work will perform satisfactorily for the purpose(s) intended. Actions include design checks and reviews, specification reviews, document control reviews, and working plan reviews; materials Sampling and Testing at the production site and the Project site; oversight of manufacturing/processing facilities and equipment; oversight of on-site equipment; calibration of test equipment; acceptance or rejection of material; and documentation of all activities.
Quality Control (QC)	The total of all activities that are performed by the production staff of the Design-Builder, Designer, Subcontractor, producer, or manufacturer to ensure that a product meets Contract requirements. QC may include design reviews and checks; inspection of material handling and construction; calibration and maintenance of sampling and testing equipment; working Plan review; document control; production process control; any inspection, sampling, and testing done for these purposes; and documentation of QC activities.
Quality Management Plan (QMP)	The plan that sets out the Design-Builder's means of complying with its obligations in relation to QC, which plan shall be provided and maintained in accordance with the Contract requirements.
Quality Program	All Quality processes developed by the Design-Builder and outlined in their Approved QMP to ensure that all Work is in accordance with the Contract, including QC activities.
Reasonable Accuracy	The meaning set forth in Part 4-19C-3 (Subsurface Utility Engineering (SUE) Information – "Reasonable Accuracy").
Recovery Schedule	The schedule described in Part 2, Section 11.1.3 (Recovery Schedule).
Reference Documents (RD)	The collection of information, data, documents and other materials that the Department has made available to the Design-Builder in connection with the Project or the Work (including those contained in the RFP documents) for general or reference information only and without any warranty as to their accuracy, completeness or fitness for any particular purpose. The Reference Documents are not Contract Documents.
Region	One of four geographical subdivisions of the State used to designate or identify the location of the proposed Work.
Released for Construction Documents (RFC)	The Design-Builder's issuance of design documents upon meeting specific requirements in accordance with Part 3 (Quality Program).
Relocation (or relocation)	As used in connection with Utilities, the removal, relocation, abandonment and/or protection in place (including provision of temporary services as necessary) of any Utility that is necessary in order to accommodate or permit construction of the Project; depending on the context, the term also may refer to

Term	*Meaning*
	the relocation of such a Utility from a location that conflicts with the Project to another location.
Remediation Work	Assessment, sampling, containment, remediation and/or off-site disposal of Hazardous Substances on the Project site in accordance with all applicable requirements of Laws and Governmental Approvals regarding the identification, handling, generation, treatment, storage, transfer, and disposal of Hazardous Substances
Removal	All Work necessary to remove any existing Utilities for which leaving the existing Utility in place is not feasible or not allowed, or which is required to be removed in order to accommodate or permit construction of the Project.
Request for Change Order (RCO)	A Design-Builder-initiated request for a Change Order under Part 2, Section 16.3.4 (Procedures for Design-Builder-Initiated Lump Sum Change Orders).
Request for Change Proposal (RCP)	A request issued by the Department under Part 2, Section 16.3.1 (Issuance of Request for Change Proposal by Department).
Request for Proposals (RFP)	The Request for Proposals procurement package, including all Addenda thereto, issued by the Department requesting proposals for the Project.
Request for Qualifications	The written solicitation issued by the Department seeking Statement of Qualifications (SOQs) to be used to identify the Short-list of the most highly qualified proposers to receive and respond to the RFP for the Project.
Right-of-Way (ROW)	Real property or interest acquired for or devoted to transportation purposes for the Project, as shown in ROW Drawings in Part 7 (Contract Drawings).
Right-of-Way Drawings	The documents titled Right-of-Way Drawings provided in Part 7 (Contract Drawings).
Right-of-Way Schedule	The schedule provided as Attachment 14A to Part 4-14 (Right-of-Way)
Roadside	The areas between the outside edges of the shoulders and the ROW boundaries including unpaved median areas between inside shoulders of divided highways and areas within interchanges.
Roadway	The portion of a highway within the construction limits.
Schedule of Values	As defined in Part 2, Section 12.1.1 (Schedule of Values – General)
Shop Drawings	A general term that includes drawings, diagrams, illustrations, samples, schedules, calculation, and other data, which provide details of the construction of the Work.
Short-List	The list of those Proposers who have submitted SOQs that the Department determines, through evaluation of the SOQ, are the most highly qualified Persons and will be invited to submit proposals and response to an RFP.
Shoulder	The portion of the roadway adjacent to the traveled way where vehicles may stop for emergencies and which supports base and surface courses.
Sidewalk	That portion of the roadway constructed exclusively for pedestrian use.
Specialty Subcontractor	Those consultants or subcontractors identified by the Design-Builder to perform work critical to the success of the Project such as the subcontractor for construction of bridges, retaining structures, landscaping or other specialty Work.
Standard Drawing	See Plan.

Term	*Meaning*
Standard Specifications	The Utah Department of Transportation 2012 Standard Specification for Road and Bridge Construction, including the 2012 Supplemental Specifications, as amended and as modified by Part 5 (Special Provisions and Exceptions).
Standards of the Industry	Practices, procedures, methods and standards that: (i) are consistent with current industry practices established for, or employed by, leading participants in the design, construction, operation, and maintenance industries; (ii) comply with applicable laws and applicable industry underwriters' and the fire and life safety codes and standards; and (iii) promote reliability, efficiency, safety and security. Standards of the Industry include taking reasonable steps to assure that sufficient personnel are employed and available to perform the work and that such personnel are adequately skilled, experienced, and trained to design, construct, install, operate, and maintain the work properly and efficiently, and that appropriate coordination, monitoring, and testing is performed to assure that all elements of the work are designed, constructed, and installed so as to function as required by the Contract Documents.
State	The State of Utah.
Statement of Qualifications (SOQ)	The Design-Builder's response to the Department's Request for Qualifications issued on September 17, 2015, as amended.
Structural Design Criteria Deviation Request	Structural Design Criteria Deviation Request template as defined in the SDDM.
Structural Design Criteria Deviation Acceptance	Structural Design Criteria Deviation Acceptance form as defined in the SDDM.
Subcontract	Any agreement entered into by the Design-Builder and one or more third parties providing for such third-party to perform any part of the Work or provide any materials, equipment, or supplies for any part of the Work, or any such agreement between a Subcontractor and its lower tier Subcontractor or a Supplier and its lower tier Supplier, at any tier.
Subcontractor	An individual or legal entity with whom the Design-Builder has entered into any Subcontract and any other Person with whom any Subcontractor has further subcontracted any part of the Work, at any tier.
Substantial Completion	As defined in Part 2, Section 13.2 (Substantial Completion)
Substantial Completion Deadline	The date set forth in Part 1, Section 4.4 (Completion Deadlines)
Substructure	All of the structure below the girders or main load carrying members of simple and continuous span bridges, including abutments, bent caps, columns, bents, footings, wingwalls, and skewbacks of arches.
Superintendent	The Design-Builder's authorized employee responsible for the construction field Work related to the Project.
Supplemental Agreement (or Supplemental Utility Agreement)	The vehicle for supplementing a Master Utility Agreement between the Department and a Utility Company to provide details for specific Utility relocations, including plans, cost estimates, schedules, and any other elements necessary to define the scope of work for a relocation.
Supplier	Any Person other than employees of the Design-Builder not performing Work at the site that supplies machinery, equipment, materials or systems to the

Term	*Meaning*
	Design-Builder or any Subcontractor in connection with the performance of the Work; Persons who merely transport, pick up, deliver, or carry materials, personnel, parts, or equipment or any other items or persons to or from the site shall not be deemed to be performing Work at the site.
Surety	The legal entity or individual, other than the Design-Builder, executing a bond furnished by the Design-Builder.
Third-Party	A Utility Company, Railroad company, City, County, or other entity which holds an interest in existing or proposed facilities within the limits of influence of the Project.
Third-Party Agreement	The Utility Agreements (or draft agreements) contained in Part 6 (Third Party Agreements), and any other agreements designated as such by the Department, between the Department and any Utility Companies or other Third-Parties relating to the Project.
Traffic Management Plan (TMP)	The plan described in Part 4-10 (Maintenance of Traffic).
Traveled Way	The portion of the roadway designated for the movement of vehicles, excluding shoulders and auxiliary lanes.
Utility (or utility)	Any privately, publicly, or cooperatively, or municipally owned line, facility, or system for producing, transmitting, or distributing communications, power, heat, natural gas, light, oil, petroleum products, cable television, water, sewer, steam, waste, storm water not connected with the highway drainage, signal systems, and other such products that directly or indirectly serve the public; a particular Utility Company.
Utility Agreement	A Master Utility Agreement (MUA) and/or a Supplemental Agreement, and other agreements entered into with Utility Companies.
Utility Company	The owner or operator of any Utility (including both privately held and publicly held entities, cooperative utilities, municipalities and other governmental agencies).
Utility/Third-Party Delay	Any failure by a Utility Company/Third-Party to meet any time parameters for performance by such Utility Company/Third-Party which are set forth in the applicable Third-Party Agreement (including Supplemental Agreements), which failure by the Utility Company/Third-Party delays the Critical Path so as to impair the Design-Builder's ability to meet a Completion Deadline; provided, however, that: (i) to the extent that such failure is excused under a "force majeure" provision in the applicable MUA ,Supplemental Agreement, or Third-Party Agreements such failure shall not be the basis for calculating a Utility/Third-Party Delay against the Utility Company/Third-Party; however, the Design-Builder shall be entitled to an extension of any Completion Deadline(s); (ii) once the Design-Builder has accepted a particular Utility Company/Third-Party furnished design pursuant to a Supplemental Agreement any subsequent failure by such Utility Company/Third-Party to meet the time parameters in the applicable Supplemental or Third-Party Agreement resulting from any failure of such design to comply with the requirements of the Supplemental or Third-Party Agreement shall not constitute a Utility/Third-Party Delay; and (iii) once the Design-Builder has issued a Construction Inspection Acceptance Letter for construction by a particular Utility Company/Third-Party pursuant to a Supplemental or Third-Party Agreement, any subsequent failure by such Utility Company/Third-Party to meet the time

Term	***Meaning***
	parameters in the applicable Supplemental or Third-Party Agreement resulting from any failure of such construction to comply with the requirements of such Agreement shall not constitute a Utility / Third-Party Delay. Any time parameters set forth in a MUA shall not be the basis for calculating a Utility/Third-Party Delay.
Utility Easements	All permanent easements and/or other permanent interests in real property owned by Utility Companies in connection with existing Utilities.
Utility Owner	See Utility Company.
Utility Work	The Work required under Part 4-19 (Utilities) and including Work related to or affecting Utilities or Utility Companies.
Verification/Verify	The act of substantiating, through the collection of objective evidence by the Department or its designated agent to independently establish Conformity to the Contract.
Warranty	Any warranty made by the Design-Builder in the Contract Documents, including in Part 2, Section 28 (Warranties).
Warranty Bond	As defined in Part 2, Section 27.3 (Bond Terms and Conditions).
Work	All duties and services to be furnished and provided by Design-Builder as required by the Contract Documents, including the administrative, design, engineering, Quality Control, Quality Assurance, Relocation, procurement, legal, professional, manufacturing, supply, installation, construction, supervision, management, testing, verification, labor, materials, equipment, documentation and other efforts necessary or appropriate to achieve Contract Completion except for those efforts which the Contract Documents specify will be performed by the Department or other Persons. Work includes alterations, amendments, or extensions made by Change Order or other written orders of the Department. In certain cases Work is also used to mean the Work Product. This includes the Build Alternative (if exercised).

Term	***Meaning***
Work Product	All the data, information, documentation and other work product produced, prepared, obtained or deliverable by or on behalf of the Design-Builder under the Contract, including but not limited to Plans, engineering documents, geotechnical soils and soil boring data, analyses, reports and records, property acquisition files, agreements and documents, engineers' and inspectors' diaries and reports, Utility relocation plans and agreements, ROW record maps and surveys, traffic and revenue studies, and other feasibility data, analyses, studies and reports, correspondence and memoranda relevant to design or construction decisions, contracting plans, air quality monitoring data, environmental reviews, studies and reports, mitigation studies and reports, data, assessments, studies and reports regarding Hazardous Materials investigations, tests, borings, monitoring and analyses, manifests regarding handling, storage or transportation of Hazardous Materials, final quantities, pile driving records, records of accidents and traffic management, field test records and reports, concrete pour records, surfacing depth check records, grade and alignment books, cross-section notes, drainage notes, photographs, false work and form plans, records of construction materials, and any other documents which can be reasonably described as technical or engineering documents. Work Product expressly excludes, however, documents and information which is determined to be exempted or protected from public disclosure under GRAMA.
Working Day	Any Calendar Day, except Saturdays, Sundays, and Holidays.
Working Drawing	See Plan.

REQUEST FOR PROPOSALS

UTAH DEPARTMENT OF TRANSPORTATION

4 Interchanges on Bangerter HWY (SR-154)

Project No. S-0154(12)11

Salt Lake County

CONTRACT DOCUMENTS
PART 2—GENERAL PROVISIONS

Addendum 2 – October 6, 2016

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1— OBLIGATIONS OF THE DESIGN-BUILDER

1.1. Performance Requirements

1.1.1. Performance of Work

All Work necessary to achieve Contract Completion and to meet the Contract Completion Deadline shall be the Design-Builder's sole responsibility, except as otherwise specifically provided in the Contract Documents. Subject to the terms of Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work), the costs of all such materials, services and efforts are included in the Contract Amount.

1.1.2. Performance Standards

The Design-Builder shall furnish the design of the Project in accordance with all professional engineering principles and generally accepted Standards of the Industry that are required of Professional Engineers in Utah, that are identified in the Contract Documents, and that are necessary to meet the terms, conditions, and requirements of the Contract Documents even though such principles and standards are not specifically identified. The Design-Builder shall construct the Project as designed, in a good and workmanlike manner, free from defects, and in accordance with the terms, conditions, and requirements of the Contract Documents.

1.1.3. Performance as Directed

During the course of the Work and notwithstanding the existence of any Dispute, the Design-Builder shall perform as directed by the Department in a diligent manner and without delay, shall abide by the Department's decision or order, and shall comply with all applicable provisions of the Contract Documents. If a Dispute arises regarding such performance or direction, the Dispute shall be resolved in accordance with Section 22 (Partnering and Dispute Resolution). If the Design-Builder receives direction from the Department in a form other than a Directive Letter and the Design-Builder believes that such direction constitutes a change to the Work, the Design-Builder shall request a Directive Letter confirming such direction.

1.2. General Obligations of Design-Builder

The Design-Builder, in addition to performing all other requirements of the Contract Documents, shall

(1) Provide all design and other services, as well as all goods, materials, and labor and undertake all efforts necessary or appropriate (excluding only those services, materials and efforts which the Contract Documents specify will be undertaken by other Persons) to construct the Project and maintain it during construction in accordance with the requirements of the Contract Documents and within the Completion Deadlines. The word "provide" includes and requires the Design-Builder to design, furnish, install, construct and perform all Work necessary for a final, complete, in-place, and fully functional Project which meets all the requirements of the Contract Documents.

(2) At all times provide a Project Manager, who will: (i) have full responsibility for the prosecution of the Work; (ii) act as agent and be a single point of contact in all matters on behalf of the Design-Builder; (iii) be present (or his Approved designee will be present) at the site at all times that Work is performed; and (iv) have authority to make binding decisions for the Design-Builder on all matters relating to the Project.

(3) Obtain all Governmental Approvals (other than the Environmental Documents and certain New Environmental Documents as provided in Section 5.3 (New Environmental Documents to be Obtained by the Department)), including any Governmental Approvals required to implement any Approved ATCs incorporated into the Contract Documents.

(4) Comply with all conditions imposed by and undertake all actions required by and all actions necessary to maintain in full force and effect, all Governmental Approvals, including implementation of all environmental mitigation measures required by the Contract Documents, except to the extent that such responsibility is expressly assigned in the Contract Documents to another Person.
(5) Coordinate with Third Parties regarding the Work and assist the Department in its coordination efforts.
(6) Provide such assistance as is reasonably requested by the Department in dealing with any Person and/or in prosecuting and defending claims or lawsuits in any and all matters against the Department by Third-Parties relating to the Project, which may include providing information and reports regarding the Project, executing declarations and attending meetings and hearings, but which shall in no event be deemed to require the Design-Builder to provide legal services. If the amount of time required to provide assistance becomes unreasonable, the Department may request such assistance at its cost. This obligation is not intended to address and shall not limit the Design-Builder's indemnification obligation under Section 21 (Indemnification).
(7) Comply with all requirements of all applicable Laws.
(8) Cooperate with the Department and other Governmental Persons in the review and oversight of the Project and other matters relating to the Work.
(9) Make payments to Third Parties required by the Contract Documents, if any.
(10) Supervise and be responsible to the Department for acts and omissions of all Design-Builder-Related Entities, as though the Design-Builder directly employed all such Persons.
(11) Take prompt action and measures to effectively mitigate potential loss or damage, including mitigation of delay to the Project and damages due to delay in all circumstances, to the extent reasonably possible, including by re-sequencing, reallocating or redeploying the Design-Builder's forces to other Work, as appropriate.
(12) Pay all applicable federal, State, and local sales, consumer, use, and similar taxes, property taxes, and any other taxes, fees, charges, or levies imposed by a Governmental Person, whether direct or indirect, relating to or incurred in connection with the performance of the Work.

1.3. Representations, Warranties, and Covenants

The Design-Builder further represents, warrants, and covenants for the benefit of the Department as follows:

1.3.1. Maintenance of Professional Qualifications

Throughout the term of the Contract, the Design-Builder shall obtain and maintain, and shall be responsible for Design-Builder-Related Entities to obtain and maintain, all required licenses, certifications, permits, professional ability, approvals, consents and other authorizations to perform the Work, and shall perform the work in accordance with the requirements of the Contract Documents.

1.3.2. Evaluation of Constraints

The Design-Builder has evaluated the constraints affecting delivery of the Project, including the ROW Drawings, ROW Schedule, Utility and other Third-Party facilities, and the conditions of the Environmental Documents, and agrees to deliver the Project within such constraints.

1.3.3. Feasibility of Performance

The Design-Builder has evaluated the feasibility of performing the Work within the time specified herein and for the Contract Amount, and agrees to deliver the Project within the Completion Deadlines.

1.3.4. Review of Site Information

The Design-Builder has, prior to submitting its Proposal, in accordance with prudent and generally accepted engineering and construction practices, reviewed the boring logs provided by the Department in Part 8 (Engineering Data), inspected and examined the Project Site and surrounding locations, and undertaken other appropriate activities sufficient to determine the surface conditions and subsurface conditions affecting the Project, to the extent the Design-Builder deemed necessary for submittal of its Proposal. The Design-Builder acknowledges that it is responsible for obtaining any additional information the Design-Builder needs to perform the Work that has not been provided in the Contract Documents. As a result of its review, inspection, examination, and other activities, the Design-Builder is familiar with and accepts the physical requirements of the Work and the risk allocations associated with such Work set forth in the Contract Documents, including Section 4 (Differing Site Conditions), Section 15 (Change Order Risk Allocation) and Section 16 (Changes in the Work). The Design-Builder acknowledges and agrees that changes in conditions at the Site may occur after the Proposal Due Date, and that the Design-Builder shall not be entitled to any Change Order in connection therewith except as specifically permitted under Sections 4 (Differing Site Conditions), 15 (Change Order Risk Allocation) and 16 (Changes in the Work). Before commencing any Work on a particular aspect of the Project, the Design-Builder shall verify all dimensions and conditions at the Site and shall examine all adjoining work, which may have an impact on such Work. The Design-Builder shall be responsible for ensuring that the Design Documents accurately depict all adjoining dimensions and conditions.

1.3.5. Governmental Approvals

The Design-Builder has no reason to believe that any Governmental Approval required to be obtained by the Design-Builder will not be granted in due course and thereafter remain in effect so as to enable the Work to proceed in accordance with the Contract Documents. If any Governmental Approvals required to be obtained by the Design-Builder must formally be issued in the name of the Department, the Design-Builder shall undertake all efforts to obtain such Governmental Approvals, including execution and delivery of appropriate applications and other documentation in a form Approved by the Department. The Department shall reasonably cooperate with the Design-Builder in obtaining any such Government Approvals at the Design-Builder's sole cost. If the Department obtains any Governmental Approval for the benefit of the Design-Builder at the Design-Builder's request, all costs shall be borne by the Design-Builder. If the Design-Builder is required to assist the Department in obtaining any Governmental Approvals pursuant to Section 5.3 (New Environmental Documents to be Obtained by the Department) that the Department may be obligated to obtain due to a Department-Directed Change, including providing information requested by the Department and participating in meetings regarding such Governmental Approvals, the Design-Builder may seek additional time and money in accordance with Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work).

1.3.6. Progression of Work

The Design-Builder shall at all times schedule and direct its Work to provide an orderly progression of the Work to achieve the Completion Deadlines in accordance with the Project Schedule, including furnishing such employees, materials, facilities and equipment, and working such hours (including extra shifts, overtime operations, Saturdays, Sundays and Legal Holidays) as may be necessary to achieve the Completion Deadlines, all at the Design-Builder's own expense, except as otherwise specifically provided in Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work).

1.3.7. Design and Engineering Personnel

All design and engineering Work furnished by the Design-Builder shall be performed by or under the supervision of Persons licensed to practice the relevant technical profession of architecture, landscape architecture, engineering, geology or surveying in the State, and performed by personnel who are careful,

skilled, experienced, and competent in their respective trades or professions, and professionally qualified to perform the Work.

1.3.8. Licensing

Design-Builder is licensed and shall maintain all such licenses throughout the performance of the Work.

1.3.9. Authorization

The execution, delivery, and performance of the Contract have been duly authorized by all necessary actions of the Design-Builder, and, if applicable, the Design-Builder's members, and will not result in a breach or a Default under their organizational documents or any indenture, loan, credit agreement, or other material agreement or instrument to which they are a party or by which their properties and assets may be bound or affected.

1.3.10. Legal, Valid, and Binding Obligation

The Contract constitutes the legal, valid, and binding obligation of the Design-Builder and, if applicable, of each member of the Design-Builder, enforceable in accordance with its terms.

1.4. False or Fraudulent Statements and Claims

The Design-Builder recognizes that the requirements of the Program Fraud Civil Remedies Act of 1986, as amended, 31 U.S.C. § 3801 et seq. and the USDOT regulations, "Program Fraud Civil Remedies," 49 CFR Part 31, apply to its actions hereunder. Accordingly, by signing the Contract, the Design-Builder certifies or affirms the truthfulness and accuracy of any statement it has made, it makes, or it may make pertaining to the Contract. In addition to other penalties that may be applicable, the Design-Builder also acknowledges that if it makes a false, fictitious, or fraudulent claim, statement, submission, or certification, the federal government reserves the right to impose the penalties of the Program Fraud Civil Remedies Act of 1986, as amended, on the Design-Builder to the extent the federal government deems appropriate.

1.5. Alternative Technical Concepts

Notwithstanding anything in the Contract Documents to the contrary, if an Approved Alternative Technical Concept (ATC) incorporated in the Contract Documents requires additional Governmental Approvals or other Third Party approvals or ROW, and the Design-Builder fails to obtain or comply with such additional approvals or ROW, the Design-Builder shall comply with the requirements of the Contract Documents excluding the ATC without any right to a Change Order or any other basis for a Claim. If an ATC incorporated in the Contract Documents was conditionally Approved and the Design-Builder fails to comply with such identified conditions, the Design-Builder shall comply with the requirements of the Contract Documents excluding the ATC without any right to a Change Order or any other basis for a Claim.

2— INFORMATION SUPPLIED TO DESIGN-BUILDER; RESPONSIBILITY FOR DESIGN; DISCLAIMER

2.1. Information Supplied

The Department has made available to the Design-Builder information, which is described in the Contract Documents and Reference Documents regarding the Project, and has allowed the Design-Builder access

to the Project site prior to submittal of the Design-Builder's Proposal for purposes of inspection, verification, and testing.

2.2. Responsibility for Design

The Design-Builder agrees that it has full responsibility for the design of the Project and that the Design-Builder shall furnish the design of the Project, regardless of the fact that certain conceptual design work occurred and was provided to the Design-Builder prior to the date of execution of the Contract. The Design-Builder specifically acknowledges and agrees to the following:

A. The Design-Builder is not entitled to rely on and has not relied on: (i) the Reference Documents; or (ii) any other documents or information provided by the Department that is not included in the Contract Documents.

B. The Design-Builder's Warranties under Section 28 (Warranties) and indemnities under Section 21 (Indemnification) apply regardless of any error, omission, ambiguity, inconsistency, inaccuracy, deficiency, inadequacy, or other defect in the Project even though they may be related to errors, omissions, ambiguities, inconsistencies, inaccuracies, deficiencies, inadequacies, or other defects in the Project Configuration (subject only to the Design-Builder's right to a Change Order for a Necessary Project Configuration Change) or Reference Documents. While the Design-Builder may be entitled to a Change Order for a Necessary Project Configuration Change, such compensation does not eliminate or modify Design-Builder's Warranties and indemnities for the Work performed in that Change Order.

C. The Project Configuration is preliminary and conceptual in nature.

D. The Design-Builder is responsible for correcting any errors, omissions, ambiguities, inconsistencies, inaccuracies, deficiencies, inadequacies, or other defects in the Project Configuration through the design and/or construction process without any increase in the Contract Amount or extension of a Completion Deadline(s) except in the case of Design-Builder's right to a Change Order for Necessary Project Configuration Changes in accordance with Section 15.6 (Changes in Project Configuration). In such a case, the Design-Builder becomes responsible for the design and construction of the Project Configuration, as amended by the Necessary Project Configuration Change.

2.3. Disclaimer

2.3.1. No Liability Regarding Reference Documents

The Design-Builder understands and agrees that the Department shall not be responsible or liable in any respect for any loss, damage, injury, liability, cost, or cause of action whatsoever suffered by any Design-Builder-Related Entity by reason of any use of any information contained in the Reference Documents or any action or forbearance in reliance thereon. The Design-Builder further acknowledges and agrees that: (i) if and to the extent the Design-Builder or anyone on the Design-Builder's behalf uses any of said information, such use is made at the Design-Builder's sole risk and discretion; and (ii) the Design-Builder is obligated to conduct any and all studies, analyses and investigations as it deems advisable to confirm, recreate, verify, or supplement said information.

2.3.2. No Representation or Warranty Regarding Project Configuration and Reference Documents

The Department does not represent or warrant that the information contained in the Project Configuration and Reference Documents is either complete or accurate or that such information conforms to the requirements of the contract documents.

2.3.3. Professional Licensing Laws

The Department does not intend to contract for, pay for, or receive any design that are in violation of any technical profession licensing laws, and the Design-Builder acknowledges that the Department has no such intent. It is the intent of the parties that the Design-Builder is fully responsible for furnishing the design for the Project, and duly qualified and licensed firm(s) or individuals will perform the design required by the Contract Documents in compliance with the technical profession laws, rules and regulations of Utah. Any references in the Contract Documents to the Design-Builder's responsibilities or obligations to "perform" the design portions of the Work shall be deemed to mean that the Design-Builder shall "furnish" the design for the Project. The terms and provisions of Section 2.3 (Disclaimer) shall control and supersede every other provision of the Contract Documents.

3— CONTROL OF WORK

3.1. Control and Coordination of Work

The Design-Builder shall be solely responsible for and have control over the construction means, methods, techniques, sequences, procedures, and site safety, and shall be solely responsible for planning and coordinating all portions of the Work in accordance with the Contract Documents.

3.2. Safety

The Design-Builder shall be solely responsible for the safety of, and shall provide protection to prevent damage, injury, or loss to, all Persons on or near the Project site or who would reasonably be expected to be affected by the Work, including individuals performing Work, employees of the Department and its consultants, visitors to the Project site, and members of the public who may be affected by the Work. The Design-Builder shall at all times comply with its Safety and Health Program. The Design-Builder shall not commence Work without developing and implementing a Site-specific Safety Plan that addresses safety in connection with the Project and that is consistent with the Utah Department of Transportation Construction Safety and Health Manual, all Laws, the Contract Documents and its Safety and Health Program. The Design-Builder shall immediately notify the Department if the Design-Builder believes that any Contract requirement creates a safety risk.

3.3. Process to be Followed for Discovery of Certain Site Conditions

3.3.1. Notification to the Department

If the Design-Builder becomes aware of (i) any Differing Site Conditions (Section 4); (ii) any on-Site material that the Design-Builder believes may contain Hazardous Substances required to be removed or treated; or (iii) any Items of Archeological or Biological Significance within the Right-of-Way, as a condition precedent to the Design-Builder's right to a Change Order, the Design-Builder shall immediately notify the Department thereof by telephone or in person, to be followed by written notification the following Working Day. The Design-Builder shall have the burden of proving such oral notice was given and when it was given. The Design-Builder's written notification shall advise the Department of any obligation to notify any Governmental Person or other Person required under

applicable Law, Governmental Approval, or the Contract Documents. The Design-Builder shall immediately stop Work in, and secure, the area. Operations that may impact the area shall be temporarily suspended and shall not be resumed at that location unless and until authorized by the Department. In such event, the Department will view the location promptly upon receipt of notification, and will advise the Design-Builder at that time whether to resume Work or whether further investigation is required. Upon the Design-Builder's fulfillment of all applicable requirements of Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work) and subject to the limitations contained therein, the Department shall be responsible for, and agrees to issue Change Orders to compensate the Design-Builder for, any additional costs for and to extend the affected Completion Deadlines as a result of any delay in the Critical Path resulting from the Department's viewing of the location that exceeds three Days (other than Saturday, Sunday or a Legal Holiday).

3.3.2. Further Investigation

The Design-Builder shall promptly conduct such further investigations, as the Department reasonably deems appropriate. As soon as possible but no later than five Days after its initial notice to the Department, the Design-Builder shall advise the Department of any action recommended to be taken regarding the situation in a written remediation plan. If Hazardous Substances are involved, the remediation plan shall describe the type of Remediation Work, if any, that the Design-Builder proposes to undertake with respect thereto. If any Items of Archeological or Biological Significance are discovered, the remediation plan shall advise the Department what course of action the Design-Builder intends to take with respect thereto and whether the location must be fenced off or whether Work can resume. The Department then will either Approve, or require modification of, the Design-Builder's proposed remediation plan.

3.3.3. Recommence Work

The Department shall have the right to require the Design-Builder to recommence Work in the area at any time, even though an investigation may still be ongoing, provided such Work is not in violation of any Laws or Governmental Approvals. The Design-Builder shall promptly recommence Work in the area upon receipt of such notification from the Department. On recommencing Work, the Design-Builder shall follow all applicable procedures contained in the Contract Documents and all other Laws with respect to such Work, consistent with the Department's determination or preliminary determination regarding the nature of the material, resources, species or condition.

3.4. Obligation to Minimize Impacts

The Design-Builder shall ensure that all of its Work and activities undertaken in the performance of the Work will minimize the effect on surrounding or adjacent properties, the environment and the public to the maximum extent practicable.

3.5. Quality Management

3.5.1. Design-Builder Quality Management

The Design-Builder shall perform the quality management necessary to meet its obligations under the Contract Documents.

3.5.2. Oversight, Audit, Inspection, and Testing by the Department and Others

All materials and each part or detail of the Work shall be subject to review, oversight, audit, and testing by the Department and other Persons designated by the Department. When any Third Party is to accept or pay for a portion of the cost of the Work, its respective representatives have the right to review, oversee, audit, inspect and test the Work; and have the right to stop the Work to the extent permitted by Law or

stated in Part 6 (Third-Party Agreements). Such review, oversight, audit, inspection, testing, or intervention does not make such Person a party to the Contract. The Design-Builder hereby consents to such review, oversight, inspection and testing, or intervention by the Department and other Persons. Upon request from the Department, the Design-Builder shall furnish information to such Persons as are designated in such request and shall permit such Persons access to the Project site and all parts of the Work. Failure to provide such information and access to the site and all parts of the Work prior to covering such Work shall result in the Design-Builder uncovering the Work as directed to provide access, without compensation or a time extension.

3.5.3. Obligation to Uncover Finished Work

At all times before Contract Completion, the Design-Builder shall remove or uncover such portions of the finished construction Work as directed by the Department. After examination by the Department, the Design-Builder shall restore the Work to the standard required by the Contract Documents. If the Work exposed or examined is not in conformance with the requirements of the Contract Documents, then the cost of uncovering, removing and restoring the Work, or making good the parts removed, and recovery of any delay to the Critical Path occasioned thereby shall be at the Design-Builder's expense. If Work exposed or examined under this Section 3.5.3 is in conformance with the requirements of the Contract Documents, then the cost of uncovering, removing, and restoring the Work shall be at the Department's expense, and any delay in the Critical Path from uncovering, removing, and restoring Work shall be the Department's responsibility. Notwithstanding the foregoing, the Department may require the Design-Builder to uncover, remove and restore any Work done or materials used without adequate prior notice to and opportunity for prior inspection by the Department, as required by Section 3.5.4 and/or theQuality Management lan (QMP), at the Design-Builder's expense, even if the Work proves acceptable after uncovering.

3.5.4. Control Points

Control Points shall be established at certain stages of the construction process to confirm compliance with specified requirements in accordance with Part 3-4.1 (Control Point Inspection). As Work is accomplished, the Department shall review the Work to determine compliance. The Design-Builder shall provide the Department with a minimum 24 hours' written notice prior to reaching any Control Point.

3.6. Effect of Oversight, Spot Checks, Assessment, Tests, Acceptances, and Approvals

3.6.1. Oversight and Acceptance

The Design-Builder shall not be relieved of its obligation to perform the Work in accordance with the Contract Documents, or any of its other obligations under the Contract Documents, by any action or inaction of the Department, Third Parties, or other Persons, related to review, oversight, spot checks, assessments, reviews, tests, inspections, acceptances, Approvals, or other approvals. Such actions or inaction does not constitute acquiescence for the purposes of Contract Completion of the particular material or Work, or waiver of any legal or equitable right with respect to the particular material or Work. At any time prior to Contract Completion and at the Design-Builder's expense, the Department may reject Work and require the Design-Builder to repair, remove and replace, or otherwise correct any Nonconforming Work and/or identify additional Work which must be done to bring the Project into compliance with Contract requirements, it being understood that oversight, spot checks, assessments, reviews, tests, inspections, acceptances, Approvals, and other approvals by the Department, Third Parties, or other Persons are for their benefit and not to relieve the Design-Builder of its responsibilities for quality control and compliance with the Contract requirements.

3.6.2. No Estoppel

The Department shall not be precluded or estopped, by any measurement, estimate, or certificate made either before or after Contract Completion and payment therefor, from showing that any such measurement, estimate or certificate is incorrectly made or untrue, or from showing the true amount and character of the Work performed and materials furnished by the Design-Builder, or from showing that the Work or materials do not conform in fact to the requirements of the Contract Documents. Notwithstanding any such measurement, estimate or certificate, or payment made in accordance therewith, the Department shall not be precluded or estopped from recovering from the Design-Builder and its Surety such damages as the Department may sustain by reason of the Design-Builder's failure to comply or to have complied with the terms of the Contract Documents.

3.7. Nonconforming Work

3.7.1. Rejection, Removal, and Replacement of Work

Subject to the Department's right, in its sole discretion, to accept Nonconforming Work, the Design-Builder shall repair, remove, replace, or otherwise correct rejected Nonconforming Work so as to comply with the requirements of the Contract Documents, at the Design-Builder's expense and without any time extension, and the Design-Builder shall promptly take all action necessary to prevent similar deficiencies from occurring in the future. The fact that the Department may not have discovered the Nonconforming Work shall not constitute an acceptance of such Nonconforming Work. If the Design-Builder fails to correct any Nonconforming Work within seven Calendar Days of receipt of notice from the Department requesting correction, the Department may, in its sole discretion, cause the Nonconforming Work to be repaired, removed, replaced, or otherwise corrected, and may deduct the cost of doing so from any monies due or to become due the Design-Builder and/or obtain reimbursement from the Design-Builder for such cost.

3.7.2. Nonconforming Work Pay Adjustment

In its sole discretion, the Department may accept any Nonconforming Work or require Design-Builder to repair or restore such Nonconforming Work, in which case the Department shall be entitled to a pay adjustment (or reimbursement of a portion of the Contract Amount, if applicable) or additional assurances (including additional warranties). If the Department accepts any Nonconforming Work, the Department shall be entitled to reimbursement of a portion of the Contract Amount in an amount determined by the Department. In general, the pay adjustment (or reimbursement) shall equal any one or combination of the following, at the Department's election, (i) the amount allocated to such Work in the Approved Schedule of Values (SOV); (ii) the Design-Builder's cost savings associated with its failure to perform the Work in accordance with the Contract requirements; (iii) the amount deemed appropriate by the Department to provide compensation for impacts to affected parties such as inconvenience to the public or future maintenance and/or other costs relating to the Nonconforming Work; or (iv) by the amount indicated for nonconforming work items specified in Part 5 (Special Provisions and Exceptions). In certain events, the Department shall be entitled to a pay adjustment (or reimbursement) as expressly set forth elsewhere in the Contract Documents. All pay adjustments or reimbursements shall be deducted from future payments or shall be payable to the Department within 30 Calendar Days after the Design-Builder's receipt of an invoice therefor.

If the Design-Builder proceeds with Nonconforming Work , then such Work and any subsequent payment (partial or full) for such items of Work will be at the Department's sole discretion.

3.8. Department-Furnished Materials

The Contract Documents provide that certain materials for the Project will be provided by the Department, at no additional cost to the Department or Design-Builder. All Department-furnished materials will be made available during normal business hours at Department-designated sites. The Design-Builder shall be responsible for arranging pick up of, inspecting, determining acceptability of, loading and transporting such materials from the Department-designated sites, and shall bear the risk of loss during such activities. The Design-Builder shall be responsible for any defects or deficiencies discovered after any Department-furnished materials are removed from the Department-designated site.

4— DIFFERING SITE CONDITIONS

4.1. Definition

The term "Differing Site Conditions" shall mean (i) subsurface or latent conditions encountered at the exact boring locations included in Part 8 (Engineering Data) that differ materially from those indicated for such locations; or (ii) physical conditions of an unusual nature, differing materially from those ordinarily encountered in the area and generally recognized as inherent in the type of work provided for in the Contract. The term shall specifically exclude the following:

A. All such conditions of which the Design-Builder had, or should have had, actual or constructive knowledge as of the Proposal Due Date

B. Utility facilities and non-contaminated groundwater

C. Any conditions that constitute or are caused by a Force Majeure event

D. Conditions that could have been discovered by reasonable site investigation or review of other available information prior to the Proposal Due Date

E. Variations in soil moisture content or groundwater levels from that indicated in available reports, borings, or tests

4.2. Responsibilities of the Department

Upon the Design-Builder's fulfillment of all applicable requirements of Section 4 (Differing Site Conditions), Section 15 (Change Order Risk Allocation) and Section 16 (Changes in the Work) and subject to the limitations contained therein, the Department will be responsible for, and agrees to issue Change Orders

A. to compensate the Design-Builder for additional costs incurred by the Design-Builder directly attributable to changes in the scope of the Work arising from Differing Site Conditions;

B. to extend the affected Completion Deadline(s) as the result of any delay in the Critical Path caused by a Differing Site Condition.

4.3. Notification

Notification as to a Differing Site Condition shall be provided in accordance with Section 3.3 (Process to be Followed for Discovery of Certain Site Conditions).

4.4. Limitations on Change Orders

The Design-Builder shall bear the burden of proving that a Differing Site Condition exists, that it could not reasonably have worked around the Differing Site Condition so as to avoid additional cost or time, and that it has mitigated the impacts of any Differing Site Condition. Each request for a Change Order relating to a Differing Site Condition shall be accompanied by a statement signed by a qualified professional setting forth all relevant information relied upon by the Design-Builder with respect to the alleged Differing Site Condition, and stating the efforts undertaken by the Design-Builder to find alternative design or construction solutions to eliminate or minimize the problem and the associated costs.

5— ENVIRONMENTAL COMPLIANCE

In performance of the Work, the Design-Builder shall comply with all requirements of all applicable Environmental Laws and Governmental Approvals, whether obtained by the Department or the Design-Builder. The Design-Builder acknowledges and agrees that it will be responsible for all fines, penalties, defense costs (including reasonable attorney and expert witness fees), Delay Damages, and disincentive assessments that may be assessed in connection with any failure by any Design-Builder-Related Entity to comply with such requirements.

Additional requirements for environmental protection are contained in Part 4-05 (Environmental Compliance).

5.1. Remediation Work

If the Department requests the Design-Builder to perform Remediation Work, the Design-Builder shall perform the Remediation Work with its own forces or with a Subcontractor under Governmental Body oversight as required by Environmental Laws and Governmental Approvals.

5.1.1. Change Orders for Remediation Work

Upon the Design-Builder's fulfillment of all applicable requirements of Sections 5 (Environmental Compliance), 15 (Change Order Risk Allocation), and 16 (Changes in the Work) and subject to the limitations contained therein, the Department shall be responsible for, and agrees to issue Change Orders

A. to compensate the Design-Builder for Remediation Work in accordance with an Approved remediation plan under Section 3.3.2 (Further Investigation); and

C. to extend the affected Completion Deadline(s) as the result of any delay in the Critical Path caused by Remediation Work arising from Hazardous Substances.

5.1.2. Limitations on Change Order Remediation Work

All Change Orders authorized by Section 5.1.1 (Change Orders for Remediation Work) shall be subject to the restrictions, limitations, and procedures set forth in this Section 5.1.2 and Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work). Allowable costs shall be limited to the additional costs associated with the Remediation Work after identification that Hazardous Substances are present and that Remediation Work is consistent with Environmental Laws and Governmental Approvals. The Design-Builder shall take all reasonable steps to minimize any such costs. Compensation for Remediation Work will not be made unless the Design-Builder demonstrates to the Department's satisfaction that the Remediation Work could not have been avoided by reasonable design modifications or construction techniques, and that the Design-Builder's remediation plan for the Remediation Work represents the approach that is most beneficial to the Project and the public and complies with Environmental Laws and Governmental Approvals. The Design-Builder shall provide the Department with such information,

analyses, and certificates as may be requested by the Department in order to enable a determination regarding eligibility for payment. The Department shall not be responsible for issuing a Change Order for: (i) Remediation Work for any spill or release, or threatened spill or release, of Hazardous Substances (a) attributable to the negligence, willful misconduct, or breach of contract by any Design-Builder-Related Entity, or (b) that was brought onto the Project Site by any Design-Builder-Related Entity; (ii) Remediation Work in connection with lead or lead-containing materials in structures and/or other improvements on or in the Project Site; or (iii) pre-existing site contamination that is exacerbated by the negligence, willful misconduct, or breach of Contract by any Design-Builder-Related Entity.

5.2. Mitigation Requirements

The Design-Builder shall be responsible for performance of all environmental mitigation requirements of the Governmental Approvals and of the New Environmental Documents that Section 5.4 (New Environmental Documents to be Obtained by Design-Builder) designates as the Design-Builder's responsibility.

5.3. New Environmental Documents to be Obtained by the Department

The Department shall be responsible for obtaining any New Environmental Documents necessitated by a Department-Directed Change or Necessary Project Configuration Change. The Design-Builder shall provide support services to the Department with respect to obtaining any such New Environmental Documents. Any Change Order covering a Department-Directed Change or a Necessary Project Configuration Change shall include compensation to the Design-Builder for any support services and any changes in the Work resulting from such New Environmental Documents, as well as any time extension necessitated by the Department-Directed Change or Necessary Project Configuration Change, subject to the conditions and limitations contained in Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work).

5.4. New Environmental Documents to be Obtained by Design-Builder

If a New Environmental Document becomes necessary for any reason other than those specified in Section 5.3 (New Environmental Documents to be Obtained by the Department), the Design-Builder shall be fully responsible for support and cost of obtaining the New Environmental Document and any other environmental clearances that may be necessary, and for all requirements resulting therefrom, as well as for any litigation arising in connection therewith, including defense costs (including reasonable attorney and expert witness fees) and Delay Damages. New Environmental Documents include additional noise analysis, modifications to required noise walls, and construction of additional noise walls beyond those identified in the Contract Documents. All required information for New Environmental Documents to be obtained by the Design-Builder shall be prepared and submitted to the Department to obtain the New Environmental Documents. The Design-Builder shall not contact any agencies or Persons regarding New Environmental Documents without the prior permission and participation of the Department.

5.5. Assignment of Third Party Reimbursement for Hazardous Substances Remediation Costs

To the extent that the Design-Builder incurs costs in connection with remediation of Hazardous Substances which are not eligible for a Change Order hereunder but which are eligible for reimbursement from a Third-Party that has not otherwise been released from such liability by the Department, the Department agrees to assign to the Design-Builder any causes of action held by the Department against such Third-Party for reimbursement of such costs. The Design-Builder shall be responsible for identifying any potentially responsible parties. If the Design-Builder wishes to obtain such an assignment

from the Department it shall deliver a notice requesting the same, and shall provide the Department with a form of assignment reasonably acceptable to the Department.

5.6. Environmental Resources of Special Significance

Upon the Design-Builder's fulfillment of all applicable requirements of Sections 5 (Environmental Compliance), 15 (Change Order Risk Allocation), and 16 (Changes in the Work) and subject to the limitations therein, the Department shall be responsible for, and agrees to issue Change Orders

(1) to compensate the Design-Builder for certain additional costs directly attributable to the discovery of items of archeological or biological significance, including threatened or endangered wildlife within the Right-of-Way in accordance with an Approved remediation plan under Section 3.3.2 (Further Investigation), provided that the existence of such resources was not disclosed in the RFP. Such costs include direct costs incurred by the Design-Builder, including site overhead, but exclude profit; and

(2) to extend the affected Completion Deadline(s) as the result of any delay in the Critical Path caused by the discovery of Items of Archeological or Biological Significance within the Right-of-Way, provided that the existence of such resources was not disclosed in the RFP.

5.7. Notification

Notification as to Hazardous Substances on the Project Site and Items of Archeological or Biological Significance within the Right-of-Way shall be provided in accordance with Section 3.3 (Process to be Followed for Discovery of Certain Site Conditions).

6— UTILITY WORK AND THIRD PARTY AGREEMENTS

This Section 6 describes how the risk of increased costs and delays associated with the Utility Work and other Third Parties is allocated between the Department and the Design-Builder through the Change Order process. The Design-Builder shall be entitled to receive a Change Order associated with the Utility Work or Third Party Agreements only as permitted by this Section 6, Section 15 (Change Order Risk Allocation), and Section 16 (Changes in the Work).

6.1. Utility Work

The Design-Builder agrees that: (i) the Contract Amount covers all of the Utility Work to be furnished or performed by the Design-Builder identified in Part 4 (Project Design and Construction Requirements) and Part 6 (Third-Party Agreements) and in this Section 6; and (ii) it is feasible to obtain and/or perform all necessary Utility Work within the time deadlines of the Contract Documents. Accordingly, the Design-Builder shall be entitled to receive a Change Order for additional costs and delays associated with the Utility Work only as permitted by this Section 6 or in circumstances for which such a Change Order is otherwise permitted under Section 15 (Change Order Risk Allocation), such as for Department-Directed Changes that increase the Utility Work. A deductive Change Order for reductions in the Utility Work shall be issued when permitted by Section 6 or in circumstances for which a deductive Change Order is otherwise permitted under Section 15 (Change Order Risk Allocation). The Design-Builder's entitlement to any Change Orders pursuant to this Section 6 shall be subject to the limitations, restrictions and procedures set forth in Section 15 (Change Order Risk Allocation) and Section 16 (Changes in the Work).

6.1.1. Accuracy of Design and Data – "Reasonable Accuracy" Defined

For purposes of this Section 6 (Utility Work and Third Party Agreements), the term "Reasonable Accuracy" shall have the meaning set forth in Part 4-19 (Utilities).

6.1.2. Changes in Utility Work

Increase in Work: Subject to the requirements of Section 15 (Change Order Risk Allocation) and Section 16 (Changes in the Work), the Department shall be responsible for additional costs, excluding Delay Damages, of Relocations of underground Utilities located within the ROW to be Relocated by the Design-Builder that are not indicated in Part 7 (Contract Drawings) or are not indicated with Reasonable Accuracy in Part 7 (Contract Drawings). The amount of any such Change Order shall be determined in accordance with Section 15 (Change Order Risk Allocation) and Section 16 (Changes in the Work).

Subject to the requirements of Section 15 (Change Order Risk Allocation) and Section 16 (Changes in the Work), the Design-Builder shall be entitled to an extension of any Completion Deadline on account of such lacking or inaccurate information regarding underground Utilities to be Relocated by the Design-Builder.

Notwithstanding the foregoing, the Design-Builder shall be responsible for the cost of Relocations of underground Utilities located within the ROW and shall not be entitled to an extension of a Completion Deadline whether or not they are identified by the Department in Part 7 (Contract Drawings) if any one or more of the following applies:

A. A surface inspection of the area would have shown the existence or the likelihood of existence of such Utility (or portion thereof) in the correct location and/or size, as applicable, by reason of above-ground facilities such as buildings, meters or junction boxes or identifying markers;

B. Such Utility is a Service Line (or the portions of a Utility that are Service Lines); or

C. Any costs or delays incurred due to performance of Incidental Utility Work by the Design-Builder.

Partial Inaccuracies: If only a portion of an existing underground Utility to be Relocated by the Design-Builder is shown on the Utility drawing in Part 7 (Contract Drawings), then a Change Order shall be allowed only for the resulting increased costs and extension of the Completion Deadlines associated with that portion of the Utility Work to be furnished or performed by the Design-Builder. If an existing underground Utility to be Relocated by the Design-Builder is not indicated at all in Part 7 (Contract Drawings), then a Change Order shall be allowed only for the resulting increased costs of the additional Utility Work to be furnished or performed by the Design-Builder.

6.1.3. Change in Allocation of Responsibility Decreasing the Work

Any Utility Work initially included in the Work may be deleted from the Work pursuant to:

A. A Supplemental Agreement providing for the Utility Company to perform Utility Work otherwise assigned to the Design-Builder; or

B. Upon Approval or direction by the Department, Utility Work may be removed from the Work by Change Order without or prior to execution of a Supplemental Agreement.

The Department shall be entitled to a reduction in the Contract Amount to reflect any reduction in the Work pursuant to this Section 6.1.3. Any reduction in the scope of the Work pursuant to this Section 6.1.3 shall not be considered a Department-Directed Change.

6.1.4. Betterments

6.1.4.1. Betterments Included in the Work

Certain Betterments are included in the Utility Work, as described in Part 4-19 (Utilities), Table 19C-4 (Betterment Design and Construction Responsibilities of Design-Builder). It is the Design-Builders

responsibility to determine the final scope, schedule, and authorization to begin the Betterment Work in a separate Supplemental Agreement between **UDOT** and the **City**.

6.1.4.2. Additional Utility Betterments

Additional Betterments may be added to the Work pursuant to this Section 6.1.4.2. All Betterments that have not been identified in the Design-Builder's Utility Work in Part 6 (Third-Party Agreements) shall be added to the Work in Supplemental Agreements to be prepared in accordance with Part 6 (Third-Party Agreements). Any Betterments added to the Work shall be subject to the same standards and requirements as Relocations.

Any Utility Company may request the Department to permit the Design-Builder to perform Utility work relating to Betterments as a part of the Work, at the Utility Company's expense. If the Department Approves any such request, the Design-Builder shall have the obligation to perform such Utility work, with the right to receive additional compensation and, if applicable, an extension of any affected Completion Deadline. Any extension of any Completion Deadline(s) or Contract Amount increase requested for any Betterment shall be subject to the requirements of Section 15 (Change Order Risk Allocation) and Section 16 (Changes in the Work).

If a Utility Company requests that the Design-Builder design and/or construct a Betterment, the Design-Builder shall use its best efforts to negotiate a lump sum price for such Utility work with the Utility Company, in good faith. If the Design-Builder and the Utility Company are unable to agree on a lump sum price, then the Department shall direct the Design-Builder to perform such Utility Work on a Force Account basis pursuant to Section 15 (Change Order Risk Allocation) and Section 16 (Changes in the Work), provided that the conditions set forth in Section 6 (Utility Work and Third Party Agreements) are satisfied.

The amount of any Change Order issued for a Betterment shall be a direct pass-through of the lump sum price negotiated by the Design-Builder and the Utility Company as set forth in the applicable Supplemental Agreement (with no additional overhead or profit) or, if no such price has been negotiated, an amount determined in accordance with Section 15 (Change Order Risk Allocation) and Section 16 (Changes in the Work).

The Department will Approve the addition of a Betterment to the Work only if: (i) the Utility Company has agreed to the addition of such Betterment to the Work; (ii) such Betterment is compatible with the Project; and will not cause delays to the Project (iii) the Utility Company has agreed to reimburse the Department for all the costs thereof; (iv) the Utility Company has agreed as to the method (negotiated lump sum amount, or Force Account cost basis) of pricing such Utility Work; and (v) it is feasible to separate the cost/pricing of the Betterment work from that for any related Utility Work being furnished or performed by the Design-Builder. The Design-Builder shall provide the Department with such information, analyses and certificates as may be requested by the Department in connection with its Approval.

If any Betterment has been added to the Work and the Contract Amount has been increased accordingly by Change Order, but subsequently for any reason the Betterment is deleted from the Work, or the scope of the Design-Builder's Work with regard to such Betterment is materially reduced, then the Department shall be entitled to issue a Change Order reducing the Contract Amount to reflect the value of any reduction in the costs of the Work that is directly attributable to such deletion or reduction.

Any change in the Utility Work pursuant to Section 6.1 (Utility Work) shall not be considered a Department-Directed Change.

6.1.5. Utility Company/Third-Party Delays

Subject to the requirements of Section 15 (Change Order Risk Allocation) and Section 16 (Changes in the Work), the Design-Builder shall be entitled to an extension of a Completion Deadline for delays to the Critical Path associated with Utility Company/Third-Party Delays only in the circumstances described in this Section 6 (Utility Work and Third Party Agreements). The Design-Builder shall give notice to the Department of any circumstances which may lead to a claim of a Utility Company/Third-Party Delay within 72 hours of the Design-Builder's becoming aware that such circumstance has occurred or is likely to occur.

The Design-Builder shall bear 100 percent of the risk of Utility Company/Third-Party Delays, up to an aggregate amount of 10 Calendar Days of Utility Company/Third-Party Delays per Utility Company/Third-Party (regardless of how many Utilities of such Utility Company/Third-Party are causing delay). Subject to Section 6.1.5.2 (Concurrent Delays), if aggregate Utility Company/Third-Party Delays caused by a particular Utility Company/Third-Party exceed 10 Calendar Days, then the risk of aggregate Utility Company/Third-Party Delays in excess of 10 Calendar Days shall be borne equally by each party (i.e., any affected Completion Deadline shall be extended by one Calendar Day for every two Calendar Days of Utility Company/Third-Party Delay in excess of the initial aggregate 10 Calendar Days).

6.1.5.1. Conditions to Extensions for Utility/Third-Party Delays

Conditions Precedent. The Design-Builder shall not be entitled to any extension of any Completion Deadline(s) for a Utility Company/Third-Party Delay, and such Utility Company/Third-Party Delay shall not be counted toward the 10 Calendar Day cap on the Design-Builder's risk per Utility Company/Third-Party unless all of the following conditions are satisfied:

A. The Design-Builder has provided evidence reasonably satisfactory to the Department that: (i) the Design-Builder has fulfilled its obligation under the applicable Utility Company/Third-Party Agreement(s) to coordinate with the Utility Company/Third-Party to prevent or reduce such delays; and (ii) the Design-Builder has otherwise made diligent efforts to obtain the timely cooperation of the Utility Company/Third-Party but has been unable to obtain such timely cooperation.

B. If the Design-Builder is responsible for the Relocation, the Design-Builder has provided a reasonable Relocation plan to the Utility Company/Third-Party and the Design-Builder has obtained, or is in a position to timely obtain, all applicable approvals, authorizations, certifications, consents, exemptions, filings, leases, licenses, permits, registrations, options, and/or rulings required by or with any Governmental Person in order to design and construct such Relocations.

C. No circumstances exist which have delayed or are delaying the affected Relocation, other than those which fit within the definition of a Utility Company/Third-Party Delay.

6.1.5.2. Concurrent Delays

To the extent one or more Utility Company/Third-Party Delays is or are concurrent with another delay to the Critical Path, which is the Design-Builder's responsibility hereunder, but which is not a Utility Company/Third-Party Delay, then such Utility Company/Third-Party Delay(s) shall not be considered in calculating any 10 Calendar Day cap on the Design-Builder's risk. Furthermore, if two or more Utility Company/Third-Party Delays occur concurrently with each other (whether caused by the same Utility Company/Third-Party or by different Utility Companies/Third-Parties), then only one of such Utility Company/Third-Party Delays shall be considered in calculating a 10 Calendar Day cap on the Design-Builder's risk (in selecting between two or more Utility Companies/Third-Parties for such purpose, the Utility Company/Third-Party Delay caused by the Utility Company/Third-Party with the least amount of

accrued Utility Company/Third-Party Delay shall be selected and applied to the 10 Calendar Day cap on the Design-Builder's risk for such Utility Company/Third-Party).

6.1.6. Certain Obligations of Design-Builder

Multiple Relocations of the Same Utility: The Design-Builder shall endeavor to avoid multiple relocations of the same Utility, whether by the Utility Company or by the Design-Builder. After a Utility has been relocated once in order to accommodate the Project based on the Design-Builder's design, the Design-Builder shall be responsible for all costs incurred by either the Design-Builder or the Utility Company in order to subsequently relocate such Utility to accommodate the Project if the subsequent relocation is not caused by a Department-Directed Change or by the Utility Company. If the Utility Company performs such subsequent Relocation at the Department's expense, then the Design-Builder shall reimburse the Department for all amounts paid by the Department to such Utility Company in reimbursement for such subsequent relocation if the subsequent relocation is not caused by a Department-Directed Change or by the Utility Company. If the Design-Builder performs such subsequent Relocation, then the Design-Builder shall not receive any extension of any Completion Deadline or increase in the Contract Amount on account of the performance of such subsequent Relocation if the subsequent relocation is not caused by a Department-Directed Change or by the Utility Company.

Minimizing Costs: In delivering the Project, the Design-Builder shall take all reasonable steps to minimize costs to the Utility Companies and the Department to the extent practicable Utility-Related Right-of-Way Costs.

6.1.6.1. Utility Easements within ROW

With respect to Utility Easements located within the ROW depicted on the ROW Drawings included in Part 7 (Contract Drawings), whether or not such Utility Easements are themselves shown on such ROW Drawings originally included in Part 7 (Contract Drawings), the Department will be responsible for: (i) acquiring such Utility Easements (pursuant to Section 7.1 (Department Obtained Right-of-Way)); and (ii) any other compensation which may be obligated to pay to the Utility Company(s) in compensation for relinquishing the replaced Utility Easements.

6.1.6.2. Necessary Utility Easement Replacement

With respect to Utility Easements for which a replacement easement is necessary to meet the requirements of the Contract Documents with respect to the Project Configuration (with the understanding that a change shall be deemed "necessary" only if the lack of a replacement easement creates a problem in which the Design-Builder is unable to meet the Contract requirements without such replacement easement), the Department will be responsible for: (i) acquiring any necessary replacements therefor; and (ii) any other compensation which may be obligated to pay to the Utility Company(s) in compensation for relinquishing such Utility Easements.

6.1.6.3. Utility Easement Replacement for Design-Builder's Convenience

With respect to all other Utility Easements, the Design-Builder shall be responsible for, and shall reimburse the Department for any such costs incurred by the Department within 30 Calendar Days after receiving an invoice therefor: (A) acquiring any necessary replacements therefor; and (B) any other compensation which may be obligated to pay to the Utility Company(s) in compensation for relinquishing such Utility Easements. The Design-Builder may acquire any replacement Utility Easements under this Section 6.1.6.3 in accordance with Section 7.3.2 (Additional Right-of-Way).

6.1.7. Additional Restrictions on Change Orders

For Relocations, the Design-Builder shall bear the burden of proving that the Relocation cannot reasonably be avoided.

The Design-Builder shall not be entitled to an increase in the Contract Amount for any costs of coordinating with Utility Companies or for assisting the Department in coordinating with Utility Companies.

If the Design-Builder elects to make payments to Utility Companies or to undertake any other efforts that are not required by the terms of the Contract Documents, the Design-Builder shall not be entitled to a Change Order in connection therewith. The Design-Builder shall promptly notify the Department of the terms of any such arrangements.

6.2. Third-Party Agreements

In addition to the Utility Agreements (including agreements with Irrigation and Canal Companies) contained in Part 6 (Third-Party Agreements), the Department has negotiated agreements (or draft agreements) relating to the Project with certain local agencies (the "Local Agency Agreements,") copies of which are included in Part 6 (Third-Party Agreements).

The Design-Builder agrees that the Contract Amount covers performance of the Design-Builder's obligations under the Third-Party Agreements as described in this Section 6.2.

6.2.1. Performance of Obligations Under Local Agency Agreements and RR Agreement

The Design-Builder is responsible for performing all obligations of the Department's Design-Builder, contractors and subcontractors (if contemplated) set forth in the Local Agency Agreements and the obligations therein allocated to the Design-Builder in "Third-Party Agreements, Exceptions to Division of UDOT/Design-Builder Responsibilities" provided in Part 6 (Third-Party Agreements); provided, however, that the Department may, in its sole discretion, exclude any such obligation from the Design-Builder's responsibility by providing written notice thereof to the Design-Builder. To the extent any such obligation is not clear, the Design-Builder shall immediately notify the Department and the Department's interpretation of the obligation shall control. The Design-Builder acknowledges and agrees that the Local Agency Agreements may contain certain Work requirements that are not specified elsewhere in the Contract Documents. The Design-Builder is responsible for addressing all such requirements. The Design-Builder further acknowledges and agrees that it will be required to comply with all requirements of encroachment permits and other permits that it may be required to obtain from the RR and local agencies in connection with the Project, in addition to the specific requirements stated in said agreements.

6.2.2. Third Party Betterments

Certain Betterments are included in the Work, as described in Part 6 (Third-Party Agreements). Additional Betterments may be separately requested by the Third Party and negotiated directly between the Third Party and the Design-Builder.

6.2.3. Design Changes Impacting Local Agency or RR Facilities

The Design-Builder shall reimburse the Department for any amounts payable by the Department to local agencies or the RR due to changes in the design for their facilities from those that have been previously approved by the Local Agency or RR.

6.2.4. Restriction on Change Orders

Any requests for Change Orders relating to Third Party or RR facilities shall be subject to the requirements and limitations contained in Section 15 (Change Order Risk Allocation) and Section 16 (Changes in the Work).

6.3. Amendments to Third-Party Agreements

Any amendment to a Utility Company/Third Party Agreement (including replacing a draft agreement with an executed agreement) shall be considered part of the Contract Documents upon the Department's delivery of a copy to the Design-Builder together with notification stating that the amendment constitutes a Contract Document. Within 14 Calendar Days after receipt of any such amendment that is material, the Design-Builder shall provide a PCO Notice to the Department in accordance with Section 16 (Changes in the Work) if it considers a Department-Directed Change to have occurred as a result thereof. Notwithstanding any contrary provision of the Contract Documents, the Design-Builder's failure to provide the foregoing notice shall constitute a waiver by the Design-Builder of the right to later claim that a Department-Directed Change has occurred with respect to any reallocation of Work responsibility which should have been covered by such notice. For purposes of this Section 6.3, any such amendments delivered during the period after the Proposal Due Date and prior to issuance of NTP shall be deemed to have been delivered to the Design-Builder one day after issuance of NTP. If any such amendment reduced the scope of Work, the Department shall be entitled to a reduction of the Contract Amount.

7— RIGHT-OF-WAY AND ACCESS

7.1. Department Obtained Right-of-Way

The Department has identified certain real property it believes is needed for ROW to construct the Project and anticipates acquiring such ROW. This ROW is depicted in the Right-of-Way Drawings (ROW Drawings) in Part 7 (Contract Drawings). The Department has provided the Right-of-Way Schedule (ROW Schedule) in Part 4-14 (Right-of-Way) to acquire such real property interests. The Department will provide access to the real property identified on the ROW Drawings by the dates in the ROW Schedule.

7.2. Responsibilities of the Department

7.2.1. Notice of Access

The Department will notify the Design-Builder when it has secured access to each parcel identified on the ROW Drawings. Prior to entering any parcel identified on the ROW Drawings, the Design-Builder shall confirm it has received notice from the Department that is has right of access to the parcel. All other property within the Construction Limit shown on the ROW Drawings is available for access by the Design-Builder in accordance with the Contract Documents.

7.2.2. Delay in Providing Access

If the Department fails to provide access in accordance with the ROW Schedule or at any time determines it will be unable to provide access to a parcel(s) in accordance with the ROW Schedule, the Department will notify the Design-Builder of the revised projected date(s) for delivery of access. Upon such notice or, in the absence of such notice, upon the failure to provide access on the date specified on the ROW Schedule, the Design-Builder shall: (i) take immediate action to minimize any cost and time impact and shall work around such parcel until access can be provided, including rescheduling and re-sequencing the Work to minimize or avoid any delay to the Project; and (ii) provide the Department written notice within seven Calendar Days after receipt of such notice or upon the Department's failure to meet the ROW Schedule whether lack of access will result in a delay to a Completion Deadline. Failure to provide such notice shall bar the Design-Builder from asserting a delay under this Section 7.2.2.

7.2.3. Material Errors in Right-of-Way Drawings

Upon the Design-Builder's fulfillment of all applicable requirements of this Section 7 (Right-of-Way and Access), and subject to the limitations contained therein, the Department shall be responsible for, and agrees to issue Change Orders: (i) to compensate the Design-Builder for additional costs directly attributable to material errors in the ROW limits indicated in the ROW Drawings; and (ii) to extend the Completion Deadlines as the result of any delay in the Critical Path affecting a Completion Deadline caused by any such errors. The Design-Builder shall provide written notice to the Department immediately upon discovery of any such material error. The Department, in the Department's sole discretion, shall have the right to cure any such error such as by acquiring additional property.

7.3. Responsibilities of the Design-Builder

If the Design-Builder's Work requires any additional interests in real property other than (i) the parcels and easements acquired by the Department and shown on the ROW Drawings, and (ii) the additional property the Department agrees to acquire in accordance with Section 7.3.2 (Additional Right-of-Way), the real property shall be acquired by the Design-Builder. The Design-Builder shall be responsible for the design and acquisition of the property, easement or ROW. See Part 4-14 (Right-of-Way).

7.3.1. Right-of-Way Schedule

The ROW Schedule shows the minimum dates the Department reserves for acquiring access to the parcels identified on the ROW Drawings for the Project. These dates shall be used by the Design-Builder for scheduling so that no Work shall be shown in the schedule to start on any parcel until the anticipated date of right of entry.

7.3.2. Additional Right-of-Way

7.3.2.1. Due to Department-Directed Change

Any property not identified on the ROW Drawings that is required as the result of a Department-Directed Change or a Necessary Project Configuration Change will be addressed in the respective Department-Directed Change or Necessary Project Configuration Change.

7.3.2.2. Acquisition Process for ROW for Design-Builder's Convenience

Any additional ROW acquired under this Section 7.3.2.2 and not identified on the ROW Drawings and not required under Section 7.3.2.1 (Due to Department-Directed Change) is for the Design-Builder's convenience. ROW required for an ATC is for the Design-Builder's convenience. The Design-Builder shall not be eligible for an increase in the Contract Amount or extension of the Completion Deadlines as a result of any acquisitions of ROW for the Design-Builder's convenience. The Design-Builder may acquire ROW for the Design-Builder's convenience, provided that the Design-Builder demonstrates, to the satisfaction of the Department, in the Department's sole discretion, that such property is required for permanent improvements or temporary interests for the Project, and provided that the Design-Builder agrees that the cost and the schedule for such acquisition is the sole responsibility of the Design-Builder. In the event that the Design-Builder acquires ROW for their convenience, the Design-Builder shall complete the acquisitions and adhere to the process and provisions for ROW acquisition described in Part 4-14, Attachment 14-C (Right-of-Way Acquisition for Design-Builder's Convenience). The Design-Builder shall reimburse the Department for any costs (including the Department's ROW services, attorneys', accountants' and expert witness fees and costs) of acquiring any real property for the Design-Builder's convenience within 30 Calendar Days after receipt of an invoice for such costs.

7.4. Failure to Have Necessary Rights of Access

Do not enter or trespass on public or private property if the necessary rights of access have not been secured. If a Design-Builder-Related Entity enters any property in connection with the Project without having all necessary rights of access, in addition to all other rights and remedies provided by law or equity or available under the Contract or otherwise, the Design-Builder shall be responsible for (i) its costs and all costs incurred by the Department as a result thereof and (ii) any delay to the Completion Deadlines to the extent the Design-Builder-Related Entity's entry onto such property causes, results in, or contributes to a delay by the Department in acquiring said property or parcel, or any other property or parcel owned by the same owner.

7.5. Use of UDOT Lands

Do not assume that any State-owned land outside the Construction Limit is acceptable or available for Project use. The use of such land is acceptable only at the Department's sole discretion and with its prior written consent, and as specified in the conditions for such use. After the Approved use of any such State owned land, return it to its previous condition and free of any Design-Builder-added hazardous material or other harmful material.

8— EQUAL EMPLOYMENT OPPORTUNITY; SUBCONTRACTS; LABOR; KEY PERSONNEL; PROJECT COMMUNICATIONS

The Design-Builder confirms that it has an equal employment opportunity policy ensuring equal employment opportunity without regard to race, color, national origin, sex, age, religion, or disability; and that it maintains no employee facilities segregated on the basis of race, color, religion, or national origin.

8.1. State Equal Employment Opportunity Requirements

8.1.1. Selection of Labor

During the performance of this Contract, do not discriminate against labor from any other State, possession, or territory of the United States.

8.1.2. Employment Practices

During the performance of this Contract, the Design-Builder agrees as follows:

The Design-Builder shall not discriminate against any employee or applicant for employment because of race, religion, sex, color, national origin, age, or disability. Take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age, or disability. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment and recruitment advertising; layoff and termination; rate of pay and other forms of compensation; and selection for training, including apprenticeship. In conspicuous places available to employees and applicants for employment, post notices (to be provided by the Utah Department of Transportation [Department]) setting forth the provisions of this nondiscrimination clause.

The Design-Builder shall, in all solicitations and advertisements for employees placed by or on behalf of the Design-Builder, state that all qualified applicants will receive consideration for employment without regard to race, religion, sex, color, national origin, age, or disability.

Send to each labor union or representative or workers with whom the Design-Builder has a collective bargaining agreement or other contract or understanding a notice (to be provided by the Department) advising them of the Design-Builder's commitments under this section 8.1.2 and post copies of the notice in conspicuous places available to employees and applicants for employment.

In the event of the Design-Builder's noncompliance with the nondiscrimination clauses of this Contract or with any of the said rules, regulations, or orders, this Contract may be canceled, terminated, or suspended in whole or in part and the Design-Builder may be declared ineligible for further State contracts.

The Design-Builder shall include the provisions of this Section 8.1.2 in every subcontract or purchase order so that such provision will be binding upon each Subcontractor or vendor. The Design-Builder shall take such action with respect to any subcontract or purchase order as the Department may direct as means of enforcing such provisions, including sanctions for noncompliance.

8.1.3. On the Job Training (OJT) Hours

Not Used.

8.2. Contract Subletting

Design-Builder shall not enter into any Subcontract, nor allow any Subcontractors to enter into a Subcontract, without first notifying the Department of the proposed Subcontractor and Work to be performed by the Subcontractor, at least 10 Calendar Days in advance of execution and delivery of the Subcontract. The Department's failure to object to a Subcontract shall not be construed to relieve the Design-Builder or Surety of any responsibility for fulfilling all of the requirements of the Contract.

Subcontracts, whether committed to in writing or by an informal, unwritten arrangement or transfer of the Contract, or any part of it or its obligations, do not relieve liability under the Contract or its Sureties under the Contract Bonds. As part of its Contract with the Department, the Design-Builder accepts liability for any claims for damages or liability resulting from an act or omission of any person who carried out Work on the Design-Builder's behalf, whether that working relationship is through a Subcontract or carried out by an informal, unwritten agreement. The Design-Builder agrees to defend, hold harmless and indemnify the Department, its employees and the State of Utah for any damages, liability, or other expenses, including but not limited to attorney's fees, discovery and investigative costs, and mediation, arbitration, trial, and court costs which may be incurred by such a person.

Design-Builder shall not allow subcontracted Work to begin until the request to sublet Work is approved by Department.

For all Subcontracts, the Design-Builder shall:

A. Provide for a reduction in retained money equal to the percentage retained in accordance with Section 12.4 (Retention).

B. Include a statement describing the method of distribution of any adjustment due to price increases or decreases using applicable price adjustment specifications for fuel, asphalt, cement, common carrier rates, etc.

Each Subcontract involving performance of services within the State shall require the Subcontractor to (1) comply with Federal and State Laws regarding employment and verification of employment eligibility of persons employed by the Subcontractor, and (2) to certify compliance with the requirements of Utah Code Section 63G-12-302 and this Contract.

Subcontractors entering into a contract valued at $750,000 or greater are required to maintain an offer of qualified health insurance coverage for its employees that live and/or work in the State of Utah and their dependents for the duration of the Project, as required by Utah Code Section 72-6-107.5 and the Utah

Administrative Code R916-5. Refer to Section 8.10 (Health Insurance Coverage) for requirements for demonstration of compliance regarding the offering of "Qualified Health Insurance Coverage" to their employees.

8.3. Subcontracting Requirements

The Design-Builder shall comply with all applicable requirements of the Contract Documents relating to Subcontracts, and shall ensure that all Subcontractors performing Work on the Project comply with all applicable requirements of the Contract Documents relating to subcontracting. The Design-Builder shall not add, delete, or change the role of any Major Contractor without the prior written Approval of the Department.

8.4. Third Party Beneficiary Rights

Each Subcontract shall provide that, pursuant to terms in form and substance satisfactory to the Department, the Department is a Third-Party beneficiary of the Subcontract and shall have the right to enforce all terms of the Subcontract for its own benefit. The Department's Third-Party beneficiary rights shall not operate to make the Department responsible or liable for any breach of the Subcontract by the Design-Builder or for any amounts due and owing under the Subcontract or relieve the Design-Builder from its obligations.

8.5. Subcontract Terms

Each Subcontract shall include terms and conditions sufficient to ensure compliance by the Subcontractor with all applicable requirements of the Contract Documents as well as any other terms that are specifically required by the Contract Documents to be included in the Subcontracts including Sections 18.2 (Design-Builder Responsibilities Upon Termination), 18.9 (Inclusion in Subcontracts) and 19.2.1 (Rights of the Department).

8.6. Subcontract Data

The Design-Builder shall notify the Department, in writing, of the name and address of, and licenses held by, each Subcontractor (excluding Suppliers), as soon as the potential Subcontractor has been identified by the Design-Builder, but in no event less than 14 Calendar Days prior to the scheduled initiation of Work by such proposed Subcontractor. For Subcontracts of or anticipated to be $750,000 or more, the Design-Builder shall include a certification with such notification that the Subcontractor has and will maintain an offer of qualified health insurance coverage for the Subcontractor's employees and the employees' dependents during the duration of the Subcontract. The Design-Builder shall provide the Department with a list of its Subcontractors (including Suppliers) from time to time upon request by the Department; shall allow the Department access to all Subcontracts and records regarding Subcontracts; and shall deliver to the Department, within 10 Calendar Days after execution, copies of all Subcontracts with Major Contractors and, within 10 Calendar Days after receipt of a request from the Department, copies of any other Subcontracts identified in the request.

8.7. Responsibility for Work by Subcontractors

Notwithstanding any Subcontract or agreement with any Subcontractor, the Design-Builder shall be fully responsible for all of the Work. The Department shall not be bound by any Subcontract, and no Subcontract shall include a provision purporting to bind the Department.

8.8. Key Personnel

Key Personnel were identified in the RFQ and included in the Proposer's SOQ for the Project, for which Sections will be a Contract Document to the extent set forth in Part 1 (Agreement), Section 1.3 (Order of Precedence). These Key Personnel are set forth to effectively manage all aspects of the work in a quality, timely, and effective manner and will integrate the organization with the Department in a cohesive, seamless manner.

8.8.1. Department Requests for Additional Key Personnel

The Department may, with the Design-Builder's acceptance, add key positions at no cost to the Department. The Department shall have the right to review the qualifications and character of each individual to be assigned to a key position (including personnel employed by Subcontractors) and to Approve or disapprove use of such key person in such key position prior to the commencement of any Work by such individual or during the prosecution of the Work.

8.8.2. Replacement of Key Personnel

The Design-Builder shall notify the Department in writing of any proposed changes in any Key Personnel, and shall submit to the Department a resume of proposed Key Personnel along with a written request documenting the proposed change and demonstrating, to the Department's satisfaction, that the change shall be equal to or better than the original Key Personnel. Such changes will require prior Approval by the Department; the Design-Builder shall not change any Key Personnel without the prior written Approval of the Department.

8.8.3. Other Projects' Key Personnel

Key Personnel who are currently committed on other projects, that carry owners into this contract term, will need to obtain a letter of release from that project's Project Manager to participate on this Project. If a letter is not obtained, the Design-Builder will be required to replace Key Personnel with equal or better key personnel subject to Department Approval.

8.8.4. Fulfill and Commit to Key Personnel

The Design-Builder acknowledges and agrees that the award of the Contract by the Department to the Design-Builder was based, in large part, on the qualifications and experience of the personnel listed in the Statement of Qualifications and the Proposal, and the Design-Builder's commitment that such individuals would be available to undertake and perform the Work until Contract Completion. The Design-Builder represents, warrants and covenants that such individuals are available for and will fulfill the roles identified for them in the Statement of Qualifications and the Proposal in connection with the Work. Unless otherwise agreed to by the Department in writing, individuals filling Key Personnel roles shall devote a sufficient amount of their time for the applicable role with respect to the prosecution and performance of the Work, and the Design-Builder shall document such commitment to the Department's satisfaction upon the Department's request.

8.9. Character of Workers

All individuals performing the Work shall have the skill and experience and any licenses or certifications required to perform the Work assigned to them. If the Department determines in its sole discretion that any Person employed by the Design-Builder or by any Subcontractor is not performing the Work properly and skillfully in compliance with the applicable standards, or is intemperate or disorderly, then, at the written request of the Department, the Design-Builder or such Subcontractor shall remove such Person and such Person shall not be re-employed on the Project without the prior Approval of the Department. If the Design-Builder or the Subcontractor fails to remove such Person(s) or fails to furnish skilled and

experienced personnel for the proper performance of the Work, then the Department may, in its sole discretion, suspend the affected portion of the Work by delivery of written notice of such suspension to the Design-Builder. Such suspension shall in no way relieve the Design-Builder of any obligation contained in the Contract Documents or entitle the Design-Builder to a Change Order. Once compliance is achieved, the Design-Builder shall be entitled to and shall promptly resume the Work.

8.10. Health Insurance Coverage

The Design-Builder certifies that it is in compliance with Utah Code Section 72-6-107.5 and Utah Administrative Code R916-5 and certifies that it has obtained statements from all Subcontractors on Subcontracts valued or anticipated to be valued at $750,000 or more certifying that they are in compliance with such requirements. The Design-Builder shall require in all Subcontracts valued or anticipated to be valued at $750,000 or more that the Subcontractor certifies compliance with Utah Code Section 72-6-107.5 and Administrative Rule R916-5. The Design-Builder agrees to provide recertifications regarding compliance, and to require its Subcontractors on Subcontracts valued or anticipated to be valued at $750,000 or more to provide recertifications, if requested to do so by the Department pursuant to R916-5.

9— RISK OF LOSS

9.1. Site Security

The Design-Builder shall provide appropriate security for the Project site, including securing any buildings from entry, and shall take all reasonable precautions and provide protection to prevent damage, injury or loss to the Work and materials and equipment to be incorporated therein, as well as all other property at the site, whether owned by the Design-Builder, the Department, or any other Person.

9.2. Maintenance and Repair of Work and On-Site Property

9.2.1. Responsibility of Design-Builder

The Design-Builder shall maintain, rebuild, repair, restore, replace, or otherwise correct all Work (including improvements constructed in whole or in part and including goods, materials, equipment, and supplies which are purchased for permanent installation in, or for use during construction of or maintenance of the Project, regardless of whether the Department has title thereto under the Contract Documents) that is lost, injured or damaged from the date of NTP until the date of acceptance of maintenance liability by the Department or third parties as specified in Section 9.2.2 (Relief from Liability for Maintenance), after which time care, custody and control of the improvements constructed under the Project shall pass to the Department. Additional requirements regarding maintenance during construction are set forth in Part 4-09 (Maintenance During Construction).

9.2.2. Relief from Liability for Maintenance

Responsibility for maintenance of improvements constructed under the Project and not excluded from the Notice of Substantial Completion shall be transferred to the Department as of the date on which the Department issues the Notice of Substantial Completion. Responsibility for maintenance of all remaining improvements constructed under the Project shall be transferred to the Department as of the date on which the Department issues the Notice of Contract Completion. Nothing in this Section 9 (Risk of Loss) shall be construed as waiving the Department's rights to enforce Warranties and other obligations for the Project Work (including Design Documents) that survive any Notice of Completion and/or Notice of Contract Completion and that are unrelated to maintenance of the Project or Force Majeure. Notwithstanding the foregoing, all elements of the Work that will be owned by Persons other than the

Department (such as Utility facilities) will be considered accepted for purposes of maintenance responsibility only as of the date of acceptance of maintenance responsibilities by such Persons.

9.2.3. Failure to Provide Maintenance

If the Department deems the Design-Builder has failed to provide adequate maintenance during construction, the Department will issue an oral notification of said failure. This oral notification will be followed by a written notification to commence and continue correction of such failure. Failure by the Design-Builder to correct the stated deficiency within 24 hours or within the stated amount of time directed by the oral notification or as stated within the Contract Documents may result in the Department performing such work with Department forces without prejudice to other remedies the Department may have. In such case, the Department will deduct such amount from future payments to the Design-Builder, or such amount will be payable to the Department within 30 days after the Design-Builder's receipt of an invoice therefor.

9.3. Injury and Damage to Persons or Off-Site Property

9.3.1. Bodily Injury Claims

The Design-Builder shall assume liability for bodily injury (including death) arising out of negligent acts or omissions that are: associated with the Contract; and caused by the Design-Builder, the Design-Builder's agents, independent contractors, Subcontractors at any tier, suppliers at any tier, or a combination thereof.

9.3.2. Precautions; Restoration

The Design-Builder shall take all reasonable precautions and provide protection to prevent damage, injury or loss to off-Site property, which includes property adjacent to the Project site and property likely to be affected by the Work. The Design-Builder shall restore damaged, injured, or lost property (i) caused by an act or omission of any Design-Builder-Related Entity to a condition similar or equal to that existing before the damage, injury or loss occurred; and (ii) as required under Part 4-20 (Photographs).

<u>Property Damage Claims (other than damage to the Project/Work itself):</u> The Design-Builder shall assume liability for physical loss or damage to Third -Party property (including loss of use resulting from property damage) arising out of negligent acts or omissions that are associated with the Contract and caused by the Design-Builder, the Design-Builder's agents, independent contractors, Subcontractors at any tier, suppliers at any tier, or a combination thereof. Design-Builder shall restore damaged property to a condition similar or equal to that condition existing before the damage, pay to restore the damaged property to that condition, or pay to replace the damaged property.

(1) If government property, the Department will determine whether the Design-Builder's restoration sufficiently corrected the damage.
(2) If private property, the property owner will determine whether the Design-Builder's restoration sufficiently corrected the damage. After restoring damaged property or paying for damaged property as required, Design-Builder shall obtain a release from the property owner and submit the release to the Department. The Department will not issue Contract Completion until the Design-Builder has obtained and submitted the required release unless the property owner acts unreasonably in refusing to issue a release.

9.4. Third-Party Agreements

The Design-Builder shall comply with all provisions in the Third Party Agreements included in Part 6 (Third-Party Agreements).

9.5. Title

The Design-Builder warrants that it owns, or will own, and has, or will have, good and marketable title to all materials, equipment, tools and supplies furnished, or to be furnished, by it and its Subcontractors that become part of the Project or are purchased for the Department for the operation, maintenance, or repair thereof, free and clear of all Liens. Title to all of such materials, equipment, tools and supplies which shall have been delivered to the Site shall pass to the Department upon incorporation into the Work or upon payment by the Department to the Design-Builder for the materials, equipment, tools and supplies furnished, whichever occurs first. Notwithstanding any such passage of title, Design-Builder will protect the title from all Liens or bond claims. Notwithstanding any such passage of title, and from NTP through the Department's issuance of the Notice of Contract Completion, the Design-Builder shall retain sole care, custody, and control of such materials, equipment, tools and supplies, shall exercise due care with respect to these items and the Site as required in Section 9.1 (Site Security), and repair, replace, or otherwise correct such items upon physical loss or damage.

10— PROJECT COMMUNICATIONS

10.1. Project Directory

Provide a directory showing all Key Personnel identified by function within 10 Calendar Days of NTP. The directory shall be updated throughout the course of the Project to remain current. The directory shall include the following information for each person listed: (1) Project title, (2) area of responsibility, (3) office location, (4) e-mail address, and (5) mobile telephone number. For offices identified, provide the following: (1) office address and location, and (2) main office telephone number.

10.2. Organization Chart

The Design-Builder shall provide the Department a Project organization chart within 10 Calendar Days of NTP. The organization chart shall be updated throughout the course of the Project to remain current. The organization chart shall graphically represent the hierarchy and functional interaction and responsibilities of each of the following personnel:

A. All Key Personnel

B. All QC positions

C. Environmental compliance

D. Subcontracts and procurement

E. Design for each discipline

F. Coordination for each Third Party, including Utilities, and other Agencies

G. Safety

H. Project controls

10.3. Project Meetings

Contact the Department within five (5) Calendar Days of receiving Notice to Proceed to schedule a pre-Work meeting. The Design-Builder shall plan for weekly and monthly meetings with the Department to discuss Project progress, issues, and all planned Work. Separate weekly meetings shall include: Quality, Project progress (status), Safety, Utilities, Environmental, and MOT. Monthly meetings shall include: Partnering, Schedule, and Payment Applications. Key Personnel or their designees shall attend meetings

such that each management function is represented in each meeting. The types of meetings, their topics and required attendees shall be mutually developed and agreed upon by the Design-Builder and the Department. The Design-Builder shall prepare and distribute agenda and meeting minutes for all regular meetings. All meeting minutes shall not become final until the Department reviews and provides comments to the minutes, which shall be included in the meeting minutes. The Design-Builder shall provide all meeting facilities unless otherwise agreed.

11— SCHEDULING AND PROGRESS

11.1. Scheduler

The Project Baseline Schedule must be prepared and managed by a scheduler with at least five years experience managing and preparing construction schedules. The scheduler cannot be a Key Personnel.

11.2. Project Baseline Schedules

Project Baseline Schedule shall mean any of the following schedules identified under this Section 11.1 (Project Baseline Schedules). References hereinafter to Project Baseline Schedule shall be any of those identified in this Section 11.1 (Project Baseline Schedules), as determined by context. If any ambiguity exists as to which Project Baseline Schedule is referenced, it shall be determined by the Department.

11.2.1. Baseline Schedule

The Baseline Schedule shall be based upon the Proposal Schedule and shall include the Completion Deadlines as set by the Contract, which shall not be changed except by Change Order. The Baseline Schedule shall be the Design-Builder's original plan for performing the Work from Award through Contract Completion and shall show all activities in sufficient detail to plan, monitor, and evaluate the progress of the Work. The Baseline Schedule shall represent conditions of the Project at NTP.

Once accepted in writing, the Baseline Schedule shall become the schedule against which all progress of the Work shall be measured. The Baseline Schedule shall not change after acceptance except as provided by this Section 11.1. The Baseline Schedule shall be the basis for the monthly Project Schedule Updates.

11.2.2. Revised Baseline Schedules

If substantial changes to the Baseline Schedule are necessary or have been made over time, the Design-Builder may propose or the Department may require that a Revised Baseline Schedule be developed and implemented. Any Revised Baseline Schedule is subject to review and comment by the Department, and the Design-Builder shall either address or respond to such comments to the Department's satisfaction and obtain Acceptance prior to implementation. Each Revised Baseline Schedule shall have a unique name that includes a sequential revision number. This schedule shall show all then-current progress of the Work, including the status of all activities, sequencing, and logic changes, and shall represent the Design-Builder's best knowledge and planning at that time. The Design-Builder acknowledges that the costs required to provide any Revised Baseline Schedules are incorporated into its Project scheduling costs. Once accepted, a Revised Baseline Schedule shall be the basis for all subsequent Project Schedule Updates.

11.2.3. Recovery Schedule

Provide a Recovery Schedule when it becomes apparent that the Work cannot be completed by the contractual Completion Deadline(s) identified as: i) The current Project Schedule Update is projecting

21 or more Calendar Days delay to the Completion Deadline. ii) Activities which were not previously critical become critical, or near-critical activities increase to more than 15% without justification.

The proposed Recovery Schedule shall be based on the latest accepted Project Schedule Update and supplemented by a written recovery plan detailing how delays will be mitigated to achieve Completion Deadline(s) and include a detailed revised resource plan. The Recovery Schedule shall comply with all Project Baseline Schedule requirements.

The Department will notify the Design-Builder within 10 Working Days after receipt of the proposed Recovery Schedule whether the schedule is accepted or returned with comments. The Design-Builder shall promptly address such comments to the Department's satisfaction. Once a Recovery Schedule is accepted, it shall become the current Revised Baseline Schedule. The Department's acceptance of any Recovery Schedule shall not relieve the Design-Builder from its exclusive responsibility for scheduling, managing, and performing the Work within the Completion Deadlines.

The Design-Builder shall provide additional labor, equipment, and/or materials, work additional shifts, and/or expedite procurement to complete the Work within the Completion Deadlines at no additional cost to the Department. The Department may, in its sole discretion and at no additional cost to the Department, require the Recovery Schedule be cost- and resource-loaded in order to be accepted. The Design-Builder acknowledges that the costs required to provide any Recovery Schedule is incorporated into its Project scheduling costs

The Design-Builder's refusal, failure, or neglect to take appropriate action to submit a Recovery Schedule, including a recovery plan and resource plan, shall constitute sufficient evidence that the Design-Builder is not prosecuting the Work, or separable part of the Work, with the diligence that will ensure its completion within the applicable Completion Deadline(s). Such lack of action shall constitute sufficient basis for the Department to withhold the current month's progress payment due and shall constitute grounds for default under Section 19 (DEFAULT).

11.2.4. Baseline Schedule Development

All Project Baseline Schedules referenced in Section 11.1 (Project Baseline Schedules) shall comply with the following:

11.2.4.1. Project Baseline Schedule Pre-Submittal Meeting

A. Conduct a pre-submittal schedule meeting to:

1. Review the requirements of this section prior to submittal of a Project Baseline Schedule.
2. Determine estimate period closing dates upon which the monthly Project Schedule Updates and progress payments will be generated (with Approval of the Department).

B. Attendees shall include, at a minimum, the Design-Builder's Project Manager, Design-Builder's qualified scheduler, and the Department.

C. The Design-Builder may arrange this meeting prior to NTP to facilitate timely development of the Project Baseline Schedule.

11.2.4.2. General Requirements

Provide the Department with the Project Baseline Schedule using Primavera P6 version 8 (software versions as approved by the Department). Provide a Baseline Schedule Narrative as described in this section.

11.2.4.3. Project Baseline Schedule Submission

Establish a sequential numbering system for schedule submittals and associated reports to allow easy identification of Project Baseline Schedule(s), Project Schedule Updates and resubmissions, as acceptable to the Department.

Submit to the Department a Project Baseline Schedule with a Baseline Schedule Narrative in a format acceptable to the Department, to include:

A. One electronic copy of Primavera software file (.XER file).

B. One electronic (PDF file) copy of narrative report.

C. One electronic (PDF file) copy of layouts as generated from Primavera, as outlined in the Baseline Schedule Narrative Requirements in this section.

The Department will review the Project Baseline Schedule and return it as accepted, accepted with comments, or returned with comments for resubmission within 10 Working Days from the date of receipt, unless otherwise noted.

The Design-Builder shall address comments and revise the schedule as necessary to the satisfaction of the Department and return within five Working Days.

No progress payments are made before the Department accepts the Baseline Schedule.

The Design-Builder is solely responsible for planning and executing the Work. The Department's acceptance of a Project Baseline Schedule does not:

1. Imply Approval of any construction methods or relieve the Design-Builder of responsibility to provide sufficient materials, equipment, and labor to complete Work in accordance with the Contract.
2. Attest to the validity of assumptions, activities, relationships, sequences, resource allocations, or any other aspect of the Project Baseline Schedule.

Failure to include any element of work required by the Contract in the accepted Project Baseline Schedule does not relieve the Design-Builder's responsibility to perform such work.

The Project Baseline Schedule does not modify the Contract Documents.

11.2.4.4. Project Baseline Schedule Requirements

A. Define a complete and logical plan that can realistically be accomplished for executing the Work defined in the Contract. Develop a Project Baseline Schedule that reflects the proposed approach to accomplish the Work.

B. Designate the Baseline Schedule Data Date as the day before the Notice to Proceed date, or alternate date as approved by the Department. The Data Date for subsequent Project Baseline Schedule submissions should be the day the estimate period closes or as agreed by the Department.

C. Include a well-defined Work Breakdown Structure (WBS) that clearly communicates Project organization and approach to Work. Each activity must be assigned to a WBS. Provide the preliminary WBS to the Department for review and acceptance prior to Baseline Schedule submittal.

D. Develop and assign Activity Project Codes to all activities in the schedule; begin each Activity Project Code name with the Department's Project Identification Number followed by a dash. Establish code values as agreed upon with the Department in the Baseline Schedule Pre-Submittal Meeting. A guideline for code values is provided in the

following table.

WORK ELEMENT CODE VALUES

Code Value	***Description***
AGGREGATE	Granular, UTBC, Finish
CLEAR&GRUB	Clear & Grub, Removal
DESIGN	Design, multiple disciplines
DEMO	Building demolition, other
DRAINAGE	Pipe, irrigation, ponds
EXCAVATION	Cut, fill, excavate
FLATWORK	Curb, gutter, sidewalks
LANDSCAPE	Topsoil, mulch, seeding
MOT	Maintenance of Traffic
PAVING	PCCP, HMA, OGSC, SMA, lean concrete
PROCURE	Procurement of materials
ROW	Right-of-Way
SIGNALS	Signals, foundations, poles
SIGNING	Signing - Permanent
STRIPING	Striping - Permanent
STRUCTURES	Box culvert, headwall (non-bridge)
SUBSTRUCTURE	Foundation, Columns, Bent, Drilled Shafts, Piles, Abutments (bridge)
SUPERSTRUCTURE	Girders, Deck, Approach Slabs, Parapet, Polymer Overlay (bridge), Membrane with SMA overlay
SURCHARGE	Consolidation & Settlement Times
TRAIL	Trails - Pedestrian & Bike
UTILITY-COMM	Utility Communication
UTILITY-GAS	Utility Gas
UTILITY-POWER	Utility Power
UTILITY-WATER	Utility Water/Irrigation/Sewer
WALLS	Noise, MSE, Retaining
NA	Not Applicable – Not on Mainline, Misc, LOE, etc.

E. Clearly define calendars.

1. Include Department Class I holidays as non-work days.
2. Appropriately account for weather. Account for weather and seasonal conditions within the Project Schedule. Use custom calendars to show weather, seasonal conditions, or seasonal shutdowns.
3. Include calendars that adequately represent non-work days associated with limitations (such as paving, utilities, landscape, etc.).

4. Include a seven day calendar to be utilized for cure, settlement, and other activities as appropriate.
5. Assign calendars consistently among similar activity types.
6. In Primavera, establish Project Calendars. Begin each calendar name with the Department's Project Identification Number followed by a dash.

F. Provide a sufficient number of activities to assure adequate planning and to allow monitoring and evaluation of progress and analysis of time impacts.

1. Define activities to a level of detail acceptable to the Department.
2. A Project Baseline Schedule with less than 500 activities or more than 2,000 activities requires justification by the Design-Builder and approval by the Department.
3. Identify all design packages intended to be Released for Construction, which at a minimum shall have logic ties to the design submittal, review activities and construction Work associated with that design package.
4. Depict and account for the acquiring of permits.
5. Show Maintenance of Traffic (MOT) activities.
6. Show the interaction of all activities, with either the Department or Third-Parties, that affect progress of the Work. Include activities identifying Third-Parties' design, agreement preparation and coordination, review periods (for both Department and the Third-Party), and relocation/construction. See Part 6 (Third-Party Agreements) and Part 4-19 (Utilities).
7. Include separate activities for cure time, major inspection points requiring preparation, submittal periods, and other time consuming activities.
8. Include additional activities as required by the Department at any time throughout the Project.

G. Include NTP, the Completion Deadlines, Project Milestones, and other milestones used by the Design-Builder to manage and track progress.

H. Include activities that define significant interaction points with the Department and other entities such as subcontractors, vendors and suppliers, utilities, local governments, and special service districts. Make schedules from these entities available to the Department when requested.

I. Describe activities so that the scope of work is readily identifiable and progress on each activity can be measured.

1. Provide a unique activity description. Indicate in each activity description its associated scope and location of work (such as type of work, bridge number, station to station locations, side of highway, pipe number, etc.). Also include a verb in the activity description to indicate the action undertaken (such as install, place, fabricate, etc.). Do not use duplicate activity descriptions.
2. Assign a unique activity ID number to all activities. Do not reuse activity numbers.

J. Define the duration of each activity.

1. Activity durations, except milestones, must be one day or longer. Limit the maximum duration of any activity to 30 Calendar Days unless otherwise accepted by the Department. Exceptions may include continuing activities as described in Section 12.1.3 (Continuing Activities), non-work type activities

such as mobilization, fabrication, settlement durations, curing, and long lead procurement items.

2. Use of level of effort (LOE) activities requires Department Approval.
3. Determine the duration for each activity based on the anticipated production rates to complete the Work (quantity divided by reasonable production rates).

K. Clearly identify the relationships and logic between activities to demonstrate the Design-Builder's overall approach to planning, scheduling, and executing the work..

1. Each activity is to have at least one predecessor and one successor activity, except for Contract Execution and Substantial Completion milestones.
2. Do not use unnecessary relationships or excessive ties to end milestones unless justified and Accepted by the Department.
3. Provide a list of activities utilizing lags and the justification for the use of each lag. Do not utilize any negative lags.

L. Design-Builder shall not use calendar dates to "logically" begin or complete any activity unless those specified calendar dates are identified in the Contract Documents.

M. Do not use Constraints to control activities unless accepted by the Department.

N. Do not manipulate project total float through adjusting calendars, extending activity durations, or any other such methodology.

O. Use of negative float is not allowed in the Baseline Project Schedule.

P. Clearly show the Critical Path, as calculated by the software.

1. Show activities on the Critical Path in red. In Primavera use the longest path schedule option setting to define critical activities.
2. Use the retained logic schedule option setting in Primavera to calculate the Critical Path.
3. Do not use the leveling resources schedule option.
4. Progress the Project Schedule (by using the Schedule function under Tools in Primavera) to the current Data Date prior to submission with no further modifications made to the schedule following progression.

Q. Limit near-critical activities to 15 percent of the construction activities not including LOE, milestones, etc. Near-critical activities are those with total float of 15 days or less.

1. If more than 15 percent of the activities in the baseline schedule are near-critical, then provide justification for acceptance by the Department.

R. Cost-load the Project Baseline Schedule.

1. Include cost-loaded activities (Payment Activities) for all activities in the Project Baseline Schedules for which payment is requested. Cost-loaded activities will be the basis for the Schedule of Values described in Section 12.1 (Schedule of Values).
2. The Contract Amount shall be allocated to accurately reflect the Design-Builder's cost for such activities and shall not artificially inflate, imbalance, or front-load Payment Activities.
3. When requested by the Department, the Design-Builder shall substantiate Payment Activity values with data that will validate their accuracy.

4. The value of the cost-loaded activities in the Project Baseline Schedule shall equal values shown on the Form PA (Price Allocation) and Form UC (Utility Cost) and and shall equal the total Contract Amount.
5. Provide sufficient number of activities so that budget of any one activity does not exceed $200,000.00, unless otherwise Approved by the Department.
6. The Design-Builder may find it beneficial to place significant portions of the Project that will be completed by a separate Subcontractor and/or that represent significant differences in crafts and/or trades, such as Utility Relocations, in separate Payment Activities.
7. Create Resource IDs and Resource Names in Primavera that are based on Form PA (Price Allocation) Payment Items.
8. In Primavera begin each Resource ID with the Department Project Identification Number followed by a dash.
9. Define costs as Material Resource Type.
10. Each resource (Form PA Payment Item) should be allocated and assigned to activities in the appropriate quantity to accomplish the Work within the activity duration.

11.2.5. Accelerated Project Baseline Schedule

If the Design-Builder wishes to propose an accelerated schedule for early completion, the Design-Builder must request in writing that the Department identify additional Department costs required to support the accelerated schedule such as increased staff for inspection, testing, and overtime.

A. The Design-Builder is responsible for paying for these added costs unless waived by the Department on the basis of other benefits accrued to the Department.

B. The acceptance of an early completion schedule is at the sole discretion of the Department.

11.2.6. Project Baseline Schedule Narrative Requirements

Prepare and include with the Baseline Schedule or any revised Baseline Schedule a schedule narrative report (document) describing the Design-Builder's plan and schedule for achieving the Contract requirements and objectives for all Work.

The narrative shall describe the methods of operation, resources to be employed, time frames for the design and construction, and time frames for accomplishment of specified milestones, and Completion Deadlines. Include a Resource Plan as described below.

Address the following items in all Baseline, Revised Baseline, or Recovery Schedule narratives unless otherwise agreed by the Department:

A. Describe the construction philosophy supporting the approach to the work outlined in the Project Baseline Schedule.

B. Describe the approach used to apply relationships between activities, such as: physical or chronological relationships between work activities; sequencing due to crew or equipment resources; or, timing of work based on limitations (such as ROW, environmental, utilities, etc.).

C. Describe any limited resources, potential conflicts, or other items that may affect the schedule and how they may be resolved.

D. Describe the Critical Path and identify challenges, risks, or issues that may arise associated with the Critical Path.

E. Describe how coordination will be handled with entities such as subcontractors, vendors and suppliers, utilities, local governments, and special service districts.

F. Describe activity coding structures and how they will be used.

G. Include a resource plan which documents in detail the types and quantities of resources needed to prosecute all aspects of the Work, including work crews, equipment, specialized personnel, materials and QC efforts.

H. Provide list of applicable activities and justification for usage of:

1. Activities with durations exceeding 30 days.
2. Constraints.
3. Unusual calendars.
4. Lag.
5. Near-critical activities, if more than 15 percent of the activities in the baseline schedule are near-critical.

I. Along with the baseline narrative, include layouts generated from Primavera (PDF files) to illustrate the following:

1. Layout to demonstrate Design-Builder's approach to work (based on WBS or other applicable coding). At a minimum include columns for activity id, activity name, start, finish, original duration, remaining duration, total float, longest path, budgeted cost, and Gantt chart/linear plot. Sort by start date.
2. Longest Path layout; sort by start date.
3. Other layouts or reports as agreed upon in the Pre-Submittal Meeting.

11.3. Project Schedule Updates

11.3.1. Monthly Progress Meetings

A. Conduct monthly progress meetings to review and discuss the status of the Project. Discuss Critical Path and changes in the Critical Path, changes in sequencing or approach to Work, change orders, and potential delay. Address current and potential issues with the intent of finding the most effective solutions to problems.

B. Attendees shall include, at a minimum, the Design-Builder's project manager, Design-Builder's scheduler, and the Department.

C. Record an action item list that specifies who is responsible for resolving existing or pending issues and the date by which the issue must be resolved to avoid Contract/Project delays.

11.3.2. Submission of Project Schedule Updates

A. Submit a Project Schedule Update each month within five Working Days of the close of the pay estimate period during the life of the Contract.

B. Submit to the Department a Project Schedule Update with Schedule Narrative and accompanying layouts or reports, to include:

1. One electronic copy of Primavera software file (.XER file) compatible with version Department is using.
2. One electronic copy of narrative report.

3. One electronic (PDF file) copy of layouts as generated from Primavera, as outlined in the Project Schedule Update Narrative Requirements in this section.

C. The Department will review the Project Schedule Update and return it as either accepted, accepted with comments, or returned with comments for resubmission within five Working Days from the date of receipt.

1. The Design-Builder is to address comments and revise the schedule as necessary to the satisfaction of the Department.
2. If a Project Schedule Update is returned by the Department with comments for resubmission, then it is the responsibility of the Design-Builder to revise and resubmit the Project Schedule Update no later than five Working Days from being returned by the Department. Upon receipt of the revised Project Schedule Update, the Department has five Working Days to review the revised Project Schedule Update and return it as either accepted, accepted with comments, or returned with comments for resubmission.

D. The Department does not process a progress payment until an acceptable Project Schedule Update has been received, reviewed, and accepted.

1. Upon acceptance of the Project Schedule Update, the Department has an additional five Working Days to complete review of the progress payment.

E. Failure to include any element of Work required by the Contract in the Schedule Updates does not relieve the Design-Builder's responsibility to perform such Work.

F. The Project Schedule Updates do not modify the Contract Documents.

G. The schedule impacts arising from the Department's time to review submittal revisions caused by noncompliance with Contract requirements, or resubmittals at the discretion of the Design-Builder, is borne by the Design-Builder.

11.3.3. Project Schedule Update Requirements

A. Comply with all Project Baseline Schedule requirements.

B. Designate the Data Date as one day after the estimate period closing date for the monthly Project Schedule Update and Progress Payment.

C. Show actual progress for each activity through the period closing date and the planned execution for the remainder of the Work:

1. Actual start dates and remaining duration for activities in progress; and actual finish dates for completed activities.
2. Projected sequences of activities for remaining Work.
3. Revised relationships and durations for unfinished activities, if warranted.
4. A well-defined Critical Path, as calculated by the software.

D. Accurately reflect "as-built" information for each activity shown in the Project Schedule Update.

E. Review cost-loaded activities and activities throughout the project and adjust costs as needed in Project Schedule Updates to account for changes to the Contract Amount. Throughout the Project, total budget and at completion cost in the schedule shall match the Contract Amount inclusive of all authorized Change Orders.

1. Add Change Orders as Approved by the Department into the schedule with appropriate activities, resources, and units/budget to represent the modified scope of work.
2. When the Design-Builder adds or splits out activities in the course of revising a Project Schedule Update,the budgeted units/costs and resources for those activities must also be reallocated to represent appropriate quantity/cost to accomplish the Work..

F. Accurately represent all planning changes, adjustments, or revisions in sequencing and timing of remaining Work.

G. If work is performed out of sequence, the Design-Builder is required to implement logic changes consistent with the retained logic method of scheduling to allow the out-of-sequence work to proceed.

H. If more than 15 percent of the activities in a Project Schedule Update become near-critical, then a recovery plan may be requested by the Department.

I. Through submittal of the Project Schedule Update, the Design-Builder may demonstrate proposed modifications to planned work that require adding or deleting activities, changing activity descriptions, or revising activity durations or logic. Provide the reason or justification for the changes as described in the narrative requirements. The Department will review the justification for proposed changes and either accept or reject the proposed modifications as part of the Project Schedule Update review.

1. Make every effort to minimize the number of changes.
2. No changes are to disrupt the integrity or comparative relationship between current and previous accepted Project Baseline Schedules or Schedule Updates.
3. Do not change or reuse activity IDs; activity IDs are unique identifiers.
4. Activity descriptions may be revised for clarification, but are not to be altered to signify a different scope than originally represented.
5. Changes to Critical and near-Critical Paths should be carefully analyzed as to the cause of the change to verify such changes were intended by the Design-Builder as part of revisions to planned work.
6. If any changes impact the Critical Path, or result in extension of the Completion Deadline(s) as compared to the previously accepted Project Schedule Update, then the Design-Builder is required to submit a time impact analysis as described in the Time Impact Analysis paragraph within Section 16.5 (Contents of Change Orders).

J. Ensure the schedule has been progressed to the Data Date prior to submission with no further modifications made to the schedule following progression.

11.3.4. Project Schedule Update Narrative Requirements

The Design-Builder shall prepare and include with the Project Schedule Update a schedule narrative report describing the status of the Work in detail. The report shall:

A. Describe the work performed during the current estimate period.

B. Explain deviations between the work planned and the work performed for the previous period.

C. Describe the work to be accomplished during the next period.

D. Describe the current Critical Path of the project, and explain any changes to the Critical Path as compared to the previous update.

E. Explain changes to the schedule since the previous update. Provide the reason or justification for the changes, and describe any resulting affects or impacts to the Project Schedule, particularly for activities on critical or near-critical paths. Explain:

1. Added or deleted activities.
2. Changes to activity durations.
3. Revisions to actual start/finish dates as accepted by the Department in previous updates.
4. Relationship or logic revisions that result in significant increases or decreases in activity float or changes to float for groups of related activities.
5. Calendar changes.
6. Addition or deletion of constraints.
7. Changes to activity coding.
8. Changes to lags and justification for use of lag.
9. Changes to activity unit/budget allocations.
10. Changes to resource allocations.

F. Provide status on pending items applicable to the schedule.

1. Permits, easements, agreements.
2. Contract changes or time adjustments.
3. Time Impact Analysis.
4. Material procurement for long-lead items.

G. Describe current and anticipated problems or delays:

1. Cause of the problem or delay.
2. Impact or potential impact to planned work, durations, milestones, or completion dates.
3. Corrective action taken to date.
4. Design-Builder's plan to mitigate or resolve problem.
5. Identify action the Department needs to take and timeline for actions to be taken to avoid or mitigate the problem.
6. Discussion of problems or delay in the Project Schedule Update narrative does not relieve the Design-Builder of complying with contractual requirements regarding notification and documentation of claims.

H. Along with the Project Schedule Update narrative, include PDF layouts generated from Primavera to illustrate the following:

1. Layout to demonstrate Design-Builder's approach and progress of work based on WBS or other applicable coding. At a minimum include columns for activity ID, activity name, start, finish, original duration, remaining duration, total float, longest path, budgeted cost, and the Gantt chart/linear plot.
2. Longest Path layout.
3. Other layouts or reports as agreed upon with the Department in the Monthly Schedule Update Meeting.

11.4. Look-Ahead Detail Schedule

The Look-Ahead Detail Schedule is a schedule that spans at least one week backward-looking and three weeks forward-looking (rolling period of at least 21 Calendar Days):

A. The Look-Ahead Detail Schedule shall be based on the current Project Schedule Update and provide a more detailed breakdown of planned schedule activities for the purpose of materials inspection and testing. Any deviations from the current contract schedule must be clearly noted and explained.

B. The Look-Ahead Detail Schedule shall reference the associated Project Schedule activity ID numbers and define specific daily operations for all Work activities scheduled to be performed during the three-week period.

The Look-Ahead Detail Schedule shall be submitted to the Department on a weekly basis and provided at the weekly construction/coordination meeting.

11.5. Project Float

Total Project float is defined as the cumulative length of time activities can be delayed before they affect a Completion Deadline.

A. Float is a shared commodity between the Design-Builder and the Department and not for the exclusive use or financial benefit of either party.

B. Either party has full use of the project float until it is depleted.

C. Changes or delays to activities in the schedule with Float that do not cause Completion Deadlines to be delayed shall not be justification for an extension of any Completion Deadline.

12— INVOICING AND PAYMENT

12.1. Schedule of Values

12.1.1. General

A. The Schedule of Values (SOV) is a detailed itemized list of Payment Activities for which the Design-Builder desires to be paid that establishes the value or cost of each detailed part of the Work. A Schedule of Values shall be derived from the cost-loaded, accepted Baseline Schedule. The Design-Builder shall allocate the Contract Amount in the SOV consistent with the Proposal Price Allocation (Form PA) and the Utility Cost Form (Form UC). The Department may verify the amounts by review of the Escrowed Proposal Documents. The Design-Builder shall submit the SOV for Approval with the Baseline Schedule.

The purpose of cost-loading the Project Schedule is to associate schedule activities to Payment Activities in order to monitor progress for making payment; however, once established, the SOV may be updated and maintained separately from the Project Schedule. The SOV may contain more items for payment than the project schedule has activities (see Section 12.1.2 (Payment Activities)). The Department may, at its discretion, require a Revised Baseline Schedule or a Recovery Schedule when the SOV is changed.

12.1.2. Payment Activities

The Design-Builder shall attach costs to those activities in the Project Baseline Schedule for which the Design-Builder desires to be paid. Payment Activities shall have identical IDs and Activity Descriptions

as activities in the Project Baseline Schedule. All Payment Activities shall be incorporated into one of the Payment Items in Form PA (Price Allocation) and Form UC (Utility Costs). Incorporate Change Orders into new or revised Payment Activities as they are Approved; new or revised Payment Activities must be agreed upon with the Department. If the Design-Builder anticipates requesting payment for stored-materials, include these materials as Payment Activities. Cost-loading of activities is described in Section 11.2.4 (Baseline Schedule Development).

12.1.3. Continuing Activities

The SOV shall include Payment Activities sufficient to cover all efforts necessary to fulfill all Contract requirements and successfully complete the Work for the following continuing activities:

A. Project Management
B. Quality Control
C. Safety and security
D. Maintenance During Construction
E. Environmental
F. Insurance

The total value for the continuing activities, except Quality Control, and Insurance, shall be equal to the value of Compensable Project Overhead listed on Form PA (Price Allocation) and shall be distributed so as to capture estimated expenditures in equal monthly increments within each continuing activity from NTP until Contract Completion.

12.2. Progress, Invoicing, and Payment

12.2.1. Measurement of Progress

Payments shall be made for Payment Activities and no payment is made until the Payment Activity is at least 50, 90 or 100 percent complete. The Department will consider payment of 50 percent of the budgeted amount when at least 50 percent of the physical progress of a Payment Activity is achieved in accordance with the Contract requirements. The Department will consider payment of 90 percent of the budgeted amount when 90-100 percent of the physical progress of a Payment Activity is achieved in accordance with the Contract requirements but required documentation is pending. Full payment of the budgeted amount will be paid when a payment activity is 100 percent complete and all required documentation is received and substantiated by the Department.

For continuing activities, payment shall be made for the amount apportioned for the period in which payment is being requested.

The amount payable to the Design-Builder for bond premiums is a dollar-for-dollar pass-through of the Design-Builder's costs (not to exceed the amount shown in the Payment Activities for such premiums). Where a Payment Activity requires submittal of a bond, the Payment Activity is met when the bond has been provided in the amount and under the terms required in the Contract and by a Surety that the Department accepts;

Invoice mobilization at the amount listed in Proposal Price Allocation Form PA upon issuance of NTP.

The Department will not pay for direct costs of equipment used to construct the Project. The Design-Builder shall allocate costs for equipment, whether new, used, or rented, as part of the activities with which the equipment is associated.

12.2.2. Power for In-place Equipment

Power necessary for Project illumination, ATMS, and signals for in-place equipment (equipment that is affixed to the land or permanent structures) that is being utilized prior to Contract Completion and paying the providers for such power is the responsibility of the Department. Arranging, notifying, and coordinating with the Department and provider for such power is the responsibility of the Design-Builder.

12.2.3. Progress Reports

The Design-Builder shall provide Progress Reports monthly along with the Request for Progress Payment. No Request for Progress Payment will be processed unless accompanied by the Progress Report.

The Design-Builder shall include the following in the monthly Progress Reports, in concurrence with the Project Schedule Update and narrative report:

A. Totals of materials incorporated into the Project from execution through the reporting period, the Department shall approved the list of material prior to the first Progress Report. If the Department requires additional material totals than agreed upon initially, the Design-Builder will include them in the list of materials. The following are examples of material totals to be provided:

B. Fill incorporated into the Project, in cubic yards

C. Concrete paving placed, in square yards

D. Lane miles completed

E. Length of pipe installed (of any size diameter)

F. Number of craft and total workers employed to work directly on the Project (including construction and professional services subcontractors)

G. A summary of executed Change Orders that includes the amount paid to date for each

H. Milestones achieved during the period

I. Summary of Project accidents (frequency and severity) and corrective actions taken

J. Progress photographs to show activity and improvements

K. The total monthly labor hours for craft labor and non-construction personnel by classification of management, engineering, and other technical personnel used on the Project.

With each monthly Progress Report, the Design-Builder shall provide a certificate signed by the Project Manager certifying the following:

L. All Work, including that of designers, Subcontractors, Suppliers, and fabricators, has been checked and/or inspected and that all Work, except as specifically noted in the certification, conforms to the requirements of the Contract

M. Records that provide evidence of compliance with Contract requirements are available

N. Nonconformances are being documented and resolved

O. Significant and/ or systemic problems are being investigated and actions taken to prevent their recurrence

P. Submittals are confirmed to meet all requirements prior to delivery and request for progress payment

Q. The Quality Program and all of the measures and procedures provided therein are functioning properly and are being followed

12.2.4. Request for Progress Payment

Submit a request for progress payment within five Working days following the estimate period closing date, or other agreed-upon date, containing the amount claimed to be payable for each Payment Activity. Requests for progress payment shall be submitted both electronically and in hardcopy format using forms agreed upon by the Department. Reference Part 2, Appendix F (Request for Periodic Payment – Form 01282C). Include with each request, the Approved SOV updated with partially and fully completed Payment Activities (50, 90, or 100 percent), that are incorporated into associated items in the Request for Progress Payment Form. Provide supporting documentation for the amount claimed payable.

Upon receipt of a Request for Progress Payment, the Department will review the submitted Request for Progress Payment and within five Working Days provide comments to the Design-Builder that lists any discrepancies and other amounts intended to be deducted.

Meet to review requests for progress payment and Department comments and attempt to resolve any outstanding issues regarding Payment Activities with the Department.

Submit a revised request for progress payment to address any outstanding issues identified by the Department. If the Design-Builder includes items for payment that remain unresolved, the Department will either (i) notify the Design-Builder that unresolved items in the request for progress payment remain, and request a resubmittal of the Request for Progress Payment, or (ii) deduct those amounts the Department asserts are not eligible for payment, and process the request for progress payment. The Department shall notify the Design-Builder of any such deductions.

12.2.4.1. Certification for Progress Payment

Requests for Progress Payment shall be certified by the Design-Builder's Project Manager that all amounts being requested are true and correct, inspection and testing in accordance with the Quality Program is complete, there are no outstanding NCRs, all certifications of compliance are submitted, and the Work is completed per the Contract Requirements. No Request for Progress Payment will be processed without such certification.

12.2.4.2. Documents Required to be Provided with the Request for Progress Payment

The following documents shall be submitted with each Request for Progress Payment application. No Request for Progress Payment will be processed without such documents:

A. The monthly Progress Report as defined in Section 12.2.3 (Progress Reports).

12.2.4.3. Payment Limitations and Partial Suspension of Payment

The Department will not pay for Work unless the following conditions are met with respect to such Work:

A. Released for Construction Documents are on Site for the Work being performed;

B. Released for Construction Documents have been checked and reviewed, and design documentation has been maintained, in accordance with the Contract Documents;

C. Construction Work has been inspected and sampling and testing conducted in accordance with Contract Documents; and

D. Nonconforming Work Items are corrected and/or resolved to the satisfaction of the Department

On any Request for Progress Payment, the Department may suspend or deduct amounts otherwise due to Design-Builder for that period's apportionment for any continuing activity for anything that does not conform to the Contract requirements or any of the following:

E. Failure to meet Contract provisions regarding Key Personnel or to staff the Project adequately and with sufficiently skilled personnel
F. Failure to maintain construction documentation so that it is complete and records and reports are submitted and/or retained in accordance with Contract Documents
G. Failure to maintain and track as-built information monthly.
H. Failure to provide or to meet Contract requirements regarding Project Schedules, including timely submittal of Project Schedule Updates
I. Failure to conduct or attend Project meetings with appropriate personnel, including Key Personnel
J. Failure to meet Contract requirements regarding the Quality Program, including for management, design, or construction related functions
K. Failure to provide timely or adequate facilities as required by the Contract
L. Failure to meet Contractual, Department, State, and federal requirements regarding safety, including holding of safety meetings and submittal of reports
M. Failure to adequately support the Department's Public Information efforts as required by the Contract
N. Failure to provide required types and levels of insurance
O. Serious disruptions to necessary traffic control and access through the Project site occur
P. Noncompliance with environmental requirements that leads to citations, fines, and/or other penalties by environmental authorities
Q. Serious disruptions to the Department's access to the Project site or use of facilities provided for the Department's use
R. Unacceptable Safety performance as evidenced by the Design-Builder's accident record
S. Continued reports of blocked vehicular and/or pedestrian access to properties

No payment will be made for design or construction Work necessary to correct Nonconforming Work.

If the Design-Builder fails to completely prosecute Work of a Payment Activity, the Department may deduct that Payment Activity amount from the next successive month for the corresponding Payment Activity(ies).

Payment Activities for Work arising from Change Orders are subject to Department Approval.

12.2.5. Processing and Payment

12.2.5.1. Processing of Requests for Progress Payment

Once the Department reviews and Approves the Request for Progress Payment, the Department will sign and date and return a copy of the Request for Progress Payment cover sheet with any corrections noted and proceed with processing the Request for Progress Payment. From the date signed, the Department will make payment on Approved amounts within 14 Calendar Days.

12.2.5.2. Amounts Withheld

No payment will be made for Payment Activity items in increments of anything other than 50, 90, or 100 percent. Payment will not be made for items that are Nonconforming unless the Department agrees that a pay adjustment may be made for Nonconforming Work in accordance with Section 12.3 (Cost Adjustments).

12.2.6. Partial Payment for Material Delivered to the Site of work

Upon application by the Design-Builder, using Form 01282A provided as Appendix D, and Approval by

the Department, payments for the Actual Cost of certain material may be made to the Design-Builder prior to incorporation of such material in the permanent Work. To be eligible for partial payment, material must meet all of the following conditions:

A. Be included on the List of materials found within this Section 12.2.6.

B. Have a minimum material cost of $20,000 per item or group of like items.

C. Be material that is incorporated into permanent Structures or features of the Project.

D. Be in a condition that is ready for on-Site installation without further fabrication or processing.

E. Be delivered and stored at the Site of Work or at a site and in a manner approved by the Department.

F. Be material that is stored a minimum of 60 Calendar Days.

G. With application for partial payments, provide documentation as follows:

1. Bill(s) of sale or vouchers indicating the actual dollar value paid by the Design-Builder for the material as stored;
2. Certification of Title (Appendix E (Form 01282B)) showing that title to the material, without encumbrances, is in the name of the Design-Builder and that title is warranted to the Utah Department of Transportation;
3. Documented evidence of acceptability of the material; and
4. If the material is stored on private property, a release and waiver covering such material (Appendix E (Form 01282B)), and providing access to the storage site, which release and waiver shall be executed by the property owner in favor of the Utah Department of Transportation or its agents.

When applying for partial payment of products that are claimed to be in short supply or unique to the Project, include documentation supporting that claim, to the satisfaction of the Department. The amount of partial payments do not exceed the total invoice amount for stored material, nor can the partial payment for material relating to any Payment Activity exceed 85 percent of the price for that item. The quantity of material for which payments are made cannot exceed the estimated quantity for that item. The making of partial payments is not deemed to be an acceptance of material, nor does it relieve the Design-Builder of responsibility for such material.

The Design-Builder is responsible for assuring that only those materials which comply with the Specifications are incorporated into the Project. All costs associated with handling, transportation, and storage of material, including any storage site rental, security, and weather protection, are borne by the Design-Builder. Any materials, other than those that are determined by the Department to be unique to the Project, that are not incorporated into the Project remain the property of the Design-Builder.

List of Materials:

1. Iron, steel, and aluminum products (including all metal components of railings and bridge superstructures)
2. Precast and prestressed concrete products
3. Pipe and underdrain products
4. Concrete, steel, and timber piles and appurtenances
5. Traffic signal, traffic control, signing, and lighting components
6. Cable, wire, and conduit
7. Impact attenuator components

8. Material manufactured to meet specific, unique requirements of the Project (to be determined by the Department)

12.2.7. Certification for Periodic Payment

Within 14 Calendar Days of receipt of a request for progress payment in accordance with Section 12.2.4 (Request for Progress Payment), unless payment is pending acceptance of the Project schedule update, the Department will issue, with a copy to the Design-Builder, a periodic payment certificate showing the amount of any periodic payment the Department considers payable by the Department to the Design-Builder. The amount of such a periodic payment certificate is the sum of the following:

A. The amounts shown to be due by reference to the Project Baseline Schedule. The amounts determined by the Department to be due in respect of the following:

1. Additional cost incurred and payable in accordance with the Contract;
2. Work executed pursuant to a Force Account Change Order; and
3. Any other amount or allowance to which the Design-Builder is entitled under the Contract, unless account has been or is taken of such amount or allowance by way of a Change Order of an SOV under Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work); less:

   a. The retention monies as provided for in Section 12.4 (Retention);
   b. Any amounts certified for payment on certificates previously issued;
   c. Any amounts recoverable from the Design-Builder and deductible from amounts due in accordance with the Contract; and
   d. Any amounts withheld under the terms of the Contract because the Design-Builder failed to provide the monthly progress report in the form and detail required in the Contract or failed to provide a revised Project Baseline Schedule that the Department has accepted.

At the same time the Department will countersign the certificate in Appendix F (Form 01282C), to be based on the draft submitted by the Design-Builder pursuant to Section 12.2.4 (Request for Progress Payment), amended as necessary, certifying the Payment Activities the Department considers the Design-Builder to have met. The Department has the power to omit from any such certificate the value of any Work with which the Department may, for the time being, be dissatisfied. The Department may by any certificate delete, correct, or modify any previously certified sum or statement of fact.

12.3. Cost Adjustments

12.3.1. Pay Adjustment Factors for Quality

Pay adjustments for Work quality shall be made as provided in Section 12.3.2 (Price Reductions for Nonconforming Work).

A pay adjustment for Nonconforming Work accepted by the Department does not affect the Design-Builder's warranty obligations under the Contract.

12.3.2. Price Reductions for Nonconforming Work

Work deviations from the specification, if accepted by the Department, will result in reductions of the Contract Price as specified below.

Unit prices for materials are not utilized in the payment structure of this Contract. However, unit prices

for reductions are required to utilize the pay factors, daily deductions, and rejection values identified in the UDOT 2012 Standard Specifications and Special Provisions relating to price reductions. Unit prices for reductions listed in Part 5 (Special Provisions and Exceptions) shall be applied as unit prices, daily deductions, or rejection values as listed. Reductions per unit of Nonconforming Work allowed to remain in place by the Department which are not covered by specification, special provision, or Part 5 (Special Provisions and Exceptions) shall be determined by the Department. The Design-Builder shall be provided the opportunity to accept the reduction or remove and replace the Nonconforming Work. Girder defects will be assessed for price reductions based on long term durability and maintenance concerns.

12.4. Retention

The Department deducts and retains five percent from each monthly invoice under Section 12.2 (Progress, Invoicing, and Payment) through Contract Completion, subject to the following:

12.4.1. Release of Retention to Subcontractors

(1) The Department will release retention being withheld for Work performed by Subcontractors, upon receipt of an Approved application from the Design-Builder under Section 12.4.1(2). The Department's release of such retention shall not relieve the Design-Builder of its contractual obligations relating to the Work.

(2) Subcontractors: Upon satisfactory completion of all Work to be performed by a Subcontractor, including provision of appropriate releases, certificates and other evidence of the Subcontractor's compliance with all applicable requirements of the Contract Documents, the Design-Builder shall (i) submit an application to the Department for the release of the retention attributed to the Subcontractor's Work stating that the Subcontractor has completed all Work required to be performed under its Subcontract, stating the amount withheld by the Design-Builder under the Subcontract and providing all backup information and stop notice and Lien releases as may be required by the Department and (ii) return all moneys withheld as retention from the Subcontractor, even if Work to be performed by the Design-Builder or other Subcontractors is not completed and has not been accepted, within 30 days following receipt of payment from the Department for the completed Subcontractor Work. The Design-Builder shall, by appropriate agreement with each Subcontractor, require each first tier Subcontractor to make payments to sub-subcontractors and Suppliers in a similar manner.

(3) Design Subcontractors: Upon issuance of all Released for Construction drawings completed by a Design Subcontractor. Include evidence of the Design Subcontractor's compliance with all applicable requirements of the Contract Documents. The Design-Builder shall (i) submit an application to the Department for the release of the retention attributed to the Design Subcontractor under the Design line item in Form PA stating that the Design Subcontractor has completed all Work required for the Released for Construction documents under its Subcontract, stating the amount withheld by the Design-Builder under the Subcontract and providing all backup information and stop notice and Lien releases as may be required by the Department and (ii) return all moneys withheld as retention from the Design Subcontractor, even if Work to be performed by the Design-Builder or other Subcontractors is not completed and has not been accepted, within 30 days following receipt of payment from the Department for the completed Design Subcontractor Work. The Design-Builder shall, by appropriate agreement with each Design Subcontractor, require each first tier Subcontractor to make payments to sub-subcontractors and Suppliers in a similar manner.

12.5. Other Deductions

The Department may deduct from any amounts otherwise owing to Design-Builder, including each monthly progress payment and the final payment, the following:

A. Any anticipated or accrued losses, liability, Liquidated Damages, Disincentives, or other damages for which Design-Builder is responsible hereunder.

B. The estimated or actual cost, as determined by the Department, of remedying any Nonconforming Work or otherwise remedying any breach of contract by the Design-Builder.

C. The amount of any outstanding claim relating to the Work.

D. The estimated amount, as determined by the Department, or the amount identified in the SOV for Work that the Design-Builder is obligated to perform under the Contract that the Design-Builder has failed to perform, whichever is greater.

E. Any other sums which the Department is entitled to recover from the Design-Builder under the terms of the Contract.

F. In addition to the above, with regard to final payment, the amount the Department deems advisable to retain to cover any existing or threatened Disputes, Claims, Liens and stop notices relating to the Project, or the cost of any uncompleted Work (including uncompleted Warranty Work).

The Department's failure to deduct from a progress payment or final payment any amount that the Department is entitled to recover from the Design-Builder under the Contract shall not constitute a waiver of the Department's right to such amounts.

12.6. Prompt Payment to Subcontractors

12.6.1. Subcontracts

Include in the subcontract language a clause agreeing to pay all retainage owed to the subcontractor for satisfactory completion of the Work within 30 Calendar Days after receiving payment from the Department.

12.6.2. Progress Payments

Pay subcontractors for satisfactory performance of subcontracted work no later than 30 Calendar Days after receiving payment from the Department.

Enter the dates that payments are sent to the subcontractor into the UDOT PDBS Subcontractor Payment Screen within 30 Calendar Days of receiving payment from the Department. The Department considers the entry of payment dates into PDBS as an affidavit certifying prompt payment by the Design-Builder.

A. The entry date is tied to the date the pay estimate is processed by the Department's comptroller.

B. The entry will be flagged red, indicating failure to make prompt payment, if the entry date is more than 30 Calendar Days after the comptroller processing date.

12.6.3. Payment Delay

Delay payment only for cause and document the reason in the comments area of the UDOT PDBS Subcontractor Payment Screen. This will serve as notification to the Department.

A. Send written notification to the subcontractor.

1. The Design-Builder is considered non-compliant if no payment is made to the subcontractor and there are no comments in PDBS explaining why the subcontractor's payment is being withheld for cause.

2. The Department may withhold the dollar amount of delayed payment, including retention, from future estimates.

B. Provide subcontractor 15 Calendar Days from the date of written notification to correct all deficiencies.

1. Release payment upon receipt of documentation demonstrating correction of deficiencies within 15 Calendar Day.

C. Include language in the subcontract that provides for the use of appropriate alternative dispute resolution mechanisms to resolve payment disputes.

1. The Department may hold disputed funds in escrow until the dispute is resolved.

12.6.4. Failure to Make Prompt Payment

The Department will provide written notification to the Design-Builder upon determination of failure to make prompt payment for Work that was performed according to the Contract's specifications.

A. Make prompt payment within three Working Days of receiving written notification.

B. The Department considers failure to make prompt payment a contract violation for which the Design-Builder is subject to all of the following measures:

1. The Department may withhold money owing to Design-Builder, including overhead and direct costs. The money withheld does not include payment for subcontractor work completed in accordance with the Contract;
2. The Department may withhold issuing a Notice of Substantial Completion; or
3. The Department may withhold recognizing Project Milestones.

The Department may use additional measures up to and including debarment for repeated failure to make prompt payment.

The Department may employ other mechanisms consistent with this Section 12.6.4 and applicable federal, state and local laws so payment is fully and promptly made.

12.7. Final Payment

Final payment will be made in accordance with this Section 12.7.

12.7.1. Application for Final Payment

On or about the date of delivery of its Affidavit of Contract Completion, the Design-Builder shall prepare and submit an Application for Final Payment to the Department showing the proposed total amount due the Design-Builder. In addition to meeting all other requirements for invoices hereunder, the Application for Final Payment shall include (i) the executed release and affidavit described in Section 12.7.2 (Payment); (ii) a list of any outstanding or pending Potential Change Order (PCO) Notices and all existing or threatened Claims, Liens, and stop notices by Subcontractors, laborers, Utility Owners, or other Third-Parties relating to the Project, including any notices filed or to be filed with the Affidavit of Contract Completion, stating the amount at issue associated with each such notice; (iii) the written consent by the Surety to such payment; and (iv) such other documentation as the Department may reasonably require. Prior applications and payments shall be subject to correction in the proposed Application for Final Payment. PCO Notices filed concurrently with the Application for Final Payment must be otherwise timely and meet all requirements under Sections 15 (Change Order Risk Allocation), 16 (Changes in the Work) and 22 (Partnering and Dispute Resolution).

The Department will review the Design-Builder's proposed Application for Final Payment, and changes or corrections will be forwarded to the Design-Builder for correction. If no changes or corrections are required, the Department will Approve the Application for Final Payment.

12.7.2. Payment

As a condition to its obligation to make payment to the Design-Builder based on the Application for Final Payment, the Department shall have received an executed release from the Design-Builder, releasing and waiving any claims against the Indemnified Parties, excluding only those matters identified in any PCO Notices listed as outstanding in the Application for Final Payment, and otherwise satisfactory in form and content to the Department.

The executed release shall be accompanied by an affidavit from the Design-Builder certifying the following:

A. All Work has been performed in strict accordance with the requirements of the Contract Documents.

B. The Design-Builder has resolved any claims made by Subcontractors, Suppliers, Utility Owners, laborers, and others against the Design-Builder, the Department, or the Project, except for those claims identified in the Application for Final Payment pursuant to Section 12.7.1 (Application for Final Payment) (ii) or those claims for which the Subcontractor has executed a release against the Department, the Project, and the Payment Bond.

C. The Design Builder has followed the Department's procedures for Contract Completion, including providing those documents and completed Forms identified in the Construction Manual of Instruction and on the Department's website and has provided complete lien releases from all Subcontractors and Suppliers, except for those with claims listed in (B) above, in a form and with language that will be provided by the Department.

D. The Design-Builder has no reason to believe that any Person has a valid claim against the Design-Builder, the Department, or the Project which has not been communicated in writing by the Design-Builder to the Department as of the date of the certificate.

E. All guarantees, warranties, the Payment Bond and the Performance Bond are in full force and effect.

The executed release and the affidavit shall extend past final payment. The payment amount will be reduced by any amounts deductible under Section 12.5 (Other Deductions).

All prior partial estimates and payments shall be subject to correction in the final payment.

The Design-Builder's acceptance of final payment shall constitute a waiver of affirmative Claims by the Design-Builder except such Claims previously made in writing and identified in writing as outstanding and unsettled at the time of the Application for Final Payment.

13— PROJECT ACCEPTANCE

13.1. Opening of Sections of Project to Traffic

If the Design-Builder determines that (i) any portion of the Project is necessary for the convenience of traffic, such as a structure, interchange, roadway section, intersection, substation, or portion of highway lighting or traffic signal systems, prior to achieving Substantial Completion, and (ii) such portion meets the requirements set forth in Part 4-10 (Maintenance of Traffic), then the following shall be performed

prior to opening such portion to use by the public: (a) the Design-Builder shall establish a Control Point regarding such portion of the Project, (b) the Design-Builder shall provide notice thereof to the Department, per the Control Point notification process, as set forth in Section 3.5.4 (Control Points) and (c) such portion shall be verified for compliance and accepted by the Department in accordance with Part 3 (Quality Program) prior to opening.

The Design-Builder remains responsible for all repair or replacement of that portion of the Work. Maintenance responsibilities remain with the Design-Builder until Substantial Completion is achieved. Designation of safe to open for any portion of the Project shall not start a warranty period for any portion of the Work or void or alter any terms of the Contract.

Opening of portions of the Project prior to Substantial Completion does not constitute acceptance of the Work or a waiver of any provisions of the Contract Documents.

13.1.1.1. Interchange Completion

As a prerequisite to Interchange Completion for each interchange (as described in the definition of Project in Part 1, Appendix A (Acronymns and Definitions) and Part 4-01 (Project Configuration)), the Design-Builder shall provide written notice to the Department when all of the following have occurred:

(1) The Department and the Design-Builder have agreed upon a Punch List and the timing for completing each Punch List item for Interchange Completion and which items, if any, can be deferred until Substantial Completion.
(2) The Design-Builder has completed all Work for an interchange, except for Punch List items, final cleanup and other items specifically identified as required for Interchange Completion.
(3) The Design-Builder has ensured that the Work in connection with Interchange Completion has been performed in accordance with the requirements of the Contract Documents.
(4) The Design-Builder has ensured that the interchange may be operated safely without injury to any Person or damage to the interchange or any other property on or off the Site.
(5) The Design-Builder has ensured that the interchange is open for traffic and that no further work is required except for seeding and landscaping and Punch List items and such work will not involve any lane or shoulder closure or impact traffic.
(6) The Design-Builder has received all applicable Governmental Approvals required for the interchange.
(7) The Design-Builder has furnished to the Department certifications from the Design Manager, in form and substance satisfactory to the Department, certifying that the Design Documents meet the requirements of the Contract Documents for the interchange.
(8) The Design-Builder has furnished to the Department certifications from the Design-Builder's Project Manager, in form and substance satisfactory to the Department, certifying that the construction meets the requirements of the Contract Documents.
(9) There is no outstanding Nonconforming Work, or incomplete Work (except for agreed to Punch List items), identified by the Design-Builder or the Department for the interchange.
(10) The Design-Builder has obtained all applicable Third-Party approvals relating to the Work for the interchange (including Utility Owners as required under any applicable MUAs, Part 4-19 (Utilities), and Part 6 (Third-Party Agreements)), and all Third-Parties have completed all work that involves obligations by the Design-Builder (including Utility Owners under any applicable MUAs, Part 4-19 (Utilities), and Part 6 (Third-Party Agreements)).
(11) All of the Design-Builder's and Subcontractors' personnel, supplies, equipment, waste materials, rubbish, and temporary facilities have been removed from the applicable portion of the Site, the Design-Builder has restored and repaired all damage or injury arising from such removal to the satisfaction of the Department and the applicable portion of the Site and adjacent affected areas for which the Design-Builder is responsible are in good working order and condition.

13.1.1.2. Notice of Interchange Completion

If the Department determines that any Work does not meet the requirements of the Contract Documents or the Department does not agree that all Work remaining will be performed without lane closures or further delays, disruption, or impediment to the public, the Department will advise the Design-Builder as to Nonconforming Work or incomplete Work. Upon correction of the Nonconforming Work or completion of incomplete Work, the Design-Builder shall provide an updated written notification under Section 13.1.1.1 (Interchange Completion) to the Department. This process will continue until there are no identified items of Nonconforming Work or incomplete Work that are prerequisites to Interchange Completion, at which time the Department will issue a Notice of Interchange Completion.

Interchange Completion is reached upon the date identified by the Department in the Notice of Interchange Completion. The Design-Builder hereby acknowledges and agrees that the Department's verification of the Notice of Interchange Completion may require substantial time and will be dependent upon the number and severity of outstanding items requiring verification, as identified in Section 13.1.1.1 (Interchange Completion). The Department agrees that it shall make reasonable efforts and act diligently in such verification and, if appropriate, issuance of the Notice of Interchange Completion. If a Notice of Interchange Completion is issued after the contractual deadline for Interchange Completion, disincentives will apply.

13.2. Substantial Completion

As a prerequisite to Substantial Completion for the Project, the Design-Builder shall provide written notice to the Department when all of the following have occurred:

(1) The Department and the Design-Builder have agreed upon a Punch List and the timing for completing each Punch List item for Substantial Completion and which items, if any, can be deferred until Physical Completion.
(2) The Design-Builder has completed all Work, except for Punch List items, final cleanup and other items specifically identified as required for Physical Completion.
(3) The Design-Builder has ensured that the Work in connection with Substantial Completion has been performed in accordance with the requirements of the Contract Documents.
(4) The Design-Builder has ensured that the Project may be operated safely without injury to any Person or damage to the Project or any other property on or off the Site.
(5) The Design-Builder has ensured that the Project is open for traffic and that no further work is required except for seeding and landscaping and Punch List items and such work will not involve any lane or shoulder closure or impact traffic.
(6) The Design-Builder has received all applicable Governmental Approvals required for the Project.
(7) The Design-Builder has furnished to the Department certifications from the Design Manager, in form and substance satisfactory to the Department, certifying that the Design Documents meet the requirements of the Contract Documents.
(8) The Design-Builder has furnished to the Department certifications from the Design-Builder's Project Manager, in form and substance satisfactory to the Department, certifying that the construction meets the requirements of the Contract Documents.
(9) There is no outstanding Nonconforming Work, or incomplete Work (except for agreed to Punch List items), identified by the Design-Builder or the Department.
(10) The Design-Builder has obtained all applicable Third-Party approvals relating to the Work (including Utility Owners as required under any applicable MUAs, Part 4-19 (Utilities), and Part 6 (Third-Party Agreements)), and all Third-Parties have completed all work that involves obligations by the Design-Builder (including Utility Owners under any applicable MUAs, Part 4-19 (Utilities), and Part 6 (Third-Party Agreements)).

(11) All of the Design-Builder's and Subcontractors' personnel, supplies, equipment, waste materials, rubbish, and temporary facilities have been removed from the applicable portion of the Site, the Design-Builder has restored and repaired all damage or injury arising from such removal to the satisfaction of the Department and the applicable portion of the Site and adjacent affected areas for which the Design-Builder is responsible are in good working order and condition.

13.3. Notice of Substantial Completion

If the Department determines that any Work does not meet the requirements of the Contract Documents or the Department does not agree that all Work remaining will be performed without lane closures or further delays, disruption, or impediment to the public, the Department will advise the Design-Builder as to Nonconforming Work or incomplete Work. Upon correction of the Nonconforming Work or completion of incomplete Work, the Design-Builder shall provide an updated written notification under Section 13.2 (Substantial Completion) to the Department. This process will continue until there are no identified items of Nonconforming Work or incomplete Work that are prerequisites to Substantial Completion, at which time the Department will issue a Notice of Substantial Completion.

Substantial Completion is reached upon the date identified by the Department in the Notice of Substantial Completion. The Design-Builder hereby acknowledges and agrees that the Department's verification of the Notice of Substantial Completion may require substantial time and will be dependent upon the number and severity of outstanding items requiring verification, as identified in Section 13.2 (Substantial Completion). The Design-Builder shall allow for such time in its Project Schedule. The Department agrees that it shall make reasonable efforts and act diligently in such verification and, if appropriate, issuance of the Notice of Substantial Completion. If a Notice of Substantial Completion is issued after the contractual deadline for Substantial Completion, Liquidated Damages or additional Liquidated Damages will apply.

13.4. Physical Completion

As a prerequisite to Physical Completion, the Design-Builder shall provide written notice to the Department when all of the following have occurred:

(1) The Design-Builder has completed all Work, including final cleanup and all Punch List items that were deferred to Physical Completion from Substantial Completion final cleanup and other items specifically identified as required for Physical Completion.
(2) The Design-Builder has ensured that the Work in connection with Physical Completion has been performed in accordance with the requirements of the Contract Documents.
(3) The Design-Builder has ensured that the Project may be operated safely without injury to any Person or damage to the Project or any other property on or off the Site.
(4) The Design-Builder has ensured that the Project is open for traffic and that no further work is required.
(5) The Design-Builder has received all applicable Governmental Approvals required for the Project.
(6) The Design-Builder has furnished to the Department certifications from the Design Manager, in form and substance satisfactory to the Department, certifying that the Design Documents meet the requirements of the Contract Documents.
(7) The Design-Builder has furnished to the Department certifications from the Design-Builder's Project Manager, in form and substance satisfactory to the Department, certifying that the construction meets the requirements of the Contract Documents.
(8) There is no outstanding Nonconforming Work or incomplete Work identified by the Design-Builder or the Department.
(9) All of the Design-Builder's and Subcontractors' personnel, supplies, equipment, waste materials, rubbish, and temporary facilities have been removed from the applicable portion of the Site, the

Design-Builder has restored and repaired all damage or injury arising from such removal to the satisfaction of the Department and the applicable portion of the Site and adjacent affected areas for which the Design-Builder is responsible are in good working order and condition.

13.5. Notice of Physical Completion

If the Department determines that any Work does not meet the requirements of the Contract Documents, the Department will advise the Design-Builder as to Nonconforming Work or incomplete Work. Upon correction of the Nonconforming Work or completion of incomplete Work, the Design-Builder shall provide an updated written notification under Section 13.4 (Physical Completion) to the Department. This process will continue until there are no identified items of Nonconforming Work or incomplete Work that are prerequisites to Physical Completion, at which time the Department will issue a Notice of Physical Completion.

Physical Completion is reached upon the date identified by the Department in the Notice of Physical Completion. The Design-Builder hereby acknowledges and agrees that the Department's verification of the Notice of Physical Completion may require substantial time and will be dependent upon the number and severity of outstanding items requiring verification, as identified in Section 13.4 (Physical Completion). The Design-Builder shall allow for such time in its Project Schedule. The Department agrees that it shall make reasonable efforts and act diligently in such verification and, if appropriate, issuance of the Notice of Physical Completion. If a Notice of Physical Completion is issued after the contractual deadline for Physical Completion, Liquidated Damages or additional disincentives will apply.

13.6. Request for Contract Completion

As a prerequisite to Contract Completion, the Design-Builder shall provide to the Department an executed sworn Affidavit requesting Contract Completion in accordance with this Section 13.6 when all of the following have occurred:

(1) The Design-Builder has completed all Work.
(2) The Department has received all Released for Construction Documents, Final Design Documents, As-Built Documents, O&M Manuals, materials certifications of compliance, surveys, test data, and other deliverables required under the Contract Documents for the Project. The Design-Builder has furnished to the Department alignment points as part of the As-Built Documents.
(3) All special tools, equipment, furnishings, and supplies purchased by and/or used by the Design-Builder, as provided in the Contract Documents, have been delivered to the Department free and clear of Liens.
(4) The Design-Builder has delivered to the Department a notice of completion for the Project in recordable form and meeting all statutory requirements.
(5) All of the Design-Builder's other obligations under the Contract Documents (other than obligations which by their nature are required to be performed after Contract Completion as determined by the Department), have been satisfied in full or waived in writing by the Department.
(6) The Design-Builder has satisfied all requirements of Section 12.7 (Final Payment).
(7) All required warranties and/ or guarantees have been provided.
(8) All requisite training has been provided.

The Affidavit shall include the following statement:

> *To the best of the Design-Builder's knowledge and belief, the Work under the Contract has been completed in strict accordance with the Contract Documents, no lawful debts for labor or materials are outstanding and no federal excise tax has been included in the Contract Amount; all requests for funds for undisputed work under the Contract, including changes in the Work, and under all billings of whatsoever nature are accurate,*

complete and final and no additional compensation over and above the final payment will be requested or is due under the Contract or under any adjustment issued thereunder for said undisputed work; there are no outstanding claims, Liens or stop notices relating to the Project, including claims by Utility Owners; there is no existing default by the Design-Builder under any Utility Agreement, and no event has occurred which, with the passing of time or giving of notice or both, would lead to a claim relating to the Work or event of default under any Utility Agreement; and upon receipt of final payment, the Design-Builder and Subcontractors acknowledge that the Department, its employees, the State of Utah and its authorized representatives are released, discharged and acquitted from any and all claims or liability for any additional sums on account of undisputed work performed under the Contract.

If the Design-Builder is unable to provide the affidavit in the above form, the affidavit shall certify that all such outstanding matters are set forth in an attached list which shall describe the outstanding matters in such detail as may be requested by the Department. The affidavit shall include a representation of the Design-Builder that it is diligently and in good faith contesting all such matters by appropriate legal proceedings and shall provide a status report regarding the same including an estimate of the maximum payable with respect to each such matter.

13.7. Notice of Contract Completion

If the Department determines that any Work does not meet the requirements of the Contract Documents or Work has not been completed, the Department will advise the Design-Builder as to Nonconforming Work or incomplete Work. Upon correction of the Nonconforming Work or completion of incomplete Work, the Design-Builder shall provide an updated written notification under Section 13.6 (Request for Contract Completion) to the Department. This process will continue until there are no identified items of Nonconforming Work or incomplete Work that are prerequisites to Contract Completion, at which time the Department will issue a Notice of Contract Completion.

Contract Completion is reached upon the date identified by the Department in the Notice of Contract Completion. The Design-Builder hereby acknowledges and agrees that the Department's verification of the Notice of Contract Completion may require substantial time and will be dependent upon the number and severity of outstanding items requiring verification, as identified in Section 13.6 (Request for Contract Completion). The Design-Builder shall allow for such time in its Project Schedule. The Department agrees that it shall make reasonable efforts and act diligently in such verification and, if appropriate, issuance of the Notice of Contract Completion if the Design-Builder has satisfied all requirement for such a Notice of Contract Completion.

13.8. Overpayments; No Relief from Continuing Obligations

Contract Completion will not prevent the Department from correcting any measurement, estimate or certificate made before or after completion of the Work, or from recovering from the Design-Builder, the Surety(ies) or both, the amount of any overpayment sustained due to failure of the Design-Builder to fulfill the obligations under the Contract. A waiver on the part of the Department of any breach by the Design-Builder shall not be held to be a waiver of any other or subsequent breach. Contract Completion shall not relieve the Design-Builder from any of its continuing obligations hereunder, or constitute any assumption of liability by the Department.

13.9. Assignment of Causes of Action

The Design-Builder hereby offers and agrees to assign to the Department all rights, title and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Section 15), arising

from purchases of goods, services or materials pursuant to the Contract or any Subcontract. This assignment shall be made and become effective at the time the Department tenders final payment to the Design-Builder, without further acknowledgment by the parties.

14— COMPLIANCE WITH THE LAW

The Design-Builder shall comply with, and ensure that all Subcontractors comply with, all applicable Laws.

14.1. Observing Laws, Rules, And Regulations

A. Observe and comply with all of the following that affect the conduct of Work on the Project, have jurisdiction or authority over the Work, or that affect individuals engaged or employed on the Project:

1. Federal, State and local Laws;
2. Health officials; and
3. UDOT Construction Safety and Health Manual.

B. Protect, defend, hold harmless and indemnify the Department, its employees, the State of Utah and its representatives against claim or liability arising out of or resulting from violations of any of the above-listed items, whether violated by employees, agents, or contractors of the following:

1. The Design-Builder;
2. Subcontractors at any tier;
3. Suppliers of materials or services;
4. Design Professional or Design Professional engaged by the Design-Builder:
   a. Design Professionals are required to indemnify the Department from liability claims which result from negligent act, wrongful act, error or omission, or other liability imposed by law;
   b. for a person for whom the Design Professional has direct or indirect control or responsibility; and
5. Any others engaged by the Design-Builder or Subcontractor.

C. Do not require employees of the Design-Builder or Subcontractor to work in surroundings or under conditions that are unsanitary, hazardous, or dangerous to health or safety:

1. Immediately correct any conditions that do not comply with the foregoing provisions:
   a. The Department issues a Stop Work order when either Work site conditions or Work practices present an imminent danger that may result in serious injury, death, or extensive property damage until those conditions or practices are corrected; and
   b. A Stop Work order does not provide relief from completing the Project within the specified Contract Completion time(s).

D. Allow access to all areas of Work Site by and admit without delay any OSHA inspector or other legally responsible agency involved in safety and health administration, upon presentation of proper credentials but without presentation of an inspection warrant.

E. Comply with Federal, State, and local Laws, rules, and regulations that enumerate unlawful employment practices including:

1. Discrimination because of race, religion, color, sex, age, disability, or national origin, and that define actions required for Affirmative Action and Minority/Disadvantaged Business programs.
2. Employment and verification of employment eligibility of all persons employed by any Contractor or Sub-Contractor performing work. Compliance must be in accordance with provisions of U.S.C. 1273 and Utah Administrative Code 63-99a-103 and 63G-12-302.

F. The Design-Builder and each of its contrctors and subcontractors must certify as to its own organization, under penalty of perjury, that to the best of their knowledge and belief that the named contractor or subcontractor has registered with and uses the Department's "Status Verification System" to determine the work eligibility status of an employee hired after July 1, 2009, pursuant to Utah Administrative Code 63-99a-103. The Department will not award and execute the Contract nor approve the request to sublet the Work with firms not in compliance with this Section. Immediately notify the Department in writing upon discovering any discrepancy or inconsistency between the Contract and any Law, except as otherwise directed or noted.

G. Immediately correct any conditions that do not comply with the foregoing provisions.

1. A statement made by the Contracting (or consulting) entity, on the entity's letterhead, stating the entity will "maintain an offer of Qualified Health Insurance coverage, as required by Utah Code 72-6-107.5, for the duration of the prime contract between the Design-Builder and the Department."
2. A statement signed by an accredited Actuary, on actuary letterhead, stating:
   a. the identified entity "has chosen to offer health insurance coverage for its employees through a certain date" and
   b. the undersigned accredited actuary has "compared said entity's benefit plan to the minimum qualified health insurance coverage requirements listed in Utah Administrative Code 72-6-107.5, Health Insurance Coverage in State Contracts, and has determined the coverage exceeds or is actuarially equivalent to the minimum health insurance coverage requirements."

H. Observe legal load restrictions when hauling equipment or materials on public roads beyond Project limits:

1. A special permit does not relieve the Design-Builder of liability for damage; and
2. Refer to the Utah Regulations for Legal and Permitted Vehicles.

I. Do not exceed legal gross weight limits on any public roads, structures, or on any component of the pavement structure, excluding granular borrow within the Project limits.

J. If a load restriction violation is observed, suspend construction operations until the Department approves acceptable corrective measures.

15— CHANGE ORDER RISK ALLOCATION

15.1. Items Included in Contract Amount

Refer to Part 1-5.1.1 (Items Included in Contract Amount) for items included in the Contract Amount.

15.2. Items Eligible for Time and Money Changes

The Design-Builder may request a Change Order to increase the Contract Amount, subject to the limitations set forth in Sections 16.6.1(Limitations on Contract Amount Increases) and 16.6.2 (Limitations on Acceleration Costs and Delay Damages), and for time extensions, subject to the limitations set forth in Section 16.6.3 (Limitations on Time Extensions), only for the following increased costs or delays and for no other costs or delays (subject to Section 15.3 (Items Eligible for Time Only Changes)):

(1) Additional costs or time directly attributable to additional Work resulting from Department-Directed Changes, as agreed to or as directed under Sections 15 (Change Order Risk Allocation) and 16 (Changes in Work).
(2) Additional costs or time directly attributable to unavoidable delays arising from a suspension order pursuant to Section 17.1 (Suspension for Convenience).
(3) Additional costs or time directly attributable to the failure or inability of the Department to provide the Design-Builder with access to the real property identified on the ROW Drawings on or before the deadline for such access set forth in the ROW Schedule, in accordance with Section 7.2.2 (Delay in Providing Access).
(4) Certain additional costs or time relating to material errors in the ROW limits indicated in the ROW Drawings, to the extent provided in Section 7 (Right-of-Way and Access).
(5) Certain additional costs or time directly attributable to Differing Site Conditions, to the extent provided in Section 4 (Differing Site Conditions).
(6) Certain additional costs or time directly attributable to the Department's delay in excess of three Working Days in viewing a location for which the Design-Builder provided notification pursuant to Section 3.3.1 (Notification to the Department), to the extent provided in Section 3.3.1.
(7) Certain additional costs or time relating to Remediation Work, to the extent provided in Section 5 (Environmental Compliance).
(8) Certain additional costs or time relating to Utility Work or Third-Party Work (including any Betterments under Section 6.1.4.2 (Additional Utility Betterments), but not including Utility Delays under Section 6.1.5 (Utility Company/Third-Party Delays), to the extent provided in Section 6 (Utility Work and Third-Party Agreements).
(9) Certain additional costs or time directly attributable to uncovering, removing, and restoring Work, to the extent provided in Section 3.5.3 (Obligation to Uncover Finished Work).
(10) Certain additional costs or time directly attributable to the discovery of Items of Archeological, Geological or Biological Significance, discovered within the ROW, provided that the existence of such resources was not disclosed in the RFP, to the extent provided in Section 5.6 (Environmental Resources of Special Significance).
(11) Additional costs or time directly attributable to the suspension, termination, interruption, denial, failure to obtain or nonrenewal of any Environmental Document or Governmental Approval or New Environmental Document required to be obtained by the Department, except as otherwise provided in Sections 5.2 (Mitigation Requirements) and 5.4 (New Environmental Documents to be Obtained by Design-Builder).
(12) Certain additional costs or time directly attributable to any change in a Law, change in the judicial interpretation of a Law, or adoption of any new Law, excluding changes in tax laws, that is materially inconsistent with Laws in effect on the Proposal Due Date (excluding any such change or new Law

which was passed or adopted as of the Proposal Due Date but had a defined future effective date), and which: (i) requires a material modification in the Project Work; (ii) requires the Design-Builder to obtain a major State or federal Environmental Document or Governmental Approval not previously required for the Project; or (iii) specifically targets the Project or the Design-Builder. Compensation shall be limited to actual costs incurred by the Design-Builder, excluding overhead or profit, and additional time, as proven in accordance with Sections 15 (Change Order Risk Allocation) and 16 (Changes in Work). Damages for delay shall not be allowed.

(13) Certain additional costs or time directly attributable to any lawsuit seeking to restrain, enjoin, challenge, or delay construction of the Project, except to the extent that the risk of such lawsuit has been assumed by Design-Builder under Section 5 (Environmental Compliance); or the lawsuit otherwise arises out of any act, omission or breach of obligation of any Design-Builder-Related Entity. Compensation shall be limited to actual costs incurred by the Design-Builder, excluding overhead or profit, and additional time, as proven in accordance with Sections 15 (Change Order Risk Allocation) and 16 (Changes in Work).

(14) Additional costs, only in excess of the Builder's Risk limit, and time directly attributable to an earthquake.

(15) Certain additional costs and time directly attributable to a Necessary Project Configuration Change, in accordance with Section 15.6 (Changes in Project Configuration), to the extent provided in Section 15.6.

(16) Additional costs and time directly attributed to delay for failure or inability of the Department to provide responses to proposed schedules, design submittals or other submittals and matters for which response by the Department is required within the time periods indicated in the Contract Documents.

(17) Additional costs and time directly attributable to any improper failure to act by the Department as required under Section 1.3.5 (Governmental Approvals) within a reasonable time after delivery of notice by the Design-Builder to the Department requesting such action.

15.3. Items Eligible for Time Only Changes

The Design-Builder may request a Change Order for time extensions, subject to the limitations set forth in Section 16.6.3 (Limitations on Time Extension), only for the following excusable delays and for no other delays (subject to Section 15.2 (Items Eligible for Time and Money Changes)):

(1) Force Majeure events, subject to Section 15.5 (Force Majeure Events).
(2) Force majeure events under a MUA.
(3) Utility and Third-Party Delays under Section 6.1.5 (Utility/Third-Party Delays), to the extent provided in Section 6.1.5.

15.4. Items Not Eligible for Change Orders

The Design-Builder acknowledges and agrees that no increase in the Contract Amount or extension of time for any Completion Deadline is available except in circumstances expressly provided for in the Contract, that such price increases shall be available only as provided in Sections 15 (Change Order Risk Allocation) and 16 (Changes in Work), and that the Design-Builder shall bear full responsibility for the costs of all other changes. Matters which are the Design-Builder's exclusive responsibility include the following:

(1) Errors, omissions, inconsistencies, inaccuracies, deficiencies or other defects in the Design Documents (including errors, omissions, inconsistencies, inaccuracies, deficiencies or other defects traceable to errors, omissions, inconsistencies, inaccuracies, deficiencies or other defects in the Reference Documents), except to the extent that the Department fails to act reasonably to approve corrections thereto proposed by the Design-Builder;

(2) Any design changes required by the Department as part of the process of making the Design Documents consistent with the Contract Documents;
(3) Defective or incorrect schedules of Work or changes in the planned sequence of performance of the Work (except to the extent that changes in the planned sequence of performance of the Work arise from causes which otherwise give rise to a right to a Change Order);
(4) Action or inaction of a Subcontractor (unless arising from causes which otherwise give rise to a right to a Change Order);
(5) The action or inaction of an adjoining property owner or of another contractor (including failure to organize and integrate their work with the Design-Builder's Work);
(6) Any variations in soil moisture content, groundwater levels or subsurface moisture content, including changes therein (unless arising from causes which otherwise give rise to a right to a Change Order);
(7) Untimely delivery of equipment or material, or unavailability, defectiveness, or increases in costs of material, equipment or products specified by the Contract Documents;
(8) Any delay not on a Critical Path;
(9) Costs covered by insurance proceeds received by or on behalf of the Design-Builder;
(10) Correction of Nonconforming Work and review and acceptance thereof by the Department;
(11) Failure by the Design-Builder to comply with Contract requirements;
(12) Obtaining all Governmental Approvals except as specified in Section 1.2(3) (General Obligations of the Design-Builder);
(13) Escalation in labor, equipment, or materials prices;
(14) Any impacts whatsoever due to weather, except to the extent provided as a Force Majeure event;
(15) Obtaining or failure to obtain any Governmental Approval or Third-Party approvals required to implement any Approved ATCs incorporated into the Contract Documents;
(16) All events beyond the control of the Department for which the Department has not agreed to assume liability hereunder; and
(17) Any situations which, while not within one of the categories delineated above, were or should have been anticipated because such situations are referred to elsewhere in the Contract or arise out of the nature of the Work (unless arising from causes which otherwise give rise to a right to a Change Order).

The Design-Builder hereby assumes responsibility for all such matters, and acknowledges and agrees that assumption by the Design-Builder of responsibility for such costs and delays, and the consequences and costs resulting therefrom, is reasonable under the circumstances of the Contract and that whatever contingencies the Design-Builder included in the Contract Amount constitute sufficient consideration for its acceptance and assumption of said risks and responsibilities as set forth in this Section 15 and the Contract Documents.

15.5. Force Majeure Events

15.5.1. Definition of Force Majeure

For purposes of the Design-Builder's entitlement to a time extension hereunder, the term "Force Majeure" shall mean any of the following events:

A. Fire or 50-year or greater floods.
B. Lightning, hurricane, or tornado.
C. Any epidemic or quarantine restrictions occurring within the vicinity of the Project.
D. A blockade or freight embargos.
E. War, whether foreign or domestic.
F. Acts of the public enemy.

G. Work stoppages, work slowdowns, or other labor disruptions, unless caused by or otherwise under the control or influence of the Design-Builder occurring within the vicinity of the Project.

15.5.2. Change Orders for Force Majeure Events

Subject to the restriction and limitations in Section 15.5 (Force Majeure Event), the Department agrees to issue Change Orders to extend the affected Completion Deadlines as the result of any delay in the Critical Path caused by a Force Majeure event.

15.5.3. Notification

If the Design-Builder becomes aware that a Force Majeure event is likely to or has impacted the Work, as a condition precedent to the Design-Builder's right to a Change Order, the Design-Builder shall notify the Department by written notification as soon as practicable but no later than five Working days from the time the Design-Builder knew or should have known of the Force Majeure event.

15.5.4. Limitations on Change Orders for Force Majeure Events

The Design-Builder shall bear the burden of proving that a Force Majeure event exists, that it could not reasonably have worked around the Force Majeure event so as to avoid impacts, and that it has mitigated the impacts of any Force Majeure event. Each request for a Change Order relating to a Force Majeure event shall be accompanied by a statement signed by a qualified professional stating the efforts undertaken by the Design-Builder to find alternative design or construction solutions to eliminate or minimize the problem and the associated costs.

15.6. Changes in Project Configuration

15.6.1. Increase in Contract Amount and/or Extension of Contract Deadlines

Upon the Design-Builder's fulfillment of all applicable requirements of Sections 15 (Change Order Risk Allocation) and 16 (Changes in Work), and subject to the limitations contained therein, the Department shall be responsible for, and agrees to issue Change Orders: (i) to compensate the Design-Builder for additional costs directly attributable to a Necessary Project Configuration Change; and (ii) to extend the Completion Deadlines as the result of any delay in the Critical Path affecting a Completion Deadline caused by a Necessary Project Configuration Change, excluding any costs and/or time that could have been avoided by the Design-Builder; provided, however, the Design-Builder shall not be entitled to an increase in the Contract Amount or an extension of the Completion Deadlines in connection with errors, omissions, inconsistencies, inaccuracies, deficiencies or other defects resulting from Approved ATCs incorporated in the Contract Documents. To the extent applicable, the Department, in the Department's sole discretion, shall have the right to mitigate any increase in the Contract Amount by acquiring additional real property.

15.6.2. Decrease in Contract Amount and/or Reduction of Contract Deadlines

If a Necessary Project Configuration Change decreases the cost and/or time to perform the Work, the Contract Amount and/or Completion Deadlines shall be decreased accordingly.

15.6.3. Non-Material Change in Project Configuration

The Design-Builder shall be responsible for any cost increases and/or delays resulting from changes in requirements and obligations of the Design-Builder relating to the Project due to inaccuracies in the Project Configuration which do not necessitate a material change in the Project Configuration. In such event, no change in the Work shall be deemed to have occurred and no Change Order shall be issued for any such cost increases and/or delays.

15.7. Insurance Claims

Prior to filing any request for a Change Order, the Design-Builder shall determine whether builder's risk or other insurance proceeds should be available to cover costs in connection with such item. If the Design-Builder determines that reasonable grounds for filing an insurance claim exist, then the Design-Builder shall so notify the Department. The Department shall not be in default for failure to pay any amounts which the Design-Builder or the Department determines should be covered by insurance, unless and until the claim is denied by the insurance company. The Design-Builder shall maintain contemporaneous records of all costs incurred by it with respect to the Differing Site Condition pending the insurance company's determination regarding the claim. Upon denial of any such claim by the insurance company and receipt of a Change Order request, the Department will process the Change Order request. The Department shall have the right to contest the denial of any insurance claim, and the Design-Builder shall cooperate with the Department in that regard. Notwithstanding anything to the contrary contained in Section 16.3.4 (Procedures for Design-Builder-Initiated Lump Sum Change Orders), the Design-Builder shall not be obligated to include amounts that may be covered by insurance in any Change Order request until 20 days after the insurance company has denied the claim. However, all other Change Order requirements, including the notice requirements of Section 16.3.4 (Procedures for Design-Builder-Initiated Lump Sum Change Orders), shall remain in effect.

16— CHANGES IN THE WORK

This Section 16 (Changes in the Work) sets forth the requirements for obtaining all Change Orders under the Contract. The Design-Builder hereby acknowledges and agrees that the Contract Amount constitutes full compensation for performance of all of the Work, subject only to those exceptions specified in Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work), and that the Department is subject to constraints which limit its ability to increase the Contract Amount or extend the Completion Deadlines. The Design-Builder hereby waives the right to make any claim for a time extension or for any monetary compensation in addition to the Contract Amount and other compensation specified in the Contract, except as set forth in Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work).

16.1. Circumstances Under Which Change Orders may be Issued

16.1.1. Change Orders

The term “Change Order” shall mean a written amendment to the terms and conditions of the Contract Documents issued in accordance with Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work). A Change Order shall not be effective for any purpose unless executed by the Department. Execution of a Change Order by the Department shall mean that the Change Order has been fully executed by the Department and any other necessary parties of the State. Change Orders may be requested by the Design-Builder only pursuant to Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work). Change Orders may be issued for the following purposes (or combination thereof):

A. To modify the Work.

B. To revise a Completion Deadline.

C. To revise the Contract Amount.

D. To revise other terms and conditions of the Contract Documents.

Upon the Department’s Approval of the Change Order form and after signature of the Design-Builder, the Department will execute the Change Order form indicating Approval thereof.

16.1.2. Issuance of Directive Letter

The Department may at any time issue a Directive Letter to the Design-Builder for any desired change in the Work or other purpose or in the event of any Dispute regarding the Work. The Directive Letter will state that it is issued under this Section 16.1.2, will describe the Work in question, and will state the basis for determining compensation, if any. The Design-Builder shall proceed immediately with the Work as directed in the letter, pending the execution of a formal Change Order (or, if the letter states that the Work is within the original scope of the Work, the Design-Builder shall proceed with the Work as directed but shall have the right pursuant to Sections 15 (Change Order Risk Allocation) and 16(Changes in the Work) to request that the Department issue a Change Order with respect thereto).

Receipt of a Directive Letter from the Department is a condition precedent to the Design-Builder's right to claim that a Department-Directed Change has occurred, provided that no Directive Letter shall be required for a Department-Directed Change described in Section 6.3 (Amendments to Third-Party Agreements) or for alleged Department-Directed Changes directly attributable to delays caused by bad faith actions, active interference, gross negligence or comparable tortious conduct by the Department. The fact that a Directive Letter was issued by the Department shall not be considered evidence that in fact a Department-Directed Change occurred. The determination whether a Department-Directed Change in fact occurred shall be based on an analysis of the original Contract Documents requirements and a determination whether the Directive Letter in fact constituted a change in those requirements.

16.1.3. Performance of Changed or Extra Work

As a condition precedent to the Design-Builder's right to receive additional payment for changed or extra work, the Design-Builder shall have received a Directive Letter from the Department stating that it is issued pursuant to Section 16.1.2 (Issuance of Directive Letter), a Change Order for such work executed by the Department for such work executed by the Department. As a condition precedent to the Design-Builder's right to receive an extension of a Completion Deadline for changed or extra work, the Design-Builder shall have received either a Directive Letter from the Department stating that it is issued pursuant to Section 16.1.2 (Issuance of Directive Letter) or a Change Order for such work executed by the Department. To the extent that the Design-Builder undertakes any such work without receiving a Directive Letter, Change Order or Exception Agreement Memorandum executed by the Department, the Design-Builder shall be deemed to have performed such work voluntarily and shall not be entitled to a Change Order in connection therewith. In addition, the Design-Builder may be required to remove or otherwise undo any such work at its sole cost.

16.2. Equal or Better Change Orders

The Design-Builder may request the Department's Approval of a Change Order that is equal or better than the Contract Document requirements. An Equal or Better Change Order is an Approved proposal developed and documented by the Design-Builder, which would modify or require a change in any of the Contract Document requirements in order to be implemented that is "equal to or better than" the underlying requirement. An Equal or Better Change Order cannot be based solely upon a change in quantities, performance or reliability.

If Approved as provided in this Section 16.2, equal or better changes may be implemented without any sharing of the Design-Builder's cost savings (and without any additional cost to the Department). Equal or Better Change Orders cannot change a Completion Deadline.

16.2.1. Required Information

At a minimum, the following information shall be submitted by the Design-Builder with each Equal or Better Change Order proposal in the form set forth in Appendix K (Equal or Better Change Proposal Form):

A. Redline of the changes proposed to the Contract requirements, which are involved in the proposed change.

B. Description of why the proposed change is equal or better than the existing Contract requirements.

C. A description of any previous use or tests of the proposal and the conditions and results if requested by the Department.

D. The Design-Builder shall provide any additional information requested by the Department in a timely manner.

16.2.2. Department Review and Approval or Rejection

Upon receipt of an Equal or Better Change Order proposal, the Department will process it, but shall not be liable for any delay in acting upon any proposal submitted pursuant to this Section 16.2 The Design-Builder may withdraw all or part of any Equal or Better Change Order proposal at any time prior to Approval by the Department. The Department may Approve, in its sole discretion, in whole or in part, any Equal or Better Change Order proposal submitted. Until an Equal or Better Change Order proposal is Approved by the Department, the Design-Builder shall remain obligated to perform in accordance with the Contract Documents. The decision of the Department as to rejection or Approval of any Equal or Better Change Order proposal shall be at the sole discretion of the Department, and shall be final and not subject to partnering, dispute resolution or appeal. Equal or Better Change Order proposals that require excessive time or costs for review, evaluation or investigations, or that are not consistent with the Department's design policies and basic design criteria may be rejected. The Design-Builder shall have no claim for any additional costs or delays resulting from the rejection of an Equal or Better Change Order proposal, including development costs, loss of anticipated profit, or increased material or labor costs. The Department will consider only proven features that have been employed under similar conditions or projects acceptable to the Department.

16.3. Lump Sum Change Orders

The preferred approach by both parties is that Change Orders will be reimbursed on a lump sum payment basis, if the parties can agree on a lump sum amount. If the parties cannot agree on a lump sum amount for Change Orders, the Change Orders will be paid as Force Account Change Orders described in Section 16.4 (Force Account Change Orders).

16.3.1. Issuance of Request for Change Proposal by Department

If the Department desires to evaluate whether to initiate a change to the Work, the Department may, at its discretion, issue a Request for Change Proposal (RCP).

Within seven Calendar Days after the Design-Builder's receipt of a RCP or as otherwise directed by the Department, the Design-Builder and the Department shall consult to define the proposed scope of the change. Within seven Calendar Days after the initial consultation or as otherwise directed by the Department, the Department and the Design-Builder shall consult concerning an estimated rough order of magnitude (ROM) cost and time impacts, if any. The Design-Builder shall prepare the ROM at its cost. The Design-Builder shall provide data regarding such matters as requested by the Department.

Within seven days after the ROM consultation meeting and provision of any data requested by the Department, the Department shall notify the Design-Builder whether the Department:

A. Requests the Design-Builder to prepare a Change Order form as discussed at the meeting.

B. Will not issue a Change Order.

The Department may at any time, in its sole discretion, require the Design-Builder to provide two alternative Change Order forms, one of which shall provide for a time extension if applicable and any additional costs permitted hereunder, and the other of which shall show all Acceleration Costs associated with meeting the original Completion Deadlines, as well as any additional costs permitted hereunder. If it is not feasible to recover to the original Completion Deadline or if the Design-Builder believes that the costs associated with such a recovery are prohibitive, then the Design-Builder shall recommend a date to be shown in the alternative Change Order form.

If and as requested by the Department, the Design-Builder shall prepare and submit to the Department for Approval a Change Order form for the requested change, complying with all applicable requirements of Section 16.3 (Lump Sum Change Orders) and incorporating all requests made by the Department. The Design-Builder shall bear the cost of developing the Change Order form, including any modifications thereto requested by the Department, except that costs of design and engineering Work required for preparation of plans or exhibits necessary to the Change Order form and pre-authorized by the Department shall be included in the Change Order as reimbursable items. If the Change Order is Approved, the design and engineering costs will be included within the Change Order. If the Change Order is not Approved, the Design-Builder shall be separately reimbursed for the design and engineering costs through a separate Change Order.

If the Department and the Design-Builder agree that a change in the requirements relating to the Work has occurred but disagree as to whether the change justifies additional compensation or time or disagree as to the amount of any change to be made to the Contract Amount or a Completion Deadline, the Department may, in its sole discretion, order the Design-Builder to proceed with the performance of the Work in question notwithstanding such disagreement. Such order may, at the Department's option, be in the form of a:

A. Force Account Change Order; or

B. Directive Letter

16.3.2. Unilateral Change Orders

The Department may issue a unilateral Change Order at any time, regardless of whether it has issued a Request for Change Proposal. Any such Change Order shall state that the Design-Builder shall be entitled to compensation in accordance with Section 16.4 (Force Account Change Order) for the additional Work required thereby. For deductive unilateral Change Orders, the Change Order may contain a price deduction deemed appropriate by the Department (if applicable), and the Design-Builder shall have the right to submit the amount of such price deduction to dispute resolution in accordance with Section 22 (Partnering and Dispute Resolution).

16.3.3. Changes in Law

The Department shall be entitled to a decrease in the Contract Amount for any change in Laws that reduces the cost of the Work, if and to the extent that the change (i) allows a material modification in the design of the Project resulting in a net cost savings or (ii) reduces the requirements of complying with the Environmental Approvals.

16.3.4. Procedures for Design-Builder-Initiated Lump Sum Change Orders

(1) The requirements set forth in this Section 16.3.4 constitute conditions precedent to the Design-Builder's entitlement to request and receive a Change Order in all circumstances. The Design-Builder agrees that the filing of a Potential Change Order (PCO) Notice and subsequent filing of a Request for Change Order (RCO) with the Department pursuant to this Section are necessary in order to begin the administrative process for Design-Builder-requested Change Orders. The Design-Builder understands that it shall be forever barred from recovering against the Department under

Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work) if it fails to give notice of any act, or failure to act, by the Department or any of its representatives or the happening of any event, thing or occurrence pursuant to a proper PCO Notice, and thereafter complies with the remaining requirements of this Section.

(2) The Design-Builder shall deliver to the Department a PCO Notice stating that an event or situation has occurred and shall state whether it is entitled to additional time or money. The first notice shall be labeled "PCO No. 1" and subsequent notices shall be numbered sequentially.

(3) Each PCO Notice shall be delivered as promptly as possible after the occurrence of such event or situation. If any PCO Notice is delivered later than ten days after the Design-Builder first discovered (or should have discovered in the exercise of reasonable prudence) the occurrence which is described therein, the Design-Builder shall be deemed to have waived the right to collect any and all costs incurred prior to the date of delivery of the PCO Notice, and shall be deemed to have waived the right to see an extension of any Completion Deadline with respect to any delay in the Critical Path that accrued prior to the date of delivery of the written notice. Furthermore, if any PCO Notice concerns any condition or material described in Section 3.3 (Process to be Followed for Discovery of Certain Site Conditions), the Design-Builder shall be deemed to have waived the right to collect any and all costs incurred in connection therewith to the extent that the Department is not afforded the opportunity to inspect such material or condition before it is disturbed. The Design-Builder's failure to provide a PCO Notice within 14 Calendar Days after the Design-Builder first discovered (or should have discovered in the exercise of reasonable prudence) the occurrence of a given event or situation shall preclude the Design-Builder from any relief whatsoever, unless the Design-Builder can show, based on a preponderance of the evidence that: (i) the Department was not materially prejudiced by the lack of notice; or (ii) the Department's designated representative specified in accordance with Part 1 (Agreement), Section-3.1 (Delivery of Notices) had actual knowledge, prior to the expiration of the notification, of the event or situation and that the Design-Builder believed it was entitled to a Change Order with respect thereto. A PCO Notice shall be deemed delivered only if it fully conforms to the requirements of Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work).

(4) The PCO Notice shall (i) state in detail the facts underlying the potential Change Order, the reasons why the Design-Builder believes additional compensation or time will or may be due and the date of occurrence; (ii) state in detail the basis that the work is not required by the Contract, if applicable; (iii) identify particular elements of Contract performance for which additional compensation may be sought under Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work);
(iv) identify any potential impact to the Critical Path affecting a Completion Deadline; and
(v) provide an estimate of the time within which a response to the notice is required to minimize cost or delay of performance.

(5) The written notification under Section 3.3 (Process to be Followed for Discovery of Certain Site Conditions) may also serve as a PCO Notice provided it meets the requirements for PCO Notices. Any adjustments made to the Contract shall not include increased costs or time extensions for delay resulting from the Design-Builder's failure to provide requested additional information under this Section 16 (Changes in the Work).

(6) The Design-Builder shall deliver all RCOs under this Section 16 (Changes in the Work) to the Department within 30 Calendar Days after delivery of the PCO Notice. The Department may require design and construction costs to be covered by separate Change Order requests. If the Design-Builder requests a time extension, then the Department, in its sole discretion, may require the Design-Builder to provide two alternative Change Order requests, one of which shall provide for a time extension and any additional costs permitted hereunder, and the other of which shall show all Acceleration Costs associated with meeting the original Completion Deadlines, as well as any additional costs permitted hereunder. If it is not feasible to recover to the original Completion Deadline or if the Design-Builder believes that the costs associated with such a recovery are

prohibitive, then the Design-Builder shall recommend a date to be shown in the alternative Change Order form.

(7) The Design-Builder acknowledges and agrees that, due to the limited availability of funds for the Project, timely delivery of notification of such events and situations and requests for Change Orders and updates thereto are of vital importance to the Department. The Department is relying on the Design-Builder to evaluate, promptly upon the occurrence of any event or situation, whether the event or situation will affect schedule or costs and, if so, whether the Design-Builder believes a time extension and/or price increase is required hereunder. If an event or situation occurs that may affect the Contract Amount or a Completion Deadline, the Department will evaluate the situation and determine whether it wishes to make any changes to the definition of the Project so as to bring it within the Department's funding and time restraints.

(8) The following matters (among others) shall be considered in determining whether the Department has been prejudiced by the Design-Builder's failure to provide timely notice: (i) The effect of the delay on alternatives available to the Department (that is, a comparison of alternatives which are available at the time notice was actually given and alternatives which would have been available had notice been given within ten days after occurrence of the event or when such occurrence should have been discovered in the exercise of reasonable prudence); and (ii) The impact of the delay on the Department's ability to obtain and review objective information contemporaneously with the event.

(9) The Design-Builder's delivery of any RCO shall be accompanied by the certification described in Section 16.5.2 (Design-Builder Representation) (with respect to the RCO).

(10) Prior to submission by the Design-Builder of an RCO to the Department which is based in whole or in part on a request by a Subcontractor to the Design-Builder for a price increase or time extension under its Subcontract, the Design-Builder shall have reviewed all claims by the Subcontractor which constitute the basis for the RCO and determined in good faith that each such claim is justified hereunder and that the Design-Builder is justified in requesting an increase in the Contract Amount and/or change in Completion Deadlines in the amounts specified in the RCO. Each RCO involving Subcontractor Work shall include a sworn certification in form acceptable to the Department signed by the Project Manager stating that the Design-Builder has investigated the basis for the Subcontractor's claims and has determined that all such claims are justified as to entitlement and amount of money and/or time requested and has no reason to believe and does not believe that the factual basis for the Subcontractor's claim is falsely represented. Any RCO involving Subcontractor Work shall be considered incomplete if it is not accompanied by such certification.

(11) If the Department refuses to issue a Change Order based on the Design-Builder's request, the Design-Builder shall nevertheless perform all work as specified in an appropriate Directive Letter, with the right to submit the issue of entitlement to a Change Order to dispute resolution in accordance with Section 22 (Partnering and Dispute Resolution). The Design-Builder shall maintain and deliver to the Department, upon request, contemporaneous records, meeting the requirements of Section 16.4.1 (Force Account Records), for all work performed which the Design-Builder believes constitutes extra work, until all Disputes regarding entitlement or cost of such work are resolved.

16.4. Force Account Change Orders

The Department may at its discretion issue a unilateral Force Account Change Order whenever the parties cannot agree to a Lump Sum Change Order or the Department determines that a Force Account Change Order is advisable. The Force Account Change Order shall instruct the Design-Builder to perform the Work, indicating expressly the intention to treat the items as changes in the Work, and setting forth the kind, character, and limits of the Work as far as they can be ascertained, the terms under which changes to the Contract Amount will be determined and the estimated total change in the Contract Amount anticipated thereunder. Upon final determination of the allowable costs, the Department shall issue a modified Change Order setting forth the final adjustment to the Contract Amount. The costs and

additional amounts allowed in Section 16.7 (Pricing of Change Orders) (and no others) shall be used for calculating the change in the Contract Amount. No direct compensation will be allowed for other miscellaneous costs for which no specific allowance is provided in Section 16.7 (Pricing of Change Orders).

The Department and the Design-Builder may agree to negotiate unit prices for a Force Account Change Order. Measurement of any unit-priced quantities will be as specified in the Change Order. Unit prices shall be deemed to include all costs for labor, material, overhead and profit, and shall not be subject to change regardless of any change in the estimated quantities. Upon final determination of the quantities, the Department will issue a modified Change Order setting forth the final adjustment to the Contract Amount.

16.4.1. Force Account Records

The Design-Builder shall maintain its records in such a manner as to provide a clear distinction between: (i) the direct cost of Work for which it is entitled (or for which it believes it is entitled) to an increase in the Contract Amount; and (ii) the costs of other operations. The Design-Builder shall contemporaneously collect, record in writing, segregate, and preserve: (A) all data necessary to determine the costs described in this Section 16.4 with respect to all Work which is the subject of a Change Order or a requested Change Order, specifically including costs associated with design Work as well as Utility Relocations, but specifically excluding all negotiated Change Orders (except for Supplemental Agreements that are also Change Orders as described in Section 16.1.1 (Change Orders)); and (B) all data necessary to show the actual impact (if any) of the change on the Critical Path affecting a Completion Deadline with respect to all Work which is the subject of a Change Order or a proposed Change Order, if the impact on the Critical Path affecting a Completion Deadline is in dispute. Such data shall be provided pursuant to Section 16 (Changes in the Work), on forms Approved by the Department. The cost of furnishing such reports is included in the Design-Builder's predetermined overhead and profit. Refer to Section 16.7 (Pricing of Change Orders).

The Design-Builder shall furnish daily, on forms Approved by the Department, reports of Force Account Change Order Work. The cost of furnishing such reports shall be included in the Design-Builder's overhead and profit percentages. The reports shall include:

A. Name, classification, date, daily hours, total hours, rate, and extension for each worker (including both construction and non-construction personnel) and foreman.

B. Designation, dates, daily hours, total hours, rental rate, and extension for each unit of machinery and equipment.

C. Quantities of materials, prices and extensions.

D. Transportation costs of materials, machinery, and equipment.

E. Invoices for materials used and for transportation charges.

F. The total costs to date for the Force Account Change Order Work.

If materials used on the Force Account Change Order Work are not specifically purchased for the Work but are taken from the Design-Builder's stock, the Design-Builder shall furnish an affidavit certifying that such materials were taken from the Design-Builder's stock, that the quantity claimed was actually used, and that the price and transportation costs claimed represent actual costs to the Design-Builder.

All Force Account Change Order reports shall be signed by the Project Manager. The Department will compare its records with the Design-Builder's reports, make the necessary adjustments and compile the costs of Force Account Change Order Work. When such reports are agreed upon and signed by both parties, they will become the basis of payment, but shall not preclude subsequent adjustment based on a

later audit. The Design-Builder's (and each Subcontractor's) cost records pertaining to Work paid for on a Force Account basis shall be open, during all regular business hours, to inspection or audit by representatives of the Department during the life of the Contract and for a period of not less than seven years after Contract Completion, and the Design-Builder (and each Subcontractor) shall retain such records for that period. If an audit is to be commenced more than 60 days after Contract Completion, the Design-Builder will be given a 14-day notice of the time when such audit is to begin.

16.5. Contents of Change Orders (excluding Equal or Better Change Orders)

Each lump sum, force account Change Order form and RCO shall meet all applicable requirements of Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work). The completed and/or modified Supplemental Agreement described in Section 6.1.3 (Change in Allocation of Responsibility Decreasing the Work) and Part 4-19 (Utilities) shall be considered an appropriate form, where applicable.

The Design-Builder shall prepare a scope of work, cost estimate, time impact analysis, if any and other information as required by this Section for each Change Order form and RCO.

Scope of Work: The scope of work shall describe in detail satisfactory to the Department all activities associated with the Change Order, including a description of additions, deletions and modifications to the existing Contract requirements.

Cost Estimate: Unless the Department agrees otherwise, the cost estimate shall set out the estimated costs in such a way that a fair evaluation can be made. It shall be in the form of Appendix J (Cost Analysis for Request for Change Order) or such other form as required by the Department and shall include as separate items: labor, materials, equipment, overhead (which includes all indirect costs) and profit, as allowed under Section 15 (Change Order Risk Allocation) and this Section 16 (Changes in the Work), if any. If the work is to be performed by Subcontractors and if the work is sufficiently defined to obtain Subcontractor quotes, the Design-Builder shall obtain quotes (with breakdowns showing cost of labor, materials, equipment, overhead and profit) on the Subcontractor's stationery and shall include such quotes as back-up for the Design-Builder's estimate. No additional payment shall be allowed in excess of the provisions under Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work).

Time Impact Analysis:

If the Design-Builder claims that an event, situation or change impacts the Critical Path affecting a Completion Deadline, it shall provide a time impact analysis (TIA). The TIA shall illustrate the impacts of each change or delay to the Project Completion Deadline or Project milestone (defined in Part 1 (Agreement)), as appropriate. The TIA shall use the accepted Project schedule update that has the closest data date prior to the event and compare it to the proposed TIA schedule which incorporates the impact event. If the Department determines that the most recently accepted Project schedule update does not appropriately represent the conditions prior to the event, then the Design-Builder shall provide a schedule updated to one day before the impact event and provide this schedule for acceptance to use in the TIA. Alternatively, if an event or change affects activities that were already in-progress at the time of the impact, then, with the approval of the Department, it may be appropriate to provide analysis using actual dates and durations from the Project schedule update at the time of the event to quantify the impact.

The TIA shall include schedule layouts and a narrative report representing specific activities affected by the event or change; including activity numbers, durations, dates, predecessor and successor activities, resource and cost, and all supporting documentation needed to evaluate the change in a form satisfactory to the Department.Other Supporting Documentation: The Design-Builder shall provide such other supporting documentation as may be required by the Department.

16.5.1. Justification

All requests for Change Orders shall include a narrative justification detailing all causes of the proposed change, making specific reference to the applicable provisions of Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work) that permit a Change Order to be issued, and describing the data and documents that establish the necessity of such proposed change.

16.5.2. Design-Builder Representation

Each Change Order shall contain a sworn certification, in the form of Appendix L, Change Order Certification, by the Design-Builder (and Subcontractor(s), for any Subcontractor involved in the Work or event contemplated by the Change Order).

16.5.3. Incomplete Change Orders

Each RCO provided under Section 16 (Changes in the Work) shall meet all requirements set forth in this Section 16.5, provided that if any such requirements cannot be met due to the nature of the occurrence, the Design-Builder shall provide an incomplete RCO, which shall:

A. Comply with all requirements capable of being met.

B. Include a list of requirements, which are not fulfilled together with an explanation reasonably satisfactory to the Department stating why such requirements cannot be met.

C. Provide such information regarding projected impact on the Critical Path affecting a Completion Deadline as is requested by the Department.

D. In all events include sufficient detail to ascertain the basis for the proposed Change Order and for any price increase associated therewith, to the extent such amount is then ascertainable.

The Design-Builder shall furnish, when requested by the Department, such further information and details as may be required to determine the facts or contentions involved. The Design-Builder agrees that it shall give the Department access to any and all of the Design-Builder's books, records, and other materials relating to the Work, and shall require its Subcontractors to do the same, so that the Department can investigate the basis for such proposed Change Order. The Design-Builder shall provide the Department with a monthly update to all outstanding incomplete requests for Change Order, describing the status of all previously unfulfilled requirements and stating any changes in projections previously delivered to the Department, time expenditures to date and time anticipated for completion of the activities for which the time extension is claimed. Failure to provide the above monthly information as required shall prevent the Design-Builder from being compensated for that month for any RCO amounts that otherwise may be owed or become owed.

The Department may reject the Design-Builder's claim at any point in the process. Once a complete RCO is provided, the Department's failure to respond thereto within 14 days of delivery of the request shall be deemed a rejection of such request. Although the Department intends to review incomplete Change Orders for the purposes of determining whether delivery was timely as described in Section 16.3.4 (Procedures for Design-Builder-Initiated Lump Sum Change Orders), the Department shall have no obligation to review the supporting information associated with any RCO until a complete RCO is provided.

16.5.4. Phased Change Orders

The Department and Design-Builder may mutually agree to use a multiple-step process involving issuance of a Change Order which includes an estimated design cost and which provides for a revised

Change Order to be issued after a certain design level has been reached, thus allowing a refinement and definition of the estimated construction cost.

16.5.5. Not Applicable to Equal or Better Change Orders

This Section 16.5 (Contents of Change Orders) shall not apply to Equal or Better Change Orders.

16.6. Certain Limitations for all Change Orders (excluding Equal or Better Change Orders)

16.6.1. Limitation on Contract Amount Increases

Any increase in the Contract Amount allowed hereunder shall exclude:

A. Costs caused by the breach of contract or fault or negligence, or act or failure to act of any Design-Builder-Related Entity.

B. Costs, which could reasonably have been avoided by the Design-Builder, including by resequencing, reallocating, or redeploying its forces to other portions of the Work or to other activities unrelated to the Work (including any additional costs reasonably incurred in connection with such reallocation or redeployment).

C. Costs for any rejected Work that failed to meet the requirements of the Contract Documents and any necessary remedial Work.

16.6.2. Limitation on Acceleration Costs and Delay Damages

Acceleration Costs: Acceleration Costs are those fully documented increased costs reasonably incurred by the Design-Builder (i.e., costs over and above what the Design-Builder would otherwise have incurred) which are directly attributable to increasing the performance level of the Work in an attempt to complete necessary activities of the Work earlier than otherwise anticipated, such as for additional equipment, additional crews, overtime and shift premiums, increased supervision, and any unexpected movement of materials, equipment, or crews necessary for resequencing in connection with acceleration efforts. Acceleration Costs do not include any costs for Disruption Damages as described below.

Acceleration Costs shall be compensable hereunder only with respect to Change Orders issued by the Department as an alternative to allowing an extension of a Completion Deadline as contemplated by Section 16.3 (Lump Sum Change Orders). Delay Damages shall be compensable hereunder only in the case of a delay to the extent that it entitles the Design-Builder to an extension of a Completion Deadline under Section 15.2(1) (Department-Directed Change), 15.2(2) (suspension order pursuant to Section 17.1 (Suspension for Convenience)), 15.2(3) (failure or inability of the Department to provide the Design-Builder with access to identified ROW), 15.2(4) (material errors in the ROW Drawings), 15.2(6) (the Department's delay in excess of three Working Day in viewing a location), 15.2(9) (uncovering, removing and restoring Work), or 15.2(16) (failure or inability of the Department to provide responses).

Other Limitations: Disruption Damages, whether from a single event or continual, multiple or repetitive events, are not allowed or recoverable under the Contract. Disruption Damages include costs of (i) rearranging the Design-Builder's Work plan not associated with an extension of a Completion Deadline, and (ii) loss of efficiency, momentum or productivity.

Delay Damages: Delay Damages are limited to additional field office and jobsite overhead costs incurred by the Design-Builder directly attributable to the delay of a Completion Deadline. Home office overhead is excluded from Delay Damages and not compensable under the Contract unless specifically agreed to in writing by the Department. Before the Design-Builder may obtain any increase in the Contract Amount

to compensate for any Delay Damages or Acceleration Costs, the Design-Builder shall have demonstrated to the Department's satisfaction that:

A. The Project Schedule in fact sets forth a reasonable method for completion of the Work.

B. The change in the Work or other event or situation that is the subject of the requested Change Order has caused or will result in an identifiable and measurable delay of the Work and impact the Critical Path affecting a Completion Deadline.

C. The Delay Damage was not due to any breach of contract or fault or negligence, or act or failure to act of any Design-Builder-Related Entity, and could not reasonably have been avoided by the Design-Builder, including by resequencing, reallocating or redeploying its forces to other portions of the Work or other activities unrelated to the Work (subject to reimbursement for additional costs reasonably incurred in connection with such reallocation or redeployment).

D. The delay for which compensation is sought is not concurrent with any other delay for which the Design-Builder is not entitled to Delay Damages.

E. The Design-Builder has suffered or will suffer actual costs due to such delay, each of which costs shall be documented in a manner satisfactory to the Department.

16.6.3. Limitation on Time Extensions

Any extension of a Completion Deadline allowed hereunder shall exclude any delay to the extent that it:

A. Did not impact the Critical Path affecting a Completion Deadline.

B. Was due to the fault or negligence, or act or failure to act of any Design-Builder-Related Entity.

C. Could reasonably have been avoided by the Design-Builder, including by resequencing, reallocating or redeploying its forces to other portions of the Work (provided that if the request for extension involves a Department caused delay, the Department shall have agreed, if requested to do so, to reimburse the Design-Builder for its costs incurred, if any, in resequencing, reallocating, or redeploying its forces).

D. Was a concurrent delay with any other delay for which the Design-Builder is not entitled to an extension.

The Design-Builder shall be required to demonstrate to the Department's satisfaction that the change in the Work or other event or situation which is the subject of the RCO seeking a change in a Completion Deadline has caused or will result in an identifiable and measurable delay of the Work which has impacted the Critical Path Activity affecting a Completion Deadline.

16.6.4. Not Applicable to Equal or Better Change Orders

Section 16.6 (Certain Limitations for all Change Orders) shall not apply to Equal or Better Change Orders.

16.7. Pricing of Change Orders (excluding Equal or Better Change Orders)

The Department and the Design-Builder (on its own behalf and on behalf of its Subcontractors) shall endeavor to negotiate, in good faith, a reasonable cost for each Change Order. Subject to the foregoing exceptions, in general the price of a Change Order shall be negotiated in accordance with this Section 16.7 or shall be based on Force Account records pursuant to Section 16.4 (Force Account Change Orders).

16.7.1. Labor Costs

The cost of labor shall be separated into construction-related Work and non-construction-related Work as described below. The use of a labor classification that would increase the extra work cost will not be permitted unless the Design-Builder establishes the necessity for such additional costs. The cost of labor shall be calculated based on straight time for all hours worked, unless the Design-Builder obtains the Department's prior Approval for overtime.

Construction Labor: The cost of labor for workers used in the actual and direct performance of construction-related Work, and the field management required up to but not including the Superintendent, according to the Design-Builder's standard work practices, whether provided by the Design-Builder or a Subcontractor, will equal the sum of the following: (a) actual unburdened wages (i.e. the base wage paid to the employee, verified from certified payrolls, exclusive of any fringe benefits); plus (b) a labor surcharge of 31 percent which constitutes compensation for health, welfare and other benefits required by the collective bargaining agreements or other employment contract generally applicable to the classes of labor employed on the work; plus (c) 15 percent (10 percent overhead and 5 percent profit) of the sum of the above items.

Non-Construction Labor: The cost of labor for non-construction-related Work, whether provided by the Design-Builder or a Subcontractor, will equal the sum of the following: (i) actual wages (i.e. the base wage paid to the employee exclusive of any fringe benefits); plus (ii) labor surcharge using the Department approved audited overhead rate in effect on the date the Design-Builder has achieved NTP, which shall constitute full compensation for all state and federal payroll, unemployment, and other taxes, insurance, fringe benefits (including health insurance, retirement plans, vacation, sick leave, and bonuses), and all other payments made to, or on behalf of, the workers in excess of actual wages, as well as for overhead. The Design-Builder will also be paid for profit on non-construction labor of 5 percent of labor costs plus 10 percent overhead.

16.7.2. Material Costs

Material costs shall be the cost of all materials to be used in the performance of construction Work including normal wastage allowance as per industry standards, subject to the requirements set forth in Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work). The material prices shall be supported by valid quotes and invoices from the Suppliers. The cost shall include applicable sales taxes, freight and delivery charges and any allowable discounts (exclusive of machinery rentals). The Department reserves the right to Approve materials and sources of supply of materials to be furnished by the Design-Builder or Subcontractors, and shall have the right to furnish such materials as it deems advisable. The price allowed for materials shall be adjusted as follows:

If the materials are obtained from a supply or source owned in whole or in part by the Design-Builder or a Subcontractor, the cost of such materials shall not exceed the lesser of the lowest price charged by the Design-Builder or such Subcontractor (as applicable) for similar materials furnished to other jobs or the current wholesale price for such materials delivered to the Site.

If the cost of such materials is, in the opinion of the Department, excessive, then the cost of such materials shall be deemed to be the lowest current wholesale price at which such materials were available, in the quantities needed and delivered to the Site.

If the Design-Builder does not furnish satisfactory evidence of the cost of such materials from the actual supplier thereof within 30 Calendar Days after the date of delivery of the material, the Department reserves the right to establish the cost of such materials at the lowest current wholesale prices at which such materials were available, in the quantities needed and delivered to the Site.

The Design-Builder will be paid an additional 10 percent on material costs, which is for overhead and profit (5 percent overhead and 5 percent profit).

16.7.3. Equipment

Design-Builder will be paid for the use of equipment owned or rented by Design-Builder or any Subcontractor for actual use in construction of the Project at an hourly rate derived from the most recently published *Rental Rate Blue Book for Construction Equipment* by Dataquest, Inc., San Jose, California which is in effect at the time of commencement of the changed Work (the "Blue Book").

The total hourly rates derived from the above publication are computed from equipment costs currently in effect. The rates derived do not include costs for operating personnel. The rates require adjustment by a Regional Factor and a Depreciation Factor found in the front of each chapter in the Blue Book.

Equipment use rates fall in the following two categories:

1. Operating Rate: This rate applies to those hours the equipment is actually in use, includes ownership and operating costs, and shall equal the Blue Book monthly rate adjusted for year of manufacture divided by 176 times the Regional Factor of 1.06 plus the estimated hourly operating costs from the Blue Book.
2. Standby Rate: This rate applies to equipment required to be at the Site but not operating, includes ownership costs only, and shall equal the Blue Book monthly rate adjusted for year of manufacture divided by 176 times the Regional Factor of 1.06 times 0.5. The duration of allowable standby time is to be Approved in writing by the Department with a maximum of eight hours per day or 40 hours in a normal week.

When the "manufacturer's rated capacity" falls between those shown in the Blue Book, the closest rated capacity will be used, without interpolation. All rates shall be agreed upon in writing before work is begun. Payment will not be made for pickup trucks used solely for transportation.

In cases where the equipment to be used is specialized in nature and is not available in Design-Builder's inventory and is rented or leased from an outside agency a 10 percent allowance will be added on the first $5,000 plus 5 percent of the balance in excess of $5,000 for overhead for all rented or leased equipment paid for by invoices. Where the rate charged by the agency exceeds the rate determined by the Blue Book, the rental or lease agreement shall be submitted to the Department for Approval. The equipment operating costs from the Blue Book will be paid for rented or leased equipment for each hour the equipment was actually used.

In those cases where the required equipment is in Design-Builder's or Subcontractor's available inventory but not on the Site, the equipment may be rented from a local source. The Department may Approve rental rates for equipment obtained from local sources when such rates are within 10 percent of rates in the Blue Book. When the equipment use is of short duration (less than a week) "move-in" and "move-out" costs for equipment owned by Design-Builder or Subcontractors may be considered when comparing rental costs of equipment obtained from local sources. This option will only be allowed when the cost of locally rented equipment would be less than using owned equipment, including "move-in" and "move-out" charges. Such rentals must be supported by a cost analysis indicating the method used was the least expensive. Should equipment be rented even though it is of a type that is in Design-Builder's or Subcontractor's inventory and the rental costs exceed that allowed by this paragraph, Design-Builder will be reimbursed for such equipment based on the rates in the Blue Book.

The rates paid as above provided shall be deemed to include compensation for the cost of fuel, oil, lubricants, supplies, small tools, necessary attachments, repairs and maintenance of all kinds, depreciation, storage, insurance and all incidentals. Individual pieces of equipment or tools not listed in the Blue Book and having an individual replacement value of $1,000 or less, whether or not consumed by use, shall be considered to be small tools. Equipment rental rates not provided by the Blue Book must be Approved by the Department before the start of any Change Order Work.

Design-Builders will be paid an additional 10 percent on the equipment costs, which is for overhead and profit.

Equipment operators will be paid for as stipulated in Section 16.7.2 (Labor Costs).

All equipment shall be in good working condition and suitable for the purpose for which the equipment is to be used.

Unless otherwise specified, manufacturer's ratings and manufacturer-approved modifications shall be used to classify equipment for the determination of applicable rental rates. Equipment, which has no direct power unit, shall be powered by a unit of at least the minimum rating recommended by the manufacturer of that equipment.

The time to be paid for use of equipment on the Site shall be the time the equipment is in operation on the Change Order Work being performed. The time shall include the reasonable time required to move the equipment to the location of the Change Order Work and return it to the original location or to another location requiring no more time than that required to return it to its original location. Moving time will not be paid for if the equipment is also used at the Site other than for Change Order Work. Loading and transporting costs will be allowed, in lieu of moving time, when the equipment is moved by means other than its own power. No payment for loading and transporting will be made if the equipment is also used at the Site other than for Change Order Work. Time will be computed in half and full hours. In computing the time for use of equipment, less than 30 minutes shall be considered one-half hour.

16.7.4. Permit Fees

The Design-Builder will be reimbursed for the cost of any additional permit fees payable as the result of a change in the Work requiring additional permit fees. Back-up documentation supporting each cost item for this category shall be provided by the Design-Builder and Approved by the Department prior to any payment authorization being granted.

In addition to the permit fees, the Design-Builder will be paid 5 percent of the permit fee, which is for overhead.

16.7.5. Subcontracted Work

For administration and all overhead costs in connection with Subcontract Work, the Design-Builder will receive an amount equal to 7.5 percent of the compensation allowed for the Subcontractor, provided that only one such markup shall be allowed, notwithstanding the actual number of intervening Subcontractors. This shall fully compensate the Design-Builder (and all Subcontractors) for administration, general superintendence, overhead, profit and expenses not otherwise recoverable with respect to subcontracted Work. This shall not apply to: (i) Subcontracts with Affiliates; or (ii) Subcontracts with Suppliers.

16.7.6. Overhead and Profit

Items included in Overhead and Profit: Unless otherwise indicated in this Section 16 (Changes in the Work), the overhead and profit and labor surcharges under this Section 16 (Changes in the Work) are full and complete compensation for all indirect costs of the added or changed Work, as well as for profit thereon. The Design-Builder's overhead and profit percentages and labor surcharges under this Section 16 (Changes in the Work) shall be considered to include, among other costs, salary and expenses of executive officers, supervising officers or supervising employees (excluding only direct labor costs permitted under Section 16.7.2 (Labor Costs)), clerical employees, charges for minor equipment, such as small tools, and other miscellaneous supplies and services, incidental job burdens, bonuses not otherwise covered, field, jobsite and general home office expenses of all types (including timekeepers, bookkeepers, and other general office help), supervisory expenses of all types (excluding only direct labor costs permitted under Section 16.7.2 (Labor Costs)) and all other overhead, general condition and indirect costs

and expenses and profit. With respect to non-construction related labor costs, overhead is included as part of the labor surcharge calculated in accordance with Section 16 (Changes in the Work) and includes accessories such as Computer-Assisted Drafting and Design (CADD) systems, computers, facsimile transmission machines, scanners, plotters, etc.

Payment of Overhead and Profit: The foregoing overhead and profit and labor surcharges will be paid to the Design-Builder only for Work it performs; in the case of Work that is subcontracted, the additional payment for Subcontract administration will be allowed to the Design-Builder as described in Section 16 (Changes in the Work) and all other overhead and profit and labor surcharges will be allowed to the Subcontractor who actually performs the Work.

Materials and Equipment: No overhead, profit or other surcharges will be paid to the Design-Builder for any materials or equipment furnished by the Department.

Deductive Changes: Where the Design-Builder's or any Subcontractor's portion of a change involves a deductive change, the Design-Builder shall include all Design-Builder's and Subcontractor's overhead and profit in computing the value of the credit.

Bond and Insurance Premiums: If a change requires additional bond and/or insurance premiums, they will be paid for as a direct payment with no additional amount for overhead or profit.

16.7.7. Compliance with Cost Principles Regulations

All costs claimed by the Design-Builder under Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work) shall, at a minimum, be allowable, allocable, and reasonable in accordance with the cost principles and procedures of Part 31 of the Federal Acquisition Regulation and Office of Management and Budget (OMB) Circular A-87, Cost Principles for State and Local Governments.

16.7.8. Not Applicable to Equal or Better Change Orders

This Section 16.7 (Pricing of Change Orders) shall not apply to Equal or Better Change Orders.

16.8. Waiver

The Design-Builder hereby expressly waives all rights to assert any and all claims based on any change in the work, delay or acceleration (including any change, delay, suspension or acceleration which, but for the express terms of the contract documents, could be inferred or implied at law) for which the Design-Builder failed to provide proper and timely notice or failed to provide a timely RCO, and agrees that the Design-Builder shall not be entitled to any compensation or damages whatsoever in connection with the work except to the extent that the contract documents expressly specify that the design-builder is entitled to a change order or other compensation or damages.

16.9. Disputes

If the Department and the Design-Builder agree that a request to increase the Contract Amount and/or extend any Completion Deadline by the Design-Builder has merit, but are unable to agree as to the amount of such price increase and/or time extension, the Department agrees to mark up the Change Order request or Change Order form, as applicable, provided by the Design-Builder to reduce the amount of the price increase and/or time extension as deemed appropriate by the Department. In such event, the Department will execute and deliver the marked-up Change Order to the Design-Builder within a reasonable period, and thereafter will make payment and/or grant a time extension based on such marked-up Change Order. The failure of the Department and the Design-Builder to agree to any Change Order under Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work) (including agreement as to the amount of compensation allowed under a Force Account Change Order and the disputed amount of the increase in the Contract Amount and/or extension of a Completion Deadline in connection with a

Change Order as described above) shall be a Dispute to be resolved pursuant to Section 22 (Partnering and Dispute Resolution). Except as otherwise specified in the Change Order, execution of a Change Order by both parties shall be deemed accord and satisfaction of all claims by the Design-Builder of any nature arising from or relating to the Work covered by the Change Order. The Design-Builder's Claim and any award by the resolver of the dispute shall be limited to the incremental costs incurred by the Design-Builder with respect to the disputed matter (crediting the Department for any corresponding reduction in the Design-Builder's other costs) and shall in no event exceed the amounts allowed by this Section 16 (Changes in the Work) with respect thereto.

16.10. No Release or Waiver

16.10.1. Extension of Time for Performance

No extension of time granted hereunder shall release the Design-Builder's Surety from its obligations. The Department shall not be deemed to have waived any rights under the Contract (including its right to abrogate the Contract for abandonment or for failure to complete within the time specified, or to impose and deduct damages as may be provided herein) as the result of any grant of an extension of time beyond the date fixed for the completion of any part of the Work, any acceptance of performance of any part of the Work after a Completion Deadline, or the making of any payments to the Design-Builder after such date.

16.10.2. No Change Order Based on Course of Conduct or Order by Unauthorized Person

No course of conduct or dealings between the parties, nor express or implied acceptance of alterations or additions to the Work, and no claim that the Department has been unjustly enriched shall be the basis for any claim, request for additional compensation or extension of a Completion Deadline. Further, the Design-Builder shall undertake, at its risk, work included in any request, order or other authorization issued by a person in excess of that person's authority as provided herein, or included in any oral request. The Design-Builder shall be deemed to have performed such work as a volunteer and at its sole cost. In addition, the Department may require the Design-Builder to remove or otherwise undo any such work, at the Design-Builder's sole cost.

17— SUSPENSION OF WORK

17.1. Suspension for Convenience

The Department may, at any time and for any reason, by written notice, order the Design-Builder to suspend all or any part of the Work required under the Contract Documents for the period of time that the Department deems appropriate for the convenience of the Department. An increase in the Contract Amount or extension of Completion Deadlines shall be determined in accordance with Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work).

17.2. Suspension for Cause

The Department has the authority by written order to suspend the Work without liability to the Department wholly or in part for the Design-Builder's failure to:

A. Correct conditions unsafe for the Project personnel or general public.

B. Comply with any Governmental Approval, Law, or otherwise carry out the requirements of the Contract.

C. Carry out orders of the Department.

D. Comply with environmental requirements or requirements for developing and implementing the Quality Management Plan.

E. Meet the requirements of Section 1.3.7 (Design and Engineering Personnel).

17.3. Design-Builder Responsibilities during Suspension

The Design-Builder shall promptly comply with any written suspension order under this Section 17. The Design-Builder shall promptly recommence the Work upon receipt of written notice from the Department directing the Design-Builder to resume Work. During periods that Work is suspended, the Design-Builder shall continue to be responsible for the Work and shall prevent damage or injury to the Project and other facilities in the Project vicinity, provide for drainage, obtain and maintain compliance with all Governmental Approvals, maintain all Design-Builder-provided insurance and bonds and erect necessary temporary structures, signs or other facilities required to maintain the Project and other facilities in the Project vicinity. During any suspension period, unless otherwise directed by the Department, the Design-Builder shall continue to be responsible for maintenance of traffic in accordance with the Maintenance of Traffic Plan and Part 4-10 (Maintenance of Traffic), and for maintenance during construction in accordance with Part 4-09 (Maintenance During Construction). If only part of the Work is suspended, for the Work not suspended the Design-Builder shall be entitled to payment for the costs allocated thereto as set forth in the Schedule of Values.

18— TERMINATION FOR CONVENIENCE

18.1. Notice of Termination

The Department may terminate the Contract and the performance of the Work by the Design-Builder for its own convenience if the Department determines, in its sole discretion, that a termination is in the best public, State, or national interest. The Department shall notify the Design-Builder of its decision to terminate by delivering to the Design-Builder a written Notice of Termination specifying the extent of termination, its effective date and any remaining Work necessary to place the Project in an acceptable condition, as determined by the Department in its sole discretion. Termination of the Contract shall not relieve any Surety of its obligation for any claims arising out of the Work performed. Termination may occur before or after Work has begun.

18.2. Design-Builder Responsibilities Upon Termination

After receipt of a Notice of Termination, and except as otherwise directed by the Department, the Design-Builder shall immediately proceed as follows, regardless of any delay in determining or adjusting any amounts due under this Section 18 (Termination for Convenience):

A. Stop Work as specified in the notice.

B. Communicate to all affected Subcontractors such notice of termination and that their Subcontracts are not to be further performed unless otherwise authorized in writing by the Department.

C. Place no further Subcontracts or orders for materials, services, or facilities, except as necessary to complete the continued portion of the Work, if any, or for mitigation of damages.

D. Terminate all Subcontracts to the extent that they relate to the Work terminated.

E. Assign to the Department, in the manner, at the times, and as and to the extent directed by the Department, all of the right, title, and interest of the Design-Builder under the Subcontracts so terminated, in which case the Department will have the right, in its sole discretion, to accept performance, settle, or pay any or all claims arising out of the termination of such Subcontracts.

F. Settle all outstanding liabilities and claims arising out of such termination of Subcontracts, with the Approval or ratification of the Department, to the extent it may be required, which Approval or ratification shall be final.

G. Provide the Department with an inventory list of all materials previously produced, purchased, or ordered from Suppliers for use in the Work and not yet used in the Work, including storage locations, as well as any documentation or other property required to be delivered hereunder, which is either in the process of development or previously completed but not yet delivered to the Department, and such other information as the Department may request; and transfer title and deliver to the Department, in the manner, at the times, and as and to the extent, if any, directed by the Department of (i) fabricated or unfabricated parts, the Work in process, completed Work, supplies, and other material produced or acquired for the Work terminated; and (ii) the Design Documents and all other completed or partially completed drawings (including plans, elevations, sections, details, and diagrams), specifications, records, samples, information, and other property that would have been required to be furnished to the Department if the Work had been completed.

H. Complete performance, in accordance with the Contract Documents, of all Work not terminated.

I. Take all action that may be reasonably necessary, or that the Department may direct, for the safety, protection, and preservation of (i) the public, including public and private vehicular movement; (ii) the Work; and (iii) the equipment, machinery, materials, and property related to the Contract Documents that are in the possession of the Design-Builder and in which the Department has or may acquire an interest.

J. As authorized by the Department in writing, use its best efforts to sell, in a manner, at the times, to the extent, and at the price or prices directed or authorized by the Department, any property of the types referred to in Section 18.2(G); provided, however, that the Design-Builder (i) is not required to extend credit to any purchaser; and (ii) may acquire the property under the conditions prescribed and at prices Approved by the Department. The proceeds of any transfer or disposition will be applied to reduce any payments to be made by the Department under the Contract Documents or paid in any other manner directed by the Department.

K. If requested by the Department, withdraw from the portions of the Site designated by the Department and remove such materials, equipment, tools and instruments used by, and any debris or waste materials generated by, the Design-Builder and any Subcontractor in the performance of the Work as the Department may direct.

L. Assign and transfer to the Department all of the Design-Builder's right, title and interest in and to the following: (a) all Design Documents, completed or partially completed drawings (including plans, elevations, sections, details and diagrams), specifications, designs, design documents, surveys, and other documents and information pertaining to the design or construction of the terminated Work; (b) all samples, borings, boring logs, geotechnical data and similar data and information relating to the terminated Work; (c) all books, records, reports, test reports, studies and other documents of a similar nature

relating to the terminated Work; and (d) all other work product used or owned by the Design-Builder or any Design-Builder-Related Entity relating to the terminated Work.

M. Take other actions directed by the Department.

18.3. Responsibility After Notice of Termination

The Design-Builder shall continue to be responsible for damage to materials after issuance of the Notice of Termination, except as follows:

A. The Design-Builder's responsibility for damage to materials for which partial payment has been made as provided in Section 12.2.6 (Partial Payment for Material Delivered to the Site of Work) shall end when the Department certifies that those materials have been stored in the manner and at the locations directed by the Department.

B. The Design-Builder's responsibility for damage to materials purchased by the Department subsequent to the Notice of Termination shall end when title and delivery of those materials has been taken by the Department.

Immediately after the Department determines that the Design-Builder has completed the Work directed to be completed in accordance with the Notice of Termination and such other work as may have been ordered to secure the Project for termination, the Design-Builder will not be required to provide for continuing safety, security, and maintenance at the Site. Subsequent to the determination that all materials have been stored in the manner and at the locations directed by the Department, further handling of such materials shall be the responsibility of the Department.

18.4. Negotiated Termination Settlement

18.4.1. Settlement Proposal

After receipt of a Notice of Termination, the Design-Builder shall submit a final termination settlement proposal to the Department in the form and with the certification prescribed by the Department. The Design-Builder shall submit the proposal promptly, but no later than 90 days from the effective date of termination, unless the Design-Builder has requested a time extension in writing within such 90-day period and the Department has agreed in writing to allow such an extension. The Department will then review the Design-Builder's termination settlement proposal and will act upon it, return it with comments or reject it. If the Design-Builder fails to submit the proposal within the time allowed, the Department may determine, on the basis of information available to it, the amount, if any, due to the Design-Builder because of the termination, and shall pay the Design-Builder the amount so determined.

18.4.2. Negotiated Settlement Amount

The Design-Builder and the Department may agree, as provided in Section 18.4.1 (Settlement Proposal), upon the whole or any part of the amount or amounts to be paid to the Design-Builder by reason of Termination of Work pursuant to this Section 18 (Termination For Convenience). Such negotiated settlement may include a reasonable allowance for profit solely on Work that has been completed as of the termination date and subsequently accepted by the Department but not an amount for lost, anticipated or unearned profit or other costs disallowed in Section 18.5.2 (Maximum Compensation). Such agreed amount(s), exclusive of settlement costs, shall not exceed the total Contract Amount as reduced by the amount of payments otherwise made and as further reduced by the cost of the Work not terminated, as determined by the costs allocated to such Work in the Schedule of Values. Upon determination of the settlement amount, the Contract will be amended accordingly, and the Design-Builder will be paid the agreed amount. If parties are unable to reach a settlement on all termination costs, compensation for those costs not agreed upon will be determined in accordance with Section 18.5 (Determination of Termination Amount if Negotiation Fails). Unless otherwise agreed to by the parties as a part of a negotiated

settlement, the Department's execution and delivery of any settlement agreement shall not affect any of its rights under the Contract Documents with respect to completed Work, relieve the Design-Builder from its obligations with respect thereto, including Warranties, or affect the Department's rights under the Contract Bond and payment as to such completed or non-terminated Work.

18.5. Determination of Termination Amount if Negotiations Fail

If the Design-Builder and the Department fail to agree, as provided in Section 18.4.2 (Negotiated Settlement Amount), upon the whole amount to be paid to the Design-Builder in whole or in part by reason of the termination of Work pursuant to this Section 18 (Termination For Convenience), the amount payable (exclusive of interest charges) shall be determined by the Department in accordance with the following, but without duplication of any amounts agreed upon in accordance with Section 18.4 (Negotiated Termination Settlement):

18.5.1. Payment Amount

Subject to the limitations in Section 18.5.2 (Maximum Compensation), the Department will pay the Design-Builder the sum of the following amounts for Work performed prior to the effective date of the Notice of Termination, as such amounts are determined by the Department:

A. The Design-Builder's actual reasonable out-of-pocket cost (without profit, and including equipment costs only to the extent permitted by Section 16 (Changes in the Work)) for all Work performed, including mobilization, demobilization, and work done to secure the Project for termination, including reasonable overhead and accounting for any refunds payable with respect to insurance premiums, deposits, or similar items, as established to the Department's satisfaction. In determining the reasonable cost, deductions will be made for the cost of materials to be retained by the Design-Builder, amounts realized by the sale of materials and for other appropriate credits. Deductions will also be made for the cost of damaged materials. When, in the opinion of the Department, the cost of an item of Work is excessively high due to costs incurred to remedy or replace defective or rejected Work, the reasonable cost to be allowed will be the estimated reasonable cost of performing that Work in compliance with the requirements of the Contract Documents, and the excessive actual cost will be disallowed.

B. As profit on the actual out-of-pocket cost permitted in clause 1 above, a sum determined by the Department to be fair and reasonable; provided, however, that if it appears that the Design-Builder would have sustained a loss on the entire Contract had it been completed, no profit shall be included or allowed under this Section 18.5.1 (Payment Amount), and an appropriate adjustment shall be made by reducing the amount of the settlement to reflect the indicated rate of loss.

C. The cost of settling and paying claims arising out of the termination of Work under Subcontracts as provided in Section 18.2(F), exclusive of the amounts paid or payable on account of supplies or materials delivered or services furnished by the Subcontractor prior to the effective date of the Notice of Termination under the Contract, which amounts shall be included in the cost on account of which payment is made under clause A above.

D. The reasonable out-of-pocket cost (including reasonable overhead) of the preservation and protection of property incurred pursuant to Section 18.2(I) and any other reasonable out-of-pocket cost (including overhead) incidental to termination of Work under the Contract, including the reasonable cost to the Design-Builder of handling material returned to the vendor, delivered to the Department or otherwise disposed of as directed by the Department, and including a reasonable allowance for the Design-Builder's

administrative costs in determining the amount due to the Design-Builder as the result of the termination of Work under the Contract.

18.5.2. Maximum Compensation

The Design-Builder acknowledges and agrees that it shall not be entitled to any compensation in excess of the value of the Work performed (determined as provided in Section 18.5.1 (Payment Amount)) plus its settlement costs, and that items such as lost, anticipated or unearned profit, unabsorbed overhead, opportunity costs or consequential or other damages shall not be recoverable by the Design-Builder for itself or for its Subcontractors on account of the termination of the Contract. However, the total amount to be paid to the Design-Builder, exclusive of costs described in Sections 18.5.1(C) and (D), may not exceed the total Contract Amount less the amount of payments previously made and less the cost of the Work not terminated, as determined by the costs allocated to such Work in the Schedule of Values. Furthermore, if any refund is payable with respect to Project-specific insurance or bond premiums, deposits, or similar items which were previously passed through to the Department by the Design-Builder, such refund shall be paid directly to the Department or otherwise credited to the Department.

18.5.3. Excluded Items

Except for normal spoilage, and except to the extent that the Department will have otherwise expressly assumed the risk of loss, there will be excluded from the amounts payable to the Design-Builder under Section 18.5.1 (Payment Amount), the fair value, as determined by the Department, of equipment, machinery, materials and property which is destroyed, lost, stolen or damaged so as to become undeliverable to the Department, or to a buyer pursuant to Section 18.2(J). The amount set forth in the Proposal by the Design-Builder for the Work terminated shall be a factor to be analyzed in determining the value of the Work terminated.

18.5.4. Payment of Termination Amount

Upon determination of the amount of the termination payment, the Contract shall be amended to reflect the agreed termination payment, and the Design-Builder shall be paid the agreed amount.

18.6. Partial Termination

If a termination hereunder is partial, the Contract Amount for the remainder of the Work shall be adjusted as appropriate to account for the change in the overall scope of the Project.

18.7. Reduction in Amount of Claim

The amount otherwise due the Design-Builder under this Section 18 (Termination For Convenience) shall be reduced by (i) all unliquidated payments for Work or materials not yet performed on or supplied to the Project at the time of the payment, excluding Work or materials paid for under Section 12.2 (Progress, Invoicing, and Payment) or other payments made to or on behalf of the Design-Builder applicable to the terminated portion of the Contract; (ii) the amount of any claim which the Department may have against any Design-Builder-Related Entity in connection with the Contract; (iii) the agreed price for, or the proceeds of the sale of, any property, materials, supplies, or other things acquired by the Design-Builder or sold, pursuant to the provisions of this Section 18 (Termination For Convenience), and not otherwise recovered by or credited to the Department; (iv) amounts that the Department reasonably deems advisable to retain to cover any existing or threatened claims, Liens, and stop notices relating to the Project, including claims by Utility Owners; (v) the cost of repairing, replacing or otherwise correcting any Nonconforming Work; and (vi) any amounts due or payable by the Design-Builder to the Department.

18.8. Partial Payments

The Department may, from time to time, under such terms and conditions as it may prescribe and in its sole discretion, make partial payments on account against costs incurred by the Design-Builder in connection with the terminated portion of the Contract, whenever, in the opinion of the Department, the aggregate of such payments shall be within the amount to which the Design-Builder will be entitled under this Section 18 (Termination For Convenience). If the total of such payments is in excess of the amount finally agreed or determined to be due under this Section 18 (Termination For Convenience), such excess shall be payable by the Design-Builder to the Department upon demand, together with interest at a rate equal to the average rate at the time being received from the investment of state funds, as determined by the State Treasurer, for the period from the date such excess payment is received by Design-Builder to the date on which such excess is repaid to the Department.

18.9. Inclusion in Subcontracts

The Design-Builder shall insert in all Subcontracts a requirement that the Subcontractor shall stop Work on the date and to the extent specified in a Notice of Termination from the Department in accordance with this Section 18 (Termination For Convenience), and shall require Subcontractors to insert the same provision in each Subcontract at all tiers.

18.10. Limitation on Payments to Subcontractor

For the purposes of Sections 18.4.2 (Negotiated Settlement Amount) and 18.5 (Determination of Termination Amount if Negotiations Fail), upon termination under Section 18.2(D) of Work under any Subcontract, the Design-Builder will not be entitled to reimbursement for that portion of the termination settlement with any such Subcontractor which constitutes lost, anticipated or unearned profit, unabsorbed overhead, opportunity costs or consequential or other damages on account of the termination.

18.11. No Unearned Profit or Consequential Damages

Under no circumstances shall the Design-Builder be entitled to lost, anticipated or unearned profit, unabsorbed overhead, opportunity costs or consequential or other damages as a result of a termination under this Section 18 (Termination For Convenience). The payment to the Design-Builder determined in accordance with this Section 18 (Termination For Convenience) constitutes the Design-Builder's sole and exclusive remedy for a termination under this Section 18 (Termination For Convenience).

18.12. No Waiver

Anything contained in the Contract to the contrary notwithstanding, a termination under this Section 18 (Termination For Convenience) shall not waive any right or claim to damages, which the Department may have, and the Department may pursue any cause of action, which it may have at law or in equity or under the Contract.

18.13. Dispute Resolution

The failure of the parties to agree on amounts due under this Section 18 shall be a Dispute to be resolved in accordance with Section 22 (Partnering and Dispute Resolution).

18.14. Allowability of Costs

All costs claimed by the Design-Builder under this Section 18 (Termination For Convenience) shall, at a minimum, be allowable, allocable and reasonable in accordance with the cost principles and procedures of 48 CFR Part 31.

18.15.Suspension of Work

(i) In the event of any suspension of all or part of the Work by the Department, after issuance of NTP, for more than 180 consecutive days, , the Design-Builder shall have the right to consider the Contract to have been terminated or partially terminated for convenience under this Section 18 (Termination For Convenience). The Design-Builder shall notify the Department of such election by delivering to the Department a written notice of termination (or partial termination) due to such suspension specifying its effective date. Upon delivery by the Design-Builder to the Department of a notice of termination due to suspension, the provisions of this Section 18 (Termination For Convenience) shall apply.

19— DEFAULT

19.1. Default by Design-Builder

19.1.1. Events of Default

The Design-Builder shall be in breach under the Contract upon the occurrence of any one or more of the following events or conditions:

A. The Design-Builder fails to promptly begin the Work under the Contract Documents following issuance of NTP.

B. The Design-Builder fails to perform the Work with sufficient resources to ensure the prompt completion thereof or, if a Recovery Schedule is required, the Design-Builder fails to provide a Recovery Schedule and otherwise satisfy the requirements of Section 11.1.3 (Recovery Schedule).

C. The Design-Builder fails to execute remedial action in accordance with the Quality Management Plan and Part 3 (Quality Program).

D. The Design-Builder fails to perform the Work in accordance with the Contract Documents, refuses to remove and replace rejected materials or Nonconforming or unacceptable Work, or fails to remove and replace workers as directed by the Department under Section 8.9 (Character of Workers).

E. The Design-Builder discontinues or suspends the prosecution of the Work (exclusive of Work stoppage due to: (i) termination by the Department; (ii) an excusable delay as a result of a Force Majeure event or suspension for convenience by the Department; or (iii) nonpayment by the Department not related to a breach by the Design-Builder).

F. The Design-Builder fails to resume performance of Work, which has been suspended or stopped, within a reasonable time after receipt of notice from the Department to do so or (if applicable) after cessation of the event preventing performance.

G. The Design-Builder breaches any other agreement, representation or warranty contained in the Contract Documents, or the Design-Builder fails to perform any other obligation under the Contract Documents.

H. The Design-Builder fails to provide and maintain the required insurance and Payment and Performance Bond or other required securities.

I. The Design-Builder assigns or transfers the Contract Documents or any right or interest therein, except as expressly permitted under Section 29.3.2 (Subcontractors and Assignment by Design-Builder).

J. The Design-Builder fails, absent a valid dispute, to make payment when due for labor, equipment or materials in accordance with its agreements with Subcontractors and applicable law, fails to comply with any Law or Governmental Approval; or fails reasonably to comply with the instructions of the Department consistent with the Contract Documents.

K. The Design-Builder fails to discharge or obtain a stay within ten days of any final judgment(s) or order for the payment of money against it in excess of $100,000 in the aggregate arising out of the prosecution of the Work (provided that, for purposes hereof, posting of a bond in the amount of 125 percent of such judgment or order shall be deemed an effective stay).

L. The Design-Builder shall have become insolvent, generally does not pay its debts as they become due, admits in writing its inability to pay its debts, or makes an assignment for the benefit of creditors.

M. Insolvency, receivership, reorganization or bankruptcy proceedings shall have been commenced by or against the Design-Builder and not dismissed within 60 days.

N. Any representation or warranty made by the Design-Builder in the Contract Documents or in any certificate, schedule, instrument or other document delivered pursuant to the Contract Documents shall have been false or materially misleading when made.

O. The Design-Builder is a party to fraud.

P. The Design-Builder fails to pay Liquidated Damages, Disincentives, or both, due and owing to the Department.

19.1.2. Right to Cure

The Department agrees to provide the Design-Builder and Surety 15 day notice and opportunity to cure any breach before declaring an Event of Default, provided that no such notice and opportunity to cure is required for any breach which by its nature cannot be cured. If a breach is curable but by its nature cannot be cured within 15 days, as reasonably determined by the Department, the Department agrees not to declare an Event of Default provided that the Design-Builder commences such cure within such 15-day period and thereafter diligently prosecutes such cure to completion; provided, however, that in no event will such cure period exceed 60 days in total. The Design-Builder hereby acknowledges and agrees that the events described in Section 19.1.1(M) and 19.1.1(N) are not curable. Notwithstanding the foregoing, if the Department believes a condition affecting the Project poses an immediate and imminent danger to public health or safety, the Department may, without notice and without awaiting lapse of any cure period, rectify the condition at the Design-Builder's cost (excluding costs that would otherwise have been the Department's responsibility under the express terms of the Contract, if any), and so long as the Department undertakes such action in good faith, even if under a mistaken belief in the occurrence of such default, such action shall not expose the Department to liability to the Design-Builder and shall not entitle the Design-Builder to any other remedy, it being acknowledged that the Department has a paramount public interest in providing and maintaining safe public use of and access to the Project. The Department's good faith determination of the existence of such danger shall be deemed conclusive in the absence of clear and convincing evidence to the contrary.

19.2. Remedies

19.2.1. Rights of the Department

If an Event of Default occurs, then, in addition to all other rights and remedies provided by law or equity or available under the Contract or otherwise, including the rights to recover Liquidated Damages and

Disincentives and to seek recourse against the Performance Bond or other performance security required hereby, the Department shall have the following rights and remedies, without further notice, and without prejudice to any of its other rights or remedies and without waiving or releasing the Design-Builder from any obligations, and the Design-Builder shall have the following obligations (as applicable):

A. The Department may order the Design-Builder to suspend or discontinue the Work or any portion of the Work.

B. The Department may terminate the Contract or a portion thereof, in which case, the provisions of Sections 18.2 (Design-Builder Responsibilities Upon Termination) and 18.3 (Responsibility After Notice of Termination) shall apply.

C. If directed by the Department, the Design-Builder shall withdraw from the Site and remove such materials, equipment, tools and instruments used by, and any debris or waste materials generated by, any Design-Builder-Related Entity in the performance of the Work.

D. The Design-Builder shall deliver to the Department possession of any or all facilities of the Design-Builder located on the Site as well as any or all Design Documents and all other completed or partially completed drawings (including plans, elevations, details and diagrams), specifications, records, information, schedules, samples, Shop Drawings and other documents, that the Department deems necessary for completion of the Work.

E. The Design-Builder shall confirm the assignment to the Department of the Subcontracts requested by the Department, and the Design-Builder shall terminate, at its cost, all other Subcontracts.

F. The Department may deduct from any amounts payable by the Department to the Design-Builder such amounts payable by the Design-Builder to the Department, including Liquidated Damages, Disincentives, or other damages payable to the Department under the Contract Documents.

G. The Department, without incurring any liability to the Design-Builder, shall have the rights to: (i) take the performance of all or a portion of the Work from the Design-Builder (either with or without the use of the Design-Builder's materials, equipment, tools and instruments) and enter into an agreement with another Person for the completion of such Work; or (ii) use such other methods, as in the opinion of the Department, will be required for the completion of the Project.

H. If the Department exercises any right to perform any obligations of the Design-Builder, in the exercise of such right the Department may, but is not obligated to, among other things: (i) perform or attempt to perform, or cause to be performed, such work; (ii) spend such sums as the Department deems necessary and reasonable to employ and pay such architects, engineers, consultants and contractors and obtain materials and equipment as may be required for the purpose of completing such work; (iii) execute all applications, certificates and other documents as may be required for completing the work; (iv) modify or terminate any contractual arrangements; (v) take any and all other actions which it may in its sole discretion consider necessary to complete the Work; and (vi) prosecute and defend any action or proceeding incident to the Work.

19.2.2. Liability of Design-Builder

If an Event of Default has occurred, the Design-Builder and Surety shall be jointly and severally liable to the Department (in addition to any other damages under the Contract Documents other than those costs intended to be covered by Liquidated Damages and Disincentives payable hereunder) for all costs

reasonably incurred by the Department or any party acting on the Department's behalf in completing the Work or having the Work completed by another Person (including any re-procurement costs, throw away costs for unused portions of the completed Work and increased financing costs). Upon the occurrence of an Event of Default, the Department shall be entitled to withhold all or any portion of further payments to the Design-Builder until such time as the Department is able to determine how much (if any) remains owing to the Design-Builder. Promptly upon such determination, the Department shall notify the Design-Builder in writing of the amount, if any, that the Design-Builder shall pay the Department or that the Department shall pay the Design-Builder with respect thereto. All costs and charges incurred by the Department, including attorneys', accountants' and expert witness fees and costs, together with the cost of completing the Work under the Contract Documents, will be deducted from any moneys due or which may become due to the Design-Builder. If such expense exceeds the sum which would have been payable under the Contract, then the Design-Builder and its Surety(ies) shall be liable and shall pay to the Department the amount of such excess.

It is recognized that if a default under Section 19.1.1(K) or (L) occurs, such event could impair or frustrate the Design-Builder's performance of the Work. Accordingly, it is agreed that upon the occurrence of any such event, the Department shall be entitled to request of the Design-Builder, or its successor in interest, adequate assurance of future performance in accordance with the terms and conditions hereof. Failure to comply with such request within ten days of delivery of the request shall entitle the Department to terminate the Contract and to the accompanying rights set forth above. Pending receipt of adequate assurance of performance and actual performance in accordance therewith, the Department shall be entitled to proceed with the Work with its own forces or with other contractors on a time and material or other appropriate basis, the cost of which will be credited against and deducted from the Department's payment obligations hereunder. The foregoing shall be in addition to all other rights and remedies provided by law or equity and such rights and remedies as are otherwise available under the Contract and Payment and Performance Bonds.

In lieu of the provisions of this Section 19.2 (Remedies) for terminating the Contract and completing the Work, the Department may pay the Design-Builder for the parts already done according to the provisions of the Contract Documents and may treat the parts remaining undone as if they had never been included or contemplated by the Contract. No claim under this provision will be allowed the Design-Builder for prospective profit on, or any other compensation relating to, Work uncompleted by the Design-Builder.

If the Contract is terminated for grounds that are later determined not to justify a termination for default, such termination shall be deemed to constitute a termination for convenience pursuant to Section 18 (Termination for Convenience).

If the Department suffers damages as a result of the Design-Builder's breach or failure to perform an obligation under the Contract Documents, then the Department shall be entitled to recovery of such damages from the Design-Builder regardless of whether the breach or failure that gives rise to the damages ripens into an Event of Default.

The exercise or beginning of the exercise by the Department of any one or more rights or remedies under this Section 19.2 (Remedies) shall not preclude the simultaneous or later exercise by the Department of any or all other rights or remedies, each of which shall be cumulative.

The Design-Builder and Surety shall not be relieved of liability for continuing Liquidated Damages or Disincentives on account of a default by the Design-Builder hereunder or by the Department's declaration of an Event of Default, or by actions taken by the Department under this Section 19.2 (Remedies).

19.3. Right to Stop Work if Undisputed Payment is Not Made

The Design-Builder shall have the right to stop Work if the Department fails to make an undisputed payment due hereunder within fourteen days after receipt of notice of nonpayment. Any such Work

stoppage shall be considered a suspension under Section 17.1 (Suspension for Convenience). The Design-Builder shall not have the right to terminate the Contract for default as the result of any failure by the Department to make an undisputed payment due hereunder, but the Design-Builder shall have the right to declare a termination for convenience under Section 18 (Termination For Convenience) upon meeting the requirements of Section 18.15 (Suspension of Work).

20— INCENTIVES, DISINCENTIVES, AND DAMAGES

20.1. Citizen Coordination Team Incentives

20.1.1. Community Coordination Team

The Department's Communication Team (CT) will organize and manage a Community Coordination Team (CCT) and act as the facilitator at CCT meetings. The CCt will meet in accordance with Part 4-12 (Public Information Services) to provide feedback to the Design-Builder on the effectiveness of the coordination efforts with the public.

20.1.2. Evaluation

The Design-Builder will be evaluated at the end of determined incentive award periods, displayed in the Table 20-1 Incentive Award Periods below. During the monthly CCT meeting at the end of each incentive award period, the voting members will rate the Design-Builder's performance for the period and determine a score (maximum of 100 percent of the incentive award period percentage) to be used in determining the period's incentive amount. The evaluation criteria to be used at each voting meeting will be developed and agreed upon no later than the second CCT meeting through a collaborative process involving both voting and non-voting CCT members. The evaluation criteria may be based on exceeding the requirements of the Public Involvement tasks as outlined in Part 4-12 (Public Information Services) and MOT as it relates to lessening the impact to the public. The portion of the overall Incentive Award allocated to the Public Involvement / CCT is $300,000. This is the total value that can be earned from all CCT incentive award periods combined. The Incentive Award will be divided equally between the seven award periods.

20.1.3. Evaluation and Award of Public Involvement/CRB Incentive

The Public Involvement / CCT criteria will be measured at the conclusion of each incentive period as work progresses. The incentive amount awarded will be based on the following formula:

$$A = T \times IAP\% \times CCT\% \text{ where:}$$

A is Actual dollar amount to be awarded each period.
T is Maximum amount of CCT incentive for project ($300,000).
IAP% is Percent of total allowed for each award period (Table Incentive Award Period).
CCT% is CCT score (in percent) for each award period.

The incentive award will be paid the month following the award period shown in Table Incentive Award Period.

TABLE 20-1
INCENTIVE AWARD PERIODS

Incentive Award Period	Maximum Percent of Total Available Award (IAP%)
Period 1: NTP – August 2017	10

Period 2 : August – October 2017	15
Period 3: November – December 2017	20
Period 4: January – March 2018	10
Period 5: April – June 2018	15
Period 6: July – September 2018	15
Period 7 – October – 30 days after Substantial Completion of the Project	15

20.2. Incentives/Disincentives Related to "Time"

Contract time related charges for the Project Work is determined by multiplying the number of Calendar Days by its corresponding time related cost rate. Document time charges for the duration of the project. Finish milestones eligible for incentive or disincentive are identified in Table 20-2 (Time Incentives/Disincentives) Payments or deductions to the Design-Builder will be based on the difference between the time related bid amounts and the actual time charges assessed for a finish milestone (as defined in Part 1 (Agreement)). Payment for the incentive will be made in the Project accounting system after Substantial Completion. Deduction for the disincentive will be made on the first progress payment after the total number of Calendar Days bid (in Form PA) for the finish milestone has passed without completion as defined in Part 1 (Agreement).

TABLE 20-2
TIME INCENTIVES/DISINCENTIVES

Finish Milestone	Time Related Cost Rate (Dollars per Calendar Day)
Substantial Completion	$5,000
5400 South Interchange Completion	$5,000
7000 South Interchange Completion	$10,000
9000 South Interchange Completion	$5,000
11400 South Interchange Completion	$7,500

A. Incentive: The Design-Builder is eligible for incentive when a finish milestone is achieved before the number of Calendar Days bid (in Form PA) as determined by the Department. Payment is made for each finish milestone in Table 20-2 (Time Incentives/Disincentives) at the respective rate identified in Table 20-2 for the difference between the number of Calendar Days bid (in Form PA) and the actual number of Calendar Days used to achieve the finish milestone up to a maximum incentive of 10 Calendar Days per finish milestone. The maximum dollar amount eligible for incentive payment for the milestone is $325,000.

B. Disincentive: The Design Builder is assessed a Disincentive when the finish milestone is not achieved within the number of Calendar Days bid (in Form PA) as determined by the Department. Disincentive is assessed for each finish milestone in Table 20-2 (Time Incentives/Disincentives) at the respective rate identified in Table 20-2 for the difference between the number of Calendar Days bid (in Form PA) and the actual number of

Calendar Days used to achieve the finish milestone. There is no maximum dollar amount for disincentive charges.

20.3. Liquidated Damages and Closure Disincentives

20.3.1. Failure to Meet Contract Requirements

The Design-Builder understands and agrees that if the Design-Builder fails to complete the Work in accordance with the Contract Documents or in the event of a Closure not permitted under the Contract Documents, the Department will suffer substantial losses and damages. If the Design-Builder fails to achieve the Completion Deadline in accordance with Part 1 (Agreement), 4.4 (Completion Deadlines), the Design-Builder shall pay the Department the applicable Liquidated Damages as set forth in Appendix I (Liquidated Damages). In the event of a Closure not permitted under the Contract Documents, the Design-Builder will be assessed Disincentives as set forth in Part 4-10 (Maintenance of Traffic).

The Design-Builder acknowledges and agrees that because of the unique nature of the Project, the fact that it is an essential part of the state highway system, and the fact that inconvenience to the traveling public will be one of the significant impacts of any completion delay, certain Closure duration delays or failure to obtain access, it is impracticable and extremely difficult to ascertain and determine the actual damages that would accrue to the Department and the public in the event of the Design-Builder's failure to achieve completion by a Completion Deadline or in the event of any Closure not permitted under the Contract Documents. In addition, the Department would incur additional costs of administering the Contract (including engineering, legal, accounting, and administrative costs) during any such period of delay, which amount is not possible to ascertain as of the date hereof. Therefore, the Design-Builder and the Department agree to liquidate the amount payable by the Design-Builder in the event of its failure to meet a Completion Deadline or in the event of any Closure not permitted under the Contract Documents. The Design-Builder acknowledges and agrees that such Liquidated Damages and/or Disincentives are intended to compensate the Department solely for the Design-Builder's failure to meet these Contract Document requirements, and shall not excuse the Design-Builder from liability from any other breach of Contract requirements, including any failure of the Work to conform to applicable requirements. The fact that the Department has agreed to accept Liquidated Damages and/or Disincentives as compensation for its damages associated with any delay in meeting a Completion Deadline or any Closure not permitted under the Contract Documents shall not preclude the Department from exercising its other rights and remedies respecting the delay set forth in Section 19.2 (Remedies) for a Default, or elsewhere in the Contract.

20.3.2. Assessments of Liquidated Damages and Disincentives

Disincentives will not be assessed after the Notice of Substantial Completion.

20.3.3. Reasonableness of Liquidated Damage and Disincentive Assessment Amounts

The Design-Builder acknowledges and agrees that the foregoing damages have been set based on an evaluation by the Department of damages that it will incur in each of the above events, including additional engineering costs, administration costs, supervision cost, inspection costs and additional interest expense. The Design-Builder and the Department agree that the damages also include Disincentives intended to recover some of the public's user costs, environmental impacts, or other public expenditures that are unique to the Project or incurred as a result of the Project. The Design-Builder and the Department agree that the amount of such Liquidated Damages and/or Disincentives are impossible to ascertain as of the date of execution hereof, and the parties have agreed to such Liquidated Damages and/or Disincentives in order to fix the Design-Builder's costs and to avoid later disputes over which items are properly chargeable to the Design-Builder. The Design-Builder understands and agrees that any Liquidated Damages and/or Disincentives payable in accordance with this Section 20 are in the nature of

liquidated damages and/or disincentive assessments and not a penalty, and such sums are reasonable under the circumstances existing as of the date of execution and delivery of the Contract. The Design-Builder further acknowledges and agrees that Liquidated Damages and/or Disincentives may be owing even though no event of Default has occurred.

20.4. Utility Relocation Incentive/Disincentive

The utility relocation incentive/disincentive applies to those utility companies listed as being responsible for the relocation design/construction of their facilities.

A. Payments/deductions to the Design-Builder will be based on the difference between the Department's cost share responsibility for Utility Work performed by Third Parties in Form PA, Form UC, and Form BA and the actual utility relocation charges assessed. Payment for the incentive, or a credit for the disincentive, will be made administratively in the project accounting system by an administrative incentive/disincentive detail.

1. Incentive: Payments to the Design-Builder, if applicable, will be lump sum. If the actual utility relocation charges accrued after completion of the project are less than the Department's cost share responsibility for Utility Work performed by Third-Parties in Form PA, Form UC, and Form BA UDOT will pay the Design-Builder 60% of the difference.

2. Disincentive: Payments deducted from the Design-Builder, if applicable, will be lump sum. If the accrued utility relocation charges exceed the amount of the Department's cost share responsibility for Utility Work performed by Third Parties in Form PA, Form UC, and Form BA, the Department will deduct 40% of the difference from moneys due the Design-Builder. These deductions will begin on the first progress payment when the accrued Utility Relocation charges exceed the Department's cost share responsibility for Utility Work performed by Third Parties in Form PA, Form UC, and Form BA.

20.5. Offset; Waiver

20.5.1. Offset

The Department shall have the right to deduct any amount owed by the Design-Builder to the Department hereunder from any amounts owed by the Department to the Design-Builder under the Contract.

20.5.2. No Waiver

Permitting or requiring the Design-Builder to continue and finish the Work or any part thereof after a Completion Deadline shall not act as a waiver of the Department's right to receive Liquidated Damages hereunder or any rights or remedies otherwise available to the Department. Assessment of Liquidated Damages and/or Disincentives shall not relieve the Design-Builder from any other responsibilities under the Contract Documents.

20.6. Payment of Liquidated Damages and Disincentives

To the extent Liquidated Damages and/or Disincentives are not deducted from any amount owed to the Department by the Design-Builder, the Department may send Design-Builder an invoice, and the Liquidated Damages and/or Disincentives shall be payable by the Design-Builder to the Department within 10 days after the Design-Builder's receipt of the invoice therefor. If the Department is unable to collect Liquidated Damages and/or Disincentives from the Design-Builder, it may collect the amount owed from the Surety after declaring a breach of Contract pursuant to Section 19 (Default).

21— INDEMNIFICATION

21.1. Indemnifications by Design-Builder

21.1.1. General Indemnities

Subject to Section 21.1.3 (Losses Due to Negligence of Indemnified Parties), the Design-Builder shall release, defend, indemnify, and hold harmless the Department, the State of Utah and its agents and consultants, and their respective successors and assigns, and their respective officers, directors, agents, and employees (collectively referred to as the "Indemnified Parties") from and against any and all claims, causes of action, suits, judgments, investigations, legal or administrative proceedings, penalties, fines, damages, losses, liabilities, costs and expenses, including any injury to or death of persons or damage to or loss of property (including damage to utility facilities), and including attorneys', accountants' and expert witness fees and costs, arising out of, relating to or resulting from:

A. The breach or alleged breach of the Contract by any Design-Builder-Related Entity.

B. The failure or alleged failure by any Design-Builder-Related Entity to comply with any applicable Environmental Laws or other Laws (including Laws regarding handling, generation, treatment, storage, transportation and disposal of Hazardous Substances) or Governmental Approvals in performing the Work.

C. Any alleged patent or copyright infringement or other allegedly improper appropriation or use of trade secrets, patents, proprietary information, know-how, copyright rights or inventions in performance of the Work, or arising out of any use in connection with the Project of methods, processes, designs, information or other items furnished or communicated to the Department or another Indemnified Party pursuant to the Contract; provided that this indemnity shall not apply to any infringement resulting from the Department's failure to comply with specific written instructions regarding use provided to the Department by the Design-Builder.

D. The alleged negligent act or omission or willful misconduct of any Design-Builder-Related Entity.

E. Any and all claims by any governmental or taxing authority claiming taxes based on gross receipts, purchases or sales, or the use of any property or income of the Design-Builder or any of its Subcontractors or any of their respective agents, officers or employees with respect to any payment for the Work made to or earned by any Design-Builder-Related Entity.

F. Any and all stop notices and/or Liens filed in connection with the Work, including all expenses and attorneys', accountants' and expert witness fees and costs incurred in discharging any stop notice or Lien, provided that the Department is not in default in payments owing to the Design-Builder with respect to such Work.

G. Any spill or release or threatened spill or release of Hazardous Substances: (i) attributable to the negligence, willful misconduct or breach of contract by any Design-Builder-Related Entity; or (ii) that was brought onto the Project site by any Design-Builder-Related Entity.

H. The claim or assertion by any contractor of inconvenience, disruption, delay or loss caused by interference by any Design-Builder-Related Entity with or hindering the progress or completion of work being performed by other contractors as described in Section 24.1 (Cooperation with Other Contractors) or failure of any Design-Builder-

Related Entity to cooperate reasonably with other contractors in accordance therewith.

21.1.2. Design Defects

Subject to Section 21.1.3 (Losses Due to Negligence of Indemnified Parties), the Design-Builder shall release, defend, indemnify and hold harmless the Indemnified Parties from and against any and all claims, causes of action, suits, judgments, investigations, legal or administrative proceedings, penalties, fines, damages, losses, liabilities, costs and expenses, including any injury to or death of persons or damage to or loss of property (including damage to utility facilities), and including attorneys', accountants' and expert witness fees and costs, arising out of, relating to or resulting from errors, omissions, inconsistencies, inaccuracies, deficiencies or other defects in the Design Documents, regardless of whether such errors, omissions, inconsistencies, inaccuracies, deficiencies or other defects were also included in the Project Configuration or Reference Documents. The Design-Builder agrees that, because the Project Configuration and Reference Documents are subject to review and modification by the Design-Builder, it is appropriate for the Design-Builder to assume liability for errors, omissions, inconsistencies, inaccuracies, deficiencies or other defects in the completed Project even though they may be related to errors, omissions, inconsistencies, inaccuracies, deficiencies or other defects in the Project Configuration or Reference Documents.

21.1.3. Losses Due to Negligence of Indemnified Parties

The Design-Builder's indemnity obligations under Sections 21.1.1 (General Indemnities) and 21.1.2 (Design Defects) shall not extend to any loss, damage or cost to the extent that such loss, damage or cost was caused by the sole-negligence or willful misconduct of such Indemnified Party or its employees, agents, or servants who are directly responsible to such Indemnified Party.

21.1.4. Claims by Employees

In claims by an employee of the Design-Builder, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this Section 21.1 (Indemnifications by Design-Builder) shall not be limited by any limitation on the amount or type of damages, compensation or benefits payable by or for the Design-Builder or a Subcontractor under workers' compensation, disability benefit or other employee benefits laws.

21.1.5. Reliance on Design-Builder's Performance

The Design-Builder hereby acknowledges and agrees that it is the Design-Builder's obligation to cause the Project to be designed and to construct the Project in accordance with the Contract Documents and that the Indemnified Parties are fully entitled to rely on the Design-Builder's performance of such obligation. The Design-Builder further agrees that any review, acceptance and/or approval by the Department and/or others hereunder shall not relieve the Design-Builder of any of its obligations under the Contract Documents or in any way diminish its liability for performance of such obligations or its obligations to provide indemnities hereunder.

21.1.6. Indemnities in Connection with Utilities and other Third Parties

The Design-Builder is advised that each MUA contains provisions for the Design-Builder to indemnify, save and hold harmless the Utility Owner, its employees and agents with respect to certain matters. The Design-Builder hereby agrees to and shall perform and comply with such provisions of the MUAs for the benefit of the Utility Owners, their employees and agents.

The Design-Builder is also advised that the Utility Agreements and other Third Party Agreements may include certain agreements by the Department to indemnify, defend and hold harmless the Utility Owners and other Third Parties with respect to certain matters. The Design-Builder's obligation under this Section 21.1 (Indemnification by Design-Builder) shall automatically apply to require it to release,

indemnify, defend and hold harmless the Utility Owners and other Third Parties, in addition to the Indemnified Parties, with respect to all such matters.

21.2. Responsibility of the Department for Certain Hazardous Substances

21.2.1. Pre-Existing Site Contamination

The Department may assert that certain Third-Persons or Parties may rightfully bear the ultimate legal responsibility for any and all Hazardous Substances, which may currently be present on the Project site. It is further recognized that certain State and federal statutes provide that individuals and firms may be held liable for damages and claims related to Hazardous Substances under such doctrines as joint and several liability and/or strict liability. It is not the intention of the parties that the Design-Builder be exposed to any such liability arising solely out of: (i) pre-existing site contamination, whether known or unknown, except as otherwise provided in Section 5.1.2 (Limitations on Change Order Remediation Work) or 21.1.1(G); (ii) the performance not attributable to the negligence, willful misconduct or breach of contract by any Design-Builder-Related Entity in the handling of such Hazardous Substances; and/or (iii) the activities of any Persons not described in clause (ii) above, including the Department.

Accordingly, for the purposes of the Contract only, the Department shall reimburse the Design-Builder for Remediation Work (through payment of the Contract Amount, as it may be increased by Change Order pursuant to Sections 15 (Change Order Risk Allocation) and 16 (Changes in the Work)), and will be responsible for any and all claims, damages, losses, liabilities, costs and expenses, including the Design-Builder's attorneys' fees, arising out of, or in connection with, bodily injury (including death) to persons, damage to property or environmental removal or response costs arising out of the presence, release or threatened release of Hazardous Substances on or from the Project site, if such substances were generated or introduced on the site before the execution of the Contract and irrespective of whether the Department was aware of, or directly involved in, the generation or introduction of such materials, but specifically excluding from any obligation of responsibility for those conditions for which the Design-Builder has agreed to be responsible as described in Section 21.1.1(G) and any negligence by the Design-Builder in handling the Hazardous Substances.

21.2.2. Generator Number for Hazardous Waste Remediation

Except for Hazardous Substances for which the Design-Builder is responsible as described in Section 21.1.1(G), without contradiction of any assertion by the Department of Third-Party liability, and for purposes of the Contract only:

A. The Design-Builder shall not be required to execute any hazardous waste manifests if the Design-Builder or Design-Builder-Related Entity did not release the Hazardous Substances.

B. Hazardous Substances encountered in the performance of the Work shall be disposed of, if at all, to a destination facility Approved by the Department utilizing an EPA Identification Number or other appropriate legal device obtained by and carried in the name of the Department or another Person designated by the Department, but only under the express written direction and permission of the Department.

21.3. No Effect on Other Rights

The foregoing obligations shall not be construed to negate, abridge or reduce other rights or obligations, which would otherwise exist in favor of a party hereunder.

21.4. Comprehensive Environmental Response, Compensation, and Liability Act Agreement

Without limiting their generality, the indemnities set forth in Section 21.1.1(G) are intended to operate as agreements pursuant to Section 107(e) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. Section 9607(e), to insure, defend, hold harmless and indemnify the parties indemnified in said Section 21.1.1(G).

22— PARTNERING AND DISPUTE RESOLUTION

22.1. Partnering Program

A. The Design-Builder shall implement a facilitated partnering program, and execute it in conjunction with the Subcontractors, design consultants, design subconsultants, and the Department. This approach uses the strengths of each organization to identify and achieve mutual goals. Partnering does not change the legal relationship of the parties or modify the Contract, and does not relieve either party from any of the terms of the Contract. Partnering does not create a legal partnership between the parties. Rather, it is intended to denote a cooperative collaboration between the parties to efficiently accomplish the Work and complete the Contract.

B. The Design-Builder shall implement partnering in accordance with the UDOT and Utah AGC Partnering Field Guide. Refer to http://www.udot.utah.gov/go/standardsreferences:

1. Design-Builder shall contact the Department within 30 days of Notice of Award and before the pre-Work conference to implement a Third-Party facilitated partnering initiative;
2. The Design-Builder and the Department shall select a facilitator for the meeting and mutually develop the attendees list, agenda, duration, and location of a partnering workshop;
3. The Design-Builder shall ensure that partnering will be held for both design and construction throughout the Project, and shall review survey responses and results monthly with the Department; and
4. The Design-Builder shall perform a design lessons-learned session within two weeks of the final drawings being released-for-construction.

C. Any cost associated with effectuating partnering will be agreed to by both the Design-Builder and the Department. The Design-Builder and the Department shall share any costs equally to accomplish partnering, except that each shall pay full costs associated with its staff attending partnering sessions.

D. Follow-up workshops may be held as agreed by the Design-Builder and the Department.

E. Design-Builder shall hold a bi-weekly Executive Partnering meeting with the Department's Project Director and Deputy Project Director. This bi-weekly meeting will begin at NTP and end at Contract Completion.

F. The Design-Builder and Department shall hold a partnering meeting as soon as possible and in no case later than 15 Calendar Days after NTP. Both parties will complete the escalation ladder by assigning the individuals to each level. The Design-Builder shall submit this information to the Department prior to the partnering meeting.

G. The parties shall in good faith attempt to resolve all issues and Disputes at the lowest possible administrative level.

H. Escalation Ladder – See Table 22-1 below. Establish resolution timeframes during Partnering Meeting in coordination with the Department.

Table 22-1 The Escalation Ladder

Level One (Construction)
Resolution Timeframe: TBD

UDOT	Design/Builder
Senior Inspector or Field Oversight	Construction Manager or Superintendent

Level One (Design)

UDOT	Design/Builder
Design Oversight Engr	Design Manager

Level Two – B (Design/Build)
Resolution Timeframe: TBD

UDOT	Design/Builder
Resident Engineer	Project Manager (PM)
Project Director	

Level Two – A (Design)

UDOT	Design/Builder
R2 Preconstruction	Design Quality Manager
Resident Engineer	Project Manager (PM)

Level Three
Resolution Timeframe: TBD

UDOT	Design/Builder
District Engineer	Area/Operations Manager

Level Four
Resolution Timeframe: TBD

UDOT	Design/Builder
Region Director	Owner/ President

Level Five:
Resolution Timeframe: TBD by Claims Review Board

22.2. Written Notice and Appeals

The dispute resolution provisions contained in Section 22 (Partnering and Dispute Resolution) shall apply only in the event that the Department-Design-Builder issue resolution efforts through partnering are not successful. The provisions of this Section 22 (Partnering and Dispute Resolution) shall apply to all Disputes arising out of the Work that are not resolved by the parties through the partnering process, except as expressly provided to the contrary in the Contract Documents.

The parties shall diligently cooperate with each other during the dispute resolution process and the Claims Review Board.

A. Written Notice and Appeals – The Design-Builder shall file a proper initial written notice of dispute with the Department within seven Calendar Days after becoming aware of any Dispute, using the Dispute Resolution Form provided as Appendix C. The Design-Builder shall provide the following information and documentation as part of the notice:

1. Executive Summary. The executive summary will include a detailed, factual statement of the dispute with necessary dates and locations of Work involved in the Dispute, the dates when the Dispute was discovered, and when the initial written notice of dispute was given to the Engineer;

   a. Describe the acts or omissions of the Department or its representative(s) that allegedly caused or may cause damage to the Design-Builder, citing specific facts, persons, dates and Work involved.

2. The specific Contract provision(s) that support the Dispute;

3. The estimated dollar cost, if any, of the protested Work, and furnish a list of estimated Materials, Equipment and labor for which the Design-Builder might request additional compensation;

4. Theory of entitlement supporting the appeal. Include a narrative of how or why the specific Contract Documents support the appeal and a statement of the reasons why such Contract Documents support the appeal;

5. Itemized list of dispute amounts. Provide claim amounts with a narrative of the theories and documents used to arrive at the amounts provided;

6. Time extension requests. If the Dispute relates to a combination of additional compensation and time extensions, submit a copy of the schedule that was in effect when the Dispute arose and a detailed narrative which explains how the disputed issue impacted a Completion Deadlines, specific to impacts on the Critical Path; and

7. Supporting documents. Include copies of, or excerpts from any documents that support the appeal, such as manuals standard to the industry and used by the Design-Builder or any other information the Design-Builder chooses to provide.

B. Appeals are to be provided within the timeframes specified and according to the procedures described in Section 22.4(Appeals).

22.3. Dispute Resolution Procedure

A. If a Dispute arises the Design-Builder shall do all of the following in order to pursue a Dispute and preserve its claim:

1. Keep all records of entire costs and time incurred throughout the disputed Work, and allow the Department access to those and other supporting records upon request. Provide daily records of disputed work, on a weekly basis, on a schedule to be determined in agreement with the Department.
2. In spite of any Dispute, proceed promptly and diligently with the Work, unless otherwise directed by the Department.
3. Follow the Escalation Ladder in Table 22-1

B. The process starts at the lowest level possible for each party and proceeds up through each party's hierarchy until the issue is resolved.

1. All Disputes are elevated to the next higher level only after a decision has been rendered by the UDOT Dispute Administrator at the current level in the ladder, and only if the Design-Builder has appealed the decision in writing.
2. Once the issue is elevated, the next level meets after receiving any appeal from the previous level, to negotiate and discuss a resolution. All individuals involved in the Dispute, from the previous level, shall sit down with the individuals at the next level of the Escalation Ladder and discuss the Dispute.
   a. Keep the previous escalation levels informed of the progress of the resolution and the reasoning behind any decisions made.
   b. Communicate any resolutions down to the originating level.
3. Meetings must be held each time a Dispute is elevated to the next level and continue through the process until the issue is resolved.
4. Decisions to be made by the UDOT Dispute Administrator at the current level in the ladder within the timeframes shown in Table 22-1, or as extended by the Department.
5. If a resolution of the Dispute has not been successfully achieved by the time the Dispute reaches level V on the Escalation Ladder, the Claims Review Board will be utilized and followed according to Section 22.5 (Claims Review Board).

22.4. Appeals

A. Written appeals apply to all Disputes. If a written appeal is submitted to the Department, both parties shall pursue the matter further in an attempt to settle the Dispute according to the Escalation Ladder shown in Table 22-1. Appeals must be received within 5 Calendar Days from the date the most recent decision was issued by the Department, or as extended by the Department. From the date that an appeal is filed to the Department, if the Department fails to issue a new decision within the timeframe shown for the next level in Table 22-1 the existing Department decision shall stand. If no notice of appeal or complaint is filed within 5 Calendar Days following the date upon which the Department made its most recent decision, the decision shall be final and conclusive.

B. All appeals must be in writing and contain complete and necessary updates to all information as outlined in Section 22.2 (Written Notice and Appeals) in order to be considered.

C. The Department reserves the right at any time to request additional information related to the Dispute, appeal, or to the Contract. Responses from the Design-Builder to requests for more information must be received within seven Calendar Days of the initial request, unless otherwise determined by the Department.

D. Non-written and/or non-supported appeals will be rejected.

22.5. Claims Review Board

A. A Claims Review Board is established to hear unresolved claims and make recommendations for settlement to the Deputy Director of the Department of Transportation pursuant to Utah State Code §63G-10-402. The Claims Review Board will be used for Disputes elevated to level V on the Escalation Ladder as shown in Table 22-1.

1. The Claims Review Board will be composed of the following:

a. The Project Development Director (or designee) as chairman.

b. The Director for Construction and Materials (or designee).

c. Member selected by the Utah Chapter of Associated General Contractors (AGC).

C. The Director for Construction and Materials (or designee) will schedule a claim hearing before the Claims Review Board when a Dispute is elevated to Level V of the Escalation Ladder.

D. The Board may retain or contact technical experts and evaluators as needed to provide additional information/clarification.

E. The claim may be presented informally, with or without legal counsel.

F. The Board will make its recommendations and provide its reasoning to the Deputy Director within 30 Calendar Days after the completion of the claim hearing.

G. The Deputy Director, as the official designee of the Executive Director of the Department, shall consider the recommendations of the Claims Review Board. Any decision shall provide the facts and conclusions for the written decision.

H. The Deputy Director shall issue a written decision within a reasonable time.

I. The Deputy Director's written decision and the recommendation of the Claims Review Board shall not be admissible in any judicial proceeding and is subject to Rule 408 of the Utah Rules of Evidence.

23— RECORDS

23.1. Escrowed Proposal Documents

EPD must be securely stored at the offices of the escrow holder (as defined and in accordance with Form EPD Escrow Agreement). One copy of all documentary information used in preparation of any quotation related to a Contract amendment or Change Order shall be added to the EPD. The EPD will be held and maintained subject to Section 23.1.1 (Review of Escrowed Proposal Documents) until the following have occurred: (i) all Disputes regarding the Contract have been settled; and (ii) final payment on the Contract has been made by the Department and accepted by the Design-Builder.

23.1.1. Review of Escrowed Proposal Documents

The EPD shall be available during regular business hours for joint review by the Design-Builder and the Department in connection with the resolution of Disputes, an audit under Section 23.3.5 (Claims Audit) (if the EPD are the subject of an audit) or as described in Section 23.1.6 (Review by the Department). The Department shall be entitled to review all or any part of the EPD in order to satisfy itself regarding the applicability of the individual documents to the matter at issue. If accompanied by the Design-

Builder, the Department may direct, and the Design-Builder agrees to comply, the Design-Builder to step outside of the immediate room where the review is taking place, provided, however, the Design-Builder is allowed a direct line of site to the Department.

23.1.2. Confidentiality

All records related to EPD, provided to the Department, will be maintained in accordance with the Government Records Access and Management Act (GRAMA), Utah Code Ann., §63G-2-305. Confidentiality will be protected pursuant to §63G-2-309.

To protect information under a Claim of Business Confidentiality, the Proposer must, at the time the information is provided to the Department, include a Claim of Business Confidentiality on Form BC. It is the responsibility of the Design-Builder to complete Form BC in accordance with Subsection §63G-2-309.

23.1.3. Representation and Warranty

The Design-Builder represents and warrants that the EPD provided in accordance with Section 23.1 (Escrowed Proposal Documents) constitute all of the information used in the preparation of its Proposal and agrees that no other Proposal preparation cost information will be considered in resolving Disputes or Claims. The Design-Builder also agrees that the EPD are not part of the Contract and that nothing in the EPD shall change or modify the Contract.

23.1.4. Contents of Escrowed Proposal Documents

The EPD shall, at a minimum, clearly detail how the components of the Contract Amount were determined and shall be adequate to enable a complete understanding and interpretation of how the Design-Builder arrived at the Contract Amount. The EPD provided in connection with quotations and Change Orders shall, inter alia, clearly detail how the total price and individual components of that price were determined and shall be adequate to enable a complete understanding and interpretation of how the Design-Builder determined its scope of Work included in its Proposal, or arrived at its quotation and/or Change Order price. All Work shall be separated into sub-items and separate notebooks as required to present a complete and detailed estimate of all costs. Mobilization costs, crews, plant, equipment, quantities, rates of production, and indirect costs shall be detailed. Estimates of costs shall be further divided into the following cost categories: direct labor, repair labor, equipment ownership and operation, expendable materials, permanent materials, and subcontract costs, as appropriate. The Design-Builder's allocation of plant and equipment, indirect costs, contingencies, overhead and profit, and other items to each direct cost item shall be clearly identified. The EPD shall itemize the estimated costs of the Payment and Performance Bonds; and the insurance premiums for each coverage required to be provided by the Design-Builder under Section 25 (Insurance). The EPD shall include all assumptions, quantity takeoffs, rates of production, the Design-Builder's internal equipment rental rates and progress calculations, quotes from Subcontractors (including Suppliers), memoranda, narratives, notes, and all other information used by the Design-Builder to arrive at the Contract Amount. For each item of Work, the EPD shall itemize any related amounts not included in the stated price for such item such as any amount allocated for contingency.

23.1.5. Format of Escrowed Proposal Documents

The Design-Builder shall submit the EPD in the format used by the Design-Builder in preparing its Proposal. It is not intended that the Design-Builder perform any significant extra work in the preparation of these documents. However, the Design-Builder represents and warrants that the EPD related to the Proposal have been personally examined prior to delivery to the Department by an authorized officer of the Design-Builder and that they meet the requirements of Section 23.1.4 (Contents of Escrowed Proposal

Documents) and are adequate to enable a complete understanding and interpretation of how the Design-Builder arrived at the Contract Amount. The Design-Builder further represents, warrants, and covenants that the EPD related to a Change Order, if applicable, will be personally examined prior to delivery to escrow by an authorized officer of the Design-Builder and that they meet the requirements of Section 23.1.4 (Contents of Escrowed Proposal Documents) and may be adequate to enable a complete understanding and interpretation of how the Design-Builder arrived at its Change Order price.

23.1.6. Review by the Department

The Department may, at any time, conduct a review of the EPD to determine whether it is complete. The Design-Builder shall provide sufficient information to link the EPD information directly to the Schedule of Values. If the Department determines that the EPD are incomplete, the Department may request the Design-Builder supply data to make the EPD complete. The Design-Builder shall provide all such data within three Working Days of the request, and at that time it will be date stamped, labeled to identify it as supplementary EPD information, and added to the EPD. The Design-Builder shall have no right to add documents to the EPD except upon the Department's request. At the Department's option, which may be exercised at any time, any EPD associated with any Change Order or contract amendment shall be reviewed, organized, and indexed as described in Section 23 (Records).

23.2. Subcontractor Pricing Documents

The Design-Builder shall require each first tier Subcontractor, any Subcontractor responsible for performing more than $1,000,000 of the Work, and any Supplier providing more than $5,000,000 in materials, to submit to the Design-Builder a copy of all documentary information used in determining its Subcontract price, immediately prior to executing the Subcontract or any Change Orders or amendments thereto, to be held in the same manner as the EPD and which shall be accessible by the Design-Builder, the Department, the DRB, and other dispute resolvers, on terms substantially similar to those contained herein. Each such Subcontract shall include a representation and warranty from the Subcontractor stating that its documentation constitutes all the documentary information used in establishing its Subcontract price. Each Subcontract that is not subject to the foregoing requirement shall include a provision that requires the Subcontractor to preserve all documentary information used in establishing its Subcontract price and to provide such documentation to the Design-Builder and/or the Department in connection with any disputed change order made by such Subcontractor.

23.3. Project Records

23.3.1. Maintenance of Records

The Design-Builder shall maintain at the Project Manager's office in the State a complete set of As-Built Documents and a complete set of all books, records and documents prepared or employed by the Design-Builder with respect to the Project.

23.3.2. Audit and Inspection Rights

The Design-Builder and its Subcontractors at all tiers shall grant to the Department, FHWA, and the U.S. Comptroller General and their respective authorized representatives, audit and inspection rights and shall allow such Persons access and the right to copy any books and records of the Design-Builder (including all tax returns and supporting documentation filed with any Governmental Persons) as such Persons may reasonably request from time to time in connection with the issuance of Change Orders, the resolution of disputes and other matters as such Persons reasonably deem necessary for purposes of complying or verifying compliance with the Contract and Laws, including responding to requests pursuant to Utah Code 63G, Chapter 2 GRAMA. The Design-Builder shall grant to Utility Owners and their respective

authorized representatives such audit and inspection rights, access and the right to copy such books and records as such Persons may request in connection with the resolution of disputes or other matters, as such Persons reasonably deem necessary for purposes of complying or verifying compliance with the Utility-related Contractual or MUA requirements.

The Design-Builder shall insert in all Subcontracts a requirement that the Subcontractor shall permit audits in accordance with this Section 23.3.2, and shall require Subcontractors to insert the same provision in each Subcontract at all tiers.

23.3.3. Audit of Force Account Work

Where the payment method for any Work is on a Force Account basis, such examination and audit rights shall include all books, records, documents and other evidence and accounting principles and practices sufficient to reflect properly all direct and indirect costs of whatever nature claimed to have been incurred and anticipated to be incurred for the performance of such Work. If an audit indicates the Design-Builder has been over-credited under a previous progress report or progress payment, that over-credit will be credited against current progress reports or payments.

23.3.4. Change Order Pricing Data

For cost and pricing data submitted in connection with pricing Change Orders, unless such pricing is based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the public, or prices set by law or regulation, the Department and its representatives have the right to examine all books, records, documents, and other data of the Design-Builder related to the negotiation of or performance of Work under such Change Orders for the purpose of evaluating the accuracy, completeness and currency of the cost or pricing data submitted. The right of examination shall extend to all documents deemed necessary by such Persons to permit adequate evaluation of the cost or pricing data submitted, along with the computations and projections used therein.

23.3.5. Claims Audits

All Claims filed against the Department shall be subject to audit at any time following the filing of the Claim. The audit may be performed by employees of the Department or by an auditor under contract with the Department. No notice is required before commencing any audit before 60 days after Contract Completion. Thereafter, the Department shall provide 20 days notice to the Design-Builder, any Subcontractors or their respective agents before commencing an audit. The Design-Builder, Subcontractors or their agents shall provide adequate facilities, acceptable to the Department, for the audit during normal business hours. The Design-Builder, Subcontractors, and their agents shall cooperate with the auditors. Failure of the Design-Builder, Subcontractors, or their agents to maintain and retain sufficient records to allow the auditors to verify all or a portion of the Claim or to permit the auditors access to the books and records of the Design-Builder, Subcontractors, or their agents shall constitute a waiver of the Claim and shall bar any recovery there under. At a minimum, the auditors shall have available to them the following documents:

A. Daily time sheets and supervisor's daily reports
B. Insurance, welfare, and benefits records
C. Payroll registers
D. Earnings records
E. Payroll tax forms
F. Material invoices and requisitions
G. Material cost distribution worksheet
H. Equipment records (list of company equipment, rates, etc.)

I. Subcontractors' (including Suppliers) and agents' invoices
J. Subcontractors' and agents' payment certificates
K. Canceled checks (payroll and Suppliers)
L. Job cost report
M. Job payroll ledger
N. General ledger
O. Cash disbursements journal
P. E-mail, letters, and correspondence
Q. Network servers, data storage devices, backup media
R. All documents that relate to each and every Claim together with all documents that support the amount of damages as to each Claim
S. Work sheets used to prepare the Claim establishing the cost components for items of the Claim including labor, benefits and insurance, materials, equipment, Subcontractors, all documents that establish the time periods, individuals involved, the hours for the individuals and the rates for the individuals

Full compliance by the Design-Builder with the provisions of this Section 23.3.5 is a contractual condition precedent to the Design-Builder's right to seek relief under Section 22 (Partnering and Dispute Resolution). The Design-Builder represents and warrants the completeness and accuracy of all information it or its agents provides in connection with this Section 23.3.5.

23.4. Retention of Records

The Design-Builder shall maintain all records and documents relating to the Contract (including copies of all original documents delivered to the Department) at the Project Manager's office in the State, or as otherwise agreed by the Department in writing, until seven years after the earlier to occur of: (i) the date Contract Completion is achieved; or (ii) the termination date. If Approved by the Department, photographs, microphotographs, or other authentic reproductions may be maintained instead of original records and documents. The Design-Builder shall notify the Department where such records and documents are kept.

Notwithstanding the foregoing, all records which relate to Claims being processed or actions brought under the dispute resolution provisions hereof shall be retained and made available until such actions and Claims have been finally resolved. Records to be retained include all books and other evidence bearing on the Design-Builder's costs and expenses under the Contract Documents. The Design-Builder shall make these records and documents available for audit and inspection to the Department, at the Design-Builder's office, at all reasonable times, without charge, and shall allow such Persons to make copies of such documents (at no expense to the Design-Builder).

23.5. Utah Government Records Access and Management Act (GRAMA)

23.5.1. Applicability of Act

The Design-Builder acknowledges and agrees that all records, documents, drawings, plans, specifications, and other materials in the Department's possession, including materials submitted to the Department by the Design-Builder, are subject to the provisions of the Utah Government Records Access and Management Act (Utah Code Sections 63G-2-101 et seq.). Proposers are responsible for determining which information, if any, they wish to protect under a Claim of Business Confidentiality, and are responsible for taking appropriate action to do so. An entire proposal may not be protected under a Claim of Business Confidentiality.

To protect information under a Claim of Business Confidentiality, the Proposer must, at the time the information is provided to the Department, include a Claim of Business Confidentiality on Form BC. It is the responsibility of the Design-Builder to complete Form BC in accordance with Subsection §63G-2-309.

23.5.2. Design-Builder to Defend Against Disclosure Request

In the event of litigation concerning the disclosure of any material submitted by the Design-Builder to the Department, the Department's sole involvement will be as a stakeholder retaining the material until otherwise ordered by a court, and the Design-Builder shall be fully responsible for otherwise prosecuting or defending any action concerning the materials at its sole expense and risk.

23.5.3. Cooperation with the Department Regarding GRAMA Requests

In the event the Department receives a GRAMA request for covered documents that are in the custody and control of the Design-Builder, the Design-Builder shall cooperate with the Department in responding to the request in a timely manner under GRAMA.

24— COOPERATION AND COORDINATION WITH OTHERS

24.1. Cooperation with Other Contractors

The Department reserves the right to perform and to contract with others to perform other or additional work on or near the Project site. The Design-Builder shall cooperate with the Department and such other contractors to the extent reasonably necessary for the performance by the Department and such other contractors of their work, and shall cause its employees, agents, officers, and Subcontractors and other Persons for whom the Design-Builder may be contractually or legally responsible to so cooperate. If other separate contracts are awarded by the Department that affect the Work, the Design-Builder shall, to the extent reasonably possible, conduct its Work without interfering with or hindering the progress or completion of the work being performed by other contractors. The Department will reasonably cooperate with and support the Design-Builder in resolving any conflicts with other contractors.

24.2. Interference by Other Contractors

If the Design-Builder asserts that any of the Department's other contractors have hindered or interfered with the progress or completion of the Work, then the Design-Builder's sole remedy shall be to seek recourse against such other contractors. The Design-Builder shall have the right to ask the Department to resolve such dispute through the Dispute resolution process, provided the other contractor and its sureties have agreed to submit the dispute to the Department, and provided that such proceeding shall be conducted at no cost to the Department.

25— INSURANCE

25.1. Owner-Controlled Insurance Program (OCIP)

The Department, through an Owner Controlled Insurance Program (OCIP), will provide, at its expense, certain insurance coverages for the Design-Builder and certain Subcontractors. The Design-Builder and Subcontractors are responsible for providing certain insurance as well. Terms and conditions of such insurance coverages are set forth in Appendix B.

Regardless of the Design-Builder insurance requirements required in this section, insolvency, bankruptcy, or failure of any insurance company to pay all claims accrued does not relieve Design-Builder of any obligations.

Provide the following for all required liability insurance policies:

A. Where and when applicable, name as additional insured, only in respect to Work to be performed under this Contract, the State of Utah and the Department;

25.2. Insurance Claims

Unless otherwise directed by the Department in writing, the Design-Builder shall be responsible for reporting and processing all potential claims by the Department or the Design-Builder against the insurance required to be provided hereunder. The Design-Builder agrees to report timely to the insurer(s) any and all matters which may give rise to an insurance claim and to pursue promptly and diligently any and all insurance claims on behalf of the Department, whether for defense or indemnity or both. The Department's responsibility in the event of denial of any claim shall be limited to amounts (if any) payable under Sections 15 and 16.

25.3. Insurance Proceeds

The Design-Builder agrees, and shall obtain a similar agreement from all Subcontractors, that any insurance recoveries for property loss covered under the OCIP, less any deductible or assessments payable by the Design-Builder or Subcontractors, shall be for the account of the Department and payable to the Department, subject to the Design-Builder's rights under this Section 25.3. If insurance proceeds with respect to any loss or damage are paid to the Department, then the Department shall arrange for such proceeds to be paid to the Design-Builder as repair or replacement work is performed by the Design-Builder, to the extent that the Department has not previously paid for such repair or replacement work; provided however, that release of such proceeds to the Design-Builder shall not be a condition precedent to its performing such work.

25.4. Coverage of Third Party Work

All work which the Design-Builder is required to perform hereunder with regard to improvements to be owned by Utility Owners and local agencies (including Betterments) shall be covered by the OCIP. Any liability insurance required by a Third-Party for work performed hereunder by the Design-Builder may be provided by naming such Third Party as an additional insured on the OCIP, and by naming such Third Party as an additional insured on the insurance provided by the Design-Builder and any Subcontractor as required by Appendix B.

26— LIABILITY

26.1. Third-Party Beneficiary Clause

This Contract does not authorize anyone who is not a party to this Contract the right to maintain an action for damages under its provisions or to any of the rights of a third-party beneficiary. However, this Contract does not prohibit the parties from agreeing to provide third-party beneficiary rights to another party so long as those rights are set forth in a separate agreement and signed by all the parties to this Contract and the intended third-party beneficiary.

26.2. Department Employees' Personal Liability

A. The Department's authorized representatives act solely as agents and representatives of the Department when carrying out the provisions of or exercising the power or authority granted to them under the Contract.

B. They are not liable either personally or as employees of the Department for actions in their ordinary course of employment.

26.3. No Waiver of Legal Rights Upon Completion

A. Contract Completion will not preclude or prevent the Department from correcting any measurement, estimate, certificate, or price reduction made before or after completion of the Work, nor will the Department be precluded or prevented from recovering from the Design-Builder, its Surety, or both such overpayment as it may sustain. A waiver on the part of the Department of a breach of the Contract will not be held to be a waiver of any other or subsequent breach.

B. The Design-Builder, without prejudice to the terms of the Contract, shall be liable to the Department for latent defects, fraud, or such gross mistakes as may amount to fraud.

26.4. Responsibility for Damage Claims

A. Protect, defend, indemnify, and hold the State, the Department, and their officers, agents, and employees harmless from and against all claims, demands, damages, and causes of action of every kind or character on account of bodily injuries, death, or damage to property arising out of, resulting from, or in any way connected with the performance of the Contract to the extent allowed by law.

B. Defend the Department against all Third-Party or other lawsuits arising out of or resulting from the Contract Work. The Department may require that the Design-Builder represent its interests or may choose to have separate counsel. If the Department has its own counsel, the Department pays for its own attorneys' fees, costs, and expenses, provided, however, that upon determination by the court of the proportionate liability for the claim, the Design-Builder shall reimburse the Department for the attorneys' fees (including fees of in-house counsel), costs and expenses the Department incurred in an amount equal to the proportionate share of the Design-Builder's liability.

C. The Design-Builder and the Department agree to provide each other with a copy of the summons and complaint within a reasonable time if served with a lawsuit or Notice of Claim. Do not file a responsive pleading on behalf of the Department until receiving written notice that the Department chooses to have the Design-Builder handle the defense. The Department will provide the Design-Builder such written notice in a timely manner allowing the Design-Builder adequate time to respond to the summons.

D. All parties agree to cooperate to the fullest extent possible, subject to privileges and ethical rules if the parties have separate counsel.

E. Provide insurance as defined in Section 25 (Insurance) from reliable insurance companies authorized to do business in Utah, rated "A" or better and with a financial size category of Class VII or larger by A.M. Best Company, at the time of Contract execution.

F. Comply with the following insurance claims notification and processing procedures:

1. Notify the Department of all claims within seven Calendar Days of receiving notification;
2. Provide written notification for all pending claims to the Department before Contract Completion.
   a. Notify claimants of denied or partially denied claims of $5,000 or less of their right to request re-examination by the:

   UDOT Claims Re-Examination Board
   4501 South 2700 West
   West Valley City, UT 84114-8430
   Phone: (801) 965-4116

   b. The information provided to the claimant includes:
      1) A time deadline for requesting re-examination equal to seven Calendar Days after notification of denial or partial denial;
      2) Address and name of the person to whom it should be directed;
      3) General information helpful in making a determination; and
      4) The Board's prerogative to waive the time deadline.

G. Cooperate with the UDOT Claims Re-Examination Board in resolving disputes regarding denials or partial denials from an insurance carrier:

1. Design-Builder shall provide any information possessed by the carrier that the Board believes is pertinent to the determination;
2. The Board may refer to an insurance carrier's decision and the reason for it;
3. The determination is based on general applicable standards of insurance adjusting;
4. The Board does not grant in-person hearings, but relies on documentation prepared by the Design-Builder, the insurance carrier, the claimant, and the Department;
5. Neither the insurance carrier nor the Design-Builder has the right to intervene in a re-examination before the Board;
6. The Board decides the claim as expeditiously as possible; and
7. The decision by the Claims Re-Examinations Board is administratively final.

H. The Department deducts from any amounts due and payable to the Design-Builder, claims that the Design-Builder's liability insurance carrier denied but are directed to be paid by the Claims Re-Examination Board.

27— SURETY BONDS

The Design-Builder shall provide to the Department, and maintain at all times during the term of the Contract, Payment and Performance Bonds as described below, or other assurance satisfactory to the

Department in its sole discretion. Each bond required hereunder shall be provided by a Surety or Sureties licensed as surety and qualified to do business in the State. The Surety(ies) shall be listed in the current United States Department of the Treasury, Fiscal Service, Department Circular 570, *Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies.* The bonds shall be issued by a Surety(ies) with an A.M. Best and Company rating level of A- or better and Class A-X or better. The Payment and Performance Bonds may not be in excess of the cumulative underwriting limitation listed in the circular of the underwriting capacities of the Design-Builder's surety companies.

27.1. Performance Bond

The Design-Builder shall provide a Performance Bond, in the form included as Appendix G, in the amount of 100 percent of the Contract Amount.

27.2. Payment Bond

The Design-Builder shall provide a Payment Bond, in the form included as Appendix H, in the amount of 100 percent of the Contract Amount. The Design-Builder shall maintain the Payment Bond in full force and effect until the earlier of: (i) the Department's receipt of satisfactory evidence that all Persons performing Work on the Project who may claim a right of action under Utah Code Section 63G-6-505 have been fully paid or (ii) two year after the Department's issuance of Contract Completion.

27.3. Bond Terms and Conditions

A. The Department-furnished Payment and Performance Bond Forms are contained in Appendix G and H to this Part 2 (General Provisions).

B. Return executed forms to the Department as required by the Utah Procurement Code:

1. **Contract Payment Bond/Security** secures the payment of the claims of laborers, mechanics, or materialmen employed on the Work under the Contract.

2. **Contract Performance Bond/Security** guarantees the full performance of the Contract requirements and specifications.

3. **Warranty Bond/Security** guarantees due and punctual performance of all obligations of the Design-Builder under the Contract which survive Contract Completion. Provided that all conditions to Contract Completion of the Project have occurred, the Design-Builder shall have the right to replace the Contract Performance Bond/Security with a Warranty Bond in the amount and in a form satisfactory to the Department in its sole discretion or with such other security as is Approved by the Department at its sole discretion.

   At Contract Completion, if the Contract Performance Bond/Security is reduced or replaced with a Warranty Bond, the Warranty Bond shall be an amount approved by the Department, not to exceed 10 percent of the Contract Amount, covering the obligations of the Design-Builder during the warranty period. Said Warranty Bond shall continue in full force and effect for the duration of the Warranty periods.

C. The Department may make alterations, grant extensions of time, request extra and additional work, and make other changes that do not exceed 20 percent of the Contract Amount without securing the additional certified checks or consent of the Surety or sureties on the Contract Bonds, and such certified checks and bonds shall be deemed amended to cover all such Contract modifications upon their occurrence.

D. If a Design-Builder's Surety is unable to provide payment, the Department shall have the right to cancel all Work on the Contract, unless the Department determines it is in the public interest to continue the Work.

E. As an alternative to the Contract Bonds, furnish a certified check or cash bond of two cashier's checks, each in the amount of the Contract Amount subject to the following conditions:

1. The Department holds the certified check or cash bond and uses it when needed for correction of any nonperformance or nonpayment;
2. The Department returns to the Design-Builder one-half of the cash bond minus any cost against the bond upon release by the Department for satisfactory completion of the work;
3. The Department releases the certified check or remaining cash bond if no payment claims have arisen within 90 Calendar Days after release by the Department;
4. The Department holds the certified check or cash bond until the nonperformance and nonpayment issues are resolved; Design-Builder accrues no liability during this time; and
5. The Department decides the need in its sole discretion for withholding the certified check or cash bond.

F. If the Design-Builder's Surety fails to act promptly, then the Department will give 10 Calendar Days notice of such failure, both to the Design-Builder and Surety, and after the expiration of the 10 Calendar Days the Department may cause the Work to be completed, and the Surety and the Design-Builder shall be jointly and severally liable for the amount of excess cost of completing the Contract Work beyond the amounts remaining for this Contract adjusted for the Work actually performed. When the cost of the excess Work is estimated, the Design-Builder and Surety shall pay, free from all liens and encumbrances, the Department-determined estimated completion costs above the funds remaining for this Contract to the Utah Department of Transportation within 30 Calendar Days of receipt of the estimate. Adjustment of the Department's estimated completion cost will be made upon Contract Completion and appropriate refunds, if any, will be promptly made to the Surety. Any Actual Costs in excess of the estimated completion cost shall be paid to the Department promptly on demand. Additionally, Design-Builder and Surety shall be liable for any applicable Liquidated Damages.

27.4. Utility Work

The Utility Work furnished or performed by the Design-Builder hereunder shall be covered by the Payment and Performance Bonds and any replacement performance bond or other security to be provided by the Design-Builder pursuant to Section 27.3 (B.3) (warranty bond/security). If a Utility Owner whose Utilities are being Relocated by the Design-Builder and which Work is included in the Contract Amount requires the Design-Builder to provide payment and performance bonds, (i) the Utility Owner shall be added as an additional obligee to the Payment and Performance Bonds (up to a maximum cost of the Utility Owner's Relocation(s)), as well as to any replacement performance bond or other security, through the use of a standard Additional Obligee rider to be Approved by the Department, or (ii) the Design-Builder shall provide separate payment and performance bonds to the Utility Owner. The Design-Builder shall provide all information necessary for such coverage to the surety(ies) providing such bonds. All

cost estimates required to be provided under the Contract Documents with respect to Utility Work furnished or performed by the Design-Builder shall include the cost of bond premiums.

27.5. No Relief of Liability

Notwithstanding any other requirements of the Contract Documents, performance by a Surety of any of the obligations of the Design-Builder shall not relieve the Design-Builder of any of its obligations hereunder.

28— WARRANTIES

28.1. Warranties by Design-Builder

28.1.1. Project Warranties

The Design-Builder warrants that

(1) all design and technical services for the Work furnished pursuant to the Contract Documents shall conform to all professional standards identified in the Contract Documents and all professional principles generally accepted as standards of the industry (to the extent such principles are not more restrictive than the professional standards specifically identified in the Contract Documents) and shall be free of errors, omissions, ambiguities, inconsistencies, inaccuracies, deficiencies, inadequacies or other defects.
(2) the construction Work furnished pursuant to the Contract Documents shall be performed in a workmanlike manner and shall conform to the standards of care and diligence normally practiced by recognized construction firms performing construction of a similar nature in the State.
(3) goods, materials and equipment furnished under the Contract Documents shall be of the quality specified or, if not specified, of good quality and, except if otherwise expressly set forth in the Standard Specifications, when installed, shall be new.
(4) the Work shall meet all of the requirements of the Contract Documents.
(5) the specifications and/or drawings selected or prepared for use during construction are suitable for their intended use.
(6) the Project shall be free of defects (including design defects, errors and omissions).

Any Work that does not meet the standards referenced in (1) through (6) above is Nonconforming Work.

28.1.2. Project Warranty Term

The Warranty term for the Work shall extend for the durations specified in Part 9 (Warranty Provisions) The Warranty term begins from the Department's issuance of the Notice of Physical Completion. If, after the issuance of the Notice of Physical Completion, Nonconforming Work is repaired, replaced, or otherwise corrected, the applicable Warranty term shall be extended to one year after completion and acceptance of such repair, replacement, or correction; in no case shall the extended Warranty term be shorter than the original expiration date of the Warranty term for such Work.

28.1.3. Corrective Work

Within seven days of receipt by the Design-Builder of notice from the Department specifying a failure of any of the Work to satisfy the Design-Builder's Warranties, or of any Subcontractor representation, warranty, guarantee, or obligation which the Design-Builder is responsible to enforce, the Design-Builder and the Department shall mutually agree when and how the Design-Builder shall remedy such violation; provided, however, that in case of an emergency as indicated by the Department in its notice requiring immediate curative action, the Design-Builder and the Department shall agree on a remedy immediately upon notice by the Department of such emergency. If the Design-Builder does not use its best efforts to

proceed to effectuate such remedy within the agreed time, or if the Design-Builder and the Department fail to reach such an agreement within such seven Day period (or immediately, in the case of emergency conditions), then the Department, after notice to the Design-Builder, shall have the right to perform or have performed by third parties the necessary remedy, and the costs thereof shall be borne by the Design-Builder. The Design-Builder shall reimburse the Department for such costs within 30 days after the Design-Builder's receipt of invoice therefor. The Department may agree to accept Nonconforming Work in accordance with Section 3.7.2 (Nonconforming Work Pay Adjustment).

The Department and the Design-Builder shall conduct a walkthrough of the Project site annually and prior to expiration of the Warranty period and shall produce a Punch List of those items requiring Warranty Work.

28.1.4. Design-Builder's Costs of Correction of Work

All costs of correcting such rejected Work, including additional testing and inspections, shall be deemed included in the Contract Amount. The Design-Builder shall reimburse the Department and pay the Department's expenses made necessary thereby within 30 days after the Design-Builder's receipt of invoice therefor. The Design-Builder shall be responsible for obtaining any required Governmental Approvals or other consents from any other Person in connection with the Warranty Work.

28.2. Subcontractor Warranties

28.2.1. Assignment

Without in any way derogating the Design-Builder's own representations and warranties (including the Warranties) and other obligations with respect to all of the Work, the Design-Builder shall obtain from all Subcontractors and cause to be extended to the Department, appropriate representations, warranties, guarantees and obligations with respect to the design, materials, workmanship, equipment, tools and supplies furnished by such Subcontractors, including all such representations, warranties, guarantees, and obligations required to be furnished by Subcontractors pursuant to the Contract Documents. All representations, warranties, guarantees, and obligations of Subcontractors shall: (a) be written so as to survive all the Department and the Design-Builder inspections, tests, and approvals; and (b) run directly to and be enforceable by the Design-Builder and/or the Department and their respective successors and assigns. The Design-Builder hereby assigns to the Department all of the Design-Builder's rights and interest in all extended warranties for periods exceeding the applicable Warranty period which are received by the Design-Builder from any of its Subcontractors.

28.2.2. Enforcement

Upon receipt from the Department of notice of a failure of any of the Work to satisfy any Subcontractor warranty, representation, guarantee, or obligation, the Design-Builder shall enforce or perform any such representation, warranty, guarantee, or obligation, in addition to the Design-Builder's other obligations hereunder. The Department's rights under this Section 28.2.2 shall commence at the time such representation, warranty, guarantee, or obligation is furnished, and shall continue until the expiration of the Design-Builder's relevant Warranty. Until such expiration, the Design-Builder shall be responsible for the cost of any equipment, material, labor (including re-engineering) or shipping, and the Design-Builder shall be required to replace or repair defective equipment, material or workmanship furnished by any Subcontractor.

28.3. No Limitation of Liability

The foregoing Warranties are in addition to all rights and remedies available under the Contract Documents or applicable law, and shall not limit the Design-Builder's liability or responsibility imposed by the Contract Documents or applicable law with respect to the Work, including liability for design defects, latent construction defects, strict liability, negligence or fraud; provided, however, that, upon

expiration of the Warranties, the Design-Builder shall have no further liability to the Department hereunder for patent construction defects.

28.4. Warranty Beneficiaries

In addition to benefiting the Department and its successors and assigns, the Warranties and Subcontractor warranties provided under this Section 28 (Warranties) shall inure to the benefit of, and shall be directly enforceable by, any local agencies and Utility Owners with respect to those portions of the Work owned or controlled by each such Person.

28.5. Remedies for Breach of Warranty

In addition to the Department's other rights and remedies hereunder, at law or in equity, the Design-Builder shall be liable for actual damages resulting from its failure to provide corrective Work in accordance with Section 23.1.3 (Representation and Warranty) and any breach of an express warranty or any defect in the Work, including design defects, latent construction defects, strict liability, negligence or fraud.

28.6. Disputes

Any disagreement between the Department and the Design-Builder relating to this Section 28 (Warranties) shall be subject to the dispute resolution provisions contained in Section 22 (Partnering and Dispute Resolution), provided that the Design-Builder shall proceed as directed by the Department pending resolution of the dispute.

29— MISCELLANEOUS PROVISIONS

29.1. Waiver

29.1.1. No Waiver of Subsequent Rights

Either party's waiver of any breach or failure to enforce any of the terms, covenants, conditions, or other provisions of the Contract Documents at any time shall not in any way limit or waive that party's right thereafter to enforce or compel strict compliance with every term, covenant, condition or other provision, any course of dealing or custom of the trade notwithstanding. Furthermore, if the parties make and implement any interpretation of the Contract Documents without documenting such interpretation by an instrument in writing signed by both parties, such interpretation and implementation thereof will not be binding in the event of any future Disputes. The consent by one party to any act by the other party requiring such consent shall not be deemed to render unnecessary the obtaining of consent to any subsequent act for which consent is required, regardless of whether similar to the act for which consent is given.

29.1.2. Custom Does not Constitute Waiver

No act, delay, or omission done, suffered or permitted by one party or its agents shall be deemed to waive, exhaust, or impair any right, remedy, or power of such party under any Contract Document, or to relieve the other party from the full performance of its obligations under the Contract Documents. No custom or practice between the parties in the administration of the terms of the Contract Documents shall be construed to waive or lessen the right of a party to insist upon performance by the other party in strict compliance with the terms of the Contract Documents.

29.1.3. Waivers Must be in Writing

No waiver of any term, covenant or condition of the Contract Documents shall be valid unless in writing and signed by the party providing the waiver.

29.2. Independent Contractor

The relationship of the Design-Builder to the Department is that of an independent contractor, and said Design-Builder, in accordance with its status as an independent contractor, covenants and agrees that it will conduct itself consistently with such status, that it will neither hold itself out as nor claim to be an officer or employee of the Department or the State by reason hereof, and that it will not, by reason hereof, make any claim, demand, or application to or for any right or privilege applicable to an officer or employee of the Department or State, including workers' compensation coverage, unemployment insurance benefits, social security coverage, or retirement membership, or credit.

29.3. Successors and Assigns

The Contract Documents shall be binding upon and inure to the benefit of the Department and the Design-Builder and their permitted successors, assigns and legal representatives.

29.3.1. Assignment by the Department

The Department may assign all or part of its right, title and interest in and to the Contract, including rights with respect to the Payment and Performance Bonds or any other performance security allowed under Section 6 (Utility Work and Third-Party Agreements), to any Person with the prior written approval of the Design-Builder.

29.3.2. Subcontracts and Assignment by Design-Builder

The Design-Builder may subcontract Work in compliance with the requirements of the Contract Documents with the Department's prior written Approval. The Design-Builder shall not otherwise sublet, transfer, assign or dispose of any portion of the Contract, including the right to receive payment, or delegate any of its duties hereunder, except with the Department's prior written Approval. The Design-Builder's assignment of any of its Work under the Contract Documents shall be ineffective to relieve the Design-Builder of its responsibility for the Work assigned, unless the Department, in its sole discretion, has Approved the assignment as well as relief from responsibility due to the assignment.

29.4. Gratuities and Conflicts of Interest

Neither the Design-Builder nor any of its employees, agents and representatives shall offer or give to an officer, official, or employee of the Department or the State gifts, entertainment, payments, loans, or gratuities. The Design-Builder represents and warrants that it has not previously offered or given any gifts, entertainment, payments, loans, or gratuities in violation of such prohibitions.

29.5. Survival

The dispute resolution provisions contained in Section 22 (Partnering and Dispute Resolution), the warranties in Section 28 (Warranties), all of the indemnification provisions, and all other provisions, which by their inherent character should survive Contract Completion or termination of the Contract, shall survive Contract Completion or the termination of the Contract.

29.6. Limitation on Third-Party Beneficiaries

The only Third-Party beneficiaries intended by the Contract Documents are those expressly identified as having Third-Party beneficiary status in other provisions of the Contract. Otherwise, the duties,

obligations, and responsibilities of the parties to the Contract Documents with respect to such Third-Parties shall remain as imposed by law. The Contract Documents shall not be construed to create a contractual relationship of any kind between the Department and a Subcontractor. Except for the Third-Party Agreements included in Part 6 (Third-Party Agreements), the Contract Documents shall not be construed to create a contractual relationship of any kind between the Department and any other Person except the Design-Builder.

29.7. No Personal Liability

The Department's authorized representatives are acting solely as agents and representatives of the Department when carrying out the provisions of or exercising the power or authority granted to them under the Contract Documents. They shall not be liable either personally or as employees of the Department for actions in their ordinary course of employment. The authorized representatives of the Third Parties assume no personal or other liability in exercising their authority granted to them under the Contract Documents. They act only as the Third Party's employees or agents.

29.8. Further Assurances

The Design-Builder shall promptly execute and deliver to the Department all such instruments and other documents and assurances as are reasonably requested by the Department to further evidence the obligations of the Design-Builder hereunder, including assurances regarding assignments of Subcontractors contained herein.

29.9. Sufficient Funding

This Contract and the obligations hereunder are only valid, effective and binding on the Department and the State to the extent sufficient authorizations and appropriations of funds are made by the Utah State Legislature and the Congress of the United States, as applicable, for performance of the Contract.

This Contract may be funded by monies from other governmental or nongovernmental entities that may include municipalities, counties, towns, villages, or authorities.

29.10.Set-Off Rights

The Department will have all of its common law, equitable, and statutory rights of set-off. These rights will include the Department's option to withhold, for the purposes of set-off, any moneys due to the Design-Builder under this Contract up to any amounts due and owing to the Department with regard to this Contract, any other contract with any State department or agency, including any contract for a term commencing prior to the term of this Contract, plus any amounts due and owing to the Department or the State for any other reason including, without limitation, tax delinquencies, fee delinquencies, or monetary penalties relative thereto.

29.11. Severability

If any clause, provision, Section or part of the Contract is ruled invalid by a court of competent jurisdiction, then the parties shall (i) promptly meet and negotiate a substitute for such clause, provision, Section or part, which shall, to the greatest extent legally permissible, effect the original intent of the parties, including an equitable adjustment to the Contract Amount to account for any change in the Work resulting from such invalidated portion; and (ii) if necessary or desirable, apply to the court or other decision maker (as applicable) which declared such invalidity for an interpretation of the invalidated portion to guide the negotiations. The invalidity or unenforceability of any such clause, provision, Section or part shall not affect the validity or enforceability of the balance of the Contract, which shall be

construed and enforced as if the Contract did not contain such invalid or unenforceable clause, provision, Section or part.

29.12. Governing Law

The Contract Documents shall be governed by and construed in accordance with the laws of the State. Venue for any legal action in connection with the Contract shall lie in Salt Lake City, Utah in the Third Judicial District Court for the State of Utah.

29.13. Patented Devices, Materials, and Processes

A. Provide proof of legal agreement with the patentee or owner, if necessary, for use of a design, device, material, or process covered by letters, patents, trademarks or copyrights.

C. Indemnify and hold harmless the Department and any affected Third-Party or political subdivision from claims of infringement of patents, copyrights, or trademarks.

D. Indemnify the Department for costs, expenses, and damages which it may be obligated to pay as a result of an infringement during the conduct of the Work or after the Project is completed.

29.14. Ownership of Documents

Subject to limitations for use of proprietary software, all data, sketches, charts, calculations, plans, specifications, electronic files, correspondence and other documents created or collected under the terms of the Contract Documents shall be considered "works made for hire" for which the Department owns the copyright. Design Documents shall become the Department's property upon preparation; construction documents shall become Department's property upon delivery to the Department; and other documents prepared or obtained by the Design-Builder in connection with the performance of its obligations under the Contract Documents, including studies, manuals, technical and other reports and the like, shall become the property of the Department upon the Design-Builder's preparation or receipt thereof. Copies of all Design Documents and construction documents shall be furnished to the Department upon preparation or receipt thereof by the Design-Builder. The Design-Builder shall maintain all other documents described in this Section 29.14 in accordance with the requirements of Section 23 (Records) and shall deliver copies to the Department as required by the Contract Documents or upon request if not otherwise required to be delivered, with all such documents delivered to the Department as a condition to Contract Completion.

REQUEST FOR PROPOSALS

UTAH DEPARTMENT OF TRANSPORTATION

4 Interchanges on Bangerter HWY (SR-154)

Project No. S-0154(12)11

Salt Lake County

PART 2, APPENDIX A – STATE AND FEDERAL REQUIREMENTS

Final Issued September 15, 2016

Not Used

REQUEST FOR PROPOSALS

UTAH DEPARTMENT OF TRANSPORTATION

4 Interchanges on Bangerter HWY (SR-154)

Project No. S-0154(12)11

Salt Lake County

PART 2, APPENDIX B – OCIP INSURANCE

Final Issued September 15, 2016

OWNER CONTROLLED INSURANCE PROGRAM (OCIP)

1. GENERAL

The Department will implement an Owner-Controlled Insurance Program (OCIP) on this Project. The Design-Builder shall enroll in and comply with all OCIP requirements. The OCIP requirements are not intended to create any contract between Subcontractors and the Department. The Design-Builder shall ensure that all eligible Subcontractors enroll in and comply with all OCIP requirements, and shall be responsible for enforcing any OCIP provisions that relate to Subcontractors based on the contract let by the Design-Builder.

The OCIP shall minimally provide the following types of insurance coverage for the Design-Builder and all eligible Subcontractors of every tier enrolled in the OCIP and performing Work at the Project site. As used in this Appendix B, the term "eligible Subcontractor" shall mean Subcontractors of every tier enrolled in the OCIP that have employees working on the Work Site. The term "eligible Subcontractor" specifically excludes suppliers, materialmen, vendors, haulers, truckers and "owner/operators" whose employee(s) perform no work on the Work Site or are engaged solely in loading, unloading, stocking, testing, or hauling equipment, supplies or materials.

For purposes of this Appendix B, the term "Work Site" shall not include any locations outside of the Project Right-of-Way that have not been specifically identified by the Design-Builder and Approved in writing by the Department and the insurer(s) for addition to the OCIP.

The OCIP shall minimally provide the following types of insurance coverage: workers' compensation, employer's liability, general liability, contractor's pollution liability, railroad protective (as required), excess liability, and builder's risk. The Department agrees to pay all premiums associated with the OCIP, including deductibles or self-insured retentions, except as otherwise stated in the Contract Documents.

A. The Design-Builder and eligible Subcontractors will not be allowed to commence performance of Work without enrolling in the OCIP.

B. The current OCIP carriers are as follows:

   1. Workers' Compensation and Employer's Liability: To be determined;
   2. General Liability: To be determined;
   3. Contractor's Pollution Liability: To be determined;
   4. Excess Liability Coverage: To be determined;
   5. Railroad Protective Liability: To be determined; and
   6. Builder's Risk: To be determined.

C. Ineligible and eligible contractors, at their own expense, shall be required to maintain their own insurance of the types and with the limits as set forth in Section 13 (Design-Builder/Subcontractor-Provided Coverage), with such coverage acknowledging the Work Site, and shall promptly furnish to Department certificates of insurance giving evidence that all required insurance is in force.

D. The Design-Builder shall enroll in the OCIP by completing the attached <u>OCIP Enrollment Form</u> and submitting it to the Department Project Director along with the required certificate(s) per Section 14 (Certificates of Insurance) at the time it returns the executed Contract to the Department or prior to commencement of any Work, whichever occurs first. The Design-Builder shall require that each of its eligible Subcontractors of every tier enroll in the OCIP by submitting the <u>OCIP Enrollment Form</u> to the Department Project Director

prior to the Subcontractor entering the Work Site. By submitting the OCIP Enrollment Form and required certificate(s) to the Department Project Director, the Design-Builder and each Subcontractor warrants that all insurance information is correct. (See Section 14 (Certificates of Insurance)).

E. It is understood and agreed that the Department is providing designated insurance coverages as identified in this Appendix B, to the Design-Builder and Subcontractors, following enrollment. All costs associated with said coverage will be paid for by the Department except for the assessed amounts payable by the Design-Builder and/or Subcontractors. If the Design-Builder or any Subcontractor that begins Work without completing the enrollment process, its Work will be stopped and/or it will be removed from the Work Site until the enrollment requirement is satisfied. The Design-Builder will be held solely responsible for the timely enrollment of all eligible Subcontractors. Failure to do so will result in the Design-Builder being issued a notice of noncompliance, and Work may be stopped, at the expense of the Design-Builder, until compliance with this requirement is met.

F. The Design-Builder's represents and warrants that the Contract Amount excludes conventional insurance costs for the OCIP coverages identified in Paragraphs B through G and that Change Orders will NOT include such costs. Further, Design-Builder shall ensure that its conventional insurance carriers exclude the OCIP Project from its policies, in accordance with Section 13 (B).

G. An auditor or auditors from the insurance companies providing OCIP coverage will audit the payroll and contract revenue of the Design-Builder and each enrolled Subcontractor after the Department Project Director submits notice to the Department's appointed OCIP Administrator (Wells Fargo Insurance) of each such entity's completion of Work.

The purpose of this Appendix B is solely to provide a general understanding of the coverage provided by the OCIP. The Design-Builder acknowledges and agrees that it reviewed the terms of the OCIP policies prior to delivery of its Proposal. The Design-Builder agrees that the specific terms thereof are incorporated by reference herein and deemed part of the Contract Documents and that the specific terms thereof shall govern in the event of any conflict with the general description of the OCIP contained herein, except that the terms of this Appendix B shall control with respect to deductibles and assessments to be made by the Design-Builder and/or Subcontractors in connection with OCIP claims.

1.1. Subcontractors

The Design-Builder shall include all of the provisions of this Appendix B in every subcontract with an eligible Subcontractor, and shall ensure that Subcontractors include such provisions for lower tier subcontracts, so that such provisions will be binding upon each eligible Subcontractor.

1.2. Audit of Design-Builder's Payroll

For purposes of the OCIP, the Design-Builder agrees, and will require all tiers of enrolled Subcontractors to agree, to keep and maintain accurate records of its payroll for operations at the Work Site. The Design-Builder further agrees, and will require all enrolled Subcontractors to further agree, to furnish to the State, it's appointed OCIP Administrator (Wells Fargo Insurance), and the insurance carrier(s) full and accurate payroll data and information in accordance with the requirements of the OCIP; this is accomplished by entering the information in the OCIP web-portal. The Design-Builder and enrolled Subcontractors shall permit the Department, its OCIP Administrator, and its insurance carrier(s) to examine and/or audit their books and records. The Design-Builder and enrolled Subcontractors shall also provide any additional information to the Department or its OCIP Administrator as may be required.

1.3. Coverage provided in OCIP

A. The OCIP will provide coverage to the Design-Builder and eligible Subcontractors, following enrollment, that have employees on the Work Site. Such coverage applies only to Work performed under this Contract at the Work Site. The Design-Builder and Subcontractors must provide their own insurance for activities outside of the Work Site. However, areas that are 100% dedicated to the Project may be added to the OCIP in accordance with UDOT OCIP Manual.

B. The OCIP policies are available for review by the Design-Builder during business hours, upon advance written request to the Department. The terms of such policies or programs, as such policies or programs may be from time to time amended, will be incorporated by reference herein. The Design-Builder hereby agrees to be bound by the terms and conditions of coverage as contained in such insurance policies and/or self-insurance programs.

C. While the OCIP is intended to provide broad coverages and high limits, the OCIP is not intended to meet all the insurance needs of the Design-Builder or Subcontractors. The Design-Builder and each Subcontractor shall ensure that other proper coverages are maintained. See Section 13 (Design-Builder/Subcontractor-Provided Coverage).

1.4. Withholding from Contract amount

With respect to each claim under the OCIP policies caused by the Design-Builder or one or more enrolled Subcontractors, as determined by the insurance carrier, the Department shall have the right to withhold from the Design-Builder the applicable assessed amount set forth herein, but not to exceed the amount of the covered loss. The assessed amount shall be deducted from payments owing to the Design-Builder, and shall become the property of Department. The Design-Builder may pass the assessment through to the responsible Subcontractor.

2. WORKERS' COMPENSATION AND EMPLOYER'S LIABILITY INSURANCE

Workers' Compensation and Employer's Liability insurance provides coverage for injury to employees arising out of and in the course of their employment.

2.1. Scope of Coverage

A. Covers: Injury to employees of insured entities performing Work at the Work Site.

B. Insured: Design-Builder and eligible Subcontractors, following enrollment (the Design-Builder and each Subcontractor will be issued a policy).

C. Limits:

1. Workers' Compensation—Statutory;
2. Employer's Liability:
    a. $1,000,000, each Accident—Bodily Injury by Accident;
    b. $1,000,000, each Employee—Bodily Injury by Disease; and
    c. $1,000,000—Policy Limit - Bodily Injury by Disease;

D. Design-Builder Assessment: $200 per claim, or the actual cost of the claim, whichever is less.

2.2. Effect on Future Experience Modifications

All premiums and losses experienced by each enrolled Design-Builder and Subcontractor will be reported to the National Council on Compensation Insurance (NCCI) or other appropriate authority. The Department anticipates that loss experience for the Project will be used in the normal manner for calculating individual future experience modifiers by NCCI.

3. COMMERCIAL GENERAL LIABILITY

Commercial General Liability insurance provides coverage for Bodily Injury, Property Damage, Personal Injury, and Products and Completed Operations. (Completed Operations has a 5-year extension.)

3.1. Scope of Coverage

A. Operations: Work of any insured entities performed at the Work Site.

B. Insureds: The Department, State of Utah, the Design-Builder and eligible Subcontractors following enrollment.

C. Limits:

1. $2,000,000, Each Occurrence, Bodily Injury and Property Damage;
2. $10,000,000, Per Project General Aggregate; and
3. $6,000,000, Per Project Products and Completed Operations, aggregate.

D. Design-Builder Assessment: $5,000 per claim or the actual cost of the claim, whichever is less.

4. RAILROAD PROTECTIVE LIABILITY (AS REQUIRED)

Railroad Protective Liability insurance provides liability coverage for railroad companies.

4.1. Scope of Coverage

A. Operations: Work of the Design-Builder or Subcontractor performed on the Work Site.

B. Insured: All railroads affected.

C. Limits:

1. $5,000,000, each occurrence; and
2. $10,000,000, aggregate.

D. Assessment: None.

5. EXCESS GENERAL LIABILITY INSURANCE

This insurance covers liability in excess of Primary Commercial General Liability, Employer's Liability, and Railroad Protective Liability.

5.1. Scope of Coverage

A. Operations: Work of insured entities performed at the Work Site.

B. Insured: For the general liability and employer's liability policies, the Department, State of Utah, and Design-Builders and eligible Subcontractors following enrollment. For the railroad protective liability, all railroad affected.

C. Limits:

1. $25,000,000, each occurrence for all Insureds;
2. $25,000,000, aggregate for all Insureds; and

D. Design-Builder Assessment: $200 per claim or the actual cost of the claim, whichever is less .

6. PROFESSIONAL ERRORS AND OMISSIONS LIABILITY

This insurance is Liability coverage for Negligent Acts, Errors, or Omissions of the Insureds. The Design-Builder is expected to carry this insurance; it is not part of the OCIP.

6.1. Scope of Coverage

A. Not Applicable.

7. DESIGN-BUILDERS POLLUTION LIABILITY

This coverage is for liability arising from pollution releases during construction or remediation Work.

7.1. Scope of Coverage

A. Operations: Work of the Design-Builder and eligible Subcontractors performed at the Work Site, following enrollment.

B. Insureds: The Department, the State of Utah (as defined in the policy), the Design-Builder and eligible Subcontractors following enrollment.

C. Limits:

1. $10,000,000, each occurrence; and
2. $10,000,000, aggregate.

D. Design-Builder Assessment: $5,000 per claim or the actual cost of the claim, whichever is less.

8. BUILDERS' RISK

This insurance provides "All Risk" coverage to protect against physical loss or damage to real and personal property or any part thereof, including during transit.

8.1. Scope of Coverage

A. Operations: Property insurance for the Project, including

1. The interest of the insured in roads, bridges, and rest stops (including buildings) included in the Project, including ancillary property that will become a permanent part of the roads, bridges, and rest stops.
2. Certain property of others in the care, custody or control of an insured.
3. Temporary structures meaning scaffolding, construction forms, cribbing, falsework, construction trailers and similar items used in construction of the Project.

B. Insured: The Department, State of Utah, the Design-Builder and eligible Subcontractors, following enrollment.

C. Limits:

1. $20,000,000, each occurrence; and
2. $20,000,000, each flood or earthquake occurrence.

D. Design-Builder Assessment: $25,000 per occurrence.

9. CERTIFICATES AND POLICIES

All OCIP insurance coverage shall be either written by insurance companies approved by the Department or self-insured. The Department or its OCIP Administrator (Wells Fargo Insurance) shall provide the enrolled Design-Builder and Subcontractors with appropriate certificates of insurance or self-insurance evidencing the coverage outlined above.

10. TERMINATION AND MODIFICATION OF THE OCIP

The Department reserves the right to terminate or to modify the OCIP or any portion thereof. To exercise this right, Department shall provide 90 Calendar Days advance written notice to the Design-Builder. The Design-Builder and enrolled Subcontractors shall immediately be required to obtain appropriate replacement insurance coverage acceptable to the Department. The reasonable cost of such replacement insurance will be reimbursed by the Department. The Design-Builder shall provide written evidence of such insurance to the Department prior to the effective date of the termination or modification of the OCIP.

11. DESIGN-BUILDER RESPONSIBILITIES

A. The Design-Builder is required to cooperate with the Department and its OCIP Administrator (Wells Fargo Insurance) regarding the administration and operation of the OCIP. The Design-Builder's responsibilities shall include, but are not limited to:

1. Complying with the terms and conditions of Construction Safety Program(s); UDOT *OCIP Manual*, and UDOT *Construction Safety and Health Manual*, as outlined in the respective manuals setting forth the administrative procedures required of contractors;
2. Providing necessary contract, operations, and insurance information;
3. Immediately notifying the Department of all eligible Subcontractors of upon award, and notifying the Department upon satisfactory completion of Work by each eligible Subcontractor;
4. Maintaining and providing payroll records and other records as necessary for NCCI reporting;
5. Cooperating with any insurance company and OCIP Administrator with respect to requests for claims, payroll, and other information required under the OCIP;
6. Immediately notifying the Department that any Design-Builder-provided or Subcontractor-provided coverage has been canceled, materially changed, or not been renewed; and
7. Completing and submitting, and ensuring that Subcontractors complete and submit, the following administrative form within the time frames specified:
    a. Design-Builder: OCIP Enrollment Form upon execution of the Contract (include certificates of insurance as per Section 14 (Certificates of Insurance); and

b. Subcontractor: OCIP Enrollment Form and required certificate (these will be sent to Subcontractors).

c. Subcontractor: Form 4 (Contract Completion Form), upon completion of Work by the Subcontractor.

B. Failure of the Design-Builder or any eligible Subcontractor to follow the procedures outlined in the UDOT *OCIP Manual* and UDOT *Construction Safety and Health Manual* may result in forfeiture of coverage, fines, and/or penalties assessed against the Design-Builder. The Department shall deduct from monies due or to become due under the Contract any applicable fines or penalties that are assessed, and will exercise any other legal remedies available to the Department which remedies may be cumulative.

12. ASSIGNMENT OF RETURN PREMIUMS

The Department will be responsible for the payment of all premiums associated solely with the OCIP and will be the sole recipient of any dividend(s) and/or return premium(s) generated by the OCIP. In consideration of the Department providing said coverage:

A. The enrolled Design-Builder agrees to irrevocably assign to the Department, all return premiums, premium refunds, premium discounts, dividends, retentions, credits, and any other monies due the Department in connection with the insurance which the Department herein agrees to provide, and to evidence same by a formal instrument of assignment, if requested, to be promptly executed in the form prepared by the Department.

B. Design-Builder shall require each eligible Subcontractor to execute similar assignments for the benefit of Department.

13. DESIGN-BUILDER/SUBCONTRACTOR-PROVIDED COVERAGE (EVEN IF OCIP PROVIDES COVERAGE)

The Design-Builder agrees, and shall require Subcontractors to agree as applicable, to provide certain insurance coverages, even if the OCIP provides coverage.

A. For any Work under this Contract, and until Final Acceptance, the Design-Builder, at its own expense, must promptly furnish to the Department certificates of insurance giving evidence that the certain coverages identified below are in force. The Design-Builder is also responsible for ensuring Subcontractor compliance with this Section 13 and provision of appropriate certificates for Subcontractor policies.

B. The Design-Builder and all enrolled Subcontractors shall cause their Workers' Compensation and Employer's Liability policy to be endorsed with a Designated Workplace Exclusion Endorsement (see Exhibit A) and its Commercial General Liability Polices to be endorsed with an Exclusion-Designated Work Endorsement (see Exhibit B) to exclude operations on the Work Site from its coverage.

C. Prior to entry on Work Site, the Design-Builder agrees to obtain the insurance set out below, at no expense to the Department, from a company or companies acceptable to the Department, as follows:

1. Workers' Compensation Insurance: Workers' compensation insurance covering full liability under the workers' compensation laws of the State, at the statutory limits;

a. The Design-Builder shall require all parties, including subcontractors, to obtain Workers Compensation Insurance as described in this section prior to their entry on the Work Site.

2. Employer's Liability Insurance: Employer's liability insurance with the following minimum limits of liability:

   a. $100,000, each Accident;

   b. $500,000, Disease, policy limit; and

   c. $100,000, Disease, each Employee;

3. Commercial General Liability Insurance: Commercial general liability insurance, on an "occurrence basis", including insurance for operations, independent contractors, products and completed operations. Such insurance must be endorsed with a Broad Form Property Damage Endorsement (including Completed Operations) and afford coverage for explosion, collapse, and underground hazards. The insurance required by this subparagraph (C)(3) shall have limits not less than the following:

   a. **$3,000,000**, General Aggregate;

   b. $1,000,000, Products—Completed Operations Aggregate;

   c. $1,000,000, Personal and Advertising Injury;

   d. $1,000,000, each occurrence;

   e. $50,000 , Fire Damage (any one fire); and

   f. $5,000, Medical Expense (any one person).

   The certificate of insurance shall state that the policy required by this subparagraph 13.C.3 has been endorsed to name the Department and the State as additional insureds. See item 13.B above and 16 (Subcontractor Participation) for waiver of subrogation requirements;

4. Automobile Liability (insurance coverage not provided in OCIP): Automobile liability insurance for claims arising from the ownership, maintenance, or use of a motor vehicle in connection with the Work at, upon, or away from the Work Site. The following minimum limits of liability apply:

   a. $1,000,000, Combined Single Limit Bodily Injury and Property Damage, each occurrence.

   The certificate of insurance shall state that the policy required by this subparagraph 13.C.4 has been endorsed to name the Department and the State as additional insureds;

5. Aircraft Liability (insurance coverage not provided in OCIP): For each entity using its own aircraft or employing aircraft in connection with the Work, aircraft liability insurance with a combined single limit of not less than $1,000,000 per occurrence.

   The certificate of insurance shall state that the policy required by this subparagraph 13.C.5 has been endorsed to name the Department and the State as additional insureds; and

6. Valuable Papers and Records and/or Electronic Data Processing (Data and Media) Coverage (insurance coverage not provided in OCIP): Coverage for the physical loss of or destruction of their work product, including drawings, specifications, and electronic data and media, as necessary.

D. The Design-Builder or (Designer) shall provide professional liability coverage with a minimum limit of $10 million per claim and $10 million aggregate. The policy must

provide coverage from the date on which the Request for Proposals (RFP) was issued to a date not less than 6 years beyond the date of Final Acceptance. The policy must protect against any negligent act, error, or omission arising out of the professional services the Design-Builder provides. The policy (ies) shall apply to the activities of all design, engineering, and professional services provided by or on behalf of the Design-Builder or the Designer.

E. Any and all deductibles and self-insured retentions in the above described insurance policy(ies) shall be assumed by and be at the sole risk of the insured parties.

14. CERTIFICATES OF INSURANCE

Prior to entry on the Work Site, the Design-Builder agrees, and shall cause all Subcontractors to agree, to provide to the Department Project Director a certificates of insurance setting out the coverages described in Section 13 (Design-Builder/Subcontractor-Provided Coverage) and the applicable policy limits, and shall also provide to the Department Project Director any amendments to the certificates necessitated by changes to the Work to be performed under the Contract, until the date of Final Acceptance.

A. Said certificate shall state that the policies required have been endorsed to provide that the insurers issuing said policies shall give the Department and the State not less than 30 Calendar Days prior written notice of cancellation, nonrenewal or material change in coverage thereunder.

B. All policies required shall be endorsed to include a waiver of subrogation in favor of the Department and the State of Utah.

C. All insurance required shall be maintained, without interruption, from the date of commencement of the Work throughout the warranty periods set forth in Part 9 (Warranty Provisions).

D. All insurance policies shall be excess of insurance provided under the OCIP and shall not contribute with such insurance.

E. The Department will forward such certificates to the OCIP Administrator at the following address:

Wells Fargo
Attn: OCIP Administrator
601 Union Street, Suite 1300
Seattle, WA 98101

F. The Design-Builder and Subcontractors shall provide copies of any policies and/or endorsements that Department may request.

15. OTHER INSURANCE

A. Any type of insurance or any increase of limits of liability not described above which the Design-Builder or any Subcontractor requires for its own protection or on account of any statute shall be its own responsibility and at its own expense.

B. The OCIP is not an attempt to provide the Design-Builder and enrolled Subcontractors with complete insurance programs. The Department shall not be responsible for providing any insurance coverage not specified above. The Design-Builder and Subcontractors are responsible for making sure their insurance programs fit their particular needs, and for arranging for and securing any insurance coverage which they deem advisable, whether or not specified above.

C. Any fees, costs, or charges related to requirements of this Appendix B, e.g., additional insured endorsement and waiver of subrogation, are to be borne by the Design-Builder and the Subcontractors.

16. SUBCONTRACTOR PARTICIPATION

The Design-Builder shall cause Subcontractors to cooperate fully with the Department and its insurance companies with respect to the administration of the OCIP. The Design-Builder agrees, and shall cause all Subcontractors to agree, to cooperate in the safety and accident prevention program and claim handling procedures as established for the Project by Department. In accordance with this Section 16, the Design-Builder shall not permit any eligible Subcontractor of any tier to enter the Work Site prior to enrolling in the OCIP.

17. WAIVER OF SUBROGATION

The Design-Builder waives all rights of subrogation and recovery against the Department and the State, including its designees(s), construction managers, other general contractors, and all Subcontractors to the extent of any loss or damage that is insured under the OCIP. The Design-Builder waives its rights of subrogation and recovery for damage to any property or equipment against the Department and State of Utah, its designees(s), construction managers, other general contractors, and Subcontractors. The Design-Builder shall require all Subcontractors to similarly waive their rights of subrogation and recovery in each of their respective construction contracts with respect to their Work.

18. NO RELEASE

The carrying of the above-described insurance shall in no way be interpreted as relieving the Design-Builder of any other responsibility or liability under the Contract Documents or any applicable Law.

19. APPROVAL OF FORMS AND COMPANIES

All Design-Builder-provided insurance described in this Appendix B shall be written by an insurance company or companies satisfactory to the Department and licensed to do business in the State, and shall have a form and content that are satisfactory to the Department. Insurance must be placed with carriers having a Best's Guide Rating of A-VII or better. No party subject to the provisions of this Contract shall violate, or knowingly permit to be violated, any of the provisions of the policies of insurance described herein.

20. OCIP MANUAL, CONSTRUCTION SAFETY AND HEALTH MANUAL, AND CLAIMS PROCEDURES

The Design-Builder and eligible Subcontractors shall adhere to and perform all reporting and administrative requirements as detailed in the UDOT *OCIP Manual* and UDOT *Construction Safety and Health Manual*.

If any construction requires pile driving, the Design-Builder and eligible Subcontractors will perform baseline seismic/vibration monitoring. They will also perform periodic monitoring as well as surveying of surrounding buildings which could be affected.

The Design-Builder will mandate 100% fall protection for all trades at elevations of six feet and greater.

Failure to follow the procedures outlined in the OCIP Manual and OCIP Safety and Health Manual may result in assessment of fines by the Utah Labor Commission or other Governmental Persons and/or a judgments against Department, the Design-Builder and/or Subcontractor. The Design-Builder is responsible for paying any fines or judgments arising out of failure to follow these procedures. In such event, if the fine is not promptly paid and evidence of payment provided to the Department, the Department

may deduct the amount of any such fine from monies due or to become due under this Contract. The foregoing remedy is in addition to and cumulative of any other remedies which may be available to the Department.

The Department will establish an OCIP Management Team consisting of members from the Department Project Team, Risk Management, the Design-Builder, the insurance providers, and the OCIP Administrator. The team will partner and meet regularly to review general liability claims, workers' compensation issues, safety matters, property damage matters, and customer concerns potentially resulting in legal liability. Trends reported and concerns addressed will be shared by all members in order to control and manage the OCIP.

The following is an overview of the required Design-Builder OCIP Safety and Health Program.

21. SAFETY PERSONNEL

The Design-Builder shall employ a full time, project dedicated safety professional. Its subcontractors shall designate an on the job safety administrator that may include a supervisor / foreman with safety knowledge. These will be the UDOT / OCIP team's contacts for safety concerns.

OCIP SAFETY OVERVIEW

Following is a brief overview of the UDOT *Construction Safety and Health Manual*.

Conflicts. In the event of a conflict between the provisions of this overview, the OCIP Manual, applicable Laws concerning safety and health, the other Contract Documents, or the Design-Builder's Safety Plan, the most stringent requirement shall apply.

Responsibility. The effectiveness of Design-Builder's OCIP Safety and Health Program will depend upon the active participation and personal cooperation of all individuals working on the Project. Project cooperation and coordination of efforts toward carrying out the overall safety responsibilities are needed for an effective program. The Design-Builder shall be held responsible for its own and it's Subcontractors' compliance with the Project safety requirements.

Administration. The Design-Builder and its Subcontractors shall designate an on-the-job Safety Administrator who will be the Department's contact for safety concerns. This may be a supervisor or foreman with safety knowledge. The Design-Builder and its Subcontractors shall ensure that a qualified Competent Person, as defined in _____, is provided at Work locations where required by the U.S. Occupational Safety and Health Administration (OSHA). The Design-Builder and its Subcontractors shall ensure that all applicable forms (confined space permit, hot work permit, lockout/tagout, critical lift checklist, Job Safety Advisory (JSA), excavation permit, etc.) are provided at Work locations where required by OSHA. The Design-Builder and its Subcontractors shall establish and enforce effective disciplinary measures to enforce the OCIP Safety and Health Program.

Training and Orientation. All Design-Builder and Subcontractor supervisory personnel must attend supervisor safety training produced by the insurance carrier(s), an approximately three-hour course. All employees (of the Design-Builder, Subcontractors, engineers, etc.) working on the Project must attend a construction safety orientation produced by the insurance carrier(s) that includes a video presentation and a three-page written statement of Project rules and questions. This orientation must be completed before an individual may begin Work at the Work Site. The Design-Builder and its Subcontractors shall conduct (at a minimum, weekly) safety meetings with all employees. All employees (of the Design-Builder, Subcontractors, engineers, etc.) shall have the proper training for the job task they are performing, such as confined-space entry and work, fall protection, use of powder-actuated tools, traffic control, and equipment operation.

Personal Protective Equipment. All employees (of the Design-Builder, Subcontractors, engineers, etc.) working on the Project shall have the proper Personal Protective Equipment (PPE) for the job task they are performing. At a minimum, an individual's PPE shall include a hard hat, safety glasses, safety vest, long pants, a shirt with minimal 4-inch sleeve, and work boots.

Drug-Free Work Zone. The Design-Builder and Subcontractor shall adhere to a 100% drug- and alcohol-free work zone. At a minimum, pre-employment and post-accident testing are required. The Design-Builder shall bear the cost and expenses of pre-employment testing. The insurance carrier(s) will bear the cost of the post-accident testing.

OCIP EXHIBIT A:
DESIGNATED WORKPLACES EXCLUSION ENDORSEMENT

Original Printing, Effective April 1, 1984; WC 00 03 02 Standard

The policy does not cover Work conducted at or from_____.

Source: Designated Workplaces Exclusion Endorsement, WC 00 03 02, National Council on Compensation Insurance, effective April 1, 1984.

This endorsement excludes from coverage injuries incurred at Workplaces described in the endorsement. It is often used when the insured is a Design-Builder who is Working on a large construction project subject to a wrap-up plan, a single consolidated insurance plan covering all parties to a construction contract. It may also be used when the employer has more than one Workers' Compensation policy to exclude Workplaces covered under the other policy; in such cases, the endorsement is filled out with a notation such as "any Workplace covered by policy #_____ issued by _____Insurance Company."

OCIP EXHIBIT B:
EXCLUSION–DESIGNATED OPERATIONS COVERED BY A
CONSOLIDATED (WRAP-UP) INSURANCE PROGRAM

Commercial General Liability Cg 21 54 01 96

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

SCHEDULE

Description and Location of Operation(s): _____
(List the OCIP project you are working on.)

_____

(If no entry appears above, information required to complete this endorsement will be shown in the Declarations as applicable to this endorsement.)

The following exclusion is added to Appendix B, Section 1(D), Exclusions of COVERAGE A–BODILY INJURY AND PROPERTY DAMAGE LIABILITY (Section I–Coverages):

> This insurance does not apply to "bodily injury" or "property damage" arising out of either your ongoing operations or operations included within the "products-completed operations hazard" at the location described in the Schedule of this endorsement, as a consolidated (wrap-up) insurance program has been provided by the Design-Builder/Project Manager or owner of the construction project in which you are involved.
>
> This exclusion applies whether or not the consolidated (wrap-up) insurance program:
>
> (1) Provides coverage identical to that provided by this Coverage Part;
>
> (2) Has limits adequate to cover all claims; or
>
> (3) Remains in effect.

Wells Fargo Insurance

WELLS FARGO INSURANCE

OCIP Web-Portal Access Form
Utah Department of Transportation

USER INFORMATION	
Awarding Contractor:	_____
Subcontractor:	_____
Contract Number:	_____
Trade:	_____
Scope of Work:	_____

Contact person for OCIP Administration: Policy information, OCIP Forms, COI, etc.

First Name: _____ Last Name: _____

Phone Number: _____ Email: _____

Physical Address		
Street Address:	_____	
City: _____	State: _____	Zip: _____

Mailing Address		
Same as Physical address _____		
Street Address:	_____	
City: _____	State: _____	Zip: _____

Wells Fargo Contact:
Brittany Chambers P: 206-892-9533
brittany.n.chambers@wellsfargo.com

Together we'll go far

DEPARTMENT OCIP ENROLLMENT FORM

PROJECT INFORMATION:

Project Name _____

Awarding Contractor _____

Design-Builder _____

Type of Work To Be Done_____

Start Date _____ End Date _____

CONTRACTOR INFORMATION:

Your Company's Name _____

Individual? _____ Partnership? _____

Corporation? _____ Joint Venture? _____

Your Company's Federal Employer Identification Number_____

Does your company fall under MBE? _____ WBE?_____ DBE? _____

Your Address _____

_____

Office Contacts *Tel. No.* _____ *Fax No.* _____

E-Mail Address(es) _____

Site Contact _____

Tel. No. _____ *Fax No.* _____

E-Mail Address(es) _____

Safety Contact _____

Tel. No. _____ *Fax No.* _____

E-Mail Address(es) _____

Payroll Contact _____

Tel. No. _____ *Fax No.* _____

E-Mail Address(es) _____

CONTRACT INFORMATION:

Contract Value ($) _____ Dept. Project No. _____

Estimated Project Payroll _____ Job Class Codes _____

% Self Performed Work _____ % Subcontracted Work _____

Estimated Number of Subcontractors _____

CURRENT INSURANCE INFORMATION:

Design-Builder's Worker's Compensation and General Liability Insurance Broker or Agent:

Company _____

Address _____

_____

Contacts *Tel. No.* _____ *Fax No.* _____

Certificate of Insurance, including wording as required by Contract, must accompany this form.
This form must be submitted to the Department Project Director.
This Enrollment Form must be received prior to starting Work on the Project.

APPENDIX C: DISPUTE RESOLUTION FORMS

Project Name:		Date Submitted by DB:	
PIN:		Date of Initial Written Notice:	
Project No.:		Date of Last Resolution:	
Brief Dispute Description:		Date Appealed by DB:	

Escalation Ladder Level	I	II	III	IV	V
Check as applicable					

DESIGN-BUILDER
1. Executive Summary. In the executive summary include a detailed, factual statement of the dispute with necessary dates and locations of Work involved in the dispute, the dates when the dispute was discovered, and when the initial written notice of dispute was given to the Engineer (attach information as necessary or provide below).
2. Cite the specific Contract provision(s) that support the dispute (attach information as necessary or provide below).
3. Include the estimated dollar cost, if any, of the protested Work, and furnish a list of estimated Materials, Equipment and labor for which the Design-Builder might request additional compensation (attach information as necessary or provide below).
4. Theory of entitlement supporting the appeal. Include a narrative of how or why the specific Contract Specifications support the appeal and a statement of the reasons why such Specifications support the appeal (attach information as necessary or provide below).
5. Itemized list of dispute amounts. Provide claim amounts with a narrative of the theories and documents used to arrive at the amounts provided (attach information as necessary or provide below).
6. Additional Contract Time requests. If the dispute relates to a combination of additional compensation and Contract Time, submit a copy of the schedule that was in effect when the dispute arose and a detailed narrative which explains how the disputed issue impacted Contract Time, specific to impacts on the Critical Path (attach information as necessary or provide below).
7. Supporting documents. Include copies of, or excerpts from any documents that support the appeal, such as manuals standard to the industry and used by the Design-Builder or any other information the Design-Builder chooses to provide (attach information as necessary or provide below).

APPENDIX C: DISPUTE RESOLUTION FORMS

DEPARTMENT
Department Decision, including additional clarifications, supporting documents, etc. (attach information as necessary or provide below).

JOINT RESOLUTION
Document any changes made to the Department's Decision, if any (attach information as necessary or provide below).

	Position for Escalation Ladder Level	I	II	III	IV	V
☐ Dispute Resolved ☐ Dispute Escalated	Check as applicable					

Approved: Date:

_____ _____
UDOT Dispute Administrator

Acknowledged: Date:

_____ _____
Design-Builder Dispute Administrator

APPENDIX D (FORM 01282A):

REQUEST FOR PAYMENT OF MATERIALS

SECTION A (COMPLETED BY DESIGN-BUILDER)
Date:
Description:
Design-Builder:
Schedule of Value Item:
Materials Description:
Value of Payment Requested:
Materials Stored at:
Scheduled Installation on Project:
Submitted by:

SECTION B (COMPLETED BY DEPARTMENT)		
Verify Submissions	***Date***	***Checked by***
Bill of Sale or Voucher		
Certification of Title (to Design-Builder)		
Warranty of Title (to Department)		
Evidence of Acceptability		
Verify Storage		
Waiver and Release (if stored on private property)		
Verify Scheduled Installation:	Yes	No
Payment Recommended by:		
Payment Approved by:	***Department Project Director***	

APPENDIX E: (FORM 01282B)

CERTIFICATE OF TITLE TO STORED MATERIALS

(Page 1 of 2)

(Title TO MATERIALS STORED OR TO BE STORED, FOR INCORPORATION INTO DEPARTMENT OF TRANSPORTATION PROJECT)

WHEREAS, _____ hereafter referred to as the "Design-Builder," is engaged in the performance of the Design-Build Contract, hereafter referred to the "Contract," with the Utah Department of Transportation, hereafter referred to as the "Department," and

WHEREAS, in accord with the Design Plans and Project Specifications, the Design-Builder has purchased certain materials for incorporation into the Contract Work from _____, hereafter referred to as the "Vendor," and

WHEREAS, these materials referred to are as follows: *[Enter description of materials and quantities]*

and, WHEREAS, to comply with the provisions of the Contract Documents regarding partial payments (Part 2, Section 12.2.6) requiring certification of the Design-Builder's absolute legal title to the materials described above and warrant of title to the same materials to the Department, the Design-Builder and the Vendor have entered into the following agreement.

NOW, THEREFORE, and in consideration of the forgoing premises, the Design-Builder and the Vendor agree, with the intention of being bound hereby, as follows:

A. The Vendor has executed this document for the purpose of acknowledging that: the Vendor has made an outright sale and transfer of title for the above materials to the Design-Builder free of all restrictions, filings, or liens; the Vendor is the lawful owner of the above materials and has the right make such transfer of title; and the Vendor will not in the future make any claims whatsoever to such title.

B. The Design-Builder certifies and represents that he is the lawful holder of the absolute legal title to the above materials, and has full legal right, power, and authority to sell and transfer such title without restrictions, filings, or liens of any kind on the part of the Vendor and/or any Subcontractor.

C. The Design-Builder, Vendor, and/or any Subcontractor and their successors and assigns, will and do by these presents warrant title to the above described materials to the Utah Department of Transportation.

D. If the Vendor has sold the above-described materials to a Subcontractor of the Design-Builder, this Certification of Title is hereby amended at all applicable points to reflect this fact. By the execution of this Certification, any such Subcontractor is acknowledging that: such Subcontractor has made an outright sale and transfer of title for the above materials to the Design-Builder free of all restrictions, filings, or liens; such Subcontractor is the lawful owner of the above materials and has the right to make such transfer of title; and such Subcontractor will not in the future make any claims whatsoever to such title.

FORM 01282B: CERTIFICATE OF TITLE TO STORED MATERIALS

(Page 2 of 2)

IN WITNESS WHEREOF, the parties hereto have caused this Certificate of Title to be executed on this _____day of _____, 201__.

ATTEST: DESIGN-BUILDER

By _____

Title _____

ATTEST: SUBCONTRACTOR

By _____

Title _____

ATTEST: VENDOR

By _____

Title _____

APPENDIX F: (FORM 01282C)

REQUEST FOR PROGRESS PAYMENT

(1) Payment Request No. :			(4) Date Received:	
(2) Period of:			(5) Current Contract Amount:	
(3) Date Request Submitted:				
(6) *Item Description from Price Allocation Form*	(7) *Lump Sum Amount from Price Allocation Form*	(8) *Cumulative Amount Earned at End of Previous Period*	(9) *Payment Request Amount for Current Period*	(10) *Actual Cumulative Amount Earned End of This Period*
[To be filled in based on Design-Builder's Price Allocation Form]				
Compensable Project Overhead				
Design				
Construction				
Utility Work performed by the Design-Builder				
Mobilization at NTP 1				
(11) Total Amount Earned to Date				
(12) Total Amount Earned as of Last Period				
(13) Total Amount Earned This Period				
(14) Less Retention (3%)				
(15) Net Due This Period				

PROGRESS AND QUALITY CERTIFICATION: We hereby certify that all amounts being requested are true and correct, the required level of testing and inspection is complete, there are no outstanding NCRs, all certifications of compliance are submitted, and the Work is completed per the Contract Requirements.

FOR THE DESIGN-BUILDER:

Signed	Signed
Printed or Typed Name	Printed or Typed Name
Design-Builder's Project Manager or Deputy Title	Quality Manager Title
Date	Date

DEPARTMENT ENDORSEMENT:

I hereby confirm the achievement of the cumulative amount earned to date indicated herein and concur with this request and certificate except as noted below or attached.

FOR THE DEPARTMENT:

_____
Signature

_____
Printed or Typed name

Department Project Director
Title

_____
Date

INSTRUCTIONS FOR FORM 01282C

A. All amounts shall be in U.S. dollars.

B. Request for Progress Payment Sheet:

(1) Enter Payment Request Number (numbered sequentially starting with "1").

(2) Enter month and year covered by this payment request.

(3) Enter date this payment request submitted to Department.

(4) Enter date received by Department.

(5) Enter Current Contract Amount.

(6) Enter the Item Description from Price Allocation Form.

(7) Enter Lump Sum Amount from the Price Allocation Form.

(8) Enter Cumulative Amount Earned at End of Previous Period.

(9) Enter Payment Request Amount for Current Period.

(10) Add (8) to (9) for each Item.

(11) Total the Item amounts shown in Column (10).

(12) Enter total of Column (8).

(13) Subtract (12) from (11).

(14) Multiply (13) by 0.03.

(15) Subtract (14) from (13).

C. Progress Payment Certifications:

Design-Builder's Project Manager and Quality Manager shall sign and date the Certifications.

D. Department's Endorsement:

Department Project Director will sign and date the Department endorsement for the Periodic Completion Certificate.

F. Add additional worksheets for additional Project sections as required.

APPENDIX G: PERFORMANCE BOND FORM

Bond No. _____

WHEREAS, the State of Utah, by and through the Utah Department of Transportation (Obligee), has awarded to _____, a _____ (Principal), a contract for Project No. S-0154(12)11/PIN 12566, dated _____, 20____ (the Contract), on the terms and conditions set forth therein; and

WHEREAS, Principal is required to furnish this bond as a condition to execution of the Agreement (Part 1 of the Contract) by Obligee;

NOW, THEREFORE, Principal and _____, a _____, and _____, a _____ (collectively, Co-Sureties), each an admitted surety insurer in the State of Utah, are held and firmly bound unto Obligee in the amount of $_____ (the Bonded Sum), for payment of which sum Principal and Co-Sureties jointly and severally firmly bind themselves and their successors and assigns.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT, if Principal shall promptly and faithfully perform all of Principal's obligations under the Contract Documents (as defined in the Contract), including any and all amendments and supplements thereto, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

The following terms and conditions shall apply with respect to this bond:

1. This bond specifically guarantees the performance of each and every obligation of Principal under the Contract Documents, as they may be amended and supplemented, including its liability for Liquidated Damages and Warranties as specified in the Contract. Conditioned upon the Co-Sureties faithful performance of its obligations, the liability of the Co-Sureties for the Principal's default shall not exceed the Bonded Sum. The Contract Documents are hereby incorporated by reference herein.
2. The guarantees contained herein shall survive the final completion of the design and construction called for in the Contract Documents with respect to those obligations of Principal which survive such final completion.
3. Whenever Principal shall be, and is declared to be, in default under the Contract by Obligee, provided that Obligee is not then in material default thereunder, Co-Sureties shall promptly:
   a. Remedy such default;
   b. Complete Project No. S-0154(12)11/PIN 8314 (the Project) in accordance with the terms and conditions of the Contract Documents then in effect; or
   c. Obtain a bid or bids for completing the Project in accordance with the terms and conditions of the Contract Documents then in effect, and upon determination by Co-Sureties of the lowest responsible bidder (or, if Obligee elects, upon determination by Obligee and Co-Sureties jointly of the lowest responsible bidder), arrange for a contract between such bidder and Obligee, and make available as work progresses (even though there should be a default or a succession of defaults under such contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the unpaid balance of the Contract Amount; but not exceeding, including other costs and damages for which Co-Sureties are liable hereunder, the Bonded Sum.

d. Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

i. After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, tender payment therefor to the Owner; or

ii. Deny liability in whole or in part and promptly notify the Owner citing reasons for the denial.

4. No alteration, modification or supplement to the Contract Documents or the nature of the work to be performed thereunder, including without limitation any extension of time for performance, shall in any way affect the obligations of Co-Sureties under this bond. Co-Sureties waive notice of any alteration, modification, supplement, or extension of time.

5. No right of action shall accrue on this bond to or for the use of any entity other than Obligee or its successors and assigns.

6. The Co-Sureties agree to empower a single representative with responsibility for coordinating among all of the Co-Sureties with respect to this bond, so that Obligee will have no obligation to deal with multiple sureties hereunder. All correspondence from Obligee to the Co-Sureties and all claims under this bond shall be sent to such designated representative. The designated representative may be changed only by delivery of written notice (by personal delivery or by certified mail with return receipt requested) to Obligee designating a single new representative signed by all of the Co-Sureties. The initial representative shall be _____.

IN WITNESS WHEREOF, Principal and Co-Sureties have caused this bond to be executed and delivered as of _____, 20____.

Principal: _____

By: _____

Its: _____

(Seal)

Co-Surety: _____

By: _____

Its: _____

(Seal)

Co-Surety: _____

By: _____

Its: _____

(Seal)

[ADD APPROPRIATE ACKNOWLEDGMENTS]

APPENDIX H: PAYMENT BOND FORM

Bond No. _____

WHEREAS, the State of Utah, by and through the Utah Department of Transportation (Obligee), has awarded to _____, a _____ (Principal), a contract for Project No. S-0154(12)11/PIN 12566, dated _____, 20____ (the Contract), on the terms and conditions set forth therein; and

WHEREAS, Principal is required to furnish this bond as a condition to execution of the Agreement (Part 1 of the Contract) by Obligee;

NOW, THEREFORE, Principal and _____, a _____, and _____, a _____ (collectively, Co-Sureties), each an admitted surety insurer in the State of Utah, are held and firmly bound unto Obligee in the amount of $_____ (the Bonded Sum), for payment of which sum Principal and Co-Sureties jointly and severally firmly bind themselves and their successors and assigns.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT, if Principal shall fail to pay any of the persons named in Utah Code §63G-6a-1103, with respect to construction work under the Contract, then Co-Sureties shall pay for the same in an amount not to exceed the Bonded Sum; otherwise this obligation shall be null and void.

The following terms and conditions shall apply with respect to this bond:

1. No alteration, modification, or supplement to the Contract Documents (as defined in the Contract) or the nature of the work to be performed thereunder, including without limitation any extension of time for performance, shall in any way affect the obligations of Co-Sureties under this bond. Co-Sureties waive notice of any alteration, modification, supplement or extension of time.

2. This bond shall inure to the benefit of the persons named in Utah Code §63G-6a-1103 with respect to construction work under the Contract so as to give a right of action to such persons and their assigns in any suit brought upon this bond.

3. Liabilities on this bond to all such claimants shall be determined in accordance with Title 63G, Chapter 6a, Part 11, Utah Code, to the same extent as if it were copied at length herein.

4. The Co-Sureties agree to empower a single representative with responsibility to coordinate with all of the Co-Sureties with respect to this bond, so that Obligee will have no obligation to deal with multiple sureties hereunder. All correspondence form Obligee to the Co-Sureties and all claims under this bond shall be sent to such designated representative. The designated representative and agent for service of process may be changed only by delivery of written notice (by personal delivery or by certified mail with return receipt requested) to Obligee designating a single new representative and/or agent, signed by all of the Co-Sureties. The initial representative shall be _____.

IN WITNESS WHEREOF, Principal and Co-Sureties have caused this bond to be executed and delivered as of _____, 20____.

Principal: _____

By: _____

Its: _____

(Seal)

Co-Surety: _____

By: _____

Its: _____

(Seal)

Co-Surety: _____

By: _____

Its: _____

(Seal)

[ADD APPROPRIATE ACKNOWLEDGMENTS]

Appendix I – Liquidated Damages

Completion Deadlines

Liquidated Damages in the amounts set forth in the second column below (LIQUIDATED DAMAGE AMOUNT) shall be assessed for failure to achieve Substantial Completion or Physical Completion by the applicable Completion Deadline.

COMPLETION DEADLINE	LIQUIDATED DAMAGE AMOUNT[1]
Substantial Completion Deadline	$4,870 per Day
Physical Completion Deadline	$1,120 per Day
Contract Completion Deadline	$200 per Day

[1]If the Design-Builder is subject to Liquidated Damages for failure to achieve more than one Completion Deadline, the greater of the applicable Liquidated Damages amounts will apply.

APPENDIX L – CHANGE ORDER CERTIFICATION

"*Under the penalty of law for perjury or falsification, the undersigned,*

*(Name)*_____, *(Title)*_____, *of*

*(Company)*_____,

Hereby certifies that the request for extra compensation and time, if any, made herein for Work on this Contract is a true statement of the actual costs and time sought, and includes all known and anticipated impacts and amounts whatsoever that may be incurred, and is fully documented and supported under the Contract between the parties.

*Dated:*_____ *Signature*_____

Subscribed and sworn before me this _____ *day of* _____, *20*_____.

Notary Public _____

My Commission Expires _____."

REQUEST FOR PROPOSALS

UTAH DEPARTMENT OF TRANSPORTATION

4 Interchanges on Bangerter HWY (SR-154)

Project No. S-0154(12)11

Salt Lake County

CONTRACT DOCUMENTS

PART 3—QUALITY PROGRAM

Final Issued September 15, 2016

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1—GENERAL

Conduct all work necessary to meet the requirements of this Part 3 (Quality Program) and to provide documentation that evidences requirements (processes and procedures) are met prior to Department reviews, testing, and inspections.

2—ADMINISTRATIVE

2.1 Quality Management Plan (QMP)

Document the Design-Builder's Quality Program in a Quality Management Plan (QMP). The QMP will define the Design-Builder's processes and procedures to ensure Contract requirements are met. The QMP may be submitted in two parts, one for management and design and one for construction. The management and design portion of the QMP must be Approved prior to the submittal of any design submittal. The construction portion of the QMP must be Approved prior to any permanent construction Work.

Submit three hard-copies and one electronic copy of the QMP. Allow 14 Calendar Days following the Department's initial receipt of the QMP for the Department to provide a response with either Approval, or conditions for Approval. Revise the QMP according to the conditions provided and resubmit for Approval. Allow five Calendar Days following the Department's receipt of the revised QMP for the Department to respond with either Approval, or conditions for Approval. Follow this resubmittal process until Approval is received.

The Department may require the Design-Builder to modify the QMP at any time throughout the Project based on results of Department reviews, testing, and inspections. Such changes initiated by the Department are made under the Department's Approval authority and may result in the Design-Builder expending additional resources and/or time to comply with the revised QMP, such changes are not eligible for additional compensation or a time extension. Any revision to the QMP requires prior Department Approval and will follow the Approval resubmittal process defined in this Section. The Design-Builder's Project Manager and Construction Manager shall endorse and approve the QMP.

Upon Approval, the QMP remains in effect until Final Acceptance.

2.2 Documentation

Utilize the Department's ProjectWise to facilitate electronic submission of documentation to the Department. Describe the submittal process in the QMP.

Specify procedures in the QMP for meeting documentation requirements for the filing of design criteria, reports and notes, calculations, plans, specifications, schematics, project administration, supporting materials, etc. and for the specific responsibilities of personnel to satisfy these requirements. Maintain Project documents for the duration of the Contract; organize and index in the Department's ProjectWise.

In the QMP, identify the folder where each document will be filed in the Department's ProjectWise. Include documentation filing procedures for all phases of the work (e.g. closeout, working drawings, material certs, change orders). Name and attribute all documents; where Department naming conventions exist, follow the Department's naming convention. Develop file naming conventions and other attributes with the intent of allowing for and contributing to easy access and retrieval of any and all documents related to any item(s) of the Work including the ability to allow for cross discipline

queries within ProjectWise. Provide documentation in formats acceptable to the Department and in accordance with the Project Files/Records section of the UDOT *Construction Manual of Instruction.*

Specify measures to control the receipt and issuance of documents in the QMP (such as instructions, procedures, drawings, and any changes thereto) that prescribe activities affecting conformance to Contract requirements. Maintain a log of changes and revisions to documents.

2.2.1 Request for Information

Track, document, and distribute discussions between design and construction to the Department as it is outlined in Appendix A.

2.2.2 Project Documentation

Identify processes in the QMP to ensure accurate, complete, and timely documentation for all submittals. Receipt of submittals by the Department follows Part 1 (Agreement), Section 3.2 (Receipt of Notices).

3—DESIGN

Describe specific procedures in the QMP to be followed to ensure the design conforms to the requirements of the Contract.

3.1 Design Checks

See Part 4-17 (Structures) for general information, definitions and terminology associated with the SDDM.

3.2 Design Adequacy Review

Specify the level, frequency, and methods of reviewing the design adequacy of the Project in the QMP, including the methods by which all design documents, approach, methodology, calculations, Special Provisions, and reports will be reviewed, verified for adequacy of design, and back-checked by licensed engineers from the Design-Builder's staff. Follow the UDOT Structures Quality Control/Quality Assurance (QC/QA) Procedures, which is included as part of the SDDM, for all structural elements. See Part 4-17 (Structures) for general information, definitions and terminology associated with the SDDM.

3.3 Design Coordination

Specify detailed procedures in the QMP for coordinating design performed by different persons, firms, or disciplines on related tasks, in the same geographic area, or in adjacent geographic areas to ensure that no conflicts, omissions, or misalignments occur, and to ensure contract compliance.

3.4 Design Milestone Reviews

Establish a process for design milestone reviews in the QMP.

Conduct a minimum of two separate design milestone reviews.

A. Initial Design Milestone Review - Conduct an initial design milestone review for each design package prior to 60 percent design progress. For structural design packages conduct the initial design milestone review at 30 percent design progress in conformance with a Stage 3 review

as defined in the SDDM. Structure Type selection reports and Plan-in-hand Review forms are not required for Design Build projects.

B. Final Design Milestone Review – Conduct a final design milestone review at 100 percent design progress prior to the issuance of Released for Construction documents. For structural design packages conduct the final design milestone review in conformance with a Stage 4 review as defined in the SDDM.

Follow the requirements in Part 4-04 (Drainage) for an intermediate design milestone review. For all other disciplines, if intermediate reviews are needed, establish a process for additional intermediate design milestone reviews that occur between the initial and final design milestone review.

Follow the requirements in Part 4-06 (Geotechnical) for the review of MSE walls.

Follow the requirements in Part 4-10 (Maintenance of Traffic) for the Traffic Management Plans review.

Include the Department in these reviews and provide the submittals to the Department in advance of the review meeting to allow for review periods required per Table 3D-1. Submit two hard copies and one electronic copy in computer-aided design and drafting (CADD) format and PDF format, of all relevant design memoranda, reports, data, review plans and specifications for each submittal package. No more than five design packages may be in to the Department for review at any one time. The schedule impacts of revisions arising from the Department's review and caused by nonconformance with Contract requirements, including the Department's time for reviewing revisions, is borne by the Design-Builder.

3.5 Early Released for Construction

Early Release for Construction (ERFC) is only allowed for girders, Maintenance of Traffic Plans, clearing and grubbing and the 7000 South pedestrian bridge superstructure. Identify the procedure in the QMP for which design drawings are ERFC. Describe the process to resolve all comments prior to issuing ERFC drawings. Submit two hard copies of ERFC documents and one electronic copy in PDF format. ERFC drawings may be submitted in electronic format.

3.6 Released for Construction

Identify the procedure in the QMP for which design drawings are Released for Construction (RFC). Include a procedure for how ERFC drawings will be included in a RFC submittal. Describe the process to resolve all comments prior to issuing RFC drawings. Submit two hard copies of RFC documents, one electronic copy in PDF format and all associated CADD files. Identify a process and/or feature to allow near real time distribution of RFC plans, or updates to previous RFC plans to all parties.

3.7 Design Changes After Plans have been Released for Construction

Follow the Field Design-Change (FDC) or Notice of Design-Change (NDC) process outlined in Appendix A for changes to documents that are Released for Construction (RFC). Identify the procedure in the QMP for ensuring the most current version of the design is available for use in the field, including Department personnel. Submit two hard copies and one electronic copy in PDF format with every NDC package.

3.8 Working Shop and Falsework Drawings

Outline the process in the QMP for how shop drawings and falsework are prepared, submitted, reviewed, corrected, and accepted. Include the following in the process:

A. Personnel assigned to perform construction submittal reviews including submittals that involve multiple disciplines (e.g. retaining walls).

B. Procedures for documenting reviews and approvals and for obtaining corrective action.

3.9 As-Built Drawings

Specify procedures in the QMP to be used in preparation of the final As-Built drawings to ensure accurate and timely documentation of the constructed Project. Provide electronic copies of the As-Built drawings, including a scanned PDF in ProjectWise, on a monthly basis showing the current status of the drawings. At Final Acceptance, submit three hard-copies and one electronic copy of the As-Built Plans, stamped by the DQM.

4—CONSTRUCTION

Notify the Department in writing each week of planned construction activities (including fabrication) for each Work segment to be undertaken in the following week to allow the Department to schedule its resources.

4.1 Control Point Inspection

A Control Point is a point in time when construction has proceeded to a defined stage and at which representatives of the Design-Builder's production, Design-Builder's QC, the Department, and Utility Company (for Utility Work) verify the conformance of the Work to that point. Provide at least 24 hours of notice to the Department for each Control Point. This notice will be re-established if items of non-conformance are discovered. With the exception of corrective work items, work may not proceed on the Work associated with the Control Point until a conforming Control Point is documented.

The Department and/or the Design-Builder may identify additional Control Points to be included at any time throughout the Project. Revise the QMP to include any additional Control Points identified and necessitated by the Design-Builder's specific design and construction approaches. Establish the following minimum Control Points:

4.1.1 Concrete

A. Prior to any placement of concrete

4.1.2 Environmental Mitigation Measures

A. Before any construction occurs, and after implementation of Best Management Practices (BMPs) and environmental controls per the Permitting requirements

B. Prior to disturbing any stream, dewatering, diverting watercourses, or building cofferdams

4.1.3 Embankments

A. After completion of drainage and utility installations, and before backfill

B. After all clearing, grubbing, and excavation

C. After each lift in accordance with specifications for lift requirements (applicable to all embankments, including walls)

D. After backfill of demolished homes

E. At completion of embankment placement

F. At completion of surcharge placement

G. Prior to removal of surcharge per the Geotechnical Manual of Instruction (MOI)

4.1.4 Structures

A. Before start of bridge foundation pile-driving

B. At Design-Builder's approval of pile driving submittals (including design prior to cutting pile tops to elevation, before and after girder and diaphragm placement)

C. At completion of bridge embankment settlement and prior to placing abutment concrete and sleeper slab

D. After rebar placement but before final form placement for CIP retaining walls and box culverts taller than 6 feet

4.1.5 Drilled Shafts

A. Prior to concrete placement, verify diameter, location, depth, plumbness, and demonstrate the drilled shaft excavation is clean; and the steel reinforcement cage is clean and of correct dimensions and placed in proper location with proper clearances.

B. Prior to construction of column or cap atop drilled shafts, verify location and that concrete strengths are met.

4.1.6 Driven Piles

A. Prior to moving the driving equipment from the driving location, cutting off pile tops, placing reinforcing steel around the piles and/or backfilling around the piles, verify complete pile driving records and tolerance measurements for all piles in each pile group, along with the applicable dynamic pile test results and signal-matching analyses.

4.1.7 Micropiles

A. Prior to building structures on micropiles, submit to the Department the completed inspection records for all micropiles, along with the applicable load test results and analyses.

4.1.8 Retaining Walls and Reinforced Soil Slopes

A. Prior to placing leveling pad or footing, verify the subgrade conditions meet specifications and drawings.

B. Upon placement of first level of soil reinforcements, verify proper placement of leveling pad, correct orientation of reinforcement, conformance of select backfill to material and compaction requirements, and proper alignment of first level of facing elements.

C. Every 10 vertical feet of wall construction, verify reinforcements have been placed in proper locations and orientations, including around obstructions, that wall facing tolerances conform to specifications, and that each lift of select backfill meets material and compaction requirements.

4.1.9 Pavement Base

A. Before placement of each course above subgrade on permanent roadway components (granular borrow, lean base, etc.)

4.1.10 Asphalt

A. Before placement of each lift of asphalt

4.1.11 Noise Walls

A. After completion of every 500 feet of noise wall posts or panels

4.1.12 Traffic Devices and Switches

A. Before opening to traffic

4.1.13 ATMS

A. Before backfilling trenches containing conduit

B. Before placing flowable fill around junction boxes

4.1.14 Utility Work

A. Before backfilling or concealing any portion of work

B. Before tying in Utility Work to existing utilities, new Utility Work, and retirement of existing utilities

C. During each testing event

D. At final field inspection for acceptance of the completed Utility Work

4.2 Deep Foundations (Driven Piles, Micropiles, and Drilled Shafts)

Detail in the QMP the Design-Builder's process for monitoring and inspecting all elements of the Work required by the Contract related to drilled shafts, driven piles, and micropiles.

4.3 Material Identification

Specify procedures in the QMP to ensure material documentation can be traced to a specific location on the project.

4.4 Testing Equipment

Describe a process in the QMP for correlating testing equipment with the Department; the frequency of the correlation will be at least quarterly.

4.5 Final Inspection

Include a process in the QMP for conducting, with the Department, a final inspection of the Work after all elements of physical Work are complete. Include scheduling, conducting, and tracking the inspection process. Include the development of a mutually agreed-to punch-list including date of correction.

4.6 Pre-Activity Meetings

Pre-activity Meetings are meetings conducted by the Design-Builder with the Department and the Design-Builder's production, construction, design, and quality personnel to review the Design-Builder's approach to conforming to requirements for certain elements of Work. Describe the approach to conducting these meetings in the QMP. Conduct all meetings at least 7 Calendar Days prior to the start of the activity. Conduct at a minimum the following Pre-Activity Meetings:

A. Bridge deck placement – At a minimum the following items must be discussed for each bridge deck (may require multiple meetings):

   1. Sequence and limits of placement (for example including pouring sequence, direction of pour
   2. Location of finishing machine rail supports and construction joints (for example including grade control)
   3. Concrete conveyance, placement methods and rate (including length and time of haul from batch plant to construction site, placing method, rate of placement anticipated, vibration of concrete)
   4. Finishing method
   5. Special equipment
   6. Curing plan and equipment
   7. Construction details (for example including skew of abutment or bents versus skew of finishing machine, superelevation and transitions)
   8. Contingency plans (including precautionary measures for back-up equipment and materials).

B. PCCP – At a minimum provide the Design-Builder's approach to:

   1. Reinforcing steel placement – The approach to verifying proper placement of tie bars and dowel bars in PCCP through destructive and/or non-destructive methods.
   2. Concrete batching and delivery
   3. Concrete placement
   4. Curing

C. HMA – At a minimum provide the Design-Builder's approach to:

   1. QC testing
   2. Equipment
   3. Subgrade control
   4. Profile and thickness control
   5. Density control

D. Pile driving – At a minimum provide the Design-Builder's approach to:

   1. QC Testing
   2. Equipment

E. Drilled shafts – At a minimum provide the Design-Builder's approach to:

   1. QC and specialty Testing
   2. Equipment

F. Drainage – At a minimum provide the Design-Builder's approach to:

1. QC Testing
2. Density control
3. Survey control
4. As-built requirements

G. Barrier – At a minimum provide the Design-Builder's approach to:

1. QC testing
2. Rebar placement
3. Concrete requirements/limitations
4. Equipment

5—MANAGEMENT

The Design-Builder's Project Manager will conduct a monthly quality management review with the Department Project Manager to ensure its continuing suitability and effectiveness in satisfying Contract requirements. As part of the monthly progress report and requests for payment, provide a written certification signed by the Design-Builder's Project Manager indicating that the QMP and all of the measures and procedures provided therein are functioning properly and are in full compliance.

The management reviews will assess, at a minimum, the results of Design-Builder quality actions, results of Department reviews, testing, and inspections, status of corrective actions, trends in non-conformance, and time to resolution of problems. Use the results of these meetings as actions for improvement of the Design-Builder's quality management system.

6—ENVIRONMENTAL MONITORING AND COMPLIANCE

Describe the methods, processes, and procedures in the QMP to provide for the effective implementation and documentation of the environmental protection, training, compliance, and monitoring program.

7—NONCONFORMING WORK

Follow the Nonconforming Work process given in Appendix A when Nonconforming Work is detected.

8—SUBMITTALS

Provide submittals to the Department in accordance with Table 8-1.

TABLE 8-1
DESIGN-BUILDER SUBMITTALS FOR QUALITY PROGRAM

Submittal	***For Approval***	***Schedule***
Quality Management Plan (QMP)	Yes	Initial submittal within 10 Calendar Days after receiving NTP. Management and design portion prior to any design submittal, construction portion prior to permanent Work
Initial and Intermediate Design Milestone Review documents	No	14 Calendar Days in advance of review meeting
Responses to Design Review Comments	No	Resolve at or prior to subsequent design milestone review submittal
Early Released for Construction (ERFC) documents	No	7 Calendar Days in advance of review meeting.
Final Design Milestone Review documents	No	14 Calendar Days in advance of review meeting
Released For Construction (RFC) Documents	No	After all review comments are resolved
Responses to notices of Nonconforming Work and Corrective Actions	Yes	Ongoing

REQUEST FOR PROPOSALS

UTAH DEPARTMENT OF TRANSPORTATION

4 Interchanges on Bangerter HWY (SR-154)

Project No. S-0154(12)11

Salt Lake County

CONTRACT DOCUMENTS

PART 3:
APPENDIX A

Final Issued September 15, 2016

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A—NON CONFORMING WORK

A-1 PURPOSE

The purpose of this procedure is to describe how Nonconforming Work is identified, described, and controlled to prevent its unintended use, delivery, or continued practice.

A-2 SCOPE

A-2.1 Definitions

Requirement Deficiency (RD) –When the Work is incomplete and is still under process control, any observation of the Work found by the Design-Builder or the Department to be non-conforming will be segregated from other conforming work and the issue documented through an RD.

Non-Conformance (NC) – When the Work is complete and the plans have been Released for Construction (RFC) or construction Work has had a Control Point.

A-2.2 Applicability

This procedure is applicable to all people involved in performing reviews, verification, inspection or testing of materials, workmanship, management, design, or construction of Work processes.

A-3 METHOD

Nonconforming Work products will be identified as either:

1. **Requirement Deficiency (RD)**
2. **Product Non-Conformance (NC)**
3. **Process Non-Conformance**

All RD's must be appropriately closed prior to the Work becoming Permanent or they will be considered a NC.

A-3.1 Requirement Deficiencies

The Department shall track each RD in a spreadsheet form and assign each RD a unique identifier. If a deficient product can be corrected in the shift it was detected, then an RD need not be issued, but shall be tracked during that shift for closure. If any deficient product cannot be corrected in the shift it was detected, or a deficiency is not corrected in the shift it was detected, then an RD shall be issued and tracked to closure.

A-3.2 Product Non-Conformance (NC)

When Work is deemed NC the Design-Builder shall investigate and rectify the process failure. The nonconforming Work shall be segregated from conforming work and prevented from use.

Once an NC is detected, the Department will verbally notify the Design-Builder of the deficiency and issue a written NCR, using Form 002 NCR Tracking Log. The Design-Builder shall distribute the NCR to the involved parties and determine the proposed resolution. The Design-Builder shall obtain all required signatures.

If the NC resolution is to remove and replace, the Design-Builder shall notify the Department and issue a Control Point. The NCR will remain open until conforming Work is verified.

The Design-Builder shall obtain Approval for any resolution other than remove and replace, prior to proceeding with the segregated Work.

If the Approved resolution is to leave as-is, the Department may, in its sole discretion, apply a deductive amount in accordance to Part 5, Table 5-1 (Unit Prices for Determining Pay Adjustments for Nonconforming Work). These NCRs will remain open until a Change Order, detailing the concession is executed.

In the event that the NC modifies the design, an FDC or NDC shall be issued by the Design-Builder.

A-3.3 Process Non-conformance

If the Nonconformance is a procedure or QMP requirement, the Design-Builder shall investigate and rectify the process failure. NCRs will not be issued for these types of NCs, but will be tracked by the Department for consideration of Corrective Action.

A-3.4 Design Non-conformance

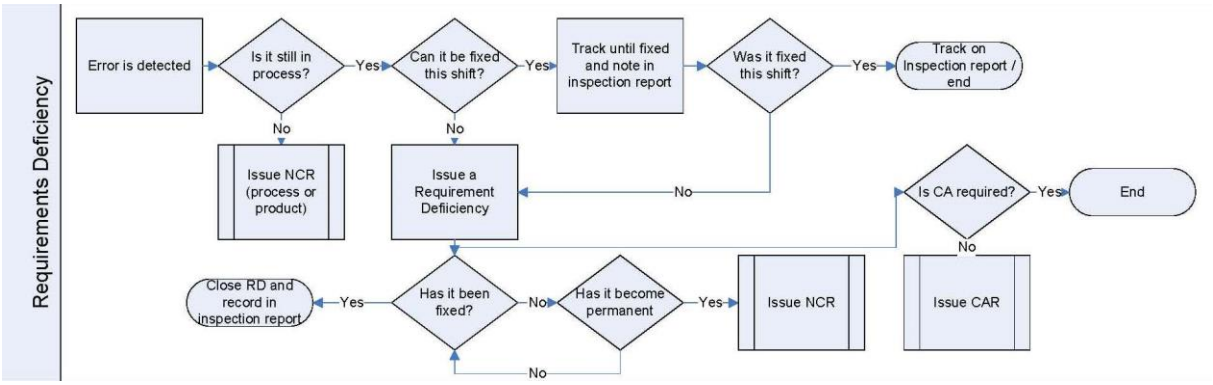
When the design is found to be non-conforming to a Contract requirement it is the responsibility of Design-Builder to investigate and rectify the process breakdown. Any non-conformance of the design or comments that are not addressed prior to RFC will result in an NCR being issued.

A-3.5 Corrective Action Report

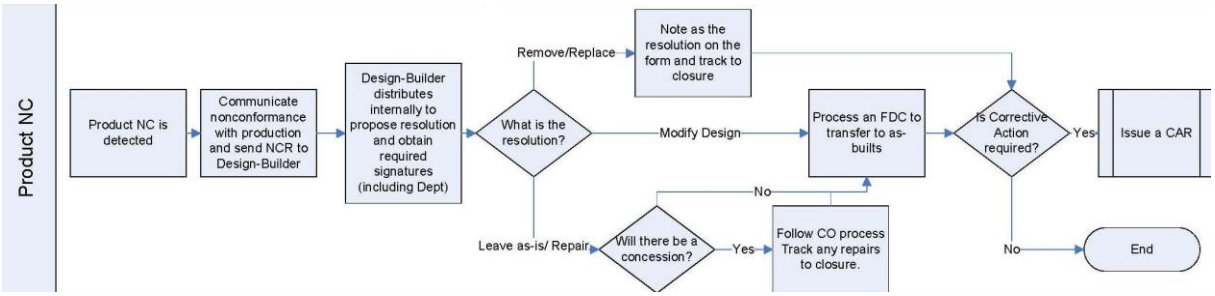
The Department may require Corrective Action if, in its sole discretion, it is determined that a systemic failure of the Design-Builder quality system has occurred; based on the severity of an individual NC, or frequency/repetition of NCs and RD's. Corrective Action will be issued through Form 002 NCR Report. The Design-Builder shall determine and perform a root cause analysis of the Nonconforming Work; modify or develop a process to prevent recurrence; obtain Department Approval of the solution; and verify the new/revised process is successful in preventing recurrence.

A-4 NON CONFORMANCE FLOW CHARTS

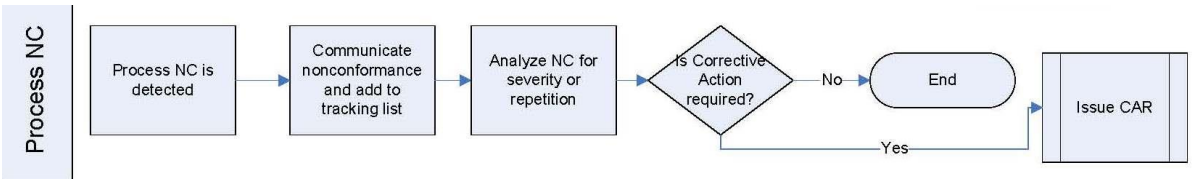
A-1: Requirement Deficiency Flow Chart



A-2: Product Nonconformance Flow Chart



A-3: Process Nonconformance Flow Chart



A-5 FORMS / LOGS

Electronic form/log will be provided.

A-4: Form 002 NCR

BANGERTER **Form NCR - Nonconformance Report**

Nonconformance Report No. (NDC):

Date Sent:

ORIGINATOR:		NOTIFICATION SENT TO:	
LOCATION:		CAP REQ. (Y/N/#)	
SPECIFICATION:			

DESCRIPTION OF NONCONFORMANCE:

CORRECTIVE ACTION / RESPONSE:

☐ Remove & Replace ☐ Repair ☐ Leave-As-Is ☐ N/A

			Yes	No
Date:	Signature: Design-Builder		☐	☐
	Print: Design-Builder			
Date:	Signature: UDOT		☐	☐
	Print: UDOT			

Status:

A-5: Form 002 NCR Tracking Log

BANGERTER

Form NCR - NCR Tracking Log

Project No.: S-0154(12)11 Page of

No.	Date	Originator	Contract / Specification Reference	Description of Nonconformance	Location	CAP Req. (Y/N)	QA Rep	Approved (Y/N)
001								
002								
003								
004								
005								
006								
007								
008								
009								
010								
011								
012								
013								
014								
015								
016								
017								
018								
019								
020								
021								
022								
023								
024								
025								
026								
027								
028								
029								

B—REQUEST FOR INFORMATION

B-1 PURPOSE

To provide a uniform and documented process for Requests for Information (RFI) or clarifications to the RFP to ensure uniform understanding of the design documents by both the Department and Design-Builder.

B-2 SCOPE

This procedure includes the interface between the Design-Builder and the Department.

B-3 DESIGN MANAGER AND CONSTRUCTION MANAGER RESPONSIBILITIES

Design & Construction Manager (DM/CM): Maintain full documentation on design and all field inquiries and process them through the requirements for the Project. Maintain and track all RFIs using RFI log.

B-4 METHOD

The Manager shall document all communication generated by field inquiries. The Manager shall track all RFIs using an RFI log.

Telephone calls where the field inquiry is immediately resolved do not require an RFI form to be generated, but shall be logged and communicated to the Department. All other inquiries and subsequent communication regarding the inquiries shall be documented using Form 001 RFI, logged, and be copied to the Manager and Department.

B-5 FORMS / LOGS

Electronic form/log will be provided.

B-1: Form 001 RFI Form

BANGERTER **Form RFI - Request For Information**

REQUEST FOR INFORMATION No. (RFI):

Date Sent:

CONTRACTOR:		OWNER:	Utah Dept. of Transportation (UDOT)
PROJECT NO.	S-0154(12)11	ORIGINATOR:	
ENGINEER:		SENT TO:	

Subject:		Drawing/Detail Reference:	
Spec. Reference:		Date Reply Required:	
Reference:			

INFORMATION REQUIRED (BE SPECIFIC):

SUGGESTION:

RESPONSE:

RESPONSE BY (SIGN AND PRINT NAME):	DATE:
Status:	

B-2: Form 001 RFI Tracking Log

BANGERTER

Form RFI - Request for Information Tracking Log

Project No.: S-0154(12)11 Page of

Discipline	RFI Number	Construction Work Area	Segment	RFI Description	Received by Design	Response Date	Returned to Document Control	Received by CQCM	Require Design Change? (Y/N)	NDC Reference	RFI Status	Remarks

C—FIELD DESIGN CHANGES

C-1 PURPOSE

To establish the mechanism for identifying, processing, and tracking design changes that are initiated to address field conditions after the design package has been Released for Construction.

C-2 SCOPE

Design changes that are initiated by the Design-Builder to address field conditions shall be processed as a FDC. This procedure applies to any situation where design changes are initiated in the field which necessitates a change to one or more plan sheets and/or specifications of a package that has been Released for Construction.

C-3 RESPONSIBILITIES

Project Manager: Initiates a FDC and coordinates processing through to resolution.

Construction Manager (CQM): Coordinates with the Project Manager and the Department to determine the FDC Level and signs off on FDC resolution and tracks and logs FDCs.

Design Manager (DM): Coordinates the design and quality control processes for those FDC's that require design input, and signs off on resolution of FDC's that require design input.

C-4 GENERAL

The procedures outlined below are used to process all modifications to Released for Construction documents that are initiated by the Design-Builder to address field conditions. Field changes shall be classified according to the following:

1. **Level 1 (Minor)** – These are minor changes in the Work that do not materially affect design. These are documented and a copy sent to the responsible design engineer (e.g. shifting a catch basin 1 foot laterally to avoid a utility).
2. **Level 2 (Medium)** – These changes may or may not materially affect design, but require confirmation as to the impact on design (e.g. shifting a catch basin vertically).
3. **Level 3 (Major)** – These changes may or may not materially affect design, but require modification to the plans and/or special provisions and implementation of a NDC (e.g. eliminating a catch basin).

C-5 METHOD

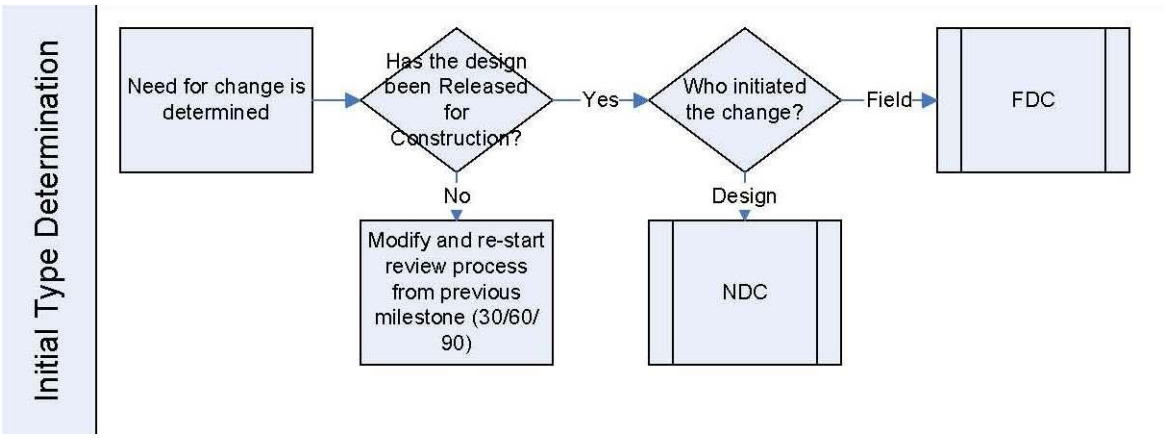
Once a change is determined necessary, the Project Manager shall contact the CQM to jointly determine the level of the field design change. Upon determination of the level of field design change and receiving Department concurrence, the Project Manager shall complete the appropriate portion of Form 003 FDC. The Project Manager and CQM shall acknowledge the information provided in the form by providing their initials in the space provided on the form. If the FDC involves a Third Party, a copy will be sent to the Third Party Design and Construction Manager or Designee, who will be responsible for obtaining an authorized initial on the Form 003 FDC.

If the level is agreed as a Level 1, the Project Manager shall provide enough information on the FDC to be able to communicate the change to the person creating As-Builts. The Project Manager shall complete Form 003 FDC and forward to the CQM for signature. After signature, the completed form shall be submitted to the Department.

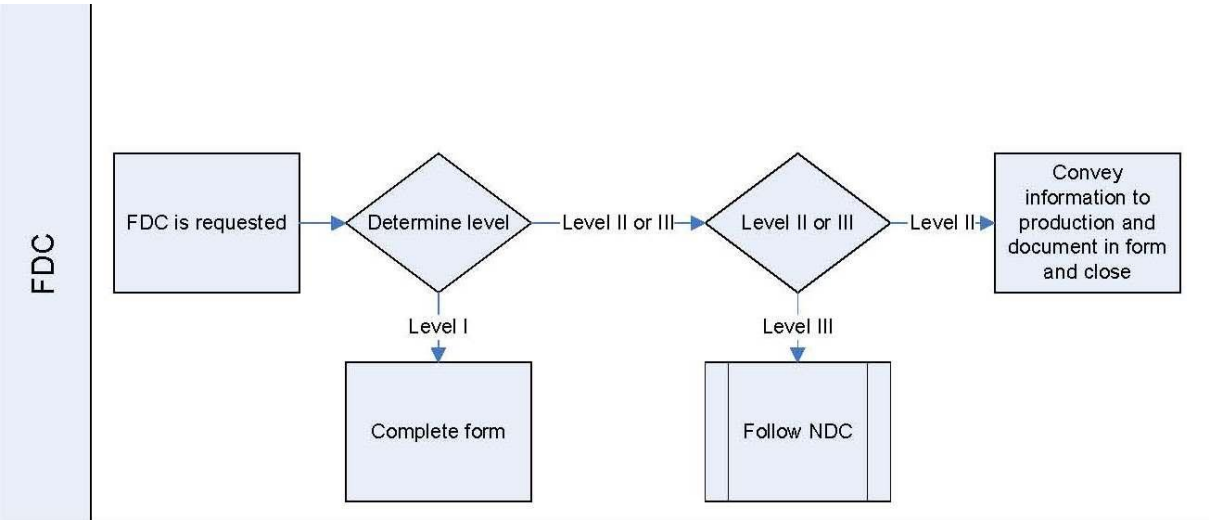
If the change requires involvement of the design team it shall be deemed a Level 2 or Level 3, and the Project Manager, CQM, Design Manager, and the Designer shall agree on the resolution. If the Design Manager determines that the resolution requires re-design, modification of design, or additional design, such that revision of RFC drawings is necessary for construction it is deemed a Level 3 and an NDC shall be processed in accordance with that procedure. If an NDC is determined not necessary, the resolution is described on Form 003 FDC (attachments may be included to clarify). The Design Manager or designee shall complete and approve Form 003 and forward to the Project Manager and CQM for approval. After signature, the completed form shall be submitted to the Department.

C-6 FLOW CHARTS

C-1: Initial Type Determination



C-2: FDC Flow Chart



C-7 FORMS / LOGS

Electronic form will be provided.

C-3: 003 FDC Form

BANGERTER

Form FDC - Field Design Change

FIELD DESIGN CHANGE No. (FDC):

Date Sent:

REQUESTED BY:		**REQUEST DATE:**		**REQUIRED DATE:**	
DESIGN ELEMENT:		**DESIGN DISCIPLINE:**			
LOCATION:					
SPECIFICATION AFFECTED:					
DRAWINGS AFFECTED:					

ISSUE:

IMPACT OF CHANGE:	**CONCURRENCE BY:**	
☐ LEVEL 1 (copysent to design)		
☐ LEVEL 2 (e-mail from design)	UDOT SIGNATURE	DATE:
☐ LEVEL 3 (requires an NDC)	CQM SIGNATURE	DATE:

RESOLUTION:

ATTACHMENTS:

APPROVAL OF CHANGE: ☐ ADD TO AS-BUILTS

APPROVED BY:	DESIGN MANAGER (LEVEL 3 ONLY) (SIGN AND PRINTE NAME)	DATE:
APPROVED BY:	CONSTRUCTION QUALITY MANAGER (SIGN AND PRINT NAME)	DATE:
APPROVED BY:	DESIGN-BUILD PROJECT MANAGER (SIGN AND PRINT NAME)	DATE:

As the Design Quality Manager, I certify this Field Design Change meets the following:
- The change has followed all applicable processes described in the QMP.
- The change is consistent with other elements of the existing design.
- The change is Released for Construction.

DESIGN QUALITY MANAGER DATE

Status:

D—NOTICE OF DESIGN CHANGE (NDC)

D-1 PURPOSE

To establish the method to identify and provide design changes deemed necessary to address situations discovered after the design package has been Released for Construction.

D-2 SCOPE

This procedure applies to any situation where design changes are initiated by the design team which necessitates a change to one or more plan sheets and/or specifications of a package that has been Released for Construction or deemed a Level 3 Field Design Change (FDC).

D-3 RESPONSIBILITES

Design Manager (DM) – Reviews and approves all NDC's. Establishes the timeline in which the NDC must be completed and issued and maintains a log of all NDC's.

Design Quality Manager (DQM) – Determines level of quality control required for revisions to design and drawings as a result of an NDC. Reviews the NDC to ensure the design change has completed quality control reviews as appropriate to the level of the NDC.

D-4 METHOD

D-4.1 Classifications of the NDCs

A. A minor NDC is a change that impacts only one discipline and has little impact to the surrounding design.

B. A major NDC impacts multiple disciplines and has a larger impact to the surrounding designs.

D-4.2 Issuance of Notices of Design Change (NDCs)

When an NDC is required, an NDC form shall be completed by the Design Manager. A set of affected drawings or specifications indicating the potential changes will be included with the NDC form. These can be hand-marked corrections or comments that explain or show the potential change.

After an NDC has been issued, the design documents will be updated to incorporate the design change and drawings will be revised. Once drawings are revised by the design team, they will undergo quality control as required by this procedure. The drawings will then be signed, sealed, and Released for Construction.

The NDC form will be the means of describing the details of the revisions to the design and drawings. For any drawings that are revised as a result of an NDC, the NDC shall be referenced in the revision block of those sheets and all changes shall be clouded with a revision triangle next to it.

D-4.3 Quality Control of NDC Design and Drawing Revisions

For Work related to a design change resulting from a Notice of Design Change form, the checking process shall be implemented as required by Design-Builder's QMP. The Design Manager shall be responsible for

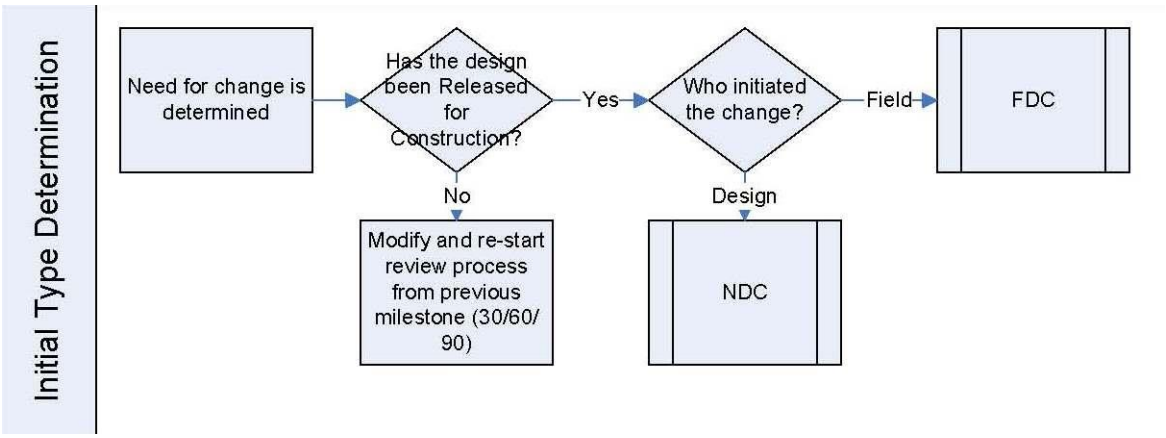
determining the magnitude of the design change and the appropriate quality control activities that will be implemented as a result of the design change.

D-4.4 Identifying Design Changes on Revised Drawings

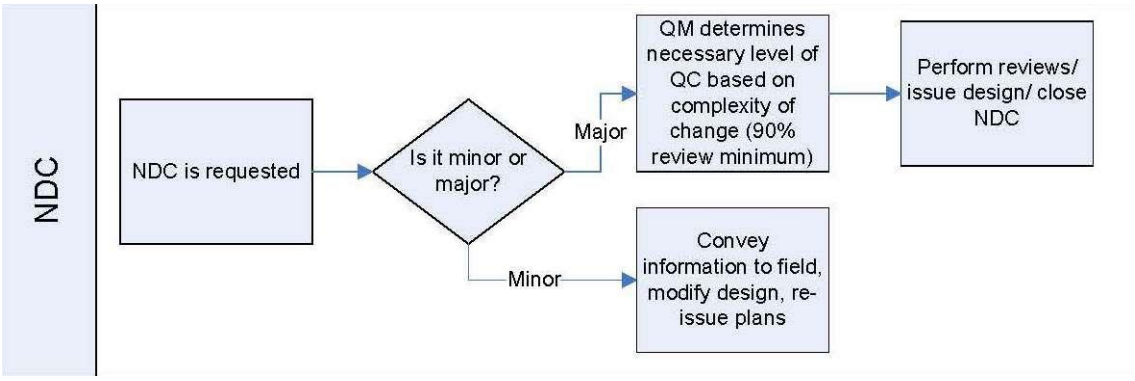
Revisions on drawings will tracked in accordance with the Design-Builder's QMP.

D-5 FLOW CHARTS

D-1: Initial Type Determination



D-2: NDC Flow Chart



REQUEST FOR PROPOSALS

UTAH DEPARTMENT OF TRANSPORTATION

4 Interchanges on Bangerter HWY (SR-154)

Project No. S-0154(12)11

Salt Lake County

CONTRACT DOCUMENTS

PART 4:
PROJECT DESIGN AND CONSTRUCTION REQUIREMENTS

Addendum 5 - October 27, 2016

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1—PROJECT CONFIGURATION

1A GENERAL

This Part 4-01 (Project Configuration) provides a summarized description of the physical infrastructure elements and limits of the Project that the Design-Builder shall design, construct, and/or install in accordance with the requirements of the Contract.

The Project Base Build and Build Alternative will be used for Project administrative and payment purposes and are not meant to constrain the Design-Builder's design or construction schedule or approach, except as other wise specified in the Contract.

1B INFRASTRUCTURE

1-B.1 Base Build

The following are major components that shall be provided as part of the Project.

1. Design and construction of four SPUI's along Bangerter Highway, structures, ramps and cross streets in accordance with Typical Sections shown in Part 7 (Contract Drawings) at the following locations:
    a. 5400 South
    b. 7000 South
    c. 9000 South
    d. 11400 South

2. Reconstruct mainline Bangerter pavement at each interchange with new PCCP in accordance with Part 4-15 (Roadways).
3. Construct a storm drain system at each interchange, replace or rehabilitate all existing storm drain pipes in accordance with Part 4-04 (Drainage).
4. Design for and accommodate future ramp metering in accordance with Part 4-15 (Roadways) at each on-ramp.
5. Construct new interchange lighting, signage, traffic signals, and ATMS in accordance with Part 4 (Project Design and Construction Requirements).
6. Provide safe facilities for pedestrian and bicycle traffic in accordance with Typical Sections shown in Part 7 (Contract Drawings).
7. Construct noise walls at each interchange as shown in Part 7 (Contract Drawings).
8. Protect the USBOR Aqueduct at 5400 South, 7000 South and 9000 South.
9. Coordinate, relocate and protect-in-place existing utilities as necessary.
10. Obliterate and/or remove all existing and temporary improvements that are not required for a fully functional Project. Unless otherwise specified in the Contract, salvageable material is the property of the Design-Builder.
11. In addition, the following are specific components for each interchanges.

5400 South

- See Build Alternative in this section below.

7000 South

- Reconstruct the pedestrian bridge at the location described in Part 4-17 (Structures) and as shown in Part 7 (Contract Drawings).
- Construct a southbound auxiliary lane between the new 7000 South southbound on ramp and the existing 7800 South southbound off ramp as described in Part 4-15 (Roadways) and shown in the Part 7 (Contract Drawings).
- Construct the JVWCD access vault as shown in Part 7 (Contract Drawings).

9000 South

- Construct the Bingham Creek Culvert.
- Relocate the West Jordan PRV Vault as described in Part 4-17 (Structures) and Part 6 (Third-Party Agreements).

11400 South

- Reconstruct 11400 South from 4000 West to 3600 West including removal of the existing "Oval-about".

1-B.2 Build Alternative

The Build Alternative consists of removal of the existing "Thru-Turn" intersection at 5400 South and 4015 West and replacing it with a standard signalized intersection as described in Part 4-15 (Roadways).

The Department may elect to include the Build Alternative in the Design-Builder's Proposal. The determination to include the Build Alternative may be made at any point during the Project.

2—GENERAL DESIGN REQUIREMENTS

2A. GENERAL

This Part 4-02 (General Design Requirements) establishes basic design and performance requirements to be used in the design and construction of the Project. Furnish the design of the Project in accordance with all professional engineering principles and generally accepted standards of the industry (but at least meeting the terms, conditions, and requirements of the Contract Documents), and in accordance with the terms and conditions set forth in the Contract Documents.

Technical design requirements, which govern the design of individual Project elements, are included within other sections of Part 4. Each section also contains requirements for additional submittals not identified in this Part 4-02 (General Design Requirements). If a Project element or component is not covered within Part 4, the design shall be governed by the Department's most current accepted version of other applicable engineering codes and standards, including those of the various federal, State, and local jurisdictions. If there are any conflicts in standards adhere to the standard with the highest priority or with the most stringent requirements.

See Part 3 (Quality Program) for additional requirements for design and construction.

See Part 1.6 (Agreement) for referenced standards, codes and criteria.

2B. STANDARDS

If there is any unresolved ambiguity in standards, it is the Design-Builder's responsibility to obtain clarification and Approval from the Department before proceeding with design and/or construction.

TABLE 2B-1
STANDARDS FOR GENERAL DESIGN REQUIREMENTS

PRIORITY	*AUTHOR OR AGENCY*	*TITLE*
1	UDOT	Special Provisions included in Part 5
2	UDOT	*2012 Standard and Supplemental Specifications for Road and Bridge Construction*
3	UDOT	*2012 Standard and Supplemental Drawings*
4	UDOT	*2015 Plan Sheet Development Standards*
5	UDOT	*Structures Design and Detailing Manual (SDDM)*
6	UDOT	*CADD Standards Manual*
7	UDOT	*Specification Writer's Guide*

2C. REQUIREMENTS

Prepare Design Documents, Plans, and Project Specifications for the Project to the Department's standards for general content and format in accordance with the Contract. Digitally sign all plan sheets.

2C-1 Design Submittals

All submittals shall meet the following requirements:

A. Upload all submittals to the Department's Projectwise.

B. Keep calculations readily accessible, clear, understandable, concise, complete, and accurate.

C. Provide any special provisions developed for the performance of the Work.

D. Organize all design calculations by discipline using a logical folder structure.

E. Include a table of contents, and number all pages with a numbering scheme that covers the entire set of calculations.

F. Include any relevant design memoranda, reports, and data.

G. Identify the code or standard, and the specific section within the code or standard, utilized for design. Indicate the design requirements, the assumptions made, the methods used, the source of information, and the cross-reference for the applicable design drawings.

H. Confirm calculations.

I. For calculations performed using software, reference the computer program name, vendor, version, and release date.

J. Document the coordination with Third-Parties.

2C-2 Released for Construction Documents

Released for Construction (RFC) Documents shall constitute all documents issued for the purposes of construction and shall include plans, reports, specifications, special provisions, Shop Drawings, and other items necessary to construct the Work.

The Design-Builder shall ensure the following:

A. All Work, including modifications to the Work, is designed under the authority of a Professional Engineer licensed in the State of Utah.

B. Work is constructed in accordance with the RFC Documents.

C. There are no outstanding Nonconformances as defined in Part 3 Appendix A.

All RFC Documents shall meet the following requirements:

D. Upload all RFC documents to the Department's Projectwise.

E. Prepare plans in general conformance with the UDOT 2015 *Plan Sheet Development Standards* and *Structures Design and Detailing* –Manual (SDDM). Obtain the Department's Approval of any variations.

F. Provide all plan sheet submittals containing CADD data in MicroStation format and in PDF, compatible for 11-by-17 inch sheets.

G. Provide estimated quantities for the purpose of materials testing.

H. Provide estimated quantities for the purpose of planning and scheduling construction activities, and facilitating payment activities.

I. Sign and seal RFC documents by a responsible Professional Engineer licensed in the State of Utah.

2C-3 Final Design Documents

Final design shall meet the requirements of the Contract and the following additional requirements:

A. Include fully completed RFC Documents and include any associated Notice of Design Changes and Field Design Changes.

B. Include design information from the most current RFC Documents and all design back-up information, including design plans, Shop Drawings, calculations, reports, specifications, memoranda, data, and electronic MicroStation data.

C. Sign and seal Final design documents by a responsible Professional Engineer licensed in the State of Utah.

D. For all post-RFC design changes, follow the same quality procedures for design checks, adequacy, and coordination as were performed on the original design, and conform to all requirements of the Contract in accordance with the Part 3 (Quality Program). Ensure that all design changes (including changes to plans, sketches, memoranda, specifications, calculations, and reports) are signed, stamped, and dated by a Professional Engineer licensed in the State of Utah.

E. Upload all final design documents to the Department's Projectwise.

2C-4 As-Built Documents

Changes to the design shall be incorporated into the As-Built Documents.

As-Built Documents shall meet the requirements of the Contract and shall reflect the actual condition of the final constructed Work.

Prior to Contract Completion, submit one copy of the As-Built Documents in MicroStation format (for CADD data) and in PDF on a CD or DVD, compatible for 11-by-17 inch sheets. Provide other As-Built documents as indicated in Part 4 (Project Design and Construction Requirements).

For all structural elements, provide final design and As-Built Documents to the Department on a CD or DVD, organized by structure number and including: calculations, load ratings, deviations, special provisions, Shop Drawings, and QC/QA forms. Include final geotechnical and hydraulic reports.

2C-5 Software

The following software programs are Approved for use on Project Work. If proposing to use any software other than that listed, submit the proposed software along with verification data for Department review and Approval.

Software used shall be the current version in effect as of the date of the Final RFP, unless otherwise specified. Update software programs throughout the Contract if mutually agreed upon by the Department.

2C-5.1 Office

A. Microsoft (MS) Office Suite 2013 edition (PowerPoint, Publisher, Word, Excel)

B. Primavera Engineering and Construction P6 (for Critical Path Method scheduling)

2C-5.2 Public Involvement

A. Adobe (Photoshop, Illustrator, Acrobat, InDesign)

B. Department-provided database

2C-5.3 Roadway

A. MicroStation (SS3) and Power InRoads (Select Series 4) (by Bentley) – Required

B. MicroStation Power Scope–for viewing CADD files

C. AutoTURN 9.0 (by Transoft Solutions)

D. SignCAD Millenium Version 8.51 (by SignCAD Systems, Inc.)

E. ProjectWise (by Bentley)

2C-5.4 Drainage

A. USACE HEC-HMS
B. USACE HEC-RAS
C. FHWA HY-8
D. Bentley InRoads Storm & Sanitary – Storm Drain Analysis
E. Bentley StormCAD – Storm Drain Analysis
F. Aquaveo Watershed Modeling System, (WMS) - Hydrologic Modeling
G. Bentley PondPak
H. NRCS WinTR-55
I. Bentley FlowMaster
J. FHWA Hydraulic Toolbox
K. EPA Storm Water Management Model (SWMM)

2C-5.5 Geotechnical

A. Deep Foundation Design: COM624, DFSAP, Driven, FLPIER, L-Pile, GROUP, GRLWEAP, Unipile, Allpile
B. Embankment and Slope Design Analysis: EMBANK, PCSTABL, GSTABL, MSEW, RESSA, Settle3D, SLOPE/W, SIGMA/W, STABL5M, STABL6, UTEXAS, UniSettle, XSTABL, SLIDE
C. Geomechanical Modeling: FLAC
D. Rockfall and Rock Slope Stability: CRSP, Rocfall, RockPack, RocPlane, Stereonet Programs, Swedge
E. Soil Nail Design: GoldNail, SNAILZ (Caltrans)
F. Geotechnical Seismic Analysis: DEEPSOIL, LiquefyPro, QUAKE/W, SHAKE, CLig/CPeT
G. Pile Dynamic Testing and Signal-Matching Analysis: PDA and CAPWAP or other Department-approved high-strain dynamic testing wave equation analysis programs with signal matching, including a full computer graphics package.

2C-5.6 Structural Design

A. See SDDM.

2C-5.7 Lighting

A. AGI32, version 2.17 – Lighting Design Software (by Lighting Analyst)

2C-5.8 Traffic

A. VISSIM—Complex signal coordination, roadway design features including but not limited to: weaving, queuing, and intersection turn bay storage (95th percentile).

2C-5.9 Advanced Traffic Management System and Maintenance of Traffic

A. ArcGIS (by ESRI)

2D. SUBMITTALS

Provide submittals to the Department in accordance with Table 2D-1.

TABLE 2D-1
DESIGN-BUILDER SUBMITTALS FOR GENERAL DESIGN

Submittal	***For Approval***	***Schedule***
Design Milestone Review Submittal Packages	No	As determined in QMP
Released for Construction Documents	No	Prior to construction of the Work element
Notice of Design Changes	No	Prior to construction of the Work element
Final Design Milestone Review Packages	No	Prior to Contract Completion
As-Built Documents	No	Prior to Contract Completion

3—ADVANCED TRAFFIC MANAGEMENT SYSTEM (ATMS)

3A. GENERAL

Conduct all Work necessary to meet the requirements of this Section 3 (Advanced Traffic Management System) and satisfy all functional needs and characteristics of the Project, including providing a complete and functional new ATMS system as detailed in the Project scope. This includes providing power services, a complete fiber-optic communications system that includes interconnecting, integrating all required traffic signals and ATMS devices to the communications system and installing Department-furnished material.

The ATMS shall include but is not limited to a fiber optic communications system, and closed circuit camera (CCTV) system, traffic monitoring stations (TMSs), and ramp meters, and variable message signs (VMSs). Note that existing UDOT ATMS conduit within the Project limits may contain private utilities in addition to UDOT ATMS fiber. Said private telecommunication utilities are to be accommodated in accordance with their individual current UDOT lease agreements, Part 4-09 (Maintenance During Construction), Part 4-19 (Utilities), and Part 6 (Third-Party Agreements). It is the Design-Builder's responsibility to coordinate with said private telecommunication utilities, in protecting or relocating their facilities.

Existing UDOT Fiber optic communication system shall remain operational during the entire Project. Damage and relocation cut over down time shall be less than four hours in duration.

3B. STANDARDS

Complete Work for the ATMS in accordance with requirements of the standards listed by priority in Table 3B-1 (Standards for ATMS).

If there is any conflict in Standards, adhere to the Standard with the highest priority.

TABLE 3B-1
STANDARDS FOR ATMS

Priority	*Author or Agency*	*Title*
1	UDOT	Special Provisions included in Part 5
2	UDOT	*Supplemental Specifications to 2012 Standard Specifications for Road and Bridge Construction,* as modified by Part 5
3	UDOT	*2012 Standard Specifications for Road and Bridge Construction,* as modified by Part 5
4	UDOT	*Supplemental Drawings to 2012 Standard Drawings for Road and Bridge Construction*
5	UDOT	*2012 Standard Drawings for Road and Bridge Construction*
6	AASHTO	*A Policy on Geometric Design Of Highways and Streets*
7	AASHTO	*Roadside Design Guide*
8	UDOT	*Utah Manual on Uniform Traffic Control Devices (*Utah MUTCD*)*
9	NEMA	*National Electrical Manufacturers Association Standards*
10	NFPA	*National Electric Code*

3C. REQUIREMENTS

Do not reuse any existing equipment and material for final device installation. Existing equipment may be used for temporary use. Identify the coordinates of all ATMS devices (poles, cabinets, and junction boxes) on the design plans.

3C-1 Closed Circuit Television (CCTV)

Design, construct, and integrate a CCTV camera system and determine locations for the CCTVs.

A. Provide CCTV surveillance coverage at each interchange within the Project limits, including Bangerter mainline lanes, cross-street lane approaches (both sides), ramp terminals, and under bridges. Provide CCTV coverage at ramp meter locations, and on the front side of all CMS within the project limits (for message verification).

B. Maintain existing CCTV surveillance at each interchange to provide a clear view of approach lanes, ramp meter lanes, and a minimum of 0.25 miles of the crossing arterial in both directions. Provide a second CCTV at the interchange if the bridge obstructs the view of the crossing arterial and the interchange signal.

C. Submit the proposed CCTV coverage by either a plot illustrating view cones (sight triangles) and profile analysis for final roadway configuration or hand-held camera view from bucket trucks from each proposed CCTV location.

D. CCTV Poles shall be State Furnished 45 Foot poles. At signalized intersections, CCTV's are to be installed on the traffic signal pole luminaire extension. The Department is to Approve final locations.

3C-2 Traffic Monitoring Station (TMS)

Design, construct, and integrate a non-intrusive detection data collection system utilizing Department-furnished radar detection devices. Design and install the system to accurately record Bangerter Highway traffic volumes, occupancy, and speeds, and collect such data at intervals at all on-ramp and off-ramp locations for each highway mainline lane and at each ramp lane. Determine the location of and construct all traffic monitoring stations.

A. Use ramp meter loops as a TMS for on-ramps.

B. For on-ramp locations the TMS shall be downstream of the ramp meter stop bar, but prior to the mainline painted gore.

C. For off-ramp locations the TMS shall be downstream of the mainline gore, but within 100 feet of the painted gore point.

D. Submit the proposed TMS coverage by a plot illustrating monitoring zones of each proposed TMS site showing that the zones meet the manufactures specifications for device placement and operation.

E. Devices may be co-located on CCTV poles if they are planned in locations that can satisfy placement and operational requirements of both CCTV and TMS devices.

F. Install TMS devices in accordance with manufacturers' installation requirements.

3C-3 Ramp Meters

Design, construct, and integrate the underground portion and partial above ground portion of a ramp meter system for all Bangerter Highway on-ramps. The underground portion consists of lane detection loops, conduits, junction boxes, cabling, power circuitry, pole foundations, and an ATMS cabinet. The above ground portion is the signal poles. Detection devices in new pavement areas shall be pre-formed loops placed under new pavement. Use preformed loops with continuous 14-gauge wire without splices in the loop and on UDOT's list of accepted materials. Saw cut loops are not allowed in new pavement areas. Ramp meter storage on the Interchange On-Ramps shall be provided in accordance with the Part 4-15 (Roadways).

Design, construct, and integrate the system to allow the Department to collect ramp lane volumes from the lane detectors.

3C-4 Changeable Message Sign (CMS)

Design a complete CMS system for future installation by the Department. Install two 2 inch conduits (power and communication) terminating at two Type II Junction Boxes between the future CMS pole and ATMS cabinet. Provide the ATMS power source.

Construct the ATMS maintenance pullout areas for the future CMS.

Locate the VMS boards on Bangerter Highway between the off ramp gores and the structure at 7000 South, centered over the traveled lanes (sign bridge) at the approximate locations listed below:

A. Northbound Bangerter Highway, prior to 7000 South

B. Southbound Bangerter Highway, prior to 7000 South

Coordinate future CMS locations with the Department during the design process. Include CMS locations in the Signing Plan submittal required in Section 16 (Signs). Provide overhead access catwalks on each CMS that extend from the outside edge of the shoulder to the CMS. CMS messages must be visible and legible by at least one CCTV camera.

3C-5 ATMS Cabinets

Determine location of and construct ATMS cabinets, including the cabinet foundations, electrical power, junction boxes, vaults, conduit, grading, cables, and conductors, for each ATMS device location.

A. Locate cabinets for CCTV installations within 100 feet of the camera pole base. CCTV Cabinets may be pedestal or pole mounted.

B. Locate cabinets for TMS installations within 100 feet of the TMS subsystem. TMS Cabinets may be pedestal or pole mounted.

C. Mount the CMS Cabinets between 250 Feet and 500 Feet upstream of the CMS structure. Cabinets for CMS may be pedestal or pole mounted.

D. Cabinet hardware for multiple ATMS devices may be combined into one cabinet, provided they otherwise satisfy the requirements of the type of device it is servicing.

E. Construct the cabinet in accordance with the AASHTO Roadside Design Guide.

F. Place the following in a table on the plan sheet for the ATMS Cabinet:

1. Northing-Easting
2. Project Stationing
3. Latitude-Longitude
4. Local street addressing

3C-6 Department-Furnished Material

3C-6.1 *Department-Furnished Material List*

The Design-Builder is responsible for installing Department-furnished material. The Department will furnish the following material:

A. CCTV Cameras:

1. 45-foot camera poles and anchor bolts
2. Traffic signal pole luminaire extensions at signalized intersections.
3. Data port & Power Supply
4. Positioner CCTV camera assembly and CCTV cable
5. Digital video encoder
6. ATMS cabinet (Model 334) and/or 3R pole-mounted enclosure fully populated and facility tested with required electronics and Ethernet switch and patch cables.

B. Traffic Monitoring Stations:

1. Non-intrusive detector (NID) and NID cabling, and electronic components
2. Lighting luminaire poles and anchor bolts
3. Mounting brackets
4. Surge suppressor
5. ATMS cabinet (Model 334) and/or 3R pole-mounted enclosure fully populated and facility tested with required electronics and Ethernet switch and patch cables.

C. Ramp Meters:

1. Signal poles and anchor bolts
2. Luminaire extensions
3. 2070 controller
4. ATMS cabinet (Model 334) fully populated and facility tested with required electronics and Ethernet switch and patch cables.

3C-6.2 *Department-Furnished Material Notification Process*

To receive Department-furnished material, the subsequent notification process must be followed:

A. Submit the State Furnished ATMS Materials Form and State Furnished Signal Materials Form to the Department for each interchange separately to request Department-furnished material. An itemized inventory schedule of each ATMS site location for the requested material shall accompany each form. These forms shall be submitted in the following time frames:

1. No more than 150 Calendar Days and no less than 110 Calendar Days prior to needing materials: ATMS cabinets, ATMS steel poles for TMS, mast arms, PED poles, VMS, camera poles, Multi-Mode Fiber-optic cable, and CCTV's not at a traffic signal.

2. No more than 90 Calendar Days and no less than 60 Calendar Days prior to needing all other material.

   (a) Submit a notification to the Department requesting pick-up of materials 10 Calendar Days prior to the needed date. This may not be submitted until 10 Days prior to the completion period of the first notification time frames unless the Department has already received the material. The notification will include each site location and associated equipment requested for pick-up.

B. The Department-furnished materials to be picked-up must be coordinated through the Department. Materials will be picked up at the locations below depending on the specific item requested.

Utah Department of Transportation Traffic Operations Center (TOC) 2060 South 2760 West Salt Lake City, UT 84104	or	Utah Department of Transportation Central Warehouse 4501 South Constitution Blvd West Valley City, UT 84119

C. The Design-Builder is responsible for all site installation, insurance, interim storage, labor, and transportation associated with equipment pickup and transportation between storage and field sites.

3C-7 Location and Protection of ATMS Elements

Install all ATMS elements within the Project and in accordance with the AASHTO Roadside Design Guide, and such that routine maintenance will not require a lane closure. Do not locate any ATMS elements in the median, except the center support of highway CMS signs.

3C-8 Electrical Power Service

Comply with Part 4, Section 19 (Utilities) for power service provider coordination and cost requirements.

A. Provide metered service to all ATMS cabinets and devices within the Project limits. Meter may be combined with traffic signals, but must be separate from meter for lighting. The rate schedule for this meter is found on Rocky Mountain Power's schedule 15.2 at http://www.rockymountainpower.net/about/rar/uri.html.

B. Existing Department ATMS power services may be used to provide power to new or relocated devices, if the service can accept, or be modified to accept, additional load, and if the voltage drop to all facilities energized from the service does not exceed NEC requirements. Where electrical power service exists, provide the electrical power feeder and branch circuit from the point of service to the ATMS equipment. Existing power services for other agencies or private interests are not permitted to power Department ATMS elements.

C. Where electrical power service does not exist, coordinate with the Utility for the building of an electrical service point to a location at the edge of the ROW. The Design-Builder shall pay for the cost of the Utility construction. Coordinate with Utility companies and cover the cost. Provide the electrical power feeder and branch circuit from the edge of the ROW to the ATMS equipment

D. It is the Design-Builders responsibility to supply all electrical calculations for ATMS facilities for full functionality.

E. Energize controller/cabinet assemblies. Provide a step-down transformer where service higher than 120 volts is used. Include with every cabinet an additional load allowance of 12 amperes (A) for powering cabinet convenience outlets. Label the cabinet destinations on each power service with a plated label.

F. Electrical power costs for new permanent services shall be paid by the Department.

3C-9 Cabling and Conductors

Design, furnish, and install all conductors, connectors, and cables.

CCTV cables, NID/TMS Cables, and CMS Multi-Mode Fiber Optic Cables are Department Furnished and the Design-Builder is to design, install, and integrate into the fiber optic system.

Remove and dispose of all abandoned ATMS features.

3C-10 Vaults and Junction Boxes

Furnish and construct all at grade junction boxes and pull boxes.

A. Protect-in-place all existing vault locations within the backbone system. If existing vaults are inside the travel lanes of the roadway, sweep conduits to the shoulder and install two new Type III junction boxes. Terminate each half of the conduit bundle into the junction boxes installed side-by-side, or end-to-end.

B. Install two new Type III junction boxes on the shoulder of the roadway, and sweep existing vacant conduits to terminate inside of new junction boxes if existing vault locations are not in locations where access to the duct system is necessary. Do not sweep existing cabling or conduits filled with existing cables into new junction boxes if the cabling does need access by the Department.

C. Junction boxes shall be no smaller than a type II when the box contains future use conduit for fiber-optic cable.

D. Junction boxes shall be no smaller than type III when containing a splice enclosure or designed for a future splice location.

E. Do not place junction boxes or vaults in a flood-prone area, irrigation area, drainage ditch, or paved shoulders.

F. Locate junction boxes for splice enclosures within 25 feet of a vehicle access point. Locate the junction box with a splice enclosure such that there are no obstructions to prevent a vehicle and splice trailer from accessing the junction box. Provide a clear area 50 feet long and 14 wide parallel to the access road with the grading no steeper than 6:1.

G. If junction boxes are placed within maintenance pullout areas, locate boxes centered in the width of the maintenance area. Provide boxes that are concrete vaults with cast iron lids.

H. Only power conductors are to be placed in Type I Junction Boxes.

I. Locate conduit system between vaults and junction boxes.

1. Establish a junction box/vault naming system that corresponds with the predominant relative route number and milepost to the nearest tenth of a mile and a letter designation of 'A-Z' for multiple boxes within the same respective tenth of a mile.

J. Place the following in a table on the plan sheet for the ATMS junction box/vault location:

1. Northing-Easting
2. Project Stationing
3. Latitude-Longitude
4. Local street addressing

Place ground rods in a corner of the junction box leaving the interior 50% clear of any ground rod. Do not place the ground rod in the pass-through space of any entering conduit.

3C-11 Conduits

A. Verify at least one conduit in the existing duct system has a viable pathway by proofing existing conduits with a Department approved mandrel. Replace any crushed conduit in 10 feet increments. Provide documentation to the Department Fiber Manager of all conduit repairs, and verification that at least once conduit is free from obstructions. Document condition or blockages of remaining conduits.

B. Design, construct, and integrate a 144-strand, single-mode fiber-optic (SMFO) cable inside the existing conduit path on Bangerter Highway. Design, construct, and integrate a 1D HDPE conduit system along each of the cross-street interchanges within the Project limits for the 72-strand SMF for the fiber-optic communication system. Splice fiber optic systems together on project cross street interchanges to any Department owned fiber optic cable within ½ mile of the Project limits.

C. Design and construct new conduit for all new conduit pathways for cabling and conductors.

D. Utilize separate conduit systems for communications and power systems. Do not utilize existing backbone conduit along Bangerter Highway for any power system without Department approval.

E. Do not place backbone conduit in bridge parapets, hanging under the structure, nor crossing the interchange ramps, to satisfy mainline conduit or cross street conduit system requirements. Place the conduit as close to the ROW fence away from the roadway as possible at bridges.

F. Use boring to install conduit under existing pavement that will not be replaced.

G. Install all conduit within the Project. If Work performed by the Design-Builder results in existing conduit not meeting depth requirements, it is the Design-Builder's responsibility to replace or relocate the conduit to the required depths.

H. One conduit of the system shall contain a detectable pull tape tied to the ground rod in each junction box.

3C-12 Communications

A. Provide a fiber-optic communication system consisting of all new components and meeting the following requirements:

1. Capable of transporting data and video signals between ATMS field devices and hubs and the Department Traffic Operations Center (TOC).
2. Connect traffic signals as required in Part 4, Section 18 (Traffic Signals) to the fiber-optic communication system.
3. Install a standard, loose-tube 144 Strand Single Mode Fiber Optic cable for the backbone of the fiber-optic communications system.
4. Connect and integrate all ATMS devices to the fiber-optic communication system.
5. Connect new fiber system to the existing Bangerter Highway locate system. Bond the armored fiber cable so it will locate through each junction box without signal interruption.

B. Design and construct a 3-inch (TAL-3) conduit and pre-terminated 6 Strand SMFO drop cable, and #14 locate wire, between the backbone or distribution line of the fiber-optic communication system and the traffic signal cabinets, and ATMS cabinets. Terminate all conduit into a cabinet base, Type II, or Type III junction box.

C. Submit a fiber-optic schematic design, including fiber optic attenuation budgets to the Department Fiber Optics Group.

D. Contact and coordinate with the owning agencies prior to designing, and then prior to performing any work that may impact a hub or communication line.

E. Provide Internet Protocol (IP) Ethernet communication for all devices.

F. Extend backbone fiber beyond the Project limits to the nearest existing full splice point. Roll-end splices shall be more than 10,000 feet from all hubs. Mid-span splices are not allowed. Notify the Department of the date to perform the full splice seven days prior to the proposed splice date.

G. Coil any excess fiber slack in the junction boxes.

H. 60 Days prior to splicing, request fiber splice details from the Department Fiber Optics Group. The request shall include the final ATMS cabinet and splice locations, and the ATMS devices within each cabinet. Modifications to a cabinet or splice location after submitting the request will extend the time period to deliver the fiber splice details an additional 30 days. Splice details will be delivered from the Department to the Design-Builder no more than 5 days prior to the Design-Builder's published splicing schedule.

I. 60 days prior to integration, request from the Department the channel diagrams. The request shall include existing IP addresses, existing channel diagram, the devices needing new addresses for each cabinet.

J. Identify all third-party communication service providers (i.e. Utopia, etc.) lines, within the Project limits on the design drawings.

K. Any disruption of service to the communications in the UDOT fiber shall be coordinated with Lynne Yocom (801-887-3780; lyocom@utah.gov) or Leon Hadley (801-887-3765; lhadley@utah.gov), and shall be in accordance with time requirements as designated in the RFP.

3C-13 Integration and Testing

A. Conduct integration and Local Field Operations Test (LFOT) for all ATMS components and fiber that meet the following criteria:

1. A new device and/or cabinet supporting device has been installed or relocated.

2. A communications path between the device and the local cabinet has been disturbed and/or relocated.

3. A communications path between the local cabinet and its communication hub has been disturbed and/or relocated.

4. New and Re-constructed traffic signals shall have signal controller cabinet, fiber and switch devices tested, configured and passed inspection prior to erecting any traffic signal poles.

B. Integrate ATMS components into the new fiber optic communications system and the TOC.

C. Perform field integration of Department-furnished ATMS field equipment, including site preparation, conduit system, pads, power drop, pick-up of Department-furnished equipment, placement of equipment, power and communications hook-up, site testing, turn-up and burn-in of the site devices, and turn-up of the entire system and its field testing, burn-in and acceptance procedures. Follow the UDOT ATMS Device Acceptance Process.

D. The Design-Builder shall only use consultants listed on the current Department pool list of prequalified consultants for the integration of ATMS field equipment for the placement, integration, and testing of field subsystems and systems.

E. Conduct a TMS detector accuracy test after traffic is in final lane locations. Verify the accuracy of detectors by conducting two separate 10-minute speed and volume counts, and comparing them with speed radar gun and hand (video-recorded) counts. 10-minute counts shall be made under typical traffic conditions, on weekdays between 7 a.m. and 10 a.m. and/or between 3 p.m. and 6 p.m. Take corrective action, as necessary, if detector accuracy is not within specified accuracies. If the inaccuracies are due to the State Furnished item, new State Furnished equipment will be provided. As recorded by the detector, the relative occupancy shall be accurate to ±20 percent, and the vehicle speed shall be accurate to ±5 miles per hour (mph). Notify the Department at least seven calendar days prior to beginning testing.

F. Submit ATMS device integration sheets to the Department five days before burn-in date.

G. Submit 30 Day ATMS Burn-in Test Reports prior to Substantial Completion.

H. Notify Department 10 days prior to fiber testing and conduit mandreling to allow witness by the Department. Submit a digital copy (on a disk or thumb drive) of the fiber test sheets to Leon Hadley five days after testing is complete.

3C-14 ATMS Maintenance Access

Design and construct ATMS device and cabinet locations to provide safe and routine maintenance access to accommodate a space of 14 feet wide and 50 feet long.

A. Provide bucket truck access to NID poles, CMS catwalk, and CCTV camera poles to re-aim or replace requiring a shoulder closure only. Maintenance access area must be 50-foot long (parallel to the roadway) by 14-foot wide and may include the concrete shoulder adjacent to the travel lanes, but not any portion of the travel lane. The point of reference for measurements on the maintenance access area is located at 10 feet from the closet edge of the maintenance access area that is perpendicular to the traffic flow and a minimum of 7 feet from the edge of the travel lane. The distance measured from the ATMS/VMS/TMS pole to the point of reference of the maintenance access must not exceed 30 feet and both must be in-line and perpendicular to the roadway. The Maintenance Access Pullout must be situated relative to the ATMS pole so the 50 foot section is split by 40 feet downstream to traffic and 10 feet upstream to traffic.

B. Provide a 32 inch tall barrier in the maintenance access (pull out) area for maintenance personnel to access ATMS cabinets behind barrier. The grades on both sides of the barrier must be the same to ease access to the ATMS cabinets behind the barrier. ATMS cabinets not behind barrier shall not have slopes steeper than 1 to 4 in the path to access the cabinet and be no more than 100 feet from a safe parking location.

C. Avoid placement of devices or poles in snow storage areas between barriers and sound walls.

D. Locate junction boxes with splice enclosures within 25 feet of the shoulder.

E. See Part 7 (Contract Drawings) for ATMS maintenance access details.

3C-15 Remove and Salvage Material

Remove and salvage to the Department existing ATMS elements and electronics, including ramp meter controllers, ATMS cabinets, ATMS cabinet electronics, NID devices, CCTV cameras and cabling, CMS board, CMS controller, and ETC devices. Remove existing backbone fiber optic cable and junction boxes. Contact the Department to coordinate the salvage work. The Design-Builder is responsible for salvaging and delivering the ATMS devices to the determined location.

3D. SUBMITTALS

Provide submittals to the Department in accordance with Table 3D-1.

TABLE 3D-1
DESIGN-BUILDER SUBMITTALS FOR ATMS

Submittal	***For Approval***	***Schedule***
State Furnished Signal Materials Form	No	As noted in this Section
Notice requesting pick-up of Department-furnished materials	No	As noted in this Section
Proposed CCTV Pole location	Yes	As noted in this Section
Proposed CCTV and TMS coverage roll plot or video	No	Consistent with Part 3 (Quality Program)
Fiber-optic schematic design, including fiber-optic attenuation budgets	No	Consistent with Part 3 (Quality Program)
End-to-end splice dates	No	7 days prior to proposed splice date
Request for fiber splice details	No	30 Days prior to splicing
Request for channel diagrams	No	30 days prior to integration
TMS detector accuracy test notification	No	Minimum 7 Days prior to testing
Device integration sheets	No	5 Days before burn-in date
30 Day ATMS Burn-in Test Reports	No	Prior to Substantial Completion
Fiber optic system as-built plans with GIS lat. and long and fiber optic light test sheets.	No	Prior to Substantial Completion

4—DRAINAGE

4A. GENERAL

Provide a complete drainage system for collecting, detaining, treating, and discharging stormwater runoff from within the Construction Limits and its contributing drainage areas and for conveying offsite surface waters across the Department Right-of-Way (ROW).

Design and construct drainage systems in accordance with requirements of this specification, including performance requirements, standards and references, warranties, design and construction criteria, maintenance during construction, and required submittals.

4B. STANDARDS AND REFERENCES

4B-1 Standards

Design and construct the drainage systems in accordance with the requirements of the standards listed by priority in Table 4B-1 (Standards for Drainage Systems).

If there is any conflict in standards, adhere to the standard with the highest priority. However, if the Design-Builder's Proposal has a higher standard than any of the listed standards, adhere to the Proposal standard.

If there is any unresolved ambiguity in standards, it is the Design-Builder's responsibility to obtain clarification and Approval from the Department before proceeding with design and/or construction.

TABLE 4B-1
STANDARDS FOR DRAINAGE SYSTEMS

Priority	*Author or Agency*	*Title*
1	*UDOT*	*Request for Proposals, for the Project (including Performance Specifications and Project Special Provisions)*
2	*UDOT*	*Supplemental Specifications to 2012 Standard Specifications for Road and Bridge Construction, as modified by Part 5*
3	*UDOT*	*2012 Standard Specifications for Road and Bridge Construction as modified by Part 5*
4	*UDOT*	*Supplemental Drawings to 2012 Standard Drawings for Road and Bridge Construction*
5	*UDOT*	*2012 Standard Drawings for Road and Bridge Construction*
6	*UDOT*	*Manual of Instruction, "Roadway Drainage"*

4B-2 References

Use the current version of each listed reference in Table 4B-2 (References for Drainage Systems) as supplementary guidelines for the design and construction of the drainage system. These references have no established order of precedence.

TABLE 4B-2
REFERENCES FOR DRAINAGE SYSTEMS

Author or Agency	*Title*
AASHTO	*Roadside Design Guide*
FEMA	*Flood Insurance Rate Maps*
FHWA	*Highway Hydrology, HDS-2*
FHWA	*Hydraulic Design of Highway Culverts, HDS-5*
FHWA	*Drainage of Highway Pavements, HEC-12*
FHWA	*Hydraulic Design of Energy Dissipaters for Culverts and Channels, HEC-14*
FHWA	*Design of Roadside Channels with Flexible Linings, HEC-15*
FHWA	*Evaluating Scour At Bridges, HEC-18*
FHWA	*Stream Stability At Highway Structures, HEC-20*
FHWA	*Design of Bridge Deck Drainage, HEC-21*
FHWA	*Urban Drainage Design Manual, HEC-22*
FHWA	*Bridge Scour And Stream Instability Countermeasures, HEC-23*
NASSCO	*Pipeline Assessment and Certification Program Reference Manual*
NCHRP	*Report 568, Riprap Design Criteria, Recommended Specifications, and Quality Control*
NCHRP	*Report 1-29, Improved Surface Drainage of Pavements.*
UDEQ/DWQ	*Utah Pollutant Discharge Elimination System (UPDES) General Permit for Storm Water Discharges from Construction Activities. UPDES Permit No. UTRC00000*
UDEQ/DWQ	*UPDES Municipal Separate Storm Sewer System (MS4) Permit. UPDES Permit No. UTS000003*
UDOT	*Erosion and Sediment Control Field Guide*

4C. GENERAL PROJECT REQUIREMENTS

A. The Design-Builder is responsible for the verification and use of existing drainage and irrigation facility data required for analysis and design. Obtain the following information for any existing drainage and irrigation facilities within the Project Limits that are not included in the information provided by the Department: ownership, size, material, end treatment, functionality, and condition.

B. Drainage facilities are to be compatible with current local stormwater management plans. Coordinate Project drainage plans with local city and county jurisdictions where applicable within the Project.

C. Provide drainage facilities that minimize post-Project maintenance required to keep the systems functional. Provide drainage features that can easily be accessed, and that have adequate operating space. Use drainage system parts, components, accessories, and sizes that conform to the Department's standard drawings. Do not use custom sized catch basin grates.

D. Do not allow any drainage to discharge from the Department ROW onto private property. Drainage that sheet flows (not concentrated) off the Department ROW is to be reviewed and approved on a case by case basis.

E. Maintain the post-construction peak discharge rates at or below the pre-Project peak discharge rates for the 2, 10, 50, and 100 year recurrence intervals. The post-Project release rates combined with other existing flows are not to exceed the capacity of a downstream drainage system.

F. Do not connect to or impact non-Department facilities unless provided for in

agreements included in Part 6 (Third-Party Agreements) or without the express, written consent from the owner of the non-Department facility. Provide a copy of the approval to the Department.

G. Maintain existing drainage patterns or outfall locations outside of the Construction Limits unless changes are specifically required in Part 4-04 (Drainage).

H. Evaluate the integrity and conveyance ability for all existing drainage pipes that will remain and function as part of the drainage system within the Project limits. Assess each drainage pipe condition using the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Program (PACP). The inspector is to have a current NASSCO Certification. Document the condition of each drainage pipe inspected. Note that PACP standards require cleaning of the drainage pipe prior to inspection.

1. *Department Owned Existing Pipes:* Line all existing Department owned pipes that remain in use within the Construction Limits with a pipe rehabilitation liner regardless of condition with the exception of pipes at and near the intersection of Bangerter Highway and 7000 South that have already been rehabilitated. Exclude existing pipes proposed to remain within the 4015 West Build Alternative. Line from manhole to manhole.

2. *Third-Party Owned Existing Pipes:* Line all Third-Party pipes, including irrigation pipes that remain in use within Construction Limits and Department ROW with a pipe rehabilitation liner. Do not rehabilitate existing irrigation pipes that remain in use and are part of the Welby Canal Turnout 200 system located outside of roadway pavement areas. After NTP, coordinate with the Department for proposed rehabilitation methods (based on the inspections) as part of the Project. Line from manhole to manhole.

3. Maintain at least the same hydraulic capacity as that of the existing pipe or culvert, for existing pipes or culverts that are lined or replaced. Use 0.011 as the lower limit for the Manning's "n" coefficient value for pipe liner. Rehabilitate all drainage pipes that remain in place.

4. Structurally evaluate any existing drainage pipe that will remain to verify that any additional fill or loading placed on the drainage pipe does not exceed fill height limits per standard drawings. Do not reuse or allow any drainage pipe to remain that does not meet this criterion.

5. Document all assessment findings in a technical memorandum and include as an appendix to the final design Drainage Report.

I. Evaluate the integrity and conveyance ability for all existing drainage structures (inlets, catch basins, end sections and manholes) that will remain and function as part of the drainage system within the Project limits. Assess each drainage structure condition using the NASSCO Manhole Assessment Certification Program (MACP). The inspector is to have a current NASSCO Certification. Document the condition of each drainage structure inspected.

1. If grade 3, 4 or 5 defects are encountered the structure is to be evaluated by the Department to determine if it is to be rehabilitated or replaced.

2. Document all assessment findings in a technical memorandum and include as an appendix to the final design Drainage Report.

J. Inspect and clean all existing drainage structures (including, but not limited to, detention outlet structures, oil/water separators, catch basins, and manholes) proposed

to remain.

1. Ease of maintenance: Provide access to all new drainage facilities, and that provide adequate operating space to allow for post-construction maintenance activities.
2. Safety: Provide safe access to all drainage facilities for post-construction maintenance activities.

K. Completely remove all drainage structures and appurtenances that are abandoned by the Project. Abandon or remove drainage pipes in accordance with Department Standard Specifications.

L. Do not use permanent pump stations for stormwater or groundwater.

M. Do not use openings in walls or barriers to convey stormwater.

N. In addition to analysis and design for the Project, analyze and design storm drain facilities within 100 feet of the Project limits of each interchange and analyze storm drain facilities within contributing drainage areas of existing and proposed detention facilities affected by the Project. . Adhere to all requirements of Section 4-04 Drainage.

4D. DESIGN AND CONSTRUCTION CRITERIA

4D-1 Hydrology

A. Perform hydrologic analyses for all on-site drainage areas and for all off-site drainage areas (or basins that contribute runoff to the Project site. On-site drainage areas are defined as contributing drainage areas within Department ROW; off-site drainage areas are those outside of Department ROW. Identify all impacts to any existing storm drainage system based on the hydrologic analyses.

B. Use the design frequencies in accordance with Table 4D-1 (Design Frequency Requirements) when designing Department owned drainage facilities. The design frequencies for all other drainage facilities are to conform to the local municipality's criteria.

TABLE 4D-1
DESIGN FREQUENCY REQUIREMENTS (YEAR)

FACILITY TYPE	ROAD CHARACTERISTICS		
	BANGERTER HWY.	OTHER THAN BANGERTER HWY. (OVER 1000 AADT*)	LOW VOLUME (UNDER 1000 AADT*)
BRIDGE	50	50	25
CROSS DRAINAGE	50	50	25
STORM DRAINAGE	10	10	10
STORM DRAINAGE CHECK EVENT (SAG LOCATION)	50	25	10

*BASED ON A 20 YEAR TRAFFIC PROJECTION

C. Design all natural rivers and streams that have a floodplain designation by the Federal Emergency Management Administration (FEMA) to accommodate the 100-yr storm

event in accordance with State and Federal requirements.

D. Use the 2-year, 1-hour storm event for designing water quality systems.

E. Design canals and irrigation facilities based on existing capacity and functionality as determined by coordination with the owner unless modified by written agreement in Part 6 (Third Party Agreements) and approved by the Department.

F. Use the Rational Method for the design of all on-site storm drain systems and for erosion protection calculations.

G. Use the precipitation data in Table 4D-2 (Depth/Intensity-Duration Frequency Data) based on NOAA Atlas 14 point precipitation frequency estimates for the design of on-site drainage systems. Use five minutes as the minimum time of concentration.

TABLE 4D-2A
DEPTH/INTENSITY-DURATION-FREQUENCY DATA
BANGERTER HWY. AT 5400 SOUTH

Duration	2-Year		5-Year		10-Year		25-Year		50-Year		100-Year	
	inches	in/hr	inches	in/hr	inches	in/hr	inches	in/hr	inches	in/hr	inches	in/hr
5-min	0.15	1.86	0.21	2.56	0.27	3.19	0.35	4.24	0.44	5.23	0.53	6.38
10-min	0.24	1.42	0.32	1.94	0.41	2.43	0.54	3.23	0.66	3.98	0.81	4.85
15-min	0.29	1.17	0.40	1.60	0.50	2.01	0.67	2.66	0.82	3.29	1.00	4.01
30-min	0.39	0.79	0.54	1.08	0.68	1.35	0.90	1.79	1.11	2.21	1.35	2.70
1-hr	0.49	0.49	0.67	0.67	0.84	0.84	1.11	1.11	1.37	1.37	1.67	1.67
2-hr	0.61	0.30	0.79	0.40	0.97	0.48	1.25	0.63	1.52	0.76	1.83	0.91
3-hr	0.70	0.23	0.88	0.29	1.05	0.35	1.32	0.44	1.56	0.52	1.86	0.62
6-hr	0.90	0.15	1.09	0.18	1.26	0.21	1.52	0.25	1.74	0.29	1.99	0.33
12-hr	1.11	0.09	1.34	0.11	1.54	0.13	1.83	0.15	2.07	0.17	2.33	0.19
24-hr	1.32	0.05	1.57	0.07	1.79	0.07	2.07	0.09	2.30	0.10	2.53	0.11

TABLE 4D-2B
DEPTH/INTENSITY-DURATION-FREQUENCY DATA
BANGERTER HWY. AT 7000 SOUTH

Duration	2-Year		5-Year		10-Year		25-Year		50-Year		100-Year	
	inches	in/hr	inches	in/hr	inches	in/hr	inches	in/hr	inches	in/hr	inches	in/hr
5-min	0.16	1.88	0.22	2.59	0.27	3.24	0.36	4.30	0.44	5.29	0.54	6.46
10-min	0.24	1.44	0.33	1.97	0.41	2.47	0.55	3.27	0.67	4.03	0.82	4.91
15-min	0.30	1.19	0.41	1.63	0.51	2.04	0.68	2.70	0.83	3.33	1.01	4.06
30-min	0.40	0.80	0.55	1.10	0.69	1.37	0.91	1.82	1.12	2.24	1.37	2.73
1-hr	0.49	0.49	0.68	0.68	0.85	0.85	1.13	1.13	1.39	1.39	1.69	1.69
2-hr	0.61	0.31	0.80	0.40	0.98	0.49	1.26	0.63	1.53	0.76	1.84	0.92
3-hr	0.70	0.23	0.89	0.30	1.05	0.35	1.32	0.44	1.57	0.52	1.87	0.62
6-hr	0.91	0.15	1.10	0.18	1.27	0.21	1.54	0.26	1.75	0.29	2.01	0.34
12-hr	1.12	0.09	1.36	0.11	1.56	0.13	1.85	0.15	2.10	0.17	2.36	0.20
24-hr	1.32	0.05	1.57	0.07	1.79	0.07	2.07	0.09	2.30	0.10	2.53	0.11

TABLE 4D-2C
DEPTH/INTENSITY-DURATION-FREQUENCY DATA
BANGERTER HWY. AT 9000 SOUTH

Duration	2-Year		5-Year		10-Year		25-Year		50-Year		100-Year	
	inches	in/hr	inches	in/hr	inches	in/hr	inches	in/hr	inches	in/hr	inches	in/hr
5-min	0.16	1.90	0.22	2.60	0.27	3.26	0.36	4.32	0.44	5.32	0.54	6.48
10-min	0.24	1.45	0.33	1.99	0.41	2.48	0.55	3.28	0.67	4.04	0.82	4.93
15-min	0.30	1.20	0.41	1.64	0.51	2.05	0.68	2.72	0.83	3.34	1.02	4.07
30-min	0.40	0.80	0.55	1.10	0.69	1.38	0.91	1.83	1.12	2.25	1.37	2.74
1-hr	0.50	0.50	0.68	0.68	0.85	0.85	1.13	1.13	1.39	1.39	1.70	1.70
2-hr	0.62	0.31	0.80	0.40	0.98	0.49	1.27	0.63	1.53	0.77	1.85	0.92
3-hr	0.71	0.24	0.89	0.30	1.06	0.35	1.33	0.44	1.58	0.53	1.88	0.63
6-hr	0.91	0.15	1.10	0.18	1.28	0.21	1.54	0.26	1.76	0.29	2.02	0.34
12-hr	1.13	0.09	1.36	0.11	1.56	0.13	1.86	0.15	2.10	0.17	2.37	0.20
24-hr	1.30	0.05	1.56	0.06	1.77	0.07	2.05	0.09	2.27	0.09	2.50	0.10

TABLE 4D-2D
DEPTH/INTENSITY-DURATION-FREQUENCY DATA
BANGERTER HWY. AT 11400 SOUTH

Duration	2-Year		5-Year		10-Year		25-Year		50-Year		100-Year	
	inches	in/hr	inches	in/hr	inches	in/hr	inches	in/hr	inches	in/hr	inches	in/hr
5-min	0.16	1.88	0.22	2.59	0.27	3.24	0.36	4.28	0.44	5.27	0.54	6.42
10-min	0.24	1.43	0.33	1.97	0.41	2.46	0.54	3.26	0.67	4.01	0.81	4.88
15-min	0.30	1.18	0.41	1.63	0.51	2.04	0.67	2.70	0.83	3.31	1.01	4.04
30-min	0.40	0.80	0.55	1.10	0.69	1.37	0.91	1.81	1.11	2.23	1.36	2.72
1-hr	0.49	0.49	0.68	0.68	0.85	0.85	1.12	1.12	1.38	1.38	1.68	1.68
2-hr	0.61	0.30	0.80	0.40	0.97	0.48	1.25	0.63	1.51	0.76	1.82	0.91
3-hr	0.69	0.23	0.88	0.29	1.04	0.35	1.31	0.44	1.55	0.52	1.85	0.62
6-hr	0.89	0.15	1.08	0.18	1.26	0.21	1.51	0.25	1.73	0.29	1.98	0.33
12-hr	1.09	0.09	1.32	0.11	1.52	0.13	1.81	0.15	2.04	0.17	2.29	0.19
24-hr	1.27	0.05	1.52	0.06	1.72	0.07	1.99	0.08	2.20	0.09	2.42	0.10

H. Develop a runoff hydrograph based on a 24-hour duration frequency storm distribution for drainage systems involving detention storage and/or large or complex storm systems.

4D-2 Pavement Drainage

A. Maintain a positive grade toward a storm drain system on all pavements. Do not allow stormwater to pond.

B. In areas where there is no curb and gutter, design and construct the Project to minimize concentrated stormwater runoff in accordance with the provisions of Section 4D-14

C. To minimize hydroplaning, optimize roadway geometric component configurations

to comply with the following hydroplaning criteria. In tangents, confirm compliance at all locations between the crown point and the outer edge of the pavement. Except in the immediate vicinity of a superelevation transition, confirm compliance through superelevations. Provide an inlet where the pavement superelevation cross slope reaches 1% prior to rollover and limit the bypass flow to 0.1 cfs.

Empirical Hydroplaning Equation

$$WD = 0.00338(TXD^{0.11}L^{0.43}I^{0.59}S_3^{-0.42}) - TXD$$

where:

- *WD* = average depth above top of texture (in inches) at distance *L* from the location where water commences to flow
  - Maximum Allowable *WD* = 0.0815 inches
- *TXD* = average texture depth (in inches)
  - For asphalt pavement:
    - *TXD* = 0.0394 inches
  - For PCCP pavement:
    - *TXD* = 0.0394 inches
- *L* = length of flow path (in feet) (see below for calculation of *L*)
- *I* = rainfall intensity (in inches/hour) (use the 2-year event, 5-minute time of concentration value)
- S_3 = slope for flow path (in ft/ft)
  - The value of S_3 is obtained from the following equation:

$$S_3 = (S_1^2 + S_2^2)^{1/2}$$

where:

- S_3 = slope of flow path (in ft/ft)
- S_1 = cross-slope (in ft/ft)
- S_2 = longitudinal grade (in ft/ft); do not account for instantaneous longitudinal grades within vertical curves that are less than 0.3 percent

  - The value of *L* is then computed as follows:

$$L = W\,(S_3/S_1)$$

where:

- *W* = the drained pavement width (in feet), measured perpendicular from the crown line to the outside edge of the outer lane whether general purpose lane or auxiliary lane as applicable

4D-3 Drainage Pipe

A drainage pipe is considered to be any pipe that conveys water regardless of shape and material type such as culverts, irrigation pipes, and storm drains.

A. Provide a 50-year design service life for all proposed drainage pipes or culverts in roadway facilities classified as Interstate or Arterials. Provide a 50-year design service life for all proposed drainage pipes or culverts in roadway facilities classified as Collectors or Local Roads. Regardless of road classification, provide a 75-year

service life for drainage pipes or culverts under permanent structures such as retaining walls, MSE walls, buildings, etc. The service life is dependent upon the in place soil characteristics, such as resistivity and pH.

B. Do not use multiple-barrel or multiple-cell drainage pipes or structures.

C. Do not decrease the diameter of a drainage pipe in the downstream direction.

D. Locate cross drainage culverts and storm drain outfalls so that the outlet elevation is as close to the receiving channel flow line as possible.

E. Provide flared end sections or head walls on drainage pipe ends. Use headwalls on all drainage pipes with a diameter of 48 inches and greater; use end sections on drainage pipes less than 48 inches in diameter. Do not place end sections on irrigation pipes.

F. Do not allow new storm drain pipes to cross under the USBOR Aqueduct.

4D-4 Storm Drain Systems

Storm drain systems consist of ditches, swales, culverts, gutters, inlets, pipes, ponds, and other appropriate features designed to collect, convey, treat, and discharge stormwater to the receiving systems.

A. Place inlets based upon spread requirements in Table 4D-3 (Storm Drainage Maximum Spread), while meeting the maximum access spacing in Table 4D-4 (Access Spacing).

TABLE 4D-3
STORM DRAINAGE MAXIMUM SPREAD

ROAD FUNCTIONAL CLASS	DESIGN SPEED	MAXIMUM SPREAD
INTERSTATE AND ARTERIAL	< 45 mph	SHOULDER + 3 ft
	≥ 45 mph	SHOULDER
	Sag	SHOULDER + 3 ft
COLLECTOR AND LOCAL ROADS	< 45 mph	1/2 DRIVING LANE
	≥ 45 mph	SHOULDER
	Sag	1/2 DRIVING LANE
STRUCTURES	NA	SHOULDER

B. Design and locate inlets to limit stormwater to 0.25 cfs or less during the design storm event at intersection features including entrances, driveways, and pedestrian ramps. Exclude residential and detention facility maintenance access driveways.

C. At sag locations where stormwater has no outlet except through the inlet and storm drain system and failure of the drainage system could result in flooding or inundation of the roadway, use the sag location check event for both the inlet and the downstream conveyance system. Low points where water can overtop the curb and escape do not warrant being designed for the sag location design event.

1. Provide flanking inlets on either side of the sag point inlet. Flanking inlets are not to be considered as intercepting flow to reduce the bypass flow to the sag point.

2. Use combination curb and grate inlets for all sag and low points located within the curb and gutter.

D. Determine inlet efficiency using Department standard grates, refer to UDOT Standard Drawings. Design inlets located in roadside ditches, interstate mainline, Bangerter Highway, and ramps with standard grates; design inlets located elsewhere with bicycle-safe grates. Use grates with grating bars oriented to match the orientation of the flow.

E. Storm drain computations are to account for inlet bypass flows.

F. Use a clogging factor of 30 % for inlets on grade and 50% for inlets in sag locations.

G. Inlets or cleanouts are required at the following locations:

1. Where three or more pipes converge,
2. At intermediate points along pipe sections such that the maximum access spacing is not exceeded,
3. Where pipe size or shape changes,
4. Where pipe material changes,
5. Where change in horizontal or vertical pipe alignment occurs.

H. Space inlets or cleanouts in accordance with Table 4D-4 (Access Spacing).

TABLE 4D-4
ACCESS SPACING

Size of Pipe (inches)	Maximum Spacing Distance (feet)
18-24	300
27-36	400
≥ 42	500

I. Do not locate inlets or cleanouts in or between travel lanes and/or shoulders. Place inlets or cleanouts on the outer edge of the shoulder.

J. Design storm drains to flow un-pressurized at the controlling design flow rate. Design storm drains so that the hydraulic grade lines (HGLs) are at least one foot below the finished grade at all times for the controlling check event (see Table 4D-1).

K. Account for energy losses in the design of the storm drainage system. Plot the design event HGL on the design plan storm drain profiles.

L. Design storm drains for a minimum full flow velocity of 2.5 feet per second (fps) and a maximum design velocity of 12 fps for the controlling design flow rates. The velocity will not be less than 2.0 fps at design flow.

M. Provide an 18 inch minimum diameter storm drainage pipes.

N. Design culverts that only convey stormwater based on Storm Drain System requirements.

O. Discharge sumps, or open bottom infiltration, are not permitted in catch basins.

P. Do not use valley gutters or waterways to convey water across streets. Intercept stormwater runoff upstream for subsurface conveyance.

Q. Do not allow water to flow over the top of or down the face of any retaining wall. Ditches adjacent to tops of retaining walls are required to be concrete-lined.

R. Do not use slotted drains. Obtain Department approval for the use of trench drains.

4D-5 Drainage Outfalls

Meet requirements for stormwater discharges as shown in Table 4D-5 (Stormwater Discharges). Include both Project flows and co-mingled flows.

TABLE 4D-5
STORMWATER DISCHARGES

Interchange	Facility or Location	Receiving Facility[1]	Allowable Discharge[2]
5400 South	Discharge Location 54-1	5400 South Storm Drain System (Department and Taylorsville City)	Demonstrate no increase in peak discharge for the 10-year, 50-year, and 100-year, 24-hour events.
5400 South	Discharge Location 54-2	Bangerter Highway Storm Drain System (to Kearns-Chesterfield Drain, Salt Lake County)	Demonstrate no increase in peak discharge for the 10-year, 50-year, and 100-year, 24-hour events.
5400 South	Detention Basin 54-A	Bangerter Highway Storm Drain Systems (to 5400 South Storm Drain System, Department and Taylorsville City)	See Discharge Location 54-1
5400 South	Detention Basin 54-B	Bangerter Highway Storm Drain Systems (to 5400 South Storm Drain System, Department and Taylorsville City)	See Discharge Location 54-1
5400 South	Detention Basin 54-C	5400 South Storm Drain System (Department and Taylorsville City)	See Discharge Location 54-1
5400 South	Storage Facility 54-D	Bangerter Highway Storm Drain System (to Kearns-Chesterfield Drain, Salt Lake County)	See Discharge Location 54-2
Build Alternative	Discharge Location 40-1	4015 West Storm Drain System (Salt Lake County)	Demonstrate no increase in peak discharge for the 10-year, 50-year, and 100-year events.
Build Alternative	Discharge Location 40-2	5400 South Storm Drain System (Department and Taylorsville City)	See Discharge Location 54-1
7000 South	Detention Basin 70-A	Gold Medal Drive Storm Drain System (West Jordan City)	1.6 cfs for 100-year, 24-hour event
9000 South	Discharge Location 90-1	Bingham Creek (West of Bangerter Highway) (Salt Lake County)	6.3 cfs for 100-year event[3]
9000 South	Discharge Location 90-2	Bingham Creek Culvert (Salt Lake County)	Demonstrate no increase in peak discharge for the 10-year, 50-year, and 100-year events.[4]
9000 South	Discharge Location 90-3	9000 South Storm Drain System	Demonstrate no increase in peak discharge for the 10-year, 50-year, and 100-year events.
9000 South	Detention Basin 90-A	3400 West Storm Drain System (South Jordan City)	Demonstrate no increase in peak discharge for the 10-year, 50-year, and 100-year, 24-hour events.
11400 South	Discharge Location 114-1	3600 West Storm Drain System (South Jordan City)	Demonstrate no increase in peak discharge for the 10-year, 50-year, and 100-year events.
11400 South	Detention Basin 114-A	Midas Creek (Salt Lake County)	Demonstrate no increase in peak discharge for the 10-year, 50-year, and 100-year, 24-hour events.
11400 South	Detention Basin 114-B	11800 South Storm Drain System (South Jordan City)	See Section 4D-9 for requirements.
11400 South	Detention Basin 114-C	Tippecanoe Way Storm Drain System (South Jordan City)	0.1 cfs per acre for 100-year, 24-hour event

1. Jurisdiction of receiving facility noted in parentheses except for Department-only storm drain systems.
2. See Section 4D-9 for additional requirements for to detention facilities. See Part 4-05 (Environmental Compliance) for permitting requirements.
3. Water quality treatment structure required.

4. Multiple storm drain pipes drain directly to the Bingham Creek Culvert. Utilize the sum of peak discharges to demonstrate no increase.

4D-6 Bridge and Approach Slab Drainage System

A. Design and construct bridge drainage systems so that drainage does not encroach upon travel lanes during the design storm. See Table 4D-3 Storm Drainage Maximum Spread. Collect and convey stormwater to a nearby roadway storm drain system. Design bridge drainage systems in accordance with Part 4-17 (Structures). Do not allow runoff from bridge decks to drain onto travel lanes, shoulders, sidewalk, or other features below the bridge.

B. Design the bridge drainage system to be compatible with the structural reinforcement, components, and aesthetics of the bridge.

C. Position the bridge drainage outfalls to avoid corrosion, runoff from falling or blowing onto bridge structural elements, erosion of embankments, and splashing of moving traffic and sidewalk areas below the bridge. Daylight outlets above ground for maintenance access.

D. Design and construct downspouts with a minimum diameter of eight inches. Provide cleanouts for downspout systems at all bends and turns in the downspout system. Do not run the drain pipe inside of structural elements.

E. Where the pipe is located behind a retaining wall or slope protection, the pipe is to have seamless joints. Allow for movement at bridge joints (provide an acceptable joint) to maintain integrity and function when accommodating thermal bridge movements.

F. Intercept pavement drainage at both ends of roadway crossing structures to prevent runoff from crossing the bridge expansion joints. Use 0.1 cfs as the maximum allowable bypass flow across bridge expansion joints for the 10-year event.

4D-7 Drainage Ditches

A. The bottom of the roadside ditch is to be one foot minimum below the bottom of the granular borrow layer of the roadway pavement section or provide other measures to drain the pavement section.

B. Ditch side slopes are not to be steeper than 2:1.

C. Provide one foot or two velocity heads minimum freeboard for roadside ditches, whichever is larger.

D. Provide an appropriate channel liner when the velocity within the ditch exceeds the permissible shear stress; adhere to the requirements of 4D-13 (Erosion Control).

4D-8 Stormwater Quality

Treat all stormwater runoff generated from areas of pavement in accordance with the requirements of all applicable Project documents and permits, including the Department's UPDES Municipal Separate Storm Sewer System (MS4) Permit, the Project Environmental Documents, the Project 401 Water Quality Certification (if applicable)), and/or approved TMDLs (if applicable), and Third-Party agreements.

A. Post construction controls that will prevent or minimize water quality impacts are required. Water quality controls may include a combination of structural and/or non-structural controls. Document the effectiveness of the water quality controls selected.

a. Structural controls: storm water detention, inlet and/or outlet protection, energy dissipaters and storm event flow attenuation.
b. Non-structural controls: maintaining pre-development flows, preserving natural drainage patterns, providing natural dispersion, grassed or vegetated swales and vegetated side-slopes.

4D-9 Detention Facilities

Design detention facilities to reduce peak flow discharge and to capture and retain sediments, oils, trash, and debris within the detention facility. Obtain approval on the location and layout for each detention facility. Detention basins in median or gore areas are not allowed. Adhere to the following minimum design requirements, unless specified otherwise in Table 4D-6.

A. Route stormwater flows along the bottom of the detention facilities and provide a pervious low-flow channel, four feet wide by six inches deep, except at Detention Basins 70-A, 90-A, 114-A, 114-B, and 114-C where flows are conveyed via pipe systems under and/or around the detention facilities. Provide a sloped pond bottom no flatter than 0.5% such that it drains toward the channel and/or outlet and maximizes potential to completely drain the pond.

B. Include a principal outlet and an emergency spillway.

C. Pond discharge via designed infiltration featured or systems is not allowed. Subsurface outlet systems are not allowed except at outlet structures to drain water below orifice invert elevations or at detention basins noted in the paragraph above.

D. Design the principal outlet to convey the 10-year and 100-year design storms without allowing flow to enter the emergency spillway. Design detention facilities to be self-draining within 48 hours after the end of the 10-year design storm.

E. Design the emergency spillway(s) according to the following:

1. The 100-year event is the minimum event to be used to size the detention basin and establish the elevation of the emergency spillway.
2. Assume detention facilities are empty prior to the 100-year event.
3. Consider the orifice(s) non-functional when designing the outlet structure except at Detention Basins 70-A, 90-A, 114-A, 114-B, and 114-C.
4. Provide a minimum of 1.0 foot of freeboard between the 100-year event water level and the lowest point in the facility's berm (excluding the emergency spillway).
5. Address the impact of emergency discharges to adjacent and downstream properties and structures.

F. Provide maintenance access into the detention facilities in accordance with Table 4D-6 (Storage Facilities).

1. Construct access using six inch thick compacted untreated base course. Prepare subgrade in accordance with Department standards.
2. Access grades are not to exceed 15% at any location.
3. Ensure that the location and design of each access does not impair or reduce the functionality of the overall drainage system.

G. Provide 6-ft Type 3 chain link fencing around detention facilities when 10-year design depths exceed three feet unless the area is within a fenced, limited access facility. Provide a maintenance access gate for those facilities that require fencing.

1. For unfenced facilities provide trash racks for pipes greater than 24-inch.

H. Retention and subsurface storage facilities are not permitted with the exception of

Storage Facility 54-D.

I. Provide detention facility improvements as specified in Table 4D-6 (Storage Facilities).

TABLE 4D-6
STORAGE FACILITIES

Interchange	Detention Basin/Storage Facility ID and Location	Status	Improvements	Approval Required for Location Change[1]
5400 South	54-A (3687 West Whitewood Court)	Proposed Facility	Provide 12-foot access driveway along noise wall; full perimeter access not required. Provide compacted riprap on pond bottom.	No
5400 South	54-B (3695 West Alveron Drive)	Proposed Facility	Provide 12-foot access driveway along noise wall; full perimeter access not required. Provide compacted riprap on pond bottom.	No
5400 South	54-C (3765 West 5400 South)	Proposed Facility	Provide 12-foot access driveway along noise wall and curb; full perimeter access not required road. Provide compacted riprap on pond bottom.	No
5400 South	54-D	Proposed Storage Facility	Provide storage to meet allowable discharge requirements; see Table 4D-5, Discharge Location 54-2. Subsurface storage is allowed outside pavement limits. Discharge via infiltration is not allowed.	No
7000 South	70-A (Approx. 6700 South & Bangerter Hwy.)	Existing UDOT Facility	Re-grade facility to meet requirements specified in Section 4D-5. Reconstruct emergency spillway. Provide 12-foot perimeter access road on south, east, and north sides of facility. Provide access driveway to pond bottom.	Yes
9000 South	90-A (Approx. 9600 South & 3400 West)	Existing UDOT Facility	Re-grade facility to meet requirements specified in Section 4D-5. Provide emergency spillway. Provide 12-foot access road on east, north, and west sides. Provide turn-around on west side. Provide access driveway to pond bottom. Provide separate farmer access outside of perimeter fence.	Yes
11400 South	114-A (Approx. 12000 South, East of Bangerter Hwy.)	Existing UDOT Facility	No proposed improvements; direct stormwater runoff from Bangerter Highway sag to Detention Basin 114-B to reduce runoff directed to Detention Basin 114-A.	Yes
11400 South	114-B (South Jordan City 23-DET08 at 11800 South & 3600 West)	Existing South Jordan City Facility	Re-grade facility to provide 4.3 AF of additional storage volume with a minimum pond bottom slope of 0.7% and a minimum pond bottom elevation of 4579.5 feet. Grade to facilitate recreational use and replace landscaping in kind. Modify inlet and outlet structures and low flow piping system as required to restore system functionality. Obtain South Jordan City approval for proposed improvements in accordance with Part 4-07 (Landscaping and Aesthetics). No detention basin fencing required; protect existing east wall in place.	Yes
11400 South	114-C (Tippecanoe Way)	Proposed South Jordan City Facility	Provide new detention facility to detain stormwater runoff from Jordan Heights Phase 3. Obtain South Jordan City and Jordan Heights HOA approval for proposed improvements. Provide low flow channel or other as approved by City and Jordan Heights HOA. Locate facility outside PUE. No detention basin fencing required.	Yes

[1]Changes to storage facility or detention basin locations require Department approval as indicated in the table.

4D-10 Cross Drainage

Cross drainage consists of pipe culverts or structures designed to convey off-site flows from one side of the roadway embankment to the other.

A. The maximum headwater elevation is to meet to following criteria:
   1. Below the bottom of the pavement section.
   2. No greater than 4 feet above the crown of the culvert.
   3. Below the elevation where flows diverts around the culvert.
   4. No flooding beyond the Department ROW, easement, or prescriptive right.
   5. No change in elevations established to delineate National Flood Insurance Program (NFIP) or other floodplain mapping.

B. The minimum pipe diameter is 24 inches.

C. All changes in horizontal and/or vertical alignment require junction boxes.

D. Provide a concrete apron on the upstream and downstream ends for culverts larger than 48 inches.

E. Increase the diameter of proposed cross drainage pipes by six inches when the embankment over the top of the pipe exceeds eight feet.

F. Analyze and design Bingham Creek cross drainage structure improvements using a 100-year peak discharge of 603 cfs. Replace culvert and provide a 75-year design service life; see Section 4D-3. Coordinate with the local floodplain administrator (West Jordan City) and Salt Lake County Flood Control. Provide a minimum culvert rise of 6 feet for maintenance purposes, and provide maintenance access. Prepare and obtain floodplain and flood control permits and comply with all floodplain requirements; see this Section 4D and Part 4-05 (Environmental Compliance). The Department will be the applicant for Salt Lake County flood control permits.

4D-11 Irrigation

A. Extend irrigation facilities from one side of the Department ROW to the other. Headwalls, wingwalls, and aprons are to be located within Department ROW or permanent easements. Install no access fencing to allow for third party maintenance access to irrigation facilities.

B. Coordinate any impacts to irrigation facilities with the owner of the facility. Maintain full functionality of irrigation systems from April 1 through October 31 each calendar year, unless otherwise approved by the facility owner in writing.

C. Relocate irrigation system downstream of Welby Canal Turnout 200, located near 4000 West, to maintain existing capacity and functionality for associated downstream water users. Obtain Welby Canal Company approval for turnout location and improvements. Obtain water user approval for downstream system improvements.

4D-12 Floodplains

A. Coordinate all impacts to FEMA-regulated floodplains and changes to bridges and culverts located in FEMA-regulated floodplains with the Department, FEMA, the local floodplain administrator, and Salt Lake County. Obtain all required stream alteration and floodplain-related permits and comply with the requirements of these permits and all applicable National Flood Insurance Program requirements.

B. As required by FEMA and/or local floodplain administrators, develop hydraulic models of the waterways and crossing structures to demonstrate hydraulic performance of new and existing structures.

C. Obtain approved Conditional Letters of Map Revision (CLOMR) and Letters of Map Revision (LOMR) as required by City and FEMA regulations. The Design-Builder bears all responsibility for the cost and time associated with obtaining new or revised CLOMRs and LOMRs, including submittal fees. The Design-Builder is responsible for preparation of all applicable permit applications, map revisions, and supporting documentation. The Department will be the applicant for all CLOMRs and LOMRs. Provide one hardcopy and one electronic copy of applications for CLOMRs and LOMRs to the Department, the appropriate floodplain administrator, and Salt Lake County.

4D-13 Groundwater

A. Provide an underdrain system to remove water from the pavement section when a free draining pavement section is not obtained or alternatively provide a modified pavement design.

1. Minimum pipe diameter is 8 inches.
2. Select geotextiles according to AASHTO M 288 and based on in-situ soil conditions.
3. Underdrain systems are required along Bangerter Highway through the limits of the sag curve under 11400 South. For other roadway facilities, underdrain systems are not required if it is demonstrated through geotechnical investigation that the groundwater elevation is greater than 10 feet below the bottom of the pavement section.

B. Protect the flow quantity and quality of the wells and/or springs during and after construction.

C. Adhere to the standards of the Utah Division of Water Rights when abandoning a well is required.

4D-14 Erosion Control

Provide temporary and permanent erosion control measures that reduce sediment from being discharged from Department ROW in accordance with the requirements of all applicable Project documents and permits.

A. Size each erosion control measure using the same design storm event that was used for the discharging facility.

4D-15 Drainage Report

Prepare a Drainage Report following the outline shown in Table 4D-6 (Drainage Report Outline). Retain the existing section and subsection headings. If a section or subsection is not used, or is pending a future design submittal, indicate under the given section heading the reason why it is not included or not applicable to the Project. Provide new sections as necessary. Provide line numbering in all draft reports to facilitate review. Provide a page number for each report page including appendices.

TABLE 4D-7
DRAINAGE REPORT OUTLINE

1 INTRODUCTION
- 1.1 Project Location
- 1.2 Description of Existing Drainage Conditions
- 1.3 Description of Improvements
- 1.4 Concept Design
- 1.5 Discussion Of Drainage Investigation

2 OFF-SITE AREA DRAINAGE
- 2.1 Location And General Discussion
- 2.2 Hydrology And Design Flow Development
  - 2.2.1 Information Sources
- 2.3 Agency Coordination
- 2.4 Description of Structural Design
- 2.5 Hydraulic Design
- 2.6 Sediment and Erosion Control

3 ON-SITE AREA DRAINAGE
- 3.1 General Discussion
- 3.2 Design Coordination
  - 3.2.1 Department Coordination
  - 3.2.2 Local Agencies
  - 3.2.3 Irrigation Companies
- 3.3 Hydrology
  - 3.3.1 Drainage Basin Delineations & Characterization
  - 3.3.2 Existing Basins
  - 3.3.3 Proposed Basins
  - 3.3.4 Analysis and Results
- 3.4 Pavement, Median and Roadside Drainage
  - 3.4.1 Inlet/Catch Basin Spacing Design
  - 3.4.2 Storm Drainage Design
  - 3.4.3 Channel Design
  - 3.4.4 Erosion Control Design

4 DETENTION FACILITY DESIGN
- 4.1 Assumptions and Methodologies
  - 4.1.1 Allowable Release Rate Development
- 4.2 Hydrology and Hydraulics
  - 4.2.1 Storage and Outlet Design Documentation

5 WATER QUALITY FACILITY DESIGN
- 5.1 Assumptions and Methodologies
- 5.2 Hydrology and Hydraulics

APPENDICES

The organization of appendices is not prescribed, but is subject to Department review. Appendices shall include or address the following as applicable.

A – Precipitation Data

TABLE 4D-7 DRAINAGE REPORT OUTLINE
B – Off-site Drainage Basin Maps
C – Pre-Project On-site Shed Maps
D – Proposed On-site Shed Maps
E – Drainage Plans
F – On-site Drainage Conveyance Hydraulic Calculations and Information
G – Off-site Drainage Conveyance Hydraulic Calculations and Information
H – Detention Facility Calculations and Information
I – Water Quality Calculations and Information
J – Erosion Control Calculations and Information
K – Pipe and Structure Inspection and Assessment Documentation
L – Correspondence and Agency Coordination
M – Design Exceptions
N – Miscellaneous Design Information
O – Operations and Maintenance

Submit the Drainage Report according to the schedule in Table 4D-8 (Drainage Report Submittal Schedule). Each Drainage Report submittal will build on the previous Report submittal.

TABLE 4D-8
DRAINAGE REPORT SUBMITTAL SCHEDULE

Submittal	Report Status	Minimum Content
Initial Milestone Design Review	Draft	As described in Initial milestone design review in this Section
Intermediate Milestone Design Review	Draft	As described in Intermediate milestone design review in this Section
Released for Construction	Final	As described in this Section
As-Built	As-built condition	As described in this Section

4D-16 Design Milestone Reviews

Initial design milestone review. The purpose of this review is to provide the Department an opportunity to identify any significant issues with the Design-Builder's approach to drainage for the Project. At a minimum, provide the following in the initial milestone review:

A. Drainage Plan:

1. Show the ownership, location, size, type, and material of all existing Utilities (including all storm drain and irrigation facilities) located within Project Limits.
2. Provide a plan for drainage from the on-site and off-site areas that demonstrates the Design-Builder's understanding of the existing flow patterns and existing flow rates.
3. Provide a drainage plan that demonstrates how the Design-Builder intends to meet the drainage performance requirements of this Part 4-04 (Drainage). Include the following minimum plan content:

    a. Locations and approximate sizes of proposed pipes, culverts, and end sections
    b. Locations of proposed inlets and catch basins

c. Locations and approximate sizes of proposed ditches
d. Locations and approximate volumes and surface areas of proposed detention facilities
e. Locations of other proposed drainage elements such as curb and gutter, and end sections
f. Provide an ID for each proposed drainage element for ease of reference.

B. Drainage Report:

1. Document the software utilized for drainage design and analysis.
2. Generally describe existing and proposed drainage patterns and discharge points.
3. Provide watershed delineation figures for drainage from both the on-site and the off-site areas.
4. Demonstrate that hydroplaning requirements are met.
5. Outline the proposed methods, approaches, assumptions, and criteria used in the drainage design, and discuss how the proposed drainage system will meet the performance criteria outlined herein.
6. Show preliminary detention facility locations.
7. Present a general discussion on how roadway drainage spread requirements are met by the design.
8. Provide preliminary discussion regarding water quality. Discuss the proposed approach to water quality measures while identifying proposed BMPs to be implemented in the drainage design.
9. Discuss the proposed approach to erosion control. Describe the methods to be used for evaluating the effectiveness of the proposed erosion controls.
10. Provide preliminary calculations, including hand calculations, spreadsheets, and models for the drainage features outlined above. Where software models are utilized for analysis, provide model input data and assumptions with the corresponding model output. Provide the software models in their native format.
11. Include drainage sheets from design plans as an appendix.

Intermediate design milestone review. The purpose of this review is to provide sufficient drainage design detail and calculations for the Department to verify that the Contract performance specifications and requirements are achievable prior to finalization of the drainage design. At a minimum, provide the following in the intermediate milestone review:

C. Drainage Plans:

1. Update all the information required for the initial milestone design review submission based on refinement of the drainage design and/or changes to the general approach to drainage.
2. Provide preliminary plan and profile sheets for storm drain systems and culverts that show at a minimum:
   a. Stations and offsets.
   b. Approximate finished grades.
   c. Rim elevations, invert elevations, pipe diameters, pipe material, pipe lengths, pipe slopes, existing or proposed utility crossings, and HGLs.
   d. Structure size and material.
3. Show the locations and sizes of proposed water quality BMPs.
4. Identify standard drawings required for each applicable drainage item.
5. Identify all detention basin outlets, discharge locations, and the associated

design events and discharges. Identify receiving facilities.

6. Provide preliminary construction details for special items such as:
   a. Detention basins
   b. Water quality BMPs
   c. Drainage structures
   d. Riprap or other outfall protection
   e. Erosion control treatments
   f. Utility conflicts resolution (relocations, removals, etc.)

D. Drainage Report

1. Update all the information required for the initial milestone design review submission based on refinement of the drainage design and/or changes to the general approach to drainage.
2. Provide documentation and discussion of the assessment of existing drainage facilities. Describe the approach for rehabilitation and replacement of facilities and document that the approach will meet all contract requirements.
3. Discuss the basis for the selection of material for pipes, culverts, and other drainage appurtenances.
4. Hydraulic data tables for each pipe, culvert, structure, etc.
5. Provide calculations and narrative to demonstrate that the proposed erosion control treatments satisfy the requirements herein.
6. Provide detailed calculations for all drainage features. Include hand calculations, spreadsheets, and models. Where software models are utilized for analysis, provide model input data and assumptions with the corresponding model output in both hard copy and PDF formats. Provide the software models in their native format.
7. Document and discuss all drainage coordination efforts with all applicable agencies. Include documentation of applicable correspondence, meeting minutes, emails, etc.
8. Include drainage sheets from design plans as an appendix.

4D-17 Final Design Milestone Review

4D-17.1 Final Design Milestone Review Drainage Plans

Include the following in the Final Design Milestone Review drainage plans:

A. The location, material type, and size of pipes, culverts, catch basins, inlets, manholes and cleanout boxes, riprap, and all other drainage and water quality facilities.

B. Profiles of all culverts, pipes, laterals, trunk lines, and other elements, showing all invert elevations, pipe slopes, pipe sizes, proposed finished grade elevations above top of pipe, and the calculated HGL for the design event.

C. Hydraulic data information for large culverts and bridges.

D. Drainage details, grading information, and construction and installation requirements.

E. Existing Utilities and any Utility conflicts with drainage elements, along with relocations, removals, etc.

F. Show how proposed drainage design interacts physically and hydraulically with existing drainage facilities.

4D-17.2 Drainage Report – Final Design

A. The final design Drainage Report submitted with the Final Design Milestone Review

Documents are to contain basic design data, design assumptions, hydrologic and hydraulic methodologies, assumptions, model inputs and outputs, detailed calculations, computations, and computer printouts, as well as the rationale for sizing and selecting all drainage elements, including catch basins, storm drain systems, culverts, ditches, swales, detention facilities, and BMPs. Include materials selection documentation. Provide hydraulic data sheets with a summary of hydraulic design information for each pipe and culvert.

B. Provide in the report a delineation of the contributing pre- and post-Project drainage basins, existing drainage patterns for both highway and cross-drainage flows, design parameters, inflow hydrographs (graphical and tabular format) for detention basins, detention basin sizing, discharge characteristics, discharge hydrographs (graphical and tabular format) for detention basins, detention times, and other information necessary for the design of the drainage systems.

C. Demonstrate that the general drainage plan and each individual element will control and treat the proposed stormwater runoff in accordance with the drainage design, the performance requirements herein, and all applicable permits. Demonstrate an understanding of existing drainage discharge rates and outfall locations, and document the development of detention basin release rates. Document how proposed drainage designs will interact with existing drainage facilities. Include drainage sheets from the Final Design Milestone Review design plans as an appendix.

D. A Professional Engineer licensed in the State of Utah is to prepare, stamp, and sign the final design drainage report. Submit five hard copies of the drainage report and one electronic copy in PDF format. Include with each report electronic copies of all analysis including hand calculations, spreadsheets and models. For models, provide input and output files in their native file format.

4D-18 As-Built Documents

A. Provide tables on the As-Built Document plan sheets that summarize the following for each drainage pipe and culvert: pipe/culvert ID, size, slope, roughness coefficient, capacity, velocity, contributing drainage area, and design flow.

B. Plot final hydraulic grade lines and surveyed elevations on pipe profile sheets.

C. Update the final design drainage report to reflect as-built conditions, and submit an as-built drainage report.

4D-19 Operation and Maintenance Manual

Before system startup, provide detailed operations and maintenance information in an appendix of the final as-built drainage report. In the appendix, address (at a minimum) maintenance of drainage facilities, detention facilities, and erosion control, and include Plans of the basins and piping systems.

4E. SUBMITTALS

Provide submittals to the Department in accordance with Table 4E-1 (Design-Builder Submittals for Drainage Systems).

TABLE 4E-1
DESIGN-BUILDER SUBMITTALS FOR DRAINAGE SYSTEMS

Submittal	***For Approval***	***Schedule***
Storm Water Pollution Prevention Plan (SWPPP)	No	Prior to construction
Drainage Reports	No	As described in Table 4D-7 (Drainage Report Submittal Schedule)
Detention Facility Fencing Plan	No	Prior to construction
Water Quality Treatment Design	No	Prior to construction

5—ENVIRONMENTAL COMPLIANCE

5A. GENERAL

Conduct all Work necessary to meet the requirements of this Section 5 (Environmental Compliance) and satisfy all functional needs of the Project, including environmental mitigation, monitoring and reporting, and protection, while complying with all applicable Environmental Laws and Governmental Approvals.

5B. STANDARDS

Complete Work for Environmental Compliance in accordance with the requirements of the standards listed by priority in Table 5B-1 (Standards for Environmental Compliance).

If there is any conflict in standards, adhere to the standard with the most stringent requirements.

TABLE 5B-1
STANDARDS FOR ENVIRONMENTAL COMPLIANCE

Priority	*Author or Agency*	*Title*
1	UDOT	Environmental Documentation for the Project State Environmental Studies; 5400 South, 7000 South, 9000 South, 11400 South
2	Various	Various permits and agreements (including the Utah Pollutant Discharge Elimination System (UPDES) Construction Permit, Municipal Separate Storm Sewer System (MS4) Permit, and all other permits issued by State and federal agencies)
3	UDOT	Special Provisions included in Part 5
4	UDOT	*Supplemental Specifications to 2012 Standard Specifications for Road and Bridge Construction*, as modified by Part 5
5	UDOT	*2012 Standard Specifications for Road and Bridge Construction*, as modified by Part 5
6	UDOT	*Supplemental Drawings to 2012 Standard Drawings for Road and Bridge Construction*
7	UDOT	*2012 Standard Drawings for Road and Bridge Construction*
8	UDOT	*Environmental Manual of Instruction*
9	UDOT	*Manual of Instruction – Roadway Drainage*
10	AASHTO	*Construction and Stormwater Field Guide*
11	UDOT	*Geotechnical Manual of Instruction*

5C. REQUIREMENTS

Comply with environmental commitments associated with Environmental Laws; the Project Environmental Document(s); and all Governmental Approvals and new Environmental Documents applicable to and required for the Project. Incorporate all environmental commitments into the Environmental Protection Program (EPP). A summary of known environmental mitigation commitments is contained in the Environmental Document(s) identified in Table 5B-1(Standards for Environmental Compliance) and summarized in the Design-Builder's Environmental Compliance Commitment Summary Table found in Attachment 5-A.

5C-1 Environmental Protection Program (EPP)

Develop, implement, and maintain an Environmental Protection Program (EPP) that incorporates all the provisions identified by this Section 4-05 (Environmental Compliance) to establish the environmental requirements, approach, and procedures to be employed to protect the environment from Project impacts. Structure and develop the EPP to satisfy applicable Environmental Laws; UDOT Standard Specifications and design standards; requirements of Governmental Approvals; and commitments included in the Environmental Documents completed for the Project.

The EPP shall:

A. Establish and implement environmental compliance measures that are consistent with the Environmental Documents and Governmental Approvals (as applicable) and with the environmental commitments for the Project in accordance with Attachment 5-A (Environmental Commitments Table).

B. Implement and document an Environmental Protection Training Plan (EPTP) as described later in Section 5C-2 (Environmental Protection Training Plan) to provide awareness and training for all personnel who will be working on the Project.

C. Demonstrate how the Design-Builder will implement a "zero environmental violation" tolerance on all Project activities.

D. Develop and include the Design-Builder's Environmental Compliance Monitoring and Reporting Plan (ECMP) as described in 5C-4.

E. Designate two Environmental Control Supervisors (ECSs), one for 5400 South and 7000 South and one for 9000 South and 11400 South. The ECSs shall be committed to the Project throughout its duration; be responsible for implementing the EPP; be the Design-Builder's single contact point for all environmental issues; and be ECS-certified by the Department. ECS Certification is available online through the Department's website. The ECSs shall also have a minimum of two years of experience serving as an ECS on a highway project similar in size and scope as the Project, including managing environmental monitoring for highway construction projects with similar complexities, permitting requirements, and clearances as the Project. Submit the qualifications of the proposed ECSs to the Department for Approval.

F. Include a reporting contact tree which lists Design-Builder personnel and contact information, and indicates the level and order in which to contact personnel regarding Environmental Compliance on the Project.

Discuss sensitive environmental areas prior to the start of construction at the pre-construction meeting.

Cooperate with the Department, and provide documentation to verify compliance with Environmental Laws, Governmental Approvals, and Environmental Documents.

5C-2 Environmental Protection Training Plan

Develop and implement a Project-specific Environmental Protection Training Plan (EPTP) that meets the requirements of all Environmental Laws, Governmental Approvals, and Environmental Documents and complies with the provisions of this Section 4-05 (Environmental Compliance). The EPTP objective is to provide a program of Design-Builder employee training adequate to fully comply with applicable Environmental Laws, Governmental Approvals, and Environmental Documents. Include all non-administrative Project workers in the EPTP training sessions. Provide documentation that all Project workers have completed the sessions. Repeat training as often as necessary to stay current with the Project. Document any changes implemented by the Design-Builder. Include activities for the implementation of the EPTP in the Project Schedule.

Structure the detail, length, and frequency of training sessions to achieve the EPTP objective of full environmental compliance on the Project.

Design the EPTP training to communicate, at a minimum, the following:

A. The importance of environmental issues to constructing, operating, and maintaining a successful Project.
B. The Department's and the Design-Builder's commitment to the Project's environmental quality.
C. The Environmental Laws that affect and/or govern the Project, the Governmental Bodies with the authority to administer those Environmental Laws, and construction activities for which Governmental Approvals must be obtained.
D. Environmental commitments at the Project level.
E. Worker responsibilities.
F. BMPs for compliance with Environmental Laws, Governmental Approvals, and/or Environmental Documents.
G. Identification of BMPs and protection measures installed throughout the Project, their meaning, and requirements to avoid water resources.
H. Required mitigation measures for environmental impacts.
I. Procedures and precautions in the event of spills, or the discovery, of Hazardous Substances or unknown chemicals or contamination that are potentially Hazardous Substances.
J. Procedures and precautions in the event that human skeletal remains or other historical, archaeological, or paleontological resources are discovered.
K. Penalties and/or fines for violations of and noncompliance with Governmental Approvals and Environmental Laws.

5C-3 Additional Permits

5C-3.1 Governmental Permits

Obtain all Governmental permits required in addition to the Department-provided permits. Coordinate preparation of all Governmental permits with the Department. All communications with applicable regulatory agencies will be coordinated directly with the Department. E-mail the Department Environmental Coordinator a minimum of five Working Days in advance of any meeting with regulatory or governmental entities. Meetings shall not be held when Department personnel are not present.

Table 5C-1 (Summary of Governmental Permits for Environmental Concerns) identifies the known Governmental Permits for environmental concerns that are needed for the Project. The Design-Builder is responsible for researching and obtaining any other Governmental Permits not included in this list and responsible to implement any required mitigation identified in Governmental Permits.

TABLE 5C-1
SUMMARY OF GOVERNMENTAL PERMITS FOR ENVIRONMENTAL CONCERNS

Permit	*Agency or Governmental Entity with Jurisdiction*	*Status*
UPDES Construction General Permit for Construction Activities	UDEQ/DWQ	Design-Builder to obtain
UPDES Construction Dewatering and Hydrostatic Testing	UDEQ/DWQ	Design-Builder to obtain
Fugitive Dust Emission Control Plan	UDEQ/DAQ	Design-Builder to obtain
Stream Alteration Permit at Bingham Creek	UDNR/DWR	Design-Builder to obtain
Clean Water Act Nationwide Permit at Bingham Creek	USACE	Department to obtain
Flood Control Permits	Salt Lake County	Design-Builder to obtain
Conditional Letter of Map Revision (CLOMR) and Letter of Map Revision (LOMR)	City of West Jordan (Local Floodplain Administrator) and FEMA	Design-Builder to obtain[2]
Phase I and Phase II Environmental Assessment at Bingham Creek Approval	UDEQ/DERR	Department to obtain
Noise Permit	Salt Lake County	Department to obtain

1. The Department is to be listed as the applicant for Department discharges to County facilities and for the Bingham Creek culvert. The applicable city is to be listed as the applicant for flood control permits associated with municipal discharges to County facilities.
2. See Section 4-04 (Drainage).

5C-3.2 Department Approval

Submit each Governmental permit application with supporting documentation to the Department for review. The Department will review the application and respond within 14 Calendar Days with either approval or disapproval. If the application is not approved, revise it in accordance with the Department's comments and resubmit. After the Department has approved and (if required) signed an application and returned it to the Design-Builder, submit the completed application to the appropriate Governmental Body.

5C-3.3 Documentation

Provide the Department with copies of all environmental submittals, correspondence, and secured Governmental Permits within seven Calendar Days of occurrence, and maintain records of said materials.

5C-3.4 Design-Builder Initiated Changes

If previously issued Environmental Documents or Governmental Permits become invalid because of Project changes initiated by the Design-Builder, undertake all necessary actions (such as applications, revisions, supplements, reassessments, reevaluations, and coordination with the appropriate Governmental Bodies) to secure and/or amend the Environmental Documents and/or Governmental Permits. E-mail the Department Environmental Coordinator a minimum of seven Calendar Days in advance of any meeting with Governmental Bodies. Meetings shall not be held when Department personnel are not present. Any proposed changes must be approved by the Department prior to any contact with Governmental Bodies.

In all cases, it shall be assumed that Environmental Documents and/or Governmental Permits are invalidated if there is any change in the Project.

Obtain and provide to the Department all necessary Governmental Permits when adding or selecting any ground- or resource-disturbing features (including materials such as gravel, borrow, or waste sites, equipment staging sites, office sites, water lines, and holding ponds).

5C-3.5 Coordination by Department

In cases that require the Department personnel to coordinate directly with Governmental Bodies, provide necessary support regarding Project design and potential environmental impacts in the form of personnel and/or data to assist in securing Governmental Permits.

5C-4 Environmental Compliance Monitoring and Reporting

Develop, implement, and maintain an Environmental Compliance Monitoring and Reporting Plan (ECMP) that details the strategies and procedures to be employed to fully comply with applicable Environmental Laws, Government Permits, and Environmental Documents. Include strategies and procedures for complying with provisions of UDOT Standards and the requirements of the AASHTO Construction and Stormwater Field Guide.

Document the Project's environmental requirements and mitigation commitments, and establish the schedules, protocols, approaches, and methodologies to achieve compliance. The ECMP shall include a plan for monitoring commitments made in the Environmental Documents, monitoring as required to comply with Governmental Permits, and monitoring the effectiveness of the BMP implementation.

5C-4.1 Environmental Monitoring Report

Provide an Environmental Monitoring Report (EMR) on a monthly basis that documents Environmental Compliance. EMRs shall be organized into a single document for each reporting period, organized by resource type. This report may discuss general erosion and sediment controls, but is separate from the required SWPPP inspection reports.

For each resource, include the following information:

A. Location of the area monitored (map, with stationing, addresses, or other reference)
B. Name of inspector or monitor
C. Date(s) monitoring occurred
D. Weather conditions
E. Observations/conditions (typical details are listed below)
F. Resolution of any and all violations or other problems encountered

Conditions to be reported shall include, at a minimum, the following:

G. Air and water quality standards compliance
H. Any and all violations of applicable Governmental Approvals, Environmental Laws, or commitments in the Environmental Documents
I. Status of all Work in streams
J. Any and all spills, either by third-parties or Design-Builder
K. Discharge of groundwater
L. Discovery of migratory bird nest or raptor nest, whether active or not
M. Discovery of any sick, dead, or injured migratory or raptor bird
N. Discovery of potentially historic artifacts, human bones or remains, or non-human bones
O. Agency field oversight, inspection, and coordination
P. Status of impacts to cultural resources
Q. Detection of Hazardous Substances and status of any Remediation Work

5C-4.2 Incident Reporting

Document and notify the Department of every violation of Environmental Law and/or Governmental Permit either electronically or verbally within 12 hours of occurrence. If a violation poses imminent danger to human health or the environment, immediately report to the Department and any other responsible Governmental Agency, and direct the Remediation Work to begin. The actual violation report need not be included in said notification, but should be readily available to the Department and any Governmental Body with jurisdiction. A violation of Environmental Law and/or Governmental Permit is considered a breach of an environmental requirement, regardless of whether a notice of violation has been delivered to the Design-Builder.

Stop work as required to eliminate, prevent, or mitigate violations or noncompliance with Environmental Laws and/or Governmental Permits. This work stoppage shall be limited to the immediate vicinity or area affected by the event. Notify the Department immediately of the event.

5C-4.3 Stormwater

Complete and maintain an individual Storm Water Pollution Prevention Plan (SWPPP) for each of the four interchanges using the Department's SWPPP template. Conduct SWPPP inspections in accordance to Standard Specification 01571. Provide inspection documentation using the Department's SWPPP Inspection Form and keep on site within each SWPPP.

5C-5 Hazardous Substances

5C-5.1 Construction Requirements

For construction activities at and around Bingham Creek, follow all conditions and procedures described in the Phase I and Phase II Environmental Site Assessment/Utah DERR remediation plan provided in Part 8 (Engineering Data).

Fuels, lubricants, cleaners, solvents, or other Hazardous Substances shall not contact the ground, be exposed to stormwater, or be released to any surface water body or to groundwater, except in *de minimus* quantities consistent with good construction business practices. Perform maintenance of vehicles and equipment in designated areas designed to contain incidental spills of hydraulic or other fluids.

Provide secondary containment for all bulk storage tanks or drums. Secondary containment shall be of adequate size to contain the entire contents of the tank plus sufficient freeboard to allow for precipitation. All secondary containments shall be constructed of impermeable materials to prevent infiltration of spilled or leaked tank contents into the ground.

In the event of the discovery and subsequent disturbance of any materials containing lead-based paint, lead, asbestos, and/or polychlorinated biphenyls, dispose of all such materials appropriately. Prepare a remediation report documenting all remedial activities and regulatory approvals. Obtain a site-specific No Further Action Letter, as required by Utah Department of Environmental Quality (UDEQ), within three weeks of completion of any site remediation report.

5C-5.2 Spills

A leak, spill, or other release meeting any of the following measures is a hazardous spill and requires an Emergency Spill Notification:

A. 2.2 pounds or more of "acutely hazardous waste" (see products Material Safety Data Sheet (MSDS)), or
B. 220 pounds or more of other hazardous waste, or
C. 25 gallons or more of fuel or oil are spilled or cause oil sheen to form on a water surface.

5C-5.3 Emergency Spill Notification Procedures

Perform the following actions if the spill presents a potential for harm to personnel, public, or the environment, or the Design-Builder is not able to immediately control and clean-up the spill, and/or the spill exceeds the reportable quantity (see Section 5C-5.2):

A. Notify the Department and the Region 2 Safety Risk Manager (Dottie Weese) to determine if the quantity or severity of the spill warrants outside assistance by emergency services (this is to ascertain the toxicity, size of spill, and if the spill could discharge to a surface water or a sewer/storm drain line).
B. If the spill is clearly an emergency hazardous spill condition, the Department or the Department Region Safety Risk Manager will notify the UDEQ and the National Response Center.
C. Submit an incident report within 24 hours to the Department and include in the next EMR. The Department Region Safety Risk Manager will review the report, and if necessary, hold a post incident meeting with the Design-Builder.
D. Use a State Certified Hazardous Materials Lab when necessary to identify an unknown spill material.

The Design-Builder is responsible for all required hazardous waste management, which includes, but is not limited to, the transportation, storage, and disposal at a hazardous waste disposal facility.

5C-5.4 Waste Disposal and Minor Spills

A minor spill is a condition that:

i) Does not present potential harm to personnel and/or the environment,

ii) Design-Builder has the ability to immediately control and clean-up the spill, and

iii) The spill does not meet the spill parameters in Section 5C-5.2. Perform the following actions to control non-emergency spills:

A. Immediately notify the Department for verification that condition is a non-reportable minor spill.
B. Begin spill clean-up immediately and use trained personnel to respond to critical events involving spills.
C. Use contingency clean up products and equipment to handle non-emergency spills (absorbent materials, personal protection equipment, compatible empty container to store spilled material, fire extinguisher, etc.)
D. Contain spilled liquids or solids in a compatible container and store on-site until proper disposal action is taken as required by state and federal requirements. Fill out a hazardous waste label and establish an accumulation date where a spill occurs or when hazardous wastes are generated.
E. Submit a spill report to the Department explaining the spill quantity and method of disposal, including a Hazardous Waste Disposal Manifest if applicable.

In the event that a Hazardous Substance spill is caused by the Design-Builder's equipment, operations, or Work, the Design-Builder shall be responsible for Remediation Work, mitigation of the hazard, and costs incurred by the Department, the UDEQ, and other Governmental Bodies in connection with said activities.

5C-6 Air Quality

5C-6.1 Air Quality Permits

Obtain any Governmental Permits regarding air quality for the Project.

Contact the Utah Division of Air Quality (DAQ) and obtain the appropriate Air Quality Permit for the Project. Permit application forms can be obtained from DAQ's web site (http://www.deq.utah.gov/Permits/air/index.htm). Refer to:

Utah Division of Air Quality
150 North 1950 West
PO Box 144820
Salt Lake City, UT 84114-4810
Phone: (801) 536-4000; Fax: (801) 536-4099

Do not proceed with Work affecting air quality without an Air Quality Approval Order, a Notice of Intent To Approve letter, or a Temporary Approval Order for the Project, process, or equipment to be used.

5C-6.2 Air Protection Control Plan

Develop, implement, and maintain a Fugitive Dust Emission Control Plan in accordance with the Permit requirements set forth by DAQ.

5C-7 Wetlands, Water Resources and Stormwater

5C-7.1 Wetlands, Waters of the US, and Floodplains

The Department has identified that the Project may impact potentially jurisdictional wetlands and the 100-year floodplain associated with Bingham Creek at the 9000 South interchange. The Department will obtain the Nationwide 3 Permit. Obtain other applicable permits including the Stream Alteration Permit and Flood Control Permit. Obtain approved Conditional Letters of Map Revision (CLOMR) and Letters of Map Revision (LOMR) as required by City and FEMA regulations; see Section 4-04 (Drainage). Comply with all conditions of the permits during construction and ensure the permits have been obtained prior to any construction activities.

5C- 7.2 Stormwater and Ground water

Following the Department's approval of each interchange's individual SWPPP, and prior to any construction activities, submit an individual Notice of Intent (NOI) for each interchange and comply with the UPDES Construction General Permit.

Prior to discharge of groundwater, obtain a UPDES Construction Dewatering Permit.

5C-7.3 USBOR Aqueduct

Follow all conditions specified in the Project Agreements in Part 6 (Third-Party Agreements) with the Bureau of Reclamation and Jordan Valley Water Conservancy District.

5C-8 Noise

Control construction noise and vibration in accordance with Standard Specification 01355. Comply with applicable state and local municipal ordinances. The Department will obtain a noise permit and a variance to the Noise Ordinance for night work. The following activities will not be allowed from 10:00 PM to 6:00 AM: concrete saw cutting, breaking of concrete, pile driving. There is no guarantee that a variance will be issued.

Modifications to the noise walls shown in Part 7 (Contract Drawings) require approval to ensure abatement measures meet the requirements found in Department's current Noise Abetment Policy 08A2-01.

5D. SUBMITTALS

Provide submittals to the Department in accordance with Table 5D-1 (Design-Builder Submittals for Environmental Compliance).

TABLE 5D-1
DESIGN-BUILDER SUBMITTALS FOR ENVIRONMENTAL COMPLIANCE

Submittal	***For Approval***	***Schedule***
Environmental Protection Plan (EPP)	Yes	14 Calendar Day review
Environmental Protection Training Plan (EPTP), (as part of the EPP)	Yes	Prior to start of construction
Four individual Storm Water Pollution Prevention Plans (SWPPPs)	Yes	Prior to start of construction
Environmental Compliance Monitoring and Reporting Plan (ECMP) (as part of the EPP)	Yes	Prior to start of construction
ECS Key Personnel (as part of the EPP)	Yes	Prior to start of construction
Reporting Contact Tree (as part of the EPP)	Yes	Prior to start of construction
Fugitive Dust Emission Control Plan	No	Prior to start of construction
Environmental Monitoring Report (EMR)	No	Monthly
Copies of all permits and environmental approvals	No	Prior to the start of construction

Attachment 5-A: Environmental Commitments Table

DESIGN-BUILDER ENVIRONMENTAL COMPLIANCE COMMITMENT SUMMARY TABLE

Subject	*Source*	*Commitment*	*Implementation Period(s)*
5400 South			
Air Quality	5400 South SES – Page 16	Follow requirements listed in UDOT Standard Specification 01572, Dust Control and Watering and UDOT Standard Specification 01355, Section 3.5, Fugitive Dust.	Construction
Cultural	5400 South SES – Page 16	Follow UDOT Standard Specification 01355, Parts 3.7 and 3.8.	Construction
Hazardous Waste	5400 South SES – Page 16	Follow UDOT Standard Specification 01355, Parts 3.1 and 3.2.	Construction
Invasive Species	5400 South SES – Page 16	Follow UDOT Supplemental Specification 02924S, Invasive Weed Control	Construction
Water Quality	5400 South SES – Page 16	Prepare, implement, and maintain a Stormwater Pollution Prevention Plan (SWPPP) in accordance with UPDES Permit No. UTRC0000 throughout construction of the Project.	Prior to and during Construction
USBOR Aqueduct	USBOR/JVWCD Project Agreement	Follow all processes and conditions described in Project Agreement between UDOT, Bureau of Reclamation, and Jordan Valley Water Conservancy District.	Construction
Noise	5400 South SES – Page 16 UDOT Noise Abatement Policy 08A2-01 (Feb 2014)	Follow requirements listed in UDOT Standard Specification 01355, Section 3.6, Noise Control. The Design-Builder will install or replace noise abatement measures, as specified by the Department. The location and height of noise abatement measures described in the Final State Environmental Study and Noise Evaluation could change based on any changes to the final design and receptors. Changes to the final design and receptors will be evaluated by the Department prior to making a final determination on the location and height of the noise abatement measures. The final determination on noise wall height and location will also depend on the approval by a sufficient number of affected residents/property owners as defined in the UDOT Noise Abatement Policy (08A2-01, Feb. 2014).	Construction
Demolitions		In accordance with Department Standard Specifications and local jurisdictions.	Construction
7000 South			
Air Quality	7000 South SES – Page 13	Follow requirements listed in UDOT Standard Specification 01572, Dust Control and Watering and UDOT Standard Specification 01355, Section 3.5, Fugitive Dust.	Construction
Cultural	7000 South SES – Page 13	Follow UDOT Standard Specification 01355, Parts 3.7 and 3.8	Construction
Hazardous Waste	7000 South SES – Page 13	Follow UDOT Standard Specification 01355, Parts 3.1	Construction
Invasive Species	7000 South SES – Page 13	Follow UDOT Supplemental Specification 02924S, Invasive Weed Control	Construction
Water Quality	7000 South SES – Page 13	Prepare, implement, and maintain a Stormwater Pollution Prevention Plan (SWPPP) in accordance with UPDES Permit No. UTRC0000 throughout construction of the Project.	Prior to and during Construction
Noise	UDOT Standard Specification 01355	Follow requirements listed in UDOT Standard Specification 01355, Section 3.6, Noise Control. The Design-Builder will install or replace noise abatement measures,	Construction

Subject	*Source*	*Commitment*	*Implementation Period(s)*
	UDOT Noise Abatement Policy 08A2-01 (Feb 2014)	as specified by the Department. The location and height of noise abatement measures described in the Final State Environmental Study and Noise Evaluation could change based on any changes to the final design and receptors. Changes to the final design and receptors will be evaluated by the Department prior to making a final determination on the location and height of the noise abatement measures. The final determination on noise wall height and location will also depend on the approval by a sufficient number of affected residents/property owners as defined in the UDOT Noise Abatement Policy (08A2-01, Feb. 2014).	
USBOR Aqueduct	USBOR/JVWCD Project Agreement	Follow all processes and conditions described in Project Agreement between UDOT, Bureau of Reclamation, and Jordan Valley Water Conservancy District.	Construction
Pedestrians	7000 South SES – page 13	In accordance with Part 4.	Construction
Demolitions		In accordance with Department Standard Specifications and local jurisdictions.	Construction
9000 South			
Air Quality	9000 South SES – Page 14	Follow requirements listed in UDOT Standard Specification 01572, Dust Control and Watering and UDOT Standard Specification 01355, Section 3.5, Fugitive Dust.	Construction
Cultural	9000 South SES – Page 14	Follow UDOT Standard Specification 01355, Parts 3.7 and 3.8	Construction
Hazardous Waste	9000 South SES – Page 14	Follow UDOT Standard Specification 01355, Parts 3.1 In accordance with the Phase I and Phase II in Part 8 (Engineering Data)	Construction
Invasive Species	9000 South SES – Page 14	Follow UDOT Supplemental Specification 02924S, Invasive Weed Control	Construction
Water Quality	9000 South SES – Page 14	Prepare, implement, and maintain a Stormwater Pollution Prevention Plan (SWPPP) in accordance with UPDES Permit No. UTRC0000 throughout construction of the Project.	Prior to and during Construction
Noise	UDOT Standard Specification 01355 UDOT Noise Abatement Policy 08A2-01 (Feb 2014)	Follow requirements listed in UDOT Standard Specification 01355, Section 3.6, Noise Control. The Design-Builder will install or replace noise abatement measures, as specified by the Department. The location and height of noise abatement measures described in the Final State Environmental Study and Noise Evaluation could change based on any changes to the final design and receptors. Changes to the final design and receptors will be evaluated by the Department prior to making a final determination on the location and height of the noise abatement measures. The final determination on noise wall height and location will also depend on the approval by a sufficient number of affected residents/property owners as defined in the UDOT Noise Abatement Policy (08A2-01, Feb. 2014).	Construction
USBOR Aqueduct	USBOR/JVWCD Project Agreement	Follow all processes and conditions described in Project Agreement between UDOT, Bureau of Reclamation, and Jordan Valley Water Conservancy District.	Construction
Wetlands and Waters of the U.S.	Permit	Conform to all general and special conditions of the nationwide permit for impacts to Bingham Creek. Obtain stream alteration permit and follow all conditions.	Construction
Floodplains		Obtain approved Conditional Letter of Map Revision (CLOMR) as	Prior to

Subject	*Source*	*Commitment*	*Implementation Period(s)*
		required by City and FEMA regulations for modifications to Bingham Creek floodplain.	Construction (of Bingham Creek Culvert)
Floodplains	Permit	Obtain flood control permits and follow all terms and conditions.	Construction
Floodplains		Obtain approved Letter of Map Revision for modifications to Bingham Creek floodplain.	Post-Construction (submit within 6 months)
Demolitions		In accordance with Department Standard Specifications and local jurisdictions.	Construction
114000 South			
Air Quality	11400 South SES – Page 13	Follow requirements listed in UDOT Standard Specification 01572, Dust Control and Watering and UDOT Standard Specification 01355, Section 3.5, Fugitive Dust.	Construction
Cultural	11400 South SES – Page 13	Follow UDOT Standard Specification 01355, Parts 3.7 and 3.8	Construction
Hazardous Waste	11400 South SES – Page 13	Follow UDOT Standard Specification 01355, Parts 3.1	Construction
Invasive Species	11400 South SES – Page 13	Follow UDOT Supplemental Specification 02924S, Invasive Weed Control	Construction
Water Quality	11400 South SES – Page 13	Prepare, implement, and maintain a Stormwater Pollution Prevention Plan (SWPPP) in accordance with UPDES Permit No. UTRC0000 throughout construction of the Project.	Prior to and during Construction
Noise	11400 South SES – Page 13 UDOT Noise Abatement Policy 08A2-01 (Feb 2014)	Follow requirements listed in UDOT Standard Specification 01355, Section 3.6, Noise Control. The Design-Builder will install or replace noise abatement measures, as specified by the Department. The location and height of noise abatement measures described in the Final State Environmental Study and Noise Evaluation could change based on any changes to the final design and receptors. Changes to the final design and receptors will be evaluated by the Department prior to making a final determination on the location and height of the noise abatement measures. The final determination on noise wall height and location will also depend on the approval by a sufficient number of affected residents/property owners as defined in the UDOT Noise Abatement Policy (08A2-01, Feb. 2014).	Construction
Demolitions		In accordance with Department Standard Specifications and local jurisdictions.	Construction

6—GEOTECHNICAL

6A. GENERAL

Conduct all Work necessary to meet the requirements of this Section 6 (Geotechnical) and to satisfy all function needs of the Project, including providing foundations, retaining walls, and embankments, and conducting geotechnical investigations.

6B. STANDARDS

Complete Work for geotechnical elements in accordance with the requirements of the standards listed by priority in Table 6B-1 (Standards for Geotechnical).

If there is any conflict in standards, adhere to the standard with the most stringent requirements.

If there is any unresolved ambiguity in standards, it is the Design-Builder's responsibility to obtain clarification and Approval from the Department before proceeding with design and/or construction.

TABLE 6B-1
GEOTECHNICAL STANDARDS

Priority	*Author or Agency*	*Title*
1	UDOT	Special Provisions included in Part 5
2	UDOT	2012 Supplemental and Standard Specifications for Road and Bridge Construction
3	UDOT	2012 Supplemental and Standard Drawings for Road and Bridge Construction

6C. REQUIREMENTS

6C-1 Geotechnical Investigations and Reports

6C-1.1 Previous Investigations

The results of a Preliminary Subsurface Investigation commissioned for the Project by the Department are provided in Part 8 (Engineering Data: Geotechnical Data). The investigation includes logs and test results for geotechnical test holes performed at or near the proposed locations of selected Project structures and roadway alignments.

6C-1.2 Geotechnical Investigations

Conduct geotechnical investigations to supplement the data provided by the Department in Part 8 (Engineering Data: Geotechnical Data) such that the location, frequency, and scope of the investigations meet applicable standards and characterize the Project sites for design and construction. At a minimum, complete one geotechnical exploratory boring at each bridge location, to a depth appropriate for foundation design.

Prepare a Geotechnical Investigation Plan showing the locations, types, and anticipated depths of proposed subsurface investigations with respect to planned elements of the Project. Obtain the Department's Approval of the Plan before commencing investigations.

Perform a geotechnical test hole located within 100 feet of the foundation extending down at least two foundation diameters below the foundation bottom elevation for each overhead sign foundation that is designed for site specific soil parameters, see Part 4-17 (Structures) for additional requirements.

6C-1.3 Geotechnical Reports

Prepare and submit geotechnical reports bearing the seal and signature of a Professional Engineer licensed in the State of Utah. Include descriptions and results of geotechnical subsurface investigations, laboratory testing, site conditions, geologic setting, engineering analyses, and design recommendations. Include or reference all geotechnical investigations used in the analyses and in development of the recommendations. Include supporting calculations with each geotechnical report.

6C-2 Settlements and Displacements

Design and construct settlement mitigation in accordance with the Geotechnical MOI provided as an appendix to this Section. Include in the geotechnical reports analyses and calculations demonstrating that the design and any planned settlement mitigation conform to the Geotechnical MOI.

Monitor the progress of settlement and settlement mitigation using geotechnical instrumentation during construction. At a minimum and regardless of anticipated settlement magnitudes and durations, use instrumentation to monitor embankment settlements in all bridge approach slab areas. Prior to performing subsequent Work in mitigated areas, submit to the Department the data collected and a technical analysis demonstrating that the mitigation meets the Project requirements.

At any locations where the total calculated (10 year) settlement exceeds 3 inches, and settlements will not be mitigated using surcharge, provide a proof load of at least 360 psf above the pavement subgrade level. Use geotechnical instrumentation to monitor settlements under the proof load for a period of at least 30 days. Prior to releasing the proof load and embankment for pavement and approach slab construction, submit to the Department a technical analysis comparing the recorded settlements with the design calculations and demonstrating that projected long-term settlements meet all Project requirements. A proof load will not be considered a surcharge with respect to the Geotechnical MOI requirements.

Establish a baseline to monitor distress (e.g., settlements and lateral movements) of structures and properties. Install instrumentation, survey points, targets, or similar means at each bridge, retaining wall, and embankment area supporting pavement to allow for long-term monitoring by the Department for at least 10 years following Substantial Completion of the Project. Conduct an as-built survey of each long-term monitoring device, point, and target within 21 Calendar Days following construction of each element, and a second survey of all points within 30 Calendar Days prior to Substantial Completion.

6C-3 Foundations

6C-3.1 Foundation Types and Materials

Use one or more of the following foundation types for support of all structures:

A. Driven concrete-filled steel pipe piles

B. Drilled shafts

C. Driven steel H- piles

D. Pre-stressed concrete piles

E. Micropiles

F. Spread footings

6C-3.2 Drilled Shafts

Drilled shaft inspection will be provided by the Department. Before proceeding with any field

modifications of the drilled shaft criteria specified on the plans, submit to the Department a technical analysis by the Design-Builder's geotechnical and structural designers demonstrating that the modified criteria will not detrimentally impact the foundation performance.

Obtain Approval for alternate methods of shaft construction and before constructing any drilled shaft without using full-depth temporary or permanent casing to maintain the stability of the excavation.

If a Special Provision is used for drilled shaft construction, furnish all shaft base cleanliness inspection and non-destructive testing equipment and services. Coordinate the inspections and tests with the Department drilled shaft inspectors.

6C-3.2 Driven Piles

Pile driving inspection will be provided by the Department. The Design-Builder's geotechnical pile designer determines final driving criteria for driven piles using the results of dynamic testing with signal matching analysis. Furnish the all required PDA testing and analysis (e.g., CAPWAP) services and submit the results to the Department. Provide each of the Department's pile driving inspector with safe and reliable means of estimating and recording the pile blow count and the hammer energy or stroke (e.g., hydraulic hammer energy readout and/or saximeter) at all times.

Ensure that the driven pile geotechnical designer or an authorized representative is present at the bridge site during driving of the first pile at each substructure (monitored with a Pile Driving Analyzer), and remains at the site until sufficient data have been gathered to establish appropriate driving criteria for each support. Notify the geotechnical and structural designers immediately if any unusual or otherwise unanticipated pile driving condition is encountered (including if the piles are driven substantially out of the specified tolerances).

Before proceeding with field modifications of the pile driving criteria specified on the plans, submit to the Department a geotechnical analysis demonstrating that the modified criteria will not detrimentally impact the foundation performance.

If using pre-cast concrete piling, prepare a Special Provision for installing and testing the piles.

6C-3.3 Micropiles

If using micropiles, prepare a Special Provision for installing and testing the micropiles. Micropile inspection will be provided by the Department.

Use solid steel bars for micropile reinforcement. Use epoxy-coated or galvanized bars for all micropiles subject to tension loads.

Place grout and concrete to the bottom of the drilled hole using tremie methods. Do not place micropile grout or concrete in the hole through the stem of an auger.

Conduct the number and type of static load tests appropriate for the site conditions, but in all cases conduct at least one successful verification test at each bridge abutment and bent/pier, and conduct successful proof testing on at least 5 percent of production micropiles. Conduct verification testing before final design occurs and incorporate the results of the verification tests into the RFC design. Furnish all equipment, personnel, materials, and engineering for load testing of micropiles.

Ensure that the micropile designer or an authorized representative is actively involved in the construction process, including on-site construction observation and oversight of load testing. The micropile designer analyzes the load test results and revises the design as necessary based on the results. Before proceeding with revised designs, submit to the Department the applicable test results and design analyses.

6C-3.4 Lateral Load Response of Deep Foundation Groups

In place of the P-multipliers listed in the AASHTO *LRFD Bridge Design Specifications*, use the *P*-multipliers listed in the table below. Alternatively, use *P*-multipliers applicable to specific soil types based on published load test results.

TABLE 6C-1
PILE *P*-MULTIPLIERS, P_M FOR MULTIPLE ROW SHADING

Pile CTC spacing (in the direction of loading)	*P*-Multipliers, P_m		
	Row 1	*Row 2*	*Row 3 and higher*
2.0*B*	0.60	0.35	0.25
3.0*B*	0.75	0.55	0.40
5.0*B*	1.0	0.85	0.70
7.0*B*	1.0	1.0	0.90
8.0*B*	1.0	1.0	1.0

6C-4 Embankments, Slopes, and Retaining Walls

Evaluate the external stability (global stability and bearing resistance) of all wall systems using a limit equilibrium program that estimates the minimum factor of safety along the critical failure surface(s).

Inspection for permanent retaining walls will be provided by the Department.

6C-4.1 Temporary Excavations

Use temporary cut slopes for excavations as permitted by the U.S. Occupational Safety and Health Administration (OSHA) standards for excavation (29 CFR Part 1926, Subpart P) and as indicated by geotechnical analyses, but in no case steeper than 1:1 (H:V) for slopes higher than 6.0 feet that are adjacent to active lanes of traffic.

6C-4.2 MSE and PMGW Wall Systems

For mechanically-stabilized earth (MSE) walls and prefabricated modular gravity walls (PMGW), use only those systems pre-approved by the Department, as listed in Special Provision 02831S.

Use reinforced concrete for all MSE wall panels. Design and construct panel joints and internal reinforcement to accommodate anticipated total and differential settlements. In designing the connection between MSE facing elements and soil reinforcements, account for both the design pullout load and the additional load due to the maximum anticipated settlement of the wall.

Do not locate drainage pipes perpendicular to MSE soil reinforcement within the reinforced soil mass without prior site-specific Department Approval. With any request for Approval, include documentation demonstrating the Design-Builder has exhausted reasonable alternative design options and has addressed applicable technical issues including maintenance, leakage, soil reinforcement conflicts, future accessibility of the pipe for repairs, and settlement. Approval will only be considered for jointless pipes no greater than 24 inches in diameter.

For design drawings and calculations specific to the wall system (typically developed by the wall supplier), comply with the following supplemental requirements.

A. Provide design reviews by the Design-Builder's geotechnical and structural engineers.

B. Complete all applicable interdisciplinary design reviews and constructability reviews to identify and resolve conflicts with other Project features.

C. Submit to the Department a draft version of each design, and a final version that incorporates all agreed-upon review comments.

6C-4.3 Soil Nail Walls

Meet the requirements of Special Provisions 02871S and 02342S for soil nail walls and shotcrete. Do not use soil nail walls below the existing ground water table.

6C-4.4 Temporary Earth Retaining Structures

Construct temporary excavation support such as sheet pile, soldier piles and lagging, soil nailing, and bracing in accordance with site-specific designs that have been prepared, signed, and sealed by a Professional Engineer licensed in the State of Utah.

Where temporary retaining structures or materials will be incorporated into permanent embankments or retaining structures, the design, construction, and testing must meet the requirements for permanent construction.

6C-5 Seismic Design

6C-5.1 Design Seismic Event Magnitudes

For the design seismic event having a 7 percent probability of exceedance in 75 years, use an earthquake moment magnitude of 7.0. For the design seismic event having a 3 percent probability of exceedance in 75 years, use an earthquake moment magnitude of 7.2.

6C-5.2 Design Seismic Acceleration Coeffecients

Determine the Site Class for each interchange. Calculate the site design acceleration coefficients using interpolated AASHTO site coefficients and the Site Class B acceleration coefficients in Table 1 (obtained from the USGS 2008 Hazard Curve Application at http://geohazards.usgs.gov/hazardtool/).

TABLE 6C-2
Seismic Acceleration Coefficients for Site Class B

Probability of Exceedance:	3% in 75 years			7% in 75 years		
Approximate Return Period:	2462 years			1033 years		
Parameter:	PGA	S_s	S_1	PGA	S_s	S_1
11400 South	0.456	1.216	0.344	0.298	0.767	0.213
9000 South	0.462	1.235	0.346	0.305	0.786	0.218
7000 South	0.514	1.374	0.380	0.331	0.853	0.235
5400 South	0.561	1.494	0.413	0.356	0.920	0.252

6C-5.3 Site-Specific Hazard and Response Analyses

Obtain Approval of any site-specific seismic hazard and/or response analysis methodologies and their results prior to their use in design. For this Project, the Department will not Approve use of design spectral response accelerations less than those determined using the General Procedure defined in the AASHTO *Guide Specifications for LRFD Seismic Bridge Design*.

6C-5.4 Design for Seismic Hazards

Account for the effects of seismic ground motions, liquefaction, and soil strength reductions associated with earthquake loading in design of foundations and retaining walls, and in the design of embankments where the seismic performance of the embankment may impact bridges, retaining walls, or other facilities.

Where necessary to meet seismic performance requirements, design and construct ground improvement to mitigate the effects of soft and/or loose foundation soils, liquefaction and dynamic soil strength loss, including global instability, loss of bearing resistance, lateral spread, and excessive deformations. Develop Special Provisions for the ground improvement work, including requirements for in-situ testing of the improved ground to verify the required improvement.

Prior to proceeding with construction in mitigated areas, submit a technical analysis and supporting construction and test data demonstrating that the completed ground improvement meets the applicable requirements and the intent of the geotechnical design.

6C-6 Utilities

Identify all new and existing Utilities crossing embankments, evaluate settlement and vibration impacts on these Utilities, and evaluate impacts of abandoned Utility lines on settlements. Design new and relocated Utilities to accommodate the anticipated settlements and to operate effectively during and after construction. Refer to Part 4-19 (Utilities) for requirements applicable to specific Utilities.

6C-7 Impacts to Adjacent Properties

6C-7.1 Vibrations and Settlements

Where vibration-inducing activities are to be performed, and/or where embankments or walls are to be constructed in the vicinity of properties, schools, structures, water tanks, Utilities, or other facilities, evaluate potential impacts. See Part 4-19 (Utilities) for additional requirements. Develop and implement a program to conduct preconstruction surveys and to monitor and mitigate vibrations and settlement impacts as follows:

A. Use published attenuation relationships to estimate the zones within which vibrations caused by the Project may impact existing properties and facilities.

B. Estimate settlement influence zones from embankment loads and other significant loads that could possibly extend beyond the ROW.

C. Determine the horizontal extent of settlement evaluation and monitoring based on the settlement tolerance of adjacent facilities. At a minimum, evaluate all facilities located within the zones defined in Section 6.7 of the Geotechnical MOI.

D. Within zones of potential impacts, conduct site investigations of properties to determine sensitivity of facilities to vibrations and/or settlement.

E. Identify properties and facilities that may be adversely affected.

F. Conduct a preconstruction survey of each susceptible structure/property.

G. Develop and implement appropriate measures to prevent and/or mitigate adverse vibration and settlement impacts, meeting the Project requirements including all Third-Party Agreements.

H. Monitor vibrations and settlements to ensure they do not cause damage or exceed specified limits. Implement additional mitigation measures where needed.

6C-7.2 Other Potential Impacts

Evaluate the potential for other geotechnical impacts to adjacent properties and structures, including modifications and disruptions to groundwater levels and flows. Develop and implement plans to monitor and mitigate these impacts.

6C-8 Fill Materials

Provide suitable materials for construction of earth fills. Document the source, quality, pertinent physical and chemical properties, and applicable test results for all materials before using them. Do not use steel slag or other potentially-corrosive materials where they may be detrimental to structures or other components, such as MSE wall reinforcements, drainage pipes, or foundations.

6C-8.1 Use of Broken Concrete in Fills

If broken concrete is used in earth fill, meet the following requirements:

A. Limit the maximum size of concrete pieces to 12 inches in the maximum dimension.

B. Arrange and distribute concrete pieces to prevent nesting and voids, and to allow placement and compaction of soil fill between adjacent pieces.

C. Do not use broken concrete as backfill for retaining walls or for reinforced soil fills.

6C-8.2 Lightweight Fill Materials

For lightweight fill materials, use only the following materials:

A. Expanded polystyrene (EPS Geofoam fill), per Special Provision 02334S.

B. Lightweight aggregate consisting of scoria, pumice, expanded shale, and/or steel slag aggregate, per Special Provision 02332S.

C. Lightweight cellular concrete (requires preparation of a Special Provision by Design-Builder's geotechnical engineer).

Use only materials that can withstand exposure to the elements without a loss of integrity over a minimum period of 75 years. Protect all lightweight fill material from conditions which may cause degradation or otherwise impact its properties and performance, including UV degradation of synthetic materials and excessive moisture absorption of lightweight aggregates.

6C-9 Minimum Limits of Granular Backfill Borrow

Place Granular Backfill Borrow to the following minimum limits:

A. 3.0 feet behind abutments

B. 3.0 feet around footings

C. 2.0 feet behind wingwalls

6C-10 Excavation and Backfill for Existing Basements

Remove basements of existing structures as outlined in Section 02221 of the UDOT Standard Specifications. Slope existing structure excavations at no steeper than 2 horizontal to 1 vertical. Backfill basement and other existing structure excavations with Borrow, meeting the placement and compaction requirements of Section 02056.

6D. SUBMITTALS

Provide all applicable submittals to the Department in accordance with Table 6D-1.

TABLE 6D-1
DESIGN-BUILDER SUBMITTALS FOR GEOTECHNICAL

Submittal	***For Approval***	***Schedule***
Geotechnical Investigation Plan(s)	Yes	5 Calendar Days before starting investigations at the applicable location(s)
Geotechnical reports and supporting calculations	No	No later than the final design milestone review
Settlement monitoring data and technical analysis of completed settlement mitigation (other than surcharge)	No	Prior to releasing area for further construction
Requests for release of surcharge, with supporting data and technical analysis	Yes	5 Calendar Days prior to releasing area for further construction
Data and technical analysis for release of proof loads.	No	Prior to releasing area for further construction
Special Provisions for foundation construction (where required)	No	No later than the final design milestone review
Pile drivability analysis demonstrating adequacy of proposed driving equipment.	No	Prior to mobilizing pile driving hammer to the site
Deep foundation inspection records and test results	No	2 Calendar Days prior to steel and concrete placement in driven piles. 2 Calendar Days prior to building structures on shafts and micropiles
Requests for Approval of drainage pipes perpendicular to MSE soil reinforcement.	Yes	No later than initial design milestone review
Supplier Wall Drawings and Calculations	No	Per requirements in Special Provisions 02831S and 02871S
Site-specific seismic hazard and/or response methodologies and analyses.	Yes	No later than initial design milestone review
Special Provisions for ground improvement	No	No later than final design milestone review
Construction/test data and analysis for completed ground improvement	No	Prior to releasing area for further construction
Geotechnical Instrumentation Plan(s)	Yes	No later than initial design milestone review
Geotechnical instrumentation reports	No	Weekly during active installation and/or monitoring

Appendix A: Geotechnical MOI

GEOTECHNICAL MANUAL OF INSTRUCTION

Utah Department of Transportation

November 2015

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CHAPTER 1: INTRODUCTION

1.1 GENERAL

The purposes of this Manual include the following:

- Outline the roles and interaction of the UDOT Geotechnical Division and of Consultant Geotechnical Engineers within the Project team for work on UDOT projects.
- Identify Standard procedures, practices, manuals, specifications, etc. for use in UDOT geotechnical work, including investigations, testing, design, and construction.
- Establish standards for presentation of geotechnical information, including reports, test hole logs, and laboratory test results.
- Define UDOT requirements and expectations for geotechnical work; particularly where UDOT's expectations may differ from or are not clearly addressed by the requirements of the referenced Standards.

Imperative statements in this Manual indicate requirements for geotechnical work on UDOT projects, and the subject of imperative statements is the Project Geotechnical Engineer, unless otherwise noted.

It is not the intent of this Manual to be all-inclusive. Where this manual uses the terms "include" or "including," the implied meaning is "including but not limited to." Address all geotechnical issues that are pertinent to the Project, regardless of whether or not a given issue is specifically addressed by this Manual. Consult with the UDOT Geotechnical Division in developing an approach to geotechnical topics not specifically addressed by this Manual or its Standards.

Wherever a publication is referenced in this Manual, the reference refers to the current edition and all current interims, unless explicitly stated otherwise in the reference. Consult with the UDOT Geotechnical Division for clarification as needed.

This Manual requires that various items be submitted to the UDOT Geotechnical Consultant Manager. The UDOT Geotechnical Division will provide comments on submittals at its discretion. Allow adequate time (generally 5 to 10 business days) for the UDOT Geotechnical Division to provide comments on submittals.

The UDOT Geotechnical Division recognizes the importance of engineering judgment, schedule, and economy in geotechnical work for UDOT projects, and may accept project-specific exceptions to the requirements of this Manual at its discretion. Where the Project Geotechnical Engineer concludes that a specific exception is justified and particularly advantageous to the Project, submit written justification of the proposed exception to the UDOT Geotechnical Consultant Manager. Obtain written acceptance of

the proposed exception from the UDOT Geotechnical Consultant Manager prior to proceeding with the related work.

The UDOT Geotechnical Division maintains and updates this Manual to accommodate advances in geotechnical engineering and AASHTO practice, and welcomes comments and suggestions to be considered for implementation in future editions.

1.2 DEFINITIONS OF SELECTED TERMS USED IN THIS MANUAL

Manual: The phrase "this Manual" refers to this document, the current UDOT *Geotechnical Manual of Instruction*.

Project Geotechnical Engineer: The Geotechnical Engineer of Record. A Professional Engineer registered in the State of Utah and responsible for the geotechnical work performed on the Project. The Project Geotechnical Engineer may be a UDOT Geotechnical Engineer or a Geotechnical Consultant (including a consultant working for another entity on the Project).

Subsurface Exploration: Any subsurface exploration as a part of a geotechnical investigation to determine the engineering properties of the subsurface materials. A subsurface exploration may include soil borings, test pits, trenches, rock coring/boring, and in-situ testing such as SPTs, CPTs, field vane shear, field permeability tests, etc.

UDOT Geotechnical Consultant Manager: Representative of the UDOT Geotechnical Division assigned to a project in cases where the Project Geotechnical Engineer is a Geotechnical Consultant.

1.3 SELECTED ACRONYMNS USED IN THIS MANUAL

AASHTO: American Association of State Highway and Transportation Officials

ADSC: Association of Drilled Shaft Contractors

ASTM: ASTM International (American Society for Testing and Materials)

CPT: Cone Penetration Test

DFI: Deep Foundations Institute

FHWA: Federal Highway Administration

LRFD: Load-and-Resistance Factor Design

MSE: Mechanically-Stabilized Earth

NACSN: North American Commission on Stratigraphic Nomenclature

NCHRP: National Cooperative Highway Research Program

NHI: National Highway Institute

OSHA: Occupational Safety and Health Administration

PDA: High-Strain Dynamic Pile Testing (e.g., Pile Driving Analyzer)

PGA: Peak Ground Acceleration

QC/QA: Quality Control / Quality Assurance

QSM: Quality Systems Manual

RFP: Request for Proposals

RQD: Rock Quality Designation

SPT: Standard Penetration Test

TRB: Transportation Research Board

UDOT: Utah Department of Transportation

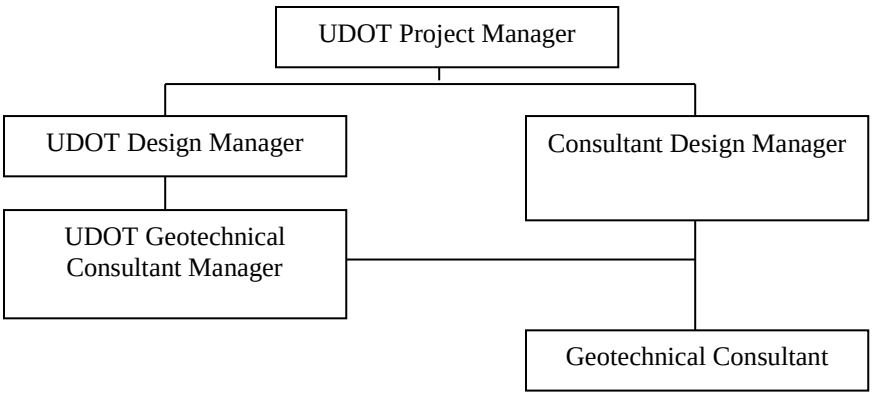
USCS: Unified Soil Classification System

USGS: United States Geological Survey

WEAP: Wave Equation Analysis of Pile Driving

1.4 GEOTECHNICAL PROJECT ORGANIZATION STRUCTURE

For projects employing a Geotechnical Consultant as the Project Geotechnical Engineer, conduct geotechnical work in accordance with the Project team structure illustrated by the diagram below.



Submit all geotechnical reports, calculations, geotechnical plan sheets, special provisions, etc. to the UDOT Geotechnical Consultant Manager, and allow time for comment prior to finalizing reports. The Project Geotechnical Engineer bears the ultimate responsibility for all geotechnical work.

1.5 UDOT PROJECT DELIVERY PROCESS

Conduct work in accordance with the *UDOT Project Delivery Network.* The *Project Delivery Network* describes the project development sequence for the various design disciplines, including the geotechnical design process, identifies the deliverables from each activity and task, and describes the coordination between the geotechnical engineer and other design disciplines.

For additional information on the project development delivery process, refer to the *Project Delivery Network* guidance on the website, the UDOT *Project Manager Guide,* and the UDOT *Local Government Guide.* The UDOT Geotechnical Division does not conduct pavement design. Where geotechnical input is needed for pavement design, refer to the UDOT *Pavement Management and Pavement Design Manual*.

1.6 LOCAL GOVERNMENT PROJECTS

For details on the design process for local government projects, refer to the UDOT *Local Government Design Process Manual*. While oversight authority lies with the local government agency on these projects, the lines of responsibility for geotechnical services and oversight are the same as for State transportation projects. Conduct geotechnical work for local government projects in accordance with this Manual.

1.7 DESIGN-BUILD PROJECTS

Conduct geotechnical work for UDOT Design-Build projects in accordance with this Manual and the other Standards listed by priority in the Project RFP. The UDOT Geotechnical Division will assign a Geotechnical Oversight Engineer to assist the Project management team.

1.8 MAINTENANCE SUPPORT

The UDOT Geotechnical Division will provide support to UDOT's maintenance group regarding issues such as landslides, rockfall, and other geotechnical concerns.

UDOT may occasionally retain consultants to assist the Geotechnical Division in specialized situations. Consultants retained to assist with maintenance issues will provide services in accordance with applicable procedures and standards.

CHAPTER 2: GEOTECHNICAL STANDARDS, REFERENCES, AND SOFTWARE

2.1 GEOTECHNICAL STANDARDS

Conduct all geotechnical work for UDOT projects in accordance with the Standards listed in Table 2-1. In the case of conflicting requirements, the requirements of the highest priority Standard take precedence.

Table 2-1

Standards for UDOT Geotechnical Work		
Priority	**Author or Agency**	**Title**
1	UDOT	Contract Documents for the Project
2	UDOT	*Supplemental Specifications to the Standard Specifications for Road and Bridge Construction*
3	UDOT	*Supplemental Drawings to the Standard Drawings for Road and Bridge Construction*
4	UDOT	*Standard Specifications for Road and Bridge Construction*
5	UDOT	*Standard Drawings for Road and Bridge Construction*
6	UDOT	*Geotechnical Manual of Instruction*
7	AASHTO	*Guide Specifications for LRFD Seismic Bridge Design*
8	AASHTO	*LRFD Bridge Design Specifications* (Customary U.S. Units)
9	AASHTO	*Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*
9	FHWA	*Mechanically Stabilized Earth Walls and Reinforced Soil Slopes, Design and Construction Guidelines* NHI-10-024 (Berg et al, Nov 2009)
9	FHWA	*Soil Nail Walls, Geotechnical Engineering Circular No. 7* FHWA-NHI-14-007Lazarte et al., 2015)

2.2 GEOTECHNICAL REFERENCES

The References section at the end of this Manual (Appendix I) contains complete references for the publications listed in Table 2-1. In addition to the Standards listed in Table 2-1, the UDOT Geotechnical Division commonly uses the other resources referenced in this Manual, and may refer to these references in reviewing geotechnical work, including investigations, testing, reports, design submittals, and proposed methodologies.

2.3 GEOTECHNICAL METHODOLOGIES AND SOFTWARE

Designers are responsible for the accuracy of all methodologies and computer software used for design. Use methodologies specified by the applicable design standards and widely-accepted computer software. Submit documentation demonstrating validity and calculated checks of other methodologies and computer software. Document all

software program names and version numbers.

CHAPTER 3: GEOTECHNICAL INVESTIGATIONS

Consult with the UDOT Geotechnical Consultant Manager in planning and conducting geotechnical investigations.

3.1 LITERATURE REVIEW

Prior to commencing subsurface explorations, conduct a review of available literature and records applicable to the Project. Common sources of geotechnical and geological literature and data useful for UDOT projects include those listed in Table 3-1.

Table 3-1

Common Sources of Geotechnical and Geological Literature and Data	
Source	**Type of Information**
UDOT	previous geotechnical investigation reports; as-constructed drawings from Structures Division records for existing highway facilities (including soil data sheets); construction monitoring and test records; maintenance records; UDOT research reports
USGS	geologic maps, charts, books; probabilistic seismic hazard deaggregations
Utah Geological Survey	geologic maps, charts, books
State, County, and Local Governments	well installation records; geological and geotechnical studies
Utah Department of Natural Resources	well installation records (Division of Water Rights)
Local Colleges and Universities	theses and dissertations on geotechnical and geologic topics of local interest; out-of-print geologic publications
Various Government Agencies	aerial photographs (review with stereoscope may show features/details not obvious to the naked eye); soil surveys (agricultural, engineering, etc.)

3.2 FIELD RECONNAISSANCE

Subsequent to the literature review, provide for site inspection by a geologist and/or a geotechnical engineer. Obtain existing surface and subsurface information prior to performing subsurface explorations, including the following:

- site history and previous land use
- site accessibility, utility conflicts, and potential traffic problems
- topography
- surface water and groundwater
- erosion patterns
- geologic structure and soil/rock profiles
- surface features that may affect design, construction, and performance of proposed facility

Refer to Appendix B of this Manual for an example field reconnaissance report form.

Where applicable, obtain information regarding the soil (nature and thickness of strata) and bedrock (lithology and structure) by observing natural and man-made exposures, including river banks, escarpments, quarries, and highway and railway cuts.

3.3 SUBSURFACE EXPLORATION PLANNING

3.3.1 General

Conduct and finalize site exploration planning in advance of any actual subsurface exploratory work. Ensure that all permits and clearances are obtained and that all necessary precautions (such as evaluations of potential hazards at or near the site) are taken ahead of time.

3.3.2 UDOT Encroachment Permits

Obtain encroachment permits prior to performing any subsurface exploration or testing on UDOT property. Contact the local UDOT region office to apply for permits.

3.3.3 Permission to Access Private Property

Obtain and document permission to access private property directly from the property owner. A sample permit to enter and conduct exploratory drilling is included in Appendix A of this Manual.

3.3.4 Railroad Right of Way

Coordinate all access to Railroad right of way with the UDOT region Engineering Coordinator of Utilities and Railroads.

3.3.5 Environmental Clearances and Permits

Obtain all required environmental clearances and permits prior to initiating investigations. Cease exploration operations and contact UDOT's Risk Management Group if potentially hazardous conditions are identified. Record and immediately report evidence of contamination in any explorations to the Region Environmental Engineer.

3.3.6 Traffic Control Plans

For all exploration sites that require drilling equipment, support vehicles and/or personnel to be located within 30 feet of a traveled way, submit a traffic control plan and obtain acceptance from the Region Traffic and Safety Engineer.

3.3.7 Utility Clearances

Obtain utility clearances through Blue Stakes of Utah (1-800-662-4111 or www.bluestakes.org) and any other entities (e.g., railroads, irrigation companies, etc.) that may own or operate utilities in the area. Provide locations of the proposed

subsurface explorations to utility locating organizations. Obtain clearances as necessary for both overhead and buried utilities
Blue Stakes requires that the address, location, and nature of the work be submitted at least two full working days prior to commencement of subsurface explorations; and requires that all exploration locations be marked in the field in order to perform a locate request. Blue Stakes can schedule an on-site meeting with utility locators in cases where the proposed subsurface exploration locations are difficult to describe. Where the exploration is near an existing utility, the utility company may require that their representative be present at the beginning of the investigation, and may require hand digging or potholing to a depth below the utility.

3.3.8 Impacts to UDOT Property

If UDOT property is damaged or modified in any way due to drilling operations, contact the UDOT region maintenance office and mitigate the impacts as directed.

3.3.9 Health and Safety

Comply with UDOT safety standards and all federal (including OSHA), state, and local laws and ordinances. Conduct drilling using trained and certified personnel equipped with appropriate safety equipment.

3.3.10 Interactions with the Public

Conduct all interactions with the public with respect and courtesy. Cooperate with property owners, public safety officers, and UDOT personnel to minimize and mitigate potential impacts and hazards of field investigations.

Protect the public from falling and tripping hazards posed by test holes. Provide advance notice of lane closures and other potential impacts in heavily-travelled areas. Refer specific questions from the public regarding UDOT projects to the UDOT Project Manager and/or Project public involvement personnel.

3.4 SUBSURFACE EXPLORATION

Submit all subsurface exploration plans to the UDOT Geotechnical Consultant Manager for acceptance prior to beginning field work.

3.4.1 Soil Borings

Soil borings are an essential element of the preliminary engineering investigations for highway bridge foundation design, cut and natural slope stability evaluations, liquefaction/lateral spread evaluation, embankment static and seismic stability and settlement evaluations, and highway location selection. The purposes of soil borings include the following:

- Determine the extent and characteristics of the various natural soil formations.
- Obtain high-quality samples representative of the different soil formations for laboratory testing and subsequent engineering analyses.
- Investigate possible trouble conditions such as springs, swamps, bogs, seepage zones, slide areas, expansive soils or rock, collapsible soils, soft soils, weak soils or rock, compressible soils, liquefiable soils, or other unusual soil or rock, or moisture conditions which could affect construction of highway structures or roadbed stability.

Conduct soil boring drilling, sampling, and in-situ testing in accordance with the specifications and procedures of this Manual and the relevant AASHTO and ASTM standards.

Drilling procedures will vary due to the variety of geologic conditions encountered within Utah. Use drill crews trained and equipped to perform investigations in the anticipated geologic conditions. Ensure that drilling crews conduct work in accordance with the procedures outlined in the NHI-FHWA *Manual on Subsurface Investigations* (2001) and the AASHTO *Manual on Subsurface Investigations* (1988).

3.4.2 Test Hole Frequency and Depth

Exercise engineering judgment in planning and performing subsurface explorations. Consider the following:

- type and criticality of Project elements
- soil and rock formations and characteristics
- subsurface variability at the site
- lengths and widths of Project elements
- loads to be imposed on the foundation materials
- availability and applicability of previous investigations at the site
- groundwater characteristics and conditions

Conduct subsurface explorations meeting the frequency and depth requirements listed in Table 3-2. These frequencies and depths may vary depending on site conditions, existing information, existing cut and fill performance, etc. CPT probes may be used for some of the required test holes where appropriate.

Table 3-2

Frequency and Depth of Geotechnical Subsurface Explorations		
Project Element	**Test Hole Frequency**	**Minimum Test Hole Depth (See discussion following table)**
Roadway Embankments	Every 200 to 600 feet, depending on variation in subsurface conditions	Twice the embankment height.
Cut Slopes	Every 200 to 600 feet, depending on conditions. Minimum of one for every cut exceeding 15 feet in depth.	15 feet below anticipated base of cut, and into competent soils or rock.
Buried Structures	One or more at each buried structure location.	15 feet below anticipated foundation elevation
Structural Foundations	See Section 10 of *AASHTO LRFD Bridge Design Specifications*, except provide at least 2 test holes for substructures more than 70 feet wide.	
Retaining Walls	See Section 11 of *AASHTO LRFD Bridge Design Specifications*	
Roadway Pavement	Refer to UDOT *Pavement Management and Pavement Design Manual*	

In developing the subsurface exploration plan, consider the widths of Project elements such as pavements, embankments, and buried structures. Where the element width exceeds about 70 feet, perform test holes along each side of the Project element at the frequencies listed in Table 3-2.

Project conditions may require more and/or deeper test holes than specified by Table 3-2, at the discretion of the Project Geotechnical Engineer in consultation with the UDOT Geotechnical Division. For example, wide embankments on compressible soils may require test holes to depths much greater than twice the fill height. In all cases, perform sufficient subsurface explorations to provide the information needed for the design and construction of each Project element. Base the extent and number of explorations and possible additional explorations on the variability of subsurface conditions in consultation with the UDOT Geotechnical Division.

It is not the intent of this Manual to require test holes in excessive quantities or depths. In particular, test holes for walls and embankments need not extend excessive depths into competent, incompressible strata. The UDOT Geotechnical Division may accept reduced test hole frequencies and/or depths at the recommendation of the Project Geotechnical Engineer.

3.4.3 Logging of Soil Borings

Log soil borings in the field and record, as a minimum, the information outlined in the NHI-FHWA *Manual on Subsurface Investigations* (2001) and the requirements of article 3.8 of this chapter and Appendix B of this Manual. Prepare final logs in English units as outlined in Appendix B.

3.4.4 Rock Coring/Boring

Obtain and recover rock cores in accordance with the applicable sections of the NHI-FHWA *Manual on Subsurface Investigations* (2001). Log rock cores as outlined in Appendix D.6 of the same manual, and as outlined in the *North American Code of Stratigraphic Nomenclature* (NACSN, 2005). Include on the logs RQD data relevant to Project requirements (see Appendix C of this Manual). Obtain downhole digital images or oriented cores where appropriate.

3.4.5 Test Pits/Trenches

The Project Geotechnical Engineer may use test pits for shallow soil investigations such as pavement subgrade and building (i.e. rest areas, etc.) investigations, and may use exploratory trenches for fault investigations, collapsible soils identification, etc. Log excavations (test pits and trenches) in the field and record the findings as outlined in Appendix D of this Manual.

3.4.6 Groundwater

Record groundwater levels in test holes during drilling/excavation and upon completion. Include the date and time of each groundwater level measurement on the field log. Note pertinent details such as height and/or rate of flow where artesian conditions are encountered.

In many cases, the water level in a test hole will not stabilize to the natural groundwater level until hours or days after drilling is complete. Where necessary, install temporary pipe in test holes to allow subsequent measurements of groundwater levels. If the primary drilling method does not permit reliable measurements of groundwater levels, conduct supplementary test holes to determine the depth to groundwater.

3.5 IN-SITU TESTING

In-situ tests used most frequently for UDOT projects include the Standard Penetration Test (SPT) and the Cone Penetration Test (CPT). Use these and other in-situ testing as appropriate to characterize the subgrade materials. Attempt a given type of in-situ testing only with a prior understanding of the applicability and limitations of the method to be employed. Conduct in-situ testing in accordance with the applicable AASHTO and ASTM standards. For tests not addressed by published standards, use widely-accepted methodologies and carefully document the procedures used.

Do not rely exclusively upon any type of testing that does not acquire a soil sample. Obtain samples of material from all soil strata for visual-manual classification and laboratory testing. Use in-situ testing of strength characteristics only as a supplement to laboratory testing. Consult with the UDOT Geotechnical Division regarding correlations proposed for use in design.

When performing paired explorations with both CPTs and borings, give preference to performing CPT investigations prior to the borings in order to target specific layers for sampling.

Include additional information such as pore pressure dissipation tests to establish estimated water levels; and shear wave velocity information to establish soil Site Class and evaluate liquefaction effects..

Present the results of in-situ tests using English units. On CPT logs, include as a minimum the tip resistance, sleeve resistance, friction ratio, ground surface elevation, latitude, longitude, and soil type interpretation versus depth.

3.6 GEOPHYSICAL METHODS

Use geophysical testing as appropriate for the Project. Refer to ASTM D 6429 for guidance in selecting geophysical methods. Conduct all geophysical testing in accordance with applicable ASTM standards, or in accordance with widely-accepted guidelines in cases where standards do not exist.

3.7 ABANDONMENT OF SUBSURFACE EXPLORATIONS

Where subsurface explorations require excavation through existing pavements, sidewalks, bridge decks, etc., properly patch the pavement upon completion of the exploration.

3.7.1 Borings

Backfill or grout borings as directed by the UDOT Geotechnical Consultant Manager and in accordance with NCHRP Report 378 (Lutenegger et al., 1995). Certify that each of the borings has been abandoned in accordance with all applicable rules and guidelines.

3.7.2 Test Pits/Trenches

Upon completion of the exploration, backfill excavations with the excavated material or other suitable soil material. In cases where any structure, wall, embankment, pavement, or other flatwork could be located over the excavation, backfill the excavation with suitable material, compacted in lifts with appropriate equipment as specified in Section 02056 of the UDOT Standard Specifications. When excavations are outside the footprint of any proposed Project element, tamp the backfill material in lifts no thicker than 12 inches to at least 90 percent of the maximum laboratory density as determined by AASHTO T 99 (Standard Proctor).

Where excavations are located in agricultural areas or other areas used to support plant growth, cover the backfilled excavation with topsoil so that the impacted area will support vegetation as well as or better than the original condition.

3.8 SOIL SAMPLING AND CLASSIFICATION

3.8.1 Sampling

Perform soil sampling to obtain samples that are as representative of subsurface materials as feasibly possible. Conduct sampling in general accordance with the *FHWA-NHI Subsurface Investigations Manual* (2001) and the AASHTO *Manual on Subsurface Investigations* (1988). In soft to very soft cohesive soils, use a piston sampler to obtain relatively undisturbed samples for consolidation testing. Do not attempt to use a driven California sampler to obtain undisturbed samples without prior acceptance by the Geotechnical Division.

Seal soil samples in air-tight containers as soon as they have been exposed and logged. Take particular care to seal samples promptly in extreme weather conditions. Seal thin-walled tube samples with rubber stoppers, o-ring caps, or paraffin wax. Make every effort to obtain, transport, and store samples in a manner that ensures and maintains sample integrity and quality. Avoid exposing samples to bumps, jolts, vibrations, or freezing temperatures.

Conduct SPT sampling using sampling hammers that have been calibrated in accordance with ASTM D 4633 within one year of the sampling date.

For sites in areas of moderate or high seismicity (sites having mapped *PGA* greater than about 0.20g), perform soil sampling and laboratory testing for both global seismic stability analysis and for liquefaction analysis. Where either global seismic stability or liquefaction is a concern for a particular site, perform CPT probes to more specifically assess either global seismic stability or liquefaction potential and to evaluate their effects. Conduct continuous SPT testing and sampling where soil layers may be susceptible to either global seismic instability or to liquefaction.

3.8.2 Field Classification

Classify soils in accordance with the approach and format detailed in ASTM D 2488. Record the basic soil profile elements in the field, including changes in strata, relative properties of soil types in layered/bedded deposits, and presence of cobbles or boulders. Make corrections and additions to the field classification, where necessary, by laboratory testing of the soil samples. See the NHI-FHWA *Manual on Subsurface Investigations* (2001) and Appendix B requirements for field logs and final logs.

Provide on the exploration logs soil descriptions that are precise and comprehensive, without being verbose. Include details without distorting the overall impression of the soil by excessive emphasis on less significant details.

Record descriptions in the Soil Description column of the boring log for every soil sample collected. The preferred order for soil descriptions is as follows:

- Soil name (ASTM D 2488 Group Name) with appropriate modifiers
- Group symbol
- Relative density or consistency
- Moisture condition
- Grain size, soil structure, mineralogy, or other descriptors
- Color

Include the gradation of coarse-grained soil (more than 50 percent retained on No. 200 sieve) in the specific soil name in accordance with ASTM D 2488. Record the maximum size and angularity or roundness of gravel and sand-sized particles. For fine grained soil (50 percent or more passing the No. 200 sieve), modify the name with the appropriate plasticity term in accordance with ASTM D 2488.

Describe interlayered soil zones beginning with an introductory name, followed by the soil types in order of predominance (e.g., “Interlayered Sand and Silt). Indicate the relative proportion of each type of soil observed in interlayered samples.

Where helpful, justify evaluations of soil plasticity with brief descriptions of visual-manual procedures, such as reaction to shaking, toughness of a soil thread, smear test, or dry strength, as outlined in ASTM D 2488.

3.8.3 Group Symbol

List the appropriate group symbol from ASTM D 2488 after each soil name. Dual symbols (e.g., GP-GM, SW-SC, CL-ML) may be used in accordance with ASTM D 2488. Borderline symbols (e.g., GM/SM, SM/SC) may be used occasionally on field logs to indicate that a soil sample has properties that do not distinctly place the soil in a specific group. In general, use the group name assigned to a soil as the group name for the first symbol. Avoid indiscriminate use of borderline symbols. Classify the soil in a single group wherever possible.

3.8.4 Relative Density and Consistency

Indicate the relative density of coarse-grained soils based on SPT N-values (ASTM D 1586). Show on the logs the raw blow counts for each 6-inch increment (or refusal) and the corrected $(N_1)_{60}$ values. Include applicable corrections for hammer energy ratio, sampler size (and liners), rod length, and overburden pressure.

Use miniature vane shear (torvane) to characterize stiffness and strength of cohesive soils. Do not rely on blow counts to characterize stiffness and strength of cohesive soils.

Where sample disturbance or large gravel prevents a reliable estimate of in-situ relative density or consistency, omit this item from the description, and note the reason for the omission on the boring log.

Use the results of vane shear, miniature vane shear (torvane), or pocket penetrometer testing as the primary field methods for evaluating consistency of fine-grained (cohesive) soil.

Correlations between field test results and relative density for coarse-grained soils are listed in Table 3-4, and correlations for consistency of cohesive soils are listed in Table 3-5.

Table 3-4

Relative Density of Cohesionless Soils			
$(N_1)_{60}$ (blows/ft)		**Relative Density**	**Field Test with ½-inch steel rod**
≤35% Gravel	**>35% Gravel**		
<5	<18	very loose	Very easily penetrated when pushed by hand
5-10	18-26	loose	Easily penetrated when pushed by hand
11-30	27-49	medium	Easily penetrated when driven with 5-lb hammer
31-50	50-75	dense	Penetrated 1 foot with difficulty when driven with 5-lb hammer
>50	>75	very dense	Penetrated less than 3 inches when driven with 5-lb hammer

Table 3-5

Consistency of Cohesive Soils				
N_{60} (blows/ft)	**Consistency**	**Shear Strength (tsf)[1]**	**Unconfined Compressive Strength (tsf)[2]**	**Field Test**
<2	very soft	<0.12	<0.25	Easily penetrated several inches by fist
2-4	soft	0.12-0.25	0.25-0.50	Easily penetrated several inches by thumb
5-8	firm	0.25-0.50	0.50-0.10	Penetrated several inches by thumb with moderate effort
9-15	stiff	0.5-1.0	1.0-2.0	Readily indented by thumb but penetrated only with great effort
16-30	very stiff	1.0-2.0	2.0-4.0	Readily indented with thumbnail
>30	hard	>2.0	>4.0	Indented with difficulty by thumbnail

[1]Torvane test is an indicator of shear strength.
[2] Pocket penetrometer is a proximate indicator of unconfined compressive strength.

3.8.5 Moisture Content

Define the degree of moisture present in the soil sample in accordance with Table 3-6.

Table 3-6

Criteria for Describing Moisture Condition	
Description	**Criteria**
Dry	Absence of moisture, dusty, dry to the touch
Slightly Moist	Apparent moisture but well below optimum moisture content
Moist	Damp, but no visible water; at or near optimum moisture content
Very Moist	Above optimum moisture content
Wet	Visible free water; substantially above optimum moisture content; at or above liquid limit

3.8.6 Soil Structure, Mineralogy, and Other Descriptors

Describe discontinuities, inclusions and other features, including joints or fissures, slickensides, bedding or laminations, veins, root holes, and wood or other debris.

Note significant mineralogical information, such as cementation, abundant mica, or unusual mineralogy such as pinhole structure, and other information such as oxidation, ferrous minerals, calcium, organic debris, odor, etc.

Include other descriptors as applicable for describing the sample, including particle size, range and percentages, particle angularity, particle shape, maximum particle size, hardness of large particles, plasticity of fines, dry strength, dilatancy, toughness, reaction to HCL, etc.

If possible, identify the parent rock and rock structure for residual soils having characteristics of both rock and soil.

3.8.7 Color

Record the basic color of a soil. Use an appropriate color code system such as the Munsell color charts. Use modifiers such as “light” and “dark” if necessary. Especially note staining or mottling, as this information may indicate water table fluctuations or contamination.

3.8.8 USCS Laboratory Classification

Modify field descriptions of soils using USCS laboratory classifications as appropriate.

3.8.9 AASHTO Laboratory Classification

Classify soils according to the AASHTO classification system based on available laboratory data in accordance with AASHTO M-145. Show the AASHTO classification symbol next to the USCS symbol on the boring logs.

3.9 ROCK CLASSIFICATION

Classify rock samples with the aid of the appropriate section of the *FHWA-NHI Manual on Subsurface Investigations* (2001), and as outlined in Appendix C of this Manual.

CHAPTER 4: GEOTECHNICAL TESTING

4.1 INTRODUCTION

Conduct the geotechnical testing program at the discretion of the Project Geotechnical Engineer and meeting the requirements of the Project and of this Manual. Exercise engineering judgment in developing the testing program. Use a testing laboratory accredited by AASHTO and ASTM. Maintain current certifications through the duration of the Project for all testing personnel.

The UDOT Geotechnical Laboratory is located in the Materials Testing Facility directly east of the Calvin Rampton building, and its primary function is to provide testing services for UDOT's in-house geotechnical design engineers, and for Geotechnical Consultants doing UDOT work on a project-by-project basis.

4.2 LABORATORY TESTING REQUIREMENTS

Conduct laboratory soil testing in accordance with the following requirements:

- Visually classify in the laboratory all soil samples extracted from the borings.
- Conduct moisture content and density tests on undisturbed cohesive samples, and perform Atterberg limits tests on selected samples to provide data for correlation and identification.
- Perform gradation/hydrometer testing to characterize grain size for any loose to medium-dense sand deposits for liquefaction effects.
- Where consolidation settlement is a concern, perform an adequate number of consolidation tests to determine variation of preconsolidation pressure with depth and variations of compressibility in different strata. Test consolidation samples at loads sufficiently large to accurately determine consolidation parameters. Record consolidation measurements versus time over a time period sufficient to determine rates of both primary and secondary consolidation under loads representative of the in-situ soil stresses anticipated during and after the Project.
- Conduct proper testing for determination of secondary settlement characteristics, amount of surcharge to use, and the percent consolidation to achieve long-term settlement requirements of the project.
- Conduct appropriate shear strength tests on samples from each definable soil deposit, depending on the soil type and the nature, purpose, loading conditions, and importance of the Project element.
- Perform pH, resistivity, chloride, soluble salts (for determining pipe class), and sulfates (for determining cement type), to evaluate potential for corrosion and deterioration of concrete and metal.
- Where sensitive soils are encountered, conduct index and appropriate shear strength tests to evaluate soil sensitivity.

- Test to evaluate potential for collapse, expansion, and other problematic behavior.
- In selecting tests for specific Project features, comply with the requirements and guidelines of applicable AASHTO and UDOT design specifications and manuals, including the *AASHTO LRFD Bridge Design Specifications* and the UDOT *Pavement Management and Pavement Design Manual*.

Perform geomechanical (rock core) testing in accordance with the guidelines set forth in the FHWA-NHI Subsurface Investigations Manual (2001).

4.3 LABORATORY TESTING PROCEDURES

Follow the applicable testing procedures outlined in the current AASHTO and ASTM Standards listed below:

- AASHTO *Standard Specifications for Transportation Materials and Methods of Sampling and Testing*
- *ASTM Volume 04.08: Construction: Soil and Rock (I)*

4.4 SOIL STRENGTH TESTING

Do not rely entirely on field methods such as miniature vane shear or pocket penetrometer tests to estimate shear strength properties of the subsurface materials. Conduct appropriate laboratory shear strength tests to supplement the results of field tests.

4.5 FORMAT OF LABORATORY DATA AND RESULTS

The exact format of laboratory data and results is not critical. Present the required information for each test in a neat and concise manner.

4.6 QUALITY ASSURANCE AND QUALITY CONTROL

Conduct laboratory testing in accordance with the Laboratory's QC/QA plan and QSM. Where samples are disturbed, contaminated, or otherwise compromised, make special note of the condition and its potential impacts on the test results. Make every effort to test only high-quality samples.

4.7 SAMPLE RETENTION

Retain and preserve samples in their original state until final acceptance of the Project following construction. Save laboratory worksheets and records in ProjectWise.

4.8 LABORATORY SUBCONTRACTING

The Project Geotechnical Engineer is ultimately responsible to UDOT for the laboratory testing for the Project, but may subcontract portions of the work to an accredited laboratory with the concurrence of the UDOT Geotechnical Consultant Manager. The same contract requirements apply to the subcontracted laboratory.

CHAPTER 5: GEOTECHNICAL DESIGN

5.1 GENERAL

This Chapter provides an overview of accepted UDOT analysis and design practices. It is not the intent of this Chapter to provide step-by-step procedures for analysis and design. Use expertise and engineering judgment in carrying out the analysis and design necessary to comply with all requirements. Include all assumptions, design properties, final calculations, and computer inputs and outputs in all reports, designs, analyses, etc. Do not hesitate to contact the UDOT Geotechnical Consultant Manager to review assumptions and approaches to analysis and design procedures.

To properly accommodate the guidelines presented herein and to incorporate any other project-specific requirements for design and construction, it may be necessary to modify some UDOT standard specifications or drawing details, or to develop special provisions for the Project. Submit all such items to the UDOT Geotechnical Consultant Manager prior to proper incorporation in the Project specifications and drawings.

5.2 SEISMIC POLICY AND PROCEDURES

5.2.1 General

Bridges built under the Department's oversight are designed in accordance with the policies and procedures specified by the UDOT Structures Division. Design bridge foundations to meet the seismic performance objectives of the bridge in accordance with the Structures Design and Detailing Manual. Design retaining walls, embankments, and other related elements in accordance with the policies and procedures presented in this Manual. For the purposes of seismic design, use the definitions and seismic design criteria shown in Table 5-1 for retaining walls and slopes.

Table 5-1

Seismic Design – Retaining Walls and Slopes		
Category	**Definition**	**Seismic Design Criteria**
Retaining walls and slopes adjacent to bridges	Located within 50 feet of bridge foundations, or within a greater distance where failure or excessive deformation would impact the seismic performance of the bridge	The geotechnical design earthquake for liquefaction, lateral spread, and slope stability for adjacent embankments and retaining walls is based on an earthquake hazard corresponding to 3% probability of exceedance in 75 years for essential and critical bridges, or to 7% probability of exceedance in 75 years for bridges classified as normal.
Retaining walls and slopes adjacent to other critical facilities	Located where failure or excessive deformation will impact adjacent critical utilities and other facilities including buildings in the Risk Categories III or IV of Table 1604.5 of the 2012 International Building Code, within or outside the Right-of-Way.	Design displacements and deformations to protect the adjacent facility in the characteristic earthquake (i.e. 3 percent probability of exceedance in 75 years).
Other retaining walls	All other retaining walls.	Design for the seismic event having a 7 percent probability of exceedance in 75 years, in accordance with the *AASHTO LRFD Bridge Design Specifications.*

5.2.2 Site-Specific Seismic Analyses

Meet the requirements and comply with the guidelines of the *AASHTO Guide Specifications for LRFD Seismic Bridge Design* and the *AASHTO LRFD Bridge Design Specifications* in selecting sites for and performing site-specific seismic analyses. Where AASHTO recommends site-specific procedures be used, consult with the UDOT Geotechnical Division to determine the best approach prior to undertaking the analyses. Before designing bridges or other Project elements using the results of site-specific seismic analyses, submit the analyses to the UDOT Geotechnical Consultant Manager.

5.2.3 Mapped Probabilistic Ground Motions

For the 1,033-year seismic event (7 percent probability of exceedance in 75 years, approximate 1,000-year event) evaluated using the General Procedure (as detailed in the *AASHTO LRFD Bridge Design Specifications* and the *AASHTO Guide Specifications for LRFD Seismic Bridge Design*), determine the mapped ground motion parameters *PGA*, S_a, and S_1 for the site latitude and longitude in accordance with the AASHTO Guide Specifications for LRFD Seismic Bridge Design and the *AASHTO LRFD Bridge Design Specifications.*

Where using the General Procedure for other seismic events (e.g., the approximate 2,500-year event), determine the mapped ground motion parameters for the site latitude

and longitude using the current USGS tools found online at http://earthquake.usgs.gov/ Because mapped ground motion parameters vary significantly over relatively small distances in many parts of Utah, do not use paper maps or zip code lookup tools to determine ground motion parameters for UDOT projects.

5.2.4 Design Event Magnitudes

Where seismic analyses require an estimate of the earthquake magnitude, use the USGS tool referenced in Section 5.2.3 to estimate the event magnitude. Guidelines for selecting design event magnitudes are provided in Article C6.8 of the *AASHTO Guide Specifications for LRFD Seismic Bridge Design*.

5.2.5 Liquefaction

Evaluate the potential for liquefaction and design for its impacts in accordance with Articles 6.8 and C6.8 of the *AASHTO Guide Specifications for LRFD Seismic Bridge Design*. Liquefaction-related impacts pertinent to UDOT projects include the following:

- Reduced soil strength impacting stability of walls and slopes
- Flow failures on steep slopes (greater than 6%)
- Lateral spread down gentle slopes (less than about 6%)
- Ground settlement
- Settlement, downdrag, reduced resistance, and shear for deep foundations
- Settlement and reduced bearing resistance for shallow foundations
-

Where the potential for liquefaction exists for bridge foundations and adjacent walls and slopes, address the potential for either global seismic stability or lateral spreading, or both, including the following considerations:

- Depth and continuity of soil layer(s) susceptible to liquefaction and/or strength loss
- Topography of the site, embankment, and vicinity
- Site geology and evidence of past liquefaction and lateral spreading

5.2.6 Seismic Soil Strength Reductions

For soils that are prone to liquefaction or severe strength loss as a result of ground shaking (e.g., sensitive soils), determine dynamic and post-earthquake strength parameters using cyclic triaxial tests where the loading is based on the design earthquake. Correlations with residual shear strength may be used in the absence of cyclic triaxial testing.

For cohesive soils that are not susceptible to appreciable dynamic/cyclic softening, account for a 10 to 20 percent increase in pore pressures or decrease in soil strength in post-earthquake analyses.

Refer to Section C6.8 of the *AASHTO Guide Specifications for LRFD Seismic Bridge Design* for guidance in addressing the timing of seismic soil strength loss relative to peak ground shaking.

5.2.7 Global Seismic Stability of Walls and Slopes

Evaluate both global seismic stability and lateral spread, and design to mitigate both, in accordance with Tables 5-1 and 5-2.

Evaluate global seismic stability of retaining walls and slopes for the following conditions:

- Dynamic condition during earthquake ground motions
- Post-earthquake condition after ground motions cease and dynamic strength losses (determined as indicated in Section 5.2.6) are fully developed

For the dynamic condition, conduct global seismic stability analyses using a horizontal pseudo-static coefficient equal to $0.5A_S$, with A_S determined in accordance with the *AASHTO LRFD Bridge Design Specifications*. If the pseudo-static limit equilibrium analysis indicates the wall or slope is stable (meeting the criteria in Table 5-2), and the value A_S for the site is less than 0.3, the permanent deformation associated with the dynamic condition can be assumed to be insignificant. For all other cases, supplement the results of the pseudo-static analyses by estimating the likely permanent deformations resulting from the dynamic condition.

Acceptable methods for estimating dynamic deformations of walls and slopes include the following:

- Newmark Sliding Block Analysis: Determine yield acceleration from pseudo-static analysis, then double-integrate acceleration time histories to estimate permanent deformations where the ground acceleration exceeds the yield acceleration. Use a minimum of three time histories that are appropriate for the site.
- Newmark-Based Displacement Charts and Equations: If a site-specific Newmark Analysis is not performed, compute and compare deformations estimated using at least two of the methods defined in Appendix A11 of the AASHTO LRFD Bridge Design Specifications.

Obtain the acceptance of the UDOT Geotechnical Division prior to using more complex methods of dynamic deformation analysis, such as dynamic stress-deformation models. Submit to the UDOT Geotechnical Consultant Manager the qualifications of the engineer(s) responsible for the modeling work, and documentation validating the proposed modeling method.

5.2.8 Lateral Spread

For the purposes of UDOT geotechnical work, “lateral spread” refers to lateral displacements of the ground surface caused by liquefaction of a laterally-continuous subsurface soil layer, and is not to be confused with localized limit-equilibrium slope instability, including flow failure or rotational slump. Lateral spread displacement occurs either in a down-slope direction on gently-sloping topography, or in the direction of a free face topographic feature where gentle or negligible slopes are interrupted by a relatively abrupt downward slope. Slopes and free-face ratios conducive to lateral spreading are outlined by Bartlett and Youd (1992) and Youd et al. (2002).

Use the revised empirical equations of Youd et al. (2002) to estimate lateral spread displacements for UDOT projects where conditions are conducive to lateral spreading. With prior acceptance of the UDOT Geotechnical Division, the Project Geotechnical Engineer may also use other methods to further evaluate potential lateral spread displacements.

5.2.9 Seismic Mitigation

Consult with the Geotechnical Division where seismic stability and/or lateral spread is an issue and ground improvement may be necessary. Where ground improvement is warranted to mitigate the effects of global seismic instability or lateral spread, design a ground improvement program to mitigate both of these conditions. Article C6.8 of the *AASHTO Guide Specifications for LRFD Seismic Bridge Design* briefly discusses potential ground improvement techniques for liquefaction effects and/or global seismic instability mitigation. Structural mitigation methods may be considered for small ground displacements and/or deformations.

The UDOT Geotechnical Division prefers the use of over-excavation and replacement or vibro-replacement (stone columns) for mitigation of liquefaction/lateral spread and global seismic instability. Obtain the prior acceptance of the UDOT Geotechnical Division for any other proposed mitigation methods (including foundation or structural mitigation methods where deemed appropriate). Develop special provisions requiring in-situ post-mitigation testing to verify that the soils left in place within the mitigated zone will not liquefy and/or become unstable in the design event. Always consider and design for the lateral spread depth and flow direction characteristics, including any slope stability failure directions, when designing treatment areas and protection of the structure.

5.3 BRIDGE FOUNDATIONS

5.3.1 General

Comply with the *AASHTO LRFD Bridge Design Specifications* for all aspects of bridge design, with any exceptions as directed by the UDOT Structures Design Manager or the Geotechnical Consultant Manager.

Bridge foundations for UDOT projects typically consist of deep foundations (piles or drilled shafts) or spread footings. Spread footings are generally not considered acceptable to the Structures or Hydraulics Divisions at stream crossings. Conduct an economic analysis to determine the optimal foundation system of those technically feasible. Do not use auger-cast piles, timber piles, rammed aggregate piers, screw-in anchors, or stone columns as a substitute for deep foundations to support UDOT bridges.

The foundation types applicable to a given project depend on anticipated loads and scour depths (where applicable), along with proper consideration of settlements, downdrag, bearing resistance, lateral load resistance, seismic hazards, constructability, and other applicable factors. Communicate with the Project Bridge and Hydraulics Engineers early in the Project and follow up regularly to develop a cost-effective foundation design.

5.3.2 Driven Piles

Driven piles should consist of steel H-pile or steel pipe pile (typically concrete-filled), or pre-stressed concrete pile. Yield strength values used in design should not exceed the values prescribed in the following specifications:

- Pipe pile: ASTM A-252 Grade 2 (35 ksi) or Grade 3 (45 ksi) steel
- H-pile: ASTM A-36 or A-50 steel

Design for corrosion and deterioration of driven piles in accordance with the *AASHTO LRFD Bridge Design Specifications.* Unless site soil conditions indicate the need for a different corrosion rate to meet the design life of the project, use a minimum corrosion rate of 1.3 mils/yr for steel piles.

Where driven piles are used, include as a minimum the following items for each abutment and bent on the pile details drawing:

- Required Driving Resistance
- Estimated Pile Toe Elevation
- Elevation of Minimum Acceptable Pile Penetration
- Pile Axial Compression Resistance at the Strength Limit State
- Pile Axial Compression Resistance at the Extreme Limit State
- Pile Uplift Resistance at the Strength Limit State
- Pile Uplift Resistance at the Extreme Limit State

UDOT Standard Specification 02455 lists installation requirements for driven piles, including required dynamic pile testing (PDA testing) with accompanying signal matching analyses. The required frequency of testing is shown in Section 6.4.1. Require end-of-initial drive PDA testing if cobbles, boulders, dense layers, or other obstructions may result in the pile being over stressed during driving. Where pile relaxation is a concern, require PDA testing during initial drive as well as restrike PDA testing at a minimum specified time following initial drive.

Evaluate pile drivability using WEAP for a range of driving systems that are likely to be proposed for use on the Project, and present the result of the analyses in the geotechnical report. Locally-available pile driving hammers typically used for UDOT projects include the following:

- Delmag/APE D 30-32
- Delmag/APE D 36-32
- ICE I-30
- ICE I-36

Unless the UDOT Geotechnical Division accepts a different approach in writing, design piles to meet all of the following drivability criteria:

- Ensure that the anticipated pile driving blow counts are not excessive (greater than about 120 blows per foot) for driving to the estimated pile toe elevation during initial drive conditions.
- Verify through a driveability analysis that the hammer(s) will deliver energy sufficient to demonstrate the required driving resistance at the estimated toe elevation during restrike conditions. State the minimum required hammer energy on the pile detail drawings.
- State the minimum pile section and yield strength on the pile details drawing to minimize the potential for excessive driving stresses. If these requirements vary depending upon hammer type (e.g., diesel hammers versus hydraulic hammers), state the minimum requirements for each hammer type.

5.3.3 Drilled Shafts

UDOT Standard Specification 02466 is intended for use with drilled shafts of relatively small diameter and depth. Where necessary, submit a special provision for drilled shaft construction that addresses construction issues relevant to the Project, including the following:

- Use of casing (temporary and/or permanent) to advance shaft excavations
- Detailed requirements related to the use of drilling slurry, including slurry type, preparation, testing, maintenance, and disposal.
- Concrete placement beneath groundwater and/or drilling fluid

- Maximum permissible time between beginning of drilling and beginning of concrete placement (to minimize degradation or expansion of exposed shaft sidewalls)
- Required inspection of cleanliness at bottom of shaft
- Time constraints for drilling near recently-completed shafts
- Non-destructive testing (e.g., cross-hole sonic logging, gamma-gamma logging, thermal integrity profiling) to verify integrity of completed shafts. Require non-destructive shaft-integrity testing when shafts are installed using drilling fluid, for all non-redundant shafts, or when determined by the Project Geotechnical Engineer.
- Requirements for post-grouting of drilled shaft toes for large diameter shafts relying on toe resistance
- Requirements that the drilled shaft geotechnical designer be actively involved in oversight of drilled shaft construction, and in the establishment of final required tip elevations in the field (if the elevations change from those shown on the plans)
- Requirements for submittal of completed shaft construction and non-destructive testing records and tolerance measurements for all shafts to the Project Geotechnical Engineer prior to building structures on top of the drilled shafts
- Qualification requirements for drilled shaft construction (i.e., 4 years demonstrated experience with the construction methods to be used in soil conditions similar to those at the site) and a quality control plan for shaft construction, to be submitted at least one month prior to mobilizing shaft construction equipment or materials to the site

For drilled shafts in gravelly soils, follow the design procedures for shaft friction outlined by Rollins, et al, 2005.

5.3.4 Load Testing of Deep Foundations

The Project Geotechnical Engineer may use static load tests to justify larger resistance factors for deep foundations in accordance with the *AASHTO LRFD Bridge Design Specifications*. Evaluate site variability and determine the required number of load tests for each site in accordance with the *AASHTO LRFD Bridge Design Specifications*. In determining the minimum number of load tests for UDOT projects, limit the radius of each site to no more than 300 feet.

UDOT owns a pile load test frame that may be available for use on a given project. The UDOT Geotechnical Division can provide information regarding the availability of the load test frame and the conditions governing its use.

5.3.5 Downdrag

Account for downdrag effects of settling soils on deep foundations, including that caused by liquefaction and by secondary consolidation settlement, in accordance with

the *AASHTO LRFD Bridge Design Specifications*. The UDOT Geotechnical Division prefers the use of the neutral plane approach recommended by Fellenius (2004) or Briaud and Tucker (1997) for analysis of pile settlement and drag load.

Do not use friction-reducing rings, or bituminous or other coatings, in an attempt to reduce downdrag.

5.4 FOUNDATIONS FOR SIGNS, LIGHTING, AND SIGNALS

When not using standard drawings, or when soil and groundwater conditions dictate, conduct appropriate subsurface explorations and testing for foundations of signs, lighting, and signals. Use the design procedure of *Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals*, and appropriate computer programs (as applicable), to design foundations for these structures.

5.5 EMBANKMENTS AND RETAINING WALLS

Design unreinforced and/or unprotected embankments no steeper than 2H:1V (Horizontal: Vertical).

Evaluate all new embankment fills, retaining walls and modifications of existing fills for settlement, global stability, and other applicable geotechnical considerations.

5.5.1 Settlement

Estimate both magnitudes and time rates of anticipated settlements associated with the Project. Address the potential for immediate settlements and both primary and secondary consolidation.

Design mitigation of settlements and displacements so as to not be detrimental to the performance of facilities, within or outside the Project, during construction and over the course of its design life.

Settlement mitigation approaches applicable to UDOT projects include the following:

- Lightweight fills (including EPS-Geofoam) used to reduce settlement magnitudes
- Prefabricated vertical (PV) drains used to accelerate primary consolidation
- Surcharge (which is defined to include preloads) used to reduce post-construction settlements
- Ground modification used to reduce settlement magnitudes and/or accelerate primary consolidation
- Isolating, underpinning, shoring, etc.

Design surcharge as a pressure rather than as a fill height or to a certain elevation. A minimum surcharge pressure should be approximately 360 psf to account for the final pavement section and traffic loads.

Submit the proposed settlement mitigation methods to the UDOT Geotechnical Consultant Manager. At bridge approaches design all settlements within 150 feet of bridge abutment centerlines to achieve at least 98 percent of the projected total primary settlement before embankments are released for construction. At all other locations, design the settlement to complete at least 95 percent of the total primary settlement

before releasing embankments for construction. At a minimum, use analyses of existing field settlement data, field and laboratory geotechnical investigations, monitoring of settlements during construction, and embankment release timing to demonstrate that long-term settlements will not exceed the following magnitudes over a period of 10 years following construction:

- 1.5 inches per 25 feet.
- Transverse differential settlement (perpendicular to roadway control line): 0.25 inch per 12-foot lane width.
- Bridge foundations total settlement: 1.5 inches (while maintaining required minimum clearances beneath structures.)

Obtain written concurrence from the UDOT Geotechnical Division prior to removal of any surcharge fill. Any surcharge fill which is removed without received this concurrence, may need to be replaced at the discretion of the UDOT Geotechnical Division.

5.5.1.1 Utilities

Evaluate settlement impacts on new and existing utilities, and evaluate the impacts of abandoned utility lines on settlements.

Design settlement mitigation as necessary to allow for effective operation through the design life of utilities.

If any utility line is to be abandoned, coordinate with applicable design disciplines and abandon it in such a way that the utility will not detrimentally impact the performance of the completed facility.

5.5.2 Global Stability

Evaluate global stability of embankments and retaining walls using widely-accepted methodologies and applicable computer software. Available slope stability programs produce a single minimum factor of safety. Table 5-2 lists the minimum acceptable factors of safety for global stability of embankments and retaining walls on UDOT projects.

Table 5-2

Minimum Acceptable Factors of Safety – Global Stability			
Category	**Feature**	**Condition**	**Minimum Factor of Safety**
Slopes and walls located where failure or excessive deformation will impact adjacent bridges or critical facilities	Retaining Walls	Construction	1.3
		Static Long-Term	1.5
		Pseudo-static Seismic	1.0*
		Post-Earthquake	1.1
	Embankments and Cut Slopes	Construction	1.3
		Static Long-Term	1.3
		Pseudo-static Seismic	1.0*
		Post-Earthquake	1.1
All other slopes and walls	Retaining Walls	Construction	1.1
		Static Long-Term	1.3
		Pseudo-static Seismic	1.0*
		Post-Earthquake	1.1
	Embankments and Cut Slopes	Construction	1.1
		Static Long-Term	1.2
		Pseudo-static Seismic	Not required
		Post-Earthquake	Not required

*Estimate deformations where required by subsection 5.2.7 in this Manual.

Evaluate and recommend appropriate means of meeting the factors of safety listed above. Acceptable means of improving factors of safety include modifying embankment slopes, dimensions, and materials, reinforcing embankment, and ground improvement. For short-term construction-phase stability deficiencies, evaluate the potential benefits of staged fill placement, using instrumentation to closely monitor stability conditions.

For medium-stiff to very soft fine-grained foundation soils, evaluate the potential for lateral squeeze.

5.5.3 Retaining Walls

Select and design MSE and cast-in-place retaining walls in accordance with the *AASHTO LRFD Bridge Design Specifications*.

- The UDOT Geotechnical Division maintains special provisions applicable to MSE and PMGW retaining walls, and will provide the current version of each to the Project Geotechnical Engineer upon request.02831S: Retaining Walls – Alternate Systems (insert project-specific soil parameters and seismic criteria)
- 02832S: Select Backfill for MSE Walls
- 02833S: MSE Walls Using Concrete Facing Panels and Metal Reinforcing Elements
- 02834S: MSE Walls Using Concrete Facing Panels and Geogrid Reinforcing Elements
- 02835S: MSE Walls Using Modular Block Units and Metal Reinforcing Elements
- 02836S: MSE Walls Using Modular Block Units and Geogrid Reinforcing Elements
- 02837S: Two-stage MSE Walls Using Concrete Facing Panels and Metal Reinforcing Elements
- 02838S: Two-stage MSE Walls Using Concrete Facing Panels and Geogrid Reinforcing Elements
- 02839S: Prefabricated Modular Gravity Wall (PMGW) Systems Using Large Modular Block Units
- 02840S: MSE Walls Using Wire Face and Metal Reinforcing Elements
-

Special Provision 02831S lists the MSE and PMGW retaining wall systems approved for use on UDOT projects, and includes design and construction requirements for the approved wall systems.

Conform to the current FHWA-NHI publication on MSE Walls and Reinforced Soil Slopes (FHWA-NHI-10-024 and -025, Berg et al., 2009) in the design of two-stage walls, and submit analyses and designs for such walls to the UDOT Geotechnical Consultant Manager.

Provide a minimum four-foot wide horizontal bench in front of retaining walls.

Avoid the use of acute corner MSE walls whenever possible, particularly those having an interior angle less than 70 degrees. For any wall having an angle less than 70 degrees, design the system as an internally tied bin structure with full at-rest lateral earth pressures. In any event, do not use any acute corner MSE wall having an interior angle less than 45 degrees.

Design soil nail walls in accordance with the provisions of Geotechnical Engineering Circular (GEC) No. 7 (FHWA, 2015). Design a drainage system for the soil nail walls including the use of geocomposite vertical strip drains spaced between every column of soil nails, and a base drainage system (protected from freezing) to convey any water seepage away from the toe of the wall.

5.6 FILL AND OTHER GEOTECHNICAL MATERIALS

UDOT Standard Specification 02056 describes the use of excavated materials in embankments, without specified exclusions. However, placement of moderately to highly plastic clays and silts (liquid limit > 50), problematic shale, certain volcanics, and other deleterious excavated materials can adversely affect long-term performance of embankments. Exclude the use of such materials in embankments by modified specification or special provision for the Project where necessary.

Other geotechnical materials acceptable for use on UDOT projects include geotextiles, prefabricated vertical drains (wick drains), composite drains, horizontal drains, sand drains, and certain lightweight fill materials. Acceptable lightweight fill materials include expanded polystyrene (e.g., Geofoam), expanded shale/ceramic aggregate, foamed concrete, pumice, inert steel slag products, and scoria. The UDOT Geotechnical Division maintains special provisions for Geofoam and wick drains and for acceptable lightweight aggregates.

Do not use shredded tires, fly ash, bottom ash, wood fibers, or broken concrete containing exposed rebar in fills.

5.7 CUT SLOPES

Evaluate cut slopes for static and dynamic conditions using methods outlined in one or more of the following publications:

- TRB Special Report 247 (1996)– Landslides: Investigation and Mitigation
- Abramson, et al. (1995)
- Huang (1983)

For cut slopes, meet the minimum factors of safety listed in Table 5-2.

Evaluate rockfall hazards using the Oregon DOT Rockfall Catchment Area Design Guide, acceptable simulation programs (e.g., CRSP), and the Ritchie Ditch criteria (Figure 18-15 in TRB Special Report 247). Conduct stereonet evaluations where applicable. Design rockfall catchment/retention (whether or not barriers or other protective measures are used) according to the following:

	At WL*
Interstate routes	98%
Other roadways	95%

* Minimum retention, at the outside edge of travel lane (typically the white line)

The minimum catchment width with barriers is 12 feet for maintenance access.

5.8 GEOTECHNICAL REPORTS

Prepare geotechnical reports in accordance with Appendix E of this Manual. Submit final reports bearing the seal and signature of a Professional Engineer licensed in the State of Utah. Include all assumptions, design properties, final calculations, and computer inputs and outputs in all reports.

5.9 GEOLOGIC REPORTS

Provide geologic reports as outlined in Appendix F, and prepared by a Professional Geologist licensed in the State of Utah with a minimum of five years experience in similar type of work and report preparation.

5.10 SOIL DATA SHEETS

Prepare signed and sealed UDOT-standard soil data sheets for inclusion in the plans for each structure. Include applicable logs of explorations provided by the Department on sheets marked “For Information Only.”

CHAPTER 6: CONSTRUCTION-PHASE WORK

6.1 GENERAL

The Project may require construction-phase services of the Project Geotechnical Engineer, including the following:

- Maintain compliance with geotechnical designs and recommendations
- Review of Contractor design submittals (drawings and calculations)
- Develop and implement an instrumentation program, with appropriate related construction recommendations
- Movement monitoring of facilities affected by the project
- Perform static pile load testing
- Review existing conditions and revise recommendations where appropriate
- Evaluate pile resistance using PDA with signal matching
- Provide clarification related to recommendations and specifications
- Vibration monitoring

Provide construction-phase services (where requested) in accordance with applicable standards. In some cases these services are provided by geotechnical engineers retained by the Contractor.

On Design-Build projects, the Design-Builder is responsible for construction as designed. The Design-Builder's Geotechnical Engineer provides construction-phase services to ensure compliance with geotechnical designs and recommendations.

6.2 RECORD KEEPING

Maintain a thorough log of all field visits and record all observations and recommendations. Document and substantiate all changes to the original design made in the field. Before changes are made, submit all proposed changes to the UDOT Resident Engineer and the UDOT Geotechnical Consultant Manager for concurrence.

6.3 TEMPORARY EXCAVATIONS AND RETAINING STRUCTURES

Evaluate and mitigate potential impacts of temporary excavations and retaining structures on existing and proposed structures, walls, embankments, utilities, railroads, and other facilities. A Utah licensed professional engineer must design, sign, and seal all plans and calculations for all temporary excavations and retaining structures. Do not incorporate temporary retaining structures or materials into permanent embankments or retaining structures unless the incorporated structures and materials have been designed, constructed, and tested in accordance with the requirements for the permanent construction.

6.4 INSPECTION OF DRIVEN PILE FOUNDATIONS

Where requested, provide pile driving inspection in accordance with the DFI *Inspector's Manual for Driven Pile Foundations* (1997). Use the pile driving forms found in Appendix G of this Manual. Note any observed or reported anomalies on the pile driving log.

6.4.1 Dynamic Pile Testing with Signal Matching Analysis

UDOT Standard Specification 02455 specifies procedures for driven pile installation and PDA testing with signal matching on UDOT projects.

The UDOT Resident Engineer will arrange for PDA testing with signal matching analyses to be conducted by either the UDOT Geotechnical Division or a qualified PDA testing firm. The PDA testing firm is responsible for QC/QA of its work. The UDOT Resident Engineer will coordinate with the Geotechnical Consultant Manager and the Project Geotechnical Engineer to resolve deficiencies in driving resistance determined from PDA testing.

On Design-Build Projects, unless otherwise specified by the Project RFP, the Design Builder is responsible for PDA testing and signal matching analyses, under the direction of the Design-Builder's Geotechnical Engineer.

Test at least one pile at each abutment and bent. Where more than 50 piles are used in an abutment or bent, or where the total foundation length is over 100 feet, test at least two piles, evenly distributed across the pile group(s). In no case test fewer piles than required by *AASHTO LRFD Bridge Design Specifications*.

Establish pile driving criteria based on a pile for which the required driving resistance has been verified by PDA testing and signal matching analysis. In the pile driving criteria for remaining piles, specify the minimum blow count and either the hammer energy or the hammer stroke corresponding to the minimum blow count, and an elevation of minimum acceptable pile penetration.

Acceptance of piles based on projected setup is not allowed on UDOT projects. Where additional setup is anticipated and is necessary to meet the required driving resistance, conduct PDA testing and signal matching analysis after the required setup has occurred.

6.5 INSPECTION OF DRILLED SHAFT FOUNDATIONS

The following manuals provide guidance for drilled shaft inspection.

- *Drilled Shaft Inspector's Manual* (DFI/ADSC, 2004)
- *Drilled Shafts: Construction Procedures and LRFD Design Methods* FHWA-NHI-10-016 (Brown, Turner, and Castelli, 2010)

6.6 STATIC LOAD TESTS OF DEEP FOUNDATIONS

Conduct or provide oversight of static load tests where required. Use the procedures specified in the *AASHTO LRFD Bridge Design Specifications*. Submit load test results, analyses, and conclusions to the UDOT Geotechnical Consultant Manager.

6.7 VIBRATION AND SETTLEMENT MONITORING

Use vibration attenuation relationships published by governmental agencies, applicable equipment manufacturers, and other entities to estimate the zones within which vibrations caused by the Project may impact properties and facilities.

At a minimum, monitor settlements of all structures, utilities, and other facilities:

- Where the estimated total settlement exceeds 0.5 inch.
- Within a horizontal distance *H* from the toe of the embankment, where *H* is the height of the embankment plus any surcharge.
- Where embankments are retained by walls, within 2*H* from the toe of walls.

Specify preconstruction surveys, and the monitoring of vibrations and settlements, at all structures, utilities, properties, and facilities potentially impacted by vibrations from compaction and other construction equipment, pile driving, settlements, roadway blasting, etc. Design and implement additional mitigation measures where needed. For vibration monitoring, the UDOT Geotechnical Division maintains Special Provision 02498S - Vibration Control During Construction Related Activities.

6.8 INSTRUMENTATION

Develop a detailed instrumentation plan to monitor parameters including settlements, slope/wall stability and movements, movements and vibrations of nearby structures, buildings, utilities, railroad tracks, and other facilities, groundwater levels, pore pressures (as applicable), and other geotechnical impacts during construction. Develop and implement plans to mitigate these impacts, both within and outside the planned Right-of-Way. Where long-term settlement of embankments or facilities may occur, provide long-term settlement instrumentation arrays in secure locations.

Develop and implement a Geotechnical Instrumentation Plan, and submit to the UDOT Geotechnical Consultant Manager including the following:

- A description of the proposed instrumentation, including parameters to be monitored, types of instruments to be used, their specific purposes, and typical duration and frequency of monitoring.

- Specific criteria for identifying locations requiring each type of instrument..
- Identification of the anticipated construction limits and the locations of adjacent properties, structures, Utilities, and other features that may be affected by the proposed construction.
- Typical construction drawings showing details for each type of instrument to be used.
- A Special Provision for Geotechnical Instrumentation detailing applicable requirements, the required materials, installation process, maintenance, protection, survey requirements, monitoring procedures for each type of instrument, and abandonment procedures.
- Details of the outside survey control and procedures that will be used to monitor and account for displacements of instrumentation reference/readout points, such as settlement platform readout boxes.
- Generalized details and location information for long-term instruments, points, targets, and/or similar devices that will allow long-term monitoring of displacements after project completion.
- Where instruments are used to monitor stability during construction, the acceptable magnitudes and rates of change in the parameters measured by the instruments, and details of an action plan to be implemented in the event the acceptable levels and/or rates are exceeded.
- Construction-phase and long-term instrumentation in sufficient quantity and type to demonstrate compliance with all requirements of the project.
- Construction plan sheets showing the locations, types, and other applicable parameters (e.g., depths) of all instrumentation to be installed.
- Redundancy in instrumentation of features critical to public safety.

During periods of active instrumentation installation and/or monitoring, submit to the UDOT Geotechnical Consultant Manager a weekly report presenting the data collected to date, accompanied by as-built details and surveyed coordinates of the instruments installed during the previous week.

Consult the paper entitled “Instrumentation and Construction Performance Monitoring for I-15 Reconstruction Project in Salt Lake City, Utah” (Bartlett et al., 2001) in developing construction monitoring programs and stability thresholds for embankments and retaining structures on soft sediments.

Include in the Project drawings and specifications requirements for sturdy, lockable instrumentation covers. Provide redundancy in instrumentation as appropriate to ensure compliance with designs and recommendations. Develop an action plan to be implemented in the event that a given instrument is damaged or fails to operate properly. Ensure that the Project special provisions make the Contractor responsible for immediately replacing all instrumentation damaged during construction, including long-term instrumentation arrays.

Make all instrumentation information available to the UDOT Geotechnical Consultant Manager prior to any construction potentially affected by the parameters being

monitored. Obtain UDOT Geotechnical Consultant Manager approval before abandoning any instrument.

Prior to release of any surcharge, submit documentation demonstrating required degree of primary consolidation settlement has been attained.

Obtain written concurrence from the UDOT Geotechnical Division prior to removal of any surcharge fill. Any surcharge fill which is removed without received this concurrence, may need to be replaced at the discretion of the UDOT Geotechnical Division.

APPENDIX A: SAMPLE FIELD WORK FORMS

See the following three pages.

EXAMPLE FIELD RECONNAISSANCE REPORT FORM

BRIDGE FOUNDATION OR OTHER DRILLING SITE
GEOTECHNICAL DIVISION
UTAH DEPARTMENT OF TRANSPORTATION

PROJECT NO.:_____ COUNTY: _____ STA. NO.: _____
REPORTED BY:_____ DATE _____

1. STAKING OF LINE
   ____Well Staked
   ____Poorly Staked, Can we still use? ____
   ____Request Division to Restake

2. BENCH MARKS
   In Place: Yes _____ No _____
   Distance from Bridge __ (ft/m)

3. PROPERTY OWNERS
   Granted Permission: Yes _____ No _____
   Remarks On Back _____

4. UTILITIES
   Will Drillers Encounter Underground or Overhead
   Utilities: Yes ____ No _____ Maybe ____
   At Which Holes? _____
   What Type? _____
   Who to See for Definite Location _____
   _____

5. GEOLOGIC FORMATION _____
   _____

6. SURFACE SOILS
   Sand ___ Clay ___ Sandy Clay/Clayey Sand
   Rock _____ Silt _____ Other _____

7. GENERAL SITE DESCRIPTION
   Topography
   Level _____ Rolling _____ Hillside _____
   Valley _____ Swamp _____ Guillied _____
   Groundcover:
   Cleared _____ Farmed _____ Buildings ____
   Heavy Woods _____ Light Woods _____

8. BRIDGE SITE
   Replacing _____
   Widening _____
   Relocation _____
   Check Appropriate Equipment
   (describe any potential problems with access)
   _____ Truck Mounted Drill Rig
   _____ Track Mounted Drill Rig
   _____ Failing 1500
   _____ Truck Mounted Skid Rig
   _____ Skid Rig
   _____ Rock Coring Rig

8. BRIDGE SITE - Cont'd
   ____ Wash Boring Equipment
   ____ Water Wagon
   ____ Pump
   ____ Hose (ft/m)
   Cut Section _____ (ft/m)
   Fill Section _____ (ft/m)
   If Stream Crossing:
   Will Pontoons Be Necessary? _____
   Can Pontoons Be Placed In Water Easily?
   _____
   Can Cable Be Stretched Across Stream?
   ____ How Long? _____ (ft/m)
   Is Outboard Motorboat Necessary? _____
   Current:
   Swift: ___ Moderate: ___ Slow: ____
   Describe Streambanks Scour:
   If Present Bridge Nearby:
   Type of Foundation_____
   _____
   Any Problems Evident in Old Bridge?
   (Incl scour):_____
   if nec, describe on back
   Is Water Nearby for Wet Drilling? Dis: __ (ft/m)

9. GROUNDWATER TABLE
   Close to Surface _____ (ft/m)
   Nearby Wells _____ (ft/m)
   Intermediate Depth _____(ft/m)

10. ROCK
   Boulders Over Area? Yes _____ No _____
   Definite Outcrop? Yes _____ No _____
   (show sketch on back)

11. SPECIAL EQUIPMENT NECESSARY
   _____
   _____

12. REMARKS ON ACCESS
   _____
   _____

13. DEBRIS AND SANITARY DUMPS
   Stations _____
   Remarks _____

Reference: 1978 AASHTO Foundation Investigation Manual

SAMPLE PERMIT TO ENTER AND CONDUCT EXPLORATORY DRILLING

Job. No.: _____ Address (attach map): _____

Incident to the "Project description", _____ hereinafter referred to as " _____", and the owner of the property at the above indicated address, hereinafter referred to as "OWNER", do agree as follows:

The OWNER hereby authorizes _____ or its agent or Contractor, to enter and conduct exploratory drilling on the property; install inclinometer casing and/or water observation wells; and to occasionally enter the property on an as-needed basis to conduct downhole monitoring.

The OWNER hereby certifies that he/she is the OWNER of the property at the address indicated above.

This permit shall expire at the completion of the Project or two years from the date of signing of this permit, or by revocation by OWNER in writing.

The foregoing covenants in each and every particular are and shall be construed as real covenants and shall run with the land, and the same hereby made binding upon the heirs, administrators, executors, devisees, assigns and successors in interest of the parties hereto.

Geotechnical Consultant: _____

By: _____ _____

Project Manager Date Owner Date

APPENDIX B: EXPLORATION LOG REQUIREMENTS

Provide the following information on both field and final exploration logs (borings and test pits), unless otherwise specified:

Project name
Project location
UDOT Project number
Location of borehole or test pit. Describe the position of the exploration with respect to its latitude and longitude. Where useful, provide a sketch of the exploration position on the field boring log.
Start date of exploration.
Completion date of exploration.
Weather: Record the approximate ambient conditions, i.e. temperature, wind and amount/type of precipitation at the time of exploration.
Exploration number. Number test holes using a consistent, organized, and intuitive numbering system, and briefly explain the numbering system in the Geotechnical Report.
Borehole inclination
Sheet ___ of ___ numbers
Name of geotechnical firm
Name of field engineer/geologist
Name of drilling/excavation contractor(s).
Names of all equipment operators and crew members.
Method of drilling
Drilling fluid: mineral slurry, polymer, water, or none
Make of drilling equipment
Drill model number
Surface elevation. Measure the ground surface elevation of the exploration to an accuracy of 0.1 foot or better.
Borehole diameter.
Drill bit type and size
Inside diameter of casing
Casing wall thickness
Cased depth
Excavation method and equipment: Identify the mode and make (John Deere, Case, etc.) of backhoe or other excavator, together with the bucket width.
Depth scale
Methods of sampling (pushing, hammering, drilling, coring)
Sampler type and size.
Blow counts
Sample depth
Depth of changed ground/drilling conditions
Soil information (description, ASTM classification, USCS symbol, color, density or

consistency/hardness, moisture, plasticity, minor constituents, etc.)
Depth of exploration termination
Length of sample recovered
Date and time of each groundwater level measurement on the field log
Backfilling information
Abandonment procedures
Abandonment certification
Field testing (pocket penetrometer, field vane shear, torvane, falling head permeability)
Depth of wells/piezometers, with material and installation details
Piezometer screen interval
Groundwater levels: during exploration, subsequent to completion, and after installation of well (see notes that follow this list)
Descriptions of any contamination encountered
Comments: Include all pertinent observations (changes in drilling fluid color or loss, rod drops, drilling chatter, rod bounce as in driving on cobble, easy advancement of hollow stem augers, damaged samplers, equipment malfunctions, etc.) in the field log. Also note if rock coring was used at any point to advance the boring through cobbles, boulders, etc. Instruct the driller to report any significant changes during drilling (changes in material, changes in drilling rates, pressures, advancement, occurrence of boulders, and loss of drilling fluid).

Meet the following additional requirements for final test hole logs:

- Use a depth scale on the log that is suitable to the depth of the test hole and the level of detail shown on the log.
- Clearly indicate the top and bottom depth of the range of sampler penetration. Also indicate whether the sample is disturbed or relatively undisturbed. Enter the depth range of the sample interval and the amount of recovery.
- Show the length to the nearest inch of soil sample recovered from the sampler. Do not include slough in the sample.
- List the raw number of blows required for each 6 inches of sampler penetration and the corrected $(N_1)_{60}$ value. Clearly identify where driving is terminated due to practical refusal, defined as a blow count of 50 for an interval less than 6 inches. Record partial penetration, for example of 50 blows for 1 inch, as 50/1”. Also enter the size, type, and section length of the sampling rods. Indicate the hammer weight, type, drop interval, and sampler dimensions in cases where these parameters vary from AASHTO T 206.
- Soil Description: Follow the USCS format. Where appropriate laboratory tests have been performed, assign the equivalent AASHTO soil designations and present them in parentheses on the final logs. Include the soil moisture content, unit weight, strength properties, and other properties where these properties have been tested in the laboratory.

- Groundwater: Enter the depth below ground surface to the static groundwater level in the exploration if encountered, and the date and time of the measurement. When groundwater is encountered, leave borings open for however long possible to monitor groundwater elevations. Generally, measure groundwater levels and record the date and time of the measurement at the end of each day of drilling, each morning before resuming drilling, and at the completion of each boring. Note on the log where free groundwater is not encountered during drilling, or cannot be detected because of the drilling method.

APPENDIX C: GEOMECHANICAL LOGGING

Use the Geomechanical Logging form included at the end of Appendix C to log rock cores. The following sections describe application of the entries of this form and accepted practice for rock core logging.

Drill Interval (From-To column)

The drill interval is the depth of where a drill run begins and ends, corresponding to the Driller's wooden blocks, which are typically placed at the beginning and end of each run. Record this interval record in the "From-To" column.

Recovery (recovered length)

Recovery is the actual length of core retrieved from a drill run. In some cases, recovery will be less than 100 percent of the drilled interval, due to washing of fines, compaction of soft units, or the inability of the core spring (catcher) to break the stub flush with the bottom of the run. Conversely, recovery sometimes exceeds 100 percent due to some caving of the hole (re-drills), expanding clays, or removal of the entire stub at the bottom of the hole during core barrel retrieval. Avoid inadequate and improper drilling methods which decrease the amount of core recovered. Triple-tube core barrels, which add another separate, non-rotating liner, may increase recovery in poor quality, semi-cemented soils, or in zones of highly variable hardness and consistency.

RQD Length (+2X core diameter)

Disregarding mechanical breaks, RQD (Rock Quality Designation) length is the sum of the lengths of the whole core pieces that are equal to or greater than twice the core diameter. Mechanical breaks are not true natural fractures, and for that reason, they are disregarded when considering RQD length, number of whole pieces, and longest-piece measurements. Mechanical breaks frequently form perpendicular to the core axis and are the result of breakage during handling or drilling.

Fracturing often occurs parallel or oblique to the axis of the core, resulting in wedge to rectangular shaped core halves. Determine RQD length for these conditions in the following manner: Project an imaginary line through the center of the core. The RQD length of an individual piece of core is defined as the distance between where this imaginary line intersects the midpoint of the structural plane bounding one end of the piece of core to a point where the line intersects the midpoint of the structural plane bounding the other end of the piece of core.

Whole Piece

Classify as a whole piece any core specimen meeting one of the following criteria:

- Some component of the core specimen has a full core diameter
- If core is fractured down the middle (parallel to the core axis) classify individual pieces with lengths equal to or greater than the core diameter as whole pieces.

Number of Whole Pieces

Disregarding mechanical breaks, the number of whole pieces are the number of pieces that fit the criteria discussed above. Do not count whole pieces in “broken” or “rubbly” zones, as defined in this Appendix.

Mark the location of mechanical breaks induced during extraction from the core barrel and/or transferring the material to core boxes, particularly where core lengths are broken with a hammer to fit into the box. Minimize the practice of breaking core to fit a core box

Length Longest Piece

Disregarding mechanical breaks, measure and record the longest whole piece of core for each drill run. If there are no whole pieces in the drill run, the recovered portion is considered to be broken material, and the length of the longest piece is zero.

Length of Whole Core

This is the sum of all whole core pieces present in the drill interval.

Length Broken Zone

A broken zone consists of a core interval composed of pieces with length of less than one core diameter in which more than 50% of the material is made up of fragments with a diameter of greater than ½ inch.

Length Rubbly Zone

A rubbly zone consists of a core interval composed of pieces with length of less than one core diameter in which more than 50% of the material is made up of fragments with a diameter of less than ½ inch.

Hardness (H)

Use Table C-1 in this Appendix for hardness field testing of each drill run.

Bedding Angle

Record the bedding angle (the surface parallel to the surface of deposition) if the bedding plane is apparent. Adjust the bedding angle for the inclination of the drill hole if the drill hole is not vertical.

Fractures and Fracture Angle

Measure and record the total number of fractures for each angle classification for each drill run. Measure the angle relative to the core axis, with 90° being parallel to the axis of the core and 0° perpendicular to the core axis.

Fracture Filling

Note any fracture filling material and include secondary mineralization and clay gouge along the fractures.

Compressive Strength Testing

Test representative samples of each rock type and variation in the laboratory in accordance with ASTM D 7012.

Notes

The combined lengths of “whole core”, “broken zone” and “rubbly zone” should equal the “recovered” core length.

Make every effort to maximize recovery during rock coring. Box, label, and store all recovered core in accordance with the current AASHTO *Manual on Subsurface Investigations*.

See the following two pages for Table C-1 and Geomechanical Logging form.

Table C-1
Relationship Between Hardness or Consistency and Unconfined Compressive Strength

Hardness	Consistency	Field Identification	Approximate Range of Unconfined Compressive Strength (psi)
		Soils and Fault Gouges	
S1	Very Soft Soil	Easily penetrated several inches by fist	< 3.5
S2	Soft Soil	Easily penetrated several inches by thumb	3.5 – 7
S3	Firm Soil	Can be penetrated several inches by thumb with moderate effort	7 - 14
S4	Stiff Soil	Readily indented by thumb but penetrated only with great effort	14 – 28
S5	Very Stiff Soil	Readily indented by thumbnail	28 – 56
S6	Hard Soil	Indented with difficulty by thumbnail	> 56
		Rock	
R0	Extremely Soft Rock	Indented by thumbnail	28 – 100
R1	Very Soft Rock	Crumbles under firm blows with point of geological pick, can be peeled by a pocket knife	100 – 1000
R2	Soft Rock	Can be peeled by a pocket knife with difficulty, specimen can be fractured with single firm blow of hammer end of geological pick	1000 – 4000
R3	Average Rock	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with single firm blow of hammer end of geological pick	4000 – 8000
R4	Hard Rock	Specimen requires many blows of hammer end of geological pick to fracture it	8000 – 16,000
R5	Very Hard Rock	Specimen requires many blows of hammer end of geological pick to fracture it	16,000 – 32,000
R6	Extremely Hard Rock	Specimen can only be chipped with geological pick	> 32,000

Table based on work by Deere (1968), Terzaghi and Peck (1967), Jennings and Robertson (1969), and Piteau (1970).

Project: _____ Core Size: _____ Dip: _____ Water Depth: _____ Date: _____

DDH No: _____ Total Depth: _____ Azimuth: _____ Logged By: _____ Page _____ of _____

Depth	Graphic	Geologic Description Rock Type, Alteration, Texture, etc.	Drill Run/Core Rec.			RQD		Pieces / Run	Long-Piece	Hard-ness	Bedd. Angle	Fract. Angle				Fracture Filling	Whole Core	Broken Zone	Rubbly Zone	Is (psi)
			From To	Len.	%	Len.	%					0-30	30-45	45-60	60-90					

APPENDIX D: TEST PIT/TRENCH SAMPLING AND LOGGING

Collect sufficient amounts of representative material from the test pit for the intended laboratory observation and testing.

If samples are required from a specific part of the test pits, do not accept a sample that has been raked up through the overburden and topsoil.

Seal samples to prevent moisture loss. Label samples clearly with the test pit/trench number, sample number and sample depth, and identify sample locations on the test pit log.

Obtain intact soil samples from test pits/trenches by cutting ring samples or block samples from the sides or bottom of the hole. The UDOT Geotechnical Division often obtains samples using U type rings having an outside diameter of 2.50 inches and an inside diameter of 2.42 inches, in heights of 1.0 inch and 3.0 inches, and has found the 3.0-inch ring height to be particularly useful for obtaining samples for collapse tests. Carefully handle and transport all samples to the laboratory to preserve their integrity. Ensure that samples are not contaminated by foreign or dissimilar materials.

Prepare logs of exploratory test pits/trenches including the following information:

Depth Below Surface: Use a depth scale on the test pit log that is suitable to the depth of the test pit and the details shown on the log.

Sample Type and Depth: Enter the sample type (i.e., U-type, bag, bulk, etc.), location, and depth. Clearly indicate the top and bottom depth of the range of the collected sample.

Soil Description: Follow the USCS format described in ASTM 2488. Where laboratory classification testing has been performed, show the AASHTO letter/number designation next to the USCS description.

Include also the following information on the logs:

- Lenses or layers of gravel, pea gravel, sand, silt or clay (either in the form of clay balls or clay lenses). This would also include isolated pockets of sand, silt, or clay.
- Record any measurable amount of soft sedimentary rock, clay, silt balls, elongated or flat particles, and list estimated percentages of these features on the logs.
- If groundwater is encountered, indicate the depth below ground level and whether water flows or seeps into the test hole.
- Measure and sketch on the log any observed variations.

Where large rock is encountered, record the following:

-
- Average size rock encountered by percentage
- Type of rock (granite, quartz, sandstone, limestone, etc.)
- Whether the material is well graded or poorly graded

While digging the area make a sketch of the trench/pit location, boundaries, and topographic features. Map man-made features including pipelines, telephone, etc.

APPENDIX E: GEOTECHNICAL REPORT REQUIREMENTS

TABLE OF CONTENTS

Show page numbers for main headings. Include lists of figures, appendices, and attachments

1 GENERAL

Explain the purposes of the study and scope of work.

1.1 PROJECT DESCRIPTION

State the background information which may be necessary to understand or interpret the materials and foundation report. Discussion of the suggested items may be very brief where they may have been adequately covered in a project report.

1.1.1 General

Describe existing site conditions with emphasis on site locations, existing structures and embankments, etc. The size of the Project and the length of corridor segments may require that the site description be broken down into stations or individual structure areas.

1.1.2 Proposed Improvements

Outline proposed improvements and contiguous road system. Describe new structures, embankments, and MSE walls, etc. in this section.

2 PREVIOUS REPORTS AND INVESTIGATIONS

Reference all pertinent reports and correspondence. Provide a brief description of the nature of the paper if the title is not self-explanatory. It is not necessary to append material which could be normally found in UDOT headquarters files such as foundation reports by UDOT and project reports. Do append such items as materials investigations by outside consultants, etc. (i.e., materials are not available in UDOT headquarters.)

Provide a brief description of previous investigations including number of borings, depths, dates of explorations, and drilling. Include relevant subsurface conditions.

3 EXISTING FACILITIES

If portions of the existing highway are to be included, describe the type, age, and condition (including deflection data when available) of the structural section. If pertinent, describe cracking of pavement on embankments and pumping/failing of PCC pavement and their probable causes. Where cross streets are to be replaced in kind, describe the structural section.

Append pictures of existing facilities and the new alignment to aid the presentation.

4 FINDINGS

4.1 SITE CONDITIONS

Provide a brief discussion of topography, terrains, land use, and other surface conditions affecting the highway and proposed widening. Identify sensitive surface and subsurface substructures, existing and abandoned utilities, presence of hazardous and toxic substances which could affect the overall construction of the Project.

Use the UDOT alignment stations for locations.

4.2 SURFACE DRAINAGE

Discuss briefly surface drainage of the site with particular emphasis on springs and signs of groundwater flow. Identify any potential surface drainage problems that may exist within the site, e.g., low areas subject to ponding and flooding, locations of nearby creeks, ponds, and rivers.

4.3 GEOLOGY

Outline the general geological formations at the Project site. Mention the presence of old slides, unstable areas, areas of cracking and subsidence, etc. Append any necessary topographic or geological maps, etc. and reference them in this section.

4.4 FAULTING AND SEISMICITY

Mention the presence of active faults and the seismicity of the area. Append any seismic maps, seismic surveys, etc. and reference them in this section. Discuss estimated mean peak ground accelerations within the study area due to previous or future MCE events. Describe types of faults and ages if applicable.

4.5 SOIL MATERIALS

Describe previous site explorations made in the Project site. Outline general types of soil materials encountered in or inferred from the previous site explorations.

4.6 GEOHYDROLOGIC CONDITIONS

Describe regional geohydrologic conditions based upon previous subsurface investigations and desk studies. Include unusual groundwater conditions, springs, artesian water flow, local ponding, etc.

4.7 CLIMATIC CONDITIONS

Discuss the climatic conditions relevant to the project, including freeze-thaw conditions and the use of deicing salt during winters. Include frost depth of the project area.

5 FIELD AND LABORATORY TESTING

Provide a concise summary of laboratory and field testing, and the physical relationship to the plan and profile of the planned improvement. Discuss the numbering system used to identify test holes and the methods and equipment used in the investigation. List the types of laboratory tests performed. Direct the reader to the locations of test hole logs and laboratory test results in the appendices of the report.

6 STRUCTURES

6.1 DESCRIPTION

6.1.1 General

Describe the proposed structures to be constructed and adjoining bridges in detail. These include the dimensions, types of structures, number of bents, bent spacings, pier heights, types of bridge deck, etc. Include design foundation loads and pile cap elevations, if available for the new structures, types of foundation, footing or pile cap elevations of the adjoining bridges, etc. which could be referenced from as-built foundation plans.

6.1.2 Subsurface Conditions

Describe subsurface conditions underlying the structures on the basis of the new and old site investigation data. Emphasize problem soils that would cause undue total and differential settlements of the structures and instability of embankments.

Provide a general description of the stratigraphy (using USCS classifications). If there are significant differences between borings, describe the strata encountered in each boring. Briefly summarize the results of laboratory testing for the various types of soils

and rock encountered. Geologic cross-sections or fence diagrams may be useful in describing subsurface relationship.

6.1.3 Groundwater

Report groundwater measured during current drilling and past subsurface investigations. Also report the range of water levels in creeks and river channels. Estimate maximum rise of groundwater level. Make note of any evidence of perched groundwater.

6.1.4 Earthquake Considerations

6.1.4.1 Seismic Hazards

Provide discussions of seismic hazards such as ground shaking, fault rupture, seismic criteria, liquefaction potential, seismic soil strength reductions, global seismic stability, and lateral spreading at the Project site.

6.1.4.2 Seismic Design Criteria

Identify the seismic site class and provide ground motion parameters for use in AASHTO LRFD design.

6.1.5 Potentially Hazardous Materials

Describe all soil and groundwater contamination encountered during the subsurface investigation. Identify any special procedures or equipment used during drilling and handling of samples. Select Environmental Protection Agency (EPA) standard test method(s) based on site assessment of area, historical use of land, and field observations. Report results of chemical testing in tabular form. Include constituent, units of concentration, reporting limits, and results. Compare concentrations of contaminants to listed values in state and federal regulations to determine severity of contamination.

6.2 RECOMMENDATIONS

6.2.1 Bridge Structures

Discuss appropriate foundation types, including advantages and disadvantages of each type considered.

6.2.1.1 Foundation Design

A. Pile Support (driven or drilled cast-in-place shafts)

1. Method of support (skin friction and/or end bearing) in clays and dense sandy materials.
2. Suitable pile type(s)- reasons for choice and/or exclusion of types.
3. Pile toe elevations and length of piles.
4. Pile axial compression resistance at the applicable AASHTO LRFD limit states.
5. Reduction of pile resistance due to negative skin friction.
6. Scour depth (elevation) if applicable and method of determination.
7. Effects of induced loads on piles due to adjoining new or existing embankments.

B. Footing Support (if applicable)
1. Elevation of bottom of footing
2. LRFD bearing resistance
3. Approximate settlements at loads corresponding to the applicable AASHTO LRFD limit states
4. Brief description of material on which the footing is to be placed and soil improvement, if expected (i.e., subexcavation)
5. Scour depth (elevation)

6.2.1.2 Settlements

Estimate group settlements and time for the settlements to occur. Discuss potential differential settlements of new and/or existing foundations due to varying subsurface conditions.

6.2.1.3 Uplift

Determine uplift resistance of deep foundations at the applicable AASHTO LRFD limit states. Discuss what governs the uplift capacity and whether the weight of pile should be included in calculating resistance to uplift.

6.2.1.4 Lateral Loading

Determine lateral capacity versus deformation of the pile. Discuss how pile layout, length, spacing, head-fixity and loading conditions would affect the lateral capacity of the piles. Present load-deformation analysis result summary.

6.2.1.5 Load Tests

Discuss the need for pile dynamic analyzer (PDA) tests and static load tests to verify design loads. Recommend pile load test programs for piles near abutments, bent locations if deemed appropriate.

6.2.1.6 Construction Considerations

A. Water table-seasonal or long term fluctuations, data for possible control in excavations (i.e. pumping, well points, tremie seals, amount of groundwater, etc.)
B. Adjacent structures-protection against damage from excavations, pile driving, dewatering, etc.
C. Pile driving - difficulties, clearance, overhead or underground utilities, other unusual conditions, etc. Effects on existing structures due to pile driving, and the corresponding mitigation measures. Include preliminary WEAP evaluations and discuss the implications in terms of required hammer energy, pile section, and pile material strengths.
D. Excavation for pile caps and footings - control of earth slopes including shoring, sheet piles, bracing, and safety considerations.
E. Need for dewatering excavations and evaluation of potential effects on surrounding area/structures.
F. Effects of induced load on piles due to adjoining new or existing embankments.
G. Corrosion effects of various soils and waters, and possibility of galvanic reaction from stray currents.

6.2.2 Embankments

Discuss where new embankments or approach fill embankments are located relative to existing structures. Describe the soil materials on which embankments will be founded.

6.2.2.1 Slope Stability

Conduct stability analyses of proposed embankments for construction conditions, long-term static conditions, and seismic conditions (including dynamic condition during earthquake ground motions and post-earthquake condition when ground motions cease and dynamic strength losses are fully developed), and discuss the results. Recommend potential mitigation methods where needed. Embankments without walls and not adjacent to bridges or critical facilities do not require seismic analysis or mitigation.

6.2.2.2 Settlements

Estimate short term (initial) and long term (primary and secondary) settlements of the embankments and discuss the results.

6.2.2.3 Time rate of settlements

Estimate rate of primary and secondary settlements based upon laboratory and field data. Discuss the results.

6.2.2.4 Construction Considerations

As the construction of the embankments is controlled by the soft grounds, recommend such measures as (1) fill height limit on untreated foundation, (2) controlled rate of loading, (3) surcharging the area, (4) waiting periods, (5) use of wick drains to shorten

the required time delay period, (6) slope protection, (7) use of light weight fills to reduce amount of settlement, and (8) any control devices required such as settlement platforms, piezometers, surface hubs, etc. These issues will be discussed in the following subsections on Staged Construction and Instrumentation.

6.2.2.5 Staged Construction

Discuss staged construction as a means to prevent foundation instability and the gain in undrained shear strength as a result of the staged construction. Discuss also the time required for each staged construction, referencing relevant stability analyses.

6.2.2.6 Instrumentation

Discuss where necessary the need for field instrumentation to monitor settlements and slope stability, including types of instrumentation, e.g., settlement platforms, settlement hubs, piezometers, inclinometers, etc.

6.2.2.7 Foundation Treatments

Make specific recommendations for foundation treatments. As may be necessary, recommend wick drains, stone columns, stabilization trenches, stripping, and special treatments of original ground. Provide any additional information as required.

6.2.3 Retaining Walls and Noise Walls

6.2.3.1 Foundation Designs

Carry out global and external stability of the retaining structures, including seismic, (note that a check of internal stability is also needed for MSE walls); specify allowable and ultimate footing pressures. Provide a brief description of material on which the wall footing is to be founded. Recommend scour depth if footing is subject to damage by flood scour.

6.2.3.2 Settlements

Estimate total and differential settlements of the walls based on the anticipated static and seismic loadings. Briefly discuss method of estimating settlements.

6.2.3.3 Earth Pressures and Geotechnical Parameters

Recommend static earth pressures for level and sloping grounds in terms of equivalent fluid pressures, sliding resistance, adhesion mobilized along the wall base, passive earth pressures and zone, unit weight of backfill, etc.

6.2.3.4 Seismic Loading

Develop seismic earth pressures (in terms of equivalent fluid pressures, where appropriate) for level and sloping grounds and recommend resultant seismic forces that develop behind the wall and inertial forces from backfill (if any).

6.2.3.5 Construction Considerations

Make a provision of a drainage system behind all the walls to intercept groundwater. Discuss specific cut or excavation conditions within given limits. Topics which may require discussion include types and conditions of materials, groundwater and springs, existing slopes, underground utilities, faults, temporary support, cut slope design, benching, maintenance, debris interception, temporary slope protection, etc. Make any suggestions considered necessary for excavation procedures. Discuss select material when pertinent. Provide any additional recommendations as needed.

6.2.3.6 Foundation Treatments (if applicable)

Recommend types of stabilization methods to mitigate unacceptable differential settlements of the walls and to enhance wall stability.

7 EARTHWORK

7.1 ROADWAY AND EMBANKMENTS

Evaluate and discuss the existing conditions. Items which may require discussion include relative compaction of existing fills, groundwater, springs, unsuitable soils, expansive soils, dumps, underground utilities, etc. Use concise engineering classification in discussion of soils.

7.2 SITE PREPARATION

Provide a brief discussion of site and subgrade preparation.

7.3 FILL PLACEMENT AND COMPACTION

Recommend methods of fill placement and compaction for embankments and retaining walls in accordance with UDOT standard specifications. These may include recommendations for moisture control, fill placement over frozen soils, erosion control, contouring, temporary drainage and expansive soil. Where applicable, include recommendations for special treatments to mitigate settlement or compression within the approach embankments to structures. This may include use of imported borrow, special compaction, or other methods as may be dictated by the available material.

7.4 EXCAVATION

Briefly discuss anticipated permanent and temporary excavations with particular reference to soil conditions. Discuss and evaluate potential adverse effects of excavations on adjacent structures and buildings.

7.5 EARTHWORK FACTORS

Provide earthwork factors and pertinent information for excavation and backfill.

7.6 RE-USE OF EXCAVATED SOIL MATERIALS

Briefly discuss re-use of excavated materials. It may be appropriate to discuss availability or scarcity of materials, quality, economic factors, or other factors which may affect material selection or embankment design. Where applicable, comment on material disposal, potential disposal sites, stockpiling for other parts of the Project, etc.

7.7 CUT & FILL SLOPES

Provide specific recommendations for cut and fill slopes. These may include proposed cut and fill slope design, surface erosion mitigation, control groundwater flow and springs by means of subdrains or dewatering systems.

7.8 TEMPORARY EXCAVATIONS

Provide specific recommendations for temporary cut and fill slopes and temporary surface erosion mitigation.

7.9 DEWATERING AND SUBDRAINS

Recommend methods of dewatering for excavations and types of sub-drainage systems for the Project.

8 CORROSION INVESTIGATIONS

Obtain soil samples from test holes and confirm the corrosion potential of soils to material types to be used for any subsurface structure. Report test results of laboratory analysis of soil. Typical laboratory testing includes pH, resistivity, sulfates, chlorides, and soluble salts. Use test results to determine corrosion potential of soil, especially in areas of pipes and foundations, and in selecting cement type.

Where applicable, conduct a culvert study from the pH and electrical resistivity values to determine estimated life span for a standard gage steel culvert. Recommend a gage type to increase longevity to 50-year life span.

Provide a recommendation of the appropriate cement type to be used for concrete in contact with soils.

State that the estimated years to detrimental corrosion can vary significantly according to the factual variables of concrete manufacture that are used in construction. If there are existing structures, describe any visible evidence of distress caused by the environment. For example, the evidence of distress could be described by a simple statement such as “Concrete cracking and rust stains in substructure.”

9 RECOMMENDED MATERIAL SPECIFICATIONS

Include suggested specifications for all materials used in the structural section, plus imported borrow, structure backfill, embankment fill, ballast and sub-ballast (if applicable) and drainage materials. Where possible, use UDOT standards and special provisions as references. For MSE backfill, use UDOT special provisions.

10 CLOSURE

Provide a brief closure of the report. List areas or topics that may require further investigation.

11 LIMITATIONS

List statements of limitations and potentials for unknowns.

12 REFERENCES

Provide complete citations for all references in alphabetical order.

TABLES

Present tables referenced in the body of the report, except where such tables are presented within the body.

FIGURES

Present figures referenced in the body of the report. Examples are vicinity map, site plans, geologic maps, fault maps, test hole location plans, subsurface soil profiles, seismic design response spectrum, etc.

APPENDICES

Examples of material include boring logs, CPT logs, soil data sheets, laboratory testing data, field test data (if applicable), instrumentation data (if applicable), copies of reports by outside consultants, seismic surveys, special correspondence or memos, maps, and

cross-sections, as-built foundation drawings, all design assumptions and property values, design calculations, computer program inputs and outputs, etc. Organize and label appendices so that information can be easily accessed.

PHOTOGRAPHS

Append photos of existing facilities and the new alignment.

APPENDIX F: GEOLOGIC REPORT REQUIREMENTS

1 Introduction
- 1.1 Purpose of Project
- 1.2 Location and Limits of Project
- 1.3 Site Description
- 1.4 Main Project Features
- 1.5 Purpose of Report
- 1.6 Related Reports

2 Subsurface Exploration

3 Geologic Setting
- 3.1 Regional Geology
- 3.2 Seismicity
  - Surface Fault Rupture
  - Ground Shaking
- 3.3 Site Geology
  - Fills
  - Talus
  - Colluvium
  - Alluvium
  - Bedrock
- 3.4 Discontinuities in Rock Mass
  - Bedding
  - Folds
  - Faults & Shear Zones
  - Jointing
- 3.5 Geologic Conditions Along Alignment or Area (including possibility of failure along each geologic segment)
  - Failure Types-wedge, sliding, bedding plane, toppling
- 3.6 Geohydrologic Conditions
  - Surface
  - Subsurface
- 3.7 Geotechnical Engineering Properties
  - Description
  - Soil Overburden Design Parameters
  - Bedrock

4 Geologic Features of Engineering & construction Significance
- 4.1 Talus Slopes
- 4.2 Rock Fall Zones
- 4.3 Fault & Shear Zones

5 Man-made Features of Engineering & Construction Significance
- 5.1 Existing Landslides

5.2 Existing Roadway and Culverts
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Construction Sequence
Behavior During Excavation
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List of Figures
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Photographs

APPENDIX G: PILE DRIVING FORMS

See the following three pages.

PILE DRIVING RECORD

Project:		Hammer Type:		Date:	
Location:		Hammer Model:		Inspector:	
Resident Engineer:		Pile Location & No.:		Weather:	
General Contractor:		Pile Type & Dia.:		Temp:	
Pile Contractor:		Pile Tip:		Final Length:	

PLUMBNESS

PILE CENTER

PILE CAP LAYOUT

COMMENTS:

PILE DRIVING RECORD

for piles up to 90 feet deep

Depth (ft)	Blows	Remarks	Depth (ft)	Blows	Remarks	Depth (ft)	Blows	Remarks
1			31			61		
2			32			62		
3			33			63		
4			34			64		
5			35			65		
6			36			66		
7			37			67		
8			38			68		
9			39			69		
10			40			70		
11			41			71		
12			42			72		
13			43			73		
14			44			74		
15			45			75		
16			46			76		
17			47			77		
18			48			78		
19			49			79		
20			50			80		
21			51			81		
22			52			82		
23			53			83		
24			54			84		
25			55			85		
26			56			86		
27			57			87		
28			58			88		
29			59			89		
30			60			90		

PILE DRIVING RECORD

for piles 90 to 130 ft. deep with relatively easy driving in upper 50 ft.

Depth (ft)	Blows	Remarks	Depth (ft)	Blows	Remarks	Depth (ft)	Blows	Remarks
0-5			71			101		
5-10			72			102		
10-15			73			103		
15-20			74			104		
20-25			75			105		
25-30			76			106		
30-35			77			107		
35-40			78			108		
40-45			79			109		
45-50			80			110		
51			81			111		
52			82			112		
53			83			113		
54			84			114		
55			85			115		
56			86			116		
57			87			117		
58			88			118		
59			89			119		
60			90			120		
61			91			121		
62			92			122		
63			93			123		
64			94			124		
65			95			125		
66			96			126		
67			97			127		
68			98			128		
69			99			129		
70			100			130		

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7—LANDSCAPING AND AESTHETICS

7A. GENERAL

Conduct all Work necessary to meet the requirements of this Section 7 (Landscaping and Aesthetics) and to satisfy all functional needs of the Project, including soil preparation, planting, irrigation, mulching, seeding, invasive weed control, aesthetic treatment of bridges/structures, walls, sidewalks, lighting, fencing/railing, colors, and incorporation of municipal Betterments.

7B. STANDARDS

Complete work for landscaping and aesthetics elements in accordance with the requirements of the standards listed by priority in Table 7B-1 (Standards for Landscaping and Aesthetics).

If there is any conflict in Standards, adhere to the Standard with the highest priority.

If there is any unresolved ambiguity in standards, it is the Design-Builder's responsibility to obtain clarification and Approval from the Department before proceeding with design and/or construction.

TABLE 7B - 1
STANDARDS FOR LANDSCAPING AND AESTHETICS

Priority	*Author or Agency*	*Title*
1	UDOT	Special Provisions included in Part 5
2	UDOT	*Supplemental Specifications to 2012 Standard Specifications for Road and Bridge Construction,* as modified by Part 5
3	UDOT	*2012 Standard Specifications for Road and Bridge Construction,* as modified by Part 5
4	UDOT	*Supplemental Drawings to 2012 Standard Drawings for Road and Bridge Construction*
5	UDOT	*2012 Standard Drawings for Road and Bridge Construction*
6	AASHTO	*A Policy on Geometric Design of Highways and Streets*
7	AASHTO	*Roadside Design Guide*
8	Various	*Municipal maintenance agreements*
9	UDOT	*Project Aesthetics and Landscaping Plan Development and Review, Policy 08A-03*
10	UDOT	*Aesthetics Guidelines*
11	UDOT	*Placement of Monument Features and City Logo Panels on State Highways, Policy 08A-02*
12	UDOT	*Monument Feature and City Logo Panel Design Guidelines*
13	Division of Administrative Rules	*Utah Administrative Code R307-361 Architectural Coatings*
14	Local Government	*Irrigation Standards*
15	AASHTO	*Construction Stormwater Field Guide*

7C. REQUIREMENTS

Design and construct all aesthetics and landscaping elements to meet the following requirements:

A. For baseline aesthetic and landscaping treatments for the Base Build:

a. Commit to provide Project aesthetics and landscaping in accordance with this Section and the UDOT Baseline Aesthetics Guidelines. Include an additional $100,000 per interchange in the Contract Amount for Project aesthetic and landscaping enhancements, this does not include design costs. Design costs for Project aesthetic and landscaping enhancements is included in the lump sum design cost in the Contract Amount.

b. Build Alternative 4015 West, provide landscape treatment at specific locations as follows:

1. Northwest corner of Sams Boulevard and 4000 West:

    a. Protect in place and maintain the existing trees that are not directly displaced by new sidewalk or other Project related elements.

    b. Protect in place and/or relocate the existing irrigation system to maintain irrigation to plant material.

    c. In new landscape areas and existing landscape areas that are disturbed:

        i. Place weed barrier in accordance with this section and use existing landscape rock in accordance with this section.

        ii. If additional landscape rock is required, match existing rock and install in accordance with this section.

2. Southeast corner of Point Lane and 4000 West:

    a. Place topsoil and roadside seed in accordance with this section.

3. Southeast corner of 5415 South and 4120 West:

    a. Place weed barrier and landscape rock in accordance with this section.

B. If landscaping is incorporated, use plant material that is drought-tolerant, and design irrigation systems that minimize water consumption and minimize maintenance.

7C-1 Aesthetics and Landscape Design Packages

For review and acceptance of Aesthetics and Landscape plans follow the UDOT Project Aesthetic and Landscaping Plan Development and Review Policy (08A-03) and Aesthetics Guidelines. This policy requires coordination with the Department, and UDOT Aesthetic Committee and local municipalities involved in the project.

After NTP coordinate with the Department to develop a Conceptual Aesthetics and Landscape Design Package that incorporates elements set forth in this Section, baseline condition, and possible enhancements. Provide Department personnel with necessary support regarding landscape and irrigation design in the form of personnel and/or design data/drawings to assist when coordinating with local municipalities. Coordination with the local municipalities should take place through the development and approval of the Conceptual Aesthetics and Landscape Design Package. Any communication between the Project and the local municipalities will be coordinated through the Department.

Submit for review a Conceptual Aesthetics and Landscape Design Package that addresses the items on the Conceptual Aesthetics and Landscape Design Checklist found in the Aesthetics Guidelines.

Incorporate any revisions or changes to the plan required by the Department and the UDOT Aesthetics Committee. Submit for Approval a Final Aesthetics and Landscape Design Package that includes all the interchanges and addresses the items on the Final Aesthetics and Landscape Design Checklist found in the Aesthetics Guidelines (Appendix D).

Allow a minimum of 30 Calendar Days for an Approval process involving the UDOT Aesthetics Committee. See Part 3 (Quality Program) for review times.

7C-2 Structures Aesthetics Criteria

Provide aesthetic treatments on bridge components, on all wall types, retaining walls, and noise walls. Provide structural aesthetic treatments as follows:

A. When designing the structures on the Project, the Department will require that the design priorities listed in Table 7C-2 (Design Guidelines for Structures Aesthetics Criteria) be followed when incorporating aesthetics into structural elements.

TABLE 7C - 2
DESIGN GUIDELINES FOR STRUCTURES AESTHETICS CRITERIA

Design Priority	*Structural Design Element or Feature*
1	Horizontal and Vertical Geometry
2	Superstructure Type and Shape
3	Bent Placement and Span Arrangement
4	Abutment Placement and Height
5	Bent, Girder, and Parapet Shape and Construction Material
6	Color and Texture of various Structural Elements
7	Ornamentation and Details

B. MSE Panel and Cast-in-Place Wall Treatments:

1. Use basalt texture form liners with a minimum 2” textural relief.
2. Apply Concrete Coating: FS 36492 tinted concrete sealer to all exposed surfaces. See Standard Specification 09981 (Concrete Coating).

C. Coping, Abutment and Wingwall Treatments:

1. Provide smooth concrete finish.
2. Apply Concrete Coating: FS 36492 tinted concrete sealer to all exposed surfaces. See Standard Specification 09981 (Concrete Coating).

D. Parapet Treatments:

1. Construct recessed windows with paired (top and bottom) concrete architectural dowel holes (maximum three foot on center spacing in recessed window insets). Provide smooth concrete finish on window frames and insets.
2. Apply Concrete Coating: FS 36492 tinted concrete sealer to all exposed surfaces. See Standard Specification 09981 (Concrete Coating).
3. If City Betterment Agreements specify to include city and/or street names on

parapets, see Part 4-17 (structures) for sign details.

E. Bridge Column Treatments:

1. If square, form columns with vertical recessed windows (one on each side of the column). Provide paired concrete architectural dowel holes in the recessed windows at a maximum four feet on center). Provide smooth textural finish.

2. If round, no recessed windows are required. Provide smooth concrete finish.

3. Apply Concrete Coating: FS 36492 tinted concrete sealer to all exposed surfaces. See Standard Specification 09981 (Concrete Coating).

F. Girder Color Treatments:

1. Concrete Girders: Apply FS 30109 tinted concrete sealer to exterior side of exterior girders and the bottom flange of all girders.

2. Steel Girders: Apply paint using FS 30109. See Standard Specification 09972 (Painting for Structural Steel).

G. Bent Caps:

1. Apply Concrete Coating: FS 36492 tinted concrete sealer to all exposed surfaces. See Standard Specification 09981 (Concrete Coating).

H. Noise Wall Treatments:

1. Bangerter Highway Facing Side: Provide single panel with exposed aggregate treatment and one-foot wide smooth finish top cap (Refer to UDOT Standard Drawing SW 6).

2. Non-Bangerter Highway Facing Side: Provide single panel with 'Ashlar' texture pattern (one-inch relief) and one-foot wide smooth finish top cap (Refer to UDOT Standard Drawing SW 6). Where tying into existing panels continue exposed aggregate wall to the property boundary. Use a single texture within the limits of a parcel.

I. Pedestrian Bridge Treatments:

2. Steel Truss Girders: Apply paint using FS 30109. See Standard Specification 09972 (Painting for Structural Steel).

3. Concrete Columns:

a) If square, form columns with vertical recessed windows (one on each side of the column). Provide paired concrete architectural dowel holes in the recessed windows at a maximum 3-foot on center spacing). Provide smooth textural finish.

b) If round, no recessed windows are required. Provide smooth concrete finish.

c) Apply Concrete Coating: FS 36492 tinted concrete sealer to all exposed surfaces. See Standard Specification 09981 (Concrete Coating).

4. Bent Caps:

a) Apply Concrete Coating: FS 36492 tinted concrete sealer to all exposed surfaces. See Standard Specification 09981 (Concrete

Coating).

7C-3 Monument Features and City Logos

Any proposal or request by local municipalities to incorporate a city monument feature or logo into the Project will be required to follow UDOT Placement of Monument Features and City Logo Panels on State Highways Policy (08A-02) and the Monument Feature and City Logo Panel Design Guidelines.

7C-4 Topsoil

Provide topsoil that is free of petroleum products, construction waste, debris, and particles larger than one inch in any dimension. Use existing topsoil wherever possible. Strip and stockpile topsoil from available open areas to be impacted by the Project.

7C-4.1 Existing Topsoil

Existing topsoil may be stripped and stockpiled from the ROW and other suitable environmentally cleared project areas and re-used on Project disturbed slopes when all of the following criteria are met:

A. The existing topsoil is free of petroleum products, construction waste, and other contaminants.

B. The area being stripped currently supports suitable vegetation.

C. The soils are not currently growing weeds included on the State's noxious weed list.

7C-5 Planting Design Criteria

7C-5.1 Plants

Obtain Approval for all plant selections and sizes. Provide plant material as follows:

A. **Trees:** Along freeways, do not locate any trees within 36 feet of the edge of the traveled way, except in areas shielded by barrier; do not place barrier to provide larger planting areas. Do not locate any trees inside the clear zone or in areas that may obstruct safe view distances from intersections and driveways. If the landscaping plan includes trees planted in the park strip, select trees appropriate for street use that provide adequate vertical clearance for vehicles and pedestrians and minimal overhang of the roadway. Consider mature height and spread of trees in the design. When selecting tree varieties, choose trees that are well adapted to the Project area and that are not susceptible to disease or other problems that will limit successful long-term growth.

1. Protect all existing trees within the Project limits that are not considered weedy species. Provide environmental fence around the canopy or dripline of all existing trees to be protected. Do not park or store equipment and construction material within fenced area of existing trees.

2. Provide tree staking on slopes greater than 4:1 (H:V).

3. For mulching around tree plantings the follow requirements listed under compost and bark mulch in this Section.

B. **Shrubs:** Along freeways, do not locate any shrubs inside the clear zone and all plants must meet height requirements. At intersections and driveways, select shrubs that allow safe viewing of the roadway from vehicles. Locate shrubs only in planting beds.

C. **Groundcovers, Ornamental Grasses and Perennials:** Use groundcovers, ornamental grasses and perennials to add color, texture, and seasonal interest to the landscape design; locate groundcovers and perennials in planting beds in masses at appropriate spacing with like varieties. Position groundcovers, ornamental grasses and perennials as masses only in planting beds.

D. **Turf Sod and Irrigation:** Restore irrigation and turf sod where there is existing turf sod, unless a property owner has been previously compensated by cost-to-cure agreement.

E. **Roadside Seed:** Seed throughout all disturbed areas of the Project that will not be stabilized with landscape treatments (i.e., turf sod and irrigation, planting beds, and landscape rock, etc.) in accordance with the seed schedule in Table 7C-3.

F. **Planting Beds**: Arrange trees, shrubs, groundcovers, ornamental grasses, and perennials into groupings or masses referred to as "planting beds". Area of planting beds should be identified by placement compost and bark mulch. Install a landscape edge along the perimeter to define and distinguish the planting bed from surrounding conditions.

7C-5.2 Plant Classifications

A. Plants are classified by category, size, and whether they are deciduous or evergreen. Comply with the American Association of Nurserymen Standards for Nursery Stock for the minimum tree height associated with the specified caliper of each species type.

B. Use the following classifications and criteria and provide a plant material and size schedule in the Released for Construction landscape plans to define the planting material:

5. **Shade Trees** (deciduous trees taller than 30 feet at mature height): Use 2-inch caliper minimum tree size at time of planting.
6. **Ornamental Trees** (deciduous trees between 15 and 40 feet at mature height, with ornamentals having distinct or showy characteristics in flower, fruit, leaf color, or form): Use 1.75-inch caliper minimum tree size at time of planting.
7. **Evergreen Trees** (evergreen or broadleaf evergreen leaf trees with a minimum mature height of 15 feet): Use 5-foot minimum tree height at time of planting.
8. **Deciduous Shrubs** (any deciduous shrub classified by height, large shrub with mature height greater than 12 feet, medium shrub with a mature height between 6 to 12 feet, small shrub with a mature height less than 6 feet.): Plant a 5-gallon minimum container size.
9. **Evergreen Shrubs** (shrubs having evergreen or broadleaf evergreen leaves): Determine the minimum size at planting by the predominant direction of growth. Use similar shrub size description referenced in deciduous shrub above. Plant a 5-gallon minimum container size.
10. **Groundcover:** (herbaceous perennials planted typically for their spreading growth characteristic): Use a minimum 4-inch pot size at time of planting.
11. **Turf Sod**
12. **Perennials and Ornamental Grasses**: Use a 1-gallon minimum container size at the time of planting.

7C-5.3 Organic Mulch

A. Place compost at a minimum depth of 2 inches throughout entire limits of planting beds.

For individual trees placed outside the limits of planting bed areas, compost shall be applied at a minimum depth of 2 inches and at a minimum 3-foot diameter area centered about the tree collar. Use only compost that meets the following requirements, and submit the source of material to the Department and obtain Approval before ordering. Compost shall:

1. Be weed-free, organic compost derived from a variety of feed stocks including agricultural, biosolids, forestry, food, leaf and yard trimmings, manure, and tree wood with no substances toxic to plants.
2. Derived from well decomposed organic matter source produced by controlled aerobic (biological) decomposition that has been sanitized through the generation of heat and stabilized to be appropriate for landscape applications.
3. Processed through proper thermophilic composting, meeting the US Environmental Protection Agency's definition for a 'process to further reduce pathogens' (PFRP).
4. Meet the chemical, physical, and biological properties outlined below:

Parameters	Units of Measure	Acceptable Compost
PH	PH Units	5.0-8.0
Soluble Salt Concentration	dS/m	< 5
Stability Dioxide Rate	mg CO_2-C per g OM per day	< 8
Physical Contaminant	% dry weight base	< 1

B. Apply bark mulch over the top of the placed compost to a minimum depth of 3 inches. Designate planting bed areas on the plans, and spread bark mulch over placed compost, throughout the entire planting bed and around root balls. For individual tree plantings located outside of planting beds or tree groupings, extend bark mulch to cover a 3 foot minimum diameter around the tree collar. Use only bark mulch that meets the following requirements, and submit the source of material to the Department for Approval before ordering:

1. Is composed of shredded bark (not ground scrap lumber or pallets)
2. Has been decomposed in a pile for a minimum of 120 Calendar Days
3. Has a pH 6.0 to 7.5
4. Has a maximum size of 1.5 inches thick and 6 inches long for at least 75 percent of the applied mulch
5. Has only natural bark color with no additional stain or color additives
6. Install landscape edge around perimeter of bark mulch to define its limit and boundary from surrounding conditions.

7C-5.4 Landscape Rock

Use landscape rocks in accordance with Part 5 (Special Provisions and Exceptions).

7C-5.5 Landscape Edge

Use a concrete landscape edge to define the perimeter boundaries of planting beds and Landscape Rock areas where other concrete (i.e.-sidewalk, curb, etc) is not present. Place a composite board Landscape Edge inside of planting beds and Landscape Rock areas to separate various materials (rock, bark mulch, and roadside grasses), including types of landscape rock. Landscape Edges are to keep material from moving, rolling, or creeping into adjacent treatment. Adhere to the following criteria when designing and placing landscape edge:

A. Perimeter landscape edge: constructed of concrete.

B. Interior landscape edge: constructed of composite board. Submit three composite board samples depicting color, size, and manufacturer installation instructions to the Engineer for Approval.

C. Placed or installed on compacted soil.

D. Overall height of the landscape edge must be tall enough to keep adjacent materials (rock, gravel and/or mulch) from moving across edge.

7C-6 Roadside Seed

A. Seed all disturbed ground areas. Install seeding by drilling or broadcasting in accordance with UDOT Standard Specification 02922.

B. Apply wood fiber mulch to all seeded areas with slopes less than 2:1.

C. Apply steep-slope erosion control to all seeded areas with slopes 2:1 or steeper.

Use the following seeding schedule:

Table 7C - 3
Seed Schedule

Seed No.	Species Name		Number of Seeds per pound	Drill Seed			Broadcast Seed		
	Botanical	Common		Pounds of pure live seed per acre	Percent of mix	Seeds per sq. ft.	Pounds of pure live seed per acre	Percent of mix	Seeds per sq. ft.
1	Agropyron cristatum 'Roadcrest'	RoadCrest wheatgrass	265,250	3.00	15.51%	18.27	4.50	15.51%	27.40
2	Elymus wawawaiensis	Snake River wheatgrass	120,000	4.00	9.36%	11.02	6.00	9.36%	16.53
3	Festuca ovina 'Covar'	Covar sheep fescue	680,000	2.50	33.14%	39.03	3.75	33.14%	58.54
4	Poa secunda spp. Sandbergii 'High Plains'	High plains sandberg bluegrass	925,000	1.50	27.05%	31.85	2.25	27.05%	47.78
5	Thinopyrum intermedium	Tegmar intermediate	88,000	4.50	7.72%	9.09	6.75	7.72%	13.64

	'Tegmar'	wheatgrass							
6	Linum lewisii 'Maple Grove"	Maple Grove blue flax	170,000	1.00	3.31%	3.90	1.5	3.31%	5.85
7	Penstemon Eatonii 'Richfield'	Richfield firecracker penstemon	400,000	0.50	3.90%	4.59	0.75	3.90%	6.89
Total				17.00	100.00%	117.75	25.50	100.00%	176.63

7C-7 Invasive Weed Control

Control invasive weeds in all disturbed areas in accordance with Part 5 (Special Provisions and Exceptions) 02924S (Invasive Weed Control). Control invasive weeds for the duration of the Project.

7C-8 Irrigation

Meet the standards for the local municipality for any proposed irrigation. Submit the design of the irrigation to the local municipality and Department for Approval. Irrigation systems should be designed without any overhead spray irrigation (pop-up or rotor) immediately adjacent to the roadway.

7C-9 Park Strip, Median, and Island Treatments

Apply one of the following treatment options to park strips, medians, and islands within the Project limits:

A. Stamped Colored Concrete:

1. Use integral concrete color Fed. Std. 36081 or approved equal.
2. Use ashlar slate pattern or approved equal.
3. Provide construction joints that parallel the ashler slate pattern.

B. Cobble Rock:

1. Use 3 to 6-inch cobble rock placed 6 inches in depth.
2. Place weed barrier fabric under rock..
3. For island areas, use a 4-foot wide band of stamped colored concrete (see above) around the perimeter and cobble rock for the interior portion.

7C-10 Landscape Treatments at Specific Locations

Provide landscape treatment at specific locations as follows:

A. Parcels 536, 562, and 565. Use a combination of landscape rock and stamped colored concrete in accordance with this section. Landscape treatments should be used in a manner compatible with the primary use of the parcel.

B. The Oval-A-Bout on 11400 South between River Heights Drive and Summer Heights Drive and District Drive and Parkway Plaza Drive. Place native borrow 4-inch below sidewalk and/or top back of curb. Native borrow must be free of petroleum products, construction waste, and other contaminants, including large rocks greater than 3-inches in diameter.

C. New Detention Basins. Use landscape rock in accordance with this section.

7D. SUBMITTALS

Provide submittals to the Department in accordance with Table 7D-1.

TABLE 7D – 1
DESIGN-BUILDER SUBMITTALS FOR LANDSCAPING AND AESTHETICS

Submittal	***For Approval***	***Schedule***
Conceptual Aesthetics and Landscape Design Package (Aesthetics committee)	Yes	After NTP
Final Aesthetics and Landscape Design Package	Yes	Obtain Approval prior to Initial Design Milestone Submittal Package for Structures and affected Release for Construction Documents
Sources of material for (i) Landscape Rock, (ii) Compost, and (iii) Bark mulch samples	Yes	Obtain Approval prior to Released for Construction Documents
As-Built Irrigation Plans	No	With As-Built Documents

8—LIGHTING

8A. GENERAL

Conduct all Work necessary to meet the requirements of this Section 8 (Lighting) and satisfy all functional needs of the Project, including lighting for mainlines, ramps, city streets, pedestrian bridge, railroad tracks under overhead structures, roadway underpasses and daytime lighting.

8B. STANDARDS

Complete Work for lighting in accordance with the requirements of the standards listed by priority in Table 8B-1 (Standards for Lighting).

If there is any conflict in Standards, adhere to the Standard with the highest priority.

TABLE 8B-1
STANDARDS FOR LIGHTING

Priority	*Author or Agency*	*Title*
1	UDOT	Special Provisions included in Part 5
2	UDOT	*Supplemental Specifications to 2012 Standard Specifications for Road and Bridge Construction,* as modified by Part 5
3	UDOT	*2012 Standard Specifications for Road and Bridge Construction*, as modified by Part 5
4	UDOT	*Supplemental Drawings to 2012 Standard Drawings for Road and Bridge Construction*
5	UDOT	*2012 Standard Drawings for Road and Bridge Construction*
6	AASHTO	*A Policy on Geometric Design of Highways and Streets*
7	AASHTO	*Roadside Design Guide*
8	UDOT	*Utah Manual on Uniform Traffic Control Devices* (Utah MUTCD)
9	NFPA	*National Electrical Code*
10	UDOT	*UDOT Design Guidelines for Signalized Intersections*
11	AASHTO	*Roadway Lighting Design Guide*
12	IES	*Roadway Lighting (RP-8)*
13	IES	*Technical Memorandum on Light Trespass: Research, Results, and Recommendations (Reaffirmed 2011) - IESMA TM-11-2000*
14	City	*South Jordan and West Jordan City Street Light Standards*

8C. REQUIREMENTS

Provide lighting systems as follows:

A. Supply a uniform light distribution where lighting is provided.

B. Avoid light pollution and light trespass outside of any highway or Right-of-Way corridor.

C. Avoids disability or discomfort from glare to users.

D. Design the lighting to allow ease of maintenance and servicing without lane closures.

E. Provide partial interchange lighting including all on-ramp areas, off-ramp areas, lane drop areas and ramp terminal intersections as defined in Part 7 (Contract Drawings).

F. Provide pedestrian lighting on the landings/ramps of the pedestrian bridge near 7000 South. Design the lighting to provide light for pedestrians on the bridge, ramps, and landings.

G. Relocate the existing decorative lights along 11400 South within the Project limits in accordance with South Jordan City Standards. Reuse the existing poles and luminaire assemblies. Replace any poles damaged by construction.

H. Relocate the existing lights on 7000 South that are impacted by the project in accordance with West Jordan City Standards. Reuse the existing poles and luminaire assemblies. Replace any poles damaged by construction. .

I. Provide lighting at all signalized intersections, including roadway luminaires at each corner. If overhead utilities prohibit the use of signal pole extensions, provide separate luminaire poles and arms located outside the conflict area.

J. Provide lighting for all pedestrian crosswalks in accordance with Part 7 (Contract Drawings).

K. Provide lighting on Bangerter Highway at 11400 South in accordance with Part 7 (Contract Drawings).

L. Provide understructure lighting for all new structures over public roadways within the Project limits, except for the pedestrian bridge at 7000 South. Provide and locate understructure luminaires to reduce the likelihood of tampering and damage by vandals.

M. Install a 2-inch future-use PVC conduit with tracer wire (single No. 14 AWG copper THHN wire) from each lighting power pedestal to the nearest ATMS junction box or cabinet.

8C-1 Design Criteria

Use the Illuminance Method for all lighting design calculations. See Part 7 (Contract Drawings) for lighting calculation requirements. Submit lighting calculations justifying the basis for the design of the lighting systems.

Provide understructure lighting that is consistent with the illuminance levels and uniformity of the surrounding lighting system; do not provide daytime lighting for understructures.

Provide lighting with a maximum Veiling Luminance Ratio of 0.3.

For all LED fixtures, use a Light Loss Factor (LLF) of 0.90 for lighting design calculations.

Perform and submit illuminance calculations using a vertical grid along the ROW line based on the method outlined in IESMA TM-11-2000 in order to avoid light trespass outside of any roadway or ROW. Extend the vertical grid 20 feet upward with calculation points oriented perpendicular to the roadway. The light trespass limitations are as follows:

A. Maximum vertical illuminance – 0.3 fc in residential areas

B. Maximum vertical illumination – 0.6 fc in commercial areas

8C-2 Construction Criteria

All splices shall be performed by an IMSA-certified and/or Journeyman Electrician. All electrical work shall be overseen by a Journeyman Electrician.

Use Schedule 40 PVC or SDR11 HDPE for conduit trenched in soil, and use SDR11 HDPE for conduit installed by boring methods.

Bury all lighting junction boxes with 2-inches of cover below finished grade. Provide locate devices inside each junction box.

8C-3 Materials

Provide lighting materials that are new at the time of installation. Do not salvage or reuse lighting materials except for the existing poles and luminaire assemblies on local streets or owned by local Cities.

8C-3.1 Lamps and Luminaires

Use Light-Emitting Diode (LED) luminaire fixtures for all luminaires. Provide luminaires with the following lamps to facilitate maintenance:

A. Use Department-furnished LED Type B cobra head roadway luminaires. Use Department-furnished anchor bolts, poles and LED luminaires.

B. Understructure LED luminaire requirements:

1. Understructure luminaires may be surface mounted to the underside of deck or wall mounted.
2. Locate understructure luminaires to provide maintenance access so that a lane closure is not necessary.
3. Provide a vibration resistant mounting for surface mounted luminaires.
4. Provide understructure luminaires that are vandal resistant.
5. Provide single photo control with lighting contactor and circuit breaker for underdeck lighting systems.

C. High mast LED luminaire requirements:

1. Type II or Type V light distribution
2. Bug rating: Max B5-U0-G5
3. UL 8750 and UL 1598 compliant
4. 3G Vibration rated per ANSI C136.31
5. EMA IP66 rated
6. IES L70 lumen maintenance minimum 70,000 hours
7. Apparent color temperature 4,000K – 4,500K
8. White fixture housing color

8C-3.2 Power

Notify the municipality at least seven Calendar Days before disconnecting and/or connecting the power to existing lighting.

If temporary lighting is required, the Design-Builder shall pay the temporary lighting costs until all permanent lighting is in place and operational.

Provide 240-Volt, single-phase power for all cross street, ramp-terminal intersection, and interchange cross-street understructure lighting.

Provide 480-Volt, single-phase power for all lighting circuits on Bangerter Highway, including ramp

lighting.

8C-3.3 Lighting Pedestal and Circuits

Use metered lighting pedestals with central photo control for all lighting circuits.

Provide lighting pedestals with a meter for each municipality or jurisdiction. For example, power for a traffic signal on a State route will be paid by the Department; however, if power for lights at the same intersection will be paid by the local municipality, a dual-metered pedestal will be required at that location. Connect each lighting circuit to the designated meter for the jurisdiction that will pay to provide power to that circuit.

Provide lighting pedestals and circuits that meet the following requirements:

A) Wiring and Conductors

1. Aluminum wire and grounding may be used as an alternative to copper wire and grounding as follows:

   a. Wire and cable – refer to American Wire Gauge
   b. Conductors and ground wires use RHW coated single-conductor aluminum wire

B) Cabinet

1. Provide Rainproof, NEMA 3R.
2. Provide 0.125" anodized aluminum 5052-H32 or 16 gauge #306 stainless steel, continuously welded or overlapped and carriage-bolted exterior and door seams, smooth and free of any voids.
3. Provide provisions for one meter socket complying with local power utility requirements.
4. Design cabinet openings such as ventilation holes to prevent entrance of insects such as wasps, hornets, or bees. Install a permanent, welded insect screen, if ventilation holes are required.
5. Provide adequate clearances inside the cabinet for pulling and connecting to service and distribution (field) wiring with conduits extending into the cabinet 2.0 inch maximum.
6. Provide sealed shatter-resistant and UV-resistant polycarbonate windows for meter reading and photocell operation. Meter shall be visible from the front. Include photocell headlight shield that will not affect normal operation nor will harbor nesting insects.
7. Provide service entrance, meter, and distribution compartments with padlockable, vandal-resistant doors and covers, and corrosion resistant barriers separating each compartment. Design compartments for safety and ease of maintenance with stainless steel piano hinges on access panel or access door. When a person is facing the cabinet, the hinges shall be on that person's left.
8. Fasten cabinet directly to pad-mount base encased in concrete, with option for attachment to anchor bolts. All mounting bolts shall be secured from inside the cabinet.
9. Mechanically fasten permanent labels (etched or engraved) to the cabinet. Adhesives are not acceptable. Exterior front-door label: "LIGHTING

DISCONNECT". Conform to UL508 Industrial Control Panel Labels for service entrance equipment requirements.

10. Provide documentation permanently and conveniently attached to the inside of the distribution section or a permanently attached interior documentation storage pocket or pouch. Include the manufacturer's name, address, phone number, a wiring diagram, date of manufacture, and all necessary information on documentation to order an identical pedestal and replacement parts.

C) Electrical

1. Provide Single-phase, 3-wire, 120V/240V or 240V/480V, 200A.
2. Provide 200A utility landing lugs rated for 250 MCM wire with two self-contained watt-hour meter sockets, main service disconnect, and meter bypass switch, meeting local power utility company requirements. Provide adequate space for a meter puller.
3. Pre-wire all components to NEC and NEMA specifications. Use XHHW-2 or THHN-2 wire for all pre-wiring.
4. Provide a system capable of operating between -30ºF and 130ºF.
5. Meet EUSERC requirements for all mounting hardware and installation details.
6. Provide double pole 70-amp main plug-in circuit breaker (10K AIC) labeled "Lighting Main".
7. Provide double pole 30-amp (240/240 volt) plug-in circuit breaker (10K AIC) labeled "lighting", plus breaker for photo control, both secondary to the Lighting Main breaker.
8. Provide pre-wired 30-amp 240V electrically-held 2-pole contactors, Square D Part # 8903-SM02, or approved equivalent.
9. Provide three-position rotary test switch with "On-Off-Auto" settings, clearly labeled.
10. Provide a minimum of 18 circuit panel board circuit breakers.
11. Provide Circuit terminal bar with lugs rated for wire sizes #6 to #0 AWG, labeled "Lighting Circuit". Provide grounding terminal bar with lugs rated for #6 to #0 AWG wire size, adjacent to circuit terminal bar

8D. SUBMITTALS

Provide submittals to the Department in accordance with Table 8D-1.

TABLE 8D-1
DESIGN-BUILDER SUBMITTALS FOR LIGHTING

Submittal	*For Approval*	*Schedule*
Lighting Design Calculations	No	Prior to Release for Construction Documents

9—MAINTENANCE DURING CONSTRUCTION

9A. GENERAL

Conduct all Work necessary to meet the requirements of this Section 9 (Maintenance During Construction) and to satisfy all functional needs of the Project, including routine maintenance, emergency and operational response, inspections, and repairs required throughout the life of the Contract.

9B. STANDARDS

Not used.

9C. REQUIREMENTS

Operate, maintain, and repair existing facilities and facilities constructed under this Contract, including cross-streets within the Project limits, to provide safe and efficient movement of people and goods throughout the Project area during construction. Perform all maintenance activities beginning at NTP and ending on the day of Contract Completion, at which time the Warranty will govern such work.

9C-1 Department's Role

The only maintenance that will be performed by the Department inside the Project limits is snowplowing of the roadways open to use by the general public.

The Department reserves the right to perform other maintenance work as it deems necessary with its own forces, and/or to enter into special contracts for the maintenance of specific items, and to back-charge the Design-Builder for costs resulting from Design-Builder's failure to comply with the provisions of this Section 4-09 (Maintenance During Construction).

9C-2 Maintenance of Traffic

Maintain all features necessary to support the maintenance of traffic during construction as described in Part 4-10 (Maintenance of Traffic).

Provide a safe travel corridor. If a device or other element of Work cannot be immediately repaired or replaced, install temporary mitigation devices and/or procedures until repair or replacement is completed. Repair or replace within 24 hours unless otherwise noted herein.

Do not use barrier(s) with wire loop pin connectors

9C-3 Maintenance of the ROW

Keep the ROW and Work site clean and free of noxious weeds, rubbish, and debris throughout all phases of construction.

9C-4 Maintenance of Roadways

Maintain all roadways within the Project limits, and adjacent roadways, in a condition such that the roadways safely accommodate traffic. As construction is completed, keep the roadways free of loose dirt, gravel, and debris. Clean and broom-sweep paved surfaces adjoining the Project, and within the Project limits as needed; rake and clean other surfaces of the Project site.

Provide the Department with contact names and 24-hour telephone numbers so that the Department can access the Design-Builder's emergency maintenance service at any time.

9C-4.1 Pavement

Maintain all pavement within the Project, including the highway and cross-streets where pavement is damaged. Damage includes potholes, other serious deterioration or rutting, and other unsafe surface conditions as determined by the Department, and includes damage caused by Design-Builder's haul operations. Begin such repair within 24 hours of observance or notification. For repairs located within a travel lane, implement the repair during the next possible MOT Off-Peak Period as defined in Part 4-10 (Maintenance of Traffic), unless otherwise directed by the Department. Clean all debris from hauling operations within 12 hours of observation or notification.

9C-4.2 Drainage & Irrigation

During the course of construction, maintain all necessary watercourses and drainage systems to collect and convey stormwater flows. Do not allow standing water on the roadway surface.

Maintain full functionality of landscaping irrigation systems from April 1 through October 31 each calendar year, unless otherwise Approved by the Department and agreed to by the facility owner in writing.

9C-4.3 Lighting

Maintain and operate all existing and new lighting systems within the Project limits, including the following:

A. Replace nonfunctioning lamps.

B. Replace or repair any damaged equipment or underground cable.

C. Address and maintain public safety issues (for example, system outage, exposed wires, and knockdowns) within one hour of notice, and routine maintenance and other maintenance not related to public safety (for example, lamp replacement or repair of minor equipment damage) within 12 hours of notice.

D. Provide temporary lighting and/or maintain lighting throughout construction at all intersections, with the exception of overhead sign lighting once new signs with ASTM D4956 Type XI sheeting have been installed.

E. Provide temporary lighting plans.

F. Prevent glare from Work zone lighting to approaching motorists.

G. Pay for the power costs for all temporary lighting associated with the Project.

9C-4.4 Signing

Maintain all signs, including sign supports and foundations. Replace or repair damaged stop signs within 30 minutes of notice. Replace or repair other signs within 12 hours of notice.

Remove and prevent any obstructions from blocking the view of signing within the Project limits, including construction equipment, parked vehicles, Work zone devices, vegetation, and other

obstructions.

9C-4.5 Pavement Markings

Maintain all pavement markings to safe levels of presence (125 millicandelas or greater) and retroreflectivity within the Project limits. At a minimum, repaint pavement markings every two months between April and October, and once per month between October and April.

Completely remove all unneeded markings by means of water-blasting, sand-blasting or shot-blasting prior to opening the roadway to traffic.

9C-4.6 Traffic Signals

Equipment: Maintain all traffic signal equipment (including new, temporary, and existing) within the Project limits, except as specified in this section, until Substantial Completion at each respective intersection. Replace existing loops to maintain signal detection during construction. Maintenance and operation shall meet requirements of the Utah MUTCD and shall include the following:

A. Replacement of nonfunctioning lamps.

B. Functioning pedestrian detection.

C. Functioning vehicle detection for all intersection approach lanes.

1. The Design-Builder may incorporate permanent radar detection equipment sensors, wire, and electronics as part of any temporary traffic signal detection system. Reimburse the Department for any damage to permanent detection devices used in a temporary condition.

D. Functioning traffic signal communication.

1. In the event the communication network is off-line for more than four hours, provide an alternate communication path. If using high-speed wireless communication, it shall operate in the 3.5/4.9-5.8 GHz bands. Wireless communication shall support bandwidth of 108 MBps. Provide wireless communication at no additional cost to the Department, and integrate into the Department's existing device control software.

E. Signal preemption at signalized intersections.

F. Replacement or repair of any damaged equipment or underground cable.

G. Functioning traffic signal cabinet and associated hardware. The Department will be responsible to maintain the traffic signal controller.

H. The Department will maintain and operate signal timing throughout the Project area.

Operations:

I. Maintain and protect traffic as required by the municipality or county in which Work is being completed along the municipal facilities.

J. When disrupting the normal operation of traffic signals, provide an adequate number of traffic control personnel on-site to facilitate the safe and efficient movement of traffic. At intersections with a functional traffic signal, no flagging operations are allowed; alternatively, the signal may be

1. Shut down and traffic directed by law enforcement personnel; or

2. Operated manually by law enforcement personnel.

K. The Design-Builder shall pay for the power costs for all temporary traffic signals associated with the Project.

L. Notify the Department seven Calendar Days prior to turning on or modifying a traffic signal. The Department will program both controllers and detection for all signals (temporary and permanent).

Shutdowns: When existing controllers and cabinets are being removed and the new cabinets and controllers are being installed, the Design-Builder shall shut down traffic signals. Obtain Approval from the Department, seven days in advance of any signal shutdown, as well as advanced Approval from the agency with jurisdiction over the facility where the equipment is located. Limit signal shutdown to the MOT Off-Peak Periods as defined in Part 4-10 (Maintenance of Traffic).

Repair and maintain traffic signals around the clock (24 hours per day, seven days per week). Respond to notification within 10 minutes and be on-Site to initiate repairs within 30 minutes. Remain onsite and continue Work until signal operation is verified by the Department. Emergency maintenance shall be limited to problems related to public safety, such as a dark intersection, flashing signal lights, twisted signal heads, burned out red lamps, exposed wires, and knockdowns or other as determined by the Department.

Provide the Department with contact names and 24-hour telephone numbers so that the Department can access this emergency maintenance service at any time.

Other routine maintenance not affecting public safety shall be initiated within 24 hours of notice or observation.

The UDOT Signal Turn-On Checklist shall be used for the process of initiating operation of new and existing signals.

Design-Builder staff responsible for maintenance of traffic signals shall demonstrate experience in trouble shooting and maintenance of traffic signal equipment and possess International Municipal Signal Association (IMSA) Level III certification.

9C-4.7 Snow Removal

The Department will be responsible for snow removal on the travel lanes, shoulders, and emergency pullouts in the vicinity of the Project as part of the normal course of plowing. The Department will take no special measures when plowing inside the Project limits, and will not be responsible for delay and/or damage caused by snow removal operations. If any channelization devices are displaced or damaged by plowing operations, the Design-Builder shall restore them within one hour of observance or notification.

The Design-Builder shall be responsible for all other snow removal in the work zone. Coordinate with UDOT Region Maintenance when snow removal from the work zone could result in impacts to traffic and/or UDOT snow removal efforts on mainline.

The Design-Builder shall not stockpile snow such that snow melt will encroach onto travel lanes, shoulders, and emergency pullouts.

9C-5 Maintenance of Structures

Maintain all structures within the Project limits in working order. Repair any potholes on bridge decks.

9C-6 Maintenance of Miscellaneous Equipment/Devices

Provide AASHTO HL-93 load-bearing junction boxes and lids, cable vaults and lids, and drainage grates within two feet of travel lanes. Weld drainage grates within two feet of travel lanes to prevent them from dislodging and causing a hazard.

9C-7 Maintenance of Access to Facilities

Maintain uninterrupted access to all public and private facilities affected by the Project. Access shall mean providing a clear and easily understood route into and out of an existing residence, facility, or business, and providing access for all types of vehicles using the access. Provide all necessary signing in accordance with the Utah MUTCD to convey that the route to the residence, facility, or business is open to traffic.

9C-8 Maintenance of Pedestrian Access Routes

Maintain or relocate the pedestrian access routes within the Project limits in on a paved surface and in accordance with the Americans with Disabilities Act (ADA), the Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG), and the Utah MUTCD. Obtain Approval of all pedestrian detour plans needed to accommodate construction.

Maintain the existing pedestrian structure near Bangerter Highway and 7000 South intersection until the new pedestrian structure is open. If the existing pedestrian bridge is closed prior to the new pedestrian bridge being open, provide at-grade pedestrian access, see Part 4-10 (Maintenance of Traffic).

9C-9 Maintenance of River and Flood Control Channels

Keep construction material away from drainage structures, flood control channels, rivers, and waterways. Do not allow debris or contaminants of any nature to be deposited in the above-mentioned waterways. If any such item is found floating in a waterway near the site, immediately remove it. Maintain all water courses, drainage ways, drainage systems, and irrigation systems. Collect and convey storm water flows that are less than or equal to the 10-year storm event to avert flooding of active roadways and properties abutting the ROW.

9C-10 Maintenance of Landscape

Existing Landscape: Maintain existing landscape within the Project limits that are to remain after construction until Substantial Completion. Limits of Work include any area within the Project limits that has been disturbed, including staging areas. Maintenance Work includes the following:

A. **Watering**: Keep trees, shrubs, and other plantings watered. Use automatic irrigation, if present.

B. **Weed Control**: Monitor and control invasive weeds as specified in Part 5 (Special Provisions and Exceptions) 02924S (Invasive Weed Control).

C. **Erosion Control**: Follow the Project Storm Water Pollution Prevention Plan (SWPPP). Repair, maintain, and replace erosion and sediment control measures according to Part 4-05 (Environmental Compliance).

D. **Irrigation System**: Perform annual winterization activities to shut down the system, including cleaning out all water in the system with compressed air. Check bubbler heads, valves, and other system components for damage or wear, and repair them prior to restarting the system the next season.

E. **Plant Replacement**: Replace plant materials.

9C-11 Maintenance of Property

Before moving, disturbing, or damaging land monument and property markers, witness or reference their locations, using a registered land surveyor. Notify the County surveyor prior to moving, disturbing, or damaging section corners and other County monuments.

Install temporary fence prior to removing the existing fence and/or wall from the properties. Place temporary fence that meets the needs of the existing fencing. Maintain all temporary fence until the permanent fence and/or wall is installed. Notify property owners affected by the Work in accordance with Part 4-12 (Public Involvement and Information Services).

Restore any damaged or injured property to a condition equal to or better than it existed before the damage or injury occurred.

9C-12 Maintenance of Advanced Traffic Management System (ATMS)

9C-12.1 General

Maintain the functionality and centrally controlled operations of all existing and temporary ATMS devices in the Project area and those outside the Project area that are affected by the Design-Builder's Work in accordance with Part 4-03 (ATMS). Temporary devices may be used to maintain functionality, but must be integrated in the Department's existing control software.

Maintain communication to the TOC for existing and temporary ATMS devices. In the event the existing communication is off-line for more than four hours provide temporary high-speed wireless communication that is compatible and will integrate with the existing ATMS communications system. Supply wireless communication at no additional cost to the Department, and integrate wireless communication into the Department's existing device control software.

Maintain the existing backbone communication functionality throughout the Project limits for the duration of the Project or until cut-over to the new backbone infrastructure. Submit a Communications Maintenance Plan to the Department describing the Design-Builder's plan for maintaining existing backbone communication.

Maintain existing CCTV surveillance functionality covering the entire traveled way in the work zone, including ramp lanes, mainline lanes, and interchanges within the work zone.

Maintain existing Non-Intrusive Detection (NIDs – radar units) functionality within the Project limits including reconfiguring device aiming and central configuration to continue accurate detection when MOT phasing reconfigures lane locations.

The Design-Builder is responsible to notify the Department and repair any damage to the ATMS system.

9C-12.2 Interval Between Installation and Operation

Make all ATMS equipment that is visible to the motoring public (e.g., variable message signing (VMS), ramp meters, and closed-circuit television (CCTV)) operational from the Department TOC within 20 Working Days of installation. An operational piece of equipment is one that satisfies the identified functional requirements and passes all required acceptance testing.

9C-12.3 Response Time

Safety-Related: Respond to a reported nonfunctioning component of Work that is safety-related and any and all issues that pose an imminent threat to the safety of the traveling public and/or Project personnel within the Project limits within 30 minutes and be on-Site to initiate repairs within 30

minutes after notification of the problem and continuously work until the problem is corrected and the component is working. Take whatever actions are necessary to protect the public from any nonfunctioning component of Work until the corrections are completed. Within 24 hours of any safety-related issue, provide the Department with correspondence detailing the safety issue(s) and the resolution.

Non-Safety-Related: Respond to a reported nonfunctioning component of Work that is not safety-related (for example, signal interconnect outage to an intersection or an inoperable video camera) within 24 hours of notification of the problem. Return the component to working condition within 48 hours of such notification.

When a problem affects an entire subsystem (e.g., all detection, all video, or all devices in a specific area), respond within four hours of problem notification and work continuously until the problem has been corrected.

9C-13 Maintenance of N/A Line

In locations where the existing N/A fence is temporarily removed, maintain a temporary N/A fence at all times. The temporary N/A fence shall be chain link and a minimum of six feet in height.

9C-14 Documentation

Maintain an electronic log of all maintenance and repair response activities performed during the Project and include, at a minimum, the following information:

A. Date and time the problem was reported

B. Entity reporting the problem

C. Description of the reported problem

D. Arrival time of maintenance or repair worker(s) at the problem site

E. Technician(s) performing repair or replacement

F. Corrective action(s) taken

G. Model and serial number of component(s) repaired or replaced

H. Date and time problem was rectified

For ATMS, signs, and signals, keep the log on the Department's TOC-supplied work order management system. For maintenance and repair activities at ATMS cabinets, update the maintenance log book at each cabinet.

9D. SUBMITTALS

Provide submittals to the Department in accordance with Table 9D-1.

TABLE 9D-1
DESIGN-BUILDER SUBMITTALS FOR MAINTENANCE DURING CONSTRUCTION

Submittal	***For Approval***	***Schedule***
Traffic Signal Shutdown Notification	Yes	Seven Calendar Days (minimum) prior to shutdown
Communications Maintenance Plan	No	Prior to start of construction
Contact Names and 24 Hour Telephone Numbers	No	Prior to start of construction

10—MAINTENANCE OF TRAFFIC

10A. GENERAL

Conduct all Work necessary to meet the requirements of this Section 10 (Maintenance of Traffic) and to satisfy all functional needs of the Project. Develop and implement Maintenance of Traffic (MOT) Plans that provide for the safe and efficient passage of traffic and optimize mobility. Coordinate, plan, provide, and implement traffic control for all the Work of the Project, including work performed by Third-Parties. The term "MOT plan" applies to, and encompasses the traffic control plan.

Develop a MOT plan with the flexibility to accommodate Project changes that produce benefits or savings to the Department and the Design-Builder without impairing the essential functions and characteristics of the Project, such as safety, traffic operations, durability, application of traffic control standards, maintainability, environmental protection, drainage, and other permitted constraints.

10B. STANDARDS

Complete Work for MOT in accordance with the requirements of the standards listed by priority in Table 10B-1 (Standards for Maintenance of Traffic). Provide MOT plans that are stamped by an engineer licensed to perform work in the State of Utah.

If there is any conflict in standards, adhere to the standard with the most stringent requirements; if the Design-Builder's Proposal has a higher standard than any of the listed standards, adhere to the Proposal standard.

If there is any unresolved ambiguity in standards, it is the Design-Builder's responsibility to obtain clarification and Approval from the Department before proceeding with design and/or construction.

Use the current version accepted by the Department of each listed standard as of the initial issue date of this RFP, unless modified by Addendum or Change Order.

TABLE 10B-1
STANDARDS FOR MAINTENANCE OF TRAFFIC

Priority	*Author or Agency*	*Title*
1	UDOT	Special Provisions included in Part 5
2	UDOT	*Supplemental Specifications to 2012 Standard Specifications for Road and Bridge Construction,* as modified by Part 5
3	UDOT	*2012 Standard Specifications for Road and Bridge Construction,* as modified by Part 5
4	UDOT	*Supplemental Drawings to 2012 Standard Drawings for Road and Bridge Construction*
5	UDOT	*2012 Standard Drawings for Road and Bridge Construction*
6	UDOT	*Utah Manual on Uniform Traffic Control Devices (Utah MUTCD)*
7	AASHTO	*A Policy on Geometric Design of Highways and Streets*
8	AASHTO	*Roadside Design Guide*
9	UDOT	*UDOT Sign Manual*
10	UDOT	*Utah Standard Highway Signs Supplement*
11	FHWA	*Standard Highway Signs*
12	TRB	*Highway Capacity Manual*
13	UDOT	*UDOT Design Guidelines for Signalized Intersections*
14	UDOT	*UDOT Flagger Training Handbook*
15	FHWA	National Cooperative Highway Research Program, *Recommended Procedures for the Safety Performance Evaluation of Highway Features* (NCHRP Report 350)
16	ATSSA	*Quality Standards for Work Zone Traffic Control Devices*

10C. REQUIREMENTS

10C-1 Definitions

Cross Streets: Streets with more than one travel lane per direction that cross Bangerter Highway, including but not limited to 5400 South, 7000 South, 9000 South, 11400 South, and public streets that intersect 5400 South, 7000 South, 9000 South and 11400 South.

Existing Configuration: The existing lane configuration on the Proposal Due Date, including existing lanes, lane widths, shoulder widths, and storage lengths.

Full Closure: The closure of all lanes in any one direction of an individual Movement.

Holiday Periods: All Holiday Periods as defined in Table 10C-6 (Holiday Periods Table).

MOT Peak Periods: All peak periods as defined in Tables 10C-1, through 10C-5 where all existing through lanes must remain open to traffic.

MOT Off-Peak Periods: All periods outside the MOT Peak Periods as defined in Tables 10C-1 through 10C-5, excluding Holiday Periods.

Movement: A direction of travel; either a left turn, right turn or through travel path of a vehicle on any ramp, Cross Street, or highway.

Partial Closure: The closure of one or more lanes of any individual Movement, compared to the Existing Configuration, so long as each Movement is accommodated. A Storage Length Reduction is also considered a Partial Closure.

Storage Length Reduction: A decrease in storage length of a turning Movement at an intersection compared to the storage lengths outlined in Table 10C-7, Table 10C-8, and Section 10C-12.8.

Rolling Slowdown: The use of a law enforcement vehicle to close a travel lane(s) or impede traffic for less than fifteen minutes between 12:00 AM and 5:00 AM.

Traffic Split: A Traffic Split is the separation of lanes in the same direction of travel of an individual Movement.

Traveled Way: Any public or private street, sidewalk, or Cross Street.

10C-2 General MOT Requirements

Coordinate, plan, provide, and implement traffic control for all Work, including work performed by Third Parties.

A. Provide for the safe and efficient passage of traffic through construction zones. Begin maintenance of traffic activities at the start of construction work (including preparatory MOT work) or when first hauling construction materials and/or equipment, whichever is earliest, and continue MOT activities until Substantial Completion and removal of all construction traffic control.

B. Minimize traffic impacts to the traveling public, residents, schools and businesses. During the MOT Peak Period, maintain all intersection turning Movements, lane configurations (e.g., dual left-turn lanes), and storage lengths consistent with roadway conditions prior to construction, unless otherwise Approved (see Section 10C-12 for additional Closure Restrictions).

C. Design, place, and maintain all required traffic control, MOT elements, and detour routes required during construction.

D. Obtain all necessary permits from all agencies impacted by the Project for temporary construction of roadways and/or haul routes. Identify and obtain required permits for all construction roads to be used for delivery of heavy loads such as fill, asphalt, concrete, and bridge girders required for the Project.

E. Obtain Approval of any temporary work zone speed limit reductions on state highways in accordance with UDOT Policy 06C-61. Obtain Approval of any temporary work zone speed limit reductions on city and Cross Streets from the respective jurisdiction.

F. Notify the Jordan and/or Granite School Districts of MOT changes that impact their schools, coordinate school bus circulation and schedules with the Districts.

10C-3 Traffic Management Plan

Prior to start of any construction activities obtain Approval of a Traffic Management Plan (TMP). Develop, implement, and maintain a TMP that describes how the MOT plans and requirements will be met. The TMP shall describe the procedures that will be implemented and followed on the Project to provide for the safe and efficient passage of traffic, pedestrians and cyclists. The TMP shall comply with the Contract Documents and not be used as a means for waiving requirements. The TMP shall be submitted in accordance with this Section and Part 3 (Quality Program). The TMP shall include the following:

A. The processes to produce MOT plans, including development, dissemination, implementation, monitoring, refinement, and maintenance of the MOT plans.

B. An emergency services plan to coordinate and cooperate with emergency service providers and the hospital at 9000 South. Ensure that emergency access is provided at all times and regularly communicated to the proper authorities.

C. An Incident Management Plan (IMP) including:

1. Protocols for notifying emergency service providers, the Department's Traffic Operations Center (TOC), and others in the event of an incident

2. Roles and responsibilities in the event of an incident

3. In the event of an incident, identify the processes to be used to modify construction activities or lane closures to allow traffic flow to return to normal conditions.

D. The processes to be used to provide and maintain access to properties and how this will be incorporated into the MOT plans.

E. The process to obtain Approval and notify the Department of every Full Closure Partial Closure, and Storage Length Reduction.

F. The process to obtain Approval from the Department of a detour plan used for each Full Closure.

G. The process of coordinating and notifying the Department's TOC of a Storage Length Reduction Full or Partial Closures. This includes coordinating the usage of technology with the TOC, including ATMS devices, Changeable Message Signs (CMS), traffic signal timing modifications, approval of CMS messages, etc.

H. A description of roles, responsibilities, qualifications, and contact information of MOT personnel identified in Section 10C-15 (MOT Personnel) who will plan, direct, implement, and maintain the Traffic Management Plan.

I. A pedestrian and bicyclist access plan that provides for safe pedestrian and bicyclist routing.

J. A student access plan that provides for safe pedestrian routing to and from all the schools within the Project limits, see section 10C-8.

K. The procedures to adjust the required traffic control devices, including advanced signing, to provide advance warning to motorists of slowed or stopped traffic.

L. The procedure to stage the implementation of traffic control for a closure and detour; including placing all of the signs and channelizing devices needed for the closure or detour on the shoulder of the road, turning signs to facing away from traffic, turning

detour signs to face traffic an hour prior to the closure, and turning all other signs at the beginning of the closure.

M. The process of coordination with the Department regarding the availability of ATMS within the Project area.

N. The processes to perform daily MOT inspection reports in accordance with UDOT Standard Specification Section 01554 and submit these reports to the Department on a weekly basis.

O. The process to coordinate plans for traffic signal timing and the procedure for communicating these to the Department. The Department is responsible for signal timing adjustments with input from the Design-Builder.

10C-4 MOT Plans

MOT plans apply to and encompass traffic control plans. Develop and implement MOT plans that meet the following performance requirements:

A. The MOT plans shall identify each work zone and the Traveled Way during all phases of construction.

B. The MOT plans shall identify and account for all elements needed to safely and efficiently maintain traffic during construction including temporary roadway improvements, temporary traffic control devices, temporary drainage improvements, temporary traffic signals, temporary lighting, hazard mitigation strategies, detour plans, pedestrian/bicycle accommodations, business access, flagging operations, construction vehicle access points, etc.

C. All traffic control shall be implemented in accordance with the Release For Construction (RFC) MOT plans.

D. MOT field personnel shall have a copy of the applicable MOT plans on-hand during the implementation of traffic control.

E. Coordinate MOT plans with the UHP, local law enforcement, and other emergency service providers to verify that public safety and emergency response times are not compromised. At the Department's request, provide evidence of coordination with emergency services agencies. Incorporate comments from emergency service providers in the development of the MOT plans and throughout the duration of construction.

10C-5 Temporary Roadway Facilities

Design and construct all geometric aspects of temporary roadways for 10 MPH below the posted speed in effect on the Proposal Due Date for Bangerter highway and the posted speed in effect on the Proposal Due Date for each Cross Street. Meet all sight distance requirements for the posted speed limit in effect on the roadway on the Proposal Due Date.

Maintain traffic on a paved surface at all times. Provide smooth transitions between existing and temporary paving. The Design-Builder is responsible to provide smooth transitions if trench plates are used. See Part 4-09 (Maintenance During Construction) and Part 4-11 (Pavement) for additional temporary paving requirements.

Maintain a travel lane width of 11 feet. The minimum width applies to travel lanes, turn lanes and

auxiliary lanes.

Maintain a shoulder width of at least two feet where shoulders exist on the Proposal Due Date.

Provide acceleration and deceleration lanes for temporary roadways, including construction access points, accessing Bangerter Highway (SR-154).

Maintain at all times a concrete barrier between opposing mainline Bangerter travel lanes where barrier exists prior to construction. When a work zone is in the median, construction access points (i.e., openings in the median barrier) shall be staggered to prevent any cross-over collisions should a vehicle enter the work zone.

Design and install or modify temporary and existing traffic signals in coordination with MOT and temporary traffic control plans. For lane shifts through an intersection use a taper rate as defined in the Department Standard Drawings and no more than three feet. Align signal heads over the center of the lanes they serve. Obtain approval of all traffic signal phasing and timing changes. Provide radar vehicle detection at all temporary traffic signals.

10C-6 Temporary Traffic Control

Maintain existing regulatory signs, warning signs, guide signs, airport signs, hospital signs, and logo signs during all phases of construction.

All temporary signing shall meet or exceed retroreflectivity standards for ASTM Type XI sheeting. Use fluorescent orange sheeting when orange sheeting is specified.

Travel lanes shall be defined by painted lines at all times where striping exists prior to construction. Temporary striping shall meet minimum retrorelectivity standards.

Stripe travel lanes or provide temporary traffic markings before removing temporary traffic control devices.

Stage the implementation of each Partial Closure or Full Closure by placing signs and channelizing devices needed for the closure on the shoulder of the road. Prior to the closure, signs shall be turned facing away from traffic, with the exception of detour signs that shall be turned to face traffic an hour prior to the closure. All signage and channelizing devices shall be placed in accordance with the RFC MOT plans when the closure is implemented.

Provide Project Notification Signs (see Utah Standard Highway Signs Supplement) on both sides of each interchange Cross Street approaching Bangerter Highway (SR-154) and on Bangerter Highway (SR-154) approaching the Project Limits (two signs on each 5400 South, 7000 South, 9000 South, 11400 South, and on Bangerter Highway (SR-154)). Prepare and obtain Approval of the Project Notification Sign layout and installation plan prior to ordering the signs.

10C-7 Business and Private Property Access

Maintain and provide access to every property except as otherwise Approved by the Department.

Provide temporary business access signs during construction according to UDOT Standard Drawings.

No two accesses that serve the same business will be permitted to be under construction concurrently. See Part 4-14 (Right of Way) for additional requirements.

10C-8 Accommodations for Bicyclists and Pedestrians

Maintain the current pedestrian accommodations within the Project limits during construction unless

otherwise Approved by the Department.

Obtain Approval of all pedestrian and bicycle detour plans. All Safe Routes to School must be maintained throughout the duration of construction. Obtain Approval of a Pedestrian Access Plan that provides for safe pedestrian routing and includes a safe route for school children to cross the Project. Coordinate and obtain approval from the school district for any modifications to the Student Neighborhood Access Plan (SNAP).

The existing pedestrian bridge at 7000 South shall remain open until a new pedestrian bridge is opened to pedestrians, unless the Design-Builder pays Jordan School District to bus students to and from the Qquirrh Elementary School during the pedestrian bridge closure. If the pedestrian bridge is closed prior to the new bridge being open, the Design-Builder is required to pay for the cost of busing students on a school day as well as for activities and programs during the summer and normal school year. The cost of Jordan School District to provide busing is $178.12 per bus per school day; four buses are needed on a school day. Busing must be done continuously during the closure. Notify the Department and Jordan School District a minimum of 30 days prior to closing the pedestrian bridge.

10C-9 Detours

Provide convenient and logical rerouting of traffic (by using advance warning systems, directional and informational signing, lighting, and striping) to provide driver-friendly detours and to maximize the safety of the traveling public and construction workers. Coordinate detour routes with the Department to ensure detour traffic signal timing plans are in place to accommodate detoured traffic.

Obtain Approval of all traffic detour plans.

Implement a signed detour in accordance with the MOT plans.

Provide motorist guidance to and along the entire length of every detour route prior to implementing a roadway closure.

Use state routes for the detour of other state routes. If the detour cannot be limited to state facilities, obtain Approval for the detour and written approval from the jurisdiction whose facilities will be utilized.

Identify and coordinate with other construction projects in the vicinity of the Project area, to ensure that both projects detours routes do not conflict with each other.

Detours for multiple closures shall not go through the same intersection.

The displacement of a left-turn Movement on Bangerter Highway is not considered a detour.

Detour trailblazing signing shall indicate the route number or street name of the road being closed.

The detour plan shall include the installation and maintenance of static signs and portable CMS at key regional locations, in addition to the point of closure.

10C-10 Flagging

Flagging is not permitted on Bangerter Highway.

Use a law enforcement officer when construction activities are impacting an operating signalized intersection. Signalized intersections shall be in flash mode when law enforcement officers are controlling traffic. Use of flaggers at traffic signals is only permitted when, under the direction of a law enforcement officer, the signals have been turned off or are inoperable.

10C-11 Changeable Message Signs (CMS)

Place a portable CMS at all ends of the Project to notify motorists of upcoming construction and to warn motorists of the pending changes to existing conditions.

Provide 10 portable CMS that the Department can access remotely to change the message. Equip each CMS with GPS tracking capability. Provide two additional CMS that the Department can access remotely to change the message, to be placed at the Department's discretion. Obtain Department approval for all messages for each CMS.

Place CMS in view of oncoming traffic without obstructing traffic flow. Relocate CMS, as necessary, to match field conditions.

Remove CMS from the site of work when they are not needed for the immediate control of traffic. Provide locked cabinets on all CMS in the field. Verify the security of all CMS during each work shift. The controller on the CMS used to change messages shall be password protected.

Unless directed otherwise by the Department, display advance notification CMS messages for six Calendar Days prior to any traffic impacts, such as lane closures or change in traffic patterns, to cover all impacted roadways of the Project and intermittently at the Department's direction.

When providing six Calendar Days notice for construction activities, state the day of the week (e.g. Monday) on which the construction will occur instead of indicating the date (e.g. June 13).

10C-12 Limitations of Operations

Tables 10C-1 through 10C-5 establish the MOT Peak Periods, and MOT Off-Peak Periods by direction of travel and day of the week on Bangerter Highway and each cross-street respectively.

TABLE 10C-1
BANGERTER HIGHWAY (SR-154) MOT PEAK AND OFF-PEAK TIMES (NUMBER OF THROUGH LANES REQUIRED TO BE OPEN IN EACH DIRECTION)

Hour Starting	Monday-Thursday		Friday		Saturday		Sunday	
	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	1	1	1	1	1	1	1	1
1:00 AM	1	1	1	1	1	1	1	1
2:00 AM	1	1	1	1	1	1	1	1
3:00 AM	1	1	1	1	1	1	1	1
4:00 AM	1	1	1	1	1	1	1	1
5:00 AM	2	2	2	2	1	1	1	1
6:00 AM	All	2	All	2	1	1	1	1
7:00 AM	All	All	All	All	2	2	1	1
8:00 AM	All	All	All	All	2	2	1	1
9:00 AM	All	All	All	All	2	2	1	1
10:00 AM	2	2	2	2	2	2	1	1
11:00 AM	2	2	2	2	2	2	2	2
12:00 PM	2	2	2	2	2	All	2	2
1:00 PM	2	2	All	All	2	All	2	2
2:00 PM	2	All	All	All	2	All	2	2
3:00 PM	All	All	All	All	2	All	2	2
4:00 PM	All	All	All	All	2	All	2	2
5:00 PM	All	All	All	All	2	All	2	2
6:00 PM	All	All	All	All	2	All	2	2
7:00 PM	2	2	2	All	2	2	2	2
8:00 PM	2	2	2	2	2	2	2	2
9:00 PM	2	2	2	2	2	2	2	2
10:00 PM	2	2	2	2	2	2	1	1
11:00 PM	1	1	1	1	1	1	1	1

1 or 2 through lanes open equals MOT Off-Peak Period

All through lanes open equals MOT Peak Period

TABLE 10C-2
5400 SOUTH MOT PEAK AND OFF-PEAK TIMES (NUMBER OF THROUGH LANES REQUIRED TO BE OPEN IN EACH DIRECTION)

Hour Starting	Monday-Thursday		Friday		Saturday		Sunday	
	EB	WB	EB	WB	EB	WB	EB	WB
12:00 AM	1	1	1	1	1	1	1	1
1:00 AM	1	1	1	1	1	1	1	1
2:00 AM	1	1	1	1	1	1	1	1
3:00 AM	1	1	1	1	1	1	1	1
4:00 AM	1	1	1	1	1	1	1	1
5:00 AM	1	1	1	1	1	1	1	1
6:00 AM	2	1	2	1	1	1	1	1
7:00 AM	All	2	All	2	1	1	1	1
8:00 AM	All	2	All	2	2	1	1	1
9:00 AM	All	2	All	2	2	2	1	1
10:00 AM	2	2	2	2	2	2	2	1
11:00 AM	2	2	2	2	2	2	2	2
12:00 PM	2	2	2	2	All	All	2	2
1:00 PM	2	2	2	2	All	All	2	2
2:00 PM	2	2	2	All	All	All	2	2
3:00 PM	2	All	2	All	2	All	2	2
4:00 PM	2	All	2	All	2	All	2	2
5:00 PM	2	All	2	All	2	All	2	2
6:00 PM	2	All	2	All	2	2	2	2
7:00 PM	2	2	2	All	2	2	2	2
8:00 PM	2	2	2	2	2	2	1	2
9:00 PM	1	2	2	2	2	2	1	1
10:00 PM	1	1	1	1	1	1	1	1
11:00 PM	1	1	1	1	1	1	1	1

1 or 2 through lanes open equals MOT Off-Peak Period
All through lanes open equals MOT Peak Period

TABLE 10C-3
7000 SOUTH MOT PEAK AND OFF-PEAK TIMES (NUMBER OF THROUGH LANES REQUIRED TO BE OPEN IN EACH DIRECTION)

Hour Starting	Monday-Thursday		Friday		Saturday		Sunday	
	EB	WB	EB	WB	EB	WB	EB	WB
12:00 AM	1	1	1	1	1	1	1	1
1:00 AM	1	1	1	1	1	1	1	1
2:00 AM	1	1	1	1	1	1	1	1
3:00 AM	1	1	1	1	1	1	1	1
4:00 AM	1	1	1	1	1	1	1	1
5:00 AM	1	1	1	1	1	1	1	1
6:00 AM	1	1	1	1	1	1	1	1
7:00 AM	1	1	1	1	1	1	1	1
8:00 AM	1	1	1	1	1	1	1	1
9:00 AM	1	1	1	1	1	1	1	1
10:00 AM	1	1	1	1	1	All	1	1
11:00 AM	1	1	1	1	All	All	1	1
12:00 PM	1	1	1	1	All	All	1	1
1:00 PM	1	1	1	1	All	All	1	1
2:00 PM	1	1	1	1	All	All	1	1
3:00 PM	1	All	1	All	All	All	1	1
4:00 PM	All	All	All	All	All	All	1	1
5:00 PM	All	All	All	All	All	All	1	1
6:00 PM	All	All	All	All	All	All	1	1
7:00 PM	1	1	1	1	1	All	1	1
8:00 PM	1	1	1	1	1	1	1	1
9:00 PM	1	1	1	1	1	1	1	1
10:00 PM	1	1	1	1	1	1	1	1
11:00 PM	1	1	1	1	1	1	1	1

1 through lane open equals MOT Off-Peak Period
All through lanes open equals MOT Peak Period

TABLE 10C-4
9000 SOUTH MOT PEAK AND OFF-PEAK TIMES (NUMBER OF THROUGH LANES REQUIRED TO BE OPEN IN EACH DIRECTION)

Hour Starting	Monday-Thursday		Friday		Saturday		Sunday	
	EB	WB	EB	WB	EB	WB	EB	WB
12:00 AM	1	1	1	1	1	1	1	1
1:00 AM	1	1	1	1	1	1	1	1
2:00 AM	1	1	1	1	1	1	1	1
3:00 AM	1	1	1	1	1	1	1	1
4:00 AM	1	1	1	1	1	1	1	1
5:00 AM	1	1	1	1	1	1	1	1
6:00 AM	All	1	All	1	1	1	1	1
7:00 AM	All	All	All	All	1	1	1	1
8:00 AM	All	All	All	All	All	1	1	1
9:00 AM	All	All	All	All	All	1	1	1
10:00 AM	All	All	All	All	All	All	1	1
11:00 AM	All	All	All	All	All	All	All	All
12:00 PM	All	All	All	All	All	All	All	All
1:00 PM	All	All	All	All	All	All	All	All
2:00 PM	All	All	All	All	All	All	1	All
3:00 PM	All	All	All	All	All	All	1	All
4:00 PM	All	All	All	All	All	All	1	All
5:00 PM	All	All	All	All	All	All	1	All
6:00 PM	All	All	All	All	All	All	1	1
7:00 PM	All	All	All	All	1	1	1	1
8:00 PM	1	All	1	All	1	1	1	1
9:00 PM	1	1	1	1	1	1	1	1
10:00 PM	1	1	1	1	1	1	1	1
11:00 PM	1	1	1	1	1	1	1	1

1 through lane open equals MOT Off-Peak Period
All through lanes open equals MOT Peak Period

TABLE 10C-5
11400 SOUTH MOT PEAK AND OFF-PEAK TIMES (NUMBER OF THROUGH LANES REQUIRED TO BE OPEN IN EACH DIRECTION)

Hour Starting	Monday-Thursday		Friday		Saturday		Sunday	
	EB	WB	EB	WB	EB	WB	EB	WB
12:00 AM	1	1	1	1	1	1	1	1
1:00 AM	1	1	1	1	1	1	1	1
2:00 AM	1	1	1	1	1	1	1	1
3:00 AM	1	1	1	1	1	1	1	1
4:00 AM	1	1	1	1	1	1	1	1
5:00 AM	1	1	1	1	1	1	1	1
6:00 AM	1	1	1	1	1	1	1	1
7:00 AM	All	All	All	All	1	1	1	1
8:00 AM	All	All	All	All	1	1	1	1
9:00 AM	All	All	All	All	All	1	1	1
10:00 AM	All	All	All	All	All	All	1	1
11:00 AM	All	All	All	All	All	All	All	1
12:00 PM	All	All	All	All	All	All	All	All
1:00 PM	All	All	All	All	All	All	All	All
2:00 PM	All	All	All	All	All	All	All	All
3:00 PM	All	All	All	All	All	All	All	All
4:00 PM	All	All	All	All	All	All	All	All
5:00 PM	All	All	All	All	All	All	All	All
6:00 PM	All	All	All	All	All	All	All	All
7:00 PM	All	All	All	All	All	All	1	1
8:00 PM	All	All	All	All	All	All	1	1
9:00 PM	1	All	1	All	1	All	1	1
10:00 PM	1	1	1	1	1	1	1	1
11:00 PM	1	1	1	1	1	1	1	1

1 through lane open equals MOT Off-Peak Period
All through lanes open equals MOT Peak Period

No Partial Closure, Full Closure, or Storage Length Reduction will be allowed during Holiday Periods for the dates and times shown Table 10C-6 below. Partial Closures, Full Closures, and Storage Length Reductions that are Approved for periods longer than 48 hours and begin at least seven Calendar Days prior to a Holiday Period are permitted to continue through Holiday Periods, except as identified in Section 10C-12.5 (Bangerter Highway Closures).

TABLE 10C-6 HOLIDAY PERIODS

Holiday/Event	From	Date	To	Date
Memorial Day	3:00 PM	May 25, 2017	12:00 AM	May 30, 2017
Independence Day	3:00 PM	June 29, 2017	1:00 AM	July 5, 2017
Pioneer Day	3:00 PM	July 20, 2017	12:00 AM	July 25, 2017
Labor Day	3:00 PM	August 31, 2017	12:00 AM	September 5, 2017
Thanksgiving Day	12:00 PM	November 21, 2017	12:00 AM	November 27, 2017
Christmas Day	3:00 PM	December 21, 2017	12:00 PM	December 26, 2017
New Year's Day	3:00 PM	December 28, 2017	5:00 AM	January 2, 2018
Memorial Day	3:00 PM	May 24, 2018	12:00 AM	May 29, 2017
Independence Day	3:00 PM	July 3, 2018	1:00 AM	July 5, 2018
Pioneer Day	3:00 PM	July 23, 2018	12:00 AM	July 25, 2018
Labor Day	3:00 PM	August 30, 2018	12:00 AM	September 4, 2018
Thanksgiving Day	3:00 PM	November 20, 2018	12:00 AM	November 26, 2018
Christmas Day	3:00 PM	December 21, 2018	12:00 AM	December 26, 2018
New Year's Day	3:00 PM	December 28, 2018	5:00 AM	January 2, 2019

10C-12.1 Requests for Closure

Obtain Approval for any Full Closure, Partial Closure, or Storage Length Reduction from the Department and the local government that has jurisdiction over the impacted roadway prior to providing the required advanced notification.

The Design-Builder shall submit a request for closure for each Full, Movement, and Partial Closures, and any Storage Length Reduction. In order to provide advanced notification of each closure, obtain Approval a minimum of:

A. 21 Calendar Days prior to implementing a Full Closure
B. 14 Calendar Days prior to implementing a Partial Closure or Storage Length Reduction during MOT Peak Periods
C. 7 Calendar Days prior to implementing a Partial Closure or Storage Length Reduction during MOT Off-Peak Periods.

Provide sufficient time in the schedule to accommodate the Department's review of each Request for Closure, including addressing comments. Allow for 7 Calendar Days for the Department to review each request.

Each request for closure shall include:

A. Plan sheets showing the location and limits of the closure
B. Applicable detour plans
C. Applicable CMS locations and messages to be displayed to the public in advance of

and during the closure

D. A detailed description of the closure including duration, date(s), need for the closure, construction activities to occur, etc.

E. Lane and shoulder widths modifications, if applicable

F. Locations, and limits of varying cross section, if applicable

The Department may revoke Approval of any closure due to significant weather events or other unanticipated civic events at the Department's sole discretion.

10C-12.2 Notifications

Provide notification of each closure or modification to the Traveled Way as follows:

A. Once a Request for Closure has been Approved, notify the Department a minimum of:

1. 21 Calendar Days in advance of implementing a Full Closure,
2. 14 Calendar Days in advance of implementing a Partial Closure, or Storage Length Reduction during MOT Peak Periods,
3. 5 Calendar Days in advance of implementing a Partial Closure or Storage Length Reduction during MOT Off-Peak Periods, or
4. Sooner if otherwise required by permit.

B. Notify the Department 7 Calendar Days prior to implementing lane shifts.

C. Notify ports of entry (Troy Richins at troyrichins@utah.gov; carbon copy the Design-Builder's Public Involvement Manager) of any lane restrictions (including reduced lane widths) for oversized loads and of any closures associated with this Project at least 14 Calendar Days in advance of the closure or lane restrictions.

D. Provide advanced notification to the Department of any upcoming lane closure cancelation at least 24 hours prior to the original start date of the closure.

E. Provide real-time notification of every lane closure and subsequent lane opening on Bangerter Highway (SR-154) to the Department's TOC at 801-887-3700.

1. Lane Closure: Notify the TOC within 10 minutes before placing the first traffic control device in the travel lane.
2. Lane Opening: Notify the TOC within 10 minutes after removing the last traffic control device in the lane.

F. Provide five Calendar Days notice before starting night work.

G. Each Closure Notification shall include:

1. The specific location and limits of the closure (route number, street name, the beginning and ending mile point, inside vs. outside lanes, direction of closure, etc.)
2. The number of lanes to be closed
3. The date and time of the beginning of the closure
4. The date and time of the ending of the closure
5. The proposed detour plan, if applicable

6. The purpose of the closure

10C-12.3 Required Storage Lengths

Table 10C-7 and Table 10C-8 outline the required number of lanes and the associated storage lengths for each turning Movement. Maintain the Existing Configuration during construction on Bangerter Highway at 11400 South and 9000 South in accordance with the minimum number of lanes and storage lengths outlined in Table 10C-7 unless otherwise Approved. Modification to the Existing Configuration during construction on Bangerter Highway at 7000 South and 5400 South and at the oval-about on 11400 South will be allowed in accordance with the minimum number of lanes and storage lengths outlined in Table 10C-8 unless otherwise Approved.

TABLE 10C-7
TURNING MOVEMENT STORAGE REQUIREMENTS ON BANGERTER HIGHWAY AT 9000 SOUTH AND 11400 SOUTH

Turning Movement	Intersection Turn-Lane Storage Requirements[a]		
	11400 South & Bangerter Highway	11400 South & 4000 West	9000 South & Bangerter Highway
Northbound Left-Turn	Two 420 ft Lanes	One 130 ft Lane	Two 460 ft Lanes
Northbound Right-Turn	One 450 ft Lane	Maintain Existing Trap Lane	One 580 ft Lane
Westbound Left-Turn	Two 200 ft Lanes	Two 100 ft Lanes	Two 480 ft Lanes
Westbound Right-Turn	One 200 ft Lane	One 140 ft Lane	One 350 ft Lane – Maintain Free-Right with Merge Condition
Southbound Left-Turn	Two 500 ft Lanes	One 100 ft Lane	Two 370 ft Lanes
Southbound Right-Turn	One 490 ft Lane	One 100 ft Lane	One 380 ft Lane
Eastbound Left-Turn	Two 220 ft Lanes	One 130 ft Lane	Two 300 ft Lanes
Eastbound Right-Turn	One 240 ft Lane	One 100 ft Lane	One 240 ft Lane

[a]Turn-lane storage length is measured from the taper to the stop bar (not including the required taper length).

TABLE 10C-8
MODIFIED TURNING MOVEMENT STORAGE REQUIREMENTS COMPARED TO THE EXISTING CONFIGURATION ON BANGERTER HIGHWAY AT 5400 SOUTH AND 7000 SOUTH AND AT THE OVAL-ABOUT ON 11400 SOUTH

Turning Movement	Intersection Turn-Lane Storage Requirements[a]			
	5400 South & Bangerter Highway	7000 South & Bangerter Highway	11400 South & River Heights Dr	11400 South & Summer Heights Dr
Northbound Left-Turn	Two 400 ft Lanes	Two 400 ft Lanes	One 100 ft Lane	One 100 ft Lane
Northbound Right-Turn	One 400 ft Lane	One 360 ft Lane	One 100 ft Lane	One 100 ft Lane
Westbound Left-Turn	Two 250 ft Lanes with continuous storage in a Two-way Left-turn Lane	Two 200 ft Lanes	One 100 ft Lane	One 100 ft Lane
Westbound Right-Turn	N/A	One 200 ft Lane	One 100 ft Lane – Maintain Free Right Turn Movement	One 100 ft Lane
Southbound Left-Turn	Two 300 ft	Two 300 ft Lanes	One 100 ft Lane	One 100 ft Lane
Southbound Right-Turn	One 200 ft Lane	One 980 ft Lane	One 100 ft Lane	One 100 ft Lane
Eastbound Left-Turn	Two 200 ft Lanes	Two 400 ft Lanes	One 150 ft Lane	One 150 ft Lane
Eastbound Right-Turn	One 200 ft Lane	One 300 ft Lane	One 100 ft Lane – Maintain Free Right Turn Movement	One 100 ft Lane – Maintain Free Right Turn Movement

[a]Turn-lane storage length is measured from the taper to the stop bar (not including the required taper length).

Provide temporary traffic signals at each intersection to modify the existing CFI and oval-about intersections from the Existing Configuration.

10C-12.4 General Closure Restrictions

All closures require Approval, including closures for work performed by Third Parties, unless otherwise specified below.

Full Closures during MOT Off-Peak Periods will only be allowed during the hours identified in Table 10C-9 (Allowable Full Closure Timeframes During MOT Off-Peak Periods).

TABLE 10C-9
ALLOWABLE FULL CLOSURE TIMEFRAMES DURING MOT OFF-PEAK PERIODS

Location	Closure Window
Bangerter Highway	11:00 PM Saturday through 8:00 AM Sunday
Cross Streets	10:00 PM Saturday through 8:00 AM Sunday

No Full or Partial Closures will be allowed with the exception of those identified in Table 10C-10 (Summary of MOT Closure Restrictions).

Maintain the existing left-turn phase at each of the intersections where either a protected phase or protected/permitted phase exists in the Existing Configuration, except when a Full Closure of the left-turn Movement has been Approved.

No Full or Partial Closures will be allowed to occur along an active detour route for any construction project, unless otherwise Approved.

No Traffic Splits will be allowed.

Do not walk construction equipment that is not street legal across any roadway or Traveled Way during MOT Peak Periods. Transport the equipment across the Traveled Way or walk across the roadway or Traveled Way in conjunction with a Rolling Slowdown during MOT Off-Peak Periods. Violation of this requirement will be deemed as Nonconforming Work and is subject to disincentive as identified in Part 5 (Special Provisions and Exceptions), Table 5-1 (Unit Prices for Determining Pay Adjustments for Nonconforming Work).

All traffic signal shut-downs and turn-ons shall occur during between 12:00 AM and 5:00 AM. Violation of this requirement will be deemed as Nonconforming Work and is subject to disincentive as identified in Part 5 (Special Provisions and Exceptions), Table 5-1 (Unit Prices for Determining Pay Adjustments for Nonconforming Work)

Table 10C-10 (Summary of MOT Closure Restrictions) summarizes the general MOT closure restrictions outlined in this section:

TABLE 10C-10
SUMMARY OF MOT CLOSURE RESTRICTION

Type of Closure	Closure Location	Traffic Movement	MOT Peak Periods	MOT Off-Peak Periods
Full Closures (See Section 10C-9 for detour requirements)	Bangerter Highway	Left-turn	Up to 45 consecutive days per direction – see Section 10C-12.5. At 7000 South, up to 60 days will be allowed in coordination with the Full Closure of the 7000 South through Movements (see details below).	Permitted
		Through	Not allowed	Up to 6 nights per direction at each interchange and for the pedestrian bridge over Bangerter Highway in accordance with the timeframes in Table 10C-9
		Right-turn	Not allowed	Not allowed, except in coordination with the Full Closure of the through Movement outlined above
	Cross Streets	Left-turn	Up to 90 consecutive days per direction at each Cross Street or up to 60 days on 7000 South in conjunction with the Full Closure of the through Movement as outlined below. (also see Section 10C-12.5)	Permitted
		Through	Not allowed, except at 7000 South for no more than 60 days as long as right-turn Movements to and from Bangerter Highway are maintained.	Up to 6 nights per Cross Street in accordance with the timeframes in Table 10C-9
		Right-turn	Not allowed	Not allowed, except in coordination with Full Closures of Bangerter Highway
	Pedestrian Bridge	All	Not allowed, except as outlined in Section 10C-8.	Not allowed, except as outlined in Section 10C-8.
Partial Closures	Bangerter	Left-turn	Not allowed	Permitted

TABLE 10C-10
SUMMARY OF MOT CLOSURE RESTRICTION

Type of Closure	Closure Location	Traffic Movement	MOT Peak Periods	MOT Off-Peak Periods
	Highway	Through	Not allowed, except for the closure of one lane in each direction for up to 45 consecutive days at the Old Bingham Highway bridge north of 9000 South, if all existing lanes are provided within 800 feet of adjacent traffic signals	Permitted - see Table 10C-1
		Right-turn	Not allowed	Not allowed
	Cross Streets	Left-turn	Not allowed	Permitted
		Through	Not allowed, except for: • The closure of flex lane system for up to 90 consecutive days - see Part 4-18 (Traffic Signals) and Section 10C-12.6	Permitted - see Table 10C-2 through Table 10C-5
		Right-turn	Not allowed	Permitted

10C-12.5 Bangerter Highway Closures

Full Closures of all left-turn Movements at 11400 South and 7000 South are not permitted beginning with the Thanksgiving Holiday Period through the Christmas Holiday Period.

Provide right-turn lanes on Bangerter Highway at all times.

10C-12.6 Cross Street Closures

Do not close 7000 South during the City's waterline project to the east when closures are taking place on 7000 South between 3200 West and 2700 West.

The flex lanes are permitted to operate in a three-one-three (three lanes each direction with a center turn lane) configuration all day for up to 90 consecutive days. Anything beyond 90 days will be considered a Partial Closure and be subject to Disincentives as identified in Table 10C-11 (MOT\ Closure Summary and Associated Disincentives). Notify Matt Luker at mluker@utah.gov 14 Calendar days prior to any impacts to the flex lane system. Coordinate with Matt Luker for any adjustments or impacts to the system, including the fiber optic network.

10C-12.7 Rolling Slowdowns

Law enforcement officers shall perform all Rolling Slowdowns. Do not use construction vehicles to perform Rolling Slowdowns.

All Rolling Slowdowns shall be Approved unless otherwise specified below.

10C-12.8 4015 West Build Alternative

For Work performed for the 4015 West Build Alternative on 5400 South, follow the requirements outlined above as it relates to closures on 5400 South. On 4015 West, a Partial Closure of the through

Movement in each direction is permitted for up to 60 consecutive days. Full Closures of 4015 West are not permitted. Provide a minimum storage length measured from the taper to the stop bar (not including the required taper length) for the following turn lanes associated with the 5400 South and 4015 West intersection:

A. Southbound right: 150 feet

B. Southbound left (at thru-turn intersection to the south): 300 feet

C. Eastbound right: 180 feet

D. Northbound right: Maintain the continuous auxiliary lane between the thru-turn intersection to the south of 5400 South

E. Northbound left (at thru-turn intersection to the north): 250 feet

F. Westbound right: 180 feet

G. Westbound left (at thru-turn intersection to the west): 250 feet

10C-12.9 11700 South

Full Closures on 11700 South will not be permitted during MOT Peak Periods as defined in Table 10C-5 or from 9:00 PM Friday night through 1:00 AM Sunday morning.

10C-13 MOT Inspection & Quality

Perform daily MOT inspection reports in accordance with UDOT Standard Specification Section 01554 and submit these reports to the Department on a weekly basis.

Correct all traffic control deficiencies upon notification or observance of the deficiency within 1 hour of notice or observation.

10C-14 MOT Disincentives

Price reductions for nonconformance of traffic control on Bangerter Highway (SR-154) and Cross Streets are assessed according to Part 5 (Special Provisions and Exceptions) Table 5-1 (Unit Prices For Determining Pay Adjustments For Nonconforming Work).

The Design-Builder is responsible for ensuring that the traffic control and the number of lanes provided for the traveling public are returned to the required state in accordance with the timeframes defined in Tables 10C-1 through 10C-5. If not, a disincentive in the amount as shown in Table 10C-11 (MOT Closure Summary and Associated Disincentive) will be assessed for non-compliance with the time periods above. The disincentives will be assessed in the amount of twenty-five percent of the hourly disincentive shown in Table 10C-11 (MOT Closure Summary and Associated Disincentive) for every 15 minute period in which the closure is in place beyond the timeframe that is allowed or Approved. If the closure is in place for any portion of a 15 minute period that has not been allowed or Approved, the disincentive will be assessed in full for that 15 minute period.

For nonconformance regarding flagging or Rolling Slowdowns such nonconformance will be deemed as a Partial Closure of the Movement where the nonconformance occurred and a Disincentive will be assessed in the amount as shown in Table 10C-11 (MOT Closure Summary and Associated Disincentives).

These Disincentives are separate from the non-conformance traffic control pay adjustment in Part 5 (Special Provisions and Exceptions) Table 5-1 (Unit Prices For Determining Pay Adjustments for

Nonconforming Work).

TABLE 10C-11
MOT CLOSURE SUMMARY AND ASSOCIATED DISINCENTIVES

Location of Closure	Type of Closure	Disincentive Per Hour of Closure
Bangerter Highway (SR-154)	Full or Partial Closure	$10,000 per lane closed
Cross Streets	Full or Partial Closure	$5,000 per lane closed

10C-15 MOT Personnel

10C-15.1 Traffic Operations Manager

The Traffic Operations Manager's duties include the following:

A. Develop MOT plans for review at milestones specified by the QMP.

B. Develop and implement the TMP.

C. Coordinate MOT activities with the Design-Builder's, the Department's signal timing staff, and the Traffic Operation Center (TOC).

D. Monitor and inspect the activities of the Traffic Control Maintainer(s).

E. Interface with the design engineers and participate in the review of the MOT Plans prior to submittal to the Department.

10C-15.2 Traffic Control Maintainer

In the event of a traffic incident, the Traffic Control Maintainer is authorized, under the direction of law enforcement, to direct changes in traffic control, coordinate with the Department to provide traffic signal timing and signal phasing that ensures safe and continuous traffic flow, and to direct traffic operations. A Traffic Control Maintainer shall be available at all times and shall be on site within 30 minutes of notification throughout the duration of the Project.

10D. SUBMITTALS

Provide submittals to the Department in accordance with Table 10D-1.

TABLE 10D-1
DESIGN-BUILDER SUBMITTALS FOR MAINTENANCE OF TRAFFIC

Submittal	***For Approval***	***Schedule***
Request for Closure	Yes	In accordance with Section 10C-12.1
Closure Notification	No	In accordance with Section 10C-12.1
Pedestrian detour plans	Yes	Obtain Approval prior to implementation
Project Notification Sign Layouts & Installation Plans	Yes	Obtain Approval prior to ordering the signs
Traffic Management Plan (TMP) including an emergency services plan, Incident Management Plan & pedestrian/bicyclist access plan, & student access plan	Yes	Obtain Approval prior to start of construction
Request for Traffic Engineering Order (TEO) for temporary speed limit reductions	Yes	Obtain Approval prior to implementation
Traffic detour plans	Yes	Obtain Approval as part of Request for Closure
MOT plans	No	Submit RFC Plans 14 days prior to implementation.
CMS messages	No	Obtain approval of messages through the design process
Verification of each Traffic Control Maintainer's qualifications	No	With the TMP, and again if changes are made
Daily MOT Inspection Reports	No	Weekly

11—PAVEMENT

11A. GENERAL

Conduct all Work necessary to meet the requirements of this Section 11 (Pavement) and satisfy all functional needs of the Project including pavement and associated items.

11B. STANDARDS

Complete Work for pavements in accordance with the requirements of the standards listed by priority in Table 11B-1 (Standards for Pavement).

If there is any conflict in Standards, adhere to the Standard with the highest priority.

TABLE 11B-1
STANDARDS FOR PAVEMENT

Priority	*Author or Agency*	*Title*
1	UDOT	Special Provisions included in Part 5
2	UDOT	*Supplemental Specifications to 2012 Standard Specifications for Road and Bridge Construction,* as modified by Part 5
3	UDOT	*2012 Standard Specifications for Road and Bridge Construction,* as modified by Part 5
4	UDOT	*Supplemental Drawings to 2012 Standard Drawings for Road and Bridge Construction*
5	UDOT	*2012 Standard Drawings for Road and Bridge Construction*
6	UDOT	*DARWin-ME 2012 (Pavement Design) Manual of Instruction*
7	UDOT	*Materials Manual of Instruction*
8	AASHTO	*A Policy on Geometric Design of Highways and Street*

11C. REQUIREMENTS

Construct pavements that meet the following requirements:

A. The term "Pavement Section," is defined as the entire pavement structural section, including all structural layers (e.g., Portland Cement Concrete Pavement (PCCP), hot-mix asphalt (HMA), additional wearing courses, base and sub-base materials) in any combination as defined by the pavement design.

B. Provide Pavement Sections as follows:

(1) Bangerter Highway (SR-154), ramps and 11400 South, east of Bangerter to 3600 West

10 inches PCCP

4 inches HMA or Lean Concrete Base

6 inches Untreated Base Course

12 inches Granular Borrow

Separation Fabric

(2) For widening adjacent to existing asphalt for 5400 South, 7000 South, 9000 South, & 11400 South

6 inches HMA

6 inches Untreated Base Course

12 inches Granular Borrow

Separation Fabric

(3) Remove existing concrete pavement and lean base course at 5400 South, 7000 South, & 9000 South and replace with:

10 inches PCCP

4 inches HMA or Lean Concrete Base

6 inches of new or existing Untreated Base Course if the vertical profile is lowered.

12 inches of new or existing Granular Borrow if the vertical profile is lowered.

(4) Local Streets:

4 inches HMA

6 inches Untreated Base Course

(5) At 5400 South provide a micro surface over asphalt full width including the full reconstruct sections to the limits of new striping.

(6) At 7000 South provide a 1.5 inch rotomill and fill with HMA over existing asphalt to the limits of new striping.

(7) At 9000 South provide a 1.5 inch rotomill and fill with HMA over existing asphalt to the limits of new striping.

(8) At 11400 South West of Bangerter provide a 1.5 inch rotomill and fill with HMA over existing asphalt to the limits of new striping.

(9) At 4015 West Build Alternative provide a micro surface over existing asphalt to the limits of new striping.

C. Overlays of existing flexible pavements are required whenever the existing pavement is widened or when new striping is required due to lane shifts and/or transitions. The overlays shall be applied to the entire width of the pavement prior to final striping to provide a continuous and homogeneous riding surface.

For the purpose of this Section 11, overlays are defined as follows:

1. Structural HMA overlays: The final full-width overlay shall include the top HMA layer and SMA wearing course.

D. Grind existing pavement and seal joints for 9000 South and 11400 South on Bangerter Highway, whenever existing pavement is widened or to the furthest limits of permanent striping, whichever is greater.

11C-1 Ride Quality

Evaluate ride quality in accordance with Standard Specification, Section 01452, and Section 8-995 (Procedure for Certifying Profilographs/Profilers and Qualifying Profilograph Technicians).

11C-2 Surface Texture

Provide longitudinal tining as defined in Standard Specification, Section 02742S.

11C-3 Temporary and/or Temporary Use Pavement

The Design-Builder shall be responsible for design, construction, and maintenance of all temporary pavements. Remove temporary pavement prior to Substantial Completion.

If existing shoulders that are to remain are used as temporary travel lanes to facilitate construction, provide in the Pavement Design Report a condition survey of the existing shoulders including photographs. The Pavement Design Report shall also include the anticipated duration for shoulder use, and demonstrate that the existing pavement is adequate to sustain the traffic loads without structural damage to the pavement. Repair or replace any damaged pavement.

11C-4 Repair of Defective Pavement

Replace any cracked, damaged, or otherwise defective pavement placed as part of the Contract or damaged by the Design-Builder. Provide new full panels for any PCCP repairs/replacement.

11C-5 Permanent Pavement Markings and Messages

For all permanent pavement markings, meet the requirements of Part 5 (Special Provisions and Exceptions).

A. Use grooved in contrasting pavement marking paint on concrete for all longitudinal lines.

B. Use pavement marking tape on asphalt surfaces for Department roads.

C. Use pavement marking paint on asphalt surfaces for City streets.

D. Use thermoplastic for all messages. Use grooved in messages on concrete.

11D. SUBMITTALS

Provide submittals to the Department in accordance with Table 11D-1.

TABLE 11D-1
DESIGN-BUILDER SUBMITTALS FOR PAVEMENT

Submittal	***For Approval***	***Schedule***
Electronic record of vibrator operating frequencies	No	At time of paving operations per Section 11C-4

12—PUBLIC INFORMATION SERVICES

12A. GENERAL

Conduct all Work necessary to meet the requirements of this Section 12 (Public Information) and to satisfy all functional needs of the Project, including providing support for the Department-led communication effort.

12B. STANDARDS

Not Used.

12C. REQUIREMENTS

12C-1 Division of Roles

The Department's ongoing objective is to be responsive to stakeholders throughout the Project. It is imperative that the Department and Design-Builder build and maintain public support by working with the public to ensure that questions, concerns, and comments are understood, considered, and addressed and that information related to Project activities and impacts is proactively and effectively distributed.

The Department has designated a consultant Communications Team (CT) to manage external communication. The Department will be responsible for all public communication strategies, including Public Involvement (PI), message development, and information dissemination . The CT will perform the Public Involvement (PI) activities including on-the-ground outreach and grassroots communication efforts.

Provide a Point of Contact (POC) for the CT to provide and verify accurate information on schedule and impacts that the CT will communicate to the public. Provide a POC who has authority to quickly make changes to MOT, access, and other potential impacts to the public on the Project.

Designate an Interchange Point of Contact (IPOC), for each Project interchange location, who is responsible to communicate and coordinate interchange-specific information directly with the CT. The IPOC must be responsible for the day-to-day construction activities at the interchange and can not be the same individual as the POC.

Table 12C-1 Division of Responsibilities		
Communications Team (CT)	Design-Builder	Shared
Set communications strategy, planning, messaging, branding, and oversight	Designate a POC to the CT	
Manage all communication, including advertising,media relations, grassroots outreach, and social media	Designate IPOCs to the CT	Develop and execute crisis communication plan
Develop and execute Communication Plan (CP) and execute all tactics for the Project	Provide schedule, impact, and other pertinent Project information to the CT	Prepare for and participate in CT and Project meetings
Create and maintain stakeholder database	Provide Emergency Responders Contact List	
Track stakeholder interactions in stakeholder database	Notify the CT of all stakeholder or media interactions, or prior to any planned interactions	
Respond to stakeholder issues and complaints	Respond to CT requests to resolve MOT, access, and other construction-related stakeholder concerns	
Provide weekly stakeholder reports	Review weekly project update emails and other construction information notices for accuracy	
Maintain Project hotline, email, web site	Report weekly on actions taken based on reported stakeholder problems	
Attend Design-Builder weekly construction meetings (PI)	Prepare for and present at CCT meetings	
Form and facilitate Community Coordination Team (CCT)		

12C-2 General Requirements

A. Provide a POC to maintain an effective working relationship with the CT.

B. Provide IPOCs to maintain an effective working relationship with the CT.

C. Provide the CT with accurate and timely information. Inform the CT in advance of any construction impacts to traffic, including all Partial and Full Closures. Notice should be provided to the CT in accordance with Part 4-10 (Maintenance of Traffic).

D. Notify the CT of any impacts to Third-Parties anticipated to be affected by the Work,

including access to homes, businesses, schools, property owners, etc., and including impacts due to noise, dust, vibrations, and light. Notify the CT at least seven Calendar Days in advance of Work impacts to Third-Parties and other Work requiring public notice, unless otherwise specified in Part 4-10 (Maintenance of Traffic).

E. Notify the CT two months in advance of any major construction phase changes.

F. Communicate construction activities that correspond and or conflict with public events and holidays to the CT. Identify and plan mitigation measures when possible.

G. Notify the CT within 15 minutes of a major accident or unexpected occurrence in or adjacent to the Project.

12C-3 Definitions and Personnel

Communications Team (CT): The CT consists of a consultant Public Involvement team that includes a Public Information Manager (PIM), Interchange Public Involvement Lead, Media Relations Manager, creative, and interactive staff. The CT will be responsible for setting communications strategies, and messaging, and executing tactics related to that strategy and Communications Plan (CP). The CT reports to the Department Project Manager and Program Manager. The Department Public Information Officer will be the media spokesperson. The CT will also keep the Region Two Region Communications Manager and Department Central Communications informed of PI activities.

Public Information Manager (PIM): The PIM will manage the CT and be responsible for the development of an overall CP for the Project. The PIM will primarily be responsible to oversee broadscale communication, media relations, advertising and outreach planned and executed by the Interchange Public Involvement Lead's.

Interchange Public Involvement Coordinator (IPIC): The IPIC will be a member of the CT and will be responsible for the execution of communication and outreach for a specific interchange for the Project and to support the CT. The IPIC is primarily responsible for on-the-ground PI, including providing current Project information, responding to urgent PI and public relations issues, communicating with stakeholders adjacent to the Project, coordinating with the Design-Builder, gathering information on construction schedule and impacts, and providing information to the CT. The IPIC will attend construction meetings.

Point of Contact (POC): The role of the POC will be filled by a member of the Design-Build team, who has authority to quickly make changes to MOT, access, and other potential impacts to the public on the Project.The POC will assist and be a resource to the CT to quickly resolve issues and provide information. The POC will be available by phone 24 hours per day, seven days per week.

Interchange Point of Contact (IPOC): The role of the IPOC will be filled by a member of the Design-Build team, who is responsible to communicate and coordinate interchange-specific information directly with the CT and has the authority to quickly make changes to MOT, access and other potential impacts to the public on the Project. The IPOC will work closely with the IPIC to provide information about contruction activities and potential impacts to the public.

Stakeholder: A stakeholder is an individual, business, group or municipality whose interests might be affected in a specific manner, whether real or perceived, by the construction and operation of the Project.

12C-3.1 POC and IPOC Responsibilities

A. Respond to and maintain regular communication with the CT.

B. Invite a member of the CT to attend construction meetings to discuss and review

construction plans, schedule, and coordinate PI activities and notifications.

C. Communicate and document construction schedule, MOT plans and changes, access impacts, and Project updates with the following:

1. Communications Team (CT)

D. Review publicly distributed materials (for accuracy) at the request of the CT prior to distribution.

E. Coordinate with emergency responders on any changes to access or traffic impacts that could affect public safety or response time.

F. Participate in crisis communication planning and response.

12C-4 Project Logo and Collateral

Obtain Department Approval for any Design-Builder items featuring the Project logo, such as any clothing or signs.

Do not use corporate logo for Project collateral or Design-Builder promotion. Do not attach permanent or temporary Design-Builder logos or branding identification on any Project physical features within the Project limits. Logos or branding identification other than those permanently attached to vehicles, equipment, and apparel are prohibited.

12C-5 Media and Communication led by the Department

12C-5.1 Project Messaging

The CT will develop key messaging to be used by anyone communicating with a member of the public or media.

12C-5.2 Project Hotline and E-mail

The CT will be responsible for staffing a Project hotline with availability 24 hours per day, seven days per week. The CT will also establish and manage a Project email address and will involve the POC and IPOCs for resolution or response, as appropriate. See Table 12C-2 for required response times.

12C-5.3 Media Relations

The CT and the Department will be responsible for media relations for the Project, and will require assistance from the POC for media events and interviews. Media is defined as any newspaper, television, radio, online, trade publication, other periodical, blog, or social media (e.g., Facebook, Twitter, online forums).

Design-Builder will notify CT and the Department prior to all communications with the media. Forward all media inquiries—written and verbal—to the CT, including requests for Project information and requests for interviews or article submissions.

12C-6 Internal Communication

12C-6.1 Kickoff and Partnering Meetings

The CT, POC, and IPOCs will participate in the Project kickoff and partnering meetings, during which the Project team will clarify goals, expectations, roles, and lines of communication.

12C-6.2 Internal Communication

The POC will coordinate with, be available for, and respond to the CT to ensure timely and accurate

information is communicated to Project stakeholders. The Design-Builder will support the coordination and communication activities of the CT by providing information, reviews, and timely response.

12C-7 Public Involvement and Outreach

12C-7.1 Communication Planning

The CT will provide the Project's CP to the POC for information. The POC will provide schedule and impact changes to the CT that would affect the CP outreach schedule within the timeframes outlined in 12C-2.

12C-7.2 Stakeholder Database and Reports

The CT will provide a stakeholder contact summary report every week. The report will be shared with the POC.

The POC will refer all stakeholder interaction to the CT. The POC will notify the CT of any unavoidable reactive communication (e.g. on-site) with stakeholders with the following information:

A. Name, address, contact information

B. Date of contact

C. Method of contact

D. Issue being addressed

E. Notes on the interaction, including steps toward resolution

F. Action items, if any

G. Attach hotline stickers to all construction hard hats with hotline number. CT will provide stickers.

12C-7.3 Event Participation

The Design-Builder will participate in events including the following:

A. Department-led media interviews and events

B. Public outreach meetings (e.g., city council meetings, private meetings, business meetings, community meetings.)

C. Special Events (e.g., ground breakings, public open houses, Meet the Contractor Open House, neighborhood meetings, ribbon cutting ceremonies, etc.)

Participation will include training, materials review (for accuracy), preparation for events, meetings, and interviews and may include providing maintenance of traffic and secure and safe access to Work areas.

12C-7.4 Emergency Response and Crisis Communication

Develop and maintain a Project emergency responders contact list. Submit the contact list within 30 days of Contract award or prior to construction activities. This list should include a main point of contact for emergency responders and a backup person if the primary contact is not available. Contact emergency responders with the same notification times as the CT when a change to access or traffic impact may alter emergency response times or public safety. Assist the CT in the development, execution, and updating of a Project Crisis Communications Plan.

12C-7.5 Stakeholder Issues and Complaints

Provide responses to the CT for stakeholder issues, complaints, and requests in a timely manner. Address safety issues immediately. Comply with the minimum response requirements in Table 12C-2.

Table 12C-2
Response Requirements

Type	*Response Due*	*Information Required*
Phone calls from the Department	Two hours after origination	Response
Emails from the Department	One Working Day after origination	Response
Stakeholder issues and complaints via email	One Working Day after origination	Response
Stakeholder issues and complaints via phone call	2 hours after origination	Response
Stakeholder issues and complaints via email (IPOC)	One Working Day after origination	Comment and stakeholder contact information provided to the CT
Stakeholder issues and complaints via phone call (IPOC)	One Working Day after origination	Issue, location, and time provided to the CT
Media inquiries	Immediately after inquiry	Media contact information and subject of inquiry provided to CT
Immediate PI-action required activities	One hour after discovery or as listed in the Crisis Communications Plan	Update or resolution provided to the CT
Late lane or road openings	One hour before the scheduled opening, or immediately upon discovery	Location, cause of delay and expected opening time provided to the CT
Safety related issues	One hour after origination or discovery or as listed in the crisis communications plan	Type and location of issue

12C-8 Community Coordination Team (CCT)

The CT will form and facilitate a Community Coordination Team (CCT) to represent West Jordan City, South Jordan City, Taylorsville City, area stakeholders, local residents and schools, area businesses, emergency services, and other local entities. The CCT will administer the monetary incentive as defined in Part 2 (General Provisions).

Committee members will represent the interests of the public and provide input from Project stakeholders to the Project Team, and communicate information about the Project and Project schedule to stakeholders.

In order to focus responsibilities, each CCT meeting will follow items as specified on an agenda, which will be prepared by the CT.

12C-8.1 Community Coordination Team Meetings

The CCT will meet no less than seven times during the Project. The CCT will be attended by the Design-Builder Project Manager, the Design-Builder POC, the Department Project team and CT representatives, and stakeholders at a minimum. The CCT meeting schedule will be determined after NTP. The last meeting will be scheduled within 30 days after Substantial Completion of the Project.

Table 12C-3
Incentive Award Periods

Incentive Award Period	**Maximum Percent of Total Available Award (IAP%)**
Period 2 : August – October 2017	15
Period 3: November – December 2017	20
Period 4: January – March 2018	10
Period 5: April – June 2018	15
Period 6: July – September 2018	15
Period 7 – October – 30 days after Substantial Completion of the Project	15

12C-8.2 CCT Meeting Logistics

The Design-Builder will provide agenda items, presentations, meeting space, and snacks, to support the CCT meetings. The CT will facilitate and lead the meetings.

12D. SUBMITTALS

Provide submittals to the Department in accordance with Table 12D-1.

TABLE 12D - 1
DESIGN-BUILDER SUBMITTALS FOR PUBLIC INFORMATION

Submittal	***For Approval***	***Schedule***
Point of Contact (POC) Designee	No	Prior to NTP
Interchange Point of Contact (IPOC) Designee	No	Prior to NTP
Material with Project ID or Logo for Design-Builder's use	Yes	Prior to material order
Emergency Responders Contact List	No	Within 30 days of Contract award or prior to construction activities
Crisis Communication Plan	Yes	Within 7 days of Contract award
Partnering Plan	No	Within 30 days of Contract award

13—RAILROAD

13A. GENERAL

Conduct all Work necessary to meet the requirements of this Section 13 (Railroads) and to satisfy all functional needs and characteristics of the Project, including providing agreements with the Railroads, and coordinating and obtaining approval of Work on, over, under, or affecting Railroad right-of-way(ROW) and at all existing, new, or future at-grade or grade-separated crossings of Railroad ROW.

13B. STANDARDS

Complete Work for all Railroads in accordance with the requirements of the standards listed by priority in Table 13B-1 (Standards for Railroad).

If there is any conflict in standards, adhere to the standard with the most stringent requirements.

If there is any unresolved ambiguity in standards, it is the Design-Builder's responsibility to obtain clarification and Approval from the Department before proceeding with design and/or construction.

TABLE 13B-1
STANDARDS FOR RAILROAD

Priority	*Author or Agency*	*Title*
1	UDOT	Utah Transit Authority Partnering Agreement
2	UTA	License Agreement for Bangerter Crossing
3	UDOT	Special Provisions included in Part 5
4	UDOT	*Supplemental Specifications to 2012 Standard Specifications for Road and Bridge Construction,* as modified by Part 5
5	UDOT	*2012 Standard Specifications for Road and Bridge Construction,* as modified by Part 5
6	UDOT	*Supplemental Drawings to 2012 Standard Drawings for Road and Bridge Construction*
7	UDOT	*2012 Standard Drawings for Road and Bridge Construction*
8	UTA	*Utah Transit Authority Light Rail Design Criteria,* HTTP://WWW.RIDEUTA.COM/UPLOADS/UTALRTDESIGNCRITERIAREVISION5.PDF
9	FHWA	*Railroads, 23 Code of Federal Regulations (CFR)*
10	FRA	*Railroad Workplace Safety, 49 CFR*
11	AASHTO	*A Policy on Geometric Design of Highways and Streets*
12	AREMA	*Manual of Railway Engineering*
13	BNSF/UPRR	*Guidelines for Railroad Grade Separation Projects*

13C. REQUIREMENTS

The Project interfaces with railroad corridors owned and/or operated by UTA. The Design-Builder shall coordinate, design, and construct both temporary and permanent Project features in accordance with UTA's criteria for Work items, as necessary to maintain the level of service and to accommodate the Project construction. The Design-Builder is responsible for obtaining and complying with all applicable design and construction specifications and requirements for each location. UTA's

requirements for working in and around UTA's property can be found at the following web site: http://www.rideuta.com/mc/?page=DoingBusiness-PropertyManagement. Obtain all permits and approvals necessary to accommodate any Project work or impacts to/within UTA's right-of-way. Include time in the schedule to obtain said permits/approvals. Any cost incurred for obtaining the agreements(s) shall be borne by the Design-Builder.

Before commencing work on UTA property, obtain and submit executed Contract Right-of-Entry Agreements as described in Section 13C-2.2 (Right of Entry/Insurance Requirements).

13C-1 General Provisions

13C-1.1 Cleaning of Right-of-Way

Upon completion of the Work performed by Design-Builder on UTA's premises, and over or beneath the tracks of UTA, promptly remove from the UTA ROW all of the Design-Builder's tools, implements, and other materials, whether brought onto the ROW by Design-Builder or any Subcontractor, employee, or agent of Design-Builder, and leave the ROW in a clean and presentable condition to the satisfaction of UTA.

13C-1.2 Traffic Control

Submit MOT Plans to UTA for all Work in, above, or affecting the railroad ROW. Design-Builder's operations that control traffic across or around rail facilities shall be coordinated with and approved by UTA's Designated Representative.

13C-1.3 Construction Excavations

Take special precaution and care in connection with excavating and shoring. Excavations for construction of footings, piers, columns, walls, or other facilities that require shoring shall comply, at a minimum, with requirements of OSHA, AREMA, and UTA / UPRR guidelines.

Contact Utah "Call Before You Dig" service (Bluestakes; www.bluestakes.org) at 811 to determine location of Utility Facilities. If Utility Facilities are buried anywhere on or near UTA ROW, coordinate with any of the Utility Facilities to arrange for relocation or other protection of the system prior to beginning any Work on UTA ROW.

For construction or maintenance of any grade-separated crossing, submit to UTA plans setting out the method and manner of handling all Work to be performed under the track and bridge structure, including shoring and cribbing, if any, to protect the operations of UTA and the freight operator. The Design-Builder shall not proceed with any such Work until Design-Builder's proposed methods have been approved by UTA.

13C-2 UTA Company Interests, Insurance, Worker Protection, Flagging, and Plan Submittal

13C-2.1 UTA Contact Persons

Coordinate and cooperate with UTA for all Work on, over, or under the railroad ROW or Work that may impact current or future railroad operations.

The primary UTA point of contact for this Project is:

Mailia Lauto'o
Property Administrator
Utah Transit Authority
669 West 200 South
Salt Lake City, UT 84101

(801) 237-1995 (Work)

13C-2.2 Right of Entry/Insurance Requirements

Apply and obtain Contractor's Right-of-Entry from UTA to allow the Design-Builder to access UTA's ROW as required by the License Agreement. Any cost incurred for processing the agreement shall be borne by the Design-Builder. Comply with the terms of the Right-of-Entry Agreement and provide and maintain insurance as required by UTA's Insurance Requirements.

Do not begin Work on or over UTA's ROW until UTA has received the insurance policies, binders, certificates, and endorsements required by the License Agreement, and until UTA has advised the Department that such insurance is in accordance with the Agreement. The required insurance will be kept in full force and effect during the performance of Work and thereafter until Design-Builder removes all tools, equipment, and material from UTA's property and cleans the premises in a manner satisfactory to UTA.

Obtain a Track Access Permit covering the time and place where there will be activity on the railroad ROW. All personnel employed by the Design-Builder and all subcontractors must complete the UTA training course "Roadway Worker Protection and Rail Safety Training", and be registered prior to working on UTA ROW.

13C-2.3 Flagging and Inspection

UTA flagging representatives, conductors, or watch persons shall be provided by UTA at Design-Builder's expense to protect UTA facilities, property, and operations. The Design-Builder shall include in its costs the number of 12-hour flagger days that required for railroad flagging and inspection. The Department will compensate UTA for flagging and inspection costs and deduct the amount of compensation from the progress and final pay estimates to be paid to the Design-Builder.

Document, in a log book, the actual time periods during which UTA personnel are flagging and inspecting. If Design-Builder disputes any payment to the Department for any charges incurred by the Department for UTA personnel flagging and inspecting, Design-Builder shall submit a copy of the log for each disputed invoicing period.

UTA may not be able to provide railroad flaggers on specific requested dates. The Design-Builder shall not receive additional compensation or be allowed changes to the Project Schedule because of flagging unavailability.

The pay rates of UTA employees shall be the UTA rates in effect at the time of the Work for the various classes of labor.

Coordinate with UTA providing initial notice at least 10 Working Days in advance of proposed Work and adjusting the Work schedule as necessary by coordinating activities with UTA.

UTA will furnish such personnel or other protective services in the following situations, subject to the opinion and interpretation of UTA's Designated Representative:

A. When any part of any equipment is standing or being operated within 25 feet, measured horizontally from centerline of any track on which trains may operate, or when any object is off the ground and any dimension thereof could extend inside the 25-foot limit, or when any erection or construction activities are in progress within such limits, regardless of elevation above or below track.

B. For any excavation below elevation of track subgrade if track or other UTA facilities may be subject to settlement or movement.

C. During any clearing, grubbing, excavation, or grading in proximity to UTA facilities that may endanger UTA facilities or operations.

D. During any Design-Builder operations when UTA facilities, including tracks, buildings, signals, wire lines, or pipelines, may be endangered.

If the Design-Builder does not comply with the flagging requirements, UTA will post flaggers as it deems necessary. The costs of such flagger(s) shall be deducted from payments to the Design-Builder. The Design-Builder shall not be entitled to any additional compensation, and shall comply with all directions given by UTA flaggers.

13D. SUBMITTALS

Provide submittals to the Department and UTA / UPRR in accordance with Table 13D-1.

TABLE 13D-1
DESIGN-BUILDER SUBMITTALS FOR RAILROAD

Submittal*	For Department Approval	For indicated Railroad approval	Schedule	Minimum Railroad Review Time
30% Bridge Structure Plans	No	Yes	Prior to Work within Railroad ROW	12 Weeks
100% Bridge Structure Plans	No	Yes	Prior to Work within Railroad ROW	12 Weeks
Shoring	No	Yes	Prior to Work within Railroad ROW	4 Weeks
Falsework	No	Yes	Prior to Work within Railroad ROW	4 Weeks
Demolition	No	Yes	Prior to Work within Railroad ROW	4 Weeks
Erection	No	Yes	Prior to Work within Railroad ROW	4 Weeks
Erosion Control	No	Yes	Prior to Work within Railroad ROW	4 Weeks
Constrution Phasing Plan	No	Yes	Prior to Work within Railroad ROW	4 Weeks
Contract Right-of-Entry	No	UTA / UPRR - Yes	Prior to Work within Railroad ROW	4 Weeks
DailyLogs	No	No	As requested by Department	
As-built Drawings	No	No	As requested by UTA / UPRR	

* SEE BNSF/UPRR Guidelines for Railroad Grade Separation Projects for submittal requirements.

14—RIGHT-OF-WAY

14A. GENERAL

It is anticipated that Right-of-Way needed for the Project as shown in the Part 7 (Contract Drawings) will be purchased by the Department. However, if any Right-of-Way is modified from Part 7 (Contract Drawings) or additional Right-of-Way needs to be purchased as part of the Design-Builders design, then the Design-Builder shall be solely responsible for the design and purchase or modification of the Right-of-Way. If purchasing Right-of-Way, conduct all Work necessary to meet the requirements of this Section 14 (Right-of-Way) and to satisfy all functional needs and characteristics of the Project, including acquisition of temporary construction easements and additional Right-of-Way as needed.

14B. STANDARDS

Complete Work for Right-of-Way in accordance with the requirements of the standards listed by priority in Table 14B-1 (Standards for Right-of-Way).

If there is any conflict in standards, adhere to the standard with the most stringent requirements.

If there is any unresolved ambiguity in standards, it is the Design-Builder's responsibility to obtain clarification and Approval from the Department before proceeding with design and/or construction.

TABLE 14B-1
STANDARDS FOR RIGHT-OF-WAY

Priority	*Author or Agency*	*Title*
1	UDOT	Special Provisions included in Part 5
2	UDOT	*Supplemental Specifications to 2012 Standard Specifications for Road and Bridge Construction,* as modified by Part 5
3	UDOT	*2012 Standard Specifications for Road and Bridge Construction,* as modified by Part 5
4	UDOT	*Supplemental Drawings to 2012 Standard Drawings for Road and Bridge Construction*
5	UDOT	*2012 Standard Drawings for Road and Bridge Construction*
6	UDOT	*Manual of Instruction–Right-of-Way-Design*
7	UDOT	*Project Development Process Manual*
8	UDOT	*Right-of-Way Operations Manual (Policies and Procedures) Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended and Implementing Regulations found in Title 49 Code of Federal regulations Part 24 and Code of Federal regulations 23 CFR Part 710.313*
9	UDOT	*ROW ProjectWise Guide*

14C. REQUIREMENTS

The Department has acquired certain Right-of-Way (ROW) specifically for the Project which is shown on the ROW Drawings included in Part 7 (Contract Drawings). The Department will retain possession of each parcel and all improvements, if any, made thereon by the Design-Builder. The Design-Builder's access and use of the ROW arises solely from the permission granted by the Department under the Contract.

The Design-Builder shall not assume that any Department-acquired property, or any other property, outside

the Project shown on the ROW Drawings in Part 7 (Contract Drawings) is acceptable for its use. In certain instances, the Project may not extend to or include the entire ROW. Use of Department property outside of the Project is acceptable only with the Department's prior Approval outlining the conditions for use. Approval is given by the Department's property management section within the ROW Division.

14C-1 Status of Right-of-Way

The Design-Builder shall be allowed access to each parcel identified in Attachment 14-A (Right-of-Way Schedule) as each individual parcel is acquired and as the Department provides the Design-Builder notice. The Department will provide the Design-Builder with status reports, written notice of parcel access, and any applicable restrictions that may apply. The Design-Builder shall not access any parcel on which access has not been provided.

The Design-Builder shall not trespass on private property.

The Department has designed the N/A or L/A line and any changes require Department Approval.

14C-1.1 Right-of-Way Commitments

Perform all obligations indicated as the Design-Builder's responsibility in Attachment 14-B (Right-of-Way Commitment Table). Items identified as paid to the property owner in the Right-of-Way agreement identified in Attachment 14-B (Right-of-Way Commitment Table), are not the responsibility of the Design-Builder.

14C-1.2 Right-of-Way Manager

Should the Design-Builder determine that additional ROW, easement, or modifications to ROW other than what is shown in Part 7 (Contract Drawings), is necessary, the Design-Builder shall submit for Approval a ROW manager who shall be responsible for all ROW coordination and compliance requirements. The ROW manager shall be qualified for both acquisition and relocation services as defined in the UDOT ROW Operations Manual and meet the requirements for the Department ROW Pool. The ROW Manager will be responsible for supervising staff and consultant agents who are specialized in real property acquisition, relocation assistance for non-residential and residential services, appraisal services for residential and complex services, and appraisal review. The ROW manager shall coordinate all acquisition and relocation activities with the Department ROW Oversight Manager or designated representative.

14C-1.3 Request for Project Right-of-Way

Request for Additional Right-of-Way

Should the Design-Builder determine that additional ROW, easement, or modification to ROW other than what is shown in Part 7 (Contract Drawings), is necessary, the Design-Builder shall submit a written request to the Department. Each request shall include an identification of the additional ROW, easement, or modification and a justification for its need related to the Project.

The Department will review each request and determine if the ROW, easement, or modification is needed for the Project (and therefore should have been originally provided or identified by the Department) or if it is for the Design-Builder's convenience.

If it is determined that the ROW is needed for the Project and should have been originally provided by the Department in accordance with Part 2, Section 7.3.2.1 (Due to Department-Directed Change), the Department will Approve the ROW request. The Design-Builder and the Department must agree to the change in the design and acquisition schedule and all related issues. The Design-Builder shall provide information as outlined in this Section 14C-1.3 (Request for Project Right-of-Way – Department Approved

Right-of-Way). The Department will acquire the approved ROW unless otherwise agreed upon with the Design-Builder. If the Design-Builder acquires the ROW on behalf of the Department, follow the procedures outlined in Attachment 14C (ROW Acquisition for the Design-Builders Convenience) unless otherwise directed by the Department.

If the Department does not Approve the ROW request, the Department will notify the Design-Builder that the ROW is for their convenience and acquisition of such ROW will be the responsibility of the Design-Builder in accordance with Part 2, Section 7.3.2.2 (Acquisition Process for ROW for Design-Builder's Convenience). The Design-Builder shall comply with the Section 14C-1.3 (Request for Project Right-of-Way – ROW Acquisition for the Design-Builder's Convenience) for acquisition procedures.

Department Approved Right-of-Way

Upon Department Approval of the request, the Design-Builder shall submit the following information:

Design Package/Electronic Summary:

A. **Right-of-Way Design Sheets:** Provide 11-by-17 inch plan sheets outlining and defining ROW acquisition boundary. ROW acquisition boundary shall be designed using Project ROW alignment. Provide station and offset references/calls to property line, intersections, and points of deflection. Provide all horizontal curve data necessary to adequately describe new property line limits.

B. **Right-of-Way Design Sheets with Aerials:** Provide 11-by-17 inch plan sheets outlining and defining ROW acquisition boundary with the project Aerial Imagery projected on each of the Right-of-Ray Design Sheets. ROW acquisition boundary shall be designed using Project ROW alignment. Provide station and offset references/calls to property line, intersections, and points of deflection. Provide all horizontal curve data necessary to adequately describe new property line limits. In addition, provide Total Tract Sheets.

C. **Ownership Record**: Provide an Ownership Record, verifying all owners and the percentages of ownership dating back five years or until a Warranty Deed is found for each ownership and/or percentages. This shall include the legal description of the full parcel along with the size of the full parcel in acreage or square footage. Provide a copy of the vesting instruments.

D. **Acquisition Package**: Provide documents in accordance with Part 4 Appendix C.

E. **Documentation**: Deliver all summaries in accordance with Part 4 Appendix C, designs, records, reports, correspondence, and documents relating to ROW acquisition to the Department in electronic, MicroStation CADD files (DGN files), and hardcopy formats, or as otherwise requested by the Department. All documents submitted to the Department must be in accordance with the Right-of-Way ProjectWise Guide found at (http://udot.utah.gov/go/rowprojectwiseguide). Complete a final quality check to ensure that all documents have been entered into ProjectWise and/ or UDOT's ePM ROW module.

Access to the additional ROW, easement, or modification shall be granted upon written notification to the Design-Builder.

ROW Acquisition for the Design-Builder's Convenience

Any additional ROW other than what is shown on the ROW Plans in Part 7 (Contract Drawings) and ROW Approved from Section 14C-1.3 (Request for Project Right-of-Way), is designated as ROW for the Design-Builder's Convenience. The Design-Builder shall be solely responsible for the acquisition of these

properties and easements. The Design-Builder shall follow the ROW acquisition procedures as outlined in Attachment 14-C (ROW Acquisition Procedures) for ROW Acquisition for the Design-Builder's Convenience.

Permission to Enter Property

Any additional ROW other than what is shown on the ROW Plans in Part 7 (Contract Drawings) and ROW Approved from Section 14C-1.3 (Request for Project Right-of-Way), is designated as ROW for the Design-Builder's Convenience. The Design-Builder shall secure Permits to Enter and Construct forms prior to entering any property outside the ROW shown on the ROW Plans in Part 7 (Contract Drawings) for survey, environmental, appraisal purposes, and Project-related Work. It shall be the Design-Builder's sole responsibility for any and all damages and claims. The Design-Builder shall submit copies of all executed Permit to Enter and Construct forms to the Department prior to performing any Work on property outside the ROW shown on the ROW Plans in Part 7 (Contract Drawings). A copy of the form is provided in UDOT's ePM ROW module system. Do not request Permits to Enter and Construct with property owners who are currently or will be in negotiations with the Department without Approval.

14C-1.4 Temporary Construction Easements (TCEs)

The Design-Builder shall be responsible for acquiring and obtaining all TCEs not shown in the ROW Drawings in Part 7 (Contract Drawings) that are necessary to meet the requirements of the Contract Documents.

All TCEs shall be appraised and valued in accordance with the UDOT *Right-of-Way Operations Manual.* If a TCE is to be acquired on a property on which the Department has an unsettled condemnation case, obtain Department Approval prior to any communication with the property owners.

After each TCE is acquired, the Design-Builder shall prepare a complete parcel acquisition file, which includes copies of offer letters, fair market valuation, fully executed easement documents and/or agreements, the agent log, and a statement signed by the property owner acknowledging receipt of payment in full. Parcel acquisition files shall be submitted through UDOT's ePM ROW module and in accordance with Sections 1.2.7 and 1.2.8 of the UDOT *Right-of-Way Operations Manual and* this Section 14C-1.3.D.

If the Design-Builder cannot reach an agreement with a property owner for the acquisition, the Design-Builder may request in writing that the Department acquire the easement(s) through condemnation proceedings.

Cost of TCEs and ROW Acquisition for the Design-Builder's Convenience Design-Builder shall pay the cost of, and be responsible for, processing and issuing all payments of agreed purchase prices or awards; relocation assistance payments and all legal, administrative, and incidental expenses of or related to the Design-Builder's temporary construction easements and ROW Acquisition for the Design-Builder's Convenience.

In addition, the Design-Builder shall:

A. Be solely responsible for all costs and be responsible for (the process of) acquiring/obtaining environmental approvals and the cost associated with obtaining the approvals.

B. Be solely responsible for cost and time delays associated with the Department's proceeding with condemnation.

C. Not be entitled to any Change Order for time or money as a result of site condition (e.g., hazardous materials, differing site conditions, geotechnical issues, Utilities) on such additional ROW.

D. Not be entitled to any Change Order for time or money as a result of any delay, inability, or cost associated with the acquisition of such ROW.

14C-1.5 Access

Maintain the same access to all existing properties that are to remain after the completion of construction. Repair or replace in kind all existing driveways and access roads. Impacts to driveways are limited to 10 Calendar Days. No full closure of driveways allowed without written permission from the property owner.

If access is required through the Project No Access lines, complete the Temporary Interstate Access Request Form provided in Part 4-14 (Right-of-Way). Access is subject to Department Approval.

14C-1.6 Construction Clearance

Do not begin construction on any real estate until specifically Approved by the Department after all property rights for the Project have been conveyed in favor of the Department or a Right of Occupancy Agreement (ROO), Court Order to Occupy, or a Right of Entry Agreement has been executed by all applicable parties of interest, and the property has been certified as cleared for construction purposes.

14C-1.7 Protection of Property

Once permission to enter has been acquired for a property in accordance with the requirements herein, the Design-Builder shall manage and minimize losses to the property. This shall include the installation of temporary chain link security fencing sufficient to contain animals, people, etc. The temporary fencing shall be installed prior to removing any ROW or existing fencing or sound barrier in place within the Project limits.

14C-1.8 Business Parking Availability and Access

Once Work begins in the vicinity of a business, the Design-Builder shall avoid losses to the business's parking availability and access to and from the business especially if there is only one access for the business. If there is only one access to a business, construction of the driveways shall be constructed by closing only 1/2 of the driveway at any given time and maintain the remaining 1/2 of the driveway open at all times. Limitations on the use and/or removal of parking and access are identified in Attachment 14-B (Right-of-Way Commitment Table).

14C-1.9 Demolition

The Design-Builder shall demolish, as necessary, all buildings, structures, and other improvements within the ROW in compliance with procedures and requirements identified by the Division of Air Quality (DAQ), the Occupational Safety and Health Administration (OSHA), all Federal, State, and Local Government rules and regulations. The Design-Builder shall conduct asbestos and lead-based paint inspections on all ROW buildings, structures, and other improvements), and prepare reports summarizing the findings of the inspections. The Design-Builder shall leave each property clear of debris, and if there was an excavation, the hole must be filled and compacted per Department specifications and the disturbed area needs to be treated in accordance with the requirements in Part 4-07 (Landscaping and Aesthetics) .The Design-Builder is responsible to demolish the structures in the tables in Attachment 14-A: Right-of-Way Schedule upon notification from the Department.

14C-1.10 Restoration of Property and Landscape

Should the Design-Builder damage, injure, or destroy property or landscaping on any property for which the owner has not been compensated, the Design-Builder shall, at its sole cost and expense, repair and/or

replace or restore the damage to a condition equal to or better than that existing prior to the damage. Restoration may include repair, replacing in kind, rebuilding, or replanting.

14C-2 Final ROW Surveying and Mapping

14C-2.1 Design-Builder's Responsibilities

The Design-Builder shall provide DGN files for ROW and easement acquisitions in the Project coordinate system based on the Project ROW alignment file.

14C-2.2 Department Responsibilities

The Department will provide surveying, mapping and will prepare all documents for ROW or easements acquired as outlined in Section 14C 1.3 (Request for Right of Way) and Section 14C 1.4 (Temporary Construction Easements). The Department will install and set permanent Right-of-Way markers. Notify the Department 14 Calendar Days prior to the installation of the Right-of-Way fence.

A Record of Survey will be prepared by the Department and submitted to the Salt Lake County Surveyor(s) office(s).

Department will prepare final ROW drawings for the Project.

14D. SUBMITTALS

Provide submittals to the Department in accordance with Table 14D-1.

TABLE 14D-1
DESIGN-BUILDER SUBMITTALS FOR RIGHT-OF-WAY

Submittal	*For Approval*	*Schedule*
ROW Instruments	Yes	Prior to acquisition
Request for additional ROW	Yes	Prior to acquisition
Permit to Enter and Construct Form	Yes	Prior to entry
Parcel acquisition file	Yes	Two Days (maximum) following payment to landowner
Asbestos and lead based paint inspection report	No	15 Days prior to demolition

Attachment 14-A: Right-of-Way Schedule

5400 South Interchange

Parcel No.	*Owner Name*	*Property Address*	*Demolition*	*Committed Clearance Date*
716	CHAVEZ, KRIS S	3661 W 5695 S	N/A	April 1, 2017
718	SONG, DOOHYUN K	3676 W 5695 S	N/A	April 16, 2017
720	LUNA, JORGE	3670 W 5695 S	N/A	April 1, 2017
722	LOVEDAY, CLINT & CARYN; JT	3671 W 5650 S	Department	NTP
724	LOVEDAY, KENNETH L & DARLENE N; JT	3677 W 5650 S	Department	NTP
726	FISHER, GARY & MALISSA; JT	3674 W 5650 S	Department	NTP
728	CRANE, DAVID L & KATHY M (JT)	3687 W WHITEWOOD CT	Department	NTP
728B	Schytler		N/A	NTP
730	SAWYER, ROBERT H; TR (RHS TR)	3688 W WHITEWOOD CT	Department	NTP
732	BLANK, CATHY L	3686 W WHITEWOOD CT	Department	NTP
734	MONTOYA, SONDRA C	3695 W ALVERON DR	Department	NTP
736	ALMEIDA, JESSICA A D S	5580 S ALVERON DR	Department	NTP
738	SMITH, STEWART	5568 S ALVERON DR	Department	NTP
740	WILLIS, KILEY	5556 S ALVERON DR	Department	NTP
743	FPA WEST POINT LLC	3835-3849 W 5400 S		
744	SEARLE, DOUGLAS E & MONA L; JT	5544 S ALVERON DR	Department	NTP
745	STEELE, KENT H & KAREN S (JT)	5532 S ALVERON DR	Department	NTP
746	BEAMON, JAMES E & CHALLI R; JT	5520 S ALVERON DR	Design-Builder	September 8, 2017
747	ROWLEY, RUSSELL J & KATHLEEN L (JT)	5512 S ALVERON DR	Design-Builder	September 5, 2017
748	HEFFRON, HOLLY	5498 S ALVERON DR	Department	NTP
749	HETRICK, MOLLY A	5490 S ALVERON DR	Department	NTP
750	HARRIS, JEREMY T	5480 S ALVERON DR	Department	NTP

751	THIEM, THIEN M & VU, LUAN B; JT	5472 S ALVERON DR	Department	NTP
752	LECHTENBERG, DANNY & ANAST, VALARIE C; JT	5462 S ALVERON DR	Department	NTP
753	GREMAR LLC	3815 W 5400 S	N/A	June 7, 2017
754	SOUKPHOUANGHAM, PATRICIA M	3740 W CHRISTYANN DR	N/A	NTP
754B	PADILLA, LARRY AND JANELLE	3736 W CHRISTYANN DR	Department	NTP
774	SUN DEVELOPMENT LP	3812 W 5400 S		
775	FPA WEST POINT LLC	3855-3879 W 5400 S	N/A	June 7, 2017
776	SJ, LLC	3770 W 5400 S	Design-Builder	May 31, 2017
777	M S C INC	3765 W 5400 S	Department	NTP
777B	COUNTY OF SALT LAKE	3738 W CHRISTYANN DR.	Department	NTP
778	21ST STREET PROPERTIES, LLC	3762 W 5400 S	N/A	July1, 2017
779	GUBLER PROPERTIES, LLC	3725 W 5400 S	N/A	April 14, 2017
781	IVERSON FAMILY INVESTMENTS LLC	3705 W 5400 S	N/A	April 14, 2017
783	REDWOOD EQUITY PARTNERS	3685 W 5400 S	N/A	April 14, 2017
798	SU CASA MULBERRY, LLC	5287 S DEWBERRY LN	N/A	May 26, 2017
806	MILLER, PAUL	5262 S 3760 W	Department	NTP
808	GRUNDVIG, NICHOLAS C & JUELEE V; JT	5256 S 3760 W	Department	NTP
810	WHITING, ERIC J & VICKIE L; JT	5244 S 3760 W	Department	NTP
812	ROULEAU, WILLIAM F JR & JEAN M; JT	5238 S 3760 W	Department	NTP
814	CHATTERTON PROPERTIES LLC	5228 S 3760 W	Department	NTP
816	HIGBY, LACIE & TROY; JT	5218 S 3760 W	Department	NTP
818	LAM, HOANG M & KIM NGAN S; TC	5208 S 3760 W	Department	NTP
819	WHITTED, DEBORAH L	5198 S 3760 W	Department	NTP

820	PRINSTON PROPERTIES, L.L.C.	5198 S 3760 W	Department	NTP
821	SORENSEN, BEN & JACQUELLE; JT	5178 S 3760 W	Department	NTP
822	HALATOA, KILIFI & BROWN, SALOTE	5168 S 3760 W	Department	NTP
823	BAILEY, KATHLEEN A	5160 S 3760 W	N/A	July 14, 2017
824	CHRISTENSON, BERT	5150 S 3760 W	N/A	July 14, 2017
825	ATTERMANN, SHARON J; TR (SJA REV TR)	5140 S 3760 W	N/A	July 14, 2017
826	GREER, DENNIS J & BLIGHT-GREER,KAREN E;	5128 S 3760 W	N/A	July 14, 2017
828	MALMSTROM, CHARLES & JOHNSON, ERICA H; JT	5116 S 3760 W	N/A	July 14, 2017
829	KOEHLER, DALLAS	5106 S 3760 W	N/A	July 14, 2017
830	STRUM, GREGORY W	5096 S 3760 W	N/A	July 14, 2017
831	JENSEN, MICHAEL R	5086 S 3760 W	N/A	July 14, 2017
832	BRIONES, GABINO H	5074 S 3760 W	N/A	July 14, 2017
833	HUDSON, JOHN G	5064 S 3760 W	N/A	July 14, 2017
834	BUCHANAN	5056 S 3760 W		

7000 South Interchange

Parcel No.	*Owner Name*	*Property Address*	*Demolition*	*Committed Clearance Date*
506	PREECE, MCCOY D & KAREN L G (JT)	3536 W PIERA CIR	N/A	NTP
508	STARKS, TONIA M & DANIEL J; JT	3535 W NEW WORLD DR	N/A	NTP
512	LOW, RICHARD D & TAMARA J; JT	3536 W NEW WORLD DR	Department	NTP
514	MITCHELL, JANICE E; TR (DR&JEMRT)	3541 W FOXTON CIR	N/A	May 19, 2017
515	LOWRY, CALEB AND JENNIFER	3542 W FOXTON CIR	Department	NTP
516	ABBOTT, WADE R & ALICIA A; JT	3540 W FOXTON CIR	N/A	NTP
518	HEGERHORST, WALTER F & ORA M; TRS (W&OHFT)	3541 W WHEATWOOD CIR	N/A	NTP
519	WILSON, DOUGLAS E & DIANE A; TRS (W FAM TR)	3542 W WHEATWOOD CIR	Department	NTP
520	J&P FAMILY INVESTMENTS, LLC	3540 W WHEATWOOD CIR	Department	NTP
521	GUSTAFSON, JOHN A	3541 W MILLERBERG CIR	Department	NTP
522	GARN, NORMA M	3542 W MILLERBERG CIR	Department	NTP
523	PLAZA AT JORDAN LANDING LLC	7111 S PLAZA CENTER DR	N/A	NTP
524	MALDONADO, JOSE G & AMINTA I; TRS	3540 W MILLERBERG CIR	Department	NTP
526	MAYER, YVETTE	3533 W BRANDY CIR	N/A	NTP
527	WELCH, GREGORY L & BARBARA R; JT	3536 W BRANDY CIR	Department	NTP
528	WATKINS, HUBERT L & SHERIE; JT	7026 S ANGELSEA DR	N/A	NTP
536	D & B BYERS, LLC	6989 S DIXIE DR	Department	NTP
536B:E	PLAZA AT JORDAN LANDING LLC	7111 S PLAZA CENTER DR	Department	NTP
537	RUSK, RICHARD D & PATRICIA L; TRS (RD&PLRRT)	6980 S 3535 W	Department	NTP

554	GOSS, EMILY A; ET AL	6968 S 3535 W	Department	NTP
556	ANDREWS, ROBERT L & TERRIE L; JT	6954 S 3535 W	Department	NTP
558	DUPAIX, JOSEPH H & ALICE S	6944 S 3535 W	N/A	NTP
560	PEARSON, ERIC N & SHALISE L; JT	6932 S 3535 W	N/A	NTP
562	DEARING, RYAN C & KRISTI; JT	6922 S 3535 W	Design-Builder	May 19, 2017
564	ANDREWS, STEVEN D & KATHERINE E; JT	6912 S 3535 W	N/A	May 19, 2017
565	BADER, TERRY	6919 S DIXIE DR	Design-Builder	May 19, 2017
566	PETERSON, MARK W & MEGAN D; JT	6900 S 3535 W	N/A	NTP
568	BLANCO, HEIDDY C	6890 S 3535 W	N/A	NTP
570	MADSEN, JOHN G & SHARILYN; JT	6880 S 3535 W	N/A	NTP
572	DOCKSTADER, MAX L & LISA M; JT	6868 S 3535 W	N/A	NTP
574	FERGUSON, WILLIAM S & SHERRI S	6858 S 3535 W	N/A	NTP
576	BARROWS, STEWART G	6848 S 3535 W	N/A	NTP
578	KLEPACZ, MATTHEW A & NICOLE L; JT	6836 S 3535 W	N/A	NTP
580	GIFFORD, QUINTEN	6826 S 3535 W	N/A	NTP
582	CANNING, DENNIS L & KATHLEEN M	3538 W 6825 S	N/A	NTP
588	CORP OF PB OF CH JC OF LDS	6780 S 3420 W	N/A	NTP
596	CITY OF WEST JORDAN	6778 S 3420 W	N/A	NTP

9000 South Interchange

Parcel No.	*Owner Name*	*Property Address*	*Demolition*	*Committed Clearance Date*
331	BRUSCH, DUSTIN	9367 S NEW HERITAGE DR	N/A	May 1, 2017
332	NEWMAN, NATHAN L	9351 S NEW HERITAGE DR	N/A	May 1, 2017
333	ERDMANN, KYLE M & AMANDA JEAN; JT	9339 S NEW HERITAGE DR	Department	NTP
334	LEITER, JASON	9327 S NEW HERITAGE DR	N/A	May 1, 2017
335	BLACKMER, BENN W & JANICE L; TC	9313 S NEW HERITAGE DR	N/A	May 1, 2017
337	CARTER, WILLIS, TR; ET AL	9301 S NEW HERITAGE DR	N/A	May 1, 2017
338	PEREZ, OLEGARIO	9287 S NEW HERITAGE DR	Department	NTP
339	HUYNH, HOA K	9275 S NEW HERITAGE DR	Design-Builder	March 3, 2017
340	LARSEN, JARED R & JAMIE R; JT	9261 S NEW HERITAGE DR	Department	NTP
341	DENNIS, ADRIAN	9249 S NEW HERITAGE DR	Department	NTP
342	JOHNSON, JEROD G & STEPHANIE J; JT	9235 S NEW HERITAGE DR	Department	NTP
343	HILL, BRIDGER W & BRANDI A; JT	9223 S NEW HERITAGE DR	Department	NTP
344	CRAIG, SCOTT M & AUBREY L; JT	9209 S NEW HERITAGE DR	Department	NTP
345	ROSALES, JAMIE L & MERRILL, MAUREEN W; JT	9197 S NEW HERITAGE DR	Department	NTP
347	PEZELY, FRANCO P & SANDI M; JT	9185 S NEW HERITAGE DR	Department	NTP
348	TOSTADO, HUMBERTO F & MARIA A; JT	9173 S NEW HERITAGE DR	Department	NTP
349	SESE, PATRICIA C	9161 S NEW HERITAGE DR	Department	NTP
350	SPENCER, SUSAN	9149 S NEW HERITAGE DR	Department	NTP
351	RUSSELL, DEANNE T & JEFFERY R; JT	9137 S NEW HERITAGE DR	Department	NTP
352	BENKOVSKIY,	9125 S NEW	Department	NTP

	ALEKSANDR L & YELENA B; JT	HERITAGE DR		
353	GARRARD, MICHAEL J & ANGELA S; JT	3642 W VISTA WEST DR	Design-Builder	March 24, 2017
355	CITY OF WEST JORDAN	9098 S WINTHROPE DR	N/A	NTP
356	MILLER, TYLER & ANNE; JT	3657 W WINTHROPE CIR	Department	NTP
358	GEDICKS, CHRISTOPHER W & KELLY L; JT	3659 W WINTHROPE CIR	Design-Builder	May 19, 2017
368	Jordan Health Properties	3706 W 9000 S	N/A	June 23, 1017
370	Baeza, SALVADOR	9012 S WINTHROPE DR	N/A	June 23, 1017
371	Weenig, DAVID R & CYNTHIA B; JT	3680 W 9000 S	N/A	June 23, 1017
373	Baker, JOHN P & CAROLYN; TRS (J&CB TR	9013 S WINTHROPE DR	N/A	June 23, 1017
375	Utah Department of Transportation	3660 W 9000 S	N/A	NTP
376	LARSEN, STEVEN L & LINDA L	3666 W WINTHROPE CIR	Department	June 23, 1017
377	WEST JORDAN CITY	3695 W 9035 S		
378	LARSEN, RICHARD J	3655 W WINTHROPE CIR	Department	NTP
380	Utah Department of Transportation	3644 W 9000 S	N/A	NTP
381	UNITED STATES OF AMERICA	3596 W 9000 S	N/A	March 17, 2017
385	JORDAN VALLEY MEDICAL CENTER LP	3580 W 9000 S		
386	DEASON, HENRY H & MAYE W; JT	8871 S 3680 W	N/A	March 17, 2017
387	KELLY, JASON P & JESSICA A; JT	3647 W 8850 S	Department	NTP
388	STOLL, CALLIE H	8845 S 3645 W	Department	NTP
389	BESSEY, BARRY M & AUTUMN G; JT	8833 S 3645 W	Department	NTP
390	MARKUS, KURT W & MARILYN J (JT)	8821 S 3645 W	Department	NTP
391	HANSEN, BUDDY &	8809 S 3645 W	Department	NTP

	WHITNEY; JT			
392	RESTORE UTAH PROPERTY I LLC	8795 S 3645 W	Department	NTP
393	BUTTON, TREVA P	8783 S 3645 W	Department	NTP
395	BENTLEY, CLIFFORD & DANA; JT	8769 S 3645 W	Design-Builder	March 31, 2017
396	DANISE, BRETT A & KELLY A; JT	8757 S 3645 W	Design-Builder	March 31, 2017
397	DUARTE, MARCOS	8745 S 3645 W	Department	NTP

11400 South Interchange

Parcel No.	*Owner Name*	*Property Address*	*Demolition*	*Committed Clearance Date*
121	South Jordan City		N/A	July 7, 2017
121B	SJ Marketplace LLC		N/A	July 7, 2017
122B	IREIT SOUTH JORDAN OQUIRRH MOUNTAIN LLC	11501 S 4000 W		
123	District	11494 S DISTRICT DR	N/A	July 7, 2017
126B	NATIONAL RETAIL PROPERTIES LP	11509 S 4000 W		
128	South Jordan City		N/A	July 7, 2017
138	IREIT SOUTH JORDAN OQUIRRH MOUNTAIN LLC	11501 S 4000 W	N/A	July 7, 2017
138B	IREIT	11501 S 4000 W		
138D	FAIME LLC	11499 S 400 W		
142	THE DISTRICT-NORTH LC	11364 S RIVER HEIGHTS DR	N/A	July 7, 2017
151	SOUTH JORDAN W, LLC	3754 W 11400 S	N/A	July 7, 2017
153	7-11	3668 W 11400 S	N/A	July 7, 2017
153B	DISTRICT PROPERTIES INVESTMENTS, LLC	3668 W 11400 S		
153D	UTAH FIRST FEDERAL CREDIT UNION	3642 W 11400 S		
154	JORDAN HEIGHTS HOA, INC	11291 S TIPPECANOE WY	N/A	July 7, 2017
154B	SOUTH JORDAN CITY	3776 W 11400 S		
155	DISTRICT-NORTH II LLC, THE	11332 S RIVER HEIGHTS DR	N/A	July 7, 2017
156	WB II LAND INVESTMENT LC; ET AL	11248 S RIVER HEIGHTS DR	N/A	July 7, 2017
157	BARBER, MELISSA K	11281 S TIPPECANOE WY	Department	NTP
158	COBURN, YUNG	11273 S TIPPECANOE WY	N/A	NTP
159	LUCERO, PATRICK JR.	11263 S TIPPECANOE WY	Design-Builder	May 12, 2017
160	BURTON, CHARLES E &	11253 S TIPPECANOE	Department	NTP

	KRISTA A; JT	WY		
161	RICHES, BRADLEY M & ASHLEY R; JT	11243 S TIPPECANOE WY	Department	NTP
162	PECK, NICHOLAS	11233 S TIPPECANOE WY	Department	NTP
162B	NYO INVESTMENTS, LLC	11160 S RIVER HEIGHTS DRIVE		
163	SEENAPPA, CHANDRASHEKAR & VESARAPU, RAMYA; JT	11227 S TIPPECANOE WY	Department	NTP
164	LUNDQUIST, DALLAS & ANGELA; JT	11217 S TIPPECANOE WY	Department	NTP
165	PILLEY, JAMES R & VANESSA L; JT	11209 S TIPPECANOE WY	Department	NTP
166	FOSTER, DENNIS K	11199 S TIPPECANOE WY	Department	NTP
166B	DISTRICT HOTEL PARTNERS, LLC	11220 S RIVER HEIGHTS DRIVE		
167	DUONG, BAO H & DIEU, QUYNH M; TC	11191 S TIPPECANOE WY	N/A	NTP
168	THATCHER, REED & GLORIA; JT	11181 S TIPPECANOE WY	Department	NTP
169	KROGH, ASHLEY	11173 S TIPPECANOE WY	Department	NTP
170	KFJ PARTNERSHIP	11163 S TIPPECANOE WY		NTP
171	YATES, WALTER G & MICHELLE L; JT	11157 S TIPPECANOE WY	Department	NTP
172	MIRANDA, ELVIS R & MELVA R; JT	11147 S TIPPECANOE WY	Department	NTP
173	ISON, JOHN N & KIMBERLY; JT	11141 S TIPPECANOE WY	Department	NTP
174	CARNESECCA, ZACHARY C & NATALIE M; JT	11137 S TIPPECANOE WY	N/A	NTP
175	BECKER, MERCEDES	11123 S TIPPECANOE WY	N/A	NTP
176	PIZZO, STEPHEN G & SMITH-PIZZO, VICTORIA A; JT	11117 S TIPPECANOE WY	N/A	NTP
177	HANSEN, JACOB & BOBBI	11109 S TIPPECANOE WY	N/A	July 7, 2017
193	DISTRICT HEIGHTS	11104 S RIVER	N/A	July 7, 2017

	VILLAGE	HEIGHTS DRIVE		

Build Alternative – 4015 West

Parcel No.	*Owner Name*	*Property Address*	*Demolition*	*Committed Clearance Date*
755	KEARNS PROPERTY COMPANY, LLC	4095 W 5415 S	N/A	TBD
755B			N/A	TBD
756	CHINN S U LLC	4040 W 5415 S	N/A	TBD
756B			N/A	TBD
757	EARLY HOLDINGS, LLC	5419 S 4015 W	N/A	TBD
757B			N/A	TBD
758	K-#3, L L C	3988 W 5400 S	N/A	TBD
758B	Parrish	5385 S 4015 W	N/A	TBD
760	K-#3, L L C	3970 W 5400 S	N/A	TBD
762	K ASSOCIATES, ET AL	3940 W 5400 S	N/A	TBD

Attachment 14-B: TEMPORARY INTERSTATE ACCESS REQUEST FORM

Date of Request:		**Attn:**	
Project		**State PIN**	
Project Description			

Temporary Interstate Access Information		
Location of proposed access (see attached map):		
City in UT:	Nearest address or intersection:	
Description:		
Estimated Duration of Temporary Access:		
Est. Calendar Days:	Est. Start Date:	Est. End Date:
Route and ADT (See attached Table 1 for Annual Daily Traffic values):		
Route Number and Description: ADT ():		
Purpose of proposed access:		
Describe:		
Alternatives to the requested access (if any):		
Describe:		
Planned safety precautions:		
Describe:		
Operations plan for ingress/egress (see attached map):		
Describe:		
Method of ensuring no unauthorized use during non-work hours:		

Describe:

Insert Map

Verify Compliance			
Has the requestor:	**YES**	**NO**	**N/A**
Verified that existing network improvements cannot satisfactorily provide the intended access? (Policy Point 1)	☐	☐	☐
Describe:			
Considered all reasonable alternatives? (Policy Point 2)	☐	☐	☐
Describe:			
Verified that there will not be a significant adverse impact on the safety and operations of the interstate mainline? (Policy Point 3)	☐	☐	☐
Describe consideration of operations:			
Describe consideration of safety:			
Verified that access connects to a public road and provides for all movements? (Policy Point 4)	☐	☐	☐
Describe:			
Verified that plan request is consistent with regional land use and transportation plans. (Policy Point 5)	☐	☐	☐
Describe:			

Systematically studied the effects? (Policy Point 6)	☐	☐	☐
Describe:			
Coordinated with related development? (Policy Point 7)	☐	☐	☐
Describe:			
Coordinated with environmental evaluation and approval process? (Policy Point 8)	☐	☐	☐
Describe:			
Verified that request meets MUTCD?	☐	☐	☐
Describe:			
Requestor Agrees to the following statements:	☐	☐	☐
The Access Point is controlled by UDOT, who may allow the Contractor control as well. The Temporary Access will be removed when it is no longer needed, returned to its previous condition. The contractor will be responsible for purchasing the materials and, if required, the time savings that will be achieved by having that access.			

Table 15-A-1
ADT Values for Utah Highways within the Project Limits

ROUTE NAME	BEG. ACCUM. MILEAGE	END ACCUM. MILEAGE	LOCATION DESCRIPTION	ADT

Attachment 14-C: Right-of-Way Acquisition Procedures

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14C. RIGHT-OF-WAY ACQUISITION FOR THE DESIGN-BUILDERS CONVENIENCE

14C-1 GENERAL REQUIREMENTS

General Scope. Design-Builder shall acquire Right-of-Way (ROW) and conduct activities related to ROW acquisition in accordance with the requirements of this Attachment 14-C for those properties designated as ROW for the Design-Builder's Convenience. These ROW activities include, at a minimum, the following:

A. Mapping
B. Documents
C. Appraisal
D. Appraisal review
E. Negotiation
F. Acquisition
G. Title insurance procurement
H. Title clearance
I. Acquisition closings
J. Condemnation support
K. Relocation assistance
L. Property Management
M. Clearance and demolition of improvements;
N. As required, environmental testing and remediation
O. As required, historical documentation.

Legal Role. Function as agent for the Department while acquiring ROW designated ROW for the Design-Builders Convenience.

Department Approval. Obtain the Department's Approval of ROW design documents, appraisals, requests to acquire ROW, acquisition documentation, acquisition settlements, Right-of-Way Contracts, relocation Notices of Eligibility, Relocation claims, and requests to commence condemnation proceedings. Provide the Department with all specific reports and supporting documentation for review and Approval during the acquisition process.

Documentation. Maintain hard copies of all ROW documentation in addition to placing documentation into ProjectWise and UDOT's ePM ROW module. Submit documents into ProjectWise in accordance with the Department's currently approved file structure and attribute each file according to the Department's current processes. Coordinate the placement of all documentation into ProjectWise with UDOT Central Right-of-Way. Notify UDOT Central Right-of-Way when documentation has been submitted into ProjectWise and/or UDOT's ePM ROW module. All documents submitted to the department must be in accordance with the Right of Way ProjectWise Guide found at (http://udot.utah.gov/go/rowprojectwiseguide). Complete a final quality check to ensure that all documents have been entered into ProjectWise and/or UDOT's ePM ROW module.

All offer documentation must be generated out of UDOT's ePM ROW module.

General. Complete all administrative activities and prepare all documentation sufficient to acquire the ROW. Obtain the Department's review and Approval of all appraisals, legal descriptions, acquisition and relocation documentation, purchase prices, and funding and closing procedures.

ROW Costs. Design-Builder is responsible for all costs associated with the acquisition of the ROW. The Design-Builder will pay the costs of all services and documentation preparation for ROW acquisition and related relocation assistance. All documents, process and procedures to acquire ROW by the Design-Builder, will conform to the Department's ROW processes as outlined in both the ROW Design and ROW Operations Manuals. The Department will not be obligated to exercise its power of eminent domain for, nor will it have any responsibility for, the acquisition, maintenance, or disposition of additional properties or of any temporary right or interest therein.

14C-2 Standards

Complete all ROW acquisition activities in accordance with the requirements of the standards in Table 14-C-1 (Standards for Right-of-Way Acquisition). Standards are listed in alphabetical order and have no established order of precedence.

TABLE 14-C-1
STANDARDS FOR RIGHT-OF-WAY ACQUISITION

Author or Agency	*Title*
Appraisal Foundation	*Uniform Standards of Professional Appraisal Practices* (USPAP)
FHWA	Right-of-Way Project Development Guide, *Federal Aid Policy Guide* (FAPG)
FHWA	*Uniform Appraisal Standards for Federal Land Acquisitions and USPAP*
UDOT	*Manual of Instruction–Right-of-Way-Design* and current UDOT Standards and Practices.
UDOT	*Project Development Process Manual*
UDOT	*Right-of-Way Operations Manual (Policies and Procedures)*
UDOT	*Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970,* as amended *and Implementing Regulations found in Title 49 Code of Federal regulations Part 24 and Code of Federal regulations 23 CFR Part 710.313.*
UDOT	*ROW ProjectWise Guide*

14C-3 Right-of-Way Schedule

14C-3.1 Department Review and Approval

Submittal. Design-Builder shall meet with the Department and submit a schedule for the acquisition and delivery of ROW to the Department for review and Approval. Include in the schedule the following:

A. The beginning date and anticipated completion date of ROW acquisition;

B. Priorities for parcels whose acquisition will significantly impact the Project Schedule and/or affect its Critical Path; and

Implementation. After the Department's review, implement the additional ROW parcel acquisition time into the ROW schedule and integrate it into the Project Baseline Schedule.

ROW Properties. Notify, in advance, the Department of all Design-Builder properties and temporary rights or interests in real property to be acquired by the Design-Builder. Obtain, Approval from the Department for the acquisition of any additional ROW for the Design-Builder's Convenience. Comply with all requirements in Part 4 (Project Design and Construction Requirements).

Acquisition Files. Submit all complete appraisal or acquisition files to the Department for review, in accordance with Section 14C-4.4 (ROW Appraisal and Acquisition File Approval). For submittals of more than one appraisal or acquisition file at any given time, indicate the priority of required review in order to meet the ROW schedule. Each acquisition file shall contain one copy of the appraisal(s) and appraisal review.

Relocation Files. Submit relocation plans and relocation files in conjunction with the acquisition files (for all parcels identified which will require displacement) to the Department for review in accordance with this section. All acquisitions which will require a relocation must be prioritized to meet the ROW schedule.

Electronic Summary/Design Packages

Each summary package(s) shall consist of a partial summary, or a final summary, or supplemental summaries. Each submitted partial summary will contain no more than 12 ownerships in any given partial summary when delivered to the Region 2 Right-of-Way Engineer for a review. Upon completion of the region review, the summary will be forwarded to Central Right-of-Way for a Conformity Review. Review packages delivered to the Region will consist of one hard copy of each document as well as all of the electronic data being posted to ProjectWise following the Department's guidelines and procedures for ROW submittals. When comments and questions have been sufficiently addressed, the Region will direct the consultant to upload the electronic summary into the ePM system and to forward the electronic design package to UDOT ROW Oversight Manager at Central Right-of-Way. If the quality of the review package is considered to be sub-standard by the Department, it may request additional reviews before authorizing the final submittal. Only one summary review will be allowed at the Department at any given time. The electronic file naming convention for partial summaries, as directed by Central Right-of-Way, must be carefully followed. The Design-Builder or ROW designer shall upload each partial or supplemental summary to ePM and ProjectWise and notify Central Right-of-Way with a carbon copy to the Department upon completion.

The Design-Builder or ROW designer will upload to ePM and forward the electronic design package to Central Right-of-Way. Any submittal not directly uploaded will not be reviewed.

Schedule Delay. The Design-Builder is responsible for any delays to the Project Baseline Schedule that result from submittal of inadequate or incomplete appraisal, acquisition files, relocation files or electronic summary/design packages and/or the inability of the Design-Builder to acquire any ROW in a timely manner.

Deficiencies. A summary/design package, appraisal, relocation file, or acquisition file shall be deficient, as determined by the Department, if any of its components contains any error or omission or if it fails to meet any of the criteria established in this Attachment 14-C. Upon Department notification of a deficiency, correct such deficiency and resubmit the file to the Department.

General. Complete all administrative activities and prepare all documentation sufficient to acquire the ROW. Obtain the Department's review and Approval of all appraisals, legal descriptions, acquisition and relocation documentation, purchase prices, and funding and closing procedures.

Eminent Domain. If the Design-Builder and landowner cannot agree upon a purchase price acceptable to the Department, the Department may, at its sole discretion, Approve an acquisition through condemnation or eminent domain procedures. Do not begin eminent domain procedures without an Approved acquisition memo as part of the acquisition file.

A. **Acquisition File.** For condemnation purposes, the acquisition file must contain an approved memo from the Director of Right-of-Way to the Attorney General's AG) office (as noted above). Attached to the memo and the request for condemnation are several documents which include copies of the following: 40 Year Title Report; Agent's log;

Appraisal; Appraisal Review; map; statement of just compensation; ownership record; and any other documents that would be relevant for the attorney representing the agency. The acquisition file should contain 2 copies of the appraisal, and 2 copies of the appraisal review, along with two copies of the agents log and any other relevant information that the Attorney General's office may need to review to properly prepare for the condemnation.

B. Providing that the Design-Builder has provided the appropriate documents with the request for condemnation (including the title report, an error free legal description, and error free map of the parcels) the Department will submit the completed Condemnation Resolution to the Attorney General's Office after it has Approved the request for condemnation.

Construction Clearance. Do not begin construction on any real estate until specifically Approved by the Department after all property rights for the Project have been conveyed in favor of the Department or a Right of Occupancy Agreement (ROOA), Court Order to Occupy or a Right of Entry Agreement has been validly executed by all applicable parties of interest, and the property has been certified as cleared for construction purposes.

Legal Compliance. Complete and document all ROW activities in compliance with applicable laws (including the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970* as amended, the *Utah Relocation Act*, and other applicable rules and regulations). Prevent fraud, waste, and mismanagement.

Communications. In all correspondence with the Department relating to acquisition of real property, include the following information (at a minimum) in a heading:

A. County
B. Region
C. Project Name
D. Project Number
E. Pin Number
F. Highway Designation
G. Project Limits
H. UDOT Parcel Number(s)
I. Assessor's Parcel Number(s)
J. Name-of-record owner(s)

Design Package/Electronic Summary

In each electronic summary or design package prepared and submitted for Department Approval, include the following items:

A. **Electronic Spreadsheet Summary**: An electronic spreadsheet with the following information:

1. Summary Submittal Number;
2. Pin Number;
3. Project Number;
4. Parcel Number;
5. Type of Granting instrument (fee, easement, etc.);
6. Name of owner(s);

7. Address of property owner;
8. Type of vesting deed;
9. County Recorder Entry, Book and Page for vesting deed;
10. County Tax ID#;
11. Section, Township and Range of Parcel;
12. Latitude and Longitude of Parcel;
13. Acreage and / or square footage;
14. Property type;
15. Contact information for licensed Land Surveyor in charge;
16. Document preparer to include the company contact information for the person responsible for creating the ROW documents on the cover sheet of each ROW submittal.

B. **Conveyance Documents**: Include:

1. Grantor Names, Caption, legal description, appropriate clauses, acknowledgement, and prepared by information; and
2. The UDOT approved form of the granting instrument (Deed, easement, etc.) adequate to effect the desired acquisition of the parcel.

C. **Right-of-Way Sheets:** Provide 11x17 Plan Sheets as prepared by the Land Surveyor, and Conveyance Summary Sheets for each summary package submitted. In addition, provide 11x17 plan sheets with aerial photography for each summary package if supplied by the Project and Total Tract Sheets.

D. **Ownership Record**: An Ownership Record, verifying all owners and the percentages of ownership, on a UDOT RW-51 form going back five years or until a Warranty Deed is found. This must include the legal description of the full parcel along with the size of the full parcel in acreage and/or square footage. Provide a copy of the vesting instrument as an addendum to the ownership record.

E. **Prepare Summary of Right-Of-Way (Form RW-53)**

F. **Submittal of Documentation**: Deliver all reports, correspondence and documents relating to ROW acquisition to the Department in both electronic and hard copy formats or as otherwise requested by the Department.

G. **Preliminary Title Reports**

H. **Closure Report** including Graphic representation of deed (Deed Plotter or similar).

14C-4 Project-Specific Services

General. Perform the following Project-specific ROW acquisition services:

A. **Title Acquisition**: As more fully described in the following subsections, provide all services necessary to:

1. Acquire title of the ROW in the name of the Utah Department of Transportation in form and substance acceptable to the Department;
2. Relocate displaces (i.e., displaced businesses and residents); and
3. Clear and/or demolish the improvements from the ROW, or as otherwise specified

by the Department, which may include improvements located on acquired properties but situate outside the final ROW.

B. **Guidelines**: Access and comply with the UDOT *Manual of Instruction Right-of-Way Design*, UDOT *Right-of-Way Operations Manual*, and maintain a current approved ROW map.

C. **Meetings**: Attend ROW meetings as requested by the Department.

D. **Letter to Property Owners**: Provide a letter of introduction to each property owner and/or occupant, as Approved by the Department, on Department letterhead stationery, and signed by the UDOT ROW Oversight Manager or his/her designee.

E. **Submittal of Documentation**: Deliver all reports, correspondence, and documents relating to ROW acquisition to the Department in both electronic format and as hard copy, or as requested by the Department.

14C-4.1 Title Services

Title Company. Select and contract with one or more title companies approved by the Department.

Preliminary Title Reports. Preliminary Title Reports are to be obtained by the consultant and are required for all ownerships as part of the summary packages.

Title Exceptions and Exclusions. All owners of record need to sign the conveying document(s). If new parties of interest are discovered during negotiations or vesting is other than what was indicated on the original documents, the acquisition file shall be revised to include all corrected grantors and all appropriate forms, deeds and other documents will be revised accordingly.

Title Insurance. Obtain title insurance on all fee acquisitions on the Department's behalf.

14C-4.2 Appraisal Services

General. Include the following for each ROW parcel acquired for the Design-Builder's Convenience:

Appraisals: Provide the Department with a fair market-value appraisal prepared by an appraiser which meets the minimum qualifications established herein, unless the parcel can be valued under the waiver valuation provisions of the Uniform Relocation Act or the implemented URA regulations as described in the UDOT *Right-of-Way Operations Manual*. The Department will pre-approve the use of the waiver valuation on a per ownership basis. Waiver valuations are acceptable only for low-value, uncomplicated valuations. The Department's pre-approval of the use of waiver valuations may be requested on a per-ownership basis; no offer may be made to a property owner based on a waiver valuation without Department Approval. Provide the Department with the following items for review and Approval if using waiver valuations:

A. Compensation estimate form printed out of Electronic Project Manager (ePM) (Compensation must be Approved by the Department).

B. A copy of a spreadsheet breaking down the compensation.

C. A copy of the comparables used (MLS sales on properties used to determine sales price). This must show comparable zoning and use, dollar amount per square foot, size of the comparable parcel, location etc.

D. Information regarding the size of the larger parcel of our subject property.

E. Pictures of the take and/or easement area. Provide pictures of any unique items that are directly impacted (i.e. cost to cure items or improvements to be acquired).

F. A copy of the ROW map.

All appraisals of properties to be acquired in full, or which include a structure within the acquisition area that may be occupied, must include an estimate of the market rental rate.

Regulations/Manuals: Prepare the appraisal in conformance with Law (including the Uniform Relocation Assistance and Real Property Acquisitions Policies Act of 1970, as amended), and in accordance with professional appraisal methods and applicable UDOT standards as described in the current UDOT *Right-of-Way Operations Manual.*

Appraiser Selection. Select qualified, certified appraisers who are licensed by the State of Utah and on the UDOT pre-approved ROW pool list. Obtain Department Approval of each appraiser and each review appraiser that the Design-Builder plans to use for this project prior to engagement of services with same. The Department reserves the right to reject any and all appraisal and/or review reports produced by appraisers or reviewers who have not been previously Approved by the Department for this Project.

Pre-Appraisal Property Inspection. For properties which are improved with residential improvements that will be directly impacted by the project provide a property (house, building, property, etc.) inspection report, prepared by a qualified inspector, to the appraiser. The report must include documentation of all deficiencies (i.e. mechanical systems, electrical systems, etc.) and comments about structural damages observed by the inspector. The inspection report shall be an all inclusive formal Inspection Report. Each appraisal which includes the valuation of improvements, determined by the appraiser to have contributory value (excluding, e.g. landscaping and minimal concrete flatwork), must include an Inspection Report, unless the Department determines, on a case by case basis that a formal Inspection Report is not necessary. The appraisal shall refer to the report, by reference, as part of the scope of the appraisal assignment.

Owner Contacts. Establish personal pre-appraisal contact with each owner of record and each occupant, lessee, or tenant. Contact shall be in person and/or in writing. The written contact may be, but is not limited to, the mailing of an introductory letter. Document all contacts using a form Approved by the Department. Offer each owner of record, party of interest and any occupants, tenants and lessees or their designated representatives, in writing, via certified mail return receipt, the opportunity to accompany the appraiser on the appraiser's inspection of the parcel. The appraiser shall maintain a record of all such contacts. Said report shall be included with the appraisal in the acquisition file.

Appraisal Report. Prepare a complete appraisal report for each parcel that:

A. Complies with and includes all matters required by this Attachment 14-C, and the UDOT ROW-related manuals and other applicable standards included in Table 14-C-1 (STANDARDS FOR RIGHT-OF-WAY ACQUISITION);

B. Includes an ePM summary report;

C. Satisfies the requirements of The Appraisal Foundation's *Uniform Standards of Professional Appraisal Practices* (USPAP) in effect at the time the appraisal is submitted;

D. Is in the form Approved by the Department;

E. Includes all pertinent special analyses, studies, or reports, including but not limited to a Real and Personal Property Report, and/or an Inspection Report;

F. Includes (as an extraordinary assumption if necessary), for residential relocation purposes, the following: Uniform Residential Appraisal Report; an opinion of the land value as a typical residential lot; and listings of comparable available rental properties; and

G. Exclude compensation for any items that are being replaced by the Design-Builder such as material for driveways in the easement areas. (Appraiser to verify what impacted items are

being replaced by the Design-Builder prior to determining cost to cure compensation)

Compensable Interests. For each parcel, provide the Department with copies of all written leases, licenses, and other occupancy agreements to identify lessees, licensees, and other occupants with potential compensable interests in each parcel to determine the value of each such interest. Include any outdoor advertising leases if there is a billboard on the site which will be impacted by the project. The appraiser will be required to evaluate the Leasehold interest and the Leased-fee interest as it pertains to the billboard, as well as a value for the billboard structure.

Environmental Concerns.

A. Documentation: Document the environmental condition of the required parcel(s), based on field investigations and/or historical review and/or the project environmental permit, and make documentation available to the appraiser(s). Develop the following report(s) for the required parcel(s):

1. An Environmental Site Assessment (ESA) Phase I;
2. An ESA Phase II if the ESA Phase I determines that there is a potential environmental risk; and
3. An ESA Phase III if the ESA Phase II report justifies it (including approximate costs to remediate the parcel to achieve its current use and its highest and best use).

B. Department Notification: Submit timely written notification to the Department of any concerns that could require environmental remediation of or other special attention to ROW parcels and/or additional properties.

Appraisal Updates. When required by the Department (e.g., for eminent domain proceedings or to allocate values for ST parcels etc.), update appraisals and appraisal reviews.

Backflow Prevention. Examine local ordinances regarding requirements for meter supply backflow preventors and/or other special conditions. In the appraisal report, consider the installation of any such appurtenances on the parcel remainder as damage and include it as part of the compensation package to the landowner.

Copies of Documents. When requested by the Department, provide copies of appraisal file documents as may be needed to respond to discovery motions or requests for production.

14C-4.3 Appraisal Review

Appraisal Reviewers. Select a qualified appraisal reviewer that is independent from the appraiser and is experienced in appraisal reviews for transportation projects. Select only one appraisal reviewer for the Project to ensure report consistency and fairness unless there is a documented need to employ more than one appraisal reviewer. The use of more than one appraisal reviewer may be allowed with justification at the discretion of the Department.

Advertising Signs. Evaluate all outdoor advertising signs, as required, utilizing the appropriate forms and sign schedule, and/or as instructed by the Department. If applicable, provide location and other information about the signs which will enable the Design-Builder to provide all appropriate relocation assistance, including advisory assistance and prescribed 90/30 Calendar Day notices to the owner of the signs.

Additional Reports. Determine, in consultation with the Department, whether additional appraisal reports or technical expert reports are required. If so, initiate, review, and reconcile each report required.

Review of Appraisals. Review all appraisal reports for each parcel to determine their consistency of

methodology, supporting documentation related to the conclusion reached, and compliance with UDOT standards, as defined herein and by standards and requirements imposed by Uniform Standards of Professional Appraisal Practices (USPAP). Obtain from the appraiser written certification that all these standards have been met.

14C-4.4 ROW Appraisal and Acquisition File Approval

UDOT ROW Oversight Manager. Before beginning ROW appraisal services, meet with the Department ROW Oversight Manager.

14C-4.5 Final Right-of-Way Acquisition and Compliance

Legal Compliance. Conduct all negotiations in accordance with the requirements of the Law and applicable regulations. Acquisition agents employed by the Design-Builder for this project may not be required to be licensed Real Estate Agents in the State of Utah. However, all acquisition agents hired to acquire real property for this project must be qualified agents Approved by the Department prior to commencing acquisition activities on this Project. Provide acquisition assistance strictly in accordance with the Law, including, but not limited to the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970*, as amended; the Utah Relocation Act; and UDOT policies and procedures as described in the UDOT *Right-of-Way Operations Manual.*

Acquisition Agents/Negotiators. All agents working as acquisition agents or negotiators shall be qualified and experienced. The Design-Builder and firm must obtain final Approval of each agent who will actually work on the Project. All agents must be fully qualified to perform the duties assigned as described in the 2015-2018 Right of Way Services & Local Government Pool RFQ. (The RFQ is available from the Consultant Services Page of the UDOT Web Site found at http://www.udot.utah.gov/main/uconowner.gf?n=20347703526797897)

Contact Reports. Prepare, in a format acceptable to the Department, a separate negotiator's contact report or agent's log which will document each meeting or conversation with any person (or their appointed representatives) who has a compensable interest in each parcel. All contacts must be noted in the agent's log which shall be available for view by the agency on a daily basis. The log entries are to be entered into the UDOT ROW ePM module as required by UDOT standards, as documented in the UDOT *Right-of-Way Operations Manual*, on a daily basis as applicable.

Brochure(s). Produce informational brochure(s) for distribution to all property owners, tenants, lessees, or other parties of interest and to actual or potential displacees. Prior to creating, coordinate with the Department to determine if a brochure will be used. Prior to distribution, submit brochures to the Department and obtain consent to use brochures.

Presentation of Offer Within 10 Calendar Days of the Department's establishment of just compensation, the agent shall prepare the offer to purchase and other required documents as part of the acquisition file. Once prepared, the agent shall present in person (when practicable) the purchase offer with the appraisal report on the subject property and applicable brochure(s), to, and only to, the property owner(s) or owner's designee. If the offer is presented by mail or e-mail, the agent shall explain in the agent log why the offer was not presented in person. Document the delivery of the appraisal report with a receipt signed by the property owner or designee. Upon acceptance of the purchase offer, maintain follow-up contacts as appropriate to secure any supplemental documentation needed to facilitate the closing.

Negotiating for Compensable Interests. Identify lessees, licensees, occupants, or other parties with potential compensable interests and if appropriate, after consultation with the Department, negotiate with such parties for the acquisition of their compensable interests. Provide timely response to the verbal or written inquiries of any property owner, lessee, licensee, occupant or other holder of a compensable

interest, as applicable, not more than 10 Calendar Days after the inquiry.

Acquisition Files. Maintain a complete acquisition file for each ownership. All original documentation related to the purchase of the real property interests will be maintained either in conjunction with or separate from the relocation files in conformance with UDOT standards, manuals, and procedures and as specified herein. The Design-Builder must maintain all acquisition and relocation agent's logs in the UDOT ePM ROW module. If a separate relocation file is set up and maintained, that file must contain a copy of all pertinent information from the acquisition file, sufficient to satisfy the needs of the relocation agent, the Design-Builder reviewing agent, and the UDOT ROW Oversight Manager or designated Department review person. The acquisition file must also include a reference to any relocation of displaced persons who occupy any parcel within the ownership. The file must include a copy of any relocation studies that are completed prior to the initiation of negotiations for the purchase of the subject property. The agent log must include any information about relocation assistance provided to the occupants including advisory assistance. Forward the signed original documents to the UDOT Project ROW Coordinator. The UDOT Project ROW Coordinator will update the ePM system with receipt dates for all documents and files received from the Design-Builder. The UDOT Project ROW Coordinator will also confirm that all files are complete and ready for Department review. The file and all forms to be Approved must be forwarded to the Department for required review. All contracts, agreements, claims, must be Approved by the UDOT Director of Right-of-Way.

UDOT Project ROW Coordinator. All documents and files including appraisals, appraisal reviews, waiver valuations, acquisition files, relocation files, claims, invoices etc., shall be submitted through ProjectWise to the designated UDOT Project ROW Coordinator as per the Right of Way ProjectWise Guide (http://udot.utah.gov/go/rowprojectwiseguide).

Administrative Settlement. If a settlement cannot be reached without an administrative settlement, advise the property owners, and other holders of compensable interests, or their representatives of the administrative settlement process. In all dealings with property owners and other holders of compensable interests, clearly represent and maintain that the UDOT Director of Right-of-Way or his designee has the ultimate decision authority regarding any settlement requests. All offers are nonbinding on the Department unless or until the contract is approved by the UDOT Director of Right-of-Way or his Deputy. Confer with and deliver to the UDOT ROW Oversight Manager any settlement request from property owners, lessees, licensees, occupants, or other holders of any compensable interest, as applicable, including a detailed recommendation from the Design-Builder in accordance with standards, manuals, and procedures as defined herein. Deliver the administrative settlement request and the Design-Builder's recommendation to the Department within five Working Days of receipt of the request.

Second Appraisals. If a property owner requests a second opinion of value or second appraisal the owner is to seek assistance from Utah's Office of the Property Rights Ombudsman (Ombudsman) before commissioning said appraisal or opinion of value.

Evaluation of Settlement/Mediation or Arbitration Requests. If requested by the Department, participate in the evaluation of administrative settlement requests and attend the settlement, mediation or arbitration meetings. Prior to the meeting, report to the Department any pertinent issues concerning the property including information about any and all leases as identified in a current title report and provide the Department with a copy of identified leases or other encumbrance documents. If the property is subject to a lease, determine the remaining lease term, rents collected and or security deposits held by the grantor. Provide applicable information about any other liens or encumbrances applicable to the subject property including but not limited to property taxes paid. When the Department has made its findings, if requested by the Department, provide a letter of response regarding the administrative settlement findings to the property owner, lessee, licensee, occupant, or other holder of a compensable interest, as applicable. Deliver

all such response(s) within five Calendar Days of receipt of findings. If the findings letter is delivered by mail, it shall be sent certified with return receipt requested.

Final Offer Letter. Subject to the Department's prior written Approval, prepare and deliver the "Four Options Letter" to the property owner, lessee, licensee, occupant, or other holder of any compensable interest, as applicable. This "Four Options Letter" will be the Final Offer Letter submitted by the Department to the property owner, lessee, licensee, occupant, or other holder of any compensable interest, as applicable. The "Four Options Letter" shall be on the UDOT designated ROW letterhead and shall be signed by the UDOT ROW Oversight Manager.

Conveyance Documents. Prepare and deliver documents of conveyance (including bisection clause and access clause, if applicable) to the property owner, lessee, licensee, occupant, or other holder of any compensable interest, as applicable, and obtain their execution of the same. Obtain notarization of all signatures on documents to be recorded, in accordance with Utah law.

Deliver the original recorded conveyance document or documents to the UDOT Project ROW Coordinator Upon receipt, the UDOT Project ROW Coordinator will log in all conveyance documents received from the Design-Builder into the UDOT's ePM ROW module.

Right-of-Occupancy Agreement. As a last resort, prior to submitting the file to the Department requesting a condemnation, secure a "Right of Occupancy Agreement" (ROOA) between the record title owner(s) and the Design-Builder. The ROOA shall grant the Department and the Design-Builder and/or assignees permission to enter and occupy the parcel. If the Design-Builder's best efforts could not result in a negotiated contract agreement or the Design-Builder cannot secure a ROOA, provide documentation acceptable to the Department that specifies the conversations, correspondence, and all other efforts made to secure the agreement.

The Design-Builder must provide an action plan to the Department describing what steps will be taken to secure a contract or ROOA. The action plan and ROOA must be presented and approved by the Department before the Design-Builder enters or commences construction on the subject parcel.

Right of Entry. Secure a Right of Entry, for the purpose of constructing driveway tie in's or other features that benefit the property owner, but which are not required for the project. A Right of Entry is only applicable and approved for use when these construction features can be eliminated from the project if permission to enter and construct is not granted by the property owner or his or her designated representative.

Expediting ROW Acquisition. Remain open to all reasonable settlement requests from property owners that are feasible and help expedite the ROW acquisition process and comply with the regulations as outlined herein. Note that the Department encourages all positive and creative solutions that satisfy the property owner, promote the success of the Project, and are fiscally responsible**.**

Mediation and/or Arbitration. The Department encourages the use of mediation and or arbitration as a means for alternate dispute resolution. We encourage all attempts to mediate or arbitrate value or relocation issues in compliance with the Utah Office of the Property Rights Ombudsman.

14C-4.6 Closing Services

Perform closing services, as discussed below:

Request for Funding. Prepare a request for funding in accordance with the UDOT Right-of-Way Operations Design, or as directed by the Department.

Closings. Attend closings as needed and as requested by the Department. Provide curative documents and exhibits as required and in conjunction with the applicable title company, if the closing is to be closed using

a title company. For partial acquisitions, closings will be completed by the Design-Builder unless the Department determines, on a case by case basis, that the Department will be responsible for the closing. The Design-Builder may need to obtain a partial release of a lien or liens. In those cases, closings will be completed by the title company.

If the property is tenant occupied, the negotiator shall obtain a copy of the lease, security deposits and pro-rated rents. If the tenant has not paid a security deposit, the Department will withhold a 1% key/security deposit from the property owner's proceeds from the sale of the property to the Department. If the property is to remain occupied by an owner-occupant, a key/security deposit is to be withheld. Notify the Department at least five Calendar Days in advance of all closing appointments. Obtain a set of keys to the property prior to or at said closing, and confirm prior to closing that all conditions of closing have been met. The Agent is also required to complete the Property Management Tenant Occupant Form. For Owner Occupied Property the Agent must complete the Property Management Owner Occupant Form. All required forms must be included in the acquisition file when the acquisition file is submitted to the Department for execution of the purchase contract.

14C-4.7 Relocation Assistance

Legal Compliance. Provide relocation assistance strictly in accordance with the Law, including, but not limited to the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970,* as amended; the Utah Relocation Act; and UDOT policies and procedures as described in the UDOT *Right-of-Way Operations Manual.*

Written Notice. Provide written notice of relocation assistance and a relocation assistance brochure to all potential displaced property owners, lessees, licensees, occupants, other holders of compensable interests and other potential displacees. Base the relocation assistance brochures on the *Relocation Assistance Brochure* on the Utah Office of the Property Rights Ombudsman website at Propertyrights.utah.gov.

Interviews. Conduct relocation interviews with potential displacees, discussing general eligibility requirements, programs, and services, then complete and maintain interview forms; and with potential displacees, maintain a written daily record of all verbal contacts in the agent's log as part of UDOT's ePM ROW module record.

Ineligible Occupants. Give written notice of the pending acquisition to any occupants believed to be ineligible for relocation assistance. Direct potential displacees to submit written eligibility questions to the Design-Builder ROW Coordinator. The Design-Builder ROW Coordinator will forward questions received to the UDOT ROW Oversight Manager or designated review person with a recommended answer to each question.

Relocation Assistance. Contact and provide relocation assistance to those parties affected by the ROW acquisition and complete necessary forms for all displacees, as required. Provide sufficient advisory assistance to those actually displaced as well as to those affected by the Project in compliance with applicable regulations and UDOT *Policies and Procedures*. Utilize the Department standardized Right-of-Way Division ePM forms or forms pre-approved by the Department if those forms are not available from ePM.

Relocation Sites. Locate, evaluate, and maintain files on comparable available housing, commercial, retail, and industrial sites, and make these information files available to displaced persons or persons not displaced but who are adjacent to or affected by the project.

Supplements. Compute and submit requests for relocation payments, including Replacement Housing Payments (RHP), and rental housing RHP's to the Department, using a form with a format approved by the Department. Obtain Department approval of all relocation benefits prior to presenting relocation notices of

eligibility or housing studies to the displaced person.

Relocation Eligibility Notices. Relocation assistance and Notices of Eligibility must be signed and approved by a qualified Relocation Agent as designated by the Design-Builder. Said Agents shall be pre-approved by the Department. The Design-Builder must obtain final Approval from the Department of each Agent who will actually work on the Project. All agents must be fully qualified to perform the duties assigned as described in the 2015-2018 Right of Way Services & Local Government Pool RFQ. (The RFQ is available from the Consultant Services Page of the UDOT Web Site found at http://www.udot.utah.gov/main/uconowner.gf?n=20347703526797897)

Inspection. Verify that all replacement housing as selected by the displacees is decent, safe, and sanitary (DS&S). Perform a DS&S inspection of the selected replacement residence, using a form pre-approved by the Department. No RHPs (including the RHP, Incidental Expenses and MIDP) shall be released to the displaced person unless or until the replacement property has met the DS&S requirements unless expressly and specifically approved by the Department.

Moving Personal Property. For relocation of personal property from a residential property which is owner or tenant occupied; prepare a Scheduled Move cost estimate. If the displaced person elects to claim reimbursement for a commercial move, the displacee shall obtain at least two moving cost estimates from qualified, publically recognized commercial moving companies unless two bids are determined to be unnecessary by the Department. (If needed, the agency reserves the right to have the Design-Builder obtain a third bid.) The Agent shall also prepare a moving plan with appropriate photographs, sketches and, as needed, an inventory of personal property to be moved. Coordinate moves with displacees and moving companies in compliance with UDOT policies and procedures, and the *Uniform Relocation Assistance and Real Property Acquisitions Policies Act of 1970, as amended.*

For the relocation of personal property from a Non-Residential property the Agent and the displacee are to obtain a minimum of two bids from qualified moving companies, unless otherwise directed by the Department.

Prior to obtaining the bids the agent shall prepare a moving plan with appropriate photographs, sketches and an inventory of all personal property, which is to be moved. This inventory should be prepared by the displacee, however, if needed, the inventory can be prepared by the agent. The agent and the displacee shall review the inventory list to verify that it is accurate. Both the Agent and the displacee must sign the inventory list agreeing to its accuracy. Once prepared, the inventory is to be provided to the moving companies to assure that they will prepare consistent and comparable bids for the move and for all associated mechanical, electrical, plumbing and other reasonable and necessary expenses of the move.

The agent shall monitor the move. All moving expenses must be documented and pre-approved by a qualified Agent and by the Department. The maximum eligible amounts should be stated on the displacee's Notice of Eligibility.

Relocation Contact Logs. Maintain relocation contact logs, also known as the agent's relocation log, in a format approved by the Department and as directed by the Department using the UDOT's ePM ROW module. If the same agent performs the duties of the acquisition agent and relocation agent, the agent's log may contain a daily record of both acquisition and relocation contacts. When the log has been completed the agent shall sign and date the log and verify that the contact report is a complete and accurate record of all contacts with the owner and/or displaced persons of the subject property.

Closings and Payments. Attend all closings on replacement properties, if requested by any party involved, and ensure that supplemental payments, if any, are properly distributed. Make all residential RHP's, except moving expense payments, payable to the title company, to be retained by the displaced person for the benefit of the displaced person. All RHP's must be applied to the purchase of the qualified replacement

residence only. As required, process and compute increased interest payments on the mortgage of owner-occupied dwellings. Note: Relocation payments are reimbursements of actual expenses incurred. As such, they are not to be released without proof of the qualified expenditure(s). Receipts and invoices must be filed once the replacement home has been purchased or rented, and the move has been completed. If funds are advanced based upon estimated expenses, any overpayments must be refunded in full to the agency within 20 Calendar Days of the move from the displacement property and or from the date of closing on a replacement property purchase.

For RHPs a final closing statement or HUD-1 statement shall be submitted to the Department upon the closing of the purchase of the replacement residence.

Notices to Displacees. For Residential property: Deliver to displacees a 90 Calendar Day Notice simultaneous with the delivery of the relocation Notice of Eligibility and the Supplemental Housing Study. The notice and the study must identify the location of the comparable property used to compute the RHP. For non-residential property: Deliver to the displaced person a 90 Calendar Day Notice simultaneously with the written offer to purchase. Note that this notice is advisory only.

A 30 Calendar Day notice to vacate shall subsequently be delivered to the displaced person when the required vacate date is known, unless the person has already vacated the displacement property. This Notice may not be sent any earlier than 60 Calendar Days from the date the initial 90 Calendar Day notice was delivered. For all Notices, the Agent must enter the date that the notices were presented into the appropriate locations in the ePM system, and include this information as part of their agent log. Copies of all written notices must be retained in the applicable acquisition and relocation file.

If a displacee has not moved after the 30 Calendar Day notice expires, immediately notify the Department's ROW Oversight Manager and prepare a written recommendation to facilitate the displacee's move.

For condemnation purposes the 30 Calendar Day Notice should be sent to the displaced person(s) when the condemnation resolution is submitted to the Attorney General's Office provided that at least 60 Calendar Day have elapsed since the 90 Calendar Day Notice was delivered to the displaced person.

Eviction Proceedings. Assist the Attorney General's (AG) office with any eviction proceedings.

Legal Proceedings. Be available for any legal proceedings, such as appeals or hearings.

Securing Vacant Properties. After a property acquisition and relocation has been completed, coordinate the final walkthrough of the vacated property with UDOT Property Management. Secure the dwelling and/or other structures no later than 24 hours after vacancy, and protect the property acquired. The Department will complete their salvage of the property within 20 Calendar Day of the final walkthrough. After the 20 Calendar Day, the property will be turned over to the Design-Builder. The Design-Builder is responsible for maintenance and care of properties acquired by, or turned over to the possession of the Design-Builder for the duration of the Project.

Displacee Files. Maintain a complete file, separate from acquisition files, on each displacee, if appropriate, and as needed. If a separate relocation file is set up and maintained, that file must contain a copy of all pertinent information from the acquisition file, sufficient to satisfy the needs of the relocation agent, the Design-Build reviewing agent, and the UDOT ROW Oversight Manager or the designated Department review person.

Eminent Domain and Relocations. For any parcel referred to the Attorney General's (AG) office for eminent domain proceedings that has a relocation issue, notify the AG that a relocation offer has been made. Include in the documents sent to the AG a copy of all relocation notices including the Notice of Eligibility and the 90 and/or 30 Calendar Day Notices that have been delivered to the displacee. Also include a record of all payments that have been made to the displacee. Advise the UDOT ROW Oversight

Manager and the AG's office if there are any contacts with or from the displacee after the case has been submitted to the AG for condemnation. Forward the complete agent log to the AG's Office immediately after each contact.

The displacee may request the assistance of the Utah Office of the Property Rights Ombudsman for relocation issues.

All correspondence to the displacees or their representative(s) that are prepared and sent by the Design-Builder will be prepared on the Design-Builder's designated letterhead and will be signed by the Design-Builder's Project ROW Relocation Specialist. Copies of all correspondence shall be retained in the acquisition/relocation file. Correspondence prepared and sent to the displacees or their representatives using Department letterhead must be signed by the UDOT ROW Oversight Manager or his/her designee.

Relocation Payments. Prepare relocation payment claim submissions for all displacees and all relocation assistance benefits using prescribed and approved forms with all appropriate funding codes. Deliver to each displacee the relocation assistance payments in compliance with separation of function, conflict of interest, and provisions of the UDOT *Right-Of-Way Operations Manual* and the *Uniform Relocation Act.*

14C-4.8 Administration and Management of Right-of-Way

Property Security, Clearance and Demolition of Right-of-Way. After acquisition or possession of any parcel of ROW, secure and protect all buildings, improvements, and fixtures until they are disposed of or demolished. Mow the grass and board up and winterize the buildings as required by the Department or applicable law.

Salvage Rights. See UDOT ROW Operations Manual.

Personal Property. Coordinate with the owner and occupants to ensure the clearance of personal property from the ROW, as applicable. Provide written notification to the Department of any real and/or personal property remaining on the ROW after being vacated by the occupants that was not acquired under the acquisition. Upon approval by the Department or the Design-Builder, if an item of personal property is allowed to be left onsite after the property has been vacated, the grantor or prior owner of the personal property must provide the Department in care of the Design-Builder, with a bill of sale and if applicable title to the vehicle or other item abandoned and left in place.

Pest Control. Provide for any insect and rodent control and initiate extermination as required to rid the acquired properties, as applicable, from infestations.

Governmental Approvals. Secure governmental approvals required for demolition and environmental surveys or tests, and notify the Department in writing of all such activities.

Documentation. Prepare all necessary documentation for disposal of improvements, fixtures, and buildings in accordance with applicable laws and submit the same to the Department.

Utility Service. Terminate all utility service(s) when appropriate and notify the UDOT Property Management.

Demolition/Removal Requirements. Process all required forms, documents, and permit applications in order to proceed with the timely demolition or removal of any and all improvements, buildings, and fixtures located on the acquired properties, as applicable.

Improvements. Demolish and/or remove all improvements necessary for construction of the Project and/or as directed by the Department.

A. Documentation:
Document the disposal of improvements, fixtures, and buildings in accordance with

applicable Laws and submit documentation to the UDOT Project ROW Coordinator.

Department Notification. Notify the Department upon completion of the demolition and clearance of the ROW, as applicable.

Parcel Files. Maintain parcel records on file of all aspects of the acquisition process in accordance with applicable law. Each parcel file and ownership file or relocation file shall include all documents required by the RFP, FHWA, and/or the Department.

Expense Reports. If needed and requested by the Department, provide monthly summary reports of project right-of-way expenses, including amounts authorized, amounts paid, and budget forecasting on a parcel-by-parcel and overall project basis.

Projected Funding. The Design-Builder ROW Project Coordinator will be required to prepare and submit the R-709 (Right-of-Way Cost Estimate) form to the UDOT ROW Oversight Manager, with the appropriate attachments and update ePM (screen 740 in the UDOT's ROW ePM module) as applicable, with all projected ROW expenses. Posting shall be prior to the commencement of the acquisition processes. Subsequent postings will also be required if there are subsequent changes to the projected ROW budget. Provide budget projections and anticipated funding requirements every 30 Calendar Days, or more frequently, as requested by the Department UDOT ROW Oversight Manager.

Status Reports. Maintain and electronically transmit to the Department, in a format acceptable to the Department, weekly status reports of all parcels and activities related to ROW acquisition as outlined in this Attachment 14-C (ROW Acquisition Procedures)..

Correspondence. Provide copies of all incoming and outgoing correspondence as requested.

Sub consultant Reports. Evaluate and report subcontractor status and performance on an ongoing basis in UDOT's ePM ROW module (Screen 760).

14C-4.9 Department Oversight, Monitoring, and Review

General. The Department or its designee may, at its discretion, review and/or monitor the ROW activities and services performed by the Design-Builder. This will be for oversight as a secondary review. Primary review shall be conducted by the Design-Builder. The Department will notify the Design-Builder in writing of any Project oversight monitor or reviewer under contract with the Department. Provide any information (in addition to that specifically required elsewhere in the RFP) to the Department requested to assist in the Department's review and assessment of the progress, timeliness, adequacy, and sufficiency of the Design-Builder's ROW activities.

14C-4.10 Cost Responsibilities of the Design-Builder

ROW Costs. The Design-Builder shall be responsible for paying all costs associated with all ROW design packages, for processing and issuing all payments of agreed purchase prices or awards; relocation assistance payments; and all legal, administrative, and incidental expenses of, or related to, the Design-Builder's additional properties, temporary construction easements, and other interests in real property acquired for the Project.

If additional ROW will be required to implement a Design-Builder's ATC, the Design-Builder acknowledges and agrees to the following:

A. Design-Builder shall be solely responsible for all costs associated with the acquisition of any such ROW, including the cost(s) thereof, and for obtaining any necessary environmental approvals;

B. Any additional ROW shall be purchased by the Design-Builder for the Project, with final

title reflecting the UDOT as owner;

C. Design-Builder shall not be entitled to any Change Order for time or money as a result of site conditions (e.g., hazardous materials, differing Site conditions, geotechnical issues, Utilities) on such additional ROW; and

D. Design-Builder shall not be entitled to any Change Order for time or money as a result of any delay, inability, or cost associated with the acquisition of such ROW.

15—ROADWAYS

15A. GENERAL

Conduct all Work necessary to meet the requirements of this Section 15 (Roadways) and to satisfy all functional needs of the Project, including providing mainline, ramps, city streets, driveways, entrances, sidewalks, cut and fill slopes, survey, and fencing.

15B.STANDARDS

Complete Work for roadways in accordance with the requirements of the standards listed by priority in Table 15B-1 (Standards for Roadways).

If there is any conflict in standards, adhere to the standard with the most stringent requirements.

If there is any unresolved ambiguity in standards, it is the Design-Builder's responsibility to obtain clarification and Approval from the Department before proceeding with design and/or construction.

TABLE 15B-1
STANDARDS FOR ROADWAYS

Priority	*Author or Agency*	*Title*
1	UDOT	Special Provisions included in Part 5
2	UDOT	*Supplemental Specifications to 2012 Standard Specifications for Road and Bridge Construction,* as modified by Part 5
3	UDOT	*2012 Standard Specifications for Road and Bridge Construction,* as modified by Part 5
4	UDOT	*Supplemental Drawings to 2012 Standard Drawings for Road and Bridge Construction*
5	UDOT	*2012 Standard Drawings for Road and Bridge Construction*
6	AASHTO	*A Policy on Geometric Design of Highways and Streets*
7	AASHTO	*Roadside Design Guide*
8	AASHTO	*Standard Specifications for Highway Bridges*
9	UDOT	*Utah Manual on Uniform Traffic Control Devices* (Utah MUTCD)
10	AASHTO	*Guide for the Development of Bicycle Facilities*
11	TRB	*Highway Capacity Manual*
12	UDOT	*UDOT Plan Sheet Development Standards*
13	UDOT	*Manual of Instruction, Roadway Design*
14	UDOT	*Manual of Instruction, Surveying*
15	UDOT	*Engineering Technology Systems Manual*
16	UDOT	*Manual for the Accommodation of Utilities and the Control and Protection of State Highway Rights of Way*
17	UDOT	*Manual of Instruction, Roadway Drainage*
18	UDOT	*Construction and Maintenance of Right-of-Way Fence,* Policy 08A-10
19	UDOT	*Guidelines for Crash Cushions and Barrier End Treatments, Approved Products List*
20	UDOT	*Single Point Urban Interchange Design and Operations Analysis*
21	APWA	*2012 American Public Works Association Standards and Specification*
22	Local	*South Jordan City*
23	Local	*West Jordan City*
24	Local	*Taylorsville City*
25	Local	*Salt Lake County*

15C. REQUIREMENTS

Remove all existing pavement, curb and gutter, sidewalk, steps, drainage facilities, soil, rock, and other obstructions within the Project limits necessary to construct the Project. Unless unused pavement is modified to be used as embankment, remove all unused pavements and sidewalks, including temporary facilities, within the Project limits.

15C-1 Non-Interstate Roadways

Design and construct all non-interstate roadway work in accordance with the functional classification and category for the specific AASHTO roadway type.

For roads that are not within the No Access Line and are not owned by the Department, design and construct according to the appropriate standards and criteria of the governing city or county; except, for the following cases comply with the requirements described in this Section 15C-1.:

A. Structures

1. Construct structures according to the Typical Sections in Part 7 (Contract Drawings) and as identified in Part 4-17 (Structures).

B. Bangerter Highway (Mainline)

1. Construct the lanes and shoulders in accordance with the Typical Sections in Part 7 (Contract Drawings). Design the mainline in accordance with the PDC.
2. Reconstruct the existing concrete pavement on Bangerter mainline from vertical tie-in points south and north of each intersection.
3. AASHTO Functional Classification is Other – Principal Arterial

C. On- and Off Ramps

1. Construct ramps in accordance with the Typical Sections in Part 7 (Contract Drawings). Design the ramps in accordance with the PDC.
2. Provide an additional 12 foot of grading for future two-lane off ramp in accordance with the drawing in Part 7 (Contract Drawings) with the following exceptions:
    a. 5400 South southbound and 7800 South southbound auxiliary lane.

15C-2 Crossing Roadways

Design and construct all roadway work in accordance with the functional classification and category for the specific AASHTO roadway type.

For roads that are not within the No Access Line and are not owned by the Department, design and construct according to the appropriate standards and criteria of the governing city or county; except, for the following cases comply with the requirements described below:

A. 5400 South

1. Construct the roadway in accordance with the Typical Sections in Part 7 (Contract Drawings). Reconstruct the existing concrete pavement on 5400 South at the intersection to the existing concrete joint limits located both east and west of Bangerter Highway. See Part 4-11 (Pavement) for additional requirements.
2. Do not impact or relocate the existing Gantries used for the flex lanes.

B. 7000 South

1. Construct the roadway in accordance with the Typical Sections in Part 7 (Contract Drawings). Reconstruct the existing concrete pavement on 7000 South at the intersection from the existing concrete pavement limits. See Part 4-11 (Pavement) for additional requirements.

C. 9000 South

1. Construct the roadway in accordance with the Typical Sections in Part 7 (Contract Drawings). Reconstruct the existing concrete pavement on 9000 South at the intersection from the existing concrete pavement limits. See Part 4-11 (Pavement) for additional requirements.

D. 11400 South

1. Construct the roadway in accordance with the Typical Sections in Part 7 (Contract Drawings). Reconstruct existing pavement on 11400 South from the east curb return

at 4000 West to the west curb return at 3600 West. See Part 4-11 (Pavement) for additional requirements.

2. Construct Bangerter Highway under 11400 South. The elevation of 11400 South cannot be raised more than five feet above existing elevation.

E. 4015 West Build Alterative

1. Construct the roadway in accordance with the Typical Sections in Part 7 (Contract Drawings).
2. At each U-turn intersection (U-turn intersections are 4015 West & Sam's Boulevard, 4015 West & Point Lane, and 5400 South & 4120 West):
   a. Remove all U-turn roadway elements such as (but not limited to) existing curb, gutter, sidewalk, raised island, associated U-turn signs, signals, striping and asphalt pavement in the bulb-out area (bulb-out area is the area of the U-turn outside of the standard travel lane and shoulder of the main street, 4105 West or 5400 South, and side street, Sam's Boulevard, Point Lane or 4120 West). Refer to Part 4, Section 18 (Traffic Signals) for removal and salvage of existing traffic signal.
   b. Reconstruct curb, gutter, drainage structure, parkstrip, sidewalk, and asphalt pavement, signing and striping to eliminate the bulb-out and to reconfigure the intersections as a standard intersection configuration. Relocate any necessary utilities such as fire hydrants in the parkstrip.

F. Local Streets

1. For parcels where buildings are demolished, remove curb and gutter curb cuts, driveway aprons, and driveways.
2. Place full-height curb and gutter matching existing width and shape of the existing curb and gutter.
3. Remove the existing sidewalk from parcel 154 to 173 on east side of Tippecanoe Way.
4. Provide crosswalk and pedestrian ramps from east side to west side of Tippecanoe where sidewalk removal ends south of parcel 174 along east side of Tippecanoe.
5. Reconstruct the knuckle at the corner of New Heritage Drive and 9150 South. Construct a turn-around area for an AASHTO City Bus and obtain Approval from West Jordan City for the design.
6. Remove the existing cul-de-sac at Winthrope Circle; pavement, curb, sidewalk. Construct a turn-around area for an AASHTO City Bus and obtain Approval from West Jordan City for the design.

15C-3 Interchange Criteria

Provide a Single-Point Urban Interchange (SPUI) at each interchange. A concept is provided in Reference Documents. If an alternate configuration is proposed, seek approval through the ATC process.

A. Provide a minimum of 4.0 feet from front face of curb to face, side or corner of bridge abutment or MSE wall unless barrier is provided.

B. Left hand exits or entrances are not allowed.

C. Provide parallel-type entrance ramps. Place the noise wall and grade to accommodate dual-lane off-ramps. Construct all other items of Work associated with the off ramps in a single-lane off-ramp configuration.

D. For on-ramps, provide acceleration lengths from the ramp meter stop bar.

E. For off-ramps, provide the deceleration lengths to the back of the ramp terminal intersection storage lengths in accordance with the PDC.

F. Provide ramp meter storage as shown in Table 15C-1.

G. Provide a minimum separation width of 10 feet between opposing left turning lanes.

H. Stop Bars for all movements will not be staggered.

I. Provide a maximum 2:1 (larger radius: small radius) compound ratio between the radii of the two curves on each ramp. Place the larger radius first in the direction of travel for on-ramps and the smaller radius first in the direction of travel for the off ramps.

J. Provide a southbound auxiliary lane between 7800 South and 7000 South.

15C-4 Horizontal and Superelevation Design

Provide horizontal curves for all horizontal alignment deflection angles greater than 0.5 degrees (30 minutes). Provide a minimum of 800 feet tangent between deflection angles.

15C-5 Vertical Design

Use a minimum vertical curve length in accordance with AASHTO design speed k values. Pavement transitions are subject to vertical design requirements. The minimum vertical curve length is 500 feet for mainlines, 200 feet for ramp bodies and State facilities, and 100 feet for ramp terminals. For all other non-State facilities, the minimum vertical curve length shall be 100 feet.

A vertical curve is required for grade breaks with an algebraic difference greater than 0.2 percent on mainline and ramps, and 0.5 percent for all other facilities. Provide a minimum of 500 feet between grade breaks along mainline and ramps, and minimum of 200 feet between grade breaks on all other facilities. The free right turn movements at the SPUI's are excluded from minimum vertical curve lengths and minimum grade break differences.

Design the maximum final pavement elevation of Bangerter Highway, ramps, and cross streets to not exceed the following elevations within a 100 foot zone, 50 feet north and 50 feet south of the existing Rocky Mountain Power (RMP) overhead power lines that run parallel to 5400 South, 9000 South, and 11400 South, and cross Bangerter Highway within the Project limits.

- 5400 South 4584.00
- 9000 South 4529.00
- 11400 South 4663.50

15C-6 Design Vehicle

For all turning movements along 5400 South, 7000 South, 9000 South, 11400 South, Bangerter Highway (SR-154) and ramps, comply with the following requirements:

A. For all single lane turning movements, an AASHTO WB-67 design vehicle must be able to turn from turning lane to receiving lane with its wheels entirely on lane, gutter pan or shoulder pavement.

B. For all multiple lane turning movements:

1. For left turns, an AASHTO WB-67 design vehicle's wheels must stay within the outside lane, gutter pan and shoulder pavement without crossing the left lane line. For the left lane, AASHTO WB-40 must be used.
2. For right turns, an AASHTO WB-67 design vehicle's wheels must stay within the right lane, gutter pan, and shoulder pavement without crossing the left lane line.

For all other turning movements use an AASHTO WB-40 design vehicle for all lanes of all turning movements.

For the design of a cul-de-sac when existing cul-de-sacs are modified or new ones are created on City streets use an AASHTO City Bus design vehicle and the respective City standard requirements for all turning movements.

15C-7 On-Ramps

Provide pavement to accommodate future ramp meters on all on-ramps. Provide a minimum of three lanes on all on-ramps from the ramp terminal to the stop bar without impacting cross-street traffic or pedestrian movements for 5400 South and 7000 South. Provide a minimum of three lanes on the northbound on-ramp from the ramp terminal to the stop bar without impacting the cross-street or pedestrian movements at 9000 South. Provide a minimum of three lanes on the southbound on-ramp at the ramp terminal with two lanes at the stop bar without impacting cross-street traffic or pedestrian movements at 9000 South. Provide a minimum of three lanes on all on-ramps at the ramp terminal with two lanes at the stop bar without impacting cross-street traffic or pedestrian movements at 11400 South.

Use a minimum 300-foot taper for each lane drop on each on-ramp except for approved deviations in the appendix to this Section.

Provide the following ramp storage lengths from the cross street curb return to the ramp meter stop bar and ramp lengths between end of taper to beginning of taper (lengths in Table 15C-1 (On-Ramp Lengths) do not include taper lengths):

TABLE 15C-1
ON-RAMP LENGTHS

Ramp	*Required Ramp Meter Storage Length (Lane-Feet)*	*Desired Ramp Meter Storage Length (Lane-Feet)*	*Length of two lane section between tapers (Feet)*	*Length of one lane section between tapers (Feet)*
5400 South				
Southbound	3,000	4,100	300	300
Northbound	1,200	1,200	300	300
7000 South				
Southbound	1,875	1,875	300	300

Northbound	900	900	300	300
9000 South				
Southbound	2,400	2,400	300	300
Northbound	1,900	2,790	300	300
11400 South				
Southbound	1,800	2,520	300	300
North bound	2715	3,200	300	300

15C-8 Off Ramps

Provide the required deceleration length from the painted gore to the beginning of the required queue length as shown in the PDC.

15C-9 Project Design Criteria (PDC) Changes

The Department has approved the Project Design Criteria (PDC) for the Project as shown in Attachment 15-A to this Section 15. The Department has approved Project Design Criteria for the 4015 West Build Alternative as shown in Attachment 15-A to this Section. Any updates or modifications to the PDC must be Approved by the Department before the subject Work is performed.

15C-10 Design Exceptions/Waivers

The Department has approved Design Exceptions/Waivers for the Project as shown in the appendix to this Section. The Design-Builder shall be responsible for obtaining any other necessary Design Exceptions/Waivers for the Project.

15C-11 Typical Sections

Design roadways in accordance with Part 7 (Contract Drawings).

Provide the structure clear spans illustrated the Structure Clearance Envelope included in Part 7 (Contract Drawings) free of all bridge substructure, retaining walls, and slope paving.

15C-12 Intersections

Provide turn-lane storage lengths and number of turn lanes in accordance with the (PDC) for the Project as shown in Attachment 15-A to this Section 15.

15C-13 Barrier

For all roadside locations where clear zone requirements are not met, provide a 42-inch minimum cast-in-place constant-slope barrier or 42-inch minimum cast-in-place constant-slope half-barrier based on the required length of need for any obstruction within the clear zone.

Provide a 42-inch minimum cast-in-place constant-slope barrier in the median along Bangerter Highway (SR-154) if existing median barrier is impacted or removed. Tie new median barrier to

existing barrier using required barrier transition element from 42 inch to 32 inch barrier. Remove existing median barrier from MP 11.8 to MP 12.6 and provide 42 inch cast-in-place constant-slope barrier. At MP 11.8 transition 42 inch barrier to 54 inch barrier. Connect new 42 inch barrier to existing 42 inch barrier at MP 12.6.

Provide 32-inch pre-cast concrete half barrier along the front face of the MSE walls or provide a 42-inch cast in place barrier at the edge of the pavement when the wall is inside the clear zone.

Provide 54 inch cast-in-place barrier (TL-5) around structural columns per Standard Drawing BA 1E for the Old Bingham Hwy, both UTA, and the canal structures north of 9000 South. See Appendix 2 for an approved deviation at this location removing the 4 foot separation requirement between the barrier and columns.

If existing barrier along structural columns is impacted or removed at all other locations, provide 54-inch minimum cast-in-place barrier around structural columns per Standard Drawing BA 1E. See Part 4-17 (Structures) for additional requirements.

15C-14 Curb, Curb & Gutter, and Median Curb

In locations where barrier is not installed along the edge of Bangerter Highway (SR-154) and the ramps, provide concrete curb and gutter Type M1. Extend M1 curb and gutter until it ties back to existing curb and gutter along Bangerter Highway (SR-154). Extend M1 curb and gutter along ramps up to the curb returns at the ramp terminal. Provide Concrete M1 curb and gutter at the edge of pavement along 5400 South, 7000 South, 9000 South, and 11400 South between ramps unless the street is on the structure.

Provide concrete curb Type M2 at ramp terminals for splitter islands.

Provide concrete curb Type B5 in the median along 5400 South, 7000 South, 9000 South, and 11400 South until it ties back to existing curb.

Provide back-to-back B5 curb along left turn pockets.

Provide concrete curb and gutter Type B1 along 5400 South, 7000 South, 9000 South, and 11400 South from the outside of the ramp curb returns to existing curb and gutter.

Provide concrete curb and gutter that meets the governing City for any local street that needs to be reconstructed as part of this Project.

4105 West Build Alternative: Provide concrete curb Type B5 in the median along 5400 South between 4120 West and 3900 West. Remove raised median curbs on 4015 West from Sam's Boulevard to Point Lane.

15C-15 Sidewalk and Parkstrips

Provide concrete sidewalk and/or parkstrips on any street that is being reconstructed as part of this project that currently has sidewalk and parkstrip that is being removed. Match existing widths for sidewalk and parkstrip. Replace in-kind aesthetic treatment in parkstrip areas.

Provide concrete sidewalk and a pedestrian crossing across the south side of the 7000 South interchange that ties into existing sidewalk on the east and west side. Provide width for a future sidewalk and pedestrian crossing on the north side of the 7000 South interchange between ramp intersections.

15C-16 Pedestrian Ramps

Provide new ADA-compliant pedestrian access ramps where a pedestrian path intersects a roadway being constructed, reconstructed, or repaved. Provide documentation and calculations at design submittal reviews that show the pedestrian ramps will meet ADA requirements.

Coordinate with the Department and each city for guidance on the color of truncated domes for pedestrian access ramps on City-owned streets. A single color shall be used for all ramps at a single intersection.

Complete the UDOT *Pedestrian Access Ramp Evaluation Form (Form C-170)* upon completion of each pedestrian ramp and provide in As-builts.

15C-17 Fencing

Provide new 6-foot chain link fence type III, within the pavement reconstruction limits along Bangerter Highway (SR-154) and at each cross street along the No-Access line. Replace any fence damaged or removed for construction activities with new fence of the same size and type.

For all other roadways, provide new fence along each parcel that currently has fencing with the same type and size. Obtain permission from the property owner(s) for elimination of fencing.

Fencing is not required along the No-Access line where noise walls are required. Install a gate if there is an existing gap for access to the noise wall.

Connect existing fence into the new noise wall locations, match the existing fence type.

15C-18 Maintenance Access Zone

Provide a continuous 10-foot-wide maintenance access zone between the ROW fencing and the face of retaining wall or between the ROW fencing and the toe of any slope greater than 4:1 (H:V). Limit the slope of the maintenance access zone to less than 4:1 (H:V). Limit the slope of the maintenance access zone to less than 4:1 (H:V). Allowable deviations from maintenance access requirements are shown in the Right of Plans in Part 7 (Contract Drawings). During design development, provide a description of areas that deviate from the maintenance access requirement that includes length, width, location, point of access and distance from point of access. Provide 12-foot-wide gates in the ROW fence and a drivable transition between the local street network and each segment of the maintenance access zone. Do not place above-grade appurtenances, including ATMS cabinets, sign structures, lighting supports, trees, shrubs, walls, drainage features or structures, within the maintenance access zone.

9000 South

Provide access from the northbound off ramp to the existing driveways for the USBOR Aqueduct Easement.

15C-19 Snow Storage Area

Provide a minimum 5-foot-wide area that can be used for snow storage between roadway barriers and noise walls. Include drainage of this area in the design and construction of drainage facilities.

15C-20 Walls

Provide noise walls in accordance with Right of Way Drawings in Part 7 (Contract Drawings). Reconstruction of noise walls is limited to the wall that is impacted by the Project.

Provide 1 foot between the face of noise wall, retaining noise wall to the N/A line.

15C-21 Survey

Perform any survey necessary to complete the Work. Survey and confirm the location, accuracy, and datum of all information provided, regardless of the source of the information. Existing horizontal and vertical survey control is provided in Part 7 (Contract Drawings).

Provide a statement before beginning design indicating all Department-provided horizontal and vertical control has been field checked and the control has been determined to be accurate within the tolerances specified in the UDOT Survey & Geomatics Standards which can be found at http://www.udot.utah.gov/main/f?p=100:pg:0::::1:T,V:1521,. Attach field survey information used to verify control. Notify the Department verbally and in writing if discrepancies are found.

SUBMITTALS

Provide submittals to the Department in accordance with Table 15D-1.

TABLE 15D-1
DESIGN-BUILDER SUBMITTALS FOR ROADWAYS

Submittal	***For Approval***	***Schedule***
Pedestrian Access Ramp Evaluation Form: C-170	No	Prior to Substantial Completion
List of deviations	Yes	Prior to submittal of Released for Construction documents
Statement of verification of survey control	No	Prior to beginning design

Appendix 1: PROJECT DESIGN CRITERIA

PROJECT DESIGN CRITERIA - URBAN ARTERIAL - OTHER

I. PROJECT DESCRIPTION

DATE: 7/7/2016

Project No	**S-0154(12)11**	**Location**	**4 Interchanges on Bangerter Highway**
PIN	**12566**	**Concept**	**4 Interchanges on Existing Freeway**

Describe the scope of the project Construct 4 New Interchanges

II. DESIGN STANDARDS BY ROADWAY

(Complete a separate PDC for each roadway on your project)

Date of OSR: 2/18/2016

Roadway Name: **SR-154 (Bangerter Hwy) - 5400 South**

Roadway Characteristics

Functional Class	Urban Arterial - Other			**Pavement Type**	Rigid	
Current Year	2015	**AADT=**	**56,000**	**Terrain**	Rolling Terrain	
Design Year	2040	**AADT=**	**109,000**	**% Trucks (current)**	6%	
Design Vehicle	WB-67			**Posted / Design Speed**	55	65

Proposed Roadway Characteristics

Total Number of Lanes 6

Shoulder Width (Typ) 12'

Curb & Gutter Type & Width (Typ) Type M1 (2.5')

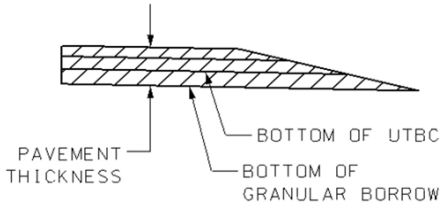
Comments

Ramps A, B, C & D
- Design Speed - 55 mph
  - 300 ft along ramp beyond painted gore in the travel direction
- Design Speed - 45 mph
  - Ramp Body
- Design Speed - 20 mph (20 MPH design speed continues through left turn movement)
  - Within 300 ft of 5400 S

Refer to Standard Drawings DD 5 and DD 6 for design of ramp elements, use the design speeds listed above for determining superelevation, minimum radii, vertical curve k values, stopping sight distance, and clear zone. Superelevations method 2 can be used for curves at the ramp terminal

Pavement Thickness

See Typical Sections in Part 7



Pavement Thickness consists of Hard Surfacing, UTBC, and Granular Borrow (if used).

Order of Precedence: SD - 2012 Standard Drawings; MOI - Roadway Design Manual of Instruction; GB - AASHTO Green Book 2011 Edition

FHWA 13 Critical Elements	UDOT Standard	RFP Requirement	Design Exception	References	Date of Decision, Comments, Mitigation, etc.
Design Speed	65 mph	65 mph	☑ Not Required ☐ Required ☐ Approved	**MOI** 2-1; **GB** pp. 2-53:58, 8-1:2	Determined by Concept Team
Lane Width	**Mainline** 12' **LT Turn Lane(s)** 12' **RT Turn Lane(s)** 12'	12' 12' 12'	☑ Not Required ☐ Required ☐ Approved	**SD** (DD & ST series); **MOI** 7-1, 43:47, 107; **GB** pp. 8-2:3	
Shoulder Width	**Outside** 12'; **Inside** 12'; **Barrier Offset** 2'	**Outside** *12'; **Inside** 12'; **Barrier Offset** 2'	☐ Not Required ☐ Required ☑ Approved	**SD** (DD & ST series); **MOI** 7-44:46; **GB** pp. 4-8:11, 8-2:3	*Design exception to reduce the outside shoulder for the SB On Ramp only.
Superelevation	**Maximum Superelevation** 6%	**Maximum Superelevation** 6%	☑ Not Required ☐ Required ☐ Approved	**SD** DD 1; **MOI** 7-26:29; **GB** pp. 8-3, 3-45 (T. 3-9)	
Horizontal Alignment	**Minimum Radii Value** 1660'	**Minimum Radii Value** 1660'	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-30:33, 50:55; **GB** pp. 8-6, 3-32 (T. 3-7), 3-45 (T. 3-9)	
Vertical Alignment	**Sag Curve Min. K Value** 157; **Crest Curve Min. K Value** 193	**Sag Curve Min. K Value** 157; **Crest Curve Min. K Value** 193	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-56:60; **GB** pp. *crest* 3-155: 157 (T. 3-34:35), *sag* 3-161 (T. 3-36)	
Profile Grades	**% Min** 0.30%; **% Max** 5.00%	**% Min** 0.30%; **% Max** 6.00%	☐ Not Required ☐ Required ☑ Approved	**MOI** 7-58:62; **GB** pp. 3-119, 8-3:4 (T. 8-1)	0.50% preferred
Cross Slope	**Standard Value** 2%	**Value Proposed/Used** 2%	☑ Not Required ☐ Required ☐ Approved	**SD** (DD, DD 4); **MOI** 7-47:48; **GB** pp. 4-1:6, 8-2:3	
Stopping-Sight Distance	**Minimum** 645'	**Minimum** 645'	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-62; **GB** pp. 3-2:8, 3-106:110, 3-4 (T. 3-1)	
Structural Capacity	**Design Loading** HL-93	**Design Loading** HL-93	☑ Not Required ☐ Required ☐ Approved	**MOI** 11-2:3; **GB** p. 8-4	HS-20 for existing; HL-93 for new construction
Bridge Width	**Minimum** 62'-10"	**Minimum** 62'-10"	☑ Not Required ☐ Required ☐ Approved	**SD** DD 9; **MOI** 11-3; **GB** p. 8-4	Bridge width per direction
Vertical Clearance*	**Minimum** 16.5' over road, 23.5' over rail	**Minimum** 16.5'	☑ Not Required ☐ Required ☐ Approved	**SD** DD 8:0; **MOI** 11-4:5; **GB** p. 8-4	* Notify FHWA on any changes to Vertical Clearance on the National Highway System
Lateral Offset to Obstruction	**Minimum** Urban environments shoulder + 2', other locations clearzone.	**Minimum** Urban environments shoulder + 2', other locations clearzone.	☑ Not Required ☐ Required ☐ Approved	**SD** DD 17; **GB** p. 8-5, 10-19:21	

Design Waivers	UDOT Standard	RFP Requirement	Design Waiver	References	Date of Decision, Comments, Mitigation, etc.
Acceleration Lanes	V: 65 mph Va: 50 mph V'a / L: 0 / 1410 14 / 1350 18 / 1310 22 / 1220 26 / 1120	Location / L: Ramp B 0 to 65 (SB On) / 1410' Ramp D 0 to 65 (NB On) / 1410'	☑ Not Required ☐ Required ☐ Approved	Refer to Table 10-4 **GB** pp. 10-111:112 to adjust for grade. A part of the ramp proper may also be considered in the acceleration length as a design waiver. Table 10-3 **GB** p. 10-110. See also **GB** pp. 9-124:125, 10-107:110, 116:122; **SD** DD 13A:14B, ST 1; **MOI** 7-106	
Deceleration Lanes	V: 65 mph Va: 55 mph V'a / L: 0 / 570 14 / 540 18 / 520 22 / 500 26 / 470	Location / L: Ramp A 65 to 0 (NB Off) / 570' Ramp C 65 to 0 (SB Off) / 570'	☑ Not Required ☐ Required ☐ Approved	Refer to Table 10-4 **GB** pp. 10-111:112 to adjust for grade. Table 10-5 **GB** p. 10-115. See also **GB** pp. 9-124:125, 10-107,112:120, 123:124; **SD** DD 13A:14B, ST 3A:3B; **MOI** 7-106	
Guardrail Bridge Connection	UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.	UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.	☑ Not Required ☐ Required ☐ Approved	**SD** BA 4B1:4B2, UDOT Design Exception Form	
Clear Zone	Meet clear zone compliant requirements defined in Standard Drawings.	30'	☑ Not Required ☐ Required ☐ Approved	2006 Roadside Design Guide pg. 3-6 and Figure 3.2 pg. 3-8; **SD** DD 4, 8, 10-12,17	
Intersection Sight Distance	Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.	Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.	☑ Not Required ☐ Required ☐ Approved	**GB** pp. 9-28:54, **MOI** 7-64:67	
Ramp Terminal Sight Distance	Along the Ramp: Design Speed / SSD (ft) 70 mph / 730 55 mph / 495 50 mph / 425 45 mph / 360 40 mph / 305 35 mph / 250 30 mph / 200 25 mph / 155 Along the Freeway or Street Preceeding Approach Nose of Exit Ramp: Design Speed / SSD (ft)* / DSD (ft)** 70 mph / 915 / 1445 55 mph / 620 / 1135 50 mph / 535 / 1030 45 mph / 450 / 930 40 mph / 385 / 825 35 mph / 315 / 720 30 mph / 250 / 620 25 mph / 200 / N/A	Along the Ramp: Design Speed / SSD (ft) 65 mph / 645 55 mph / 495 45 mph / 360 25 mph / 155 20 mph / 115 Along the Freeway or Street Preceeding Approach Nose of Exit Ramp: Location / SSD* / DSD** SR-154 Approaching Ramp A (NB Off) / 810' / 1365' SR-154 Approaching Ramp C (SB Off) / 810' / 1365'	☑ Not Required ☐ Required ☐ Approved	SSD (Stopping Sight Distance) should be at least as great as design SSD *SSD is 25% greater than minimum SSD. **DSD is Decision Sight Distance based on avoidance maneuver 'E' and is desired where feasible. Document DSD but do not obtain waiver if DSD is not met. **GB** p. 3-4 (T. 3-1) **GB** p. 3-7 (T. 3-3) **GB** p. 10-92	
Shoulder/Travel way (gutter pan)	The gutter pan is not considered a part of the traveled way or shoulder.	The gutter pan is not considered a part of the traveled way or shoulder.	☑ Not Required ☐ Required ☐ Approved	**GB** pp. 4-19, 10-103; **MOI** 7-1, 43:44	

Design Waivers	UDOT Standard	RFP Requirement	Design Waiver	References	Date of Decision, Comments, Mitigation, etc.
Gores	Follow the key points from 2011 AASHTO: • Should be uniform along the freeway; • Geometric shape is appropriate for given speeds; • Mitigation required for major obstructions in a gore; and • Unpaved area beyond the gore nose should be graded nearly level with the roadways as practical.	Location: 5400 South Meets all Requirements?: YES	☑ Not Required ☐ Required ☐ Approved	**GB** pp. 10-96:101; **SD** DD 6, ST 3A:3B	
Ramp Terminals	Platform Location: Ramp side of the approach nose or merging end. Length: 200 ft At- grade terminal of ramp.: Varies	Platform Location: Ramp side of the approach nose or merging end. Length: 200 ft t- grade terminal of ramp.: Varies	☑ Not Required ☐ Required ☐ Approved	Avoid left hand entrances and exits. **GB** pp. 10 103:104. Ramp Terminal means: 1) the exit terminal from the side street onto the freeway entrance ramp; 2) the entrance terminal onto the freeway; 3) the exit terminal from the freeway onto the exit ramp; and 4) the entrance terminal from the freeway exit ramp onto the side street. Refer to **GB** 10-104 for platform lengths. **MOI** 7-105:106	
On Ramp Design	Type: Parallel Curve Radius: 1000 ft Dist. From Physical Nose to Ramp Control Line Terminus: 200 ft Taper: 300 ft min	Ramp Loc.: 5400 South Ramps Type: Parallel Curve Rad.: 1000 ft Dist.: 200 ft Taper: 300'	☑ Not Required ☐ Required ☐ Approved	**GB** pp. 10-107:112; **SD** DD 6, ST 1; **MOI** p. 1-2. UDOTs preferred approach is to utilize parallel entrance ramps. See **GB** pp. 10-89:90; **MOI** 7-105:106.	
Off Ramp Design	Type: Taper Divergence Angle (deg): 2-5 Dist. from outer edge alignment break to ramp control line: 200 ft	Ramp Loc.: 5400 South Ramps Type: Taper Angle: 2-5 Dist.: 200 ft	☑ Not Required ☐ Required ☐ Approved	**GB** pp. 10-112:116; **SD** DD 6, ST 3A:3B; **MOI** p. 1-2. UDOTs preferred approach is to utilize tapered exit ramps for single lane exits. If multi lane exit, one lane must be parallel. See **GB** pp. 10-89:90; **MOI** 7-105:106.	
Curb Configuration	2011 AASHTO p.10-103	Type M1	☑ Not Required ☐ Required ☐ Approved	Determine if the curb is appropriate for the type of facility. **GB** pp. 4-16:19, 10-103; **SD** GW 2	
Traffic Control	Meet Traffic Control Standard Drawings requirements	Meet Traffic Control Standard Drawings requirements	☑ Not Required ☐ Required ☐ Approved	**SD** TC series	
Rumble Strips	Meet Paving Standard Drawings requirements	Meet Paving Standard Drawings requirements	☑ Not Required ☐ Required ☐ Approved	**SD** PV 6A:8B	

Prepared by _____ Date 10/7/2016

Verified Only _____ Date _____
- Local Government Projects Only

Approved by _____ Charles Mason-Hill 2016.10.13 14:59:35 -06'00' Date _____

On local government projects that are not on a UDOT road, the Region Preconstruction Engineer signs the "Verified Only" line and the Engineer of Record signs the "Approved by" line. For all other projects, the "Verified Only" line is left blank and the Region Preconstruction Engineer signs the "Approved by" line.

PROJECT DESIGN CRITERIA - URBAN ARTERIAL

I. PROJECT DESCRIPTION

DATE: 7/7/2016

Project No	**S-0154(12)11**	**Location**	**4 Interchanges on Bangerter Highway**
PIN	**12566**	**Concept**	**4 Interchanges on Existing Freeway**

Describe the scope of the project Construct 4 New Interchanges

II. DESIGN STANDARDS BY ROADWAY

(Complete a separate PDC for each roadway on your project)

Date of OSR: 2/18/2016

Roadway Name: **5400 South**

Roadway Characteristics

Functional Class	Urban Arterial			**Pavement Type**	Rigid	
Current Yea	2015	**AADT=**	38,000	**Terrain**	Flat	
Design Yea	2040	**AADT=**	45,000	**% Trucks (current)**	4%	
Design Vehicle	WB-67			**Posted / Design Speed**	45	50

Comments

*8' shoulders will be provided in the interchange limits (through pork chop islands between left and right hand turns on each leg of the interchange)

Proposed Roadway Characteristics

Total Number of Lanes	6	**Park Strip Width (Typ)**	5'
Shoulder Width (Typ)	0	**Sidewalk Width (Typ)**	4' - 6'
Curb & Gutter Type & Width (Typ)	Type B1 (2.5')		

Intersection #1:

Roadway Name	Dir.	# of LT Lanes	Storage Length	# of Thru Lanes	# of RT Lanes	Storage Length
5400 South	**EB**	2	250	3	1	N/A
5400 South	**WB**	2	185	3	0	N/A
NB Off Ramp	**NB**	2	525	0	2	525
SB Off Ramp	**SB**	2	450	0	1	450

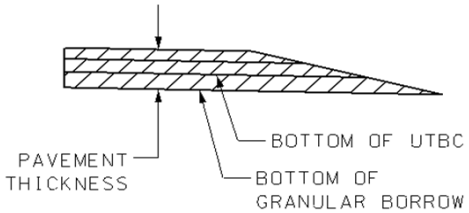
Curb Radius From T.B.C.

NW Curb Radius:	25'
SW Curb Radius:	68.5'
NE Curb Radius:	70.5'
SE Curb Radius:	25'

Pavement Thickness

See Typical Sections in Part 7

Ramp	Required Ramp Meter Storage (Lane-Feet)
SB On Ramp	3000
NB On Ramp	1200



Pavement Thickness consists of Hard Surfacing, UTBC, and Granular Borrow (if used).

Order of Precedence: SD - 2012 Standard Drawings; MOI - Roadway Design Manual of Instruction; GB - AASHTO Green Book 2011 Edition

FHWA 13 Critical Elements	UDOT Standard	RFP Requirement	Design Exception	References	Date of Decision, Comments, Mitigation, etc.
Design Speed	50 MPH	50 MPH	☑ Not Required ☐ Required ☐ Approved	**MOI** 2-1; **GB** pp. 2-53:58, 7-27	Determined by Concept Team
Lane Width	**Mainline** 12' **LT Turn Lane(s)** 12' **RT Turn Lane(s)** 11'	11' 11' 11'	☐ Not Required ☐ Required ☑ Approved	**SD** (DD & ST series); **MOI** 7-1, 43:47, 107; **GB** pp. 7-29:30	11' lanes allowed per existing design exception, PIN 8523
Shoulder Width	**Outside** 8'; **Inside** N/A; **Barrier Offset** N/A	**Outside** 0'*; **Inside** N/A; **Barrier Offset** N/A	☐ Not Required ☐ Required ☑ Approved	**SD** (DD & ST series); **MOI** 7-44:46; **GB** pp. 4-8:11, 7-30	*Standard 8' shoulders must be provided within the interchange limits.
Superelevation	**Maximum Superelevation** 4%	**Maximum Superelevation** 4%	☑ Not Required ☐ Required ☐ Approved	**SD** DD 1; **MOI** 7-26:29; **GB** pp. 7-29, 3-44 (T. 3-8)	
Horizontal Alignment	**Minimum Radii Value** 926'	**Minimum Radii Value** 926'	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-30:33, 50:55; **GB** pp. 7-28, 3-32 (T. 3-7), 3-44 (T. 3-8)	
Vertical Alignment	**Sag Curve Min. K Value** 96; **Crest Curve Min. K Value** 84	**Sag Curve Min. K Value** 96; **Crest Curve Min. K Value** 84	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-56:60; **GB** pp. *crest* 3-155: 157 (T. 3-34:35), *sag* 3-161 (T. 3-36)	
Profile Grades	**% Min** 0.30%; **% Max** 6.0%	**% Min** 0.30%; **% Max** 6.0%	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-58:62; **GB** pp. 3-119, 7-28:29 (T. 7-4)	0.50% preferred
Cross Slope	**Standard Value** 2%	**Value Proposed/Used** 2%	☑ Not Required ☐ Required ☐ Approved	**SD** (DD series); **MOI** 7-47:48; **GB** pp. 4-1:6, 7-29	
Stopping-Sight Distance	**Minimum** 425'	**Minimum** 425'	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-62; **GB** pp. 3-2:8, 3-106:110, 7-28, 7-3 (T. 7-1)	
Structural Capacity	**Design Loading** HL-93 for New Construction	**Design Loading** HL-93 for New Construction	☑ Not Required ☐ Required ☐ Approved	**MOI** 11-2:3; **GB** p. 7-38	HS-20 for existing; HL-93 for new construction
Bridge Width	**Minimum** N/A	**Minimum** N/A	☑ Not Required ☐ Required ☐ Approved	**SD** DD 9; **MOI** 11-3; **GB** pp. 7-37:38	
Vertical Clearance*	**Minimum** 16.5' over road, 23.5' over rail	**Minimum** 16.5'	☑ Not Required ☐ Required ☐ Approved	**SD** DD 8:9; **MOI** 11-4:5; **GB** p. 7-38	* Notify FHWA on any changes to Vertical Clearance on the National Highway System
Lateral Offset to Obstruction	**Minimum** 1.5' tangent / 3' radius	**Minimum** 1.5' tangent / 3' radius	☑ Not Required ☐ Required ☐ Approved	**SD** DD 17; **GB** pp. 7-37:38	

Design Waivers	UDOT Standard				RFP Requirement		Design Waiver	References	Date of Decision, Comments, Mitigation, etc.
Acceleration Lanes	**V**	**Va**	**V'a**	**L**	**Location**	**L**	☑ Not Required ☐ Required ☐ Approved	Refer to Table 10-4 **GB** pp. 10-111:112 to adjust for grade. A part of the ramp proper may also be considered in the acceleration length as a design waiver. Table 10-3 **GB** p. 10-110. See also **GB** pp. 9-124:125, 10-107:110, 116:122; **SD** DD 13A:14B, ST 1; **MOI** 7-106	
	50 mph	39 mph	0	720	N/A				
			14	660					
			18	610					
			22	550					
			26	450					
Deceleration Lanes	**V**	**Va**	**V'a**	**L**	**Location**	**L**	☐ Not Required ☐ Required ☑ Approved	Refer to Table 10-4 **GB** pp. 10-111:112 to adjust for grade. Table 10-5 **GB** p. 10-115. See also **GB** pp. 9-124:125, 10-107,112:120, 123:124; **SD** DD 13A:14B, ST 3A:3B; **MOI** 7-106	*Design waiver provided
	50 mph	44 mph	0	435	EB Left Turn	*140'			
			14	405	WB Left Turn	435'			
			18	385	WB Left Turn Onto 3900 W	*140'			
			22	355					
			26	315					
Guardrail Bridge Connection	UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.				N/A		☑ Not Required ☐ Required ☐ Approved	**SD** BA 4B1:4B2, UDOT Design Exception Form	
Clear Zone	Meet clear zone compliant requirements defined in Standard Drawings.				20'		☑ Not Required ☐ Required ☐ Approved	2006 Roadside Design Guide pg. 3-6 and Figure 3.2 pg. 3-8; **SD** DD 4, 8, 10:12,17	
Intersection Sight Distance	Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.				Sight triangles cases A-F and skew are met.		☑ Not Required ☐ Required ☐ Approved	**GB** pp. 9-28:54, **MOI** 7-64:67	
Shoulder/Travel way (gutter pan)	The gutter pan is not considered a part of the traveled way or shoulder.				The gutter pan is not a part of the shoulder or traveled way.		☑ Not Required ☐ Required ☐ Approved	**GB** pp. 4-19, 10-103; **MOI** 7-1, 43:44	
Curb Configuration	2011 AASHTO p. 10-103				Type B1,Type B5, Type M2		☑ Not Required ☐ Required ☐ Approved	Determine if the curb is appropriate for the type of facility. **GB** pp. 4-16:19, 10-103; **SD** GW 2	
Traffic Control	Meet Traffic Control Standard Drawings requirements				Meet Traffic Control Standard Drawings requirements		☑ Not Required ☐ Required ☐ Approved	**SD** TC series	
Rumble Strips	Meet Paving Standard Drawings requirements				N/A		☑ Not Required ☐ Required ☐ Approved	**SD** PV 6A:8B	

Prepared by _____ Date 10/7/2016

Verified Only _____ Date _____
- Local Government Projects Only

Approved by _____ Charles Mason-Hill 2016.10.13 15:00:03 -06'00' Date _____

On local government projects that are not on a UDOT road, the Region Preconstruction Engineer signs the "Verified Only" line and the Engineer of Record signs the "Approved by" line. For all other projects, the "Verified Only" line is left blank and the Region Preconstruction Engineer signs the "Approved by" line.

PROJECT DESIGN CRITERIA - URBAN ARTERIAL

I. PROJECT DESCRIPTION

DATE: 7/28/2016

Project No	**S-0154(12)11**	**Location**	**4 Interchanges on Bangerter Highway**
PIN	**12566**	**Concept**	**4 Interchanges on Existing Freeway**

Describe the scope of the project Construct 4 New Interchanges

II. DESIGN STANDARDS BY ROADWAY

(Complete a separate PDC for each roadway on your project)

Date of OSR: 2/18/2016

Roadway Name: **5400 South (at 4015 West)**

Roadway Characteristics

Functional Class	Urban Arterial			**Pavement Type**	Asphalt	
Current Year	2015	**AADT=**	38,000	**Terrain**	Level	
Design Year	2040	**AADT=**	45,000	**% Trucks (current)**	4%	
Design Vehicle	WB-67			**Posted / Design Speed**	40*	45*

Comments

This PDC is for 5400 South at 4015 West only. As shown in the additive bidding plans.

*Low speed urban design is assumed through the 45 MPH design speed section of 5400 South. This eastern limit of this section is just east of the reverse curves through the 4015 intersection. The 45 design speed zone then continues to the west. The design speed is classified as 50 MPH east of this zone.

Proposed Roadway Characteristics

Total Number of Lanes	6	**Park Strip Width (Typ)**	0' - 5'
Shoulder Width (Typ)	0	**Sidewalk Width (Typ)**	4' - 6'
Curb & Gutter Type & Width (Typ)	Type B1 (2.5')		

Intersection #1: **4015 West at 5400 South**

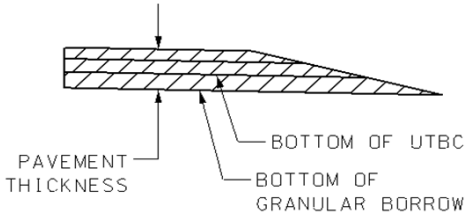
Roadway Name	Dir.	# of LT Lanes	Storage Length	# of Thru Lanes	# of RT Lanes	Storage Length
5400 South	**EB**	1	375	3	1	250
5400 South	**WB**	1	450	3	1	100
4015 West	**NB**	1	250	1	1	250
4015 West	**SB**	1	250	1	1	250

Curb Radius From T.B.C.

NW Curb Radius:	55'
SW Curb Radius:	60' (existing)
NE Curb Radius:	45'
SE Curb Radius:	60' (existing)

Pavement Thickness

See Typical Sections in Part 7



Pavement Thickness consists of Hard Surfacing, UTBC, and Granular Borrow (if used).

Order of Precedence: SD - 2012 Standard Drawings; MOI - Roadway Design Manual of Instruction; GB - AASHTO Green Book 2011 Edition

FHWA 13 Critical Elements	UDOT Standard	RFP Requirement	Design Exception	References	Date of Decision, Comments, Mitigation, etc.
Design Speed	50 MPH	50 MPH	☑ Not Required ☐ Required ☐ Approved	**MOI** 2-1; **GB** pp. 2-53:58, 7-27	
Lane Width	**Mainline** 12' **LT Turn Lane(s)** 12' **RT Turn Lane(s)** 11'	11 11 11	☐ Not Required ☐ Required ☑ Approved	**SD** (DD & ST series); **MOI** 7-1, 43:47, 107; **GB** pp. 7-29:30	Existing design exception for 11' lanes exists in this location from PIN 8523.
Shoulder Width	**Outside** 4', **Inside** N/A, **Barrier Offset** N/A	**Outside** 0', **Inside** N/A, **Barrier Offset** N/A	☐ Not Required ☐ Required ☑ Approved	**SD** (DD & ST series); **MOI** 7-44:46; **GB** pp. 4-8:11, 7-30	Existing design exception for 0' shoulders exists in this location from PIN 8523.
Superelevation	**Maximum Superelevation** 4%	**Maximum Superelevation** 4%	☑ Not Required ☐ Required ☐ Approved	**SD** DD 1; **MOI** 7-26:29; **GB** pp. 7-29, 3-44 (T. 3-8)	
Horizontal Alignment	**Minimum Radii Value** 1039'	**Minimum Radii Value** 1039'	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-30:33, 50:55; **GB** pp. 7-28, 3-32 (T. 3-7), 3-44 (T. 3-8)	PIN 8523 assumed low speed urban design for the 45 MPH design section. That will be continued.
Vertical Alignment	**Sag Curve Min. K Value** 96 **Crest Curve Min. K Value** 84	**Sag Curve Min. K Value** 96 **Crest Curve Min. K Value** 84	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-56:60; **GB** pp. *crest* 3-155: 157 (T. 3-34:35), *sag* 3-161 (T. 3-36)	
Profile Grades	**% Min** 0.30% **% Max** 6.0%	**% Min** 0.30% **% Max** 6.0%	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-58:62; **GB** pp. 3-119, 7-28:29 (T. 7-4)	0.50% preferred
Cross Slope	**Standard Value** 2%	**Value Proposed/Used** 2%	☑ Not Required ☐ Required ☐ Approved	**SD** (DD series); **MOI** 7-47:48; **GB** pp. 4-1:6, 7-29	
Stopping-Sight Distance	**Minimum** 425'	**Minimum** 425'	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-62; **GB** pp. 3-2:8, 3-106:110, 7-28, 7-3 (T. 7-1)	
Structural Capacity	**Design Loading** HL-93 for New Construction	**Design Loading** HL-93 for New Construction	☑ Not Required ☐ Required ☐ Approved	**MOI** 11-2:3; **GB** p. 7-38	HS-20 for existing; HL-93 for new construction
Bridge Width	**Minimum** N/A	**Minimum** N/A	☑ Not Required ☐ Required ☐ Approved	**SD** DD 9; **MOI** 11-3; **GB** pp. 7-37:38	
Vertical Clearance*	**Minimum** 16.5' over road, 23.5' over rail	**Minimum** 16.5'	☑ Not Required ☐ Required ☐ Approved	**SD** DD 8:9; **MOI** 11-4:5; **GB** p. 7-38	* Notify FHWA on any changes to Vertical Clearance on the National Highway System
Lateral Offset to Obstruction	**Minimum** 1.5' tangent / 3' radius	**Minimum** 1.5' tangent / 3' radius	☑ Not Required ☐ Required ☐ Approved	**SD** DD 17; **GB** pp. 7-37:38	

Design Waivers	UDOT Standard				RFP Requirement		Design Waiver	References	Date of Decision, Comments, Mitigation, etc.
Acceleration Lanes	**V**	**Va**	**V'a**	**L**	**Location**	**L**	☑ Not Required ☐ Required ☐ Approved	Refer to Table 10-4 **GB** pp. 10-111:112 to adjust for grade. A part of the ramp proper may also be considered in the acceleration length as a design waiver. Table 10-3 **GB** p. 10-110. See also **GB** pp. 9-124:125, 10-107:110, 116:122; **SD** DD 13A:14B, ST 1; **MOI** 7-106	
	50 mph	39 mph	0	720	N/A				
			14	660					
			18	610					
			22	550					
			26	450					
Deceleration Lanes	**V**	**Va**	**V'a**	**L**	**Location**	**L**	☑ Not Required ☐ Required ☐ Approved	Refer to Table 10-4 **GB** pp. 10-111:112 to adjust for grade. Table 10-5 **GB** p. 10-115. See also **GB** pp. 9-124:125, 10-107,112:120, 123:124; **SD** DD 13A:14B, ST 3A:3B; **MOI** 7-106	
	50 mph	44 mph	0	435	N/A				
			14	405					
			18	385					
			22	355					
			26	315					
Guardrail Bridge Connection	UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.				N/A		☑ Not Required ☐ Required ☐ Approved	**SD** BA 4B1:4B2, UDOT Design Exception Form	
Clear Zone	Meet clear zone compliant requirements defined in Standard Drawings.				20'		☑ Not Required ☐ Required ☐ Approved	2006 Roadside Design Guide pg. 3-6 and Figure 3.2 pg. 3-8; **SD** DD 4, 8, 10:12,17	
Intersection Sight Distance	Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.				Sight triangles cases A-F and skew are met.		☑ Not Required ☐ Required ☐ Approved	**GB** pp. 9-28:54, **MOI** 7-64:67	
Shoulder/Travel way (gutter pan)	The gutter pan is not considered a part of the traveled way or shoulder.				The gutter pan is not a part of the shoulder or traveled way.		☑ Not Required ☐ Required ☐ Approved	**GB** pp. 4-19, 10-103; **MOI** 7-1, 43:44	
Curb Configuration	2011 AASHTO p. 10-103				Type B1		☑ Not Required ☐ Required ☐ Approved	Determine if the curb is appropriate for the type of facility. **GB** pp. 4-16:19, 10-103; **SD** GW 2	
Traffic Control	Meet Traffic Control Standard Drawings requirements				Meet Traffic Control Standard Drawings requirements		☑ Not Required ☐ Required ☐ Approved	**SD** TC series	
Rumble Strips	Meet Paving Standard Drawings requirements				N/A		☑ Not Required ☐ Required ☐ Approved	**SD** PV 6A:8B	

Prepared by _____ Date 9/01/16

Verified Only _____ Date _____
- Local Government Projects Only

Approved by _____ Date: 2016.09.07 07:50:54 -06'00' Date _____

On local government projects that are not on a UDOT road, the Region Preconstruction Engineer signs the "Verified Only" line and the Engineer of Record signs the "Approved by" line. For all other projects, the "Verified Only" line is left blank and the Region Preconstruction Engineer signs the "Approved by" line.

PROJECT DESIGN CRITERIA - URBAN COLLECTOR

I. PROJECT DESCRIPTION

DATE: 7/28/2016

Project No	**S-0154(12)11**	**Location**	**4 Interchanges on Bangerter Highway**
PIN	**12566**	**Concept**	**4 Interchanges on Existing Freeway**

Describe the scope of the project Construct 4 New Interchanges

II. DESIGN STANDARDS BY ROADWAY

(Complete a separate PDC for each roadway on your project)

Date of OSR: 2/18/2016

Roadway Name: **4015 West**

Comments

As shown in the additive bidding plans.

Roadway Characteristics

Functional Class	Urban Collector			**Pavement Type**	Asphalt	
Current Year	2015	**AADT=**	15,500	**Terrain**	Level	
Design Year	2040	**AADT=**	16,900	**% Trucks (current)**	2% (assumed)	
Design Vehicle	WB-67			**Posted / Design Speed**	35	40

Proposed Roadway Characteristics

Total Number of Lanes	2	**Park Strip Width (Typ)**	0' - 5'
Shoulder Width (Typ)	0-10'	**Sidewalk Width (Typ)**	4' - 6'
Curb & Gutter Type & Width (Typ)	Type B1 (2.5')		

Intersection #1: **4015 West at 5400 South**

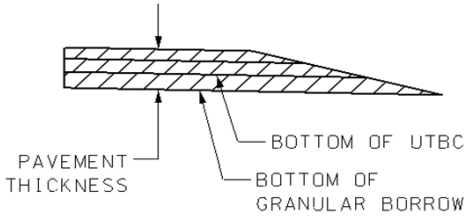
Roadway Name	Dir.	# of LT Lanes	Storage Length	# of Thru Lanes	# of RT Lanes	Storage Length
5400 South	**EB**	1	375	3	1	250
5400 South	**WB**	1	450	3	1	100
4015 West	**NB**	1	250	1	1	250
4015 West	**SB**	1	250	1	1	250

Curb Radius From T.B.C.

NW Curb Radius:	55'
SW Curb Radius:	60' (existing)
NE Curb Radius:	45'
SE Curb Radius:	60' (existing)

Pavement Thickness

See Typical Sections in Part 7



Pavement Thickness consists of Hard Surfacing, UTBC, and Granular Borrow (if used).

Order of Precedence: SD - 2012 Standard Drawings; MOI - Roadway Design Manual of Instruction; GB - AASHTO Green Book 2011 Edition

FHWA 13 Critical Elements	UDOT Standard	RFP Requirement	Design Exception	References	Date of Decision, Comments, Mitigation, etc.
Design Speed	40 MPH	40 MPH	☑ Not Required ☐ Required ☐ Approved	**MOI** 2-1; **GB** pp. 2-53:58, 7-27	
Lane Width	**Mainline** 12' **LT Turn Lane(s)** 12' **RT Turn Lane(s)** 11'	11' 11' 11'	☐ Not Required ☐ Required ☑ Approved	**SD** (DD & ST series); **MOI** 7-1, 43:47, 107; **GB** pp. 7-29:30	Existing design exception for 11' lanes exists in this location from PIN 8523.
Shoulder Width	**Outside** 4', **Inside** N/A, **Barrier Offset** N/A	**Outside** 0', **Inside** N/A, **Barrier Offset** N/A	☐ Not Required ☐ Required ☑ Approved	**SD** (DD & ST series); **MOI** 7-44:46; **GB** pp. 4-8:11, 7-30	Existing design exception for 0' shoulders exists in this location from PIN 8523.
Superelevation	**Maximum Superelevation** 4%	**Maximum Superelevation** 4%	☑ Not Required ☐ Required ☐ Approved	**SD** DD 1; **MOI** 7-26:29; **GB** pp. 7-29, 3-44 (T. 3-8)	PIN 8523 assumed low speed urban design
Horizontal Alignment	**Minimum Radii Value** 1039'	**Minimum Radii Value** 1039'	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-30:33, 50:55; **GB** pp. 7-28, 3-32 (T. 3-7), 3-44 (T. 3-8)	PIN 8523 assumed low speed urban design
Vertical Alignment	**Sag Curve Min. K Value** 64, **Crest Curve Min. K Value** 44	**Sag Curve Min. K Value** 64, **Crest Curve Min. K Value** 44	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-56:60; **GB** pp. *crest* 3-155: 157 (T. 3-34:35), *sag* 3-161 (T. 3-36)	
Profile Grades	**% Min** 0.30%, **% Max** 6.0%	**% Min** 0.30%, **% Max** 6.0%	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-58:62; **GB** pp. 3-119, 7-28:29 (T. 7-4)	0.50% preferred
Cross Slope	**Standard Value** 2%	**Value Proposed/Used** 2%	☑ Not Required ☐ Required ☐ Approved	**SD** (DD series); **MOI** 7-47:48; **GB** pp. 4-1:6, 7-29	
Stopping-Sight Distance	**Minimum** 305'	**Minimum** 305'	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-62; **GB** pp. 3-2:8, 3-106:110, 7-28, 7-3 (T. 7-1)	
Structural Capacity	**Design Loading** HL-93 for New Construction	**Design Loading** HL-93 for New Construction	☑ Not Required ☐ Required ☐ Approved	**MOI** 11-2:3; **GB** p. 7-38	HS-20 for existing; HL-93 for new construction
Bridge Width	**Minimum** N/A	**Minimum** N/A	☑ Not Required ☐ Required ☐ Approved	**SD** DD 9; **MOI** 11-3; **GB** pp. 7-37:38	
Vertical Clearance*	**Minimum** 16.5' over road, 23.5' over rail	**Minimum** 16.5'	☑ Not Required ☐ Required ☐ Approved	**SD** DD 8:9; **MOI** 11-4:5; **GB** p. 7-38	* Notify FHWA on any changes to Vertical Clearance on the National Highway System
Lateral Offset to Obstruction	**Minimum** 1.5' tangent / 3' radius	**Minimum** 1.5' tangent / 3' radius	☑ Not Required ☐ Required ☐ Approved	**SD** DD 17; **GB** pp. 7-37:38	

Design Waivers	UDOT Standard				RFP Requirement		Design Waiver	References	Date of Decision, Comments, Mitigation, etc.
Acceleration Lanes	**V**	**Va**	**V'a**	**L**	**Location**	**L**	☑ Not Required ☐ Required ☐ Approved	Refer to Table 10-4 **GB** pp. 10-111:112 to adjust for grade. A part of the ramp proper may also be considered in the acceleration length as a design waiver. Table 10-3 **GB** p. 10-110. See also **GB** pp. 9-124:125, 10-107:110, 116:122; **SD** DD 13A:14B, ST 1; **MOI** 7-106	
	40	31	0	360	N/A				
			14	300					
			18	270					
			22	210					
			26	120					
Deceleration Lanes	**V**	**Va**	**V'a**	**L**	**Location**	**L**	☑ Not Required ☐ Required ☐ Approved	Refer to Table 10-4 **GB** pp. 10-111:112 to adjust for grade. Table 10-5 **GB** p. 10-115. See also **GB** pp. 9-124:125, 10-107,112:120, 123:124; **SD** DD 13A:14B, ST 3A:3B; **MOI** 7-106	
	40	31	0	360	N/A				
			14	300					
			18	270					
			22	210					
			26	120					
Guardrail Bridge Connection	UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.				N/A		☑ Not Required ☐ Required ☐ Approved	**SD** BA 4B1:4B2, UDOT Design Exception Form	
Clear Zone	Meet clear zone compliant requirements defined in Standard Drawings.				14'		☑ Not Required ☐ Required ☐ Approved	2006 Roadside Design Guide pg. 3-6 and Figure 3.2 pg. 3-8; **SD** DD 4, 8, 10:12,17	
Intersection Sight Distance	Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.				Sight triangles cases A-F and skew are met.		☑ Not Required ☐ Required ☐ Approved	**GB** pp. 9-28:54, **MOI** 7-64:67	
Shoulder/Travel way (gutter pan)	The gutter pan is not considered a part of the traveled way or shoulder.				The gutter pan is not a part of the shoulder or traveled way.		☑ Not Required ☐ Required ☐ Approved	**GB** pp. 4-19, 10-103; **MOI** 7-1, 43:44	
Curb Configuration	2011 AASHTO p. 10-103				Type B1		☑ Not Required ☐ Required ☐ Approved	Determine if the curb is appropriate for the type of facility. **GB** pp. 4-16:19, 10-103; **SD** GW 2	
Traffic Control	Meet Traffic Control Standard Drawings requirements				Meet Traffic Control Standard Drawings requirements		☑ Not Required ☐ Required ☐ Approved	**SD** TC series	
Rumble Strips	Meet Paving Standard Drawings requirements				N/A		☑ Not Required ☐ Required ☐ Approved	**SD** PV 6A:8B	

Prepared by _____ Date 9/01/16

Verified Only _____ Date _____
- Local Government Projects Only

Approved by _____ Date: 2016.09.07 07:53:58 -06'00' Date _____

On local government projects that are not on a UDOT road, the Region Preconstruction Engineer signs the "Verified Only" line and the Engineer of Record signs the "Approved by" line. For all other projects, the "Verified Only" line is left blank and the Region Preconstruction Engineer signs the "Approved by" line.

PROJECT DESIGN CRITERIA - URBAN ARTERIAL - OTHER

I. PROJECT DESCRIPTION

DATE: 7/6/2016

Project No	**S-0154(12)11**	**Location**	**4 Interchanges on Bangerter Highway**
PIN	**12566**	**Concept**	**4 Interchanges on Bangerter Highway**

Describe the scope of the project Construct 4 New Interchanges

II. DESIGN STANDARDS BY ROADWAY

(Complete a separate PDC for each roadway on your project)

Date of OSR: 2/18/2016

Roadway Name: **SR-154 (Bangerter Highway) at 7000 S Interchange**

Roadway Characteristics

Functional Class	Urban Arterial - Other			**Pavement Type**	Rigid	
Current Year	2015	**AADT=**	**57,000**	**Terrain**	Rolling Terrain	
Design Year	2040	**AADT=**	**121,000**	**% Trucks (current)**	6%	
Design Vehicle	WB-67			**Posted / Design Speed**	55	65

Proposed Roadway Characteristics

Total Number of Lanes 6

Shoulder Width (Typ) 12'

Curb & Gutter Type & Width (Typ) Type M1 (2.5')

Comments

Ramps A2, B2, C2, & D2:*

Design Speed (300 ft along ramp beyond the painted gore in the travel direction) - 55 mph

Design Speed (Ramp Body) - 45 mph

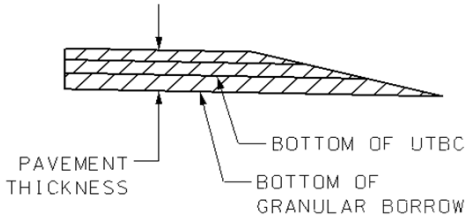
Design Speed (Within 300 ft of 7000 S) - 20 mph

20-mph Design Speed continues through the left turn movement

*Refer to Standard Drawings DD 5 and DD 6 for design of ramp elements, use the design speeds listed above for determining superelevation, minimum radii, vertical curve k values, stopping sight distance, and clear zone.

Pavement Thickness

See Typical Sections in Part 7



Pavement Thickness consists of Hard Surfacing, UTBC, and Granular Borrow (if used).

Order of Precedence: SD - 2012 Standard Drawings; MOI - Roadway Design Manual of Instruction; GB - AASHTO Green Book 2011 Edition

FHWA 13 Critical Elements	UDOT Standard	RFP Requirement	Design Exception	References	Date of Decision, Comments, Mitigation, etc.
Design Speed	65 mph	65 mph	☑ Not Required ☐ Required ☐ Approved	**MOI** 2-1; **GB** pp. 2-53:58, 8-1:2	Determined by Concept Team
Lane Width	**Mainline** 12' **LT Turn Lane(s)** 12' **RT Turn Lane(s)** 11'	12' 12' 12'	☑ Not Required ☐ Required ☐ Approved	**SD** (DD & ST series); **MOI** 7-1, 43:47, 107; **GB** pp. 8-2:3	
Shoulder Width	**Outside** 12' / **Inside** 12' / **Barrier Offset** 2'	**Outside** 12' / **Inside** 12' / **Barrier Offset** 2'	☑ Not Required ☐ Required ☐ Approved	**SD** (DD & ST series); **MOI** 7-44:46; **GB** pp. 4-8:11, 8-2:3	Barrier offset not required for 12' shoulders
Superelevation	**Maximum Superelevation** 6%	**Maximum Superelevation** 6%	☑ Not Required ☐ Required ☐ Approved	**SD** DD 1; **MOI** 7-26:29; **GB** pp. 8-3, 3-45 (T. 3-9)	
Horizontal Alignment	**Minimum Radii Value** 1660'	**Minimum Radii Value** 1660'	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-30:33, 50:55; **GB** pp. 8-6, 3-32 (T. 3-7), 3-45 (T. 3-9)	
Vertical Alignment	**Sag Curve Min. K Value** 157 / **Crest Curve Min. K Value** 193	**Sag Curve Min. K Value** 157 / **Crest Curve Min. K Value** 193	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-56:60; **GB** pp. *crest* 3-155: 157 (T. 3-34:35), *sag* 3-161 (T. 3-36)	
Profile Grades	**% Min** 0.30% / **% Max** 5.00%	**% Min** 0.30% / **% Max** 5.00%	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-58:62; **GB** pp. 3-119, 8-3:4 (T. 8-1)	0.50% preferred
Cross Slope	**Standard Value** 2%	**Value Proposed/Used** 2%	☑ Not Required ☐ Required ☐ Approved	**SD** (DD, DD 4); **MOI** 7-47:48; **GB** pp. 4-1:6, 8-2:3	
Stopping-Sight Distance	**Minimum** 645'	**Minimum** 645'	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-62; **GB** pp. 3-2:8, 3-106:110, 3-4 (T. 3-1)	
Structural Capacity	**Design Loading** HL-93	**Design Loading** HL-93	☑ Not Required ☐ Required ☐ Approved	**MOI** 11-2:3; **GB** p. 8-4	HS-20 for existing; HL-93 for new construction
Bridge Width	**Minimum** 62'-10"	**Minimum** 62'-10"	☑ Not Required ☐ Required ☐ Approved	**SD** DD 9; **MOI** 11-3; **GB** p. 8-4	
Vertical Clearance*	**Minimum** 16.5' over road, 23.5' over rail	**Minimum** 16.5'	☑ Not Required ☐ Required ☐ Approved	**SD** DD 8:0; **MOI** 11-4:5; **GB** p. 8-4	* Notify FHWA on any changes to Vertical Clearance on the National Highway System
Lateral Offset to Obstruction	**Minimum** Urban environments shoulder + 2', other locations clearzone.	**Minimum** Urban environments shoulder + 2', other locations clearzone.	☑ Not Required ☐ Required ☐ Approved	**SD** DD 17; **GB** p. 8-5, 10-19:21	

Design Waivers	UDOT Standard	RFP Requirement	Design Waiver	References	Date of Decision, Comments, Mitigation, etc.
Acceleration Lanes	**V** / **Va** / **V'a** / **L** 65 mph / 50 mph / 0 mph / 1410' 14 mph / 1350' 18 mph / 1310' 22 mph / 1220' 26 mph / 1120'	**Location** / **L** Ramp B 0 to 65 (SB On) / 1410' Ramp D 0 to 65 (NB On) / 1410'	☑ Not Required ☐ Required ☐ Approved	Refer to Table 10-4 **GB** pp. 10-111:112 to adjust for grade. A part of the ramp proper may also be considered in the acceleration length as a design waiver. Table 10-3 **GB** p. 10-110. See also **GB** pp. 9-124:125, 10-107:110, 116:122; **SD** DD 13A:14B, ST 1; **MOI** 7-106	
Deceleration Lanes	**V** / **Va** / **V'a** / **L** 65 mph / 55 mph / 0 mph / 570' 14 mph / 540' 18 mph / 520' 22 mph / 500' 26 mph / 470'	**Location** / **L** Ramp A 65 to 0 (NB Off) / 570' Ramp C 65 to 0 (SB Off) / 570'	☑ Not Required ☐ Required ☐ Approved	Refer to Table 10-4 **GB** pp. 10-111:112 to adjust for grade. Table 10-5 **GB** p. 10-115. See also **GB** pp. 9-124:125, 10-107,112:120, 123:124; **SD** DD 13A:14B, ST 3A:3B; **MOI** 7-106	
Guardrail Bridge Connection	UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.	UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.	☑ Not Required ☐ Required ☐ Approved	**SD** BA 4B1:4B2, UDOT Design Exception Form	
Clear Zone	Meet clear zone compliant requirements defined in Standard Drawings.	30'	☑ Not Required ☐ Required ☐ Approved	2006 Roadside Design Guide pg. 3-6 and Figure 3.2 pg. 3-8; **SD** DD 4, 8, 10-12,17	
Intersection Sight Distance	Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.	Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.	☑ Not Required ☐ Required ☐ Approved	**GB** pp. 9-28:54, **MOI** 7-64:67	
Ramp Terminal Sight Distance	Along the Ramp **Design Speed** / **SSD (ft)** 70 mph / 730 55 mph / 495 50 mph / 425 45 mph / 360 40 mph / 305 35 mph / 250 30 mph / 200 25 mph / 155 Along the Freeway or Street Preceeding Approach Nose of Exit Ramp **Design Speed** / **SSD (ft)*** / **DSD (ft)**** 65 mph / 810 / 1365 55 mph / 620 / 1135 50 mph / 535 / 1030 45 mph / 450 / 930 40 mph / 385 / 825 35 mph / 315 / 720 30 mph / 250 / 620 25 mph / 200 / N/A	Along the Ramp **Design Speed** / **SSD (ft)** 65 mph / 645 55 mph / 495 45 mph / 360 20 mph / 115 Along the Freeway or Street Preceeding Approach Nose of Exit Ramp **Location** / **SSD*** / **DSD**** SR-154 Approaching Ram / 810' / 1365' SR-154 Approaching Ram C / 810' / 1365'	☑ Not Required ☐ Required ☐ Approved	SSD (Stopping Sight Distance) should be at least as great as design SSD *SSD is 25% greater than minimum SSD. **DSD is Decision Sight Distance based on avoidance maneuver 'E' and is desired where feasible. Document DSD but do not obtain waiver if DSD is not met. **GB** p. 3-4 (T. 3-1) **GB** p. 3-7 (T. 3-3) **GB** p. 10-92	
Shoulder/Travel way (gutter pan)	The gutter pan is not considered a part of the traveled way or shoulder.	The gutter pan is not considered a part of the traveled way or shoulder.	☑ Not Required ☐ Required ☐ Approved	**GB** pp. 4-19, 10-103; **MOI** 7-1, 43:44	

Design Waivers	UDOT Standard	RFP Requirement	Design Waiver	References	Date of Decision, Comments, Mitigation, etc.
Gores	Follow the key points from 2011 AASHTO: • Should be uniform along the freeway; • Geometric shape is appropriate for given speeds; • Mitigation required for major obstructions in a gore; and • Unpaved area beyond the gore nose should be graded nearly level with the roadways as practical.	Location: 7000 South Meets all Requirements?: YES	☑ Not Required ☐ Required ☐ Approved	**GB** pp. 10-96:101; **SD** DD 6, ST 3A:3B	
Ramp Terminals	Platform Location: Ramp side of the approach nose or merging end. Length: 200 ft Location: At- grade terminal of ramp. Length: Varies	Platform Location: Ramp side of the approach nose or merging end. Length: 200 ft Location: At- grade terminal of ramp. Length: Varies	☑ Not Required ☐ Required ☐ Approved	Avoid left hand entrances and exits. **GB** pp. 10-103:104. Ramp Terminal means: 1) the exit terminal from the side street onto the freeway entrance ramp; 2) the entrance terminal onto the freeway; 3) the exit terminal from the freeway onto the exit ramp; and 4) the entrance terminal from the freeway exit ramp onto the side street. Refer to **GB** 10-104 for platform lengths. **MOI** 7-105:106	
On Ramp Design	Type: Parallel Curve Radius: 1000 ft Dist. From Physical Nose to Ramp Control Line Terminus: 200 ft Taper: 300 ft min	Ramp Loc.: 7000 South Ramps Type: Parallel Curve Rad.: 1400' Dist.: 327' Taper: 300'	☑ Not Required ☐ Required ☐ Approved	**GB** pp. 10-107:112; **SD** DD 6, ST 1; **MOI** p. 1-2. UDOTs preferred approach is to utilize parallel entrance ramps. See **GB** pp. 10-89:90; **MOI** 7-105:106.	
Off Ramp Design	Type: Taper Divergence Angle (deg): 2-5 Dist. from outer edge alignment break to ramp control line: 200 ft	Ramp Loc.: 7000 South Ramps Type: Taper Angle: 2-5 Dist.: 200'	☑ Not Required ☐ Required ☐ Approved	**GB** pp. 10-112:116; **SD** DD 6, ST 3A:3B; **MOI** p. 1-2. UDOTs preferred approach is to utilize tapered exit ramps for single lane exits. If multi lane exit, one lane must be parallel. See **GB** pp. 10-89:90; **MOI** 7-105:106.	
Curb Configuration	2011 AASHTO p.10-103	Type M1	☑ Not Required ☐ Required ☐ Approved	Determine if the curb is appropriate for the type of facility. **GB** pp. 4-16:19, 10-103; **SD** GW 2	
Traffic Control	Meet Traffic Control Standard Drawings requirements	Meet Traffic Control Standard Drawings requirements	☑ Not Required ☐ Required ☐ Approved	**SD** TC series	
Rumble Strips	Meet Paving Standard Drawings requirements	NA	☑ Not Required ☐ Required ☐ Approved	**SD** PV 6A:8B	

Prepared by David Clawson _____ Date 10/7/16

Verified Only _____ Date _____
- Local Government Projects Only

Approved by _____ Charles Mason-Hill 2016.10.13 14:58:16 -06'00' Date _____

On local government projects that are not on a UDOT road, the Region Preconstruction Engineer signs the "Verified Only" line and the Engineer of Record signs the "Approved by" line. For all other projects, the "Verified Only" line is left blank and the Region Preconstruction Engineer signs the "Approved by" line.

PROJECT DESIGN CRITERIA - URBAN ARTERIAL

I. PROJECT DESCRIPTION

DATE: 7/6/2016

Project No	**S-0154(12)11**	Location	**4 Interchanges on Bangerter Highway**
PIN	**12566**	Concept	**4 Interchanges on Bangerter Highway**

Describe the scope of the project Construct 4 New Interchanges

II. DESIGN STANDARDS BY ROADWAY

(Complete a separate PDC for each roadway on your project)

Date of OSR: 2/18/2016

Roadway Name: **7000 South**

Comments

Roadway Characteristics

Functional Class	Urban Arterial			**Pavement Type**	Rigid	
Current Yea	2015	**AADT=**	20,000	**Terrain**	Rolling	
Design Yea	2040	**AADT=**	32,000	**% Trucks (current)**	3%	
Design Vehicle	WB-67			**Posted / Design Speed**	35	40

Proposed Roadway Characteristics

Total Number of Lanes 5 **Park Strip Width (Typ)** NA

Shoulder Width (Typ) 8' **Sidewalk Width (Typ)** 6'

Curb & Gutter Type & Width (Typ) Type B1 (2.5')

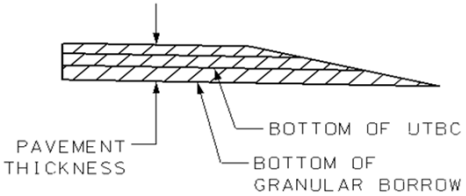
Intersection #1: **SPUI - 7000 South & Bangerter Hwy**

Roadway Name	Dir.	# of LT Lanes	Storage Length	# of Thru Lanes	# of RT Lanes	Storage Length
7000 South	**EB**	2	800	2	1	300
7000 South	**WB**	2	400	2	1	200
SB OFF Ramp	**SB**	2 (Including 1 Shared RT/LT Lane)	450	-	2 (Including 1 Shared RT/LT Lane)	800
NB OFF Ramp	**NB**	2	400	-	1	300

Pavement Thickness

See Typical Sections in Part 7

Ramp	Required Ramp Meter Storage (Lane-Feet)
SB On Ramp	1875
NB On Ramp	900



Pavement Thickness consists of Hard Surfacing, UTBC, and Granular Borrow (if used).

Order of Precedence: SD - 2012 Standard Drawings; MOI - Roadway Design Manual of Instruction; GB - AASHTO Green Book 2011 Edition

FHWA 13 Critical Elements	UDOT Standard	RFP Requirement	Design Exception	References	Date of Decision, Comments, Mitigation, etc.
Design Speed	40 MPH	40 MPH	☑ Not Required ☐ Required ☐ Approved	**MOI** 2-1; **GB** pp. 2-53:58, 7-27	Determined by Concept Team
Lane Width	**Mainline** 12' **LT Turn Lane(s)** 12' **RT Turn Lane(s)** 10'	12' 12' 12'	☑ Not Required ☐ Required ☐ Approved	**SD** (DD & ST series); **MOI** 7-1, 43:47, 107; **GB** pp. 7-29:30	
Shoulder Width	**Outside** 4'/8'; **Inside** NA; **Barrier Offset** NA	**Outside** 8'; **Inside** NA; **Barrier Offset** NA	☑ Not Required ☐ Required ☐ Approved	**SD** (DD & ST series); **MOI** 7-44:46; **GB** pp. 4-8:11, 7-30	5' Minimum outside shoulder/bike lane.
Superelevation	**Maximum Superelevation** 2%	**Maximum Superelevation** 2%	☑ Not Required ☐ Required ☐ Approved	**SD** DD 1; **MOI** 7-26:29; **GB** pp. 7-29, 3-44 (T. 3-8)	Use low speed urban
Horizontal Alignment	**Minimum Radii Value** 762	**Minimum Radii Value** 762	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-30:33, 50:55; **GB** pp. 7-28, 3-32 (T. 3-7), 3-44 (T. 3-8)	
Vertical Alignment	**Sag Curve Min. K Value** 64; **Crest Curve Min. K Value** 44	**Sag Curve Min. K Value** 64; **Crest Curve Min. K Value** 44	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-56:60; **GB** pp. *crest* 3-155: 157 (T. 3-34:35), *sag* 3-161 (T. 3-36)	
Profile Grades	**% Min** 0.3%; **% Max** 6%	**% Min** 0.3%; **% Max** 6%	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-58:62; **GB** pp. 3-119, 7-28:29 (T. 7-4)	0.50% preferred
Cross Slope	**Standard Value** 2%	**Value Proposed/Used** 2%	☑ Not Required ☐ Required ☐ Approved	**SD** (DD series); **MOI** 7-47:48; **GB** pp. 4-1:6, 7-29	
Stopping-Sight Distance	**Minimum** 305	**Minimum** 305	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-62; **GB** pp. 3-2:8, 3-106:110, 7-28, 7-3 (T. 7-1)	
Structural Capacity	**Design Loading** HL-93 for new construction	**Design Loading** HL-93 for new construction	☑ Not Required ☐ Required ☐ Approved	**MOI** 11-2:3; **GB** p. 7-38	HS-20 for existing; HL-93 for new construction
Bridge Width	**Minimum** 125.833'	**Minimum** 125.833'	☑ Not Required ☐ Required ☐ Approved	**SD** DD 9; **MOI** 11-3; **GB** pp. 7-37:38	
Vertical Clearance*	**Minimum** 16.5' over road, 23.5' over rail	**Minimum** 16.5'	☑ Not Required ☐ Required ☐ Approved	**SD** DD 8:9; **MOI** 11-4:5; **GB** p. 7-38	* Notify FHWA on any changes to Vertical Clearance on the National Highway System
Lateral Offset to Obstruction	**Minimum** 1.5' tangent / 3' radius	**Minimum** 1.5' tangent / 3' radius	☑ Not Required ☐ Required ☐ Approved	**SD** DD 17; **GB** pp. 7-37:38	

Design Waivers	UDOT Standard				RFP Requirement		Design Waiver	References	Date of Decision, Comments, Mitigation, etc.
Acceleration Lanes	**V**	**Va**	**V'a**	**L**	**Location**	**L**	☑ Not Required ☐ Required ☐ Approved	Refer to Table 10-4 **GB** pp. 10-111:112 to adjust for grade. A part of the ramp proper may also be considered in the acceleration length as a design waiver. Table 10-3 **GB** p. 10-110. See also **GB** pp. 9-124:125, 10-107:110, 116:122; **SD** DD 13A:14B, ST 1; **MOI** 7-106	
	40 mph	31 mph	0 mph	360'	N/A	N/A			
			14 mph	300'					
			18 mph	270'					
			22 mph	210'					
			26 mph	120'					
Deceleration Lanes	**V**	**Va**	**V'a**	**L**	**Location**	**L**	☑ Not Required ☐ Required ☐ Approved	Refer to Table 10-4 **GB** pp. 10-111:112 to adjust for grade. Table 10-5 **GB** p. 10-115. See also **GB** pp. 9-124:125, 10-107,112:120, 123:124; **SD** DD 13A:14B, ST 3A:3B; **MOI** 7-106	
	40 mph	36 mph	0 mph	320'	N/A	N/A			
			14 mph	295'					
			18 mph	265'					
			22 mph	235'					
			26 mph	185'					
Guardrail Bridge Connection	UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.				UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.		☑ Not Required ☐ Required ☐ Approved	**SD** BA 4B1:4B2, UDOT Design Exception Form	
Clear Zone	Meet clear zone compliant requirements defined in Standard Drawings.				14'		☑ Not Required ☐ Required ☐ Approved	2006 Roadside Design Guide pg. 3-6 and Figure 3.2 pg. 3-8; **SD** DD 4, 8, 10:12,17	
Intersection Sight Distance	Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.				Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.		☑ Not Required ☐ Required ☐ Approved	**GB** pp. 9-28:54, **MOI** 7-64:67	
Shoulder/Travel way (gutter pan)	The gutter pan is not considered a part of the traveled way or shoulder.				The gutter pan is not considered a part of the traveled way or shoulder.		☑ Not Required ☐ Required ☐ Approved	**GB** pp. 4-19, 10-103; **MOI** 7-1, 43:44	
Curb Configuration	2011 AASHTO p. 10-103				Type B1/Type B5/ Type M1/Type M2		☑ Not Required ☐ Required ☐ Approved	Determine if the curb is appropriate for the type of facility. **GB** pp. 4-16:19, 10-103; **SD** GW 2	
Traffic Control	Meet Traffic Control Standard Drawings requirements				Meet Traffic Control Standard Drawings requirements		☑ Not Required ☐ Required ☐ Approved	**SD** TC series	
Rumble Strips	Meet Paving Standard Drawings requirements				NA		☑ Not Required ☐ Required ☐ Approved	**SD** PV 6A:8B	

Prepared by David Clawson Date 10/7/16

Verified Only _____ Date _____
- Local Government Projects Only

Approved by _____ Charles Mason-Hill 2016.10.13 14:58:36 -06'00' Date _____

On local government projects that are not on a UDOT road, the Region Preconstruction Engineer signs the "Verified Only" line and the Engineer of Record signs the "Approved by" line. For all other projects, the "Verified Only" line is left blank and the Region Preconstruction Engineer signs the "Approved by" line.

PROJECT DESIGN CRITERIA - URBAN ARTERIAL - OTHER

I. PROJECT DESCRIPTION

DATE: **10/7/2016**

Project No	**S-0154(12)11**	Location	**4 Interchanges on Bangerter Highway**
PIN	**12566**	Concept	**4 New Interchanges on Bangerter Highway**

Describe the scope of the project Construct 4 New Interchanges

II. DESIGN STANDARDS BY ROADWAY

Date of OSR: 2/18/2016

Roadway Name: **SR-154 Bangerter Hwy - 9000 South**

Roadway Characteristics

Functional Class	Urban Arterial - Other			**Pavement Type**	Rigid	
Current Year	2016	**AADT=**	50,000	**Terrain**	Rolling Terrain	
Design Year	2040	**AADT=**	115,000	**% Trucks (current)**	6%	
Design Vehicle	WB-67			**Posted / Design Speed**	60	65

Proposed Roadway Characteristics

Total Number of Lanes 6

Shoulder Width (Typ) 12'

Curb & Gutter Type & Width (Typ) Type M1 (2.5')

Pavement Thickness

See Part 4-11 for Pavement Requirements

Comments

Ramps A, B, C, & D:*

Design Speed (300 ft along ramp beyond the painted gore in the travel direction) - 55 mph

Design Speed (Ramp Body) - 45 mph

Design Speed (Within 300 ft of 9000 S) - 20 mph

20-mph Design Speed continues through the left turn movement

*Refer to Standard Drawings DD 5 and DD 6 for design of ramp elements, use the design speeds listed above for determining superelevation, minimum radii, vertical curve k values, stopping sight distance, and clear zone. Superelevation method 2 can be used for curves at the ramp terminal.

Order of Precedence: SD - 2012 Standard Drawings; MOI - Roadway Design Manual of Instruction; GB - AASHTO Green Book 2011 Edition

FHWA 13 Critical Elements	UDOT Standard	RFP Requirement	Design Exception	References	Date of Decision, Comments, Mitigation, etc.
Design Speed	65 mph	65 mph	☑ Not Required ☐ Required ☐ Approved	**MOI** 2-1; **GB** pp. 2-53:58, 8-1:2	Determined by Concept Team. See Comments box for Ramp Design Speeds.
Lane Width	**Through Lanes** 12' **LT Turn Lane(s)** 12' **RT Turn Lane(s)** 12'	12' 12' 12'	☑ Not Required ☐ Required ☐ Approved	**SD** (DD & ST series); **MOI** 7-1, 43:47, 107; **GB** pp. 8-2:3	
Shoulder Width	**Outside** 12'; **Inside** 12'; **Barrier Offset** 2'	**Outside** 12'; **Inside** 12'*; **Barrier Offset** 2'	☐ Not Required ☐ Required ☑ Approved	**SD** (DD & ST series); **MOI** 7-44:46; **GB** pp. 4-8:11, 8-2:3	*Inside Shoulder - narrows to 3 feet (shoulder + shy) under canal/ Old Bingham Highway Bridges
Superelevation	**Maximum Superelevation** 6.0%	**Maximum Superelevation** 6.0%	☑ Not Required ☐ Required ☐ Approved	**SD** DD 1; **MOI** 7-26:29; **GB** pp. 8-3, 3-45 (T. 3-9)	
Horizontal Alignment	**Minimum Radii Value** 1660'	**Minimum Radii Value** 1660'	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-30:33, 50:55; **GB** pp. 8-6, 3-32 (T. 3-7), 3-45 (T. 3-9)	
Vertical Alignment	**Sag Curve Min. K Value** 157; **Crest Curve Min. K Value** 193	**Sag Curve Min. K Value** 157; **Crest Curve Min. K Value** 193	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-56:60; **GB** pp. *crest* 3-155: 157 (T. 3-34:35), *sag* 3-161 (T. 3-36)	
Profile Grades	**% Min** 0.30%; **% Max** 5.0%	**% Min** 0.30%; **% Max** 6.0%	☐ Not Required ☐ Required ☑ Approved	**MOI** 7-58:62; **GB** pp. 3-119, 8-3:4 (T. 8-1)	6% needed to reduce profile impacts
Cross Slope	**Standard Value** 2.0%	**Value Proposed/Used** 2%	☑ Not Required ☐ Required ☐ Approved	**SD** (DD, DD 4); **MOI** 7-47:48; **GB** pp. 4-1:6, 8-2:3	
Stopping-Sight Distance	**Minimum** 645'	**Minimum** 645'	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-62; **GB** pp. 3-2:8, 3-106:110, 3-4 (T. 3-1)	
Structural Capacity	**Design Loading** HL-93	**Design Loading** HL-93	☑ Not Required ☐ Required ☐ Approved	**MOI** 11-2:3; **GB** p. 8-4	HS-20 for existing; HL-93 for new construction
Bridge Width	**Minimum** 62'-10"	**Minimum** 62'-10"	☑ Not Required ☐ Required ☐ Approved	**SD** DD 9; **MOI** 11-3; **GB** p. 8-4	
Vertical Clearance*	**Minimum** 16.5' over road, 23.5' over rail	**Minimum** 16.5'	☑ Not Required ☐ Required ☐ Approved	**SD** DD 8:0; **MOI** 11-4:5; **GB** p. 8-4	* Notify FHWA on any changes to Vertical Clearance on the National Hi hwa S stem
Lateral Offset to Obstruction	**Minimum** Edge of the Travel Lane to the Edge of the Shoulder.	**Minimum** Edge of the Travel Lane to the Edge of the Shoulder.	☑ Not Required ☐ Required ☐ Approved	**SD** DD 17; **GB** p. 8-5, 10-19:21	

Design Waivers	UDOT Standard	RFP Requirement	Design Waiver	References	Date of Decision, Comments, Mitigation, etc.
Acceleration Lanes	V: 65 mph Va: 50 mph V'a / L: 0 mph 1410' 14 mph 1350' 18 mph 1310' 22 mph 1220' 26 mph 1120'	Location / L: Ramp B 0 to 65 (SB On) 1410' Ramp D 0 to 65 (NB On) 1410'	☑ Not Required ☐ Required ☐ Approved	Refer to Table 10-4 **GB** pp. 10-111:112 to adjust for grade. A part of the ramp proper may also be considered in the acceleration length as a design waiver. Table 10-3 **GB** p. 10-110. See also **GB** pp. 9-124:125, 10-107:110, 116:122; **SD** DD 13A:14B, ST 1; **MOI** 7-106	*5-6% Downgrade = 0.5 Adjustment Factor for 0 mph to 50 mph acceleration
Deceleration Lanes	V: 65 mph Va: 55 mph V'a / L: 0 mph 570' 14 mph 540' 18 mph 520' 22 mph 500' 26 mph 470'	Location / L: Ramp A 65 to 0 (NB Off) 570' Ramp C 65 to 0 (SB Off) 570'	☑ Not Required ☐ Required ☐ Approved	Refer to Table 10-4 **GB** pp. 10-111:112 to adjust for grade. Table 10-5 **GB** p. 10-115. See also **GB** pp. 9-124:125, 10-107,112:120, 123:124; **SD** DD 13A:14B, ST 3A:3B; **MOI** 7-106	*3-4% Upgrade = 0.9 Adjustment Factor for 50 mph to 0 mph deceleration. **5-6% Upgrade = 0.8 Adjustment Factor for 50 mph to 0 mph deceleration.
Guardrail Bridge Connection	UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.	UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.	☑ Not Required ☐ Required ☐ Approved	**SD** BA 4B1:4B2, UDOT Design Exception Form	
Clear Zone	Meet clear zone compliant requirements defined in Standard Drawings.	30'	☑ Not Required ☐ Required ☐ Approved	2006 Roadside Design Guide pg. 3-6 and Figure 3.2 pg. 3-8; **SD** DD 4, 8, 10-12,17	
Intersection Sight Distance	Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.	Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.	☑ Not Required ☐ Required ☐ Approved	**GB** pp. 9-28:54, **MOI** 7-64:67	
Ramp Terminal Sight Distance	Along the Ramp Design Speed / SSD (ft): 65 mph 645 55 mph 495 50 mph 425 45 mph 360 40 mph 305 35 mph 250 30 mph 200 25 mph 155 Along the Freeway or Street Preceeding Approach Nose of Exit Ramp Design Speed / SSD (ft)* / DSD (ft)**: 65 mph 810 1365 55 mph 620 1135 50 mph 535 1030 45 mph 450 930 40 mph 385 825 35 mph 315 720 30 mph 250 620 25 mph 195 N/	Along the Ramp Design Speed / SSD (ft): 65 mph 645' 55 mph 495' 45 mph 360' 25 mph 155' long the Freeway or Street Preceeding Approach Nose of Exit Ramp Location / SSD* / DSD**: SR-154 Approaching Ram 810' 1365' SR-154 Approaching Ramp C 810' 1365'	☑ Not Required ☐ Required ☐ Approved	SSD (Stopping Sight Distance) should be at least as great as design SSD *SSD is 25% greater than minimum SSD. **DSD is Decision Sight Distance based on avoidance maneuver 'E' and is desired where feasible. Document DSD but do not obtain waiver if DSD is not met. **GB** p. 3-4 (T. 3-1) **GB** p. 3-7 (T. 3-3) **GB** p. 10-92	
Shoulder/Travel way (gutter pan)	The gutter pan is not considered a part of the traveled way or shoulder.	The gutter pan is not considered a part of the traveled way or shoulder.	☑ Not Required ☐ Required ☐ Approved	**GB** pp. 4-19, 10-103; **MOI** 7-1, 43:44	

Design Waivers	UDOT Standard	RFP Requirement	Design Waiver	References	Date of Decision, Comments, Mitigation, etc.
Gores	Follow the key points from 2011 AASHTO: • Should be uniform along the freeway; • Geometric shape is appropriate for given speeds; • Mitigation required for major obstructions in a gore; and • Unpaved area beyond the gore nose should be graded nearly level with the roadways as practical.	Location: 9000 South Meets all Requirements?: YES	☑ Not Required ☐ Required ☐ Approved	**GB** pp. 10-96:101; **SD** DD 6, ST 3A:3B	
Ramp Terminals	Platform Location: Ramp side of the approach nose or merging end. Length: 200' At- grade terminal of ramp.: Varies	Platform Location: Ramp side of the approach nose or merging end. Length: 200' At- grade terminal of ramp.: Varies	☑ Not Required ☐ Required ☐ Approved	Avoid left hand entrances and exits. **GB** pp. 10 103:104. Ramp Terminal means: 1) the exit terminal from the side street onto the freeway entrance ramp; 2) the entrance terminal onto the freeway; 3) the exit terminal from the freeway onto the exit ramp; and 4) the entrance terminal from the freeway exit ramp onto the side street. Refer to **GB** 10-104 for platform lengths. **MOI** 7-105:106	
On Ramp Design	Type: Parallel Curve Radius: 1000' min Dist. From Physical Nose to Ramp Control Line Terminus: 200' min Taper: L(300' min)	Ramp Loc.: 9000 South Ramps Type: Parallel Curve Rad.: 1000' min Dist.: 200' min Taper: L(300' min)	☑ Not Required ☐ Required ☐ Approved	**GB** pp. 10-107:112; **SD** DD 6, ST 1; **MOI** p. 1-2. UDOTs preferred approach is to utilize parallel entrance ramps. See **GB** pp. 10-89:90; **MOI** 7-105:106.	
Off Ramp Design	Type: Taper Divergence Angle (deg): 2-5 Dist. from outer edge alignment break to ramp control line: 200'	Ramp Loc.: 9000 South Ramps Type: Taper Angle: 2-5 Dist.: 200'	☑ Not Required ☐ Required ☐ Approved	**GB** pp. 10-112:116; **SD** DD 6, ST 3A:3B; **MOI** p. 1-2. UDOTs preferred approach is to utilize tapered exit ramps for single lane exits. If multi lane exit, one lane must be parallel. See **GB** pp. 10-89:90; **MOI** 7-105:106.	
Curb Configuration	Low Profile, Sloping Design	Type M1	☑ Not Required ☐ Required ☐ Approved	Determine if the curb is appropriate for the type of facility. **GB** pp. 4-16:19, 10-103; **SD** GW 2	
Traffic Control	Meet Traffic Control Standard Drawings requirements	Meet Traffic Control Standard Drawings requirements	☑ Not Required ☐ Required ☐ Approved	**SD** TC series	
Rumble Strips	Meet Paving Standard Drawings requirements	NA	☑ Not Required ☐ Required ☐ Approved	**SD** PV 6A:8B	

Prepared by Justin Beddoes — Justin Beddoes 2016.10.07 14:57:21 -06'00' — Date _____

Verified Only _____ — Date _____
- Local Government Projects Only

Approved by _____ Charles Mason-Hill 2016.10.13 13:31:50 -06'00' — Date _____

On local government projects that are not on a UDOT road, the Region Preconstruction Engineer signs the "Verified Only" line and the Engineer of Record signs the "Approved by" line. For all other projects, the "Verified Only" line is left blank and the Region Preconstruction Engineer signs the "Approved by" line.

PROJECT DESIGN CRITERIA - URBAN ARTERIAL

I. PROJECT DESCRIPTION

DATE: 10/7/2016

Project No	**S-0154(12)11**	Location	**9000 S/Bangerter Hwy**
PIN	**12566**	Concept	**SPUI Bangerter Over 9000 S**

Describe the scope of the project Construct New Interchange

II. DESIGN STANDARDS BY ROADWAY

Date of OSR: 2/18/2016

Roadway Name: **9000 South**

Comments

Intersections at 3695 W and Jordan Valley Way are right-in/right-out access only.

Roadway Characteristics

Functional Class	Urban Arterial			**Pavement Type**	Both	
Current Year	2016	**AADT=**	29,000	**Terrain**	Rolling	
Design Year	2040	**AADT=**	54,000	**% Trucks (current)**	4%	
Design Vehicle	WB-67			**Posted / Design Speed**	40	45

Proposed Roadway Characteristics

Total Number of Lanes 5 **Park Strip Width (Typ)** NA

Shoulder Width (Typ) 8' **Sidewalk Width (Typ)** 6'

Curb & Gutter Type & Width (Typ) Type B1 (2.5')

Intersection #1: **9000 South & Judd Ln**

Roadway Name	Dir.	# of LT Lanes	Storage Length	# of Thru Lanes	# of RT Lanes	Storage Length
9000 South	**EB**	-	-	2	-	-
9000 South	**WB**	1	100' Lane	2	-	-
Judd Ln	**NB**	1 Shared	-	-	1 Shared	-

Intersection #2: **SPUI - 9000 South & Bangerter Hwy**

Roadway Name	Dir.	# of LT Lanes	Storage Length	# of Thru Lanes	# of RT Lanes	Storage Length
9000 South	**EB**	2	300' Each Lane	2	1	100' Lane
9000 South	**WB**	2	300' Each Lane	2	1	100' Lane
SB OFF Ramp	**SB**	2	500' Each Lane	-	2	800' Each Lane
NB OFF Ramp	**NB**	2	400' Each Lane	-	2	1000' Each Lane

Intersection #3: **9000 South & 3400 West**

Roadway Name	Dir.	# of LT Lanes	Storage Length	# of Thru Lanes	# of RT Lanes	Storage Length
9000 South	**EB**	1	Maintain Existing	2	1	Maintain Existing
9000 South	**WB**	1	Maintain Existing	2	1	Maintain Existing
3400 West	**SB**	1	Maintain Existing	1	1	Maintain Existing
3400 West	**NB**	1	Maintain Existing	1	1	Maintain Existing

Pavement Thickness

See Part 4-11 for Pavement Requirements

Ramp	Ramp Meter Storage (Lane-Feet)
SB On Ramp	2,400
NB On Ramp	1,900

*Inside Shoulder - narrows to 1 foot

Order of Precedence: SD - 2012 Standard Drawings; MOI - Roadway Design Manual of Instruction; GB - AASHTO Green Book 2011 Edition

FHWA 13 Critical Elements	UDOT Standard			RFP Requirement			Design Exce tion	References	Date of Decision, Comments, Mitigation, etc.
Design Speed	45 MPH			45 MPH			☑ Not Required ☐ Required ☐ Approved	**MOI** 2-1; **GB** pp. 2-53:58, 7-27	Determined by Concept Team
Lane Width	**Mainline**		12'	12'			☑ Not Required ☐ Required ☐ Approved	**SD** (DD & ST series); **MOI** 7-1, 43:47, 107; **GB** pp. 7-29:30	
	LT Turn Lane(s)		12'	12'/14'					
	RT Turn Lane(s)		10'	12'					
Shoulder Width	**Outside**	**Inside**	**Barrier Offset**	**Outside**	**Inside**	**Barrier Offset**	☑ Not Required ☐ Required ☐ Approved	**SD** (DD & ST series); **MOI** 7-44:46; **GB** pp. 4-8:11, 7-30	5' Minimum outside shoulder/bike lane.
	4'/8'	NA	NA	5'	NA	NA			
Superelevation	**Maximum Superelevation**			**Maximum Superelevation**			☑ Not Required ☐ Required ☐ Approved	**SD** DD 1; **MOI** 7-26:29; **GB** pp. 7-29, 3-44 (T. 3-8)	Use low speed urban
	2%			2%					
Horizontal Alignment	**Minimum Radii Value**			**Minimum Radii Value**			☑ Not Required ☐ Required ☐ Approved	**MOI** 7-30:33, 50:55; **GB** pp. 7-28, 3-32 (T. 3-7), 3-44 (T. 3-8)	
	1039			1039					
Vertical Alignment	**Sag Curve Min. K Value**	**Crest Curve Min. K Value**		**Sag Curve Min. K Value**	**Crest Curve Min. K Value**		☑ Not Required ☐ Required ☐ Approved	**MOI** 7-56:60; **GB** pp. *crest* 3-155: 157 (T. 3-34:35), *sag* 3-161 (T. 3-36)	
	79	61		79	61				
Profile Grades	**% Min**	**% Max**		**% Min**	**% Max**		☑ Not Required ☐ Required ☐ Approved	**MOI** 7-58:62; **GB** pp. 3-119, 7-28:29 (T. 7-4)	0.50% preferred
	0.3%	6%		0.5%	6%				
Cross Slope	**Standard Value**			**Value Proposed/Used**			☑ Not Required ☐ Required ☐ Approved	**SD** (DD series); **MOI** 7-47:48; **GB** pp. 4-1:6, 7-29	
	2%			2%					
Stopping-Sight Distance	**Minimum**			**Minimum**			☑ Not Required ☐ Required ☐ Approved	**MOI** 7-62; **GB** pp. 3-2:8, 3-106:110, 7-28, 7-3 (T. 7-1)	
	360			360					
Structural Capacity	**Design Loading**			**Design Loading**			☑ Not Required ☐ Required ☐ Approved	**MOI** 11-2:3; **GB** p. 7-38	HS-20 for existing; HL-93 for new construction
	HL-93 for new construction			HL-93 for new construction					
Bridge Width	**Minimum**			**Minimum**			☑ Not Required ☐ Required ☐ Approved	**SD** DD 9; **MOI** 11-3; **GB** pp. 7-37:38	
	125.833"			125.833"					
Vertical Clearance*	**Minimum**			**Minimum**			☑ Not Required ☐ Required ☐ Approved	**SD** DD 8:9; **MOI** 11-4:5; **GB** p. 7-38	* Notify FHWA on any changes to Vertical Clearance on the National Hi hwa S stem
	16.5' over road, 23.5' over rail			16.5'					
Lateral Offset to Obstruction	**Minimum**			**Minimum**			☑ Not Required ☐ Required ☐ Approved	**SD** DD 17; **GB** pp. 7-37:38	
	1.5' tangent / 3' radius			1.5' tangent / 3' radius					

Design Waivers	UDOT Standard				RFP Requirement		Design Waiver	References	Date of Decision, Comments, Mitigation, etc.
Acceleration Lanes	**V**	**Va**	**V'a**	**L**	**Location**	**L**	☑ Not Required ☐ Required ☐ Approved	Refer to Table 10-4 **GB** pp. 10-111:112 to adjust for grade. A part of the ramp proper may also be considered in the acceleration length as a design waiver. Table 10-3 **GB** p. 10-110. See also **GB** pp. 9-124:125, 10-107:110, 116:122; **SD** DD 13A:14B, ST 1; **MOI** 7-106	
	45 mph	35 mph	0 mph	560'	NA	NA			
			14 mph	490'					
			18 mph	440'					
			22 mph	380'					
			26 mph	280'					
Deceleration Lanes	**V**	**Va**	**V'a**	**L**	**Location**	**L**	☑ Not Required ☐ Required ☐ Approved	Refer to Table 10-4 **GB** pp. 10-111:112 to adjust for grade. Table 10-5 **GB** p. 10-115. See also **GB** pp. 9-124:125, 10-107,112:120, 123:124; **SD** DD 13A:14B, ST 3A:3B; **MOI** 7-106	
	45 mph	40 mph	0 mph	385'	Ramp B (45-0 mph) Ramp D (45-0 mph)	385' 385'			
			14 mph	350'					
			18 mph	325'					
			22 mph	295'					
			26 mph	250'					
Guardrail Bridge Connection	UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.				UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.		☑ Not Required ☐ Required ☐ Approved	**SD** BA 4B1:4B2, UDOT Design Exception Form	
Clear Zone	Meet clear zone compliant requirements defined in Standard Drawings.				20'		☑ Not Required ☐ Required ☐ Approved	2006 Roadside Design Guide pg. 3-6 and Figure 3.2 pg. 3-8; **SD** DD 4, 8, 10:12,17	
Intersection Sight Distance	Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.				Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.		☑ Not Required ☐ Required ☐ Approved	**GB** pp. 9-28:54, **MOI** 7-64:67	
Shoulder/Travel way (gutter pan)	The gutter pan is not considered a part of the traveled way or shoulder.				The gutter pan is not considered a part of the traveled way or shoulder.		☑ Not Required ☐ Required ☐ Approved	**GB** pp. 4-19, 10-103; **MOI** 7-1, 43:44	
Curb Configuration	2011 AASHTO p. 10-103				Type B1/Type M2		☑ Not Required ☐ Required ☐ Approved	Determine if the curb is appropriate for the type of facility. **GB** pp. 4-16:19, 10-103; **SD** GW 2	
Traffic Control	Meet Traffic Control Standard Drawings requirements				Meet Traffic Control Standard Drawings requirements		☑ Not Required ☐ Required ☐ Approved	**SD** TC series	
Rumble Strips	Meet Paving Standard Drawings requirements				NA		☑ Not Required ☐ Required ☐ Approved	**SD** PV 6A:8B	

Prepared by Justin Beddoes Justin Beddoes 2016.10.07 14:57:32 -06'00' Date _____

Verified Only _____ Date _____
- Local Government Projects Only

Approved by _____ Charles Mason-Hill 2016.10.13 14:37:56 -06'00' Date _____

On local government projects that are not on a UDOT road, the Region Preconstruction Engineer signs the "Verified Only" line and the Engineer of Record signs the "Approved by" line. For all other projects, the "Verified Only" line is left blank and the Region Preconstruction Engineer signs the "Approved by" line.

PROJECT DESIGN CRITERIA - URBAN ARTERIAL - OTHER

I. PROJECT DESCRIPTION

DATE: 5/9/2016

Project No	**S-0154(12)11**	**Location**	11400 S/Bangerter Hwy
PIN	**12566**	**Concept**	4 New Interchanges on Bangerter Highway

Describe the scope of the project Construct 4 New Interchages

II. DESIGN STANDARDS BY ROADWAY

(Complete a separate PDC for each roadway on your project)

Date of OSR: 2/18/2016

Roadway Name: **SR-154 (Bangerter Highway) at 11400 S Interchange**

Roadway Characteristics

Functional Class	Urban Arterial - Other			**Pavement Type**	Rigid	
Current Year	2015	**AADT=**	**43,000**	**Terrain**	Rolling	
Design Year	2040	**AADT=**	**87,000**	**% Trucks (current)**	6	
Design Vehicle	WB-67			**Posted / Design Speed**	60	65

Proposed Roadway Characteristics

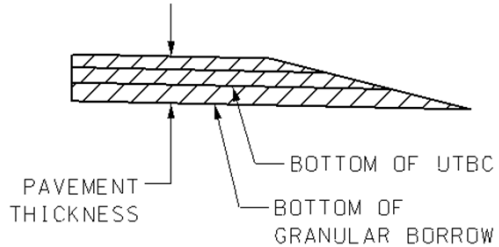
Total Number of Lanes 6

Shoulder Width (Typ) 12'

Curb & Gutter Type & Width (Typ) Type M1 (2.5')

Pavement Thickness

See Typical Sections in Part 7



Pavement Thickness consists of Hard Surfacing, LCBC, UTBC, and Granular Borrow.

Comments

Ramps A1, B1, C1, & D1:*

Design Speed (300 ft along ramp beyond the painted gore in the travel direction) - 55 mph

Design Speed (Ramp Body) - 45 mph

Design Speed (Within 300 ft of 11400 S) - 20 mph

20-mph Design Speed continues through the left turn movement

*Refer to Standard Drawings DD 5 and DD 6 for design of ramp elements, use the design speeds listed above for determining superelevation, minimum radii, vertical curve k values, stopping sight distance, and clear zone. Superelevation method 2 can be used for curves at the ramp terminal.

Order of Precedence: SD - 2012 Standard Drawings; MOI - Roadway Design Manual of Instruction; GB - AASHTO Green Book 2011 Edition

FHWA 13 Critical Elements	UDOT Standard	RFP Requirement	Design Exce tion	References	Date of Decision, Comments, Mitigation, etc.
Design Speed	65 MPH	65 MPH	☑ Not Required ☐ Required ☐ Approved	**MOI** 2-1; **GB** pp. 2-53:58, 7-27	Determined by Concept Team
Lane Width	**Mainline** 12' **LT Turn Lane(s)** 12' **RT Turn Lane(s)** 12'	12' 12' 12'	☑ Not Required ☐ Required ☐ Approved	**SD** (DD & ST series); **MOI** 7-1, 43:47, 107; **GB** pp. 7-29:30	
Shoulder Width	**Outside** 12'; **Inside** 12'; **Barrier Offset** 2'	**Outside** *12'; **Inside** *12'; **Barrier Offset** 2'	☐ Not Required ☑ Required ☐ Approved	**SD** (DD & ST series); **MOI** 7-44:46; **GB** pp. 4-8:11, 7-30	*Increase shoulder width as necessary to accommodate stopping sight distance. Barrier Offset not required for 12' shoulders. Design Exception is for the outside shoulder for the entrance ramps only. See Design Exception for limits of reduced shoulder
Superelevation	**Maximum Superelevation** 6%	**Maximum Superelevation** 6%	☑ Not Required ☐ Required ☐ Approved	**SD** DD 1; **MOI** 7-26:29; **GB** pp. 7-29, 3-44 (T. 3-8)	
Horizontal Alignment	**Minimum Radii Value** 1660'	**Minimum Radii Value** 1660'	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-30:33, 50:55; **GB** pp. 7-28, 3-32 (T. 3-7), 3-44 (T. 3-8)	
Vertical Alignment	**Sag Curve Min. K Value** 157; **Crest Curve Min. K Value** 193	**Sag Curve Min. K Value** *157; **Crest Curve Min. K Value** 193	☐ Not Required ☑ Required ☐ Approved	**MOI** 7-56:60; **GB** pp. *crest* 3-155: 157 (T. 3-34:35), *sag* 3-161 (T. 3-36)	*AASHTO Design criteria for a "Comfort" Sag curve will be allowed for the sag curve under 11400 South only, meet min k value of 157 at all other locations on SR-154. Meet AASHTO GB requirements for length of comfort sag. See RFP for Lighting Requirements.
Profile Grades	**% Min** 0.30%; **% Max** 5%	**% Min** 0.30%; **% Max** 5%	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-58:62; **GB** pp. 3-119, 7-28:29 (T. 7-4)	0.50% preferred
Cross Slope	**Standard Value** 2%	**Value Proposed/Used** 2%	☑ Not Required ☐ Required ☐ Approved	**SD** (DD, DD 4); **MOI** 7-47:48; **GB** pp. 4-1:6, 8-2:3	
Stopping-Sight Distance	**Minimum** 645	**Minimum** 645	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-62; **GB** pp. 3-2:8, 3-106:110, 3-4 (T. 3-1)	Adjust stopping sight distance for grades above 3% per AASHTO GB
Structural Capacity	**Design Loading** HL-93	**Design Loading** HL-93	☑ Not Required ☐ Required ☐ Approved	**MOI** 11-2:3; **GB** p. 8-4	HS-20 for existing; HL-93 for new construction
Bridge Width	**Minimum** Traffic Lanes+Shoulders+Barrier Offset+Parapets	**Minimum** Traffic Lanes+Shoulders+Barrier Offset+Parapets	☑ Not Required ☐ Required ☐ Approved	**SD** DD 9; **MOI** 11-3; **GB** p. 8-4	
Vertical Clearance*	**Minimum** 16.5' over road, 23.5' over rail	**Minimum** 16.5'	☑ Not Required ☐ Required ☐ Approved	**SD** DD 8:9; **MOI** 11-4:5; **GB** p. 7-38	* Notify FHWA on any changes to Vertical Clearance on the National Highway System
Lateral Offset to Obstruction	**Minimum** Edge of the Travel Lane to the Edge of the Shoulder.	**Minimum** Edge of the Travel Lane to the Edge of the Shoulder.	☑ Not Required ☐ Required ☐ Approved	**SD** DD 17; **GB** pp. 7-37:38	

Design Waivers	UDOT Standard	RFP Requirement	Design Waiver	References	Date of Decision, Comments, Mitigation, etc.
Acceleration Lanes	V: 65 mph; Va: 50 mph V'a / L: 0 / 1410 14 / 1350 18 / 1310 22 / 1220 26 / 1120	Location / L: Ramp B 0 to 65 (SB ON) / 1410' Ramp D 0 to 65 (NB ON) / 1410'	☑ Not Required ☐ Required ☐ Approved	Refer to Table 10-4 **GB** pp. 10-111:112 to adjust for grade. A part of the ramp proper may also be considered in the acceleration length as a design waiver. Table 10-3 **GB** p. 10-110. See also **GB** pp. 9-124:125, 10-107:110, 116:122; **SD** DD 13A:14B, ST 1; **MOI** 7-106	
Deceleration Lanes	V: 65 mph; Va: 55 mph V'a / L: 0 / 570 14 / 540 18 / 520 22 / 500 26 / 470	Location / L: Ramp A 65 to 0 (NB Off) / 570' Ramp C 65 to 0 (SB Off) / 570'	☑ Not Required ☐ Required ☐ Approved	Refer to Table 10-4 **GB** pp. 10-111:112 to adjust for grade. Table 10-5 **GB** p. 10-115. See also **GB** pp. 9-124:125, 10-107,112:120, 123:124; **SD** DD 13A:14B, ST 3A:3B; **MOI** 7-106	
Guardrail Bridge Connection	UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.	UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.	☑ Not Required ☐ Required ☐ Approved	**SD** BA 4B1:4B2, UDOT Design Exception Form	
Clear Zone	Meet clear zone compliant requirements defined in Standard Drawings.	30'	☑ Not Required ☐ Required ☐ Approved	2006 Roadside Design Guide pg. 3-6 and Figure 3.2 pg. 3-8; **SD** DD 4, 8, 10-12,17	
Intersection Sight Distance	Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.	Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.	☑ Not Required ☐ Required ☐ Approved	**GB** pp. 9-28:54, **MOI** 7-64:67	
Ramp Terminal Sight Distance	Along the Ramp: Design Speed / SSD (ft) 65 mph / 645 55 mph / 495 50 mph / 425 45 mph / 360 40 mph / 305 35 mph / 250 30 mph / 200 25 mph / 155 Along the Freeway or Street Preceeding Approach Nose of Exit Ramp: Design Speed / SSD (ft)* / DSD (ft)** 65 mph / 810 / 1365 55 mph / 620 / 1135 50 mph / 535 / 1030 45 mph / 450 / 930 40 mph / 385 / 825 35 mph / 315 / 720 30 mph / 250 / 620 25 mph / 200 / N/	Along the Ramp: Design Speed / SSD (ft) 65 mph / 645 55 mph / 495 45 mph / 360 20 mph / 115 Along the Freeway or Street Preceeding Approach Nose of Exit Ramp: Location / SSD* / DSD** SR-154 Approacing Ramp A & C / 810' / 1365'	☑ Not Required ☐ Required ☐ Approved	SSD (Stopping Sight Distance) should be at least as great as design SSD *SSD is 25% greater than minimum SSD. **DSD is Decision Sight Distance based on avoidance maneuver 'E' and is desired where feasible. Document DSD but do not obtain waiver if DSD is not met. **GB** p. 3-4 (T. 3-1) **GB** p. 3-7 (T. 3-3) **GB** p. 10-92	
Shoulder/Travel way (gutter pan)	The gutter pan is not considered a part of the traveled way or shoulder.	The gutter pan is not considered a part of the traveled way or shoulder.	☑ Not Required ☐ Required ☐ Approved	**GB** pp. 4-19, 10-103; **MOI** 7-1, 43:44	

Design Waivers	UDOT Standard	RFP Requirement	Design Waiver	References	Date of Decision, Comments, Mitigation, etc.
Gores	Follow the key points from 2011 AASHTO: • Should be uniform along the freeway; • Geometric shape is appropriate for given speeds; • Mitigation required for major obstructions in a gore; and • Unpaved area beyond the gore nose should be graded nearly level with the roadways as practical.	Location: All Gores Meets all Requirements?: Yes	☑ Not Required ☐ Required ☐ Approved	**GB** pp. 10-96:101; **SD** DD 6, ST 3A:3B	
Ramp Terminals	Platform Location: Ramp side of the approach nose or merging end. Length: 200 ft At- grade terminal of ramp.: Varies	Platform Location: Ramp side of the approach nose or merging end. Length: 200 ft At- grade terminal of ramp.: Varies	☑ Not Required ☐ Required ☐ Approved	Avoid left hand entrances and exits. **GB** pp. 10-103:104. Ramp Terminal means: 1) the exit terminal from the side street onto the freeway entrance ramp; 2) the entrance terminal onto the freeway; 3) the exit terminal from the freeway onto the exit ramp; and 4) the entrance terminal from the freeway exit ramp onto the side street. Refer to **GB** 10-104 for platform lengths. **MOI** 7-105:106	
On Ramp Design	Type: Parallel Curve Radius: 1000 ft Dist. From Physical Nose to Ramp Control Line Terminus: 200 ft Taper: 300 ft min	Ramp Loc.: All On Ramps Type: Parallel Curve Rad.: 1000 ft Dist.: 200 ft Taper: 300 ft	☑ Not Required ☐ Required ☐ Approved	**GB** pp. 10-107:112; **SD** DD 6, ST 1; **MOI** p. 1-2. UDOTs preferred approach is to utilize parallel entrance ramps. See **GB** pp. 10-89:90; **MOI** 7-105:106.	
Off Ramp Design	Type: Taper Divergence Angle (deg): 2-5 Dist. from outer edge alignment break to ramp control line: 200 ft	Ramp Loc.: All Off Ramps Type: Taper Angle: 2-5 Dist.: 200 ft	☑ Not Required ☐ Required ☐ Approved	**GB** pp. 10-112:116; **SD** DD 6, ST 3A:3B; **MOI** p. 1-2. UDOTs preferred approach is to utilize tapered exit ramps for single lane exits. If multi lane exit, one lane must be parallel. See **GB** pp. 10-89:90; **MOI** 7-105:106.	
Curb Configuration	2011 AASHTO p.10-103	Type M1	☑ Not Required ☐ Required ☐ Approved	Determine if the curb is appropriate for the type of facility. **GB** pp. 4-16:19, 10-103; **SD** GW 2	
Traffic Control	Meet Traffic Control Standard Drawings requirements	Meet Traffic Control Standard Drawings requirements	☑ Not Required ☐ Required ☐ Approved	**SD** TC series	
Rumble Strips	Meet Paving Standard Drawings requirements	N/A	☑ Not Required ☐ Required ☐ Approved	**SD** PV 6A:8B	

Prepared by _____ Date 10/7/2016

Verified Only _____ Date _____
- Local Government Projects Only

Approved by _____ Charles Mason-Hill Date _____

On local government projects that are not on a UDOT road, the Region Preconstruction Engineer signs the "Verified Only" line and the Engineer of Record signs the "Approved by" line. For all other projects, the "Verified Only" line is left blank and the Region Preconstruction Engineer signs the "Approved by" line.

PROJECT DESIGN CRITERIA - URBAN ARTERIAL

I. PROJECT DESCRIPTION

DATE: 5/9/2016

Project No	**S-0154(12)11**	**Location**	11400 S/Bangerter Hwy
PIN	**12566**	**Concept**	SPUI Bangerter Under 11400 S

Describe the scope of the project Construct 4 New Interchages

II. DESIGN STANDARDS BY ROADWAY

(Complete a separate PDC for each roadway on your project)

Date of OSR: 2/18/2016

Roadway Name: **11400 South**

Comments

Storage Length shown is per lane.

Roadway Characteristics

Functional Class	Urban Arterial			**Pavement Type**	Rigid		
Current Year	2015	**AADT=**	**26,000**	**Terrain**	Level		
Design Year	2040	**AADT=**	**47,000**	**% Trucks (current)**	3		
Design Vehicle	WB-67			**Posted / Design Speed**	40	45	

Proposed Roadway Characteristics

Total Number of Lanes	5	**Park Strip Width (Typ)**	4
Shoulder Width (Typ)	8	**Sidewalk Width (Typ)**	5
Curb & Gutter Type & Width (Typ)	B1, 2.5'		

Intersection #1:

Roadway Name	Dir.	# of LT Lanes	Storage Length	# of Thru Lanes	# of RT Lanes	Storage Length
11400 S	**EB**	-	-	-	-	-
11400 S	**WB**	2	75	2	1	115
4000 West	**NB**	-	-	-	-	-
4000 West	**SB**	-	-	-	-	-

Curb Radius From T.B.C.

NW Curb Radius:	-
SW Curb Radius:	-
NE Curb Radius:	35
SE Curb Radius:	35

Intersection #2:

Roadway Name	Dir.	# of LT Lanes	Storage Length	# of Thru Lanes	# of RT Lanes	Storage Length
11400 S	**EB**	2	100	2	1	-
11400 S	**WB**	2	250	2	1	-
NB Off Ramp	**NB**	2	300	-	1	300
SB Off Ramp	**SB**	2	500	-	2	500

NW Curb Radius:	45
SW Curb Radius:	64.5
NE Curb Radius:	64.5
SE Curb Radius:	45

Intersection #3:

Roadway Name	Dir.	# of LT Lanes	Storage Length	# of Thru Lanes	# of RT Lanes	Storage Length
11400 S	**EB**	1	200	2	1	200
11400 S	**WB**	1	110	2	1	-
River Heights	**NB**	1	200	1	1	100
River Heights	**SB**	1	150	1	1	300

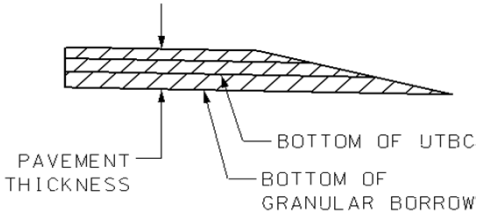
NW Curb Radius:	35
SW Curb Radius:	35
NE Curb Radius:	35
SE Curb Radius:	35

Intersection #4:

Roadway Name	Dir.	# of LT Lanes	Storage Length	# of Thru Lanes	# of RT Lanes	Storage Length
11400 S	EB	1	100	2	1	-
11400 S	WB	1	125	2	1	150
Summer Heights	NB	1	150	1	1	100
Summer Heights	SB	1	100	1	1	125

NW Curb Radius:	35
SW Curb Radius:	35
NE Curb Radius:	35
SE Curb Radius:	35

Pavement Thickness
See Typical Sections in Part 7



Pavement Thickness consists of Hard Surfacing, UTBC, and Granular Borrow (if used).

Order of Precedence: SD - 2012 Standard Drawings; MOI - Roadway Design Manual of Instruction; GB - AASHTO Green Book 2011 Edition

FHWA 13 Critical Elements	UDOT Standard	RFP Requirement	Design Exception	References	Date of Decision, Comments, Mitigation, etc.
Design Speed	45	45	☑ Not Required ☐ Required ☐ Approved	**MOI** 2-1; **GB** pp. 2-53:58, 7-27	Determined by Concept Team
Lane Width	**Mainline** 12' **LT Turn Lane(s)** 12' **RT Turn Lane(s)** 12'	12' 12' 12'	☑ Not Required ☐ Required ☐ Approved	**SD** (DD & ST series); **MOI** 7-1, 43:47, 107; **GB** pp. 7-29:30	
Shoulder Width	**Outside** 8; **Inside** N/A; **Barrier Offset** 2	**Outside** 8; **Inside** N/A; **Barrier Offset** 2	☑ Not Required ☐ Required ☐ Approved	**SD** (DD & ST series); **MOI** 7-44:46; **GB** pp. 4-8:11, 7-30	
Superelevation	**Maximum Superelevation** 6%	**Maximum Superelevation** 6%	☑ Not Required ☐ Required ☐ Approved	**SD** DD 1; **MOI** 7-26:29; **GB** pp. 7-29, 3-44 (T. 3-8)	
Horizontal Alignment	**Minimum Radii Value** 643	**Minimum Radii Value** 643	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-30:33, 50:55; **GB** pp. 7-28, 3-32 (T. 3-7), 3-44 (T. 3-8)	
Vertical Alignment	**Sag Curve Min. K Value** 79; **Crest Curve Min. K Value** 61	**Sag Curve Min. K Value** 79; **Crest Curve Min. K Value** 61	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-56:60; **GB** pp. *crest* 3-155: 157 (T. 3-34:35), *sag* 3-161 (T. 3-36)	
Profile Grades	**% Min** 0.30%; **% Max** 6%	**% Min** 0.30%; **% Max** 6%	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-58:62; **GB** pp. 3-119, 7-28:29 (T. 7-4)	0.50% preferred
Cross Slope	**Standard Value** 2%	**Value Proposed/Used** 2%	☑ Not Required ☐ Required ☐ Approved	**SD** (DD series); **MOI** 7-47:48; **GB** pp. 4-1:6, 7-29	
Stopping-Sight Distance	**Minimum** 360'	**Minimum** 360'	☑ Not Required ☐ Required ☐ Approved	**MOI** 7-62; **GB** pp. 3-2:8, 3-106:110, 7-28, 7-3 (T. 7-1)	
Structural Capacity	**Design Loading** HL-93 for New Construction	**Design Loading** HL-93 for New Construction	☑ Not Required ☐ Required ☐ Approved	**MOI** 11-2:3; **GB** p. 7-38	HS-20 for existing; HL-93 for new construction
Bridge Width	**Minimum** N/A	**Minimum** N/A	☑ Not Required ☐ Required ☐ Approved	**SD** DD 9; **MOI** 11-3; **GB** pp. 7-37:38	
Vertical Clearance*	**Minimum** 16.5' over road, 23.5' over rail	**Minimum** 16.5'	☑ Not Required ☐ Required ☐ Approved	**SD** DD 8:9; **MOI** 11-4:5; **GB** p. 7-38	* Notify FHWA on any changes to Vertical Clearance on the National Hi hwa S stem
Lateral Offset to Obstruction	**Minimum** 1.5' tangent / 3' radius	**Minimum** 1.5' tangent / 3' radius	☑ Not Required ☐ Required ☐ Approved	**SD** DD 17; **GB** pp. 7-37:38	

Design Waivers	UDOT Standard				RFP Requirement		Design Waiver	References	Date of Decision, Comments, Mitigation, etc.
Acceleration Lanes	**V**	**Va**	**V'a**	**L**	**Location**	**L**	☑ **Not Required** ☐ **Required** ☐ **Approved**	Refer to Table 10-4 **GB** pp. 10-111:112 to adjust for grade. A part of the ramp proper may also be considered in the acceleration length as a design waiver. Table 10-3 **GB** p. 10-110. See also **GB** pp. 9-124:125, 10-107:110, 116:122; **SD** DD 13A:14B, ST 1; **MOI** 7-106	
	70 mph	53 mph	22	1420	N/A				
			26	1350					
			36	1000					
			40	820					
			44	580					
Deceleration Lanes	**V**	**Va**	**V'a**	**L**	**Location**	**L**	☑ **Not Required** ☐ **Required** ☐ **Approved**	Refer to Table 10-4 **GB** pp. 10-111:112 to adjust for grade. Table 10-5 **GB** p. 10-115. See also **GB** pp. 9-124:125, 10-107,112:120, 123:124; **SD** DD 13A:14B, ST 3A:3B; **MOI** 7-106	
	70 mph	58 mph	22	550	N/A				
			26	520					
			36	440					
			40	390					
			44	340					
Guardrail Bridge Connection	UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception Form.				UDOT Std Dwg BA 4B1:4B2 & Bridge Rail or Parapet section of UDOT Design Exception		☑ **Not Required** ☐ **Required** ☐ **Approved**	**SD** BA 4B1:4B2, UDOT Design Exception Form	
Clear Zone	Meet clear zone compliant requirements defined in Standard Drawings.				20'		☑ **Not Required** ☐ **Required** ☐ **Approved**	2006 Roadside Design Guide pg. 3-6 and Figure 3.2 pg. 3-8; **SD** DD 4, 8, 10:12,17	
Intersection Sight Distance	Meet 2011 AASHTO requirements for sight triangles cases A-F and skew.				Sight triangles cases A-F and skew are met.		☑ Not Required ☐ Required ☐ Approved	**GB** pp. 9-28:54, **MOI** 7-64:67	
Shoulder/Travel way (gutter pan)	The gutter pan is not considered a part of the traveled way or shoulder.				The gutter pan is not considered a part of the traveled way or shoulder.		☑ Not Required ☐ Required ☐ Approved	**GB** pp. 4-19, 10-103; **MOI** 7-1, 43:44	
Curb Configuration	2011 AASHTO p. 10-103				Type B1		☑ Not Required ☐ Required ☐ Approved	Determine if the curb is appropriate for the type of facility. **GB** pp. 4-16:19, 10-103; **SD** GW 2	
Traffic Control	Meet Traffic Control Standard Drawings requirements				Meet Traffic Control Standard Drawings requirements		☑ Not Required ☐ Required ☐ Approved	**SD** TC series	
Rumble Strips	Meet Paving Standard Drawings requirements				Meet Paving Standard Drawings requirements		☑ Not Required ☐ Required ☐ Approved	**SD** PV 6A:8B	

Prepared by _____ Date 10/21/2016

Verified Only _____ Date _____
- Local Government Projects Only

Approved by _____ Charles Mason-Hill Date _____

On local government projects that are not on a UDOT road, the Region Preconstruction Engineer signs the "Verified Only" line and the Engineer of Record signs the "Approved by" line. For all other projects, the "Verified Only" line is left blank and the Region Preconstruction Engineer signs the "Approved by" line.

Appendix 2: PROJECT DESIGN EXCEPTIONS & DEVIATIONS

Utah Department of Transportation - Deviation from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

Project Information:

Project No:	S-R299(210)	PIN:	12566
Location:	Bangerter Hwy; 4 Locations; 5400 South		
Description:	New Interchange on Existing Freeway		

All Deviations are approved at the Region Level

Deviations are any change that does one of the following:

1) Entirely or partially modifies or deletes a Standard or Supplemental Specification.
2) Modifies or deletes a Standard Drawing.
3) Modifies or deletes an internal design process.
4) Adds a project scope related special provision, adds a new section, or a new drawing.

Deviations that DO NOT need to be listed on this page include:

- Special Provisions obtained from UDOT's website.
- Modifications to Section 00555M or 00555S, Limitation of Operations.
- Any specification modified for the purposes of updating contact information.

Proposed Deviations:

Spec/Dwg Number:	SW 2	Spec/Dwg Name:	Noise Wall Placement UDOT Standard:	5'-0" Minimum	
Proposed Deviation:	0'-0"				
Explanation of Deviation and Mitigation Measures:	The northbound off ramp of SR-154 (Bangerter Highway) encroaches into an adjacent neighborhood. A 5' minimum distance between the noise wall and concrete barrier for a section adjacent to roadway is required. Providing this minimum distance will place the concrete barrier in the roadway requiring it to be re-aligned which will impact right-of-way of adjacent homes that are not currently being impacted by the project. Snow storage would be removed for approx. 520 feet.				
Safety Impacts:	No safety impacts				
Cost to Attain UDOT Standard:	49,300		Practical Design :	No	

Total Project Cost Savings Identified Using Practical Design: 0.00

Utah Department of Transportation
Deviation from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566 S-R299(210) Bangerter Hwy; 4 Locations; 5400 South

Approval / Signatures:

Comments:

Prepared By

Comments:

Marwan Farah

Digitally signed by Marwan Farah
Date: 2016.09.12 09:18:21 -06'00'

UDOT Project Manager

Comments:

Date: 2016.09.13 15:39:39 -06'00'

Region Pre-construction Engineer

* A completed copy of this form will be provided to the Region Director for informational purposes.

** If the Region Preconstruction Engineer deems a Deviation in need of escalation, it may be submitted to the Statewide Preconstruction Engineer for review and approval.

Utah Department of Transportation
Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

Type of Request: (select one or both) ☒ Design Exception ☒ Design Waiver

Project Information:

Project No:	S-R299(210)	PIN:	12566
Location:	Bangerter Hwy; 4 Locations; 5400 South		
Concept:	New Interchange on Existing Freeway		

Roadway Characteristics and Traffic Data:

Functional Class:	Urban Arterial			Pavement Type:	Rigid
Current Year:	2016	AADT =	56,000	Current % Trucks:	6 %
Projected:	10 Years	AADT =	76,000	Projected % Trucks:	6 %
Projected:	25 Years	AADT =	109,000	Projected % Trucks:	6 %
Terrain:	Level			Posted Speed:	60 mph
Project Design Life:	40 Years			Design Speed:	65 mph
Design Vehicle:	WB-67				

Geometric Data:

Number of Lanes:	6	Clear Zone Distance:	30 ft.
Pavement Width:	122 ft.	ROW Width:	150 ft.
Shoulder Width:	12 ft.	Shoulder Type:	Paved

Accident History as documented in the OSR:

	Actual Rate	Expected Rate
Accident History	N/A	N/A
Severity	N/A	N/A

Accident History Years:	2012-2014
Date of OSR:	2/18/2016

Remarks:
Accident data is not applicable because the at-grade intersection will be converted to a grade separated interchange.

Utah Department of Transportation
Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566 S-R299(210) Bangerter Hwy; 4 Locations; 5400 South

Adjoining Section Geometry Compatibility:

Direction:	North	Pavement Width: 98'	Shoulder Width	In-12; Out-0
Shoulder Type:	Inside - Paved; Outside - None			
Compatibility:	At reconstruction limits the shoulders will be tapered in to match existing.			

Direction:	South	Pavement Width: 98'	Shoulder Width	In-12; Out-0
Shoulder Type:	Inside - Paved; Outside - None			
Compatibility:	At reconstruction limits the shoulders will be tapered in to match existing.			

Programmed Future Improvements:

Cost Data:

Project Cost as Proposed:	$62,927,617.07
Additional Project Cost to Attain FHWA 13 Critical Elements (Design Exceptions):	$7,343,000.00
Additional Project Cost to Attain Other Standards (Design Waivers):	$5,000,000.00
Project Cost Savings Identified Using Practical Design (This amount may be part of or all of the above amounts for Design Exceptions and/or Waivers):	
Attached Detailed Estimate:	

Comments:
None

Utah Department of Transportation
Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566 S-R299(210) Bangerter Hwy; 4 Locations; 5400 South

Exceptions to FHWA's 13 Critical Elements:

1. Design Speed	2. Lane Width	3. Shoulder Width	4. Horizontal Alignment	5. Vertical Alignment
6. Grades	7. Stopping-Sight Distance	8. Cross Slopes	9. Superelevation	10. Structural Capacity
11.Bridge Width	12. Vertical Clearance (Notify FHWA on any changes on the NHS and STRAHNET routes. See detailed instructions for more information.)		13. Lateral Offset to Obstruction	

Design Exception #1		Additional information in attached file:		
Element:	Shoulder Width	Existing	UDOT Standard	Proposed
Location:	SB On Ramp - Outside shoulder (right side based on direction of travel)	N/A	10' (Shoulder + Shy)	4' (Shoulder + Shy)

Mitigation: None

Remarks: The SB on ramp for Bangerter Hwy and 5400 South will be a three lane ramp with the ramp metering system located on the inside of the ramp due to the BOR aqueduct on the West side. The 4' (shoulder + shy) occurs for 50' along the ramp, but the shoulder is reduced from the 10' (shoulder + shy) for a total of 482' with the appropriate taper rates for the design speed. Reducing the shoulder will prevent impacts to the adjacent commercial property.

Design Exception #2		Additional information in attached file:		
Element:	Grades	Existing	UDOT Standard	Proposed
Location:	SR-154 (Bangerter Hwy); North SR-173 (5400 South)	4.16%	5.00%	6.00%

Mitigation: None

Remarks: The intersection improvements of Bangerter Hwy and 5400 South will implement a bridge over 5400 South for Bangerter travel. Currently North of the intersection the road slopes downward at 4.16%; with the addition of the bridge a steeper slope is necessary to connect the existing roadway with the design. Using a 6% grade for 434 ft will minimize the impacts to the surrounding urban environment. This grade allows for the design to tie in quicker taking advantage of the current roadway topography, reduces the amount of the retaining wall necessary, reduces the required length of aqueduct reconstruction by 380 linear feet, and prevents the total acquisition of 7 properties and 2 partial acquisitions.

Utah Department of Transportation
Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566 S-R299(210) Bangerter Hwy; 4 Locations; 5400 South

Design Exception #3		Additional information in attached file:		
Element:	Shoulder Width	Existing	UDOT Standard	Proposed
Location:	SR-173 (5400 South)	0'	8'	0'

Mitigation: None

Remarks: Currently SR-173 (5400 South) has no shoulders along the traveled way. 8 foot shoulders would have major impacts on the surrounding urban environment. Property acquisitions would occur for each adjacent property and would cause a few businesses to close. Besides the major ROW/community impacts, there would also be major utility conflicts with the flex lane gantries and the power lines that run along SR-173. To avoid the major utility and ROW impacts with widening the road to construct the 8 foot shoulders the design will follow the existing condition of no shoulders. Standard shoulder widths will be provided within the interchange limits. This design exception is only provided for 5400 South outside of the interchange (outside of the pork chop islands separating left and right turn movements on each leg of the interchange).

Utah Department of Transportation
Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566 S-R299(210) Bangerter Hwy; 4 Locations; 5400 South

Waivers of Additional Design Criteria:

1. Acceleration Lanes	2. Deceleration Lanes	3. Clear Zone	4. Intersection Sight Distance	5. Ramp Terminal Sight Distance
6. Shoulder/Travel Way (Gutter Pan)	7. Gores	8. Ramp Terminals	9. On Ramp Design	10. Off Ramp Design
11. Curb Configuration	12. Guardrail Bridge Connection (See next section)	13. Traffic Control	14. Rumble Strips	

Waiver #1		Additional information in attached file:		
Element:	Deceleration Lanes	Existing	UDOT Standard	Proposed
Location:	SR-173 (5400 South)	EB - LT : 200 ft WB - LT : 90 ft	EB - LT : 385 ft WB - LT : 385 ft	EB - LT : 140 ft WB - LT : 140 ft

Mitigation:

Remarks: The required deceleration length will not be provided for the Eastbound left turn from SR-173 (5400 South) onto SR-154 (Bangerter Hwy) and Westbound left turn from SR-173 (5400 South) onto 3900 West. For the EB left, providing the full deceleration length would extend the deceleration lane into the 3900 West intersection making it inoperative. Providing full deceleration for the WB left would have similar repercussions as the deceleration length would push the lane into the middle of the SPUI system. In order to provide the deceleration lengths required the 3900 West signal would need to be moved and redesigned. Both left turns have been designed to provide the required 140 ft gap length for the design speed and allows both intersections to operate

Utah Department of Transportation
Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566 S-R299(210) Bangerter Hwy; 4 Locations; 5400 South

Waivers of Additional Design Criteria – Bridge Rail or Parapet:

Structure Number: _____ Sufficiency Rating: (from Structures Division) _____

Mainline or Overcrossing: _____

Location: _____

Existing Systems:

	Bridge		Approach	
Rail Type*			◯ Guardrail	◯ Precast Barrier
Height				
Attached			◯ Yes	◯ No
Meets Standards	◯ Yes	◯ No	◯ Yes	◯ No
Total Width				
Lane Width				
Shoulder Width				
Condition				
3 Year Accidents	Actual Rate	Expected Rate	Actual Rate	Expected Rate

*Attach Sketch of Rail Type

Remarks:

_____

Utah Department of Transportation
Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566 S-R299(210) Bangerter Hwy; 4 Locations; 5400 South

Approval / Signatures:

Prepared and Submitted by: Aaron Rasmussen

PROFESSIONAL ENGINEER
09/20/16
No. 5049058-2202
Aaron Rasmussen
ELECTRONIC SEAL
STATE OF UTAH

Marwan Farah

Digitally signed by Marwan Farah
DN: o=Utah Department of Transportation, email=mfarah@utah.gov, cn=Marwan Farah
Date: 2016.10.05 07:22:19 -06'00'

UDOT Project Manager

Comments:

Charles Mason-Hill

Region Pre-construction Engineer

Comments:

Glenn Blackwelder

Statewide Traffic and Safety Engineer

Comments:

George Lukes
2016.10.18
11:19:41 -06'00'

Statewide Pre-construction Engineer

Comments:
There are no future programmed projects.

FHWA Approval*
(*If required per current Stewardship and Oversight Agreement)

Comments:

Approval of Design Exceptions for all highway improvement projects on the NHS or Interstate System is considered to be a Federal Administrative Action as specified in 23 CFR 771.107, and as such must comply with the National Environmental Policy Act (NEPA). For Design Exceptions on a Federal-Aid project (or state funded project where a NEPA action was taken), the Design Exception is covered by the previous NEPA action. For Design Exceptions on projects where there has been no previous NEPA action FHWA intends to programmatically classify these actions as Categorical Exclusions (CE) pursuant to 23 CFR 771.117(a), provided there are no unusual circumstances (23 CFR 771.117(b)) or significant environmental impacts. Signature above by the Statewide Pre-construction Engineer confirms that NEPA has been completed for approved Design Exceptions.

Utah Department of Transportation
Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

Type of Request: (select one or both) ☒ Design Exception ☐ Design Waiver

Project Information:

Project No: S-0154(12)11 PIN: 12566

Location: Bangerter Hwy; 4 Locations; 9000 South

Concept: New Interchange on Existing Freeway

Roadway Characteristics and Traffic Data:

Functional Class:	Urban Arterial			Pavement Type:	Rigid
Current Year:	2016	AADT =	50,000	Current % Trucks:	6 %
Projected:	10 Years	AADT =	75,000	Projected % Trucks:	6 %
Projected:	25 Years	AADT =	115,000	Projected % Trucks:	6 %
Terrain:		Rolling		Posted Speed:	60 mph
Project Design Life:	40 Years			Design Speed:	65 mph
Design Vehicle:		WB-67			

Geometric Data:

Number of Lanes:	6	Clear Zone Distance:	30 ft.
Pavement Width:	125 ft.	ROW Width:	150 ft.
Shoulder Width:	12 ft.	Shoulder Type:	Paved

Accident History as documented in the OSR:

	Actual Rate	Expected Rate
Accident History	N/A	N/A
Severity	N/A	N/A

Accident History Years: 2012-2014

Date of OSR: 2/18/2016

Remarks:

Accident data is not applicable due the at-grade intersection will be converted to grade separated interchange.

Utah Department of Transportation
Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566 S-0154(12)11 Bangerter Hwy; 4 Locations; 9000 South

Adjoining Section Geometry Compatibility:

Direction:	North	Pavement Width: 49	Shoulder Width 0
Shoulder Type:	N/A (No Shoulder)		
Compatibility:	Full Shoulder will be added		

Direction:	South	Pavement Width: 49	Shoulder Width 0
Shoulder Type:	N/A (No Shoulder)		
Compatibility:	Full Shoulder will be added		

Programmed Future Improvements:

None

Cost Data:

Project Cost as Proposed:	$67,651,000.00
Additional Project Cost to Attain FHWA 13 Critical Elements (Design Exceptions):	$14,800,000.00
Additional Project Cost to Attain Other Standards (Design Waivers):	
Project Cost Savings Identified Using Practical Design (This amount may be part of or all of the above amounts for Design Exceptions and/or Waivers):	
Attached Detailed Estimate:	

Comments:

Remove 4 Bridges - $80,000
Build 4 bridges - $10,000,000
Remove existing wall - $200,000
Install New Wall - $2,600,000
Relocate JV Aqueduct - $2,000,000
Total $14,800,000

Utah Department of Transportation
Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566 S-0154(12)11 Bangerter Hwy; 4 Locations; 9000 South

Exceptions to FHWA's 13 Critical Elements:

1. Design Speed	2. Lane Width	3. Shoulder Width	4. Horizontal Alignment	5. Vertical Alignment
6. Grades	7. Stopping-Sight Distance	8. Cross Slopes	9. Superelevation	10. Structural Capacity
11.Bridge Width	12. Vertical Clearance (Notify FHWA on any changes on the NHS and STRAHNET routes. See detailed instructions for more information.)		13. Lateral Offset to Obstruction	

Design Exception #1		Additional information in attached file: 12566_9000 South_Profiles 5 and 6		
Element:	Vertical Alignment	Existing	UDOT Standard	Proposed
Location:	SR-154 (Bangerter Hwy) SR-209 (9000 South) Between Old Bingham Hwy and 90th South	5%	5%	6%

Mitigation: 400 feet at 6%; Avoid Bridge Structures, Canal, UTA, Old Bingham Hwy.

Remarks: Currently, there is a 55-foot elevation difference along Bangerter Hwy between 90th South (higher) and Old Bingham Hwy (lower). The current grade of Bangerter Hwy at this location is 5%. There are three bridges that cross over Bangerter Hwy in the vicinity of the Old Bingham Hwy, a canal bridge , two UTA bridges, and a bridge for the Old Bingham Hwy. If the standard 5% grade was used to set a new profile to go over 90th South; it would require to raise the profile of Bangerter Hwy under these structures that would require the full reconstruction of these bridges. If a 6% grade is used the geometry can be tied back in to existing Bangerter Hwy before these structures. Both Grades require 90th South to be lowered 1 to 2 feet. See Profile Figure.

Design Exception #2		Additional information in attached file:		
Element:	Shoulder Width	Existing	UDOT Standard	Proposed
Location:	SR-154 (Bangerter Hwy) under Old Bingham Hwy For Northbound only Inside Shoulder Width Outside Shoulder Width	 8' 0'	 12' 12'	 3' 3'

Mitigation: Object markers will be placed on end columns to enhance visibility of concrete columns.

Remarks: Due to center bents in the median for the Old Bingham Hwy, UTA Tracks, and the Canal structures the existing shoulder at this location is reduced from the standard 12' inside shoulder to 8'. The proposed design adds a fourth-lane in the northbound direction that extends past these bridge columns.

To add the fourth lane, it will require the removal of the slope paving between the outside edge of pavement and the retaining wall and re-striping the travel lanes. The new striping will be offset from the joint lines by about 5 feet.

The proposed inside shoulder will be 3-feet from the face of the barrier at the bridge columns, the 3-foot shoulders will run for 220 feet; then the barrier around the columns transitions back to single median barrier where the inside shoulder becomes 6-feet wide for 360 feet. Then the lanes shift back to the existing striping over a 370-foot taper where the inside shoulder is back to 12 feet wide.

Utah Department of Transportation
Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566 S-0154(12)11 Bangerter Hwy; 4 Locations; 9000 South

Waivers of Additional Design Criteria:

1. Acceleration Lanes	2. Deceleration Lanes	3. Clear Zone	4. Intersection Sight Distance	5. Ramp Terminal Sight Distance
6. Shoulder/Travel Way (Gutter Pan)	7. Gores	8. Ramp Terminals	9. On Ramp Design	10. Off Ramp Design
11. Curb Configuration	12. Guardrail Bridge Connection (See next section)	13. Traffic Control	14. Rumble Strips	

Utah Department of Transportation
Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566 S-0154(12)11 Bangerter Hwy; 4 Locations; 9000 South

Waivers of Additional Design Criteria – Bridge Rail or Parapet:

Structure Number: _____ Sufficiency Rating: (from Structures Division) _____

Mainline or Overcrossing: _____

Location: _____

Existing Systems:

	Bridge		Approach	
Rail Type*			◯ Guardrail	◯ Precast Barrier
Height				
Attached			◯ Yes	◯ No
Meets Standards	◯ Yes	◯ No	◯ Yes	◯ No
Total Width				
Lane Width				
Shoulder Width				
Condition				
3 Year Accidents	Actual Rate	Expected Rate	Actual Rate	Expected Rate

*Attach Sketch of Rail Type

Remarks:

_____

Utah Department of Transportation
Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566 S-0154(12)11 Bangerter Hwy; 4 Locations; 9000 South

Approval / Signatures:

Prepared and Submitted by: Justin A Beddoes

PROFESSIONAL ENGINEER
09/08/16
No. 362173
Justin A Beddoes
ELECTRONIC SEAL
STATE OF UTAH

Justin Beddoes

Comments:

9/12/2016

UDOT Project Manager

Comments:

Region Pre-construction Engineer

Comments:

Statewide Traffic and Safety Engineer

Comments:

Statewide Pre-construction Engineer

Comments:

FHWA Approval*

(*If required per current Stewardship and Oversight Agreement)

Approval of Design Exceptions for all highway improvement projects on the NHS or Interstate System is considered to be a Federal Administrative Action as specified in 23 CFR 771.107, and as such must comply with the National Environmental Policy Act (NEPA). For Design Exceptions on a Federal-Aid project (or state funded project where a NEPA action was taken), the Design Exception is covered by the previous NEPA action. For Design Exceptions on projects where there has been no previous NEPA action FHWA intends to programmatically classify these actions as Categorical Exclusions (CE) pursuant to 23 CFR 771.117(a), provided there are no unusual circumstances (23 CFR 771.117(b)) or significant environmental impacts. Signature above by the Statewide Pre-construction Engineer confirms that NEPA has been completed for approved Design Exceptions.

Utah Department of Transportation
Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

Type of Request: (select one or both) ☒ Design Exception ☐ Design Waiver

Project Information:

Project No: S-0154(12)11 PIN: 12566

Location: Bangerter Hwy; 4 Locations; 11400 South

Concept: New Interchange on Existing Freeway

Roadway Characteristics and Traffic Data:

Functional Class:	Urban Arterial			Pavement Type:	Rigid
Current Year:	2015	AADT =	43,000	Current % Trucks:	6 %
Projected:	10 Years	AADT =	56,500	Projected % Trucks:	6 %
Projected:	25 Years	AADT =	87,000	Projected % Trucks:	6 %
Terrain:		Rolling		Posted Speed:	60 mph
Project Design Life:	40 Years			Design Speed:	65 mph
Design Vehicle:		WB-67			

Geometric Data:

Number of Lanes:	6	Clear Zone Distance:	30 ft.
Pavement Width:	113 ft.	ROW Width:	150-250 ft.
Shoulder Width:	12 ft.	Shoulder Type:	Paved

Accident History as documented in the OSR:

	Actual Rate	Expected Rate
Accident History	N/A	N/A
Severity	N/A	N/A

Accident History Years: 2012-2014

Date of OSR: 2/18/2016

Remarks:

Accident data is not applicable due to the at-grade intersection will be converted to grade separated interchange.

Utah Department of Transportation
Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566 S-0154(12)11 Bangerter Hwy; 4 Locations; 11400 South

Adjoining Section Geometry Compatibility:

Direction:	South	Pavement Width: 105'	Shoulder Width	In-12' Out-4'
Shoulder Type:	Paved			
Compatibility:	Shoulders will be tapered to match existing at ends of reconstruction limits			

Direction:	North	Pavement Width: 97'	Shoulder Width	In-12' Out-0'
Shoulder Type:	Inside - Paved, Outside - None			
Compatibility:	Shoulders will be tapered to match existing at ends of reconstruction limits			

Programmed Future Improvements:

Cost Data:

Project Cost as Proposed:	$54,560,000.00
Additional Project Cost to Attain FHWA 13 Critical Elements (Design Exceptions):	$2,790,000.00
Additional Project Cost to Attain Other Standards (Design Waivers):	
Project Cost Savings Identified Using Practical Design (This amount may be part of or all of the above amounts for Design Exceptions and/or Waivers):	$2,790,000.00
Attached Detailed Estimate:	

Comments:

Utah Department of Transportation
Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566 S-0154(12)11 Bangerter Hwy; 4 Locations; 11400 South

Exceptions to FHWA's 13 Critical Elements:

1. Design Speed	2. Lane Width	3. Shoulder Width	4. Horizontal Alignment	5. Vertical Alignment
6. Grades	7. Stopping-Sight Distance	8. Cross Slopes	9. Superelevation	10. Structural Capacity
11.Bridge Width	12. Vertical Clearance (Notify FHWA on any changes on the NHS and STRAHNET routes. See detailed instructions for more information.)		13. Lateral Offset to Obstruction	

Design Exception #1		Additional information in attached file:		
Element:	Shoulder Width	Existing	UDOT Standard	Proposed
Location:	Outside Shoulder on the entrance ramps through the limits of the ramp meter storage only.	N/A	10' Outside Shoulder (including barrier offset)	7' Outside Shoulder (including barrier offset)

Mitigation: None

Remarks: Design Exception would allow a minimum distance of 9' from back of barrier to all commercial buildings in the area. Without the design exception we will be able to provide approx 6'. Impacts to the parking lot for Buffalo Wild Wings and the parking lot for the new development to the north would be avoided. Full standard shoulders will be provided beyond the proposed ramp meter storage area.
$870,000 cost to attain standard includes approx $400,000 in property acquisition and damage costs, and $320,000 in pavement/earthwork/retaining wall costs, $150,000 in utility and commercial sign costs.

Design Exception #2		Additional information in attached file:		
Element:	Vertical Alignment	Existing	UDOT Standard	Proposed
Location:	Sag curve on SR-154 under 11400 South	N/A	min K value of 157 for sag curves for a design speed of 65 mph	Design Sag curve for Comfort instead of headlight sight distance

Mitigation: Lighting will be provided through the limits of the comfort sag curve.

Remarks: Project will meet AASHTO design criteria for a comfort sag under 11400 South. All other sag curves will meet minimum k values for headlight sight distance.
$1,920,000 cost to attain standard includes approx $700,000 in residential property acquisitions, $800,000 in retaining wall costs, $230,000 in roadway excavation, $190,000 in other misc roadway/drainage costs

Utah Department of Transportation
Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566 S-0154(12)11 Bangerter Hwy; 4 Locations; 11400 South

Waivers of Additional Design Criteria:

1. Acceleration Lanes	2. Deceleration Lanes	3. Clear Zone	4. Intersection Sight Distance	5. Ramp Terminal Sight Distance
6. Shoulder/Travel Way (Gutter Pan)	7. Gores	8. Ramp Terminals	9. On Ramp Design	10. Off Ramp Design
11. Curb Configuration	12. Guardrail Bridge Connection (See next section)	13. Traffic Control	14. Rumble Strips	

Utah Department of Transportation
Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566 S-0154(12)11 Bangerter Hwy; 4 Locations; 11400 South

Waivers of Additional Design Criteria – Bridge Rail or Parapet:

Structure Number: _____ Sufficiency Rating: (from Structures Division) _____

Mainline or Overcrossing: _____

Location: _____

Existing Systems:

	Bridge		Approach	
Rail Type*			◯ Guardrail	◯ Precast Barrier
Height				
Attached			◯ Yes	◯ No
Meets Standards	◯ Yes	◯ No	◯ Yes	◯ No
Total Width				
Lane Width				
Shoulder Width				
Condition				
3 Year Accidents	Actual Rate	Expected Rate	Actual Rate	Expected Rate

*Attach Sketch of Rail Type

Remarks:

_____

Utah Department of Transportation
Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566 S-0154(12)11 Bangerter Hwy; 4 Locations; 11400 South

Approval / Signatures:

Prepared and Submitted by: Mark Bedke

PROFESSIONAL ENGINEER
09/08/16
No. 8562477
Mark Bedke
ELECTRONIC SEAL
STATE OF UTAH

Comments:

9/12/2016
UDOT Project Manager

Comments:

Charles Mason-Hill

Region Pre-construction Engineer

Comments:

Glenn Blackwelder

Statewide Traffic and Safety Engineer

Comments:

Fred Doehring

cosign

Statewide Pre-construction Engineer

Comments:

FHWA Approval*
(*If required per current Stewardship and Oversight Agreement)

Approval of Design Exceptions for all highway improvement projects on the NHS or Interstate System is considered to be a Federal Administrative Action as specified in 23 CFR 771.107, and as such must comply with the National Environmental Policy Act (NEPA). For Design Exceptions on a Federal-Aid project (or state funded project where a NEPA action was taken), the Design Exception is covered by the previous NEPA action. For Design Exceptions on projects where there has been no previous NEPA action FHWA intends to programmatically classify these actions as Categorical Exclusions (CE) pursuant to 23 CFR 771.117(a), provided there are no unusual circumstances (23 CFR 771.117(b)) or significant environmental impacts. Signature above by the Statewide Pre-construction Engineer confirms that NEPA has been completed for approved Design Exceptions.

Utah Department of Transportation - Deviation from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

Project Information:

Project No:	S-0154(12)11	PIN:	12566
Location:	Bangerter Hwy; 4 Locations; 11400 South		
Description:	New Interchange on Existing Freeway		

All Deviations are approved at the Region Level

Deviations are any change that does one of the following:

1) Entirely or partially modifies or deletes a Standard or Supplemental Specification.
2) Modifies or deletes a Standard Drawing.
3) Modifies or deletes an internal design process.
4) Adds a project scope related special provision, adds a new section, or a new drawing.

Deviations that DO NOT need to be listed on this page include:

- Special Provisions obtained from UDOT's website.
- Modifications to Section 00555M or 00555S, Limitation of Operations.
- Any specification modified for the purposes of updating contact information.

Proposed Deviations:

Spec/Dwg Number:	DD 5A	Spec/Dwg Name:	Entrance and Exit Ram	UDOT Standard:	300' Min Transition
Proposed Deviation:	180' Min Transition				
Explanation of Deviation and Mitigation Measures:	This deviation applies to the first transition from 3 lanes to 2 lanes on the SB On Ramp Only. Due to the close proximity of the newly developed commercial buildings there is not sufficient length to safely provide a 300' lane taper. Traffic and Safety wants to avoid a yield condition for the right turn movements, providing a shorter taper rather than a yield condition would be a safer option. The merging point begins within 300 ft of the cross street, traffic will be traveling at slower speeds. Cost to attain standard includes approx $1,500,000 for property acquisition.				
Safety Impacts:	Traffic would have less distance to merge.				
Cost to Attain UDOT Standard:	1,500,000			Practical Design :	Yes

Utah Department of Transportation
Deviation from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566 S-0154(12)11 Bangerter Hwy; 4 Locations; 11400 South

Spec/Dwg Number:	SW 2	Spec/Dwg Name:	Noise Wall Placement UDOT Standard:	5' min snow storage	
Proposed Deviation:	3" min distance between noise wall and concrete barrier				
Explanation of Deviation and Mitigation Measures:	This deviation applies to the proposed noise wall along SR-154 on the east side between station 1050+00 RT to 1060+00 RT. All other locations where noise walls are located the 5 ft min storage area is required. Providing the snow storage would require a 3 ft Right-of-Way strip acquisition through the entire limits of the adjacent property of approx 1000 ft long. There is an existing retaining wall of about 5 ft high and 300 ft long that would be avoided with design deviation. Currently the proposed retaining/noise wall is retaining a max height of 5 ft, providing snow storage would increase the retaining portion of the wall to approx 7' high. The UDOT Standard shoulders are required through this area. $540,000 to attain standard includes approx $160,000 in property acquisition and temporary construction easements, $380,000 for reconstruction existing retaining wall and additional Ret/Noise wall				
Safety Impacts:	Snow would be pushed to the shoulder instead of behind the barrier creating a temporary hazard and reduced shoulder for emergencies.				
Cost to Attain UDOT Standard:	540,000		Practical Design :	Yes	

Total Project Cost Savings Identified Using Practical Design: 2,040,000

Utah Department of Transportation
Deviation from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566 S-0154(12)11 Bangerter Hwy; 4 Locations; 11400 South

Approval / Signatures:

Comments:

Prepared By

Comments:

Marwan Farah

Digitally signed by Marwan Farah
Date: 2016.09.12 09:24:36 -06'00'

UDOT Project Manager

Comments:

Date: 2016.09.13 15:37:43 -06'00'

Region Pre-construction Engineer

* A completed copy of this form will be provided to the Region Director for informational purposes.

** If the Region Preconstruction Engineer deems a Deviation in need of escalation, it may be submitted to the Statewide Preconstruction Engineer for review and approval.

Utah Department of Transportation
Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

Type of Request: (select one or both) ☒ Design Exception ☐ Design Waiver

Project Information:

Project No: S-0154(12)11 PIN: 12566

Location: Bangerter Hwy; 4 Locations; 11400 South to 5400 South

Concept: New Interchange on Existing Freeway

Roadway Characteristics and Traffic Data:

Functional Class:	Urban Arterial			Pavement Type:	Rigid
Current Year:	2016	AADT =	50,000	Current % Trucks:	6 %
Projected:	10 Years	AADT =	80,000	Projected % Trucks:	6 %
Projected:	25 Years	AADT =	115,000	Projected % Trucks:	6 %
Terrain:		Rolling		Posted Speed:	60 mph
Project Design Life:	Years			Design Speed:	65 mph
Design Vehicle:		WB-67			

Geometric Data:

Number of Lanes:	6	Clear Zone Distance:	30 ft.
Pavement Width:	97 ft.	ROW Width:	200 ft.
Shoulder Width:	12 ft.	Shoulder Type:	Paved

Accident History as documented in the OSR:

	Actual Rate	Expected Rate
Accident History	N/A	N/A
Severity	N/A	N/A

Accident History Years: 2012-2014

Date of OSR: 2/18/2016

Remarks:

Accident data is not applicable due the at-grade intersections will be converted to grade separated interchanges.

Utah Department of Transportation
Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566 S-0154(12)11 Bangerter Hwy; 4 Locations; 11400 South to 5400 South

Adjoining Section Geometry Compatibility:

Direction:	North	Pavement Width: 49	Shoulder Width 0
Shoulder Type:	N/A (No Shoulder)		
Compatibility:	Lanes are compatible		

Direction:	South	Pavement Width: 49	Shoulder Width 0
Shoulder Type:	N/A (No Shoulder)		
Compatibility:	Lanes are compatible		

Programmed Future Improvements:

Cost Data:

Project Cost as Proposed:	$208,000,000.00
Additional Project Cost to Attain FHWA 13 Critical Elements (Design Exceptions):	$770,000.00
Additional Project Cost to Attain Other Standards (Design Waivers):	
Project Cost Savings Identified Using Practical Design (This amount may be part of or all of the above amounts for Design Exceptions and/or Waivers):	
Attached Detailed Estimate:	

Comments:
Reduced inside shoulders for median light poles and median sign structure foundations.
Along Bangerter at:

11400 South:
2 High Mast Poles

9000 South:
3 back to back cobra head light poles on top the median barrier
1 butterfly sign structure north of 9000 S

7000 South:
5 back to back cobra head light poles on top the median barrier

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Utah Department of Transportation
Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566 S-0154(12)11 Bangerter Hwy; 4 Locations; 11400 South to 5400 South

Exceptions to FHWA's 13 Critical Elements:

1. Design Speed	2. Lane Width	3. Shoulder Width	4. Horizontal Alignment	5. Vertical Alignment
6. Grades	7. Stopping-Sight Distance	8. Cross Slopes	9. Superelevation	10. Structural Capacity
11.Bridge Width	12. Vertical Clearance (Notify FHWA on any changes on the NHS and STRAHNET routes. See detailed instructions for more information.)		13. Lateral Offset to Obstruction	

Design Exception #1		Additional information in attached file:		
Element:	Shoulder Width	Existing	UDOT Standard	Proposed
Location:	Inside Shoulder Project Wide Various Locations	12'	12'	10'

Mitigation: None

Remarks: The shoulder widths at overhead sign locations will be reduced by 2 feet in both directions to accommodate the overhead signs. The shoulders will be immediately widened out to meet standards outside of the sign structure limits.

In order to meet the shoulder width standard at the overhead sign locations Bangerter Highway would need to be widened by an additional 4 ft (2 ft in each direction) at all sign locations. This would result in additional construction costs of approximately $70,000 as well as additional impacts to right-of-way.

Utah Department of Transportation
Design Exception / Design Waiver from UDOT Standards

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12566 S-0154(12)11 Bangerter Hwy; 4 Locations; 11400 South to 5400 South

Waivers of Additional Design Criteria:

1. Acceleration Lanes	2. Deceleration Lanes	3. Clear Zone	4. Intersection Sight Distance	5. Ramp Terminal Sight Distance
6. Shoulder/Travel Way (Gutter Pan)	7. Gores	8. Ramp Terminals	9. On Ramp Design	10. Off Ramp Design
11. Curb Configuration	12. Guardrail Bridge Connection (See next section)	13. Traffic Control	14. Rumble Strips	

Utah Department of Transportation
Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566 S-0154(12)11 Bangerter Hwy; 4 Locations; 11400 South to 5400 South

Waivers of Additional Design Criteria – Bridge Rail or Parapet:

Structure Number: _____ Sufficiency Rating: (from Structures Division) _____

Mainline or Overcrossing: _____

Location: _____

Existing Systems:

	Bridge		Approach	
Rail Type*			◯ Guardrail	◯ Precast Barrier
Height				
Attached			◯ Yes	◯ No
Meets Standards	◯ Yes	◯ No	◯ Yes	◯ No
Total Width				
Lane Width				
Shoulder Width				
Condition				
3 Year Accidents	Actual Rate	Expected Rate	Actual Rate	Expected Rate

*Attach Sketch of Rail Type

Remarks:

_____

Utah Department of Transportation
Design Exception / Design Waiver from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566 S-0154(12)11 Bangerter Hwy; 4 Locations; 11400 South to 5400 South

Approval / Signatures:

Prepared and Submitted by: Justin A Beddoes

PROFESSIONAL ENGINEER
09/08/16
No. 362173
Justin A Beddoes
ELECTRONIC SEAL
STATE OF UTAH

Comments:

UDOT Project Manager

Comments:

Charles Mason-Hill
Oct 13 2016 3:09 PM

Region Pre-construction Engineer

Comments:

Glenn Blackwelder
Oct 17 2016 6:20 PM

Statewide Traffic and Safety Engineer

George Lukes
2016.10.18
11:26:27 -06'00'

Comments: No Future Planned Improvements

Statewide Pre-construction Engineer

Comments:

FHWA Approval*
(*If required per current Stewardship and Oversight Agreement)

Approval of Design Exceptions for all highway improvement projects on the NHS or Interstate System is considered to be a Federal Administrative Action as specified in 23 CFR 771.107, and as such must comply with the National Environmental Policy Act (NEPA). For Design Exceptions on a Federal-Aid project (or state funded project where a NEPA action was taken), the Design Exception is covered by the previous NEPA action. For Design Exceptions on projects where there has been no previous NEPA action FHWA intends to programmatically classify these actions as Categorical Exclusions (CE) pursuant to 23 CFR 771.117(a), provided there are no unusual circumstances (23 CFR 771.117(b)) or significant environmental impacts. Signature above by the Statewide Pre-construction Engineer confirms that NEPA has been completed for approved Design Exceptions.

Utah Department of Transportation - Deviation from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

Project Information:

Project No:	S-R299(210)	PIN:	12566
Location:	Bangerter Hwy; 4 Locations; 11400 South to 5400 South		
Description:	4 New Interchange on Existing Freeway		

All Deviations are approved at the Region Level

Deviations are any change that does one of the following:

1) Entirely or partially modifies or deletes a Standard or Supplemental Specification.
2) Modifies or deletes a Standard Drawing.
3) Modifies or deletes an internal design process.
4) Adds a project scope related special provision, adds a new section, or a new drawing.

Deviations that DO NOT need to be listed on this page include:

- Special Provisions obtained from UDOT's website.
- Modifications to Section 00555M or 00555S, Limitation of Operations.
- Any specification modified for the purposes of updating contact information.

Proposed Deviations:

Spec/Dwg Number:	BA 1C	Spec/Dwg Name:	Conc Barrier Shoulder	UDOT Standard:	1.0'
Proposed Deviation:	0.0'				
Explanation of Deviation and Mitigation Measures:	This will reduce the overall width of the mainline and ramp pavement, which will minimize the foot print of each interchange; It is proposed that 42 inch Cast-in-place Concrete Half Barrier will be used for this project. The barrier will have #8 bars dowelled into the concrete pavement at a spacing of two-foot intervals. This is considered a rigid barrier, which will not deflect. The standard drawing does not define why the 1-foot is required behind the barrier so whether it's part of the deflection area or if it is for being able to construct the barrier on the pavement is not known. It has been demonstrated on recent projects that the additional width is not needed for contractors to install the barrier properly. Therefore, we have determined that by eliminating this additional foot it does not create a safety concern or constructability problem				
Safety Impacts:	No safety impacts				
Cost to Attain UDOT Standard:	190,000			Practical Design :	No

Total Project Cost Savings Identified Using Practical Design:

Utah Department of Transportation
Deviation from UDOT Standards

www.udot.utah.gov/go/designexceptionprocess

12566 S-R299(210) Bangerter Hwy; 4 Locations; 11400 South to 5400 South

Approval / Signatures:

Comments:

Justin Bodoloes

Prepared By

Comments:

Marwan Farah

Digitally signed by Marwan Farah
Date: 2016.09.27 08:39:27 -06'00'

UDOT Project Manager

Comments:

Region Pre-construction Engineer

* A completed copy of this form will be provided to the Region Director for informational purposes.

** If the Region Preconstruction Engineer deems a Deviation in need of escalation, it may be submitted to the Statewide Preconstruction Engineer for review and approval.

16—SIGNS

16A. GENERAL

Conduct all Work necessary to meet the requirements of this Section 16 (Signs) and to satisfy all functional needs of the Project, including signing for Bangerter Highway (SR-154), ramps, city streets, interchanges, intersections, frontage roads, accesses, parking lots, bike lanes, and sidewalks.

16B. STANDARDS

Complete Work for signs in accordance with the requirements of the standards listed by priority in Table 16B-1 (Standards for Signs).

If there is any conflict in standards, adhere to the standard with the most stringent requirements.

If there is any unresolved ambiguity in standards, it is the Design-Builder's responsibility to obtain clarification and Approval from the Department before proceeding with design and/or construction.

TABLE 16B-1
STANDARDS FOR SIGNS

Priority	*Author or Agency*	*Title*
1	UDOT	Special Provisions included in Part 5
2	UDOT	*Supplemental Specifications to 2012 Standard Specifications for Road and Bridge Construction,* as modified by Part 5
3	UDOT	*2012 Standard Specifications for Road and Bridge Construction,* as modified by Part 5
4	UDOT	*Supplemental Drawings to 2012 Standard Drawings for Road and Bridge Construction*
5	UDOT	*2012 Standard Drawings for Road and Bridge Construction*
6	UDOT	*Utah Manual on Uniform Traffic Control Devices (Utah MUTCD)*
7	UDOT	*UDOT Sign Manual*
8	UDOT	*Utah Standard Highway Signs Supplement*
9	FHWA	*2012 Supplemental to the Standard Highway Signs*
10	FHWA	*Standard Highway Signs*
11	AASHTO	*A Policy on Geometric Design of Highways and Streets*
12	AASHTO	*Roadside Design Guide*

16C. REQUIREMENTS

Provide all components of a sign system to meet the following requirements:

A. Provide for the orderly and predictable movement of all traffic, including bicycle and pedestrian traffic.

B. Provide guidance, regulatory, and warning signs needed to ensure the safe and informed operation of individual elements of the traffic stream, including bicycle and pedestrian traffic.

C. Provide new signs on the Project.

D. Provide signing, striping, and pavement messages in accordance the requirements of Part 4 (Project Design and Construction Requirements).

E. All specific service (logo) signing impacted by a Work zone shall be included in the Project. This includes the reconstruction, relocation, and/or upgrade of signs and/or supports for the specific service signs. Provide for and integrate logo signs into the Project signing in the design.

F. When specific service (logo) signs are impacted due to Work, the signs shall be temporarily relocated so that they are displayed for the Project duration. The Design-Builder shall be responsible for any fees that need to be refunded to individual business for the direction(s) of travel when for more than a month the signs cannot be temporarily displayed.

G. Provide Interchange Guide Signing on Bangerter Highway (SR-154) as well as crossroad signing for each of the following interchanges: 5400 South, 7000 South, 9000 South and 11400 South. Advanced Guide Signing shall not be installed prior to adjacent signalized intersections on Bangerter Highway. Where space allows, both a ½ mile and 1 mile advanced guide sign shall be provided in advance of each interchange. See Part 7 (Contract Drawings) for sign details.

H. All off-ramps shall have intersection lane control signing (for multiple lanes, on both sides of the off-ramp) for permanent off-ramp lane configurations at the beginning of the turn lanes.

I. Provide overhead guide signing on Bangerter Highway (SR-154) for any trap lanes and as necessary to avoid design conflicts such as ROW restrictions, utilities, etc. See Part 7 (Contract Drawings) for sign details.

J. Provide ½ mile advanced guide signing for signalized intersections on Bangerter Highway 12600 South (southbound only), 10400 South (northbound only), and 9800 South (southbound only). See Part 7 (Contract Drawings) for sign details. Existing advanced guide signing for the existing CFI intersections at 6200 South and 4700 South shall remain in place unless otherwise impacted by the Project.

K. Provide supplemental guide signing on Bangerter Highway (SR-154) and off-ramps in both direction for Utah Olympic Oval and USANA Amphitheatre at the 5400 South interchange and for the Hospital at the 9000 South interchange. See Part 7 (Contract Drawings) for sign details.

L. Provide oversized one-way (R6-1), do not enter (R5-1), wrong way (R5-1a) signs, four wrong way (R5-1a) signs (two of which include solar powered continuous flashing LED borders), and wrong way arrow pavement markings in accordance with Part 7 (Contract Drawings). Place a 2 inch wide red retroreflective strip on all off ramp sign posts and all delineation on the side facing the wrong way traffic.

M. 4015 West Build Alternative – Remove all existing signs associated with the ThrU Turns, including overhead signs. Obliterate ThrU Turn overhead sign foundations 24 inches below grade.

16C-1 Design

Prepare a Signing Plan and sign details. The sheets shall cover the entire Project area. Design all signs

in accordance with the Utah MUTCD, UDOT Sign Manual and the Utah Standard Highway Signs Supplement, along with the Standard Drawings and Specifications for sign heights and lateral offsets. Design all signing on Bangerter Highway (SR-154) to expressway design standards. For loading requirements refer to Part 4-17 (Structures).

16C-1.1 Signing Plan

A. Include all necessary regulatory, warning, guide signs (including, but not limited to supplemental, specific service (Hospital) for Bangerter Highway (SR-154), ramps, the cross-streets, and any other roadways affected by the Project.

B. Modify any signage outside the limits of the Project that is rendered inaccurate, ineffective, confusing, or unnecessary by the Project due to the Design-Builder's design and construction; such modifications may be in the form of addition, removal, or replacement of signs and appurtenances.

C. Design all off-ramp signing to the design speed of Bangerter Highway (SR-154) until within 250 feet of the ramp terminal.

D. Design all signing on Bangerter Highway (SR-154) to expressway design standards. Refer to Part 7 (Contract Drawings).

E. Design and install signing that meets all Standard and Guidance statements outlined in the Utah MUTCD. Obtain Approval prior to implementing any option statements provided in the Utah MUTCD. See the Utah MUTCD (Section 1A.13) for definitions of Standard, Guidance, and Option.

16C-1.2 Overhead Sign Design

Provide overhead signing that meets the following requirements:

A. Install new signs using retroreflective sheeting meeting or exceeding the minimum requirements of ASTM D-4956 Type XI sheeting in accordance with Section 16C-2, Materials. Sign lights are not required.

B. Refer to Part 4-17 (Structures) for structural design of sign supports.

C. Refer to Part 4-17 (Structures) for minimum overhead sign clearance.

D. Design and construct all overhead sign structures in accordance with Part 7 (Contract Drawings) for sign details and sign details.

16C-1.3 Sign Spacing on Bangerter Highway (SR-154)

Sign spacing shall meet the following requirements:

A. Changeable Message Signs (CMS) – Minimum sign spacing: 1000 feet in advance of the CMS unless otherwise Approved by the Department. Show the location of future CMS on the Signing Plan. See Part 4-03, Section 3C-4 for additional requirements regarding the placement of CMS.

B. Guide Signs – Minimum sign spacing: 800 feet

C. Mile Posts: 14 Calendar Days prior to installation, contact the Department (Peter Bigelow 801-965-4349) to mark locations for mile posts.

16C-1.4 Sign Lateral Offsets

All ground-mounted signs mounted on raised islands shall not overhang into the shoulder or travel lane.

16C-1.5 Other Signage Requirements

Do not attach signs to any bridge structure with the exception of cross-street names on overhead structures over Bangerter Highway (SR-154). Mechanical attachment of signs on structures is not permitted; use adhesive as approved by the Department to attach signs to bridge structures.

16C-2 Materials

Provide signing materials that are new at the time of installation with the exception of Logo Signs as described above.

A. **Sheeting**: Retroreflective sheeting shall meet or exceed the minimum requirements of ASTM D-4956 Type XI.

B. **Substrate**: Aluminum is required for all permanent signing in accordance with the 2012 UDOT Standard Specifications and in accordance with the following categories of signing:

1. For all signs placed on galvanized frames, use 0.125-inch aluminum substrate.
2. For all exit gore signs, use one-piece 0.125-inch aluminum substrate backed with plywood (½ inch HDO plywood backing).
3. For all ground mount signs located on the right hand side of the road, use ½ inch HDO plywood backing behind 0.080-inch aluminum substrate.
4. For all other signs either with or without Z bar, use 0.080-inch aluminum substrate.

C. **Ground-Mounted Sign Supports**: For all sign supports with breakaway slip bases, use no smaller than P5 Steel Posts (UDOT Standard Drawings SN 10A, SN 10B, SN 11A). For all signing 16 square feet or larger, use the freeway signing standards for posts, bases, hardware, etc. (UDOT Standard Drawings SN 14A, SN 14B, SN 14C, SN 14D, SN 14E, SN 16A, SN 16B, SN 16C). Signs placed in paved gores or other paved areas shall be mounted on bases that break away flush with the pavement.

D. **Roadside and Barrier Delineators**: Place roadside delineators a uniform distance from the edge of shoulder pavement in accordance with UDOT Standard Drawing GW 10. Place barrier reflectors on all roadside barriers in accordance with UDOT Standard Drawings. Use Flexible Delineator Posts for roadside delineators.

E. **Raised Island/Median Reflectors:** Install raised island/median reflectors in accordance with Standard Drawing GW1D.

F. **Linear Delineation Panels:** Install linear delineation panels in accordance with UDOT Standard Drawing GW 9B on the barrier on the outside of the following curves and in the place of barrier delineators when the barrier is greater than 42 inches high:

1. Bangerter Highway (SR-154) north of 11400 South
2. Bangerter Highway (SR-154) north of 5400 South

16D. SUBMITTALS

Provide submittals to the Department in accordance with Table 16D-1.

TABLE 16D-1
DESIGN-BUILDER SUBMITTALS FOR SIGNS

Submittal	***For Approval***	***Schedule***
Signing Plan (Provide a scroll plot for each submittal)	Yes	Prior to designing overhead sign structures

17—STRUCTURES

17A. GENERAL

Conduct all Work necessary to meet the requirements of this Section and to satisfy all functional needs of the Project, including temporary and permanent structures, bridges, and miscellaneous structures including walls, barriers, tunnels, moment slabs, sign structures, luminaires, traffic signals, and major drainage structures such as box culverts, structural plate arches, and precast concrete arches.

17A-1 Standards

Complete Work for structures in accordance with the requirements of the standards listed by priority in Table 17B-1(Standards for Structures).

If there is any conflict in standards, adhere to the standard with the most stringent requirements.

If there is any unresolved ambiguity in standards, it is the Design-Builder's responsibility to obtain clarification and Approval from the Department before proceeding with design and/or construction.

TABLE 17B-1
STANDARDS FOR STRUCTURES

Priority	*Author or Agency*	*Title*
1	UDOT	Special Provisions included in Part 5
2	UDOT	*Supplemental Specifications for 2012 Standard Specifications for Road and Bridge Construction,* as modified by Part 5
3	UDOT	*2012 Standard Specifications for Road and Bridge Construction,* as modified by Part 5
4	UDOT	*Structures Design and Detailing Manual(SDDM)*
5	UDOT	*Supplemental Drawings to 2012 Standard Drawings for Road and Bridge Construction*
6	UDOT	*2012 Standard Drawings for Road and Bridge Construction*
7	UDOT	*Bridge Management Manual*
8	UDOT	*Structures Quality Control / Quality Assurance (QC/QA) Procedures*
9	UDOT	*Aesthetics Guidelines*
10	State of Utah	*Utah Administrative Code, Rule R930-7 Manual of Accommodation of Utility Facilities and the Control and Protection of State Highway Rights-of-Way.*
11	AASHTO	*AASHTO LRFD Bridge Design Specifications* (Customary U.S. Units),
12	AASHTO	*Guide Specifications for LRFD Seismic Bridge Design*
13	AASHTO	*A Policy on Geometric Design of Highways and Streets*
14	AASHTO	*Guide Specifications for Design and Construction of Segmental Concrete Bridges*
15	AASHTO	*LRFD Guide Specifications for the Design of Pedestrian Bridges*
16	AASHTO	*Guide Design Specifications for Bridge Temporary Works*
17	OSHA	*Standards-29 CFR, Part 1926 Safety & Health Regulations for Construction*
18	AASHTO	*Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 6th edition.*
19	AASHTO / AWS	*Bridge Welding Code, D1.5M/D1.5: 2015*
20	AWS	*Structural Welding Code-Steel, D.1/D1.1M:2010*

21	AASHTO	*Manual for Bridge Evaluation*
22	BNSF/UPRR	*Guidelines for Railroad Grade Separation Projects*
23	AREMA	*Manual for Railway Engineering*
24	ANSI/ASSE	*Z359 Fall Protection Code*
25	PTI/ASBI	*M50.3-12: Guide Specification for Grouted Post-Tensioning*
26	PTI	*M55.1-12: Specification for Grouting of Post-Tensioned Structures*
27	FHWA	*Steel Bridge Design Handbook*
28	PCI	*Bridge Design Manual*
29	AASHTO	*Guide Specifications for Seismic Isolation Design*
30	AASHTO	*LRFD Bridge Construction Specifications*
31	FHWA	*Drilled Shafts, FHWA-IF-99-025*
32	FHWA	*Drilled Shafts for Bridge Foundations, FHWA-RD-92-004*
33	FHWA	*Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines,* Demonstration Project 82, Ground Improvement, FHWA-NHI-10-025
34	FHWA	*Corrosion/Degradation of Soil Reinforcements for Mechanically Stabilized Earth Walls and Reinforced Soil Slopes, FHWA-NHI-09-087*
35	UDOT Engineering Services Division	*Life Cycle Cost Analysis*

17A-2 Structures Design and Detailing Manual

17A-2.1 General SDDM

The SDDM defines the Department's requirements for structure design and detailing. The SDDM consists of manual chapters, drawings, checklists, templates, and design memoranda and is located on the UDOT website. Any deviations from the SDDM require Department approval.

17A-2.2 Definitions and Terminology

A. When the SDDM refers to "Structures Design Manager" such reference means the individual representing the Department who grants formal conditional determination that a particular matter or item is good or satisfactory for the Project.

B. When the SDDM refers to "approval, approves, or approved" such references means the definition in Section 17A-3 (Structures Approval).

C. When the SDDM refers to "temporary" such reference means intended for limited time or use as necessary for the completion of the Project. Temporary items are used by the Design-Builder to assist in the construction of the Project and are removed before Substantial Completion.

D. When the SDDM refers to "permanent" such reference means items are contractually required and are in place at Substantial Completion.

E. When the SDDM refers to nonredundant structural elements such references include integral and/or post-tensioned bent caps.

17A-3 Structures Approval

"Approval" as used in this Section, means any modifications from structural design criteria as defined in the RFP, including Work that differs from the design and/or technical requirements of the Contract

and must be submitted and Approved as an Alternative Technical Concept (ATC). Approval of an ATC does not constitute approval of a design deviation as defined in the SDDM.

When this Section refers to "approval" request acceptance using the Structural Design Criteria Deviation Request template and Structural Design Criteria Deviation Acceptance form found on the UDOT website. The Structural Design Criteria Deviations request cannot be used to request approval for design that does not meet requirements. Structural Design Deviation Requests must include justification for the request. Submit and receive approval for requests for deviations in accordance with Part 3 (Quality Program). Submit deviations and receive approval before incorporation into the design and before each Milestone Review.

17B. REQUIREMENTS

The requirements set forth provide Project specific clarification and supplement the requirements in 17A-1.

17B-1 Materials

17B-1.1 Structural Concrete

See Part 5 (Special Provisions and Exceptions), Section 03310M (Structural Concrete).

17B-1.2 Structural Concrete for Decks and Approach Slabs

See Part 5 (Special Provisions and Exceptions), Section 03312S (Structural Concrete for Decks and Approach Slabs).

17B-1.3 Penetrating Concrete Sealer and Concrete Coating

Seal or coat all columns, bent caps, abutment seats and exposed faces, wing walls and parapets on new and existing bridges. Meet the requirements in Part 4-07 (Landscaping and Aesthetics). Show required limits of sealing or coating on the plans.

17B-1.4 Prestressed Concrete Members

Use low-relaxation strand from plants certified by the Precast/Prestressed Concrete Institute (PCI).

17B-1.5 Post-Tensioning Steel

All personnel grouting post-tensioning ducts must be American Segmental Bridge Institute (ASBI) or PCI -certified as grouting technicians.

17B-1.6 Reinforcing

Stainless steel reinforcing conforming to ASTM A 955 Type XM-28 may be used.

17B-2 Design

17B-2.1 Loads and Forces

Comply with the following minimum design and load requirements as follows:

A. **Uplift:** Proportion the bridge spans to eliminate uplift at supports due to non-seismic loads. Designs resulting in uplift at the supports require approval. Approval is not required when widening existing structures with uplift at supports.

B. **Wind Forces.** Use wind exposure category C for design.

17B-2.2 Weathering Steel Details

Provide girder details as follows that control girder drainage and concrete staining.

A. Paint steel expansion bearings.

B. Ensure the girders can air-dry from any water spray or high-water events.

17B-2.3 Structural Steel Parameters

Provide steel girder details as follows:

A. Minimum thickness of any steel plate or shape to which shear studs are welded: ½ inch.

B. Web depth: Constant depth per bridge. The maximum allowable change in thickness or gross cross-sectional area of any web or flange plate at any splice is a factor of 2.0.

C. On new girders, do not use cover plates, pins, or hangers.

D. For structural steel field splices, use direct-tension indicator washers.

E. Provide steel diaphragms that satisfy strength and stiffness recommendations in the FHWA *Steel Bridge Design Handbook*, Volume 13.

17B-2.4 Prestressed Concrete Members

A. Design prestressed concrete members so that there is no sag (negative camber) in the girder after all dead loads are applied to the bridge (**C_D**) and to prevent ponding on the bridge under long-term sag conditions. Calculate dead load deflections based on the gross section properties and AASHTO *LRFD Bridge Design Specifications* Article 5.7.3.6.

B. Use of Utah Deck Bulb Tee prestressed concrete members is not allowed.

C. Girder depth: Provide a constant depth per bridge. Use a single prestressed concrete girder type for a bridge.

17B-2.5 Post-Tensioning Steel

A. Unbonded and external tendons may be used for bridge rehabilitation work with Approval.

B. Design the top flange of cast-in-place post-tensioned bridges to satisfy the requirements for severe corrosion conditions.

C. Provide a minimum 6 inches of concrete below bottom of girder flanges for post-tensioned integral bent caps. Use of post-tensioned integral bent caps requires Approval.

D. See Part 5 (Special Provisions and Exceptions), Section 03251 (Post-Tensioning Concrete for Structures).

17B-2.6 Accelerated Bridge Construction (ABC)

See Part 5 (Special Provisions and Exceptions), Section 03374S (Move Bridge) and the Heavy Lift ABC Project, Planning Items, Plan Sheet Requirements, Engineering Checks, Review Guidelines And Shop Drawing Sheet Requirements Checklist. Submit the checklist with both design milestones submittals and construction as defined by the responsibilities on the checklist Align the stages on the checklist with applicable project milestones in both design and construction. In addition, meet the following requirements:

A. **Temporary Support Structures:** Show dimensions, alignments, and elevations of

temporary supports relative to those of the permanent supports.

B. **Permanent Superstructure:** Design permanent superstructure for any temporary support conditions necessitated by the chosen method of moving the bridge. Specify the maximum anticipated and maximum allowable deflections for all stages of construction.

C. **Bridge Movement System:** When transporting the bridge using SPMTs, include a 10 percent contingency factor for loss of support or function of individual axles.

D. **Placement Tolerances:** As shown on the RFC plans.

E. **Utility Agreements and Mitigation Plans:** Obtain and provide written agreements to cross all affected above- and below-ground Utilities. Include in each agreement a plan to mitigate Utility issues via partial shut-down of Utility, complete shut-down of Utility, redistribution of load, etc.

17B-3 Bridges

17B-3.1 Bridge Geometry

A. **Geometric Layout (including Cut-and-Fill Slopes and Retaining Walls):**

1. Modifications from the RFP and the design provided as Reference Documents for the following structure geometrics require Approval:

   a. Horizontal alignment shift greater than five feet;

   b. Increasing structure skew greater than five degrees;

   c. Span configuration (number of spans and/or span length proportions);

   d. Locations of retaining walls relative to the abutments and wingwalls including changes to the abutment type or shape.

   e. Deck Slope:

      a. Evaluate the potential for ponding due to flat profiles and residual camber or long-term deflections. Adjust the profile to prevent ponding.

      b. Do not place the low point of profile on the bridge. See 17B-2.4 (Prestressed Girders) and Part 4-15 (Roadways) for additional requirements.

      c. See Part 4-04 (Drainage) for additional bridge drainage system requirements.

      d. Do not use deck drains.

B. **Vertical Clearances:** Provide the following minimum vertical clearances for all new structures whether in a temporary or final location:

1. During Construction: Do not reduce the vertical clearance for a bridge over a road from the minimum existing vertical clearance or 16’-0”, whichever is greater. For vertical clearance less than 16’-6”, provide a mitigation strategy for Approval. The Department approves all submittals to address any impacts to the structure.

2. Bridges over railroads: 23.83 feet.

3. Bridges over water: Meet the requirements of the SDDM 10.6.2.

C. **Horizontal Clearances:** Meet the horizontal clearance requirements of UDOT Standard Drawings, the SDDM, and in accordance with the Typical Sections in Part 7 (Contract Drawings).

D. **Bridges with Median Parapet:** Where a bridge includes a median parapet, provide a 2-inch minimum longitudinal joint in the center of the median parapet and deck to separate the cross-section into two bridges.

E. **Overhang:** Proportion the overhang per the SDDM 10.3.3.

F. **Support locations:** Locate adjacent bridges at the same crossing so that center lines of girder bearings are collinear.

G. **Single Point Urban Interchanges (SPUI):** Bridge abutments must be constant in width with no kinks or chamfered corners. Approach slabs for ramps require a minimum length of 25 feet measured along any edge. See Part 4-15 (Roadways) for additional requirements.

17B-3.2 Bridge Type

A. The bridge types listed in the SDDM 10.9.1 are the Department's common applications for new bridges and can be used without Approval.

B. The bridge types listed in the SDDM 10.9.2 and 10.9.3 are not commonly used by the Department, but may be used when Approved.

C. Buried structures may be used when Approved.

D. The Department will not allow steel box girders or concrete box girders with an inside depth that is less than 5.0 feet.

E. For requests to use uncommon bridge types, supply the Department with information demonstrating the following:

1. The bridge type or element has been successfully used by other transportation authorities, as supported by specific project contact information or validation of the concept by the Design-Builder through a detailed discussion of the proposed structural system, anticipated performance, and benefit to the Project.
2. The bridge type benefits the Department and/or Project.
3. The bridge type and components will perform well under the environmental conditions of the Project, including frequent freeze-thaw cycles and heavy road salt use.
4. A method for replacing bridge deck with minimal impacts to the cross-traffic.
5. The bridge meets all other requirements contained in the SDDM and this Section.

F. The following requirements apply to bridge widenings.

1. Provide a minimum of two girder lines per widened section unless Approved.
2. Match the aesthetics of the existing structure, including column and bent cap shapes and proportions unless approved.
3. Provide a full moment connection across the longitudinal joint between the new and existing deck sections unless approved.

17B-3.3 Seismic Requirements

A. Bridge Classification for a bridge carrying Bangerter Highway is Essential. Bridge Classification for a bridge carrying 5400 South, 7000 South, 9000 South and 11400 South are Normal. Provide adequate gap between barriers and structural elements such as columns and retaining walls to accommodate the design seismic movement.

17B-3.4 Inspection Access

A. When the bridge crosses a river or railroad tracks or cannot be reached by a 25-foot ladder, provide the following clearances for the snooper truck:

1. Total height of the parapet and fencing must be 10 feet or less.
2. The horizontal distances from the front face of the parapet or curb and gutter to the edge of deck must be less than 10 feet.

B. Provide a cable anchorage system to facilitate inspections when elements subject to inspection cannot be accessed using a 25-foot ladder.

C. Provide lighting inside of box girders to aid inspection.

17B-4 Bridge Components

A. **Bridge Parapets:** Provide cast-in-place single-slope parapets on bridges and approach slabs that are consistent with the requirements in the SDDM and Part 4-15 (Roadways). Use of Aesthetic Rail requires Approval. Use a minimum parapet height of 42 inches, or match the roadway barrier height if it exceeds 42 inches, 54 inch parapet may be utilized in median applications only. Transition to roadway barriers on the roadway section, not on the approach slabs.

B. **Bridge Approach Slabs:** Provide for expansion and contraction at the approach slab to pavement interface. For skews at the approach slab to pavement interface greater than 20 degrees, and where the roadway pavement structural section surface is PCCP, provide a stepped joint to prevent lateral movement of the approach slab due to expansion and contraction. When a stepped joint is used, match step widths to those defined by Standard Drawing PV-2. On bridge widenings, use approach slabs with lengths, orientation, and step widths that match the existing approach slab. Use of a precast approach slab requires Approval. For ramp approach slabs, see Section 17B-3.1G (SPUI).

C. **Sleeper Slabs:** Sleeper slabs are not required for bridge widenings where an existing sleeper slab does not exist or for box culvert approach slabs.

D. **Box Culvert Approach Slabs:** Provide approach slabs at box culverts and at three sided boxes where the cover over the top slab is less than the full pavement section as defined in Part 4-11 (Pavement) and the Typical Sections in Part 7 (Contract Drawings).

E. **Deck Systems:**

1. Do not connect temporary barriers to bridge decks by pinning, drilling, bolting or any other means, unless the bridge deck to which the connection is made will be replaced as part of this Project.

2. Use only the deck systems addressed in the SDDM. Deck systems not addressed in the SDDM require Approval.

3. Design post-tensioning systems to prevent inducing tension in the deck.

4. The maximum width of a closure pour is the greater of the reinforcement lap splice length required plus three inches, or three feet.

F. **Inlets/Downspouts/Pipes:** Paint drain pipes to match the color of the adjacent structural members. Where feasible, extend drains down substructure elements to an outlet at ground level into slope protection or rip-rap basin. Provide bicycle safe grates at inlets. See Part 4-04 (Drainage) for additional requirements.

G. **Expansion Joints:**

1. Eliminate deck expansion joints in bridges shorter than 360 feet, unless the bridge is skewed more than 30 degrees. Expansion joints are required at the roadway ends of approach slabs as specified in the SDDM.

2. Tabulate the movement rating for each joint, and the appropriate gap dimensions for anticipated temperatures at the time of installation.

3. In the design and location of joints, provide for maintenance accessibility and future replacement.

4. Use modular expansion joints designed for high-cycle fatigue loading.

H. **Thin-Bonded Polymer:** Use a Thin-Bonded Polymer Type I overlay on all bridges. See Part 5 (Special Provisions and Exceptions), Section 03372S (Thin Bonded Polymer Overlay). Apply the overlay on the concrete deck after grinding and proper surface preparation. Extend overlay to include approach slabs.

1. For bridge decks and approach slabs, the Thin Bonded Polymer overlay may be applied within the same construction season, between April 15 and September 15, as long as required temperatures can be attained.

2. For bridges constructed and moved into place where the operation of moving the bridge either requires the bridge to be supported more than 36 inches from the staged support point, or if tensile stresses may occur during the movement or setting of the bridge, apply the Polymer overlay within 30 Calendar Days after setting the bridge in its final location as temperature and material specifications allow. This is an exception to the dates specified above.

I. **Graffiti Protection:** Provide flange guards on all steel and concrete exterior girders that are accessible without a ladder to prevent pedestrian access along the exterior girders. Install steel plate flange guards on exterior steel plate girders where necessary. Provide steel guard plates or concrete guard blocks to the tops of exterior concrete girder bottom flanges where the top of bottom flanges are flatter than 45 degrees.

J. **Bearing:** At expansion bearings, do not permit the edge of the sole plate to slide past the edge of the elastomeric pad. Provide at least six inches of cover between the edge of the anchor bolts and the edge of the concrete pedestal. Reinforce pedestals taller than three inches.

K. **Bent Caps:** Make the type of bent cap consistent with the bridge system and aesthetic strategy proposed for the Project.

L. **Abutments:** Do not use MSE walls to support abutments.

M. **Wingwalls:** Run wingwalls parallel with the edge of the approach slab at all abutments unless otherwise approved.

N. **Slope Protection:** Provide concrete slope protection for all bridges with spill-through

abutments, except where riprap is required for hydraulic reasons. Make slope protection consistent with the aesthetics and landscaping concept submitted by the Design-Builder.

O. **Waterproofing Membrane:** Apply a waterproofing membrane to the top slab and side walls of all buried structures (concrete box culverts and three-sided structures). Place the waterproofing membrane the full length of the structure. Place 12 inches of free draining granular backfill full height of wall, adjacent to each wall, the full length of the structure. Provide a system to drain the backfill, such as a six-inch pipe, away from the structure.

17B-5 Retaining Walls

17B-5.1 Approved Wall Systems

Use only the wall types listed as approved retaining walls in the SDDM section 22.4.3. Obtain Approval for other wall types as directed in the same section. Tieback walls may only be used with Approval. Obtain Approval when using retaining walls of different types adjacent to each other.

17B-5.2 General

A. At retaining wall ends, construct wall five feet past the point where retaining is no longer necessary.

B. Where access is open to the public, provide a pedestrian railing or a six foot fence at the top of walls.

C. Provide a minimum clear distance of six inches between the top of the retaining wall and the top of the material being retained.

17B-5.3 Wall Characteristics

A. Refer to Part 4-06 (Geotechnical).

B. **Moment Slabs:** Use a minimum barrier height of 42 inches, or match the roadway barrier height if it exceeds 42 inches. Transition to roadway barriers on the roadway section (not on the moment slab) over a minimum of 20 feet. Use minimum test level criteria of TL-4 for moment slab barrier design.

17B-6 Sign, Signal, and Lighting Structures

A. If a Project specific design is required, use the SDDM drawings and submit for approval.

B. All overhead sign structures must be one of the seven types of overhead sign structures detailed in the SDDM. A Project specific configuration requires Approval.

C. Do not reduce design dimensions, including drilled shaft embedment depth, for overhead sign structures covered in the SDDM drawings.

D. Provide a separate plan and elevation for each sign structure in the plans.

1. Draw the structure to scale at each unique location; include roadway features.

E. Use Fatigue Importance Category I for overhead sign structures and High Mast Lighting Towers with High Hazard Level. Use Fatigue Importance Category II for all other structures. Consider truck-induced gust loading when designing overhead traffic signal support structures for fatigue.

F. Limit the horizontal displacement at the top of the drilled shaft foundation to 1/2 inch maximum.

G. Use constant diameter drilled shafts to support overhead sign structures; any alternative requires approval. Cast-in-place retaining walls may be used to provide vertical support for sign and lighting foundations. Coordinate and incorporate sign loads transferred through soil with retaining wall designers and fabricators. However, do not count on horizontal structural support from any retaining wall to support sign loads. Under loading conditions the sign foundation cannot apply any horizontal pressure on the wall. Do not mount signs on bridges.

H. Reuse of existing sign structures or any components is not allowed.

I. **Signal Heads and Detection Devices**: Signal heads and detection devices for the SPUI are not considered a utility and may be attached to the exterior girder. If signal heads or detection devices must be placed on a structure, include the connection design, details, and calculations in the appropriate design milestone submittal and final documents.

17B-7 Miscellaneous Structures – Vaults

A. Design all vaults for HS-20 loading.

B. See Part 4-19 (Utilities) for additional information.

17B-8 Hydraulic Structures

A. Provide clearance for storm drains over box culverts following requirements of Part 4-04 (Drainage) and UDOT Standards.

17B-9 Interchange Specific Requirements

17B-9.1 5400 South

A. Meet the requirements for the Flex Lane Gantry Structures in accordance with Part 4-15 (Roadways)

17B-9.2 7000 South Pedestrian Bridge

A. Provide a pedestrian bridge over Bangerter Highway at the 7000 South interchange in accordance with Part 7 (Contract Drawings). Locate the landings/ramps on parcels 562 and 565 in accordance with the Part 7 (Contract Drawings) and tie into the existing sidewalk.

B. Enclose area below ramps to prevent public access with a 6-foot chain link fence type III. Provide access to the Department to allow future inspection of structural ramp elements.

C. Provide a concrete deck (4000 psi, Class AA(AE)). The concrete deck must be composite when supported by girders. The concrete deck must be connected to its supporting components to prevent vertical separation when supported by truss type superstructures. Timber decking is not allowed.

D. Provide a roof/cover that protects the deck from snow.

E. Pedestrian Bridge Roof/Cover Loads

1. Design for a roof snow load of 40 psf.

2. Roof Snow Load Factors:
   a. Use a load factor of 1.0 for roof snow load for all Service Load Cases.
   b. Use a load factor of 0.5 for roof snow load for all Strength Load Cases.
   c. Use a load factor of 0.2 for roof snow load for all Extreme Event Load Cases. The effective snow load will be accounted for as dead load and included as mass in the Extreme Event Load Cases.

F. Salvage the existing pedestrian bridge at 7000 South. Store the bridge in the property in the northwest corner of Bangerter Highway and 9000 South. Place the structure on temporary supports.

G. Provide a detail sheet in the structure plans incorporating the aesthetics requirements.

17B-9.3 9000 South

A. Existing wall R-261 West along Bangerter Highway
   1. Remove and modify existing wall to meet Project requirements while protecting existing bridge structures north of 9000 South.
      a. Provide cast-in-place coping along the top of the modified wall using the SDDM SD sheets.
      b. Provide 2 inches of cover for existing reinforcing not covered by a coping.

B. Existing wall R-260 East along Bangerter Highway
   1. Any modification to the existing retaining wall requires Approval.
   2. Protect the existing USBOR Aqueduct in place in accordance with Part 4-19 (Utilities)
   3. Removal, replacement or modification to the existing barrier adjacent to structures R-288, F-576, F-764 and C-785 requires Approval.

C. Bingham Creek Culvert Replacement
   1. Do not increase load on the existing USBOR Aqueduct structure. See Part 4-04 (Drainage) for additional requirements.

17B-9.4 11400 South

A. 11400 South Structure
   1. Signal foundation must be isolated and independent of bridge elements.
   2. Detail, design and phase construction of 11400 South structure to address temperature, shrinkage and creep effects in the bridge deck and approach slab. Design to accommodate expansion and contraction in the substructure.

17B-10 Structure Design Calculations

A. Organize the final structure calculations as required by the SDDM with the following exception:

1. SDDM 2.17.6 – Replace the Structure Design Criteria and Design Codes and References bullets with the following:
    - Structure Design Criteria
        - Design codes and references
        - Design loads
        - Materials
        - Design assumptions relevant to the design of each element.

B. Number all pages with a numbering scheme that covers the entire set of calculations.

17B-11 Plan Organization and Content

Provide structure RFC plans that comply with the SDDM project document requirements and the following:

A. Separate the structure plans from all other discipline sheets in the plan set and organize them by UDOT structure drawing number.

B. When corridor standard plans are used to replace details typically included in the structure plan set, include the applicable corridor standard plan sheets with each structure plan set and list them in the Index of Sheets on the Situation and Layout Sheet.

C. Include in the structure plans a soil boring location plan and the soil boring logs used in the geotechnical design of the structure.

D. Include in the final retaining wall structures plans a location plan showing the location of all retaining walls pertaining to the structure drawing number. Include for each individual retaining wall the situation and layout plans and details prepared by the Designer. For MSE walls include the detailed drawings prepared by the wall supplier. Include aesthetic treatment in supplier drawings.

E. Include in the final overhead sign structure plans a location plan showing the location of all overhead sign structures.

F. Place As-Built quantities on the first sheet of the As-Built Structure Situation and Layout.

G. Provide As-Built locations on the Situation and Layout plans for a structure moved into its final location.

17B-12 Submittal Packages

17B-12.1 Initial Design Milestone Submittals (30%)

Provide Situation and Layout plans for all bridges, box culverts, rigid frame drainage structures, retaining walls, and custom designed noise walls.

For a structure moved into its final location, provide placement tolerances along the X, Y, and Z axes on the Situation and Layout plans for the structure placement.

Include the following quantities as appropriate on the Situation and Layout plans prior to releasing them for construction.

A. Granular Backfill Borrow / Free Draining Granular Backfill

B. Drilled shafts / Driven Piles

C. Reinforcing steel

D. Structural concrete

E. Thin Bonded Polymer Overlay (or applicable deck protection)

F. Prestressed Concrete Members

G. Structural Steel

For the initial design milestone review, provide a Situation and Layout submittal package that includes the following:

A. Situation and Layout plans
B. S&L Sheet(s) Guidelines and Checklist (for each structure)
C. Seismic Design Strategy Report (Preliminary) for each bridge
D. Foundation recommendation memos
E. Draft Hydraulics Report

17B-12.2 Intermediate Design Milestone Submittals (60%)

For any design milestone reviews between the initial design and final design milestone reviews, refer to Part 3 (Quality Program) for submittal requirements and review processes.

17B-12.3 Final Design Milestone Submittals (100%)

Provide required quantities on the Situation and Layout plans.

For the final design milestone review, for each structure provide a final design submittal package that includes:

A. Structures Plans

B. Structures Design Calculations

C. Load Rating Package for each bridge.

D. Seismic Design Strategy Report (Final) for each bridge.

E. Final Geotechnical Report

F. Final Hydraulics Report

17C. SUBMITTALS

Provide these submittals in addition to the submittals in Part 4-02 (General Design Requirements) to the Department in accordance with Table 17C-1 (Design-Builder Submittals for Structures) for review. Submittal package requirements are identified in Section 17B-12 (Submittal Packages).

TABLE 17C-1
DESIGN-BUILDER SUBMITTALS FOR STRUCTURES

Submittal	***For Approval***	***Schedule***
Structural Design Criteria Deviation Request	No	Allow a minimum of 7 Calendar Days for initial Review. When comments are provided allow an additional 3 Calendar Days. Allow 3 Calendar Days for review after comments have - been addressed and the Deviation request has been re-submitted.
Initial Design Milestone Review - Situation and Layout Submittal Package	No	A minimum of 7 Calendar Days for review.
Intermediate Design Milestone Design	No	7 Calendar Days for review
Final Design Milestone Review Submittal Package	No	A minimum of 14 Calendar Days for review
Accelerated Bridge Construction Plans (for bridges constructed in a staging area and launched, slide or transported to a final location) RFC documents and all required submittals.	Yes	A minimum of 14 Calendar days before construction.

18—TRAFFIC SIGNALS

18A. GENERAL

Conduct all Work necessary to meet the requirements of this Part 4-18 (Traffic Signals) and to satisfy all functional needs of the Project, including constructing new and temporary traffic signals and maintaining the operation of existing signals, and infrastructure provisions for future signals.

18B. STANDARDS

Complete Work for traffic signals in accordance with the requirements of the standards listed by priority in Table 18B-1 (Standards for Traffic Signals).

If there is any conflict in standards, adhere to the standard with the most stringent requirements.

If there is any unresolved ambiguity in standards, it is the Design-Builder's responsibility to obtain clarification and Approval from the Department before proceeding with design and/or construction.

TABLE 18B-1
STANDARDS FOR TRAFFIC SIGNALS

Priority	*Author or Agency*	*Title*
1	UDOT	Special Provisions included in Part 5
2	UDOT	*Supplemental Specifications to 2012 Standard Specifications for Road and Bridge Construction,* as modified by Part 5
3	UDOT	*2012 Standard Specifications for Road and Bridge Construction,* as modified by Part 5
4	UDOT	*Supplemental Drawings to 2012 Standard Drawings for Road and Bridge Construction*
5	UDOT	*2012 Standard Drawings for Road and Bridge Construction*
6	UDOT	*Utah Manual on Uniform Traffic Control Devices* (Utah MUTCD)
7	AASHTO	*A Policy on Geometric Design of Highways and Streets*
8	UDOT	*UDOT Signalized Intersections Design Guidelines*
9	AASHTO	*Roadside Design Guide*
10	AASHTO	*Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals Design Guide*.
11	ITE	*Vehicle Traffic Control Signal Heads (VTCSH), Reference 2012 Standard Specification 02892*
12	TRB	*Highway Capacity Manual 2010*
13	Local Jurisdiction	*Design Standards, Details and Specifications*
14	UDOT	*Manual for the Accommodation of Utilities and Control and Protection of State Highway Rights of Way*
15	NEMA	*National Electrical Manufacturers Association Standards*
16	IMSA	*International Municipal Signal Association Standards*
17	NFPA	*National Electrical Code*

18C. REQUIREMENTS

18C-1 General

Coordinate the traffic signal design plans with the Department to ensure signal design can handle the required phasing when implemented. The Department will provide the phasing diagram to include on the signal design plans.

Provide documentation establishing the basis of designs of temporary, new, and replacement traffic signals.

Submit traffic signal plans, including the following:

A. Placement of intersection physical equipment

B. Accommodation of pedestrians and shared use path users

C. Verification that sight distance for signals is met in locations with structures.

D. The Department will be responsible for developing and implementing traffic signal timing plans. Coordinate with the Department on issues regarding the following:

1. Group(s) of signals to be coordinated
2. Coordinated phases at each signal
3. Operation of signals that will not be in coordination
4. Cycle lengths
5. Splits for side streets
6. Coordinated phases
7. Anticipated traffic volumes

E. Compatibility with State supplied signal equipment

Traffic signal mast arm pole foundations and highway luminaire pole foundations are prohibited within the Jordan Valley Water Conservancy District (JVWCD) Aqueduct easement. JVWCD must Approve placement of any other signal equipment within the easement, including pedestrian poles, signal cabinets, etc.

18C-2 Traffic Signal Design

Provide permanent traffic signals for the design year traffic volumes in accordance with Part 7 (Contract Drawings) to minimize delay and accommodate pedestrians at the following interchanges with Bangerter Highway (SR-154):

A. 5400 South
B. 7000 South
C. 9000 South
D. 11400 South

Provide permanent traffic signals at the following intersections:

E. 11400 South and River Heights Drive
F. 11400 South and Parkway Plaza Drive/Summer Heights Drive

Design and reconstruct existing traffic signals at the following intersections;

G. 11400 South and 4000 West

Design and reconstruct existing traffic signals at the following intersections for the 4015 West Build Alternative;

H. 5400 South and 4015 West

Remove existing traffic signals at the following intersection if the 4015 West Build Alternative is exercised:

I. 4015 West and Sam's Boulevard (North Leg U-Turn)
J. 4015 West and Point Lane (South Leg U-Turn)
K. 5400 South and 4120 West (West Leg U-Turn)

Design the traffic signals to accommodate the future widening of 7000 South to five lanes and of 9000 South and 11400 South to seven lanes. Design intersections to accommodate optimal signal coordination. Use queue detection on the highway off-ramps and on the surface streets.

18C-3 Left-Turn Phasing

Provide left-turn phasing in accordance with UDOT's Guidelines for Left-Turn Phases at Signalized Intersections using design year traffic volumes. Use Flashing Yellow Arrow (FYA - Type VI) signal heads for all left-turns that require permissive/protected left-turn phasing. Do not use Type V heads for permissive/protected left-turn phasing.

18C-4 Right-Turns

Signalize all right-turn movements from the off-ramp at each SPUI.

For right-turns from the cross-street on to the on-ramp, yield conditions will not be permitted.

Provide right-turn overlap phasing using a modified Type V signal head at the following locations:

A. Northbound Right-Turn at 11400 South & 4000 West

18C-5 Signal Placement at Single Point Urban Interchanges (SPUI)

Install signal heads overhead over each lane where Bangerter Highway is under the cross street. Use programmable signal heads for all left-turn signal heads installed over each lane that will be visible to other left-turn movements.

Provide both near-side and far-side (pull-through) signal heads for all left-turn movements through the SPUI.

18C-6 Controller Cabinet Foundations

Provide size 6 cabinet foundations at all traffic signals within the Project limits.

18C-7 Power Service for Signals and Lighting at Signalized Intersections

Coordinate with and provide support to the Department and the local municipality for updates to the lighting agreements for the street lighting at all new traffic signals or at existing traffic signals where the street lighting is changing by this Project.

Install a Department-furnished uninterruptible power supply (UPS) at each ramp terminal intersection at all interchanges and at adjacent intersections.

18C-8 Temporary Traffic Signals

Utilize temporary signal configurations at existing signalized intersections until new traffic signals are fully operational, including detection. Integrate communication for signal controller and detection to the ATMS system.

Submit all proposed phasing changes and temporary signal pole and head placement for approval. For temporary signals, signal heads must also be centered in the travel lanes as shown in the MOT or temporary traffic control plan. Use new LEDs in signal heads for temporary signals or provide certification that they meet standards for brightness and luminous intensity.

18C-9 Signal Inspections and Turn-On

Provide a proposed schedule for the following activities at the start of construction. Notify the Department a minimum of eight Calendar Days prior to the following activities:

A. Meter base inspection
B. Traffic signal preliminary inspection
C. Traffic signal turn-on
D. Removal of existing traffic signals
E. Traffic signal final inspection
F. Flex Lane mast arm pole relocation

The Department will turn on all traffic signals belonging to the Department. Coordinate with the local jurisdiction on all other signal turn-ons.

The UDOT Signal Turn-On Checklist shall be used for the process of initiating operation of new and existing signals that were previously turned off.

New and re-constructed traffic signals shall have signal controller cabinet, fiber and switch devices tested, configured and passed inspection prior to erecting any traffic signal poles.

18C-10 Vehicle Detection Devices

Install Department-furnished detection on all approaches to each traffic signal. Install Department-furnished advance detection on approaches with posted speeds of 40mph or greater.

Integration of State Furnished radar devices shall be done by an approved contractor if the electrical subcontractor is not qualified.

18C-11 Preemption

Relocate existing emergency vehicle preemption equipment at all signalized intersections where preemption currently exists. Do not add any new devices unless agreed upon by emergency agency and Department.

18C-12 Communication

Connect traffic signals to the Department fiber-optic communications system and verify system communication with the Region 2 Traffic Signal Engineer (Peter Jager at pjager@utah.gov) prior to signal turn-on. Include communication setup and integration of any other IP addressable devices, including radar detection and uninterruptible power supplies (UPS).

Restore the connectivity of any traffic signals that have lost connectivity because of the Work within 24 hours of notification.

18C-13 Vehicle and Pedestrian Indications

Use State Furnished signal heads and backplates for all permanent traffic signals, which include retroreflective tape.

18C-14 Advanced Warning System (AWS)

Provide an AWS (Prepare to Stop When Flashing Signs, Flashers, & Detection) on Bangerter Highway (SR-154) as follows:

A. Provide a post-mounted AWS "Option A" in accordance with UDOT Supplemental Drawing SL 18 at the following locations:

1. Northbound and southbound Bangerter Highway (SR-154) at 9800 South
2. Northbound and southbound Bangerter Highway (SR-154) at 6200 South

Connect each AWS to the existing traffic signal controller. Coordinate the timing of the AWS with the Department prior to programming and turning on the AWS.

18C-15 Removal and Salvage

Remove and salvage existing traffic signal hardware equipment (power pedestal, meterbase, preemption equipment, signal heads, cabinets, cameras, and hardware, including, hand-hole covers, end caps, and mounting brackets) and detection equipment including radar sensors, pucks, and aerial repeaters and deliver the items to the Department. Contact the Region 2 Signal Supervisor to coordinate the delivery date and location. Remove and dispose of all other traffic signal steel and equipment. Remove and salvage cabinet electronic equipment (controllers and other components) and deliver to the UDOT Region 2 Signals Laboratory. Contact the Region 2 Signal Supervisor to coordinate the delivery date. Remove unused existing foundations or obliterate 24 inches below existing ground.

18C-16 Department-Furnished Material List

The Design-Builder is responsible to install all Department-furnished material. The Department will furnish the following material:

A. Signal steel equipment: Signal poles, mast arms, signal pole luminaire extensions and arms, pedestrian poles and anchor bolts

B. Signal detection equipment: hardware, including the radar sensor, sensor mount, 100 foot cable & connector, splice kits, and cabinet interface

C. Signal cabinet equipment: Controller cabinets (all internal hardware, except fiber-optic gator patches), controllers, and uninterruptible power source (UPS) service pedestals or inverters with batteries.

D. Signal heads, including the mounting bracket, visor, backplate, and LED module.

18C-16.1 Department-Furnished Material Notification Process

For the Design-Builder to receive Department-furnished material, the subsequent notification process must be followed:

A. The Design-Builder shall submit the completed State Furnished ATMS Materials Form and State Furnished Signal Materials Forms. A state furnished materials order form must be submitted for each intersection but all the materials for each intersection should be submitted on the same order form at the same time. Provide an itemized inventory schedule of each signal location for the requested material shall accompany the form. The completed state furnished forms are to be emailed to the Region 2 Traffic Signal Engineer (Peter Jager at pjager@utah.gov) and State Furnished Materials at sfmaterials@utah.gov, along with Department notification. This

notification shall be submitted prior to pick-up in accordance with the following minimum time frames:

1. 110 Calendar Days: Signal poles, mast arms, PED poles, and controller cabinets
2. 90 Calendar Days for Programmable Signal Heads
3. Allow an additional 30 Calendar Days for powder coating
4. 60 Calendar Days: All other material

B. The Design-Builder shall submit a notification requesting pick-up of materials 10 Calendar Days prior to the needed date. This may not be submitted until 10 Days prior to the completion period of the first notification time frames unless the Department has already received the material. The notification will include each site location and associated equipment requested for pick-up.

C. The Department-furnished materials to be picked-up must be coordinated through the Department and a time arranged to pick-up the materials at one of the following locations, depending on the specific equipment ordered:

Utah Department of Transportation Traffic Operations Center (TOC) 2060 South 2760 West Salt Lake City, UT 84104	or	Utah Department of Transportation Central Warehouse 4501 South Constitution Blvd West Valley City, UT 84119

Steel poles and mast arms can be drop-shipped to the Design-Builder's yard within the Project limits with an additional 14 Calendar Day notice.

D. Provide all site installation, insurance, interim storage, labor, and transportation associated with equipment pickup and transportation between storage and field sites.

18C-17 Flex Lanes on 5400 South

Install a new signal pole and mast arm for eastbound traffic east of the 5400 South Interchange to modify the beginning of the Flex Lane System. Install the new signal pole 90 feet east of the existing pole. Relocate the existing mounted signs and blank-out sign and reroute the existing conduit and conductors to the new location.

Do not impact the existing flex lanes gantries and other equipment not listed above. Notify Matt Luker at mluker@utah.gov in the event of any impacts to the flex lane system. See Part 4-10 (Maintenance of Traffic) for additional requirements.

E.

18D. SUBMITTALS

Provide submittals to the Department in accordance with Table 18D-1.

TABLE 18D-1
DESIGN-BUILDER SUBMITTALS FOR TRAFFIC SIGNALS

Submittal	***For Approval***	***Schedule***
Traffic Signal Plans and Calculations	No	Prior to RFC
Proposed Phasing Changes and Temporary Signal Pole and Head Placement	No	Prior to RFC
Phasing changes to traffic signals	No	Prior to implementing phase change
State-Furnished Signal Material Form & State-Furnished ATMS Material Form	No	As described in Section 18C-13
Request to pick up materials	No	As described in Section 18C-13.1

19—UTILITIES

19A. GENERAL

Conduct all Work necessary to meet the requirements of this Section 19 (Utilities) and satisfy all functional needs and characteristics of the Project, including performing and coordinating Utility Work and executing additional agreements as necessary.

19B. STANDARDS

Complete Work for Utilities in accordance with the requirements of the standards listed by priority in Table 19B-1 (Standards for Utilities).

If there is any conflict in standards, adhere to the standard with the most stringent requirements.

If there is any unresolved ambiguity in standards, it is the Design-Builder's responsibility to obtain clarification and Approval from the Department before proceeding with design and/or construction.

TABLE 19B-1
STANDARDS FOR UTILITIES

Priority	*Author or Agency*	*Title*
1	UDOT	*Statewide, Project MUAs and Supplemental Agreements (including Utility specifications and standards) (in App. 6-1)*
2	UDOT	*Contract Documents for the Project*
3	UDOT	*Supplemental Specifications to 2012 Standard Specifications for Road and Bridge Construction, as modified by Part 5*
4	UDOT	*2012 Standard Specifications for Road and Bridge Construction, as modified by Part 5*
5	UDOT	*Utah Administrative Code R930-7 Utility Accommodation and R930-8 Utility Relocations Required by Highway Projects*
6	UDOT	*Standard Drawing No. DD18; Utility Location Requirements*
7	FHWA	*Utilities, 23 Code of Federal Regulations (CFR)*
8	AASHTO	*A Policy on Geometric Design of Highways and Streets*
9	CI/ASCE 38-02	*Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data*
10	APWA	*Manual of Standard Specifications*
11	APWA	*Manual of Standard Plans*
12	NESC	*National Electric Safety Code*

19C. REQUIREMENTS

Coordinate the Utility Work with the Department and with privately, publicly, cooperatively, or municipally owned Utilities (hereinafter referred to as "Utility Company") in accordance with this Section 4-19 (Utilities) and with Section 4-17 (Structures) paragraph 17B-2.6(I).

The Department has developed Master Utility Agreements (hereinafter referred to as "MUA(s)") or Statewide Utility Relocation Agreements with each of the Utility Companies known to own and/or operate facilities affected by the Project which are included in Part 6 (Third-Party Agreements).

Develop Supplemental or Project Agreements on behalf of the Department for signature by the Utility Companies and signature and execution by the Department, for all Utility Work. Perform or coordinate the performance of the Utility Work for design and construction as specified herein. Obtain required permits necessary to perform Utility Work.

Repair any Utility damages caused by the Design-Builder which occur during construction within the Project limits. All repairs associated with such damages are the responsibility of the Design-Builder.

All costs for coordination, design, permits, construction, and coordination of all temporary Utility relocations that are implemented for the convenience of the Design-Builder's construction operation and schedule are the responsibility of the Design-Builder.

The Design-Builder is responsible to contact Blue Stakes at (800) 662-4111 before all Utility Work to have all utilities marked prior to construction.

The existing RMP transmission overhead power lines poles and appurtenances (including any distribution lines on those transmission poles) located along 11400 South, 9000 South, 5400 South, and the Build Alternative will be relocated by others within the Project Limits; do not provide a price for these relocates in Form UC. The RMP transmission relocation project is being installed by others, see Part 4-15 (Roadway) for additional requirements. The anticipated completion date of the relocation is December 31, 2017. Coordinate with RMP to assure that the Design-Builder's design does not negatively impact the RMP transmission relocation project. All impacts to the RMP transmission relocation project must be accounted for in the Design-Builder's schedule and Price Proposal. Coordinate the relocation with each Utility Company for utilities located on the existing transmission power poles.

Price all other RMP relocates and the other utility relocates and include in Form UC.

If the Design-Builder's design has additional transmission relocations, it is the Design-Builder's responsibility to price those relocates and include them in Form UC.

19C-1 General Requirements

Coordinate all design and construction activities with the Department and the Utility Company Project Representative identified in each MUA or Statewide Utility Relocation Agreement (regardless of who performs or pays for any proposed Utility Work). Coordinate on finalizing the design, the location of the relocated Utility facility, the potential impacts of Utility Work, costs, and schedule. Design, protect, temporarily relocate, and/or construct the facility as applicable for the Utility type, subject to the requirements of the specific MUA or Statewide Utility Relocation Agreement.

Perform the Utility Work as follows:

A. Comply with all provisions of MUA(s), Statewide Utility Relocation Agreement(s), Supplemental Agreement(s), and other applicable agreements, whether included in Part 6 (Third-Party Agreements) or subsequently provided to the Design-Builder.

B. Minimize the impacts to Utility Companies and Third-Party.

C. Identify the extents of required protect-in-place measures and relocations, if Utility facility conflicts cannot reasonably be avoided. Coordinate with impacted Utility Companies as necessary to accomplish each mutually agreeable proposed protect-in-place measure and relocation solution. Coordinate the proposed Utility Work with other Utility facilities present at the site to ensure that all Utility facilities are accommodated.

D. Prepare Supplemental Agreement(s) as necessary and submit to the Department for review and approval prior to submitting them to the Utility Companies.

E. Perform all obligations indicated as responsibility of the Department, contractors, and subcontractors (if contemplated) set forth in the MUA(s), Statewide Utility Relocation Agreements, or other Agreements that are included in Part 6 (Third-Party Agreements) and the obligations therein.

F. Provide all coordination, surveying, staking, clearing/grubbing, MOT, and traffic control for all Utility Work, regardless of who is performing the Utility Work. These costs will not be back-charged to the Utility Companies.

G. Provide all Incidental Utility Work.

H. Keep the Department and Utility Companies well informed of Project construction progress and schedules. Notify Utility Companies at least twenty-four (24) hours in advance of any Utility Work in the vicinity of their facilities and forty-eight (48) hours notice of potential impacts on service or as outlined in each specific MUA or Statewide Utility Relocation Agreement, whichever is greater. Invite Utility Companies to Utility-related coordination meetings and keep Utility Companies well informed of Project changes and involved in making the Utility design decisions.

I. Cooperate with the Utility Companies to solve relocation installation issues, allow betterments without causing the Department or Utility Companies to incur any unnecessary expense, and remain consistent with the Design-Builder's scope of Work.

J. Work cooperatively with the Utility Companies identified in this Part 4-19 (Utilities) and in Part 6 (Third-Party Agreements) and establish reasonable schedules to perform Utility Work.

K. Coordinate with those Utility Companies who perform their own Utility Work by scheduling adequate and reasonable time to accomplish their Utility Work.

L. Advise the Utility Company of the approximate time required for Utility relocations performed by the Design-Builder.

M. Develop procedures for addressing Utility facility conflicts discovered during design and/or construction and for notification/coordination/approval from the Department in addressing the Utility conflict.

N. Evaluate and discuss the possible elimination of Utility conflicts with the Utility Companies.

O. Establish the mitigation approach to be implemented at each specific Utility location.

P. Ensure that all relocated Utility facilities are acceptable to the Department and the Utility Company.

Q. Ensure that all relocated Utility facilities shall be functionally equivalent to or better than the existing Utility facilities. All Utility relocations shall meet current Utility Company standards.

R. Coordinate the construction schedule to accommodate all Utility Company Utility Work, including design, Supplemental Agreement review and approval, permitting regulatory approvals, material procurement, and construction.

S. Do not perform any Utility Work on behalf of a Utility Company without prior written approval for said Utility Work. If Design-Builder choses to perform any Utility Work without a written agreement between the Utility Company the and Department, such as excavation in an effort to expedite completion of the Utility Work process, costs for said

work shall not be back-charged to the Utility Company or the Department.

T. Provide to the Department a weekly report of events (including all Utility Company coordination meetings, design progress, and construction progress) and the revised schedule as it relates to design and construction progress of Utility Work.

U. Monitor the progress of Utility Company Utility Work and notify the Department if there is cause to believe that the Utility Company will not meet the specified time frame(s) for design review of the Design-Builder's plans, construction, or timely inspection. Provide such notice to the Department within seventy-two (72) hours of discovery.

V. Provide survey-grade (X,Y and Z coordinates) As-Built Utility locations and attributes for Utility Work performed by the Design-Builder and Third Parties in the Department Utility Database Template .csv file weekly and at the completion of each specific Utility facility relocation.

W. Notify the Department's Utility Manager or designee, Communications Team (CT) Manager, and Utility Company Representative seven Calendar Days prior to starting any planned Utility Work. Also, for unforeseen Utility facility interruptions, contact the Resident Engineer, PM, and Utility Company Representative immediately.

X. Maintain the positive working relationships the Department has developed with the Utility Companies in their cooperative participation and support of the Project.

Y. Extend all existing Utility casings to limits defined in Utah Administrative Code R930-7. Design-Builder is responsible to work with Utility Companies to locate and extend existing Utility casings within the Project

Z. Be responsible for installing/obtaining all power service to ATMS, signals lighting, and ATMS/ITS equipment.

AA. Be responsible for the costs and schedule for all temporary Utility relocations.

BB. Ensure that all overhead and underground clearances and depth of bury meet both Department requirements as well as the Utility Company's requirements.

CC. Include the Department in all communications and coordination efforts with the Utility Companies.

DD. Extend all service laterals and meters to the new ROW line. Match existing sizes for laterals and meters.

Do not bury or conceal any portion of the Utility Work that has not been inspected and accepted by the Utility Company. Any Utility Work buried or concealed without being inspected and accepted by the Utility Company shall be exposed by the Design-Builder at no additional cost to the Department or Utility Company.

19C-2 U. S. Bureau of Reclamation/Jordan Valley Water Conservancy District

The Department entered into a Project Agreement with the USBOR and Jordan Valley Water Conservancy District (JVWCD) for the protection of the USBOR Jordan Aqueduct Reaches 2 & 3 (JA2 & JA3) within the USBOR's Aqueduct Easement. The UDOT/ USBOR/JVWCD Project Agreement is in Part 6 (Third Party Agreements) and contains restrictions on both temporary and permanent construction activities that are allowed within the USBOR's aqueduct easement. Coordinate all Work within the USBOR's Aqueduct Easement through the single point of contact listed in the Project Agreement and receive approval from the USBOR /JVWCD prior to performing

any Work within the USBOR's Aqueduct Easement area. Obtain approvals from the USBOR /JVWCD for any deviation from the terms of the agreement. The 2005 USBOR & UDOT Memorandum of Agreement is included as an exhibit to the Project Agreement in Part 6 (Third Party Agreements) and the USBOR O&M Guidelines are included in Part 7 (Contract Drawings). See Part 5 (Special Provisions & Exceptions) Section 01511S Jordan Aqueduct Protection and Monitoring for settlement and monitoring requirements.

Below is a list of the USBOR's Jordan Aqueduct Reach 2 (JA-2) requirements and shutdown information:

1. Aqueduct 2 runs between the Bluffdale Water Treatment Plant (15303 South, 3200 West) and the Terminal Reservoirs on Bangerter Highway near 6000 S.
2. There are two mainline isolation valves that break JA2 into three segments, located at 12600 South and 9000 South.
3. Do not shut down the segment of the aqueduct on the north side of the 9000 South valve at the same time as the south side for operational reasons.
4. Perform all work on north side of 9000 South during the first shutdown period, followed by a separate shutdown to perform work on the south side.
5. The two aqueduct shutdown periods are allowed to be consecutive.
6. Schedule the north side shutdown first, followed by the south side shutdown.
7. Aqueduct shutdown periods must take place in accordance with the Project Agreement.

19C-3 City of West Jordan

Repair the damaged 12-inch sanitary sewer line at along the west side of the intersection approximately 212 feet east of the sanitary sewer manhole (SSMH) located at 7000 South and Dixie Drive if the West Jordan betterment is not performed. Pipe repair method required West Jordan City approval.

19C-4 Daybreak Water Company

Coordinate impacts to the facilities owned by the Daybreak Water Company through Keith Hanson, 801-330-3447 or keith@canyonwater.com. The requirements for Daybreak Water Company are as follows:

1. Submit initial plans to Daybreak Water Company for their review.
2. Obtain approval from Daybreak Water Company including but not limited to, irrigation coverage for the remaining streetscape, adequate water supplies and tailwater drainage.

19C-5 Taylorsville-Bennion Improvement District

The location of the 18 inch betterment identified in the Taylorsville-Bennion Improvement District MUA in Part 6 (Third Party Agreements), referenced in paragraph 9.a., is located at approximately Brixton Road, running east west. The 18 inch line transitions to an 8 inch line east of Bangerter and ends east bound at 3760 West.

19C-6 Design-Builder Third Party-Manager

Provide a Third-Party Manager to act as the overall Utility coordinator to ensure adequate coordination during Supplemental Agreement development, mobilization activities, and performance reviews of Utility Work. Coordinate, cooperate, and work with the contact person designated in Part 6 (Third-Party Agreements) or as otherwise assigned by the Department. Responsibilities of the Third-Party Manager include coordinating Design-Builder oversight, coordinating and administering the Utility Work within the Project, site administration, standard and specification adherence, and performance reviews of the Design-Builder while working on and off-site, including but not limited to safety, quality, timeliness, and performance.

Coordinate Utility facility relocations until all Utility Work is completed.

Maintain a record of all design and construction activities for all Utility Work that has been performed by the Design-Builder, and all Utility Work that has been designed and Released for Construction after Notice to Proceed.

The Third-Party Manager responsibilities:

A. Act as a liaison between the Department, Utility Company, and Design-Builder workforces as needed.

B. Prepare Supplemental and Project Agreement(s) as necessary and submit to the Department for review and approval prior to submitting them to the Utility Companies.

C. Provide support in Utility Work problem resolution.

D. Communicate Utility Work Project status to various levels of site personnel including management, other company organizations, contractors, and suppliers.

E. Monitor the successful completion of assigned Project deliverables and milestones.

F. Distribute design plans that have been reviewed by the Utility Company and received consultation and written comment by the Department.

G. Provide notification of construction dates to the Department and Utility Company.

H. Keep a record of all meetings with Utility Companies and provide meeting minutes within seven Calendar Days.

I. Obtain a signature from the Utility Company on final design plans indicating that the plans are Released for Construction.

J. Keep a record of Utility Company inspector present at any time.

K. Provide any revisions to the design plans.

L. Provide date(s) that construction was completed.

M. Obtain signature and acceptance of Utility Companies on As-Built Plans and all other As-Built requirements stipulated in the Department's Utility Regulations.

N. Provide a weekly summary and schedule of Utility Work activities.

19C-7 Subsurface Utility Engineering (SUE) Information

Underground Utilities. The Department has performed a Utility investigation with subsequent depictions as per CI/ASCE 38-02 Standard Guideline for the Collection and Depiction of Existing

Subsurface Utility Data. Subsurface Utility Engineering (SUE), and various Quality Levels have been obtained. Quality Level B/C/D has been achieved at various locations throughout the Project and Quality Level A at selected locations. These data are listed and depicted in the documented information shown in Part 7 (Contract Drawings) and Part 8 (Engineering Data). Only the elevations and depths on Utilities at actual test holes or within manholes shall be considered accurate and reliable vertical data. The vertical component of Utility lines depictions in the three-dimensional SUE representation were interpolated between Quality Level A data points and at measured Utility elevations at points within vaults. All vertical Utility data except at these points should be considered as unverified and uncertain.

Various SUE quality levels of Utility location data have been achieved with "Reasonable Confidence" as follows:

A. Quality Level A is information gathered attest hole locations (a vertical location within +/- 0.5 feet tolerance at the test hole location only).

B. For Quality Level A data, actual pipe size does not differ from the size indicated by more than twenty-five percent (25%).

C. Quality Level B is horizontal location information gathered by application of non-destructive surface geophysical techniques, professional interpretation of the results, and appropriate survey control (horizontal accuracy is certified to within +/- 2-foot tolerance unless indicated otherwise); there are no estimates on vertical elevation). For Quality Level B data, actual pipe size does not differ from the size indicated by more than twenty-five percent (25%)

D. Quality Level C is information gathered from correlating Utility records to surveyed visible above-ground facilities, visible inspections, and all other obtained data.

E. For Quality Level C data, actual pipe size does not differ from the size indicated by more than twenty-five percent (25%)

F. Quality Level D is information gathered and interpreted from existing Utility records, and put into context with all other obtained data.

G. The depiction of this Utility data does not replace the statutory duty of the Design-Builder to utilize the One-Call system before any excavation activities. Nor does it relieve the Design-Builder of the responsibility to confirm the horizontal and vertical locations of all tie-in points.

The cost of any additional SUE information required by the Design-Builder for use during design and construction of the Project in addition to the information provided shall be performed at the Design-Builder's expense.

19C-8 Relocation Agreements

The Department has developed MUAs or Statewide Utility Relocation Agreements with the Utility Companies known to own and/or operate facilities affected by the Project. Copies of these proposed Agreements are in Part 6 (Third-Party Agreements). Each MUA or Statewide Utility Relocation Agreement includes the following:

A. Allocation of roles and responsibility for the design and construction of the Utility Work between the Design-Builder and the Utility Company.

B. Utility Company requirements, including time frames and commitments for Utility facility design, material acquisition, engineering review, supplemental agreement

review and approval, and construction activities.

Authority to Execute Agreements. The terms of all MUAs and any amendments will be set by the Department and the Utility Company; the Design-Builder shall have no authority to enter into or execute any Agreements with any Utility Company on the Department's behalf.

If the Design-Builder identifies conflicts with a Utility facility owned by an entity other than as listed in Part 6 (Third-Party Agreements), the Department will execute a MUA or Relocation Reimbursement Agreement with the unlisted Utility Company.

In the case of an inconsistency between an executed MUA or Statewide Utility Relocation Agreement and information provided elsewhere in this document or Contract Documents, the terms and conditions in the executed MUA or Statewide Utility Relocation Agreement shall govern.

19C-9 Supplemental / Project Agreements

Submit Supplemental and Project Agreements for Department approval that provides the Utility Work scope, schedule, and cost to the affected Utility Company and to the Department for review. Develop, negotiate, and provide a schedule as part of the Supplemental or Project Agreement for defined Utility Work. Allow the specified amount of time in the Project Schedule for each Utility Work design, design review, Supplemental Agreement review and execution, and construction, as provided in the MUA(s) or Statewide Utility Relocation Agreements. Allow three Working Days for the Department to execute Supplemental and Project Agreements after it has been signed by the Third Party. Identify critical activities and sequences as they affect the Utility Work and plan to effectively mitigate impacts.

Coordinate the negotiations for and the preparation of all Supplemental and Project Agreements. Use the draft Supplemental and draft Project Agreement form as provided in Part 6 (Third-Party Agreements) to accommodate the specific Utility Work identified as the design of the Project progresses. Prepare and provide any related documentation such as reports, plans, surveys, and estimates of cost and provide personnel to attend negotiation sessions with Utility Companies.

Include plans, cost, and schedule, as exhibits, for the Utility Work associated with each executed Supplemental or Project Agreement. Upon request, Design-Builder shall provide actual costs for Utility Work performed by Design-Builder which will be included in the Supplemental or Project Agreement.

Do not submit Supplemental and Project Agreements to the Department for approval until the Agreement is complete and includes scope, costs, and schedule. Incomplete Supplemental and Project Agreement submittals will not be reviewed.

The Department and Utility Company will sign each Supplemental Agreement indicating their concurrence with the Utility Work.

Once the draft Supplemental or Project Agreement has been approved by the Department, provide two copies of each proposed Supplemental or Project Agreement, along with the corresponding plans, schedules, and estimates of cost to the Utility Company for signature. Once the Supplemental or Project Agreements have been signed by the Utility Company provide the partially executed agreements to the Department's Utility Manager or designee for signature from the Department and full execution. The Design-Builder shall not perform any Utility Work until the Supplemental Agreement for the Utility Work is signed by the Company and the Department. The Department will issue an authorization to proceed to the Design-Builder for each specific Utility Work location.

19C-10 Cooperative Agreements

Department will prepare and negotiate Cooperative Agreements needed for the Project.

Design-Builder Responsibility - Prepare and provide any related documentation such as reports, plans, surveys, and estimates of cost and provide personnel to attend negotiation sessions with Third-Parties at no additional cost to the Department. Upon request of the Department, provide related documentation within seven Calendar Days

19C-11 Meetings and Correspondence

Keep Utility Companies well informed of Project changes and involved in making Project design decisions so they can provide uninterrupted service to their customers or minimize interruption of services. Notify Utility Companies at least 24 hours in advance of any Work in the vicinity of their facilities and provide 48 hours prior notice of potential impacts on service.

Startup Meeting Topics. Schedule startup meetings with each Utility Company and the Department's Utility Manager to review the following:

A. Inventory of Utility facilities.

B. Terms of the MUAs and Statewide Utility Relocation Agreements, including allocation of responsibilities.

C. All potential items of Work that affect the Project schedule.

D. The schedule for the Project.

E. Potential Utility conflicts and relocations.

F. Time frames to design, procure materials for, and construct Utility relocations.

G. Concurrence on the number and extent of known affected Utility facilities and issues.

H. Possibility of eliminating Utility conflicts.

I. Mitigation approach to be used at each specific location.

J. Procedures for addressing Utility conflicts discovered during design and/or construction.

Progress Meetings. Schedule at least bi-monthly Utility meetings with the Department to discuss Project progress, issues, and planned Work for all phases of Utility Work, including design and construction. Notify the Department at least seven Calendar Days in advance of each meeting. Invite Utility Companies to progress meetings.

Develop the agenda for these meetings jointly with the Department. At these meetings, include the Design-Builder's and the Department's Key Personnel who have responsibilities for Utilities. Take and maintain meeting minutes of all the Utility meetings and distribute copies of the minutes to participants, including representatives of Utility Companies who have facilities in the areas reviewed (even if they did not attend the meeting) within seven Calendar Days after the meeting.

Correspondence. Maintain documentation of contact and discussions with Utility Companies. Provide to the Department copies of all correspondence between the Design-Builder and any Utility Company within one Calendar Day of receiving it or sending it, as applicable.

19C-12 Design and Construction Responsibility

Coordinate all Project design and construction activities with the Department and Utility Companies,

including design and construction of Utility facilities as applicable for each Utility type, subject to the requirements of the MUA(s), Statewide Utility Relocation Agreement(s), and Supplemental Agreement(s). Verify that the design plans prepared and the Utility Work performed is consistent and compatible with the executed Agreement(s) and with the Project design and construction.

The following Tables summarize the Utility requirements and responsibilities specified in the respective MUA(s), Statewide Utility Relocation Agreement(s), and Supplemental Agreement(s). In case of a discrepancy or conflict between the information in this section and an executed Agreement, the executed Agreement shall govern.

Table 19C-1 (Design-Builder to Design and Construct) lists the Utility Companies for which the engineering design and construction of Utility Work will be the responsibility of the Design-Builder. Design-Builder may be required to perform the Utility relocation design and/or construction using specific subcontractors and/or vendors in accordance with MUA(s).

TABLE 19C-1
DESIGN-BUILDER TO DESIGN AND CONSTRUCT

Utility Company	***Department Cost Share (Include on Form PA & Form UC)***
Daybreak Secondary Water	100%
Kearns Improvement District	100%
Manuel Bros., Inc	50%
South Jordan City	100%
South Valley Sewer District	100%
Taylorsville City	100%
Taylorsville Bennion Improvement District	100%
US Bureau of Reclamation (using an approved sub-contractor)	100%
City of West Jordan City	100%
Welby Jacobs Canal	100%
Private Irrigation Users	100%

Utility Companies listed in Table 19C-2 (Utility Company for a Portion of the Utility Work) are responsible for completing a portion of the Utility Work as specified in Table 19C-2 (Utility Company for a Portion of the Utility Work). Perform all other Utility Work. Design-Builder may be required to perform the relocation design and/or construction of Utility Work using specific subcontractors and/or vendors in accordance with MUA(s), Telecommunications Facility Exchange Agreement(s) and Statewide Utility Relocation Agreement(s).

TABLE 19C-2
UTILITY COMPANY FOR A PORTION OF THE UTILITY WORK

Utility Company	***Company Utility Work Responsibility***	***Department Cost Share (Include on Form PA & Form UC)***
AT&T Corp.	AT&T Corp to furnishing cables and hand holds and	50%

Utility Company	***Company Utility Work Responsibility***	***Department Cost Share (Include on Form PA & Form UC)***
	pulling and splicing	
First Digital Telcom	First Digital Telecom to furnish cable/pedestal procurement, pulling, and splicing	50%
MCI (Verizon Business)	MCI Communication Services to provide cable and pedestal procurement, pulling, and splicing	50%
Syringa Networks, LLC	Fiber design fiber procurement, pulling, and splicing	100% of UDOT's design and construction boxes and conduit Syringa Networks, LLC responsible for 100% of fiber design, fiber procurement, pulling and splicing
Zayo Group, LLC.	Cable/pedestal procurement, pulling, and splicing	50%

Table 19C-3 (Utility Company for Design and Construction) identifies the Utility Companies that will be responsible for performing engineering design and construction of its own Utility facilities independent from the Design-Builder. Coordinate with the Utility Companies in identifying Utility facility conflicts with the Project to incorporate the design and construction of Utility Work into the Project Schedule and the Work.

TABLE 19C-3
UTILITY COMPANY FOR DESIGN AND CONSTRUCTION

Utility Company	***Department Cost Share (Include on Form PA & Form UC)***
CenturyLink	50%
Comcast	50%
Questar Gas Company	50%
Rocky Mountain Power (11400 South)	100%
Rocky Mountain Power (9000 South)	83%
Rocky Mountain Power (7000 South)	50%
Rocky Mountain Power (5400 South)	60%
Rocky Mountain Power (4015 West & 5400 S)	50%

*Design-Builder to provide trenching, conduit, and bedding material per RMP specification for all RMP underground Utility Work, only if agreed upon and coordinated with RMP.

Utility Companies have requested Utility Betterments to be constructed as part of the Project. Construct the Betterments identified in Table 19C-4 (Betterment Design and Construction Responsibilities of Design-Builder) as part of the Utility Work.

TABLE 19C-4
BETTERMENT DESIGN AND CONSTRUCTION RESPONSIBILITIES OF DESIGN-BUILDER

Utility Company	***Betterment***
South Jordan City	See Part 6 (Third Party Agreements)
Taylorsville City	See Part 6 (Third-Party Agreements)
Taylorsville Bennion Improvement District	See Part 6 (Third-Party Agreements)
City of West Jordan	See Part 6 (Third Party Agreements)

If the Design-Builder changes the Project design after the Utility Company has an executed Supplemental Agreement or the Utility Work has been performed, resulting in a new conflict with the completed Project related Utility Work, the Design-Builder will pay for one-hundred percent (100%) of the costs to redesign and construct the additional Utility Work required to resolve said new conflict. The Design-Builder is responsible to make adjustments for any additional time that may be required for the Utility Company to review modified plans and perform Utility Work on its facilities when required.

Cost share percentages provided as an example or guide. If a Utility Company is within their own Right-of-Way, easement, or in a Public Utility Easement, then the Department is responsible for one-hundred percent (100%) of the Utility relocation costs. Follow Utah Law per Utah Code 72-6-116, unless otherwise specifically noted in the MUA(s) or Statewide Utility Relocation Agreement(s) between the Department and each Utility Company. In-case of discrepancy the executed MUA(s) or Statewide Utility Relocation Agreement(s) shall govern.

19C-13 Utility Work Design Plans

After the Project design has been advanced sufficiently to clearly define Utility Work, prepare Utility Work design plans, or coordinate with Utility Companies to obtain company-prepared Utility Work plans. Utility Work design plans need to identify the extent of the Utility Work required and clearly show the proposed highway improvements. Coordinate as necessary with each Utility Company to accomplish each Utility relocation including providing and clearly indicating a mutually agreeable proposed location for the relocated Utility facility.

For Utility Work Design Plans Prepared by the Design-Builder, prepare Utility Work design plans:

A. Prepare a detail Utility Work design plan for each specific Utility relocation in the Project plan sheet format.

B. Plan set shall include sufficient information to perform survey verification.

C. Include a MOT and traffic control plan in compliance with Part 4-10 (Maintenance of Traffic) for each Utility Work that requires MOT and traffic control.

D. Include submittal information for proper material verification.

E. Include sufficient design detail to allow review and verification of Utility Work and show all proposed Utility Work design. Show all existing Utilities, as identified by the Department and Design-Builder.

F. Deliver electronic and hardcopy to the Department.

G. Identify the extent of the Utility Work and clearly show the proposed highway improvements.

H. If the Design-Builder makes changes to the approved Utility Work design plans, submit the revised plans to the Utility Company for approval. Allow additional time for the Utility Company to review the modifications to plans.

I. Obtain final design approval signatures for Utility Work design plans from authorized Utility Company personnel. The approval signature shall appear on the Released for Construction plan set.

J. Provide Released for Construction Documents signed by both the Utility Company and Design-Builder to the Department.

K. Correlate all Utility Work design plans with the Project design information and submit them to the Department, Design-Builder, and Department Utility Manager for review prior to construction.

For Utility Work Design Plans Prepared by the Utility Company, prepare plan sheets showing

the proposed highway improvements and existing Utility facility locations. Identify all Utility conflicts and required Utility Work on the plans and submit them to the Utility Company and the Department. The Utility Company will use these plans to prepare their Utility Work design plans. Correlate all Utility Company relocation plans with the Project design information and submit them to the Department for review prior to construction.

Review Utility Company-prepared relocation plans for consistency and compatibility with the Project design and obtain Utility Company Supplemental Agreement approval before construction on the utility for which the plans are prepared, whether construction is to be performed by the Design-Builder or the Utility Company.

19C-14 Notification

Notify the Department and each Utility Company in writing as required in the MUA(s) and Statewide Utility Relocation Agreement(s), prior to beginning any Utility Work that may affect any Utility facility, including shutdowns and diversions. Provide proper notification to each Utility Company of all temporary Utility Work implemented for the convenience of the Design-Builder's construction operation.

19C-15 Inspection

Utility Companies have the right to inspect and test the Utility Work performed by the Design-Builder on their facilities. The Utility Company and Design-Builder shall keep daily records of the Utility Work performed. The Utility Company and Design-Builder shall retain a copy of said daily records and upon request, supply a copy of each record to the Department. Utility Companies will communicate any concerns or irregularities with the progression of Utility Work to the Department, which will forward the concerns to the Design-Builder in accordance with the MUA(s) and Statewide Utility Relocation Agreement(s). Inspection and acceptance of the Utility Work by the Utility Company shall not relieve the Design-Builder from the obligation to perform all Utility Work in compliance with specifications and any other obligations in the MUA(s) or Statewide Utility Relocation Agreement(s).

19C-16 Utility Work Limits

The limits of Utility Work extend as far as is necessary to accommodate the Utility Work and the Utility Company's relocation requirements, whether inside or outside the ROW or Construction limits. Obtain all necessary permits as needed to complete the Utility Work.

The relocation of all existing Utility facilities that may have resided outside the existing ROW and will be located within the new ROW are the responsibility of the Design-Builder.

19C-17 Excavation

Give such notices of excavation as are required under Utah Code Title 54 Chapter 8a-2 (known as the Blue Stakes Law). Contact Blue Stakes at (800) 662-4111 before all Utility Work.

19C-18 Overhead Lines

Before working adjacent to overhead lines, give appropriate notice to the Utility Company. Obtain the minimum clearances requirements (between the Utility lines and the Project's construction equipment, permanent finished grade and appurtenances, and/or temporary grade) directly from the Utility Companies.

Inventory and determine existing vertical clearance of overhead lines over existing roadways and

appurtenances. Provide clearance between overhead electric wires and under-build communication systems and between top of finished ground and appurtenances (at the lowest sag).

19C-19 Fees and Construction Permits

Where performing Utility Work, obtain, pay the cost of, and comply with all relocation permits and application fees for Utility locations, both within and outside the ROW. Obtain a construction permit from the Department for construction of any new facility within the ROW. (No construction permit is required from the Department for the relocation, betterment, abandonment, or removal of an existing Utility within the ROW). Pay any fees associated with installation of new Utility services or maintenance of existing Utility services. Obtain other non-UDOT permits before beginning Utility Work.

19C-20 Abandonment and Protection-in-Place

Unless specifically noted otherwise in the Contract Documents or directed otherwise in writing by the Utility Company, removal of abandoned underground Utility or pipes within the planned ROW limits is not required of the Design-Builder. For underground Utilities, casings, and pipes that are to be left in place and are larger than six (6) inches in equivalent diameter, abandon them by placing or pumping in concrete slurry, sand slurry, or other material approved by the Department and then capping all open ends with concrete; for pipes eight (8) inches or greater in diameter, the cap must be at least twenty-four inches (24") thick. All abandoned pipelines shall be shown and identified on the As-built drawings

The following are exceptions to the abandonment process, listed above:

A. Remove the existing abandoned USBOR/JVWCD water main located starting on the north side of the 5400 South interchange and moving north.
B. Remove all manholes, vaults, and other underground structures to a depth of 2' below subgrade. Completely remove any underground structure that will be located under any structural element of the project.

Protect existing Utilities not requiring relocation, removal, or abandonment in accordance with the Utility Company's requirements. It is the Design-Builder's responsibility to fully understand the Utility Company's protect-in-place requirements prior to submitting their bid. Actively protect all Utilities to be left in place and communicate its status to the Subcontractors and other Utility Companies. Repair or replace any existing Utility facility that is damaged by the Design-Builder at no cost to the Department or Utility Company. All costs including costs of the facility being out of service as a result of the damage shall be borne by the Design-Builder.

Design-Builder shall submit an abandonment and/or protection-in-place plan to the Department as part of a Supplemental Agreement for Department approval. All protect-in-place measures must be approved by the Utility Company prior to the start of Utility Work. The Design-Builder must provide written acceptance of the Utility Company (or signed protect-in-place plans) to the Department. Survey the abandoned pipes and show them on the as-built drawings and provide the Department the locations in a .cvs file.

19C-21 Utility Company As-Built Plans

For all Utility Work designed and/or constructed by the Design-Builder, provide Utility As-built plans to each Utility Company in the electronic file format specified by the Utility Company. Show the locations of existing Utilities, structures, trees, streets, and highway ROW limits on the plans.

19C-22 Project-Wide Utility Plans

Transfer As-built information to a separate set of Project-wide Utility plans, prepared using the Project plan sheet format. The purpose of this set is to show a comprehensive picture of all As-built Utilities (both existing and adjusted as a part of the Project) for the Project on a single set of plans in the same format, as is required for all other Project As-built Plans.

Include on the plans Project survey control information and sheets. Show survey-grade points along the relocated Utility facilities via stations, offsets to the dominant control line at the following intervals along with northing coordinates, easting coordinates, Project elevation of natural ground, and facility elevation (invert or bottom of facility), as follows:

A. Every 100 feet and/or at angle points.

B. At ROW boundaries.

C. At roadway control points.

19C-23 Completion of Work

Obtain written approval by the respective Utility Company of all As-built Utility Work plans for which the Design-Builder has been responsible.

19D. SUBMITTALS

Provide submittals to the Department in accordance with Table 19D-1.

TABLE 19D-1
DESIGN-BUILDER SUBMITTALS FOR UTILITIES

Submittal	***Department Approval***	***Utility approval***	***Schedule***
Utility Work weekly work plan	No	No	Weekly
Supplemental Agreements	No	Yes	Prior to submission to Utility Company
Abandonment and Protection-in-Place Plan	Yes	Yes	Prior to Construction
Construction Permits	No	Yes	Prior to Construction
Utility Work design plans	No	Yes	Prior to Construction
Daily Records	No	No	As requested by Department
Utility As-Built plans	No	Yes	With As-Built Documents
Project-wide Utility plans	No	No	Upon completion of Utility Work

20—PHOTOGRAPHS

20A. GENERAL

Conduct all Work necessary to meet the requirements of this Section 20 (Photographs) and satisfy all functional needs and characteristics of the Project, including providing aerial imagery of the Project at each stage of construction and at all critical elements, and as the Design-Buider and Department deem necessary.

20B. STANDARDS

Complete Work related to Project photographs in accordance with the requirements of the standards listed by priority in Table 20B-1 (Standards for Photographs).

If there is any conflict in standards, adhere to the standard with the most stringent requirements.

If there is any unresolved ambiguity in standards, it is the Design-Builder's responsibility to obtain clarification and Approval from the Department before proceeding with design and/or construction.

TABLE 20B-1
STANDARDS FOR PHOTOGRAPHS

Priority	*Author or Agency*	*Title*
1	UDOT	*Supplemental Specifications to 2012 Standard Specifications for Road and Bridge Construction,* as modified by Part 5
2	UDOT	*2012 Standard Specifications for Road and Bridge Construction,* as modified by Part 5
3	UDOT	*Supplemental Drawings to 2012 Standard Drawings for Road and Bridge Construction*
4	UDOT	*2012 Standard Drawings for Road and Bridge Construction*

20C. REQUIREMENTS

20C-1 Progress Photographs

Take monthly aerial photographs of the Project Work and site to serve as Progress Photographs. Each time photos are taken, aerial photographs shall include all areas within the Project, whether temporary or permanent, and all other areas impacted. Prior to each photo event, obtain the Department's acceptance of the views to be taken and captured in the photos, and the approximate time of day when the photos will be taken.

Provide monthly a DVD or USB Drive containing a complete set of the aerial Progress Photographs. Provide the Department with one copy of the DVD or USB Drive. Aerial photographs shall be at least 16-by-24-inches at a resolution of 200 dots-per-inch taken with a digital single lens reflex (DSLR) camera having a minimum image sensor size of 15.4 megapixels. Provide all photographs in high-quality .jpeg format and label the file names with the approximate view and location (intersection) and the date the photos were taken.

20C-2 Pre-Construction Photographs and Video

Immediately after NTP, take a sufficient number of pre-construction photographs and a high-quality video of the Project site, including roadways, structures, drainage, adjacent buildings to the site, businesses, and all areas anticipated to be impacted by the Work, in high-definition format so as to resolve any disputes that may arise regarding the conditions prior to and subsequent to construction. Work with the CT (Communication Team) to obtain access to properties adjacent to areas impacted by th Work. Such preconstruction survey shall be completed prior to the start of construction in addition to the requirements of Part 4-06 (Geotechnical) and Part 5 (Special Provisions and Exceptions) Section 01727S – Preconstruction Survey.

If a dispute arises whether or not sufficient photographic or video evidence of the existing condition is available, the disputed area shall be restored to the extent directed by the Department at no additional cost to the Department.

20D. SUBMITTALS

Provide submittals to the Department in accordance with Table 20D-1.

TABLE 20D-1
DESIGN-BUILDER SUBMITTALS FOR ROADWAYS

Submittal	***For Approval***	***Schedule***
Progress photographs (Aerials)	No	With monthly Progress Report
Pre-construction photography	No	Prior to the start of construction

REQUEST FOR PROPOSALS

UTAH DEPARTMENT OF TRANSPORTATION

4 Interchanges on Bangerter HWY (SR-154)

Project No. S-0154(12)11

Salt Lake County

CONTRACT DOCUMENTS

PART 5:

SPECIAL PROVISIONS AND EXCEPTIONS

Addendum 5 – October 27, 2016

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1. PRICE REDUCTIONS FOR NONCONFORMING WORK
2. DESIGN-BUILD SPECIAL PROVISIONS
3. ERRATA

1—PRICE REDUCTIONS FOR NONCONFORMING WORK

Unit prices for materials are not utilized in the payment structure of this Contract. However, unit prices are required to utilize the pay factors and/or daily pay adjustments identified in the Standard Specifications and Special Provisions of this Contract. Unit prices listed in Table 5-1 (Unit Prices for Determining Pay Adjustments for Nonconforming Work) shall be applied and used in the calculation of Pay adjustments per specification requirements. Other prices for price reductions not listed below shall be established.

TABLE 5-1:
UNIT PRICES FOR DETERMINING PAY ADJUSTMENTS FOR NONCONFORMING WORK

Material or Activity	*Standard Specification Section*	*Unit*	*Unit Price*	*Pay Adjustment Type*
1. Traffic Control	01554	Day per interchange	$2,500	Daily Deduction
2. Driven Piles	02455	Cubic Yard, of concrete in place	$400	Unit Price for Pay Factor
2a. Driven Piles	02455	Linear Foot, in place	$65	Unit Price for Pay Factor
3. Drilled Shafts	02466	Cubic Yard, of concrete in place	$400	Unit Price for Pay Factor
4. Portland Cement Concrete Pavement	02752	Square Yard, in place	$42	Unit Price for Pay Factor
5. Lean Concrete Base	02712	Square Yard, in place	$25	Unit Price for Pay Factor
6. Structural Concrete (Structurally designed elements – bridges, box culverts, etc.)	03310	Cubic Yard, of concrete in place	$500	Unit Price for Pay Factor
7. Structural Concrete (all other structural elements)	03310	Cubic Yard, of concrete in place	$400	Unit Price for Pay Factor
8. Portland Cement Concrete (un-reinforced concrete items)	03055	Cubic Yard, of concrete in place	$200	Unit Price for Pay Factor
9. Hot-Mix Asphalt (HMA)	02741	Tons, in place	$65	Unit Price for Pay Factor
10. Asphalt Material (Binder)	02745	Ton of HMA, in place	$75	Unit Price for Pay Factor
11. Prestressed Concrete	03412	Cubic Yard, of concrete in place	$750	Unit Price for Pay Factor
12. MSE Walls – Single Stage	02831S	Square Feet, in place. Includes backfill material	$60	Unit Price for Pay Factor
13. MSE Walls – Two Stage	02837S	Square Feet, in place. Includes backfill material	$70	Unit Price for Pay Factor
14. Pavement Marking Paint	02765	Gallons, in place	$25	Unit Price for Pay Factor
15. Untreated Base Course	02721S	Tons, in place	$18	Unit Price for Pay Factor

* Based on current specifications, pay adjustments for these materials are "hard dollar" calculations and are not based on a pay factor (i.e., some percentage of a unit cost). These items are eligible for incentives as well as disincentives/reductions.

2—DESIGN-BUILD SPECIAL PROVISIONS

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August 1, 2016

SECTION 01452S

PAVEMENT SMOOTHNESS

(International Roughness Index Specification)

Delete section 01452 and replace with the following:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Process and procedures for acceptance testing and determination of a minimum International Roughness Index (IRI) and Incentive/Disincentive for smoothness of Hot Mix Asphalt (HMA), Open Graded Surface Course (OGSC), Bonded Wearing Course (BWC), Stone Matrix Asphalt (SMA), Micro-Surfacing, Portland Cement Concrete Pavement (PCCP) and Portland Cement Concrete Pavement (PCCP) rehabilitation using a profiler approved and certified by the Department.

1.2 RELATED SECTIONS

A. Section 02735: Micro-Surfacing

B. Section 02741: Hot Mix Asphalt

C. Section 02742S: Project Specific Surfacing Requirements

D. Section 02744S: Stone Matrix Asphalt

E. Section 02752: Portland Cement Concrete Pavement

F. Section 02786: Open Graded Surface Course

G. Section 02787: Bonded Wearing Course

H. Section 02981: Grinding Pavement

1.3 REFERENCES

A. AASHTO R 43: Quantifying Roughness of Pavements

B. AASHTO R 54: Accepting Pavement Ride Quality When Measured Using Inertial Profiling Systems

C. AASHTO R 57: Operating Inertial Profiling Systems

D. UDOT Materials Manual of Instruction

E. AASHTO M 328: Inertial Profiler

1.4 DEFINITIONS

A. Category 1
   1. Newly constructed pavement surfaces having two or more opportunities for improving ride.

B. Category 2
   1. Newly constructed pavement surfaces without two or more opportunities for improving ride.

C. Opportunity to Improve Ride
   1. Placing Granular Borrow, Untreated Base Course, Treated Base Course, Open-Graded Surface Course (OGSC), Bonded Wearing Course (BWC), Stone Matrix Asphalt (SMA), Rotomilling, Cold-In-Place Recycling, Hot-In-Place Recycling, and each lift of paving.
   2. Lane leveling is not considered an opportunity to improve ride.

D. Pavement Section
   1. Each travel lane or median, 0.1 mile long, sections include:
      a. All traffic lanes
      b. Ramps
      c. Medians 8 ft and wider
      d. Turn lanes
      e. Bridges and approach slabs with final riding surfaces placed as part of the contract

   2. Each pavement section is laid out consecutively from the start of the project.

   3. Localized Roughness Criteria also applies to bike lanes and shoulders.

E. Wheel Path
   1. A continuous parallel line 2.5 ft inside the lane or median lines.

F. Mean Roughness Index (MRI)
   1. Average of two wheel path IRIs taken from each pavement section.

G. Localized Roughness
   1. Profile deviations in a continuous 25-ft pavement.

1.5 SUBMITTALS

A. Certifications for Profilers and Operators.

B. Summary report of acceptance profile testing for the project, including electronic file. Refer to AASHTO R 43.

C. Original raw data files compatible with the ASTM E2560 standard. Refer to AASHTO R 43.

1. Data files collected before corrective work
2. Data files collected for final acceptance

1.6 GENERAL REQUIREMENTS

A. Certify operators and equipment according to UDOT Materials Manual of Instruction 995.

B. Perform all work necessary to prepare the pavement for testing, including sweeping; this is incidental to the work and is not measured for payment.
   1. Seal asphaltic based pavements after corrective grinding.
   2. Include all costs and resources for smoothness testing, preparation, and correction, including traffic control, temporary pavement markings, grinding or milling, disposal of waste material, and flush coat for ground areas in the surfacing bid items.

C. Perform Independent Assurance testing with the Department as directed by the Engineer according to AASHTO R 54 *Verification Testing.*

1.7 ACCEPTANCE

A. The Department evaluates longitudinal deviations for all roadways using acceptance profiles performed by the Contractor.

   1. Determine IRI using the most recent version of Profile Viewer and Analysis (ProVAL) software. Refer to AASHTO R 54 and ASTM E2560. Areas of localized roughness will be identified using the ProVAL “Smoothness Assurance” analysis, calculating IRI with a continuous short interval of 25 ft [7.62 m] and the 250-mm filter applied.

   2. Determine MRI for each Pavement Section with 250-mm filter applied.

B. Limit transverse pavement deviations to less than 3/16 inch from the lower edge of a 10-foot straightedge.

C. Pavement smoothness is evaluated before and after corrective work. Final pavement smoothness acceptance is based on the final profile of all Pavement Sections of the project.

D. Limit localized roughness as specified in Section 02742S
   1. Include profile deviations from bridge decks, approach slabs and transitions, manholes, valves, and other facilities in the profile when the contract requires the adjustment, new construction or reconstruction of these facilities.
   2. Exclude profile deviations from bridge decks, approach slabs and transitions, manholes, valves, and other facilities in the profile when the contract does not include adjustment, new construction or reconstruction of these facilities.
   3. Limit profile deviations in shoulder or bike lane as specified in 02742S.

1.8 INCENTIVE/DISINCENTIVE

A. The Department applies Incentive/Disincentive for final smoothness to Category 1 pavement surfaces longer than 1,000 ft. Refer to Section 02742S.
   1. Prorate incentives/disincentives for partial pavement sections.
   2. Not eligible for incentives:
      a. Pavement requiring corrective action at the time of acceptance testing. Disincentives are based on the MRI obtained at the time of final acceptance re-testing.
      b. Non-PCCP Pavement Section where grinding exceeds 20 yd^2; disincentive remains applicable. The minimum disincentive for these pavement sections is $1,000 each.
      c. Pavements with grinding on the final surface of OGSC, BWC, and Microsurfacing.

B. The Department applies Incentive/Disincentive for Category 2 pavements according to Section 02742S.
   1. The department calculates the percent of improvement using the following formula:

$$\frac{MRI_o - MRI_f}{MRI_o} \times 100$$

Where:

MRI_o = MRI of original roadway surface
MRI_f = MRI of final corrected roadway surface

C. The Department does not apply Incentive/Disincentive to:
   1. Pavements shorter than 1,000 ft
   2. Shoulders
   3. Bike lanes
   4. Medians narrower than 8 ft
   5. Horizontal curves with a centerline curvature radius less than 900 ft and areas within the superelevation transitions to these short radius curves
   6. Tapers
   7. Surfaces within 15 ft of bridge decks and approach slabs not paved as part of the contract

PART 2 PRODUCTS

2.1 PAVEMENTS

A. Hot Mix Asphalt (HMA). Refer to Section 02741

B. Open Graded Surface Course (OGSC). Refer to Section 02786

C. Bonded Wearing Course (BWC). Refer to Section 02787

D. Stone Matrix Asphalt (SMA). Refer to Section 02744S

E. Micro-Surfacing. Refer to Section 02735

F. Portland Concrete Pavement (PCCP). Refer to Section 02752

2.2 FLUSH COAT

A. Tack coat. Refer to Section 02748

PART 3 EXECUTION

3.1 PAVEMENT PROFILE CORRECTION

A. Perform preliminary profiling and roadway smoothness evaluation to identify any defects exceeding acceptance limits.
   1. Correct defects before performing acceptance testing.
      a. Measure and correct localized roughness defects in the underlying surface before placement of the final OGSC, BWC, SMA, or Micro-Surfacing surface course.
      b. Correct localized roughness defects across lanes, medians, and shoulders in widths terminating at a lane line, edge of pavement, or center of the lane by grinding with a device approved by the Engineer. Refer to Section 02981
         1) Include areas not eligible for incentive/disincentive. Refer to this Section, article 1.8, paragraph. B,.
      c. Taper corrected areas for smooth transverse transitions and surface drainage.
      d. Re-profile for correction verification before acceptance testing.
      e. Seal corrected areas in BWC, OGSC, HMA, SMA, and Micro-Surfacing with a flush coat application.
         1) Apply the emulsion according to Section 02748 for tack coat.

3.2 ACCEPTANCE TESTING

A. Notify the Engineer in writing at least two working days before performing acceptance testing for pavement smoothness.
   1. After all corrective work has been performed
   2. Clearly define each of the pavement sections to be evaluated.

B. Perform acceptance testing for smoothness.
   1. Collect longitudinal profiles in each wheel path and in the center of each paved shoulder and bike lane using Department certified profilers and operators in accordance with AASHTO R 54, R57 and M328.
      a. Collect profiles with no filters applied.
   2. Determine the MRI for each Pavement Section
   3. Determine localized roughness using IRI.
   4. Submit a summary report to the Engineer within two working days that includes pavement section identification, profile results, and bump locations showing localized roughness corrections by pavement section.

3.3 PAVEMENT THICKNESS

A. Determine PCCP thickness after smoothness acceptance testing.

B. Re-test other pavements for thickness after grinding as directed by the Engineer.

END OF SECTION

SECTION 01511S

JORDAN AQUEDUCT PROTECTION AND MONITORING

PART 1 GENERAL

1.1 THE REQUIREMENTS

A. The work in this section includes specific measures required to protect the Jordan Aqueduct from potential damages during construction of the Four Interchanges on Bangerter Highway (SR-154).

B. The Jordan Aqueduct is owned by the United States Bureau of Reclamation (BOR, Reclamation) and operated and maintained by the Jordan Valley Water Conservancy District (JVWCD, District).

C. The Jordan Aqueduct is located within the limits of the Bangerter Highway right-of-way in some areas of the project. Horizontal and vertical alignment, based upon BOR design drawings, are shown on the plans. Limits of the BOR right-of-way are shown on the plans.

D. The existing aqueduct was constructed in the 1970's using gasketed bell and spigot style pipe. The Jordan Aqueduct consists of 78-inch diameter welded steel pipe at 9000 South and 7000 South (Reach 2), and 66-inch diameter reinforced concrete cylinder pipe at 5400 South (Reach 3).

E. The age of the aqueduct and lack of joint restraint requires that extreme caution be exercised when operating equipment and constructing facilities along or adjacent to the BOR right-of-way. Excessive vibration, loading, or settlement of the aqueduct may cause joints to leak and the pipeline to fail. The aqueduct must continuously convey water for a significant portion of the population of the Salt Lake Valley. The aqueduct cannot be taken out of service for maintenance and repair without significant advance planning and expense, and then only during limited (low wintertime demand) periods of the year.

F. Requirements of this Section are based upon the Encroachment Guidelines for Jordan Aqueduct, Reach 1, 2, 3, and 4, and the U.S. Department of the Interior Bureau of Reclamation Engineering and O&M Guidelines for Crossings. Copies of these documents are included at the end of this Section for reference.

G. Note that this Section is intended to provide a summary of the key requirements of the above documents as they relate to the Four Interchanges on Bangerter Project. It is not intended to be a comprehensive list of BOR requirements. All requirements of these documents shall be adhered to when operating along or adjacent to the Jordan Aqueduct and United States right-of-way.

1.2 RELATED SECTIONS

A. Section 02570S: Steel Pipe

B. Section 02578S: Flexible Internal Joint Repair

C. Section 09910S: Pipeline Coating and Lining

1.3 REFERENCES

A. Engineering and O&M Guidelines for Crossings – Bureau of Reclamation Water Conveyance Facilities, April 2008

B. Exhibit A Encroachment Guidelines for Jordan Aqueduct, Reach 1, 2, 3, & 4 – Protection Criteria

C. Standard Form 299 – Application for Transportation and Utility Systems and Facilities on Federal Lands

D. Easement Encroachment Application for Jordan Aqueduct Right-of-Way

E. 29 CFR 1926: OSHA Safety and Health Regulations for Construction

1.4 DEFINITIONS Not Used

1.5 SUBMITTALS

A. Submit a detailed protection and monitoring plan, including working drawings which identify the specific equipment, equipment specifications, drum weights, axle weights, calculations of live and dead loads, and construction procedures including excavation and haul off, placement of materials, and compaction methods that will be used for all phases of the construction that occur within the BOR right-of-way.

B. Submit a detailed geotechnical report to show anticipated settlement along the centerline of the Jordan Aqueduct caused by construction of adjacent highway structures and embankment fills. Reference Section 3.5 – Special Protections for Potential Ground Settlement for requirements.

C. Provide training to drivers, equipment operators, subcontractors and employees regarding the requirements of the approved protection and monitoring plan. Provide all individuals with a hard hat sticker to indicate successful completion of training prior to beginning work.

D. Upon completion of construction, provide both the District and BOR with one hard copy and one electronic copy of as-built drawings showing actual improvements in, on, or along the rights-of-way. Drawing format shall meet BOR record drawing requirements. Contact the BOR Provo Area Office for detailed requirements.

1.6 QUALITY CONTROL

A. Assign full time personnel responsible to monitor and verify that the approved protection plan is being followed at all times while operating within the BOR rights-of-way.

B. As a first item of work, "pothole excavations" should be made to field locate and identify the alignment of the Jordan Aqueduct and its appurtenant structures within the construction zone. Provide 48-hours advance notification and conduct all pothole excavation work in the presence of BOR and/or JVWCD staff. All pothole work within 18 inches of the aqueduct should be done using hand-held tools or vac truck only.

C. Maintain clear visual marking along the aqueduct centerline and limits of the Load Restricted Area (12-feet each side of centerline of the aqueduct) within the BOR right-of-way at all times during construction.

D. All individuals operating equipment within the BOR right-of-way must display a hard hat sticker to indicate that they have successfully completed necessary training per Section 1.5 C prior to beginning work. Stickers should be clearly visible to on-site field representatives.

PART 2 PRODUCTS Not Used

PART 3 EXECUTION

3.1 BOR/JVWCD ENCROACHMENT APPLICATION PROCESS

A. A JVWCD Easement Encroachment Application for Jordan Aqueduct Right-of-Way must be completed for all encroachments within the Jordan Aqueduct easement. This form is attached to this section and can be obtained electronically at the District's Web site at https://jvwcd.org/public.

B. Requirements for obtaining a use authorization to cross Reclamation project land are in the Code of Federal Regulations (CFR) at 43 CFR 429 and Reclamation Manual LND 08-01. Applicants must complete the Standard Form (SF) 299, "Application for Transportation and Utility Systems and Facilities on Federal Lands." The form is attached to this section and can be obtained electronically at Reclamation's Web site at: http://www.usbr.gov/pmts/lands.

C. Standard encroachment request process:

1. Request for encroachment is applied for by delivering two forms to JVWCD (Standard Form 299 & Easement Encroachment Application for Jordan Aqueduct Right-of-Way), providing the necessary plan & profile exhibits and paying the associated fees.

2. Once the application been accepted by the District, a preliminary review process begins and redlines and comments are returned to the applicant prior to formal submittal to Reclamation.
3. Applicant resubmits with updated plan & profiles that either incorporate ALL of the comments for revision of design or the applicant can request a variance to the criteria to be further reviewed.
4. The District will then either proceed with permitting through Reclamation or continue with further review and comment, in which case steps c & d are repeated.
5. Both forms must be approved prior to construction being authorized within the Jordan Aqueduct easement.

3.2 CONSTRUCTION WITHIN THE BOR JORDAN AQUEDUCT RIGHTS-OF-WAY

A. All new construction shall meet requirements of the Encroachment Guidelines for Jordan Aqueduct, Reach 1, 2, 3, and 4, included at the end of this Section for reference.

B. All new construction and utility crossings shall meet requirements of the Engineering and O&M Guidelines for Crossings by the U.S. Department of the Interior Bureau of Reclamation, included at the end of this Section for reference.

C. All requests for encroachments on Reclamation land, facility, or water body must obtain a written land use authorization from JVWCD and BOR.

D. Surface structures that will generally be allowed to be constructed within the BOR rights-of-way include standard UDOT concrete pavement section, asphalt pavement, non-reinforced parking areas, curbs, gutters, sidewalks, walkways and driveways, and removable barriers. **However, it is understood that all surface structures shall be analyzed and considered on an individual basis.**

E. Structures that may <u>not</u> be constructed in, on, or along the BOR rights-of-way include but are not limited to permanent structures such as retaining walls, street light standards, supports for large signs, power or communication poles, buildings, permanent foundations, permanent traffic barriers, cement or rock walls, sound walls, and longitudinal fences.

F. Parallel utilities are <u>not</u> permitted within the BOR rights-of-way.

G. Trees or vines are <u>not</u> permitted within the BOR rights-of-way.

H. Storage of hazardous materials is <u>not</u> permitted within the BOR rights-of-way.

I. All temporary and permanent changes in ground surfaces within the BOR rights-of-way are considered to be encroaching structures and must be handled as such.

J. If existing drainage features are to be modified during construction, detailed drawings showing the proposed drainage replacement/restoration should be submitted with the application for review and approval.

K. Notify the BOR Provo Area Office Field Engineering Division Manager at (801) 379-1000 and the Jordan Valley Water Conservancy District (District) at (801) 565-4300 at least forty-eight (48) hours in advance of commencing construction to permit inspection by the BOR and/or District.

L. Notify JVWCD immediately upon any evidence of suspected damage to the Jordan Aqueduct so that emergency response efforts can be initiated as determined necessary. Maintain 24-hour emergency contract information on-site at all times.

3.2.2 Utility Crossings

1. Any non-metallic encroaching structure below ground level shall be accompanied with a metallic strip within the BOR rights-of-way.

2. The points where proposed crossing utilities enter and exit the BOR rights-of-way should be plainly and permanently marked by sign posts. Sign posts should contain the name of the owner/operator, contents of the pipeline, utility identification, and emergency contact phone number.
3. Utilities including electrical and communication lines, and pipelines containing sewage, oil, gasoline, natural gas, contaminated waters, non-potable waters, or hazardous materials should only **cross perpendicular (between 70 and 90 degrees)** to the Jordan Aqueduct.

4. Utilities crossing above or under the Jordan Aqueduct should maintain a vertical clearance between the utility and aqueduct of **at least of 12 inches**.

5. Sanitary sewer crossings shall be contained within steel pipe casings within the BOR right-of-way.

6. No vertical or horizontal bends will be permitted on utilities within the BOR right-of-way.

7. Overhead wires across BOR rights-of-way should be at least 32 feet above all ground levels. For electrical power lines of 69 kilovolts (kV) or higher voltage, the minimum clearance should be 40 feet plus 0.25 inch per kV of line-to-line voltage above 450 kV. Poles or towers are not allowed within the BOR rights-of-way.

8. High voltage, direct current powerlines are generally not permitted to encroach on the BOR rights-of-way for the Jordan Aqueduct, except in unusual circumstances and with proper cathodic protection considerations.

9. Refer to the Engineering and O&M Guidelines for Crossings for specific cathodic protection requirements within the BOR rights-of-way.

3.3 LOAD RESTRICTIONS WITHIN BOR JORDAN AQUEDUCT RIGHTS-OF-WAY

A. Load restrictions must be carefully observed to protect the Jordan Aqueduct from damages that could be caused by excessive live or dead loading or vibrations during construction. The Load Restricted Area surrounding the Jordan Aqueduct is defined as a zone within 12-feet of both sides of the centerline of the pipeline (24-feet total width).

B. Limit equipment, operation, procedures, and methods of construction within the Load Restricted Area to ensure that any combination of either live loads or dead loads does not exceed the design capabilities of the aqueduct. Comply with the following constraints, procedures, and load restrictions which apply to all construction activities and operations located within this zone.

C. The largest equipment loading (live load) which shall be permitted within the Load Restricted Area is HS-20 with a minimum soil cover of 3-feet or greater.

D. Prevent heavy equipment (exceeding an HS-20 loading) from encroaching within the Load Restricted Area. Dynamic loading of equipment, including soil compaction equipment, shall not exceed HS-20 loading with a minimum of 3 feet of cover.

E. Operation of backhoes, augers, excavation or lifting equipment which may impose point loads from outriggers, wheels, or jacks is not permitted within the Load Restricted Area.

F. The allowable soil loading (dead load) or depth of cover over the aqueduct is restricted to a minimum of 3 feet and a maximum of 5 feet for Class A pipe, 10 feet for Class B, 15 feet for Class C, and 20 feet for Class D. Note that the aqueduct changes pipe class frequently along its alignment. Class changes are based upon the original design depth of cover that was present along the aqueduct. See Tables 1, 2 and 3 and BOR reference plans for further detail.

Table 1
Jordan Aqueduct Reach 2 at 9000 South
78-Inch Welded Steel Pipe Classifications

Location – Segment (1)	Begin Aqueduct Stationing	End Aqueduct Stationing	Approximate Distance from Intersection (ft)	Pipe Class	Max Cover (ft)
South Segment 5	955+00	996+20	1373 - 5493	A	5
South Segment 4	996+20	996+66	1327 - 1373	B	10
South Segment 3	996+66	1006+00	393 – 1327	A	5
South Segment 2	1006+00	1009+40	53 – 393	B	10
South Segment 1	1009+40	1009+93	0 – 53	A	5
9000 South Intersection					
North Segment 1	1009+93	1022+00	0 – 1207	A	5
North Segment 2	1022+00	1028+10	1207 – 1817	A	5
North Segment 3	1028+10	1030+38	1817 – 2045	C	15
North Segment 4	1030+38	1035+00	2045 - 2507	B	10

Notes:

1. *Segments are numbered from 1 through X starting from the centerline of the intersection and continuing for a distance beyond 2,000 feet north or south to cover the intended interchange project. Consult BOR record drawings for additional information if required.*

Table 2
Jordan Aqueduct Reach 2 at 7000 South
78-Inch Welded Steel Pipe Classifications

Location – Segment (1)	Begin Aqueduct Stationing	End Aqueduct Stationing	Approximate Distance from Intersection (ft)	Pipe Class	Max Cover (ft)
South Segment 2	1115+48	1131+00	1085 – 2637	A	5
South Segment 1	1131+00	1141+85	0 – 1085	B	10
7000 South Intersection					
North Segment 1	1141+85	1143+00	0 – 115	B	10
North Segment 2	1143+00	1168+18	115 – 2633	A	5

Notes:

1. *Segments are numbered from 1 through X starting from the centerline of the intersection and continuing for a distance beyond 2,000 feet north or south to cover the intended interchange project. Consult BOR record drawings for additional information if required.*

Table 3
Jordan Aqueduct Reach 3 at 5400 South
66-Inch Reinforced Concrete Cylinder Pipe Classifications

Location – Segment (1)	Begin Aqueduct Stationing	End Aqueduct Stationing	Approximate Distance from Intersection (ft)	Pipe Class	Max Cover (ft)
South Segment 3	1226+50	1235+60	1450 - 2300	C	15
South Segment 2	1235+60	1248+00	150 – 2637	A	10
South Segment 1	1248+00	1248+90	0 – 150	C	15
5400 South Intersection (Aqueduct in Casing from Station 1248+90 to 1250+05)					
North Segment 1	1250+05	1250+15	0 – 10	C	15
Newly Relocated Segment (2)	1250+15 BK	1265+44 AH	15 – 1670	NA	25
North Segment 2	1265+44	1274+00	1670 – 2450	B	10

Notes:

1. *Segments are numbered from 1 through X starting from the centerline of the intersection and continuing for a distance beyond 2,000 feet north or south to cover the intended interchange project. Consult BOR record drawings for additional information if required.*
2. *This segment of the Jordan Aqueduct was relocated to the west side of the highway in 2016. Refer to plans for the Bangerter Hwy. @5400 S. Aqueduct Relocation.*

G. All backfill material within the BOR rights-of-way shall be compacted to a minimum of 95-percent maximum density specified by ASTM Part 19, D-698, method A; unless otherwise shown.

H. Backfilling of any excavation or around any structure within the BOR rights-of-way shall be compacted in layers not exceeding 6-inches thick if hand compacted or 8-inches thick if power compacted to the following requirements: (1) cohesive soils to 95 percent maximum density specified by ASTM Part 19, D-698, method A; or (2) noncohesive soils to 95 percent relative compaction specified by ASTM D 7382-08.

I. Maintain existing ground cover over the aqueduct unless special exceptions are approved which allow for modifications during construction.

J. Do not place fill or temporarily stockpile construction materials in the Load Restricted Area within 12-feet of the centerline of the aqueduct.

3.4 SPECIAL PROTECTIONS FOR TEMPORARY LOW COVER CONDITIONS

A. Special protections are required during conditions when temporary low cover is present over the Jordan Aqueduct, such as when replacement of the existing roadway requires the pavement section and subgrade to be removed and replaced for development of the new roadway section over the aqueduct.

B. Temporary low cover conditions are present any time that the depth of soil over the aqueduct is less than the allowable 3-foot minimum.

C. Coordinate planned subgrade elevations with Jordan Aqueduct pothole depths. Submit cross sections in low cover areas illustrating the identified depth of cover and proposed subgrade elevation at 25-foot intervals.

D. Excavation over the aqueduct shall take place from the adjacent existing pavement to allow removal of excavated material while maintaining minimum cover between the top of aqueduct and construction equipment.

E. For placement of granular borrow materials, utilize the adjacent existing pavement for material delivery and place import material using one of the following methods:

1. Side dump trucks, placing material directly on grade.
2. Belly dump trucks, placing material on the existing pavement and blading off of pavement onto grade.

F. Backfill within 18-inches of the aqueduct shall be compacted using light, hand operated compactors and rollers. Mechanical compaction shall not be allowed within 6-inches of the aqueduct.

G. Once a working platform has been established, a low ground pressure Dozer/Grader (less than 7 psi) shall be used to spread material across the sub grade while maintaining a minimum of 18 inches of cover over the aqueduct.

H. Utilize static rolling compaction methods with light weight equipment (less than 8,000 lbs) within the low cover zone between 18-inches and 36-inches. Vibratory compaction shall <u>not</u> be used within the Load Restricted Area when cover over the existing Jordan Aqueduct is less than 36-inches.

3.5 SPECIAL PROTECTIONS FOR POTENTIAL GROUND SETTLEMENT

A. All necessary precautions should be taken to prevent ground settlement from occurring which could be damaging to the existing Jordan Aqueduct.

B. **Zero (0.00-inches)** ground settlement will be permitted along the centerline of the existing Jordan Aqueduct where internal joint seal protections are <u>not</u> installed in advance of construction.

C. In the event that highway design cannot demonstrate zero (0.00-inches) settlement along the Jordan Aqueduct (through the use of light weight fills or other means) as documented in a geotechnical report, special internal joint seals must be installed in advance of construction. Refer to Special Provision 02578S – Flexible Internal Joint Repair. Note special schedule constraints are associated with shutdown of the aqueduct.

D. In anticipation of the close proximity of highway fills adjacent to the Jordan Aqueduct at 7000 South and 5400 South, internal joint seals were installed in advance of this project by UDOT (fall 2016). Joint seals were not installed at 9000 South due to the larger separation distance that is available at this location between the aqueduct and anticipated highway fills. **It is the contractor's responsibility to achieve zero (0.00-inches) of ground settlement along the aqueduct at 9000 South**.

E. Note that internal joint seals are installed as a preventative measure only. The temporary seals provide flexibility at the joint to help prevent leakage and failure of the aqueduct in the event of settlement during construction. They do not prevent damage to the aqueduct caused by settlement from occurring.

F. Contractor shall be responsible for all damages to the aqueduct as a result of highway construction, regardless of whether internal joint seals are installed prior to construction.

3.5.1 Status of Internal Joint Protections

1. **9000 South Interchange – No protections in place.** Internal joint seal protections have not been installed in this location. Highway design shall achieve (0.00-inch) settlement along the centerline of the Jordan Aqueduct as documented in a geotechnical report stamped by a registered Professional Engineer in the State of Utah. If design does not meet this requirement, internal joint seal protections will be required to be installed at Contractor's expense in advance of construction. Note that special schedule constraints are associated with shutdown of the Jordan Aqueduct.

2. **7000 South Interchange – Internal joint protections in place.** Internal joint seals were installed by UDOT in 2016 covering an approximate distance of 1,300-feet south (aqueduct station 1128+60) to 1,110-feet south (aqueduct station 1152+60) of the intersection. Protect aqueduct in place in accordance with the requirements of this Section. Refer to Bangerter Hwy @ 5400 S. Aqueduct Relocation plans.

3. **5400 South Interchange – Internal joint protections in place.** Internal joint seals were installed by UDOT in 2016 covering an approximate distance of 1,050-feet south of the intersection (aqueduct station 1235+65 to 1246+00). A segment of aqueduct on the north side of 5400 South was relocated by UDOT in 2016. Internal joint seals are not required along this newly installed segment. Protect the aqueduct in place in accordance with the requirements of this Section. Refer to Bangerter Hwy @ 5400 S. Aqueduct Relocation plans.

END OF SECTION

March 30, 2015

SECTION 01554M

TRAFFIC CONTROL

Add Article 3.8:

3.8 NOTIFICATION OF LANE CLOSURES AND SUBSEQUENT OPENINGS

A. Provide advance notification of every lane closure on designated state Routes to the engineer.
   1. Notify the engineer as soon as it is known that a lane closure is necessary to execute the work and at a minimum, 72 hours before the closure.
   2. Notify the engineer immediately when the schedule, location, or need for an upcoming lane closure changes.
   3. Include in the notification the route, the beginning and ending milepost/mile marker, number of lanes to be closed, direction of the closure, the date and time of the beginning of closure, and the date and time of the ending of the closure.
   4. Notification of the engineer may be made in person or via email, phone call or text message.

B. Provide advance notice of every lane closure to third-party public involvement consultant for entry into UDOT Traffic Lane Closure system via UDOT Traffic website. Information should be provided to third-party public involvement consultant 72 hours prior to each closure.

   1. Refer to Section 01315.

C. Provide real-time notification of every lane closure, and subsequent lane opening, via UDOT Lane Closure mobile application. ***(Use iOS or Android smartphone;*** download instructions for app will be provided by UDOT.)
   1. **Lane Closure**: Confirm closure details via mobile application 30 minutes before placing the first traffic control device in the travel lane. *(Mobile application will generate a notification of the upcoming closure 45 minutes prior to scheduled start time; contractor accepts the closure to activate it, or cancels/reschedules the closure as needed.)*
   2. **Lane Opening:** Confirm lane reopening via mobile application 30 minutes prior to removing the last traffic control device in the lane. *(Mobile application will generate a notification 45 minutes prior to scheduled expiration of lane closure; contractor accepts the notification to confirm scheduled end time, or extends the closure as needed.)*
   3. **In the event mobile application is not working or unavailable: Call the TOC at (801) 887-3700** and provide information to activate, modify, or delete lane closure in the UDOT Traffic Lane Closure system. This call must be made 30 minutes prior to placing the first device in the travel lane, and 30 minutes prior to reopening the lane.

D. Include brief summary of lane closure notification plan in Traffic Control Plan narrative.

1. Lane closure notification plan

END OF SECTION

SECTION 01557S

MAINTENANCE OF TRAFFIC (MOT)

Add Section 01557:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. MOT Maintainer

B. Maintenance of Traffic (MOT) plans, Materials, and labor necessary for implementation.

C. Variable message signs and construction signs

1.2 RELATED SECTIONS

A. Section 00555: Prosecution and Progress

B. Section 01554: Traffic Control

C. Section 02891: Traffic Signs

1.3 REFERENCES

A. Manual on Uniform Traffic Control Devices, Latest Edition (MUTCD).

1.4 DEFINITIONS

A. Maintenance of Traffic (MOT): The work necessary to advise the public of changes to normal traffic flow, and to indicate planned detours and alternate routes to closed roads. Use solely as advisory information to the public.

1.5 SUBMITTALS

A. Daily inspection reports on a form acceptable to the Engineer.

B. Proposed MOT plan to the Engineer for approval if a construction phase is proposed that is not covered by a Department supplied MOT plan.
   1. Submit proposed MOT plan to the Engineer 10 working days before the proposed MOT plan is to be implemented.

1.6 POST-BID REQUIREMENTS

A. Department provides MOT plans to be implemented as part of the bid package.

B. Attend a mandatory meeting as detailed in Section 01554.

C. Attendees of the mandatory meeting will review the Contractor's submitted traffic control plans and the Department's supplied MOT plans for compatibility. Modify plans where necessary, as set forth in Section 01554.

D. Do not begin work on the project until written approval of the MOT plan is received from the Engineer. No item of work can begin until the approved MOT plan is implemented for that phase of work.

1.7 MOT MAINTAINER

A. The Traffic Control Maintainer, as specified in Section 01554 is responsible for maintenance of MOT on the project. The Department makes no separate payment for maintenance of MOT.

B. Inspect MOT devices daily for compliance with the MOT plans.

1.8 MAINTENANCE OF MOT DEVICES

A. Maintain traffic control devices per Section 01554.

1.9 WAGE RATES FOR TRAFFIC CONTROL PERSONNEL (FEDERAL AID JOBS ONLY)

A. Refer to Section 01554 for wage rate information.

1.10 PAYMENT PROCEDURES

A. Partial Payments - Based on the percentage of the project completed, excluding the cost of MOT.
   1. Failure to comply with any of the requirements of this special provision will result in non-compliance.

B. Price Adjustments:
   1. The Department reduces payment if the MOT implemented is not in compliance with the approved MOT plan, as determined by the Engineer.
   2. The amount per day by which the Contractor's compensation will be reduced is calculated using the greater of the following:
      a. The daily charge in the Schedule of Liquidated Damages found in Section 00555 or
      b. The Contract lump sum bid price for MOT divided by the number of Contract days.

C. Payment for change in scope: Negotiate a price adjustment for MOT if the Engineer orders a change in the scope of work that requires modification to the approved MOT Plan.

PART 2 PRODUCTS

2.1 SIGNS

A. Refer to Section 02891.

B. Use type and configuration as directed by the MOT plans.

2.2 VARIABLE MESSAGE SIGNS (VMS)

A. Advance warning device
   1. Conform to guidelines set forth in Section 6F.60 of the MUTCD.
   2. Messages can be changed on-site and by dial-up modem

PART 3 EXECUTION

3.1 MODIFICATION OF MOT PLANS

A. Engineer may modify the MOT plans at any time.

B. Implement changes to the MOT plan before the end of the work shift.

C. Each phase of construction must be covered by an approved MOT plan.
   1. Do not begin work until the proposed MOT plan is approved for use, and has been fully implemented.

3.2 TRAFFIC CONTROL DEVICES

A. Installation and Maintenance:
   1. Install appropriate devices for each construction phase as identified in the appropriate MOT plan.
   2. Maintain devices to provide proper, continuous functionality.
   3. Wash devices weekly unless conditions warrant more frequent cleaning.
   4. Replace any device missing any part of the message or background.

B. Channelizing Devices: Use as directed by the MOT plan.
   1. Furnish a daily record of the number and location of all traffic control devices in use.
   2. Remove devices from the site of work when they are not needed for the immediate control of traffic.

3.3 VARIABLE MESSAGE SIGN (VMS)

A. The Department retains control of messages appearing on the VMS. Do not change the location or the message configuration of the VMS unless directed to by the Engineer in writing.

B. Place in view of oncoming traffic without obstructing traffic flow. Relocate VMS to match field conditions at no additional cost to Department.

C. Provide dial-up modem number to the Engineer.

D. Use necessary traffic control devices with VMS to provide safe operation.

E. Remove devices from the site of work when they are not needed for the immediate control of traffic.

F. Unless directed by the Engineer, display advance notification VMS messages for a minimum of seven days prior to any traffic impacts such as start of work, change in traffic directions, etc. at each end of the project.

G. Make two additional VMS signs available at all times during the project to be used as directed by the Engineer at no additional cost to the Department.

3.4 COORDINATION OF SIGNAL OPERATIONS

A. Notify the Engineer seven days prior to implementing a MOT plan (detour plans and alternate route plans) or any traffic control plan that impacts signal operations to allow the Engineer to coordinate any necessary signal timing adjustments with the TOC (Traffic Operations Center).

B. Changes to traffic signal operations will be done by the Department.

END OF SECTION

July 8, 2016

SECTION 01727S

PRECONSTRUCTION SURVEY

Add Section 01727:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Procedures for documenting the existing condition of adjacent properties, prior to construction, in the areas defined under this specification.

B. Monitoring and control of vibrations adjacent to the project site that arises from soil compaction and other vibration-producing activities.

1.2 RELATED SECTIONS Not used

1.3 REFERENCES Not used

1.4 DEFINITIONS Not used

1.5 SUBMITTALS

A. Video surveys in electronic format with accompanying audio.

PART 2 PRODUCTS Not Used

PART 3 EXECUTION

3.1 PRECONSTRUCTION SURVEY

A. Prior to start of work in any given section, perform an existing condition survey of all adjacent properties to document the existing conditions.

B. Accomplish the survey under the direct supervision of a Utah licensed professional engineer familiar with construction work and practices.

C. Gain permission from the property owner for access to private property to document preconstruction conditions.
   1. Send a certified, return receipt requested introductory letter (wording to be reviewed by the Engineer) to inform the property owner of the survey and to request permission to survey the existing conditions.
   2. If the property owner refuses access, notify the Engineer and log all contacts with the property owner.

C. For each property surveyed, document the following conditions:
   1. All foundations, exterior, walls, interior walls and ceilings of buildings clearly and precisely showing and describing any existing damage.
      a. Document the lengths and widths of any existing cracks.
   2. Retaining walls
   3. Driveways
   4. Sidewalks
   5. Swimming pools
   6. Parking lots, and other auxiliary structures that may be at risk of damage due to construction activities.

D. Include in the documentation for each property the date, time, street address, parcel number, and people performing the survey
   1 . Include the names of any owners or owners' representatives.

END OF SECTION

July 7, 2016

SECTION 02072S

GEOGRID

Add Section 02072:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Roadway, roadway embankment, and similar applications.

1.2 RELATED SECTIONS Not Used

1.3 REFERENCES

A. ASTM D 4354: Practice for Sampling of Geosynthetics for Testing

B. ASTM D 4355-05: Standard Test Method for UV and Weather Degradation

C. ASTM D 4759: Practice for Determining the Specification Conformance of Geosynthetics

D. ASTM D 5732-01: Standard Test Method for Determining Flexural Stiffness

E. ASTM D 5818: Practice for Obtaining Samples of Geosynthetics from a Test Section for Assessment of Installation Damage

F. ASTM D 6637: Standard Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-rib Tensile Method

G. U.S. Environmental Protection Agency (U.S. EPA) EPA 9090: Compatibility Test for Wastes and Membrane Liners

H. GRI-GG2: Geosynthetic Institute Test for geogrids junction strength

1.4 DEFINITIONS

A. Geogrid – A biaxial polymeric grid formed by a regular network of integrally connected tensile elements with apertures of sufficient size to

allow interlocking with surrounding soil, rock, or earth to function primarily as reinforcement.

B. Minimum Average Roll Value (MARV) – Value based on testing and determined according to ASTM D 4759.

C. Multi-Layer Geogrid – A geogrid product consisting of multiple layers of grid which are not integrally connected throughout.

D. Traffic Benefit Ratio (TBR) is also known as Traffic Improvement Factor or TIF – A ratio comparing the performance of a pavement cross-section with a geogrid-reinforced base course to a similar cross-section without geogrid reinforcement, based on the number of cycles to failure with failure defined as a selected depth of rut.

E. True Tensile Strength – True resistance to elongation when initially subjected to load measured via ASTM D 6637 without deforming test materials under load before measuring such resistance or employing "secant" or "offset" tangent methods of measurement.

F. Welded Strip geogrid – A geogrid product formed by heat bonding (welding) discrete strips of polymer into a regular network.

G. Woven Geogrid – A geogrid product formed by weaving discrete strips of polymer into a network.

1.5 SUBMITTALS

A. Submit geogrid product sample approximately 4 inches by 7 inches or larger. Refer to ASTM D 4354.

B. Submit geogrid product data sheet and certification from the Manufacturer that the geogrid product supplied meets the requirements of this Section, Article 2.2 including Table 1.

C. Submit Manufacturer's installation instructions and general recommendations.

D. Submit the following to the Engineer at least 15 days before bid letting for alternate geogrid materials that do not meet the requirements of this Section, Article 2.2 including Table 1. The Engineer will respond within 10 days with a written justification to allow or disallow the requested alternate Geogrid. The Engineer will consult with the Region Pavement Design Engineer to decide on and approve the materials.

1. Full-scale laboratory and in-ground testing of pavement structures, in the United State, reinforced with the specific geogrid that quantifies the TBR or structural benefit of the product.
   a. Include full-scale independent research to substantiate the benefits of submitted research.
   b. The geogrid benefit must meet or exceed that of the design geogrid.
2. A list of five comparable projects that are similar in terms of size and application, are located in the United States, and where the results of using the specific alternate geogrid material can be verified after a minimum of five years of service life.
3. A sample 4 x 7 inches or larger.
4. Recommended installation instructions.
5. Additional information as requested by the Engineer to fully evaluate the product.

1.6 DELIVERY STORAGE AND HANDLING

A. Storage and Protection
   1. Prevent excessive mud, wet concrete, epoxy, or other deleterious materials from coming in contact with and affixing to the geogrid materials.
   2. Store at temperatures above -20 degrees F (-29 degrees C).
   3. Rolled materials may be laid flat or stood on end.
   4. Do not expose geogrid materials to direct sunlight for a period longer than recommended by the manufacturer.

1.7 QUALITY ASSURANCE

A. Pre-Construction Conference
   1. The Contractor will arrange a meeting at the site with the geogrid material supplier and where applicable, the geogrid installer before the installation of the geogrid.
   2. Notify the Owner and the Engineer at least three days in advance of the time of the meeting.

B. A representative of the geogrid supplier must be available on an “as needed” basis during construction.

1.8 ACCEPTANCE

A. The Department rejects geogrid at installation if it has defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transport, handling or storage.

PART 2 PRODUCTS

2.1 GENERAL

A. Synthetic fiber net at least 85 percent by weight of polypropylene, polyethylene, or polyester.

B. Resistant to chemical attack, rot, and mildew.

C. No tears or defects that will adversely alter properties of product.

2.2 ROADWAY AGGREGATE GEOGRID – SUBGRADE IMPROVEMENT

A. Geogrids are a regular network of integrally connected polymer tensile elements constructed with aperture geometry sufficient to permit significant mechanical interlock with the surrounding soil or rock.

B. Geogrids must also be dimensionally stable and able to retain their geometry under manufacture, transport, and installation.

C. Geogrids have the following properties:

Table 1

Geogrid Property Values for SUB-GRADE IMPROVEMENT Minimum Average Roll Values (MARV)					
Geogrid Properties	**Test Method**	**Type 1**		**Type 2**	
		Machine Direction MD[2]	**Perpendicular to Machine Direction XMD[2]**	**Machine Direction MD[2]**	**Perpendicular to Machine Direction XMD[2]**
Type of Geogrid		Punched and Drawn	Punched and Drawn	Punched and Drawn	Punched and Drawn
Rib Shape	Observation	Rectangular or Square	Rectangular or Square	Rectangular or Square	Rectangular or Square
Rib Thickness	Nominal Dimensions	Minimum - 0.03 inch	Minimum – 0.03 inch	Minimum - 0.05 inch	Minimum – 0.05 inch
Nominal Aperture Size	I.D. Callipered	1.0 - 1.3 inch	1.0 -1.3 inch	1.0 - 1.3 inch	1.0 - 1.3 inch
Tensile Strength@2% Strain	ASTM D 6637-09[1]	Minimum – 280 lb/ft	Minimum – 450 lb/ft	Minimum – 410 lb/ft	Minimum – 620 lb/ft
Tensile Strength@5% Strain	ASTM D 6637-09[1]	Minimum – 580 lb/ft	Minimum – 920 lb/ft	Minimum – 810 lb/ft	Minimum – 1340 lb/ft
Ultimate Tensile Strength	ASTM D 6637-09[1]	Minimum – 850 lb/ft	Minimum – 1300 lb/ft	Minimum – 850 lb/ft	Minimum – 1300 lb/ft
Junction Efficiency[3]	GRI-GG2-05	93%		93%	
Flexural Stiffness[4]	ASTM 5732-01	250,000 mg-cm		750,000 mg-cm	
Aperture Stability[5]	Army Corp of Engineer(Tensional Rigidity)	0.32 m-N/deg			
Resistance to Installation Damage[6]	ASTM D 5818-06, ASTM D 6637-09[1]	95 / 93 / 90 %AC/%SW/%GP		95 / 93 / 90 %AC/%SW/%GP	
Resistance to Long Term Degradation[7]	EPA 9090	100%	100%	100%	100%
Resistance to UV Degradation[8]	ASTM D4355-05	100%	100%	100%	100%

1. Resistance to elongation when initially subjected to load measured via ASTM D 6637 without deforming test materials under load before measuring such resistance or employing “secant” or “offset” tangent methods of measurement.
2. Unless indicated otherwise, values shown are minimum average roll values (MARV) determined in accordance with ASTM D 4759.
3. Load transfer capability determined according to GRI-GG2-05 and express as a percentage of the ultimate tensile strength.
4. Resistance to bending force determined according to ASTM D 5732-01, using specimens of width two ribs wide, with transverse ribs cut flush with exterior edges of longitudinal ribs (as a “ladder”) and of length sufficiently long to enable measurement of the overhang dimension. The overall Flexural Stiffness is calculated as the square root of the product of MD and XMD Flexural Stiffness value.
5. Resistance to in-place rotational movement measured by applying a 20 kg-cm(2m-N) moment to the central junction of a 9 inch X 9 inch specimen restrained at its perimeter according with the U.S. Army Corps of Engineers Mythology for measurement of Tensional Rigidity.
6. Resistance to loss of load capacity of structural integrity when subjected to mechanical installation stress in clayery sand (SC), well graded sand(SW) and crushed stone classified as poorly graded gravel(GP). The geogrids will be sampled according to ASTM D 5818-06 and load capacity will be determined according to ASTM D 6637-09.
7. Resistance to loss of load capacity or structural integrity when subject to Chemical aggressive environments according to EPA 9090 immersion testing.
8. Resistance to loss of load capacity or structural integrity when subject to 500 hours of ultraviolet light and aggressive weathering according to ASTM D 4355-05.

D. Acceptance Requirements:
   1. Base the actual minimum average roll values furnished by the manufacturer on representative test results from the manufacturing plant that produced the geogrid.
   2. Meet or exceed each of the specified minimum values.
   3. Clearly label all geogrids as being part of the same production run certified as meeting all applicable requirements.

PART 3 EXECUTION

3.1 GRANULAR BASE REINFORCEMENT

A. Place geogrid at the proper elevation and alignment as shown on the construction drawings.

B. Provide minimum overlap per manufacturer's recommendations.

C. Install geogrid according to the guidelines provided by the manufacturer or as directed by the Engineer.

D. Geogrid may be temporarily secured in place with ties, staples, pins, sand bags, or backfill as required by fill properties, fill placement, weather conditions, or as directed by the Engineer.

E. Place, spread, and compact granular fill material in such a manner that minimizes the development of wrinkles in or movement of the geogrid.

F. Replace at no additional cost to the Department any roll of geogrid damaged before, during, or after installation.
   1. Proper replacement consists of replacing the affected area and overlapping the geogrid one foot on all sides adjacent to the damaged area.
   2. Follow ASTM D 5818 for exposure and retrieval damages done during installation of evaluation samples.

3.2 PROTECTION

A. A minimum loose fill thickness of six inches is required before operation of tracked vehicles over the geogrid.
   1. Keep the turning of tracked vehicles to a minimum to prevent tracks from displacing the fill and damaging the geogrid.
   2. Rubber-tired equipment may pass over the geogrid reinforcement at slow speeds (less than 10 mph) when integrally-formed geogrids are used if subgrade conditions permit.

3. Do not use rubber-tired equipment directly on the geogrid when woven, multi-layer, or welded strip geogrids are used.
4. Avoid sudden braking and sharp turning movements.

END OF SECTION

January 12, 2012

SECTION 02216S

POTHOLE UTILITY

PART I GENERAL

1.1 SECTION INCLUDES

A. Procedure for pot holing utilities during construction activities.

1.2 RELATED SECTIONS

A. Section 01721: Survey

1.3 REFERENCES

A. CI/ASCE 38-02: Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data

1.4 DEFINITIONS Not Used

1.5 SUBMITTALS Not Used

PART 2 PRODUCTS Not Used

PART 3 EXECUTION

3.1 PREPARATION

A. Locations of utilities shown on the plans are approximate and based only on a record search by local controlling agencies and are for general guidance.

B. Use potholing to verify location, elevation and type of existing buried utilities.

C. Contact Blue Stakes before excavating or potholing.

D. Pothole locations of possible conflicts including excavation, pipe culvert extensions, catch basins, and other construction as requested by the Contractor or as directed by the Engineer in writing.

E. Use vacuum excavation or other methods that protect the integrity of the potholed utility.

F. Cooperate with the utility companies to protect their facilities.

G. Adhere to OSHA health and safety practices

H. Request potholing in writing from the Engineer at least 21 calendar days before potholing. Inform the Engineer 24 hours prior to any pothole. Pothole and backfill utility in the presence of the Engineer.

3.2 RECORDS

A. Record coordinates of elevation and horizontal position, owner, material, size, number of ducts, casings and any other information relevant to identifying and establishing utility.

B. Provide written documentation to the Engineer within 72 hours of potholing. Tie all coordinates and benches into the project coordinate system.

3.3 RESPONSIBILITY OF DAMAGED UTILITY

A. The Contractor is solely responsible for any damage to utility facilities resulting from pothole operations. In the event of utility damage, stop work and immediately notify the appropriate agencies, including the utility owner. No compensation for any delays to the project schedule resulting from damages, repair time, materials or any other circumstance due to damages will be made.

3.4 BACKFILL AND CLEAN-UP

A. Backfill potholed utility according to utility owner's specifications when outside of roadway prism. If pothole is within the roadway prism, then backfill according to the most restrictive of either the Department's or the utility owner's specifications. Backfill within 24 hours or as otherwise directed.

B. Backfill potholed utility to the same depth and materials of surrounding pavement or terrain.

C. Provide complete cleanup of the work to equal or better condition than existing prior to potholing.

END OF SECTION

July 7, 2016

SECTION 02332S

LIGHTWEIGHT AGGREGATE BORROW

Add Section 02332:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Supply lightweight aggregate borrow consisting of scoria, pumice, expanded shale, or steel slag for use in roadway embankments. Haul, place, and compact in accordance with these specifications.

B. Obtain material from a qualified source that has been tested to meet the specified requirements and Utah State Environmental Laws for embankment fill.

1.2 RELATED SECTIONS

A. Section 02056: Embankment, Borrow and Backfill

B. Section 02075: Geotextiles

1.3 ACCEPTANCE

A. Provide the Department a certified test report from the material supplier, showing all data required to indicate compliance with the specifications.

B. The Department or its designated representative may sample and/or test any portion of lightweight aggregate borrow that appears non-uniform or non-conforming.

C. Reject any fill product that does not meet requirements of this section.

D. Remove any product found defective after installation and install acceptable product at no additional cost to the Department.

1.4 QUALITY CONTROL

A. The Department or its designated representative will monitor conformance of the lightweight aggregate borrow with the specification requirements.

B. Remove products found defective after installation and install acceptable products at no additional costs to the Department.

1.5 SUBMITTALS

A. Submit technical information (both physical and chemical) to the Department that clearly demonstrates that the proposed material can withstand exposure to the elements without a loss of integrity over a minimum period of 75 years.

PART 2 PRODUCTS

2.1 PUMICE

A. Lightweight aggregate borrow consisting of pumice.

B. Chemically inert, durable, and free draining.

C. Target compacted moist density: 75-85 pounds per cubic foot (pcf)

D. Meet the following gradation:

Table 1

Sieve Size	Percent Passing
4 inch	100
1 ½ inch	80-100
3/8 inch	50-100
No. 4	10-90
No. 16	0-65
No. 50	0-40
No. 200	0-15

2.2 SCORIA

A. Lightweight aggregate borrow consisting of scoria.

B. Chemically inert, durable, and free draining.

C. Target compacted moist density: 62-75 pcf.

D. Meet the following gradation:

Table 2

Sieve Size	Percent Passing
3 inch	100
1 ½ inch	80-100
3/8 inch	40-100
No. 4	10-70
No. 16	0-40
No. 50	0-25
No. 200	0-15

2.3 STEEL SLAG

A. Lightweight aggregate borrow consisting of steel slag.

B. Chemically inert, durable, and free draining.

C. Target compacted moist density: 85-100 pcf

D. Meet the following gradation:

Table 3

Sieve Size	Percent Passing
3 inch	100
1 ½ inch	80-100
3/4 inch	20 – 100
3/8 inch	0 – 20
No. 4	0 - 10
No. 200	0 - 3

2.4 EXPANDED SHALE

A. Lightweight aggregate borrow consisting of expanded shale, clay, or slate.

B. Chemically inert, durable, and free draining.

C. Target compacted moist density: 50-70 pcf

D. Meet one of the following gradations:

Table 4

Sieve Size	**Percent Passing**	
	Coarse	**Medium**
3 inch	100	
1 inch	70-100	
3/4 inch	55-100	100
3/8 inch	40-100	80-100
No. 4	0-30	0-30
No. 50	0-15	0-15
No. 200	0-8	0-8

2.5 SEPARATION GEOTEXTILE

A. See Section 02075.

PART 3 EXECUTION

3.1 GENERAL

A. Do not extend lightweight aggregate borrow into the untreated base course. Cover side-slopes consisting of lightweight aggregate borrow in accordance with the landscape plans.

B. Cover the final surface of the lightweight aggregate borrow with Separation Geotextile.

3.2 TEST FILL PROCEDURES

A. Prior to using the material on the project, construct a test fill that is at least 30 feet by 60 feet in plan and 5 feet high using the lightweight aggregate material.

B. Place the material as specified in Article 3.3 and compact to a target moist unit weight equal to 96 percent of the maximum laboratory density as determined by AASHTO T-99.

C. Compact the test lifts with various numbers of passes with a small vibratory drum roller (such as a Cat CS-433C), at low amplitude; or a medium vibratory drum roller (such as a Cat CS- 563C), at low amplitude.

D. The Department will evaluate and approve the test fill to determine the production compaction methods to be used for the material.

3.3 CONSTRUCTION PROCEDURES

A. Place the lightweight aggregate borrow in uniformly thick lifts with a maximum loose thickness of 12 inches.

B. Place steel slag or scoria lightweight aggregate borrow at a moisture content high enough to obtain compaction while remaining below the maximum allowable average compacted moist in-place density.

C. Do not add any moisture to lightweight pumice aggregate, unless specifically approved by the Engineer.
   1. Cover stockpiles of pumice aggregate and keep covered during periods of anticipated significant precipitation.

E. Compact the lightweight aggregate using either smooth-drum vibratory, or track-mounted equipment having an operating weight no greater than 13 tons.
   1. Implement necessary measures to avoid crushing the aggregate.
   2. If crushing occurs, adjustments to the compaction equipment, lift thickness, and/or the number of passes may be required.

E. Conduct in-place density testing as described in Article 3.5.
   1. Average in-place moist density: no greater than the maximum target compacted moist density for the lightweight aggregate borrow supplied, unless approved by the Department.
   2. Maximum in-place moist density in a single area: no more than 2 pcf greater than that specified maximum target compacted moist density.

F. If test results show moist densities less than the minimum target compacted moist density for the lightweight aggregate borrow supplied, the results will be evaluated by the Department.

3.4 COMPACTION TESTING EQUIPMENT CORRECTION FACTOR

A. Perform density calibration testing on the lightweight aggregate borrow prior to use to determine accuracy and possible adjustment factors to be used for nuclear density testing of the lightweight material densities during production placement.
   1. The testing will consist of the Contractor constructing a box of known capacity (at least 13 cu ft, such as 3 x 3 x 1.5 ft) and compacting the lightweight aggregate into the box at varying compactive efforts as requested by the Department.
   2. The Department will conduct direct transmission density tests with the nuclear densometer gage for at least five locations in the box.
   3. At each test location, three readings will be taken by rotating the gage by 120 degrees between each reading.
   4. The readings given by the nuclear densometer gage be compared with the known weight of the material in the box to identify an appropriate correction factor for that (each) specific gage.
   5. A densometer gage that thas been calibrated by the above procedure will be used to calibrate additional gages by comparative testing in the same lightweight aggregate material.

3.5 COMPACTION TESTING PROCEDURES

A. Use a densometer gage that has a known correction factor for the lightweight aggregate borrow supplied in the direct transmission method to test the density of the compacted production material.
   1. Wherever possible, extend the densometer probe a minimum of 12 inches.
   2. Do not use backscatter to evaluate the density of the compacted material.

B. Testing frequency will be as a minimum, in accordance with Section 02056.
   1. Perform testing to represent the entire vertical extent of the lift.

C. The maximum allowable variation in moist density within a single lift at any one site is 8 pcf for the lightweight aggregate borrow.

END OF SECTION

July 8, 2016

SECTION 02334S

EPS GEOFOAM FILL

Add Section 02334:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials for furnishing, fabricating, and placing expanded polystyrene (EPS) "Geofoam" fill.

1.2 RELATED SECTIONS

A. Section 02056: Embankment, Borrow, and Backfill

B. Section 02231: Site Clearing and Grubbing

C. Section 03211: Reinforcing Steel and Welded Wire

D. Section 03310: Structural Concrete

E. Section 03924: Structural Concrete Repair and Sealing

1.3 REFERENCES

A. ASTM D 751 Standard Test Methods for Coated Fabrics

B. ASTM D 814 Standard Test Method for Rubber Property-Vapor Transmission of Volatile Liquids

C. ASTM D 1621 Standard Test Method for Compressive Properties of Rigid Cellular Plastics

D. ASTM D 2136 Standard Test Method for Coated Fabrics—Low-Temperature Bend Test

E. ASTM D 6817 Standard Specification for Rigid Cellular Polystyrene Geofoam.

1.4 SUBMITTALS

A. Submit working drawings and design calculations to the Engineer for approval, prepared and signed by a licensed professional engineer (referred to as the EPS engineer), for the EPS geofoam fill and load distribution slab construction.

B. Include plans, profiles, cross-sections, quantities, and details that address the following:
   1. Locations, types, and minimum compressive resistance of EPS geofoam used.
   2. A cast-in-place concrete load distribution slab.
      a. Do not use a precast load distribution slab without prior written approval from the Department.
   3. Provisions for facilities which penetrate the EPS geofoam blocks and load distribution slab (including, but not limited to, drainage catch basins, piping, utilities, and other buried facilities).
   4. Gradual transitions (at slopes no steeper than 4H:1V) between EPS geofoam fill and other embankment fill.
   5. Methods, sequence, and equipment for placing the EPS geofoam blocks and load distribution slab.
   6. Methods of providing continuity across horizontal and vertical planes.
   7. Other applicable protective measures.

C. Allow up to three weeks for the Engineer's review. Within this time, the Engineer will provide either written acceptance of the submittals, with any exceptions noted, or notification the submittals are insufficient.
   1. Upon receiving notification the submittals are insufficient, provide new submittals and allow another two-week period for the Engineer's review.
   2. Do not start EPS geofoam fill and load distribution slab construction prior to receiving full written acceptance by the Engineer.
   3. Working drawings do not supersede the contract drawings.

D. Provide the Engineer with a certified test report from the manufacturer showing all data required to indicate compliance with specifications.

E. Submit a quality assurance plan for testing EPS geofoam blocks to the Engineer.

F. Material Submittals
   1. EPS Geofoam
      a. Provide certification as directed in Specification ASTM D 6817.
      b. Submit sampling and testing results to the Engineer for approval.
   2. Hydrocarbon-resistant Geomembrane
      a. Provide certificate of compliance stating that the hydrocarbon-resistant geomembrane has been tested and satisfies the requirements of this specification.
   3. Structural Concrete
      a. Refer to Section 03310.
   4. Reinforcing Steel and Welded Wire
      a. Refer to Section 03211.

1.5 SAMPLING AND TESTING

A. Complete quality assurance testing and sampling to monitor the conformance of EPS geofoam blocks to the specification requirements.

B. Conduct compressive resistance testing per ASTM D 6817.

C. The Engineer has the right to randomly sample EPS geofoam blocks and reject EPS geofoam blocks that do not conform to the physical requirements or that are damaged in any way.

D. Conduct field sampling to ensure dimensional tolerances and density at regular intervals as directed by the Engineer.

1. Conduct quality control testing for density and geometry using full-sized EPS geofoam blocks.
2. Only use EPS geofoam blocks in conformance with contract requirements for construction.
3. Test and evaluate EPS geofoam block quality and stability prior to shipment of the first EPS geofoam block delivery to the project site.
   a. Test a minimum of 10 samples per 500 cubic yards of material.
   b. Testing can be performed with either a 2-inch by 2-inch by 2-inch cube or a 12-inch by 12-inch by 12-inch cube.
   c. Use ASTM D 1621 to test and evaluate product stability.
   d. Take ten samples from every delivery for the first 15 trucks.
   e. If all samples tested from the first 15 trucks meet the specifications, the Engineer may approve a reduction of the testing frequency to one batch of 10 samples every 500 cubic yards of the material remaining to be delivered.

PART 2 PRODUCTS

2.1 MATERIALS

A. Geofoam
1. Fabricate EPS geofoam blocks using virgin feedstock manufactured into blocks having no more than five percent regrind content.
2. Use EPS geofoam blocks with the following minimum dimensions:
   a. 36 inches high
   b. 48 inches wide
   c. 144 inches long
   d. These are typical minimum dimensions for blocks within the EPS geofoam mass, and may be altered in the working drawings to account for vertical and horizontal geometry on the edges of the geofoam fill.
3. Use EPS geofoam blocks that meet the requirements of ASTM D 6817.
4. Provide EPS geofoam blocks that have the minimum compressive resistance shown on the plans.

5. Use EPS geofoam blocks with flame retardant additives that meet or exceed UL Certifications of Classification as to External Fire Exposure and Surface Burning Characteristics.
6. Use EPS geofoam blocks treated to prevent insect attack as directed by the manufacturer and as approved by the Engineer.

B. Geofoam Design
1. Design each EPS geofoam fill embankment to behave as a single entity during a seismic event.
2. Provide continuity across continuous horizontal and vertical planes.
3. Design and detail shear keys in the working drawings.
   a. This may be accomplished by offsetting blocks within the fill.

C. Hydrocarbon-Resistant Geomembrane
1. Provide geomembrane acceptable for spill containment of hydrocarbons including automobile gasoline, diesel fuel, concrete curing compound, coal tar pitch, asphaltic mastic compound, kerosene, hydraulic fluid, methanol ethanol, mineral spirits and naphtha.
2. Provide geomembrane free from pinholes, tears, and other defects which would cause leakage of liquids through the geomembrane.
3. Provide geomembrane that is flexible and, by its own weight, covers and conforms closely to 90 degree edges and corners of geofoam blocks at ambient temperatures above 45 degrees Fahrenheit without additional heating of the geomembrane.
4. Provide geomembrane that is reinforced or unreinforced.
5. Provide geomembrane manufactured from a tri-polymer of polyvinyl chloride, ethylene interpolymer alloy, and polyurethane or a comparable polymer combination.
6. Provide geomembrane that meets the following physical and chemical requirements:

Table 1

Test Designation	Property	Allowable	Comments
ASTM D 751	Thickness	> 28 mills	
ASTM D 814	Transmission rate	< 0.4 ounces per square foot per 24 hours	
ASTM D 751	Grab tensile strength	> 600 lbs	2 inch grip, 4 inch by 8 inch sample
ASTM D 751	Elongation at break	> 20%	
ASTM D 751	Puncture resistance	> 800 lbs	
ASTM D 2136	Cold crack	No cracking for 4 hours at 30 degrees Fahrenheit	
ASTM D 751	Bonded seam width	> 2 inches	
ASTM D 751	Shear	> 320 lbs	Modified per National Sanitation Foundation Standard 54

7. Replace, at no additional cost, all damaged geomembrane.

2.2 QUALIFICATIONS

A. Use geofoam provided by a manufacturer demonstrating experience in manufacturing EPS geofoam blocks similar to those indicated in the contract documents, a successful record of in-service performance, and sufficient production capacity to produce the required quantity.

B. Use an installer with experience in the installation and handling of EPS geofoam on a minimum of three projects of similar scope within the past five years.

C. Use an EPS engineer having experience in the design and installation of EPS on a minimum of three projects of similar scope within the past five years.

PART 3 EXECUTION

3.1 SUBGRADE PREPARATION

A. Clear and grub site per Section 02231. Remove soft or unstable soil and soil particles or rock larger than coarse gravel.

B. Excavate as shown on the plans. Grade to elevations shown on the plans with vertical deviations no greater than 0.4 inches in 10 feet.

C. Remove any standing water or accumulations of snow or ice before placing EPS geofoam blocks.

3.2 PLACE STRUCTURAL FILL

A. Place, compact, and grade 8 inches minimum thickness of granular backfill borrow per plans and Section 02056.

B. Level granular backfill borrow material to plus or minus 1/4 inches vertical per 10 feet horizontal.

3.3 PROTECTION

A. Prevent damage to the EPS geofoam blocks during storage and construction per manufacturer's recommendations and as directed by the Engineer.

B. Care for and handle EPS geofoam blocks per manufacturer's specifications and as directed by the Engineer.

C. Cover any EPS geofoam block that will be exposed to the sun for more than 90 days with opaque material.

D. Protect EPS geofoam blocks from petroleum based solvents such as gasoline or diesel fuel.

E. EPS is considered combustible and should not be exposed to open flame or any ignition source.

F. Correct damage to EPS geofoam blocks as follows, unless otherwise recommended by the EPS engineer and approved by the Engineer:
   1. Slight Damage - Leave in place any EPS geofoam blocks damaged less than 17 cubic inches with no linear dimension greater than 1 foot.
   2. Moderate Damage - Fill with sand any EPS geofoam blocks damaged less than 50 cubic inches with no linear dimension greater than 3 feet 4 inches.
   3. Replace any EPS geofoam block with damage exceeding the Moderate Damage level.
   4. Damaged EPS geofoam blocks may be cut and the undamaged portion used within the EPS geofoam fill, provided the undamaged portion of the EPS geofoam block meets all other requirements.

G. Address safety implications of slippery EPS geofoam surfaces that may occur during wet or cold conditions during construction.

H. Place hydrocarbon-resistant geomembrane in such a way that the EPS geofoam blocks are not damaged.

I. Do not allow construction equipment or vehicles directly on the EPS geofoam blocks or the hydrocarbon-resistant geomembrane.

J. Provide temporary weighting or guying such to temporarily restrain EPS geofoam blocks against wind.

3.4 PLACEMENT

A. Place EPS geofoam fill to the lines and grades as shown in the plans and as directed by the Engineer.

B. Trim all EPS geofoam blocks in the shop as necessary so that all surfaces are smooth and flat and are within tolerance of 0.5% of respective height, width, and length dimensions.

C. Trim in the shop or the field as necessary to match the geometry of the fill being constructed.

D. Construct rows of EPS geofoam blocks that are to receive additional EPS geofoam blocks with a surface variation tolerance of no more than 0.05 feet in any 10-foot interval.

E. Accurately fit adjacent EPS geofoam blocks within a tolerance of 1 inch per vertical joint.

F. Step EPS geofoam fill finished grade a maximum of 2-foot intervals.

G. Trim EPS geofoam blocks in the shop or in the field to construct a 3:1 slope between steps at the top of the EPS geofoam fill finished grade.

H. Use a saw or hot wire to trim EPS geofoam blocks. Alternative cutting methods may be used with approval of the EPS manufacturer.

I. Place final course of EPS geofoam blocks to a finished grade tolerance of plus 0 inches to minus 2 inches over the entire surface.

J. Place each consecutive rows of EPS geofoam blocks rotated 90 degrees in the horizontal plane from the previously placed row to form 2 feet minimum running bond offset.

K. Consecutive vertical joints less than 2 feet apart are not allowed with the exception of the vertical joints at the phasing line shown in the plans.

L. Do not place EPS geofoam blocks on frozen subgrade.

M. Do not place EPS geofoam blocks above EPS geofoam blocks on which ice has developed on the surface.

N. Do not place EPS geofoam blocks when wind speeds exceed 40 mph.

O. Reinforcing steel supports (dobies) are permissible to support reinforcing steel during construction of load distribution slab with approval by the Engineer.

P. Do not use “gripper plates” or steel plates that pierce the EPS geofoam blocks during construction.

3.5 CAST-IN-PLACE LOAD DISTRIBUTION SLAB

A. Construct load distribution slab per Section 03211, Section 03310, and as shown in the roadway plans and/or EPS Geofoam working drawings.

B. Seal all cracks per Section 03924.

END OF SECTION

July 8, 2016

SECTION 02342S

SHOTCRETE

Add Section 02342:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials and procedures for producing shotcrete.

1.2 RELATED SECTIONS

A. Section 03055: Portland Cement Concrete

B. Section 03211: Reinforcing Steel and Welded Wire

C Section 09981: Concrete Coating

1.3 REFERENCES

A. AASHTO M 6: Standard Specification for Fine Aggregate for Hydraulic Cement Concrete

B. AASHTO M 80: Standard Specification for Coarse Aggregate for Hydraulic Cement Concrete

C. AASHTO T 11: Standard Method of Test for Materials Finer Than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing

D. AASHTO T 23: Standard Method of Test for Making and Curing Concrete Test Specimens in the Field

E. AASHTO T 24: Standard Method of Test for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete

F. AASHTO T 27: Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates

G. AASHTO T 96: Standard Method of Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

H. AASHTO T 121: Standard Method of Test for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete

I. AASHTO T 141: Standard Method of Test for Sampling Freshly Mixed Concrete

J. AASHTO T 152: Standard Method of Test for Air Content of Freshly Mixed Concrete by the Pressure Method

K. AASHTO T 196: Standard Method of Test for Air Content of Freshly Mixed Concrete by the Volumetric Method

L. ACI 506R: Guide to Shotcrete

M. ACI 506.2: Specifications for Proportioning Application of Shotcrete

N. ASTM C 1077: Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation

O. ASTM C 1140: Standard Practice for Preparing and Testing Specimens from Shotcrete Test Panels

1.4 DEFINITIONS

A. Shotcrete: Mortar or concrete pneumatically projected into a surface at high velocity.

B. Dry-mix process: Shotcrete in which most of the water is added at the nozzle.

C. Wet-mix process: Shotcrete in which plastic concrete with cement, aggregate, and water are first mixed together before introduction into the delivery hose.

D. Lean or separated shotcrete: Condition in which voids (honeycomb) in the shotcrete binder are visible on a shotcrete surface.

E. Fiber-reinforced shotcrete: Shotcrete mixed with discrete discontinuous fibers commonly made of steel, plastic, or alkali-resistant glass.

F. Rebound: Shotcrete constituents that fail to adhere to the surface on which the shotcrete is being applied.

G. Overspray: Shotcrete material deposited away from the intended receiving surface by air blast.

H. Gun finish: Undisturbed final layer of shotcrete as applied from nozzle without hand finishing; also known as natural or nozzle finish.

I. Primary support: Soil nails, welded wire mesh, reinforcing steel, or shotcrete or any combination thereof, installed in any excavation that renders the excavation safe for any subsequent occupation of the excavated space.

J. Additives: Any material added to the basic constituents (cement, water aggregates) of shotcrete mix. Additives may include fibers, admixtures, and cement extenders. They may be added before or during mixing, or immediately prior to shotcrete application.

K. Nozzle operator: Worker on shotcrete crew who manipulates the nozzle, controls consistency of dry-mix shotcrete, and controls final disposition of the material.

1.5 SUBMITTALS

A. Submit shotcrete mix design with mix proportions; aggregate source and grading; cement type and brand; and water source. If hydration stabilizing/extended-set admixtures are proposed, provide type, dosage, and discharge time limit.

B. Submit compressive test results for the proposed mix design using the intended wet-mix or dry-mix process, 30 calendar days prior to the start of work.

C. Submit compressive test results and core grades from test panels within 5 calendar days of core removal from field.

1.6 ACCEPTANCE

A. Based on visual inspection, quality control testing, and materials certifications.

B. Perform quality control testing in accordance with Table 1.

C. Shotcrete compressive strengths meet criteria for shotcrete mix design.

Table 1

Sampling and Testing Schedule			
Property or Characteristic	**Test Methods or Specifications**	**Frequency**	**Sampling Point**
Air Content	AASHTO T 152 or AASHTO T 196	1 per load[1]	Truck, mixer, or agitator[2]
Unit Mass	AASHTO T 121	1 per load[1]	Truck, mixer, or agitator[2]
Compressive Strength	AASHTO T 23	1 set per 50 cy; at least one set per day	Production test panels[3]

[1]When continuous mixing is used, sample every 10 cy.
[2]Sample according to AASHTO T 141.
[3]A single compressive strength test result is the average result from two 3-inch diameter core specimens from the same test panel tested according to AASHTO T 23 at 28 days.

C. Shotcrete that has been damaged by frost, or which lacks uniformity, exhibits segregation, honeycombing, lamination with a shotcrete stage, shows excessive cracking or fails to meet the strength and toughness requirements specified herein is considered defective.
   1. Remove and replace defective shotcrete unless the Engineer indicates otherwise.

D. If samples are taken from the structure, the patch areas used for sampling and testing for compressive strength and other properties immediately after samples have been removed.

E. Test Panels.
   1. Produce a test panel for every 50 cubic yards of each different shotcrete mix placed.
   2. Meet ASTM C 1140 Standard Practice for Preparing and Testing Specimens from Shotcrete Test Panels.
   3. Construct test panels in the same manner as that being used on the project, including distance from nozzle, angle and orientation.
   4. Cure test panels in similar conditions to those anticipated in the field
   5. Field cure test panels until test specimens are taken.

F. Field Compressive Strength.

1. The field compressive strength will be determined from at least three test specimens from each test panel in accordance with ASTM 1140.
2. Remove the test specimens at no more than 26 calendar days age and at an age approved by the Engineer.
3. The test specimens will be cylindrical cores with a diameter of 2 inches, stored in watertight plastic bags and labeled with the project number, test panel number and date of placement.

PART 2 PRODUCTS

2.1 AIR-ENTRAINING ADMIXTURE (WET MIX ONLY)

A. Refer to Section 03055.

B. Air entrainment not to exceed 4% as shot, and 8 to 10% at the pump.

2.2 CHEMICAL ADMIXTURE (WET MIX ONLY)

A. Refer to Section 03055

2.3 BLENDED HYDRAULIC CEMENT

A. Refer to Section 03055

2.4 POZZOLANS

A. Refer to Section 03055

2.5 AGGREGATE

A. Conform to the mix design for a mortar or small-aggregate concrete meeting the minimum compressive strength requirements.

PART 3 EXECUTION

3.1 SHOTCRETE GENERAL REQUIREMENTS

A. Conform to the following:
1. ACI 506R: Guide to Shotcrete
2. ACI 506.2: Specifications for Proportioning Application of Shotcrete
3. Section 03055

3.2 MIX DESIGN

A. Conform to Table 2.

Table 2

Shotcrete Composition				
Type of Shotcrete Process	**Minimum Cement Content**	**Maximum W/C[1] Ratio**	**Air Content Range**	**Minimum 28-day Compressive Strength[2]**
Units	**lb/cy [2]**	**-**	**%**	**psi**
Wet	550	0.55	NA	4,000
Dry	550	0.50	NA	4,000
Wet (with EA)	550	0.45	5 min.	4,000
Dry (with EA)	550	0.45	5 min.	4,000

[1]Water/Cement by weight
[2]According to AASHTO T 23. Mean compressive strength of three cube samples, with no single result less than 0.88 x 4,000 psi. If cores are tested, mean compressive strength of 0.85 x 4,000 psi required, with minimum value of 0.75 x 4,000psi.
NA = Not applicable
EA = Entrained air

B. Use the amount of water required to produce shotcrete of suitable strength, consistency, quality, and uniformity with the minimum amount of rebound.

C. Use the same material types and sources as submitted with the mix design in the field trials and production work.

D. Hydration stabilizing admixtures
   1. Allowed to extend shotcrete delivery time
   2. Base dosage on time needed to delay initial shotcrete set for delivery and discharge on the job
   3. Determine dosage using job site material and field trial mixtures
   4. Extended-set admixture controls the hydration of all cement minerals and gypsum
   5. Deliver and place shotcrete mix within the approved design discharge time limit.
   6. If required, use an approved and compatible hydration activator at the discharge site to insure proper placement and testing.

E. When requested, provide the service from a qualified representative of admixture manufacturer to assist in establishing proper dose of extended-set admixture and to make dosage adjustments required to meet changing job site conditions.

3.3 TEST PANELS

A. Successfully construct test panels prior to starting shotcrete production.

B. Notify the Engineer and allow the Department to witness all phases of test panel construction.

C. Produce test panels for each proposed mix design, each anticipated shooting orientation, and each proposed nozzle operator.

D. In half of the test panels, provide reinforcement of the same size and spacing required for the work.

E. Forms and Construction
   1. Construct wood forms for test panel at least 6-inch thick by 3 ft by 3 ft in size.
   2. Construct separate wood forms for reinforced and unreinforced test panels.

F. Testing
   1. Drill 6 3-inch diameter cores, 3 reinforced and 3 non-reinforced, from each test panel according to AASHTO T 24 to make cylinders at least 3-inch long.
   2. Test the non-reinforced samples for compliance with the specified physical properties in accordance with AASHTO T 23.
   3. Visually grade the reinforced cores for compliance with specified core grade in ACI 506.2 Part 1.7.
   4. Only nozzle operators with a test panel mean core grade less than or equal to 2.5 may place shotcrete. If not initially achieved, a proposed nozzle operator may shoot a second set of test panels.
   5. Satisfy all specified strength requirements.

G. The Engineer will accept or reject the shotcrete mix design based on the results of the test panel construction and testing.
   1. The Department may require additional test panel construction and testing at no additional cost.

END OF SECTION

July 8, 2016

SECTION 02455S

DRIVEN PILES

Delete Section 02455 and replace with the following:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials, equipment and procedures for driving steel piles.

1.2 RELATED SECTIONS

A. Section 03055: Portland Cement Concrete

B. Section 03211: Reinforcing Steel and Welded Wire

1.3 REFERENCES

A. AASHTO M 31: Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

B. AASHTO M 270: Structural Steel for Bridges

C. ASTM A 252: Welded and Seamless Steel Pipe Piles

D. ASTM D 4945: High Strain Dynamic Testing of Piles

E. AASHTO/AWS Welding Specifications

1.4 DEFINITIONS Not used

1.5 SUBMITTALS

A. Complete and submit the “Pile and Driving Equipment Data” form located at the end of this Section for each proposed hammer and pile/structure combination.

1. Provide all data in the form necessary to perform a pile driving wave equation analysis, together with preliminary schedule for driving.

2. Include the results of a wave equation analysis and drivability evaluation by the Design-Builder's Geotechnical Engineer demonstrating that the proposed equipment is suitable for driving the piles.
3. Include Manufacturer's product data, specifications, and recommended installation instructions for the submitted pile hammer.

PART 2 PRODUCTS

2.1 PIPE PILE SHELLS

A. Use new pipe pile shells having wall thickness as shown on plans.

B. Meet requirements for ASTM A 252 steel, for either Grade 2 (normal strength) or Grade 3 (high strength) steel.

2.2 STEEL HP SECTION PILES

A. Follow AASHTO M 270 for Grade 36 or 50 steel, as specified in the plans.

2.3 PORTLAND CEMENT CONCRETE

A. Class A(AE) Concrete following Section 03055.

2.4 REINFORCING STEEL

A. Meet AASHTO M 31, Grade 60.

B. Follow requirements in Section 03211.

2.5 PILE DRIVER

A. Verify the equipment can drive piles to the required ultimate driving resistance without damage or without requiring an excessive number of blows to achieve the required tip elevation and capacity before mobilizing pile driver to the site, in accordance with this Section, article 1.5, paragraph A.

B. Mobilize pile driver to the site only after the Design Builder's Geotechnical Engineer indicates that acceptable results of the wave equation analysis have been obtained in accordance with this Section, article 1.5, paragraph A.

C. Remove any mobilized pile driver and related equipment found to be inadequate for the project pile driving conditions, and repeat the requirements of this Section, article 1.5, paragraph A until an acceptable pile driver system is obtained.
   1. Re-mobilize the accepted hammer at no cost to the Department.

D. Provide accurate test information regarding the yield stress values (heat) for each batch of piles to be used on the project.

E. Equip pile driver following Manufacturer's recommendations.

F. Leads:
   1. Used with all types of hammers.
   2. Hold in the required position with guys, stiff braces, or both.
   3. Hold the pile parallel to the leads.
   4. Accommodate the maximum length of the pile segment, and extend to the lowest point that the hammer must reach.
   5. Obtain approval from the Design Builder's Geotechnical Engineer before using followers.
   6. Use fixed leads if necessary to maintain required driving tolerances described in this Section, article 3.3, paragraph C.

G. Drive Cap (or Drive Head): Fits the top of pile and provides full bearing.
   1. For pipe piles, drive cap to have a machined surface to fully engage the end of the pipe.

H. Hammer:
   1. With fully operable adjustable settings.
   2. Rated energy greater than or equal to the value indicated on the foundation plans.
   3. Inspect hammer cushion with the Design Builder's Geotechnical Engineer present before beginning pile driving and after every 100 hours of pile driving.
      a. Replace the cushion when it loses 25 percent or more of its original thickness.

PART 3 EXECUTION

3.1 PREPARATION

A. Complete all foundation excavation before driving piles.

B. Dewater excavation at least 1 ft below bottom of foundation at all times during pile foundation operations.

C. Notify the Department, the Design Builder's Structural Engineer, and the Design Builder's Geotechnical Engineer of any conflicts between the designated position of piles and the locations of existing piles from previous construction, existing utilities, old foundations, or other potential conflicts.
   1. The Design Builder's Structural Engineer designates new pile locations as required, subject to review by the Department.

3.2 DYNAMIC ANALYSIS OF PILE DRIVING

A. Notify the the Engineer at least five working days before pile driving is to begin on the Project, and at least three working days before piles are to be driven on all subsequent abutment and bent/pier foundations.

B. Provide pile driving analyzer (PDA) testing by a qualified PDA firm selected and retained under contract with the Design Builder.

C. The Design Builder's designated PDA Firm conducts high-strain dynamic tests (in accordance with ASTM D 4945) using pile driving analysis (PDA) equipment.
   1. Test the number of piles at each foundation (abutment, bent, or pier foundation) designated on the plans, but in no case fewer than required by the UDOT Geotechnical Manual of Instruction.
   2. Perform the first PDA test on the first pile driven at each abutment and bent/pier foundation, unless the Engineer approves testing of another pile.

D. The Design Builder's Geotechnical Engineer shall either: a) be on site during the PDA testing of the first pile at each support; or b) be in direct telephone contact with the PDA Firm's operator and the inspector covering the pile driving, as necessary to gather sufficient data to establish appropriate driving criteria for each support.

E. Begin installation of dynamic analysis instruments after placing the pile in

the leads.

F. Provide safe working conditions for personnel to safely attach and remove the gages.

G. Monitor the stresses in the piles to ensure that stresses do not exceed 0.9 Fy (yield stress). Reduce the energy of the hammer if the stress exceeds 0.9 Fy.
   1. When steel piles having Fy greater than 36 ksi are required, provide accurate test information regarding the yield stress values for each batch (heat) of piles to be used on the Project.
   2. Reduce the energy of the hammer and/or make other adjustments as necessary, if the measured driving stresses exceed the specified limit.

H. The Design Builder's Geotechnical Engineer evaluates the driving resistance, and establishes driving criteria, using the results of the high-strain dynamic testing and signal matching analyses.
   1. Do not drive other piles in the foundation until the Design Builder's Geotechnical Engineer gives formal notice (confirmed in writing to the Department) that the test results indicate that sufficient capacity has been obtained, and the driving criteria for the remainder of the piles in the foundation have been established.

I. If sufficient capacity is not obtained on initial drive testing, perform a restrike
PDA test on the pile after a sufficient time period (generally 24 hours or more after the initial driving of the pile).
   1. Do not perform restrikes using a cold hammer.
   2. The Design Builder's Geotechnical Engineer will use the results of the PDA test(s) to establish pile toe elevations at the foundation support locations.
   3. The Design Builder's Geotechnical Engineer may revise the pile driving criteria during the dynamic pile testing period.

J. Notify the Design Builder's Geotechnical Engineer and the Department if any of the remaining piles in the foundation do not meet the established driving criteria before moving hammer away from bent/abutment area, or if driving conditions otherwise change.
   1. The Design Builder's Geotechnical Engineer or the Department may require testing additional piles and reestablishing driving criteria for the remaining piles within the foundation.

3.3 PILE INSTALLATION

A. Pre-drill/pre-auger if the designated pile tip elevation cannot be reached by the approved pile driver.
   1. Do not drill holes greater in diameter than the diameter or other maximum dimension of the pile.

B. Pile Splicing:
   1. Use no more than one spliced section shorter than 30 ft for any pile.
   2. Inspect the driven pile section before splicing any pile section to determine if it has been distorted from its original shape, or otherwise damaged from pile driving operations.
      a. Remove the damaged portion where distortion/damage has occurred, before splicing the next segment.
   3. Splice new pile segments parallel with previously driven pile segments.
   4. Butt weld the entire pile cross section using full penetration welds as per AWS D.1.1 for pipe piles and AASHTO/AWS D.1.5 for HP section piles.

C. Keep driven piles within 6 inches of the designated plan location, and within 2 percent of vertical (plumb) throughout the total length of the pile (including bending). This is roughly equivalent to ¼ inch in a foot, or 0.60 inches in 30 inches.
   1. Verify that these criteria have been met, including using a calibrated pile bending probe where necessary, at the end of pile driving before proceeding with backfilling or other associated foundation work.
   2. Notify the Design Builder's Structural Engineer and Geotechnical Engineer, and the Department to determine the appropriate resolution if either requirement is not met.
   3. The Design Builder bears all costs for any measures required to resolve the non-conformance, including the price reduction factors shown this Section, article 3.5.

D. Drive additional piles as required to replace damaged piles and piles driven out of plumb, or plan location at locations designated by the Design Builder's Structural Engineer.

E. Drive down piles that were raised due to driving adjacent piles.

F. Notify the Design Builder's Structural Engineer and Geotechnical Engineer, and the Department of water collecting in open pipe piles so that they can be evaluated for possible damage.
   1. Drive additional piles as described above and abandon damaged piles as directed by the Department as necessary to resolve concerns with pile damage.

G. Cover open-ended pipe piles to prevent the collection of precipitation, other sources of water, or debris.

H. Cutting and Capping Piles:
   1. Remove all damaged material from the top of the piles.
   2. Keep sides of piles at least 9 inches away from nearest edge of pile cap.
   3. Cut off piles with clean, straight-line cuts to the designated elevation at a right angle to the pile axis.
   4. Level all irregularities before placing concrete for pile cap.

I. Fill any annular space between the pipe shell and the surrounding soil with grout or clean sand washed down to reestablish lateral support.

J. Remove all loose and displaced materials from around the completed piles leaving clean, solid surfaces to receive the concrete.

K. Level all irregularities before constructing pile cap.

3.4 CONCRETE FILLING OF CLOSED-END PIPE PILES

A. Remove water and debris from pipe piles before filling with concrete.

B. Receive approval from the Design Builder's Geotechnical Engineer and the Department before concrete placement in pipe piles.

C. Fill pipe piles with specified concrete after compliance with all tolerances and required criteria have been confirmed by the Department.

D. Avoid segregation of the concrete ingredients.

E. Slump at the time of placement: between 4 and 6 inches.

F. Arrange chutes, pipes, etc. used as aids in placing concrete so concrete does not separate (i.e. flows freely without having to be pushed or shoveled).

G. Place concrete in pipe shell either by free fall, or through a tremie, drop chute, or concrete pump.

H. Place concrete to the base without contacting either the rebar cage or the pipe wall.

I. If a hopper or concrete bucket is used, discharge concrete into a funnel-type downpipe centered over the hopper or bucket.
   1. Do not discharge concrete directly from the mixer into the hopper or bucket.

J. Use high frequency internal vibrators to consolidate concrete to at least 3 ft below the bottom of the rebar cage, or to at least 13 ft below the pile cutoff level, whichever is deeper.

K. Do not vibrate concrete that has taken initial set.

L. Vibrate concrete again after inserting cage to eliminate voids around the cage if rebar cage is inserted after concrete has been placed.

M. Place the reinforcement cage into the driven pipe pile when the concrete reaches the planned bottom elevation of the reinforcement for piles larger than 16 inches in diameter.
   1. Support the reinforcement so it remains within 2 inches of the required vertical location.
   2. Support the cage from the top until the concrete reaches the top of the pile.

N. Secure rebar cage in position until concrete is set.

O. Provide lighting to the work site if concrete placement is to occur after daylight hours so all operations are plainly visible.

P. Embed the tops of piles in the concrete pile cap as shown on the plans.

3.5 PRICE REDUCTIONS FOR NONCONFORMING WORK

A. Price Adjustment—Reduction for Deficient-Strength Concrete shall be in accordance with this Section 5-1 (Price Reductions for Non-Conforming Work).
   1. Consider acceptance for concrete in pipe pile shells that are below the specified strength according to this Section.

2. The Department will:
   a. Use the bid price listed in Table 5-1 (Unit Prices for Determining Pay Adjustments For Nonconforming Work) and the pay factors schedule presented in Section 03055 Table 1 to calculate the price reduction for compensation.
   b. Evaluate concrete with a compressive strength deviation of more than 400 psi below the specification to determine capability of the material to maintain the integrity of the concrete-filled pipe pile.
      1) Provide acceptance for either:
         a) A 50 percent pay factor, or
         b) Design-Builder's Designer will direct another pile driven at a suitable location adjacent to the deficient pile and obtain approval from the Department before proceeding.

B. Price Adjustment – Reduction for Out-of-Tolerance Piles

1. Demonstrate technical adequacy for piles driven out of plumb or plan location.
2. The Department will:
   a. Accept piles according to this Section, article 3.5.
   b. Reject any pile driven outside the upper deviation limits shown in Table 1 below.
      1) No payment made for the rejected pile.
   c. Use the bid price listen in Table 5-1 (Unit Prices for Determining Pay Adjustments For Nonconforming Work), and the pay factors schedule presented in Table 1 to calculate the price reduction for compensation.

Table 1

Price Reduction Pay Factors For Non-Conforming Pile Driving Tolerances		
Pay Factor	**Plumb % deviation from 2.0%**	**Plan Location inch deviation from 6 inch**
1.00	0.00 to 0.40	0.00 to 0.75
0.90	0.41 to 0.80	0.76 to 1.50
0.80	0.81 to 1.20	1.51 to 2.25
0.70	1.21 to 1.60	2.26 to 3.00
0.50	1.61 to 2.00	3.01 to 3.75
0.30	2.01 to 2.40	3.76 to 4.50
0.10	2.41 to 3.00	4.51 to 6.00
0.0, Reject	> 3.00	> 6.00

C. The Department will:
   1. Apply pay factors to each pile individually based on the total measured pile length from the specified cutoff elevation.
   2. Apply only the criteria with the lowest pay factor for any one pile.

3.5 PILE AND DRIVING EQUIPMENT DATA FORM

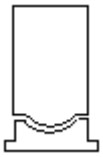
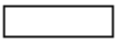
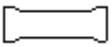
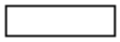
A. The recommended “Pile and Driving Equipment Data” form follows.

END OF SECTION

Sheet # _____

Pile and Driving Equipment Data

Project No: _____
Project Name: _____ County: _____
Drawing No: _____
General Contractor: _____
Pile Driving Contractor/Subcontractor: _____
Phone: _____ FAX: _____
(Piles driven by, foreman): _____
Date Submitted: _____

Hammer Components		**Hammer**	Manufacturer: _____ Model: _____ Type: _____ Serial No: _____ Manufacturer's Maximum Rated Energy: _____(k-ft) Stroke at Maximum Rated Energy: _____(ft) Range in Operating Energy: ____ to ____(ft-k) Range in Operating Stroke: ____ to ____(ft) Modifications: _____
		Ram	Ram Weight: _____ (lbs) Ram Length: _____(ft) (for diesel hammers)
		Anvil	Ram Cross Sectional Area: _____(in^2) (With diesel hammers) Anvil Weight: _____(lbs)
		**Hammer Cushion**	Material #1 Material #2 Name: _____ _____ Area: _____ _____ (in^2) No. of Plates: _____ _____ Thickness: _____ _____ (in) Mod. of Elasticity - E: _____ _____ (psi) Coeff. of Restitution - e: _____ _____
		**Drive Cap**	Helmet Weight: _____(lbs) Bonnet Anvil Block Drive Head
		**Pile Cushion** (Only for Concrete or Timber Piles)	Material: _____ Area: _____ (in^2) No. of Sheets: _____ Thickness/Sheet: _____ (in) Total Thickness of Pile Cushion: _____ (in) Mod. of Elasticity - E: _____ (psi) Coeff. of Restitution - e: _____
Pile		**Pile**	Diameter: _____ (in) Wall Thickness: _____ (in) Taper (if any): _____ Length in Leads: _____ (ft) Ordered Length: _____ (ft) Required Driving Resistance: _____ (kips) Description of Splice: _____ Tip Treatment/Plate Description: _____

Use Separate Data Sheet for Each Proposed Hammer and Pile/Structure Combination

July 8, 2016

SECTION 02456S

PREFABRICATED VERTICAL DRAINS

Add Section 02456:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Products and procedures for installation of prefabricated vertical drains.

B. Special methods of PV drain installation may be necessary for artesian conditions.

1.2 RELATED SECTIONS

A. Section 00725: Scope of Work

1.3 REFERENCES

A. ASTM D 3786: Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method

B. ASTM D 4533: Standard Test Method for Trapezoid Tearing Strength of Geotextiles

C. ASTM D 4631: Standard Test Method for Determining Transmissivity and Storativity of Low Permeability Rocks by In Situ Measurements Using Pressure Pulse Technique

D. ASTM D 4595: Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method

E. ASTM D 4632: Standard Test Method for Grab Breaking Load and Elongation of Geotextiles

F. ASTM D 4716: Test Method for Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head

G. ASTM D 4751: Standard Test Method for Determining Apparent Opening Size of a Geotextile

H. ASTM D 4833: Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products

I. UDOT Minimum Sampling and Testing Guide

1.4 DEFINITIONS Not Used

1.5 SUBMITTALS Not Used

PART 2 PRODUCTS

2.1 GENERAL

A. Use newly manufactured materials consisting of a polyethylene or polypropylene drainage core enclosed in or integrated with a Geotextile jacket.
   1. Provide a jacket that allows free passage of pore-water to the core without loss of soil material or piping.
   2. Provide a core that provides continuous vertical drainage channels.

B. Provide band-shaped PV drains with an aspect ratio (width divided by thickness) not exceeding 40.

2.2 JACKET

A. Provide jacket with a synthetic nonwoven geotextile of 100 percent heat-set continuous filament polypropylene capable of resisting all bending, punching, and tensile forces imposed during installation and during the design life of the drain.

B. Do not use jacket material that is subject to localized damage (e.g. punching through the filter by sand or gravel particles.)

C. Provide jacket material that is sufficiently rigid to withstand lateral earth pressures due to embedment and surcharge so that the vertical flow capacity through the core will not be adversely affected.

D. Provide jacket material that is sufficiently flexible to bend smoothly during installation and induced consolidation settlement without damage.

E. Provide jacket material that will not crack or peel during installation of the drain. Conform to the following specifications:

Test Item	Requirement Designation	Minimum Ave. Roll Value
Grab Tensile Strength:	ASTM D 4631	120 lbs
Trapezoidal Tear:	ASTM D 4533	50 lbs
Puncture Strength:	ASTM D 4833	38 lbs
Mullen Burst Strength:	ASTM D 3786	130 psi
Elongation at Break:	ASTM D 4632	> 50%
Permitivity AOS:	ASTM D 4491	0.45 sec-1
	ASTM D 4751	≤100 sieve

2.3 CORE

A. Provide a core that is continuous polyethylene or polypropylene plastic material fabricated to promote drainage along the axis of the vertical drain, with the following characteristics.

Test Item	Requirement Designation	Minimum Ave. Roll Value
Tensile Strength:	ASTM D 4595	235 lbs

2.4 ASSEMBLED DRAIN

A. Provide assembled PV drains that have mechanical properties (strength and modulus) that equal or exceed those specified for the component jacket and core.

B. Provide assembled drains that are resistant against wet rot, mildew, bacterial action insects, salts in solution in the groundwater, acids, alkalis, solvents, and any other significant ingredients in the site groundwater.

C. Use one single type of assembled PV drain on the Project. Provide an assembled drain with the following minimum properties:

Test Item	Requirement Designation	Minimum Ave. Roll Value
Weight:	N/A	0.8 oz/ft
Width:	N/A	3.8 inch
Thickness:	N/A	1/8 inch
Discharge Capacity:	ASTM D 4716 50 psi	1.5 gpm
	ASTM D 4716 25% Compression	1.5 gpm

D. Label or tag PV drain materials so that the information for sample identification and other quality control purposes can be read from the label. As a minimum, identify each roll by the manufacturer as to lot or control numbers, individual roll number, date of manufacture, manufacturer, and product identification of the jacket and core.

E. Provide PV drain that is wrapped in heavy paper, burlap, plastic, or similar heavy-duty protective covering during shipping. Protect the PV drain from sunlight, mud, dirt, dust, debris, and other detrimental substances during shipping and onsite storage.

F. Reject all material that is damaged during shipment, unloading, storage, handling, or that does not meet the minimum requirements of the PV drain material.

2.5 PV DRAIN LAYER

A. Place a PV drain layer consisting of at least one foot of sand meeting the gradation below, unless another gradation is approved by the Engineer.

Sieve	Percent Passing
2-inch:	100
½-inch:	65-100
¼-inch:	50-100
No. 10:	40-70
No. 40:	10-40
No. 200:	0-5

B. Place PV drain layer prior to PV drain installation.

C. Reject all material not meeting the specified gradation.

D. Accept the sand at the project site.

2.6 QUALITY CONTROL

A. The actual type of PV drain installed are at the option of the Design Builder, provided the requirements of these specifications are met.

B. Notify the Department at least seven days prior to the installation of any drains.

1. Test samples of the unspliced PV drains to be used, and three samples of any proposed splices, at least seven days prior to the installation of any drains.
   a. Provide a sample of unspliced drain at least 10 feet long.
   b. Provide samples of spliced PV drain long enough to include the splice plus 2 feet if unspliced drain on both sides of the splice.
2. Submit manufacturer's literature documenting the physical and mechanical properties of the drain (as a minimum those properties required by the specifications) and other similar projects where the same drain has been installed including details on prior performance on these projects, at least seven days prior to installation.

C. Base acceptance of the PV drain layer on the installed material.
   1. Test in accordance with the Minimum Sampling and Testing requirements.

PART 3 EXECUTION

3.1 INSTALLATION EQUIPMENT

A. Install PV drains with approved modern equipment of a type that causes a minimum disturbance of the subsoil during the installation operation and maintain the mandrel in a vertical position.

B. Install PV drains using a mandrel or sleeve that inserts the PV drain (pushed or vibrated) into the soil. Use a mandrel or sleeve that protects the drain material from tears, cuts, and abrasion during installation and that retracts after each drain is installed.

C. Advance the mandrel with constant load or constant rate of advancement.
   1. Make available a vibrator with an eccentric moment of at least 500 in-lbs for use in areas where constant load or constant rate of advancement methods cannot install the PV drains to the design depths.
   2. Advance PV drains that cannot be installed to the design penetration using only static methods with the use of the vibrator.
   3. Use of the vibrator is not considered under differing site conditions; use the vibrator only in cases where design penetration cannot be achieved by using the full static force available to the mandrel.

D. Predrill or spud through existing embankments or through hard and dense materials prior to installation of the PV drain.
   1. Use a maximum 6-inch-diameter auger/drill/spud/etc. to predrill or spud through embankments or hard and dense materials.
   2. Predrilling is not considered differing site conditions.

E. Minimize the disturbance of the subsoil by using a mandrel or sleeve that has a maximum cross-sectional area of 12.2 inch.
   1. Use of a standard “foot” is allowed, provided that the largest surface area is less than 12.5 inch .
   2. Use a mandrel or sleeve sufficiently stiff to prevent wobble or deflection during installation.

F. Provide a mandrel or sleeve with an anchor rod or similar arrangement at the bottom to permit the installation of the drain and to anchor the drain tip at the required depth at the time of mandrel withdrawal.
   1. Use anchors with dimensions that conform as closely as possible to the dimensions of the mandrel so as to minimize soil disturbance.
   2. Do not install PV drain until the Design Builder’s Geotechnical Engineer has approved the anchor system and installation procedure.

G. Submit drawings describing the size of the mandrel and anchor system at least seven days prior to delivery of the equipment to the site.
   1. Use the smallest surface area required to secure the PV drain.
   2. Use one 8-inch long piece of No. 4 reinforcing steel as the primary anchoring method.
   3. If the primary anchoring method fails to anchor the PV drain, use one 9-inch long piece of No. 4 reinforcing steel as the secondary anchoring method.
   4. If the secondary anchoring method fails to anchor, use one 4-inch by 7-inch sheet metal plate with a sheet metal bale as the final anchoring method.

H. Make a minimum of five attempts to place the PV drain before moving to another area.
   1. Determine areas of “refusal” by moving ahead, skipping approximately five rows of layout at a time, until planned PV drain depths are obtained.

I. Provide equipment and materials to grout PV drains that reach sand layers exhibiting artesian behavior with a low permeability mixture of bentonite, water, Portland cement, and other additives to seal the penetration hole.

3.2 INSTALLATION APPROVAL

A. At least seven days prior to the beginning of initial PV drain installation, submit full details on the materials, equipment, sequence, and method proposed for PV drain.

B. Prior to the installation of production PV drains, demonstrate that equipment, methods, and materials produce a satisfactory installation in accordance with these specifications.

C. If at any time the method of installation does not produce satisfactory PV drains, alter the method and equipment as necessary to comply with these specifications.

3.3 INSTALLATION

A. Locate, number, and stake PV drains. Take all reasonable precautions to preserve the stakes.
   1. Be responsible for any necessary restaking.
   2. Do not vary the as-installed location of the PV drains by more than 6 inches from the plan locations designed on the drawings.

B. Reject PV drains that are more than 6 inches from design plan location or are damaged or improperly installed and abandoned in-place.
   1. Install additional prefabricated vertical drains to replace the damaged ones.

C. Install PV drains from the working surface to the depth shown on the drawings.

D. During PV drain installation, provide a suitable means of determining the depth of the advancing drain at any given time and the length of drain installed at each location.

E. Supply a summary report by the morning following each work-day of PV drains installed the previous day.
   1. Include in the summary drain type, locations, and length to nearest 1-foot quantity of PV drain installed at that location, the location of any PV drains that do not extend to the plan depth, and the locations and depths where vibration was used to install the PV drain.

F. Plumb equipment for installing PV drains prior to installing each drain.

1. Do not deviate from the vertical more than 5.0 inches (0.4 feet) in 10 feet during installation of any drain.

G. Installation techniques requiring driving or jetting are not permitted. Only use limited amounts of injected water to facilitate anchoring PV drains.

H. Perform the installation without any damage to the drain during advancement or retraction of the mandrel.
   1. Alternate raising or lowering the mandrel during advancement is not permitted.
   2. Raising the mandrel is permitted only after completion of a drain installation.

J. Splice or connect the PV drain material to provide continuity of PV material.
   1. Provide a 4- to 8-inch length of PV material protruding above the sand surface at each PV location.
   2. Cut the PV drain material neatly at its upper end at the working grade.

K. Observe precautions necessary for protection of any field instrumentation devices.
   1. Pay for the replacement of any instrumentation equipment that has been damaged or becomes unreliable as a result of these operations.

3.4 PRE-AUGERING/OBSTRUCTIONS

A. Use auguring, spudding, or other methods to loosen the soil and clear obstructions.
   1. Do not allow the auger to penetrate more than two feet into the underlying compressible soil.

B. Be responsible for penetrating overlying fill material as necessary to satisfactorily install the PV drains.
   1. Clear obstructions defined as any man-made or natural object or strata that prevent the proper insertion of the mandrel and installation of the PV drain.

C. Use auguring, spudding, or other approved methods to loosen the soil and any obstruction material prior to the installation of PV drains.
   1. The obstruction clearance procedure is subject to approval by the Engineer.

2. The Engineer's approval does not relieve the Design Builder of responsibility to clear obstructions in accordance with these specifications.

D. If auguring is the selected method use augers with a minimum outside diameter equal to the largest horizontal dimension of the mandrel, shoe, or anchor, whichever is greatest.
   1. Use an auger with a maximum outside diameter of no more than 3 inches greater than the minimum outside diameter.

E. When obstructions are encountered, implement the following procedure in the listed sequence:
   1. Immediately notify the Engineer prior to completing the drain and prior to installing any other drains.
   2. Attempt to install drains adjacent to the obstructed location at the direction of the Design-Builder's Geotechnical Engineer and under his review:
   3. Attempt to install an offset drain within two feet horizontally of the obstructed drain.
   4. Implement obstruction clearance procedures and install the drains at the design location.
   5. Use obstruction clearance procedures only as directed by the Design-Builder's Geotechnical Engineer.

3.5 SPLICING

A. Splice PV drain material by stapling. Provide splices with structural and hydraulic continuity of the drain.

B. Permit a maximum of one splice per drain installed.

3.6 ARTESIAN GROUNDWATER CONDITIONS

A. Subsurface formations may be present along the alignment that contain a hydrostatic head elevation that is higher than the ground surface (artesian).
   1. Where PV drains penetrate to these formations, unacceptable water flow is expected.

B. The Design-Builder's Geotechnical Engineer evaluates initial PV drain installation at each work area to provide information regarding penetration depths, the need for vibration to reach design penetration depths, anchorage of the PV drains, and the presence of artesian water conditions.

1. Following installation of the initial drains, finalize PV drain lengths.

C. Plug all PV drains that reach artesian ground water conditions.

D. Provide drilling or grouting equipment capable of penetrating to the depths of observed artesian groundwater conditions to seal the PV drain hole.

E. The Design-Builder's Geotechnical Engineer determines the need for plugging PV drains and the acceptability of the plugging procedures.

END OF SECTION

July 8, 2016

SECTION 02479S

MONITORING SETTLEMENT OF ADJACENT STRUCTURES

Add Section 02479:

PART 1 GENERAL

1.6 SECTION INCLUDES

A. Materials and procedures for monitoring settlement of adjacent structures that arise from construction of embankments, retaining walls, and other roadway elements.

1.7 RELATED SECTIONS

A. Section 01721S: Survey

1.8 REFERENCES **Not used**

1.9 DEFINITIONS **Not used**

1.10 SUBMITTALS

A. Settlement records of all measurement locations signed by a licensed land surveyor.
   1. Submit according to the schedule specified in Article 3.1.

PART 2 PRODUCTS

A. Provide all stakes, benchmarks, lath, concrete nails, and any other survey supplies necessary to monitor settlement at the locations required.

B. Set necessary benchmarks to monitor settlement as described herein.

C. Provide all survey equipment certified to accomplish closed-level circuits accurate to within one hundredth of a foot or better.

PART 3 EXECUTION

3.2 SETTLEMENT MONITORING

A. Monitor settlement at the locations shown on the plans, conducting the work as follows:
   1. Establish and measure elevations of settlement-monitoring locations during daylight hours and at the convenience of the property owner.
   2. Make prior arrangements with the property owner to allow access to the property to identify appropriate monitoring locations and make measurements.
   3. Identify and permanently mark settlement-monitoring locations using paint, concrete nails, concrete embedded brass caps, or other accepted survey practice method at least 14 calendar days prior to commencing any construction work.
   4. Measure the elevation of the settlement-monitoring locations twice within 10 days but at least 2 days prior to commencement of adjacent construction.
   5. Perform all elevation measurements to an accuracy of one hundredth of a foot or better using a closed-level circuit.
   6. Measure elevations of the settlement-monitoring locations once a week after construction has begun.
   7. Continue weekly measurements until the Design-Builder's Geotechnical Engineer determines that the measurements can be discontinued.
   8. Provide report of measurements within 24 hours of each set of weekly measurements to the Design-Builder's Geotechnical Engineer and concurrently to the Department.
   9. Remove settlement-monitoring identification materials once settlement measurements are discontinued as approved by the Department at Final Owner Acceptance or otherwise and restore locations to their original condition as acceptable to the Department.

END OF SECTION

July 8, 2016

SECTION 02498S

VIBRATION CONTROL DURING CONSTRUCTION RELATED ACTIVITIES

Add Section 02498S:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Procedures for monitoring and controlling vibrations adjacent to the project site that arise from pile driving, soil compaction and other vibration-producing activities.

1.2 RELATED SECTIONS Not used

1.3 REFERENCES Not used

1.4 DEFINITIONS Not used

1.5 SUBMITTALS

A. Vibration records signed by the Vibration Monitoring Specialist.

B. Calibration data and machine documentation for each seismograph used on the project.

1.6 VIBRATION MONITORING SPECIALIST

A. Provide a Vibration Monitoring Specialist who is experienced in vibration monitoring techniques for similar civil and geotechnical work, preparation of vibration monitoring plans and instrumentation, and interpretation and use of vibration records.
   1. The Vibration Monitoring Specialist will possess all required federal, state and local licenses and/or permits.
   2. The Vibration Monitoring Specialist will be responsible for supervision of all field vibration monitoring operations and personnel, and have a minimum 10 years of vibration monitoring experience.

PART 2 PRODUCTS Not used

PART 3 EXECUTION

3.1 PREPARATION

A. Control and monitor vibrations when engaging in construction-related activity near objects, structures or utilities which may be susceptible to damage from ground vibrations.

3.2 EQUIPMENT

A. Use approved seismographs located, at a minimum and as approved by the Engineer, between the vibration source and the closest susceptible objects, structures or utilities.

B. Use seismographs capable of recording particle velocity for three (3) mutually perpendicular components of vibration.

C. Furnish records of seismograph characteristics and factory calibration to the Engineer prior to commencing vibration producing activity.

D. Provide vibration monitoring equipment capable of detecting velocities of 0.1 in/s or less.

E. Use seismographs with response characteristics in the range generally found for the specific construction related activity being monitored.

3.3 MONITORING

A. Do not allow ground motions to exceed the limits identified in article E.

B. Use appropriate care in all vibration inducing operations.
   1. Repair, at no expense to the Department, any damage to neighboring structures or utilities caused by construction related vibrations.

C. Monitor every vibration-inducing activity for which ground motions may exceed 0.09 in/sec. at any structure or utility, using calibrated seismographs containing internal calibration and triaxial orthogonal transducers with a flat frequency response from 2 to 200 hz.
   1. Furnish real-time, permanent time histories of the vibration measurements in terms of particle velocity.
   2. Make vibration monitoring records available to the Engineer no later

than 48 hours after measurements are taken

D. Place transducers in locations approved by the Engineer.
   1. The Department may direct that different features be monitored.

E. Vibration limits are based on instrumentation with a flat frequency response from 2 to 200 hertz.

F. Do not exceed the following maximum ground motions:
   1. 0.2 in/sec for steady state vibrations (vibrations generated by construction traffic, vibrating rollers, etc.)
   2. 0.1 in/sec for steady state vibrations near historic buildings (vibrations generated by construction traffic, vibrating rollers, etc.)
   3. 2.0 in/sec for impact vibrations (pile driving)
   4. 1.0 in/sec for impact vibrations (pile driving) near historic buildings

F. The Engineer may establish different vibration limits for other features.

END OF SECTION

November 14, 2012

SECTION 02583S

JACK AND BORE UTILITY INSTALLATION

Add Section 02583

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials and procedures for installing a buried utility by means of jacking and boring.

1.2 RELATED SECTIONS

A. Section 01355: Environmental Protection

B. Section 01554: Traffic Control

C. Section 02056: Embankment, Borrow, and Backfill

D. Section 02316: Roadway Excavation

E. Section 02610: Drainage Pipe

F. Section 02922: Seed, Turf Seed, And Turf Sod

G. Section 03575: Flowable Fill

H. Section 13553: ATMS Conduit

1.3 REFERENCES

A. American Water Works Association (AWWA) Standards

B. Utah Administrative Code

1.4 DEFINITIONS

A. Carrier – A pipe or conduit directly enclosing a utility.

B. Casing – A steel pipe enclosing a carrier for the purpose of providing structural or other protection to the carrier or to allow for carrier replacement without excavation.

C. Roadway Prism – The roadway cross section that contains the embankment, pavement, shoulders and other features, together with the subsoils that underlie the same to the maximum depth of the subject utility.

1.5 SUBMITTALS

A. Two copies of each submittal for review. Include all applicable drawings, calculations, geotechnical reports, and a written work plan in each copy.
   1. Identify in the work plan details of the jack and bore construction, sequence of operations to be performed during construction, a detailed schedule of construction, and a traffic control plan.
   2. Detail sufficiently the drawings, calculations, and descriptions in order to demonstrate to the Engineer whether the proposed materials and procedures will meet the requirements of this Section.
   3. Sign and seal the structural designs and other engineered components by a registered Professional Engineer.

B. Include the following information, divided into the sections listed below:
   1. Geotechnical Report:
      a. Map showing field exploration locations
      b. Summary of field exploration and laboratory testing procedures and results
      c. Description of site surface and subsurface conditions encountered during field investigations
      d. Soil boring Logs
   2. Structural Data:
      a. Casing and carrier material type
      b. Casing and carrier wall thickness
      c. Manufacturer's recommended maximum and minimum fill height limits for the identified casing and carrier
   3. Traffic Control Plan – Comply with Section 01554:
      a. Location and dimensions of any temporary access roads
      b. Location and dimensions of bore pit area "footprint"
      d. Proposed traffic control
      e. Amount of time the footprint will be exposed
   4. Installation Plan:

a. Manufacturer's current recommended installation for each type of pipe used and any incidental materials required for installation
b. Location and dimensions of bore pit
c. Method of shoring, including details for all required ground support
d. Method of controlling line and grade
e. Method of spoil removal, including surface storage and disposal
f. Grouting techniques to be used for filling annular voids caused by over excavation if any, including equipment, pumping and injection procedures, pressure grout types, and mixtures
g. Method of dewatering and disposal
h. Details of casing spacers and casing end seals
i. Emergency safety and repair plan for accidental damage caused to existing utilities, roadway surface, or other features resulting from construction operations

C. Do not begin work until the submittals have been reviewed and accepted by the Engineer.
1. The Engineer will have 10 working days for review and acceptance.
2. Provide new submittals upon receiving notification that the submittals are insufficient.
a. Allow an additional 7 working days for the Engineer's review and acceptance.

D. Alternative mix design: Refer to this Section, article 3.2.G for requirements.

1.6 QUALITY ASSURANCE

A. Third party utilities must meet the requirements of Utah Administrative Code Rule 930-7.

B. Adhere to manufacturer standards for products and installation methods.

1.7 ACCEPTANCE

A. Provide the Engineer horizontal and vertical alignment data, in latitude and longitude coordinates and elevation in feet, pertaining to the termini of installation, including but not limited to the beginning and end points and all intermediate boxes.

B. Perform inspection and acceptance according to Section 02610 for carriers with a diameter greater than 12 inches.

PART 2 MATERIALS

2.1 CASING AND CASING SPACERS

A. Casing

1. Case utilities for the following situations and conditions:
   a. The utility carrier is not structurally capable of resisting loading encountered during installation or during operation beneath highway facilities.
   b. Utility crossings where casing is required by appropriate industry code or special conditions.
   c. Pressurized carrier installed beneath the roadway prism including those installed longitudinally under the roadway
   d. A carrier containing transmittants that are flammable, corrosive, expansive, energized, or environmentally hazardous.
   e. Installations at locations with controlled access where the current or future insertion, removal, replacement, or maintenance of utilities would avoid open trench construction.
   f. As a method of conveying leaking fluids or gasses away from the area directly under the roadway prism to a point of release.
2. Made of steel meeting the requirements of Table 1, having minimum yield strength of 35,000 psi, and be rated for a design life of at least 75 years.

Table 1

Minimum Wall Thickness for Steel Casing (minimum yield strength of 35,000 psi)	
Minimum Thickness	**Diameter of Casing**
¼" (0.2500")	12" or less
$^{5}/_{16}$" (0.3125")	over 12"-18"
$^{3}/_{8}$" (0.3750")	over 18"-22"
$^{7}/_{16}$" (0.4375)	over 22"-28"
½" (0.5000")	over 28"-34"

$^{9}/_{16}$" (0.5625)	over 34"-42"
$^{5}/_{8}$" (0.6250")	over 42"-48"

3. Connect each section of the casing with a full penetration butt weld around the entire circumference of the joint, to achieve a water tight joint. The quality of the weld will conform to AWWA Standard C206, and develop the full strength of the casing wall.
4. No casing is required if the carrier is structurally capable of resisting loading encountered during installation or during operation beneath highway facilities and is not required by this Section, article 2.1.A.
   a. Carrier is to be locatable.
   b. Refer to Section 13553 for requirements for detectable pull tape.

B. Casing Spacer
1. Use to position carrier conduit in casing, and to ensure that no external loads are to be transmitted to the carrier. Do not use wood skids in place of manufactured casing spacer.
2. Manufactured of material having a low coefficient of friction and designed to support the weight of the carrier and associated transmittants.
3. Sized sufficiently to provide a minimum clearance of 2 inches between the outside of carrier, to include bells or couplings, and the inside of casing.
4. Place as required by the Manufacturer.

PART 3 EXECUTION

3.1 PREPARATION

A. Conduct a geotechnical investigation to characterize the nature of the native materials to determine the feasibility of the installation.
1. Interpretation of soil investigation reports and data, investigating the site, and determination of the site soil conditions is the sole responsibility of the Contractor.

B. Verify the position of nearby utilities before installation. Establish a path for the casing installation that will meet minimum clearances required by adjacent utilities while following the plans.

C. The design of a bore pit and required bearing to resist jacking forces is the responsibility of the Contractor.

D. Excavation:
   1. Refer to Sections 02316 and 01355.
   2. Keep bore pit free of water.
      a. Dewater according to the installation plan.
      b. Disposal of water must not cause damage or become a nuisance.

E. Place bore pits outside the AASHTO clear zone.
   1. Refer to TC Series Standard Drawings for mitigation if the bore pits cannot be located outside the AASHTO clear zone.

3.2 INSTALLATION – GENERAL

A. Install the utility specified in the contract documents to the alignment and profile shown on the plans.

B. Continuously monitor the location and alignment of the pilot bore progress to insure compliance with the proposed installation alignment and to verify depth of the bore.
   1. Provide the Engineer as-built drawings and an accurate log of the utility boring upon completion of the bore.

C. Monitor worksite for indications of displacement of the roadway prism and escaping boring fluids.
   1. Suspend work immediately whenever fluids seep to the surface other than in the boring entrance or exit pit or when the paved surface is displaced.
      a. Propose a method for acceptance by the Engineer to prevent further seepage or displacement before resuming the boring operation.
   2. Provide GPS survey of the existing surface within the vicinity of the installation and at other locations as requested by the Engineer before and at the conclusion of the installation.
      a. Changes to the existing surface will be evaluated and repaired at no additional cost to the Department.
      b. Remediation plans must be approved by the Engineer before any work proceeds when required.

D. Repair any buckling of the casing due to jacking forces at no additional cost to the Department.

E. Contain excess boring fluids at the entry and exit points until recycled or removed from the site.
   1. Verify that all boring fluids are disposed of in a manner acceptable to the appropriate local, state, and federal regulations.

F. Leave no exterior voids along the bore hole.
   1. Fill the voids with an approved pressurized grout material at no additional cost to the Department if voids develop greater than the outside diameter of the conduit by 1 inch.

G. Fill the void immediately with flowable fill if an obstruction is hit during construction and the bore path is to be abandoned. Refer to Section 03575 for an approved mix design or submit an alternative mix design to be approved by the Region Materials Engineer.
   1. Submit a new installation plan to the Engineer for approval before resuming work at another location.

H. Do not allow the use of water under pressure (jetting) or puddling to facilitate boring or jacking operations.

I. Seal the ends of the casing and carrier with structural grout to provide a barrier against debris and seepage between the two.

3.3 RESTORE EXCAVATED AREA

A. Restore excavated or disturbed area to pre-installation conditions.

B. Backfill and compact excavation material to match the shape of the surrounding surface. Refer to Section 02056.

C. Topsoil and seed disturbed area. Refer to Section 02922 for seed planting schedule. Use the original soils and plants in wetland areas.

END OF SECTION

July 14, 2016

SECTION 02612S

STEEL PIPE
(AWWA C200, MODIFIED)

Add Section 02612:

PART 1 GENERAL

1.1 THE REQUIREMENTS

A. A Purchase Order has been provided by the Department to Northwest Pipe Company for steel pipe materials.

B. The Contractor shall be responsible for all items included in this Special Provision unless specifically included in the Department's Purchase Order.

C. A copy of the Department's Purchase Order with Northwest Pipe is provided for Contractor's reference. Fully review and understand the details of the Purchase Order. Provide all items necessary for completion of the project in accordance with the Contract Documents.

1.2 RELATED SECTIONS

D. Section 02615S: Steel Pipe Fabricated Specials

E. Section 02621S: Pipeline Coatings and Linings

1.3 REFERENCES

A. ANSI/ASTM A 20:General Requirements for Steel Plates for Pressure Vessels

B. ASTM E 165: Practice for Liquid Penetrant Examination

C. ASTM A 370:Test Methods and Definitions for Mechanical Testing of Steel Products

D. ASTM A 516: Pressure Vessel Plates, Carbon Steel, for Moderate- and Lower-Temperature Service

E. ANSI/AWWA C200: Steel Water Pipe 6 In and Larger

F. ANSI/AWWA C205: Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4 In and Larger - Shop Applied

G. ANSI/AWWA C206: Field Welding of Steel Water Pipe

H. ANSI/AWWA C208:Dimensions for Fabricated Steel Water Pipe Fittings

I. ANSI/AWWA C214: Tape Coating Systems for the Exterior of the Steel Water Pipelines

J. ANSI/AWWA C218:Coating the Exterior of Above Ground Steel Water Pipelines and Fittings

K. ANSI/AWWA C602: Cement-Mortar Lining of Water Pipelines 4-In (100 mm) and Larger - In Place

L. ANSI/AWWA C604: Installation of Steel Water Pipe – 4 In. or Larger

M. ANSI/ASTM A 36: Carbon Structural Steel

N. ANSI/ASTM A 283: Low and Intermediate Tensile Strength Carbon Steel Plates

O. ASTM A 572: High-Strength Low-Alloy Columbium-Vanadium Structural Steel

P. ASTM A 1011/1018: Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength

Q. ASTM C 150: Portland Cement

R. ANSI/AWS D1.1: Structural Welding Code – Steel

S. API Standard 1104: Welding Pipelines and Related Structures

T. AWWA M-11: Steel Water Pipe - A Guide for Design and Installation

U. ASME Boiler and Pressure Vessel Code

1.4 DEFINITIONS Not Used

1.5 SUBMITTALS

E. Shop Drawings: Submit shop drawings of pipe and fittings and the following supplemental requirements as applicable.

1. Fabrication Information

a. Pipe/fitting wall construction details which indicate the type and thickness of cylinder; the position, type, size, and area of reinforcement; manufacturing tolerances; maximum

angular joint deflection limitations; and all other pertinent information required for the manufacture and installation of the product.

b. Welded joint details shall be submitted for all joint types, including beveled ends for alignment conformance and deep bell or butt strap joints required for control of temperature stresses.

c. Pipe Fabricator's Credentials: Submit the credentials of the pipe manufacturer/fabricator. Credentials shall include reference names, telephone numbers, and descriptions of projects for pipe conforming to AWWA C200 that is of similar diameter, length, and wall thickness to the pipe in this project. Project description shall include length, diameter, wall thickness, steel metallurgy, location of facility where pipe was manufactured/fabricated, and names of key plant personnel responsible for the manufacturing process. Submit names and qualifications of current plant personnel to be responsible for manufacture of the pipe in this project. To demonstrate ability to meet the schedule requirements of this project, submit project descriptions and manufacturing/fabrication schedules for other currently contracted pipe projects at the Fabricator's plant. The manufacturing / fabrication schedule for the pipe in this project shall be identified on a schedule submittal.

d. Manufacturer's Written Quality Assurance/Control Program.

2. Materials: Material lists and steel reinforcement schedules which include and describe all materials to be utilized. Metallurgical test reports for steel proposed for use on the project. Submit chemical and physical test reports from each heat of steel that indicate the steel conforms to the Project Specifications.

3. Line Layout Information

a. Line layout and marking diagrams compatible with the requirements of AWWA Manual 11 (M-11) and which indicate the specific number of each pipe and fitting and the location of each pipe and the direction of each fitting in the completed line. In addition, the line layouts shall include: the pipe station and centerline elevation at all changes in grade or horizontal alignment; the station and centerline elevation to which the bell end of each pipe will be laid; all elements of curves and bends, both in horizontal and vertical alignment. The location of all metered pipe sections, beveled ends for alignment conformance, and deep bell or butt strap joints for temperature stress control shall be clearly indicated on the diagrams.

b. Dimensional drawings of all valves, fittings, and appurtenances.

c. Drawings showing the location and details of bulkheads for hydrostatic testing of the pipeline, and details for removal of test bulkheads and repair of the lining.

d. Details and locations of closures for length adjustment, temporary access manways, vents, and weld lead pass holes as indicated and as required for construction convenience.

4. Welding Information

a. Information regarding location, type, size, and extent of all welds with reference called out for Welding Procedure Specifications (WPS) numbers shall be shown on the shop drawings. The shop drawings shall distinguish between shop and field welds. Shop drawings shall indicate by welding symbols or sketches the details of the welded joints, and the preparation of parent metal required to make them.

b. Written welding procedures for shop and field welds, including WPS's and Procedure Qualification Records (PQR's).

c. Written nondestructive testing procedure specifications, and nondestructive testing personnel qualifications for shop and field welds.

d. Current welder performance qualifications (WPQ's) shall be submitted for each welder used prior to its performing any Work either in the shop or field. Qualification testing shall be as specified in Article 1.6 - Quality Assurance, Paragraph H.

e. Submit the credentials of the certified welding inspectors (CWI's) and quality control specialist for review both the shop and field personnel prior to starting any welding. The credentials shall include, but not be limited to, American Welding Society QC-1 Certification.

f. Submit personnel qualifications for nondestructive testing (NDT) personnel in accordance with requirements of SNT-TC-1A, level II.

g. Submit all NDT data for each shop-welded and field-welded joint. This data shall include all testing on each weld joint, including re-examination of repaired welds, using radiographic, magnetic particle, dye penetrant examination, ultrasonic, or air test examination methods specified. Test data shall be reviewed and signed by the welding inspector(s).

h. Submit a welder log for field and shop welding. Log shall list all welders to be used for the Work and the types of welds each welder is qualified to perform.

i. Submit a welding map showing the sequence of welds for all field welds.

j. Submit a written weld repair procedure for each type of shop and field weld proposed for use on the Project.

k. Submit a written rod control procedure for shop and field operations demonstrating how rods will be maintained in good condition throughout the Work. The rod control procedure shall demonstrate how the procedures that will be used to ensure that the proper rods are used for each weld.

5. Handling and Support Information: Detail drawings indicating the type, number and other pertinent details of the slings, strutting and other methods proposed for pipe support and handling during manufacturing, transport, and installation. Calculations supporting the handling and support system design shall be submitted. Drawings and calculations shall be sealed by a registered professional engineer.

6. Control of Temperature Stresses

   a. Submit proposed sequencing of events to control temperature stresses in the pipe wall during installation prior to starting of any field welding.

   b. Submit the proposed sequencing of events or special techniques to minimize distortion of the steel as may result from shop welding procedures.

   c. Submit plan for monitoring pipeline temperatures.

7. Field Lining

   a. Submit field lining contractor's credentials.

   b. Submit a description of lining equipment and personnel to be used.

   c. Submit written procedures for pipe surface preparation, lining application, and curing.

   d. Submit cement mortar mix design.

F. Certifications: Furnish a certified affidavit of compliance for all pipe and other products, materials, or related work provided under this Section, as specified in ANSI/AWWA C200, C205, C602, and C206, respectively, and the following supplemental requirements:

1. Compliance with the additional requirements included in these Contract Documents.
2. Physical and chemical properties of all steel.
3. Hydrostatic test reports.
4. Results of production weld tests.

5. Sand, cement, and mortar tests.
6. Rubber gasket tests.
7. All materials are NSF approved for use with potable water.
8. Certify that pipe temperature complies with Specifications prior to pouring pipe zone material, during and between periods of flowable fill placement, and prior to and during welding temperature control joints (including supporting data).
9. All welds were performed in conformance with these documents.

G. All expenses incurred in making samples or collecting data for certification of tests shall be borne by the Supplier and Contractor at no increased cost to the Department.

1.7 QUALITY ASSURANCE

A. USBR will perform in-plant inspection during fabrication of welded steel pipe at the place of fabrication. USBR inspection does not relieve pipe manufacturer of any responsibility for QA/QC program as specified herein.

B. Certified Welding Inspector (CWI): Furnish the services of a certified welding inspector(s) for all shop and field welding as specified in AWWA C200 and C206. The certified welding inspector(s) shall 100 percent visually inspect all welds, verify proper procedures are being followed using qualified welders, supervise non-destructive testing, and witness Engineer's non-destructive testing. The welding inspector(s) shall submit written certification that all welds were performed in conformance with these documents. All shop weld tests shall be reviewed and signed by the inspector(s).

C. Inspection: All pipe, linings, welds, coatings, and related work shall be subject to inspection at the place of manufacture and/or the place the Work is performed in accordance with the provisions of ANSI/AWWA C200, C205, C206, C602, C209, C214, C215, and C222 as applicable, as supplemented by the requirements herein. Notify the Engineer in writing not less than 21 calendar days prior to the start of any phase of the pipe manufacture, welding, lining, coating, testing, or field operations.

D. Tests: Except as modified herein, all materials used in the manufacture of the pipe shall be tested in accordance with the requirements of ANSI/AWWA C200, C205, C206, and C602, as applicable.
   1. Prior to lining with cement-mortar, if applicable, each length of pipe of each diameter and pressure class shall be shop-tested and certified to a pressure of at least 75 percent of the minimum yield

strength of the pipe steel. Test pressure shall be maintained for a sufficient time to observe the weld seams. There shall be no leaks. Any leaks shall be repaired and the pipe retested.

2. Production weld tests as required in ANSI/AWWA C200, except weld tests shall be conducted on each 5,000 feet of production welds at a minimum, and at least one set of tests per operator per work shift shall be performed.

E. Perform said material tests at no additional cost to the Department. The Engineer shall have the right to witness all testing conducted by the Supplier; provided, that the Supplier's schedule is not delayed for the convenience of the Engineer.

F. In addition to those tests specifically required, the Engineer may request additional samples of any material including mixed concrete and lining and coating samples for testing by the Department. The additional samples shall be furnished at no additional cost to the Department.

G. Welding Procedure Specifications: All welding procedures used to fabricate and install pipe shall be in accordance with the ASME Boiler and Pressure Vessel Code (BPVC) for shop welds and ANSI/AWS D1.1 for field welds. Written welding procedures shall be required for all welds, both shop and field. Welds qualified per the ASME BPVC shall include Supplementary Essential Variables for notch-tough welding. All provisions of ANSI/AWS D1.1 pertaining to notch-tough welding shall apply.

H. Welder Performance Qualifications: All welding shall be done by skilled welders, welding operators, and tackers who have had adequate experience in the methods and materials to be used. Welders shall be qualified by the Supplier under the provisions of ASME BPVC for shop welds and ANSI/AWS D1.1 for field welds. Furnish all material and bear the expense of qualifying welders.

I. Shop Nondestructive Testing: Nondestructive testing shall be performed for various weld categories as specified below. Testing shall include submitting written documentation of procedures per Section V, and acceptance criteria shall be in accordance with Section VIII of the ASME Boiler and Pressure Vessel Code.

1. Butt Joint Welds: Spot radiographically examine pipe in accordance with Paragraph UW-52 of the ASME Boiler and Pressure Vessel Code Section VIII, Division 1. If, in the opinion of the Engineer, the butt joint welds cannot readily be radiographed, they shall be 100 percent ultrasonically examined.

2. Fillet Welds: 100 percent examine all fillet welds using the magnetic particle inspection method.
3. Groove Welds: 100 percent ultrasonically examine all groove welds that cannot be readily radiographically spot examined.
4. All Welds: Certified welding inspector shall 100 percent visually examine all welds as a minimum.
5. In addition to weld tests hereinbefore specified, doubler pads shall be air tested as stated in AWWA C206.

J. Onsite Observation: The pipe fabricator shall provide an experienced staff member to train the contractor's installation crews regarding pipe handling, jointing, and backfilling. Training shall be provided for a minimum period to where the Contractor proves proficient at all installation procedures prior to starting the project. The staff member's duties shall include, but not be limited to, the following:
1. Observe the installation and welding of the pipe and fittings.
2. Report any concerns to the Engineer's onsite observer.
3. Answer questions and provide assistance to the Engineer and the Contractor.

K. Pipe Manufacturer/Fabricator:
1. The manufacturer or fabricator of the pipe shall be experienced in fabricating pipe of similar diameters and wall thicknesses required for this Work and shall have the manufacturing capability to meet the schedule requirements of this project.
2. Steel Pipe Fabricators Association (SPFA), Lloyd's Registry Certification, or ISO 9001:2000 Certification.
3. Demonstrate current production capability for volume of Work required for this Project.
4. Experience shall include successful fabrication to AWWA C200 standards of at least 30,000 linear feet of 66-inch and larger pipe with wall thicknesses 0.3125- inch or larger within the 4-year period preceding the bid date, and continuous AWWA C200 manufacturing experience for at least 7 years preceding the bid date.
5. Experience requirement shall apply to the fabrication plant facility and responsible personnel, not to the firm which owns the facility or employs the personnel.
6. See Section 02572S for qualifications for fittings and specials fabricator.

L. All manufacturing shall be done by a single manufacture, including mainline pipe fabrication and lining and coating, under one roof.

PART 2 PRODUCTS

2.1 GENERAL

A. Unless otherwise indicated, steel pipe, linings and coatings shall conform to ANSI/AWWA C200, C205, C602, C210, C214, and C216, as applicable, subject to the following supplemental requirements. The pipe shall be of the diameter and wall thickness shown, shall be furnished complete with welded, and all specials shall be provided as required in Section 02572S - Steel Pipe Fabricated Specials. For pipe larger than 24 inches in diameter, the inside diameter after lining shall not be less than the nominal diameter indicated unless otherwise shown. Pipe 24 inches in diameter and smaller may be provided in standard outside diameters.

B. Markings: Legibly mark all pipes and specials in accordance with the laying schedule and marking diagram. Each pipe shall be numbered in sequence and said number shall appear on the laying schedule and marking diagram in its proper location for installation. All special pipe sections and fittings shall be marked at each end with top field centerline. The word "top" shall be painted or marked on the outside top spigot of each pipe section.

C. Handling and Storage: The pipe shall be handled by use of wide slings, padded cradles, or other devices, designed and constructed to prevent damage to the pipe coating/exterior. The use of chains, hooks, or other equipment which might injure the pipe coating/exterior will not be permitted. Stockpiled pipe shall be suitably supported and shall be secured to prevent accidental rolling and to avoid contact with mud, water, or other deleterious materials. Stockpiled pipe shall be supported on sand or earth berms free of rock exceeding 3 inches in diameter. The ends of all pipe shall be securely bulkheaded or otherwise sealed during transport to the jobsite. All pipe handling equipment and methods shall be acceptable to the Engineer.

D. Pay the cost of replacement or repair of pipe which is damaged at no increased cost to the Department.

E. Strutting: Adequate strutting (stulling) shall be provided on all specials, fittings, and straight pipe so as to avoid damage or distortion to the pipe and fittings during handling, storage, hauling, and installation. The following requirements shall apply:

1. The strutting shall be placed as soon as practicable after the pipe is fabricated or the mortar lining has been applied and shall remain in place while the pipe is loaded, transported, unloaded, installed and backfilled at the jobsite.
2. The strutting materials, size and spacing shall be the responsibility of the Contractor and shall be adequate to prevent deflection and support the earth backfill plus any greater loads which may be imposed by the backfilling and compaction equipment. One strut shall be placed vertical oriented with the top of pipe. One set of struts shall be set 2 feet from each end of each pipe section and at a maximum interval of 15 feet in-between
3. Any pipe damaged during handling, hauling, storage, or installation due to improper strutting shall be repaired or replaced.

F. Laying Lengths: Maximum pipe laying lengths shall not be limited unless specifically required by the Drawings. Final steel pipe lay drawings shall be provided to the Contractor prior to Bid. **Any modification to the Department's Purchase Order and pipeline lay drawings that are desired to accommodate the Contractor's operation shall be paid for at the Contractor's expense.**

G. Lining: The pipe lining shall have smooth dense interior surfaces and shall be free from fractures, excessive interior surface crazing and roughness.

H. Closures and Correction Pieces: Closures and correction pieces shall be provided as required so that closures may be made due to different headings in the pipe laying operation and so that correction may be made to adjust the pipe laying to conform to pipe stationing indicated. The locations of correction pieces and closure assemblies shall be shown on the pipe layout diagrams and shall be subject to the Engineer's review. Any change in location or number of said items shall be approved by the Engineer.

I. Shop-Welded Surfaces: All weld seams on pipe surfaces that will have a flexible tape coating in accordance with Section 02621S - Pipeline Coatings shall be ground such that the maximum weld bead height will not exceed 3/32 inch. All ground weld seams shall be smooth and free of all burrs. Do not grind into, or gouge, the adjacent pipe wall material.

2.2 MATERIALS

A. Cement: Cement for mortar shall conform to the requirements of ANSI/AWWA C205; provided, that cement for mortar coating shall be

Type V, and mortar lining shall be Type II or V, per ASTM C 150. Fly ash or pozzolan shall not be used as a cement replacement.

B. Steel: Provide steel coils for spiral welded steel pipe or steel plate for straight seam welded steel pipe per AWWA C200 and as follows:
   1. Minimum Yield Strength: 36,000 psi
   2. Minimum Tensile Strength: 58,000 psi
   3. Coils: Steel coils shall be made from the continuous cast process or continuous cast slabs, fully killed, fine-grain practice conforming to the physical and chemical characteristics of ASTM A1018/A1018M, SS Grade 36 (Type 2).
   4. Plate: Steel plate shall be fully killed, conform to ASTM A20, and be manufactured to fine-grain practice conforming to the physical and chemical characteristics of ASTM A572/A572M, Grade 42.

C. Pipe shall be manufactured as fabricated pipe per AWWA C200 as modified herein. ASTM pipe manufacturing standards referenced in AWWA C200 shall not be used. Pipe sections shall be fabricated by either of the following methods:
   1. Pipe sections may be spirally welded or fabricated from short cylindrical courses joined circumferentially by complete penetration butt joint welds with not more than two longitudinal seams per course. Longitudinal seams shall be staggered on both sides of the pipe. Measured yield strength shall not exceed 80-percent of measured tensile strength.
   2. Pipe sections may be rolled or pressed from no more than three sheets the full length of the pipe and welded with no more than three longitudinal seams. Patching inserts, overlays, or pounding out of dents will not be permitted. Repair of notches or laminations on second ends will not be permitted. Damaged ends shall be removed as a cylinder and the section end properly prepared. Distorted or flattened lengths shall be rejected. A buckled section shall be replaced as a cylinder.

D. Charpy Tests
   1. General. Steel used in production manufacturing of pipe and specials shall be tested for notch toughness using Charpy V-Notch tests per ASTM A 370. The test acceptance shall be 25 foot-pounds at a test temperature of 30 degrees F.
   2. The Department may elect to increase the Charpy testing to include more steel than indicated above at a negotiated price.

2.3 SPECIALS AND FITTINGS

A. Unless otherwise required, all specials and fittings shall be in accordance with Section 02572S - Steel Pipe Fabricated Specials and shall conform to the dimensions of ANSI/AWWA C208.

2.4 DESIGN OF PIPE

A. General: The pipe shall be steel pipe, mortar-lined and flexible and mortar-coated, with field welded joints as indicated. The pipe shall consist of a steel cylinder, lined with portland cement-mortar as indicated, with an exterior coating as indicated in Section 02621S – Pipeline Coatings and Linings.

B. The pipe shall be manufactured, tested, inspected, and marked according to applicable requirements previously stated and except as hereinafter modified, shall conform to ANSI/AWWA C200.

C. Pipe Dimensions: The pipe shall be of the diameter and wall thickness shown on the Drawings. The minimum (not nominal) steel cylinder thickness for each pipe size shall be as indicated.

D. Specials Dimensions: The specials shall be of the diameter and minimum wall thickness indicated on the Drawings, or as specified in Section 02572S - Steel Pipe Fabricated Specials.

E. Joint Design: Unless otherwise shown, the standard field joint for steel pipe shall be double-welded (fully circumferential) lap joint. Mechanically coupled, or flanged joints shall be required where indicated on the Drawings. Butt-strap joints shall be used only where required for closures or where indicated. The joints furnished shall have the same or higher pressure rating as the abutting pipe. Provide two air test tapped holes for each double welded lap joint, one each side, at spring line of pipe.

F. Lap joints prepared for field welding shall be in accordance with ANSI/AWWA C200. The method used to form, shape and size bell ends shall be such that the physical properties of the steel are not substantially altered. Unless otherwise approved by the Engineer, bell ends shall be formed by an expanding press or by the pipe being moved axially over a die in such a manner as to stretch the steel plate beyond its elastic limit to form a truly round bell of suitable diameter and shape. The ends shall not be rolled. Faying surfaces of the bell and spigot shall be essentially parallel, but in no case shall the bell slope vary more than 2 degrees from the longitudinal axis of the pipe.

G. Moderate deflections and long radius curves may be made by means of beveled joint rings, by pulling standard joints, by using short lengths of pipe, or a combination of these methods; provided that pulled joints shall not be used in combination with bevels and maximum joint deflections are not exceeded. The maximum total allowable angle for beveled joints shall be 5 degrees per pipe joint. Bevels shall be provided on the bell ends. Mitering of the spigot ends will not be permitted. The maximum allowable angle for pulled joints shall be 75 percent of the manufacturer's recommendations or the angle which results from a ¾-inch pull out from normal joint closure, whichever is less. In no case shall pulled joints result in a gap between the bell and spigot at the weld location that exceeds 1/8 inch. All horizontal deflections or fabricated angles shall fall on the alignment, as shown.

H. All vertical deflections shall fall on the alignment within laying tolerance as described in Section 3.2.

I. Shop-applied interior linings and exterior coatings shall be held back from the ends of the pipe as indicated or as otherwise acceptable to the Engineer. Holdback areas shall be coated as hereinafter specified.

J. Temperature Control Lap Joint: A special longer bell end (temperature control lap joint) shall be provided at a maximum spacing of 400 feet to account for movement of the installed pipe due to temperature changes. The pipe manufacturer shall determine the length required for the longer bell as defined by the Contractor's pipe laying procedures and the location of the special bell. Minimum temperature control lap joint length shall be as shown on the Drawings.

K. Joint Shop Coating: All holdback areas for welded joints and all butt straps shall be thoroughly cleaned and given a shop coat of rust-inhibitive primer. The surface preparation and primer shall be compatible with the intended finish coating as specified in Section 02621S – Pipeline Coatings and Lining, as applicable.

L. Shop Fit Test
   1. To ensure that joints may be fully assembled and that excessive annular space between spigots and bells does not exist, and that the pipe meets the requirements of AWWA C200, the pipe fabricator shall perform a shop fit test on a minimum of five joints. The joints to be tested shall be selected by the Engineer based on pipe measurements.
   2. The shop fit test shall join the pipe ends in the shop with the proposed adjacent pipe end.

3. Record the actual annular space, with the data to include as a minimum:
   a. Maximum space at any point.
   b. Minimum space at any point.
   c. Space at 90-degree intervals--top, bottom, and spring line on both sides.
4. The pipe ends shall be match marked after shop assembly.

2.5 CEMENT-MORTAR LINING

A. Cement-Mortar Lining for Shop Application: The interior lining of all steel pipe shall be in accordance with Section 02621S – Pipeline Coating and Linings.

B. The minimum lining thickness shall be as follows, with a tolerance of plus 1/8-inch or minus 1/16-inch:

Nominal Pipe Diameter (in)	Lining Thickness (in)
4 - 10	1/4
11 - 23	5/16
24 - 36	3/8
over 36	½

C. The pipe shall be left bare where field joints occur as indicated. Ends of the linings shall be left square and uniform. Feathered or uneven edges will not be permitted.

D. Defective linings, as determined by the Engineer, shall be removed from the pipe wall and shall be replaced to the full thickness required. Defective linings shall be cut back to a square shoulder in order to avoid feather edged joints. Temperature and shrinkage cracks in the mortar less than 1/16 inch wide need not be repaired. Pipe, specials, or fittings with cracks wider than 1/16 inch shall be rejected or repaired per C205 at the discretion of the Engineer.

E. The progress of the application of mortar lining shall be regulated in order that all hand work, including the repair of defective areas is cured in accordance with the provisions of ANSI/AWWA C205. Cement-mortar for patching shall be the same materials as the mortar for shop or machine lining, except that a finer grading of sand and mortar richer in cement shall be used when field inspection indicates that such mix will improve the finished lining of the pipe.

F. Protection of Pipe Lining/Interior: For all pipe and fittings with plant-applied cement-mortar linings, provide a polyethylene or other suitable bulkhead on the ends of the pipe and on all special openings to prevent drying out of the lining. All bulkheads shall be substantial enough to remain intact during shipping and storage until the pipe is installed.

2.6 EXTERIOR COATING OF PIPE

A. Exterior Coating of Steel Pipe: The exterior coating of all steel pipe shall be in accordance with Section 02621S – Pipeline Coatings and Linings.

B. Field Coating Requirements: Provide heat shrink sleeves for exterior coating of joints following installation in accordance with Section 02621S-Pipeline Coating and Lining.

2.7 PIPELINE MARKING TAPE

B. Metallic tape: Terra Tape Sentry Line Detectable manufactured by Reef Industries, Inc., 9209 Alemeda Genoa Road, Houston, TX 77075, www.reefindustries.com; or approved equal, having the following essential characteristics:
1. Aluminum foil encased in high visibility inert polyethylene jacket.
2. Total thickness: 6.0 mils, minimum.
3. Core foil thickness: 0.30 mils, minimum.
4. Width: 6 inches, minimum.
5. Imprinted on one side, 1-inch-tall, permanent black lettering.
6. Color: as listed below.
7. Joining clips shall be manufacturer's standard tin or nickel coated.
8. Tape shall read “JVWCD Potable Pipeline, Tel #801-256-4401”.

C. Plastic tape: Terra Tape Extra Stretch manufactured by Reef Industries, Inc., 9209 Alemeda Genoa Road, Houston, TX 77075, www.reefindustries.com; or equal, having the following essential characteristics:
1. Polyolefin or similar chemically inert material unsusceptible to alkalies, acids, and chemicals and solvents likely in the soil.
2. Thickness: 8.0 mil, minimum.
3. Width: 12 inches minimum.
4. Color: as listed in below.
5. Imprinted on one side, 1-inch-tall, permanent black lettering on a colored background.
6. Tape shall read “JVWCD Potable Pipeline, Tel #801-256-4401”.

C. Marking Tape Lettering: Lettering for mainline pipeline shall read "Jordan Valley Water Conservancy District – Water Line Buried Below." Lettering for marking tape for other utilities shall read as required by utility owner.

2.8 ABOVE GROUND MARKERS

A. Provide pipeline markers at the locations indicated. Markers in open areas shall be High Visibility Tri-View Utility Marking Posts as manufactured by Rhino Marking and Protection Systems (www.rhinomarkers.com) or approved equal. Coordinate color and lettering with JVWCD/BOR prior to installation. Markers shall be provided at the following locations:
   1. Both sides of street crossings.
   2. At the beginning and end of open areas and at a maximum interval of 500-feet.

B. Brass Caps: Caps shall be 2-1/2-inch diameter brass caps with posts set by epoxy into holes drilled into the curb adjacent to the pipeline. Brass caps and monuments shall be provided in locations as described in the plans. Caps shall be stamped as shown on the detail and shall be provided at the following locations:
   1. Both sides of street crossings.
   2. Within deck of concrete structures (manway, vaults, etc.)

2.9 PIPELINE TESTING AND DISINFECTION

J. All test equipment, chemicals for chlorination, temporary valves, bulkheads, or other water control equipment and materials shall be determined and furnished by the Contractor subject to the Engineer's review. No materials shall be used which would be injurious to the construction or its future function.

K. Used pressure gauges shall be recertified prior to testing.

L. Chlorine for disinfection shall be in the form of liquid chlorine, sodium hypochlorite solution, or calcium hypochlorite granules or tablets.

M. Liquid chlorine shall be in accordance with the requirements of ANSI/AWWA B301. Liquid chlorine shall be used only:
   1. In combination with appropriate gas flow chlorinators and ejectors;
   2. Under the direct supervision of an experienced technician;
   3. When appropriate safety practices are observed.

N. Sodium hypochlorite and calcium hypochlorite shall be in accordance with the requirements of ANSI/AWWA B300 - Hypochlorite.

PART 3 EXECUTION

3.1 GENERAL

A. Not Used.

3.2 INSTALLATION OF PIPE

A. Handling and Storage: All pipe, fittings, and specials shall be carefully handled and protected against damage to lining and coating/interior and exterior surfaces, impact shocks, and free fall. All pipe handling equipment shall be acceptable to the Engineer. Pipe shall not be placed directly on rough ground but shall be supported in a manner which will protect the pipe against injury whenever stored at the trench site or elsewhere. Pipe shall be handled and stored at the trench site in accordance with the requirements stated below. No pipe shall be installed when the lining or coating/interior or exterior surfaces show cracks or other damage that may be harmful as determined by the Engineer. Such damaged lining and coating/interior and exterior surfaces, shall be repaired to the satisfaction of the Engineer, or a new undamaged pipe shall be furnished.

B. All pipe damaged prior shall be repaired or replaced.

C. Inspect each pipe and fitting to insure that there are no damaged portions of the pipe. Remove or smooth out any burrs, gouges, weld splatter or other small defects prior to laying the pipe.

D. Before placement of pipe in the trench, each pipe or fitting shall be thoroughly cleaned of any foreign substance, which may have collected thereon and shall be kept clean at all times thereafter. For this purpose, the openings of all pipes and fittings in the trench shall be closed during any interruption to the Work.

E. Select lifting points that when used, do not result in damage to the pipe.

F. Excavations shall be made as needed to facilitate removal of handling devices after the pipe is laid. Excavation shall be made as needed outside the normal trench section at field joints to permit adequate access to the joints for field connection operations and for application of coating on field joints.

G. Where necessary to raise or lower the pipe due to unforeseen obstructions or other causes, the Engineer may change the alignment and/or the grades. Such change shall be made by the deflection of joints, short lengths of pipe, by the use of beveled joint rings, or by the use of additional fittings. However, in no case shall the deflection in the joint exceed 75 percent of the maximum deflection recommended by the pipe manufacturer or the amount that results in more than a 1/8-inch gap at the weld location, whichever is less. No joint shall be misfit any amount which will be detrimental to the strength and water tightness of the finished joint.

H. Pipe struts shall be left in place until backfilling operations have been completed. After the backfill has been placed to the springline of the pipe, the struts shall be removed and shall be properly disposed. Struts shall not be removed with a torch or any other method that may damage the pipe lining or coating. The parent pipe material shall not be nicked, gouged, or damaged during strut removal. All repairs of gouges or nicks in the parent material shall be made using 3/32-inch maximum diameter E-6010 welding electrodes with a maximum heat input of 5.6 kj per inch. Tack welds, stull metal, weld splatter, slag, and burrs that remain attached to the parent metal surface after cutting shall be ground to within 1/32 inch of the parent metal. Grinding shall not penetrate the parent metal. Notify the Engineer prior to grinding. Following grinding, all pipe surfaces at the tack weld shall be visually inspected for defects. All defects deeper than 1/16 inch shall be repaired by welding in accordance with ANSI/AWSD.1.1 and AWWA/ANSI C206. All inspection work shall be performed by a certified welding inspector.

I. For pipe backfilled with flowable fill, the pipe shall be laid directly on moist sandbags or other suitable supports approved by the Engineer in preparation for flowable fill pipe zone material. Sandbags shall be placed to provide at least 6 inches of flowable fill below the bottom of the pipe. Sandbags shall be spaced at a maximum interval of 8 feet and one set shall be placed within 3 feet on both sides of each joint. Provide additional sandbags as needed to support the pipe on line and grade. For pipe bedded in granular material, no blocking will be permitted, and the bedding shall be such that it forms a continuous, solid bearing for the full length of the pipe. Excavations shall be made as needed to facilitate removal of handling devices after the pipe is laid. Bell holes shall be formed at the ends of the pipe to prevent point loading at the bells or couplings. Excavation shall be made as needed outside the normal trench section at field joints to permit adequate access to the joints for field connection operations and for application of coating on field joints.

J. At all times, means shall be provided to prevent the pipe from floating. Take all necessary precautions to prevent the pipe from floating due to water entering the trench or from backfilling with flowable fill. Assume full responsibility for any damage due to this cause and shall at its own expense restore and replace the pipe to its specified condition and grade if it is displaced due to floating. Maintain the inside of the pipe free from foreign materials and in a clean and sanitary condition until its acceptance by the JVWCD/BOR.

K. Bulkheads
   1. Prior to shipment of pipe with cement mortar lining the lining shall be wetted then a suitable bulkhead shall be attached to each end of the pipe section. This bulkhead shall remain in place and in good condition through transit to the Project.
   2. During construction the openings of all pipe and specials where the pipe and specials have been cement-mortar lined in the shop shall be protected with suitable bulkheads to maintain a moist atmosphere and to prevent unauthorized access by persons, animals, water or any undesirable substance. The bulkheads shall be so designed to prevent drying out of the interior of the pipe. Introduce water into the pipe as needed to keep the mortar moist where moisture has been lost due to damaged bulkheads.

L. Pipe Cleanup: As pipe laying progresses, keep the pipe interior free of all debris. Completely clean the interior of the pipe of all sand, dirt, mortar splatter and any other debris following completion of pipe laying and any necessary interior repairs prior to testing and disinfecting the completed pipeline.

M. Installation Tolerances: Each section of pipe shall be laid in the order and position shown on the laying diagram and the following requirements:
   1. Each section of pipe having nominal diameter 48 inches and larger shall be laid to line and grade, within plus or minus 5 percent of diameter horizontal deviation and plus or minus 2.5 percent of diameter vertical deviation.
   2. In addition to the horizontal and vertical tolerances above, lay the pipe so that no high or low points other than those on the laying diagram are introduced.
   3. Pipe deflection, after backfill but prior to installation of field-applied cement mortar lining, if applied, shall not exceed 2.25 percent for flexible coated pipe and 1.5 percent for cement mortar coated pipe. Deflection shall be measured by the difference in vertical inside diameter in the installed pipe and the manufactured pipe.

4. Pipe not conforming to these criteria or which otherwise impact the ability to complete the Work shall be removed and reinstalled in full conformance with the Contract Documents at no additional cost to the Department.
5. For each section of pipe, record the invert elevation at the lower end and incorporate the data on the Record Drawings.

N. Protection of Pipe: At locations where the pipeline will be crossed with heavy equipment, precautions as approved by the Engineer shall be taken to protect the pipe from damage. Acceptable precautions include: backfilling the pipe trench as necessary to protect the pipe, concrete encasing the pipe, and placing steel plating over the pipe. Any damage to the pipe shall be repaired.

3.3 WELDED JOINTS

A. Welding Procedures, Welding Qualifications, and Testing
1. Field welding procedures, welders, welding operators, and tackers shall be qualified in accordance with AWS D1.1 and as defined in Section 3 of ANSI/AWWA C206 or ANSI/AWWA C200, as applicable. All qualifications shall be in accordance with all-position pipe tests as defined in Section 5 of AWS D1.1.
2. For field welding, the welder qualification testing shall be performed at the site. Previous qualifications will not be accepted. Obtain the services of an independent testing laboratory to perform the welder qualification onsite. Copies of all test data and certifications shall be provided to the Engineer. All costs for welder qualification testing shall be at no increased cost to the Department.
3. Upon completion of each field-welded joint, the welding operator shall mark his regularly assigned identification number and the last two numbers of the year in which the Work was completed, or the Contractor may have a records system that traces a welder's work completion to a specific joint. Steel stamping directly on piping will not be permitted unless "low stress" die stamps, such as interrupted dot or round nose types, are used.
4. All single welded lap joints will be inspected by the Contractor in the presence of the Engineer using magnetic particle or dye penetration methods. Field butt welds will be inspected by the Contractor in accordance with the requirements of API 1104 by the radiographic method and the acceptance criteria of API 1104. Magnetic particle testing is not required for seal welds.
5. All double welded lap joints and butt strap joints shall be air tested by the Contractor in the presence of the Engineer. Repairs and retesting shall be required if any loss of pressure occurs.

6. Inform the Engineer before completed weld joints are to be backfilled so that the joint may be inspected. Assume all costs of exposing backfilled joints for inspection when backfilling preceded the inspection.
7. Personnel performing visual inspection of welds shall be qualified and currently certified as Certified Welding Inspectors (CWI) in accordance with AWS QC1, Standard for Qualification and Certification of Welding Inspectors. Personnel performing nondestructive tests shall be qualified and certified to the requirements of SNT-TC-1A.
    a. The Engineer may also order nondestructive testing by an independent testing laboratory in addition to any testing specified herein. Except as otherwise specified herein, all costs for the independent testing laboratory to inspect and test field welds will be paid for by the Department. Defective welds shall be inspected, repaired, and retested.
    b. Test reports of all laboratory tests shall be submitted as provided in the quality control section.

B. Where exterior welds are performed, adequate space shall be provided for welding and inspection of the joints.

C. Lap Welded Joints: During installation of welded steel pipe in either straight alignment or on curves, the pipe shall be laid so that at any point around the circumference of the joint there is a minimum lap as shown on the Drawings.

D. Butt Straps: Where used or required, shall be as shown on the Drawings.

E. After the pipe and pipe joint are properly positioned in the trench, weld and provide external joint protection for all joints except the special temperature control lap joint hereinafter specified. The length of pipe between special temperature control joints shall be backfilled to at least one foot above the top of the pipe as hereinafter specified. The special temperature control joints shall be welded after the pipe is backfilled to at least one foot above the top of the pipe for the full distance between the temperature control joints upstream and downstream. Joint protection shall be provided for special temperature control joints after completion of the joint welds and tests as specified. Care shall be exercised during the initial backfilling to prevent movement of the pipe and to prevent any backfill material from being deposited on the special temperature control joint.

F. Control of Temperature Stresses

1. Control temperature stresses in accordance with AWWA C206, the approved temperature stress control submittal, and these Specifications. Provide special temperature control lap joints at intervals of 400 feet or less, unless otherwise approved by the Engineer.
2. To control temperature stresses, the unbackfilled special temperature control joint areas of all pipe shall be shaded from the direct rays of the sun by the use of properly supported awnings, umbrellas, tarpaulins, or other suitable materials until the pipe is backfilled at least 1 foot over the top of the pipe. The "temperature control joint area" is defined as the entire length of pipe left exposed near a control joint after placing the pipe backfill between it and the other control joints in each direction. The term "special temperature control joint area" is defined as the entire length of pipe left exposed near a control joint after placing the backfill between it and the other control joints in each direction. Shading materials at the joint area shall not rest directly on the pipe but shall be supported to allow air circulation around the pipe. Shading of the pipe joints need not be performed when the ambient air temperature is below 45 degrees F.
3. At intervals not exceeding 400 feet along welded reaches of the pipeline, at the first regular lap-welded field joints outside concrete encasements and structures, and where shown, the pipe shall be supplied with a special temperature control lap joint and laid with an initial lap of not less than 3 inches greater than the typical lap joint. Where temperature control lap joints occur in a traveled roadway or other inconvenient location, the location of the joint may be adjusted, as acceptable to the Engineer.
4. Provide and install thermocouple temperature gauges to monitor the temperature of the steel pipe wall on the inside top of the pipe as it lays in the trench. All pipe temperature requirements specified herein shall be measured at the top inside of the steel cylinder. Specific temperature requirements for the pipeline steel cylinder shall be met prior to installation of the flowable fill, during and after placement of flowable fill, and during welding of the special temperature control joints. If atmospheric conditions do not allow the conditions to be met, supplemental cooling shall be required. The following outlines the specific temperature control requirements.
    a. Prior to and during placement of the flowable fill, the pipeline steel temperature shall be at or below 90 degrees F. The specified temperature shall be maintained for at least three hours after the placement of flowable fill. The specified

temperature shall be maintained until the line is fully backfilled. Provide supplemental cooling as required.

b. Placement of flowable fill shall proceed in the direction of pipe laying from one special temperature control joint to the next. During placement of flowable fill, the lead end of the pipe section (toward the next special temperature control joint) shall be left unbackfilled or otherwise unrestrained such that the end of the pipe is free to move in response to expansion or contraction due to temperature changes. Flowable fill shall not be placed in a direction which would result in flowable fill placement proceeding in a direction toward previously or simultaneously placed flowable fill without the written permission of the Engineer. The direction of flowable fill placement will not be limited for placement at the short unbackfilled section immediately adjacent to the special temperature control joints.

c. During periods between flowable fill placement operations, any section of pipeline that is backfilled with flowable fill shall be shaded from the direct rays of the sun by the use of properly supported awnings, umbrellas, tarpaulins, or other suitable materials until the pipe is backfilled at least 1 foot over the top of the pipe. The temperature of the partially backfilled pipe shall not be allowed to exceed 110 degrees Fahrenheit at any time. Provide supplemental cooling as required. Shading materials shall not rest directly on the pipe but shall be supported to allow air circulation around the pipe. Shading of the partially backfilled pipe need not be performed when it can demonstrate to the satisfaction of the Engineer, using thermocouple data, that shading is not necessary to meet the specified temperature requirement.

d. Prior to welding the special temperature control joints, the pipeline extending 400 feet each direction from the joint shall be maintained at or below 85 degrees F. Additionally, the pipeline extending 400 feet each direction from the joint shall be backfilled with flowable fill to at least one foot over the top of the pipe. At the specified temperature, the special temperature control joints can be welded. Begin and complete the weld during the coolest interval of suitable length within a 24-hour day. Use the thermocouple temperature data to demonstrate to the Engineer the coolest interval of the day.

e. After welding any temperature control joint, the pipe temperature for 150 feet in each direction from the control joint shall be maintained below 110 degrees F for a minimum

of 24 hours after the temperature control joint area has been backfilled to at least 1 foot over the top of the pipe. This requirement is in addition to the shading and flowable fill placement temperature requirements indicated herein.

G. Prior to the beginning of pouring flowable fill or beginning the welding procedure, any tack welds or joint stops used to position the pipe during laying shall be removed. Any annular space between the faying surfaces of the bell and spigot shall be equally distributed around the circumference of the joint by shimming, jacking, or other suitable means. The weld shall then be made in accordance with ANSI/AWWA C206. Where more than one pass is required, all dirt, slag, and flux shall be removed before the succeeding bead is applied.

H. Testing of Joints: All double welded lap and butt strap joints shall be tested to a minimum of 40-psi air pressure for a period of 10 minutes per AWWA C206. No air leakage will be allowed. If the test pressure drops below 40 psi, paint the welds with a soap solution. Mark any leaks indicated by the escaping gas bubbles and repair and retest joint.

I. Following tests of the joint, the exterior joint spaces shall be coated in accordance with these Paragraph 3.4 Joint Coating and Lining after which backfilling may be completed.

J. Joints: The pipe ends shall be cut straight on joints where butt straps are used for realignment, adjustment, or deflection, and fillet welds shall be made as indicated.

K. Repair of Welds: All welds that are defective shall be repaired to meet the requirements of this Section at no additional cost to the Department. Defects in welds or defective welds shall be removed, and that section of the joint shall then be rewelded. Only sufficient removal of defective material that is necessary to correct the defect is required. After the repair is made, the joint shall be checked by repeating the original test procedure. Welds deficient in size shall be repaired by adding weld metal.

3.4 JOINT COATING AND LINING

A. General: The interior and exterior joint recesses shall be thoroughly wiped clean and all water, loose scale, dirt and other foreign material shall be removed from the inside surface of the pipe. The grout for joint coating and lining shall be cement grout, except that composition shall be one part cement to two parts sand and sufficient water for dry-pack consistency

B. Joint Coating: In accordance with the requirements of Section 02621S – Pipeline Coating.

C. Joint Lining:
1. Clean joint to remove dirt, debris, and other contaminants.
2. Apply a single application of NSF approved acrylic latex bonding admixture (Flex-Con, or equal) to wet out joint for the promotion of adhesion.
3. The grout for joint lining shall be cement grout, except that composition shall be one part cement to two parts sand and sufficient water for dry-pack consistency. NSF approved acrylic latex admixture shall be added to develop a dough like consistency.
4. Mortar mixture is hand packed into the joint area.
5. Joint is troweled smooth to create a uniform transition between existing mortar lined pipe.
6. Joint area is swept clean of debris.
7. After the backfill has been completed to final grade, the interior joint recess of shop-lined pipe shall be filled with grout, tightly packed into the joint recess and troweled flush with the interior surface. All excess shall be removed. At no point shall there be an indentation or projection of the grout exceeding 1/16 inch. With pipe smaller than 24 inches in diameter, before the spigot is inserted into the bell, the bell shall be daubed with grout containing one part cement to two parts sand. The spigot end then shall be forced to the bottom of the bell and excess mortar on the inside of the joint shall be swabbed out.

3.5 MARKING TAPE INSTALLATION

A. Continuously install plastic marking tape along the pipe at the depth and locations shown on the Drawings.

3.6 PIPELINE TESTING

A. Visually inspect the entire pipeline and remove all construction debris, silt, mortar, etc. from the pipeline prior to filling for hydrostatic testing and disinfection. Coordinate schedule for final visual inspection walkthrough with the Engineer.

B. Water for testing and disinfecting water pipelines shall be furnished by the Contractor. Make all necessary provisions for conveying the water from the source to the points of use, and disposal of the water (and dechlorinating - where applicable).

C. All pressure pipelines shall be tested. Disinfection shall be accomplished by chlorination for all pipelines providing potable water or connected to a potable water system. All chlorinating and testing operations shall be performed in the presence of the Engineer.

D. Disinfection operations shall be scheduled as late as possible during the contract time period so as to assure the maximum degree of sterility of the facilities at the time the Work is accepted by the JVWCD/BOR. Samples for bacteriological testing shall be collected by the Contractor, and testing shall be performed by the JVWCD laboratory and at the expense of the Contractor. The Jordan Valley Water Treatment Plant laboratory is can only accept bacteriological samples for testing during working hours Monday through Thursday. Samples shall be turn during these times. Results of the bacteriological testing shall be satisfactory with the State Department of Health or other appropriate regulatory agency.

E. Pipeline pressure tests will include the following tests:
   1. Air test of double welded lap and butt strap joints.
   2. Hydrostatic pressure test of the complete pipeline, in segments as required to match pipe pressure class.
   3. Conduct the discharge in accordance with the Utah Pollutant Discharge Elimination System (UPDES) permit from the Utah Division of Environmental Quality (UDEQ). Apply a reducing agent to the discharged water to neutralize the chlorine residual and meet the chlorine residual limit required under the permit. JVWCD/BOR shall conduct the water quality sampling of the discharge as required by the permit. Notify local agencies, secure appropriate other permits and approvals, and provide erosion control measures for any releases as appropriate. Release of water after pipeline testing and disinfection have been completed shall be only if acceptable to the Engineer.

F. Notification: Notify the Engineer at each of the following stages:
   1. Three working days prior to the start of filling the pipeline with water.
   2. Three working days prior to the start of chlorination.
   3. Twenty-four hours before withdrawing samples for bacteriological testing.
   4. Three working days prior to the start of flushing.

3.7 HYDROSTATIC TESTING OF PIPELINES

A. Prior to hydrostatic testing, all pipelines shall be flushed or blown out as appropriate. Test all pipelines either in sections or as a unit. No section of

the pipeline shall be tested until all field-placed concrete or mortar has attained an age of 7 days. The test shall be made by closing valves when available, or by placing temporary bulkheads in the pipe and filling the line slowly with water. Ascertaining that all test bulkheads are suitably restrained to resist the thrust of the test pressure without damage to or movement of the adjacent pipe. Any unharnessed sleeve-type couplings, expansion joints, or other sliding joints shall be restrained or suitably anchored prior to the test, to avoid movement and damage to piping and equipment. Provide sufficient temporary air tappings in the pipelines to allow for evacuation of all entrapped air in each pipe segment to be tested. After completion of the tests, such taps shall be permanently plugged. Care shall be taken to see that all air vents are open during filling.

B. The pipeline shall be filled at a rate not to exceed 2-feet per second as calculated by using the cross-sectional area based on the inside diameter of the pipe and which will not cause any surges or exceed the rate at which the air can be released through the air valves at a reasonable velocity and all the air within the pipeline shall be properly purged. After the pipeline or section thereof has been filled, it shall be allowed to stand under a slight pressure for at least 24 hours to allow the concrete or mortar lining, as applicable, to absorb what water it will and to allow the escape of air from any air pockets. During this period, bulkheads, valves, and connections shall be examined for leaks. If leaks are found, corrective measures satisfactory to the Engineer shall be taken.

C. The hydrostatic test shall consist of holding the test pressure on the pipeline for a period of 4 hours. The test pressure for distribution and transmission pipelines shall be as shown on the drawings measured at the lowest point of the pipeline section being tested. No pressure test will be required for overflow/drain lines. All visible leaks shall be repaired in a manner acceptable to the Engineer.

D. In the case of pipelines that fail to pass the prescribed leakage test, determine the cause of the leakage, take corrective measures necessary to repair the leaks, and again test the pipelines at no additional cost to the Department.

E. The pipeline shall be drained after successful completion of the hydrostatic test.

3.8 DISINFECTING PIPELINES

A. General: All potable water pipelines shall be disinfected in accordance with the requirements of ANSI/AWWA C651 - Disinfecting Water Mains as modified herein.

B. Prior to disinfecting the pipeline for potable water services and before placing into service for other water pipelines, flush the pipeline to remove any debris, rocks, or other foreign material that may have entered the pipe. Provide all required material, labor and equipment to complete flushing. Provide the water for flushing. Make appropriate provision and preparations for disposal of flushing water, satisfying all local, state and federal rules, laws, regulations and ordinances.

C. Continuous Feed Method: Disinfect in accordance with ANSI/AWWA C651 except that:
   1. The water in the pipe shall contain 50 mg/l free chlorine.
   2. After 24 hours of disinfection, the residual free chlorine shall be at least 25 mg/l at the pipeline extremities.

D. Chlorinating Valves: During the process of chlorinating the pipelines, all valves and other appurtenances shall be operated while the pipeline is filled with the heavily chlorinated water.

E. Final Flushing: After the applicable retention period, the heavily chlorinated water shall be flushed from the pipeline until chlorine measurements show that the concentration in the water leaving the pipeline is no higher than that generally prevailing in the system or is acceptable for domestic use. If there is any question that the chlorinated discharge will cause damage to the environment, a reducing agent shall be applied to the water to neutralize thoroughly the chlorine residual remaining in the water. See the appendix of AWWA C651 for acceptable neutralization methods for heavily chlorinated water.

F. Sampling Ports: Provide sampling ports along the pipeline as defined in AWWA C651. Taps may be made at manways and air valves to help facilitate the spacing requirement.

G. Bacteriological Testing: After final flushing and before the pipeline is placed in service, a sample, or samples shall be collected from the end of the line and at other locations as designated by the Engineer, and shall be tested by JVWCD for bacteriological quality in accordance with the requirements of the State Department of Health or other appropriate regulatory agency. For this purpose the pipe shall be refilled with fresh potable water and left for a period of 24 hours before any sample is collected. Should the initial disinfection treatment fail to produce

satisfactory bacteriological test results, the disinfection procedure shall be repeated until acceptable results are obtained.

3.9 CONNECTIONS TO EXISTING SYSTEM

A. Where connections are to be made to an existing potable water system, the interior surfaces of all pipe and fittings used in making the connections shall be swabbed or sprayed with a one percent hypochlorite solution before they are installed. Thorough flushing shall be started as soon as the connection is completed and shall be continued until discolored water is eliminated.

END OF SECTION

March 16, 2016

SECTION 02618S

DRAINAGE PIPE LINER

Add Section 02618:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Drainage lining methods such as polyvinyl chloride (PVC) fold-and-form, cured in place pipe (CIPP), and segmental thermoplastic pipe.

1.2 RELATED SECTIONS

A. Section 02610: Drainage Pipe

1.3 REFERENCES

A. AASHTO M 326: Polyethylene (PE) Liner Pipe, 300- to 1600-mm Diameter, Based on Controlled Outside Diameter

B. AASHTO LRFD Bridge Design Specifications

C. ASTM D 790: Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

D. ASTM D 1784: Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

E. ASTM D 5813: Cured-In-Place Thermosetting Resin Sewer Piping Systems

F. ASTM F 1216: Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube

G. ASTM F 1504: Folded Poly (Vinyl Chloride) (PVC) Pipe for Existing Sewer and Conduit Rehabilitation

H. ASTM F 1743: Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)

I. ASTM F 1867: Installation of Folded/Formed Poly (Vinyl Chloride) (PVC) Pipe Type A for Existing Sewer and Conduit Rehabilitation

J. ASTM F 1871: Folded/Formed Poly (Vinyl Chloride) Pipe Type A for Existing Sewer and Conduit Rehabilitation

K. ASTM F 1947: Installation of Folded Poly (Vinyl Chloride) (PVC) Pipe into Existing Sewers and Conduits

L. ASTM F 2019: Rehabilitation of Existing Pipelines and Conduits by the Pulled in Place Installation of Glass Reinforced Plastic (GRP) Cured-in-Place Thermosetting Resin Pipe (CIPP)

1.4 DEFINITIONS Not Used

1.5 SUBMITTALS

A. Include the following information into a single submittal for review for each drainage pipe to be lined. Use the naming convention used in the plans for each location. Divide information into the sections listed below.
   1. Work Area
      a. Locations and dimensions of any temporary access roads
      b. Locations and dimensions of pipe liner assembly and insertion area “footprints”
      c. Distance of insertion footprint from the traveled way
      d. Amount of time the footprint will be exposed
      e. Shoring method when excavation is proposed
      f. Written access agreements from property owners when work area is outside Department Right of Way
   2. Preparation
      a. Host pipe cleaning
      b. Management of flows in the host pipe
      c. Initial pipe inspection
   3. Installation
      a. Method of pipe liner installation and finishing
      b. Bulkhead and grouting details for segmental thermoplastic and metal liner
      c. Curing method identifying required curing times, temperatures, and pressures
      d. Any potential for producing contaminant concentrations in excess of surface water quality standards or ambient groundwater quality standards, as applicable

e. Control and disposal of any contaminants from materials or installation methods during and after installation
f. Final pipe inspection

4. Product Data
   a. Structural calculations and recommended size and wall thickness of pipe liner. The host pipe is considered to be fully deteriorated and unable to carry loads.
      1) Meet or exceed AASHTO HL-93 or interstate alternate loading according to AASHTO LRFD Bridge Design Specifications and interim specifications for pipe liner load capacity.
   b. Maximum allowable external grouting pressure on pipe liner and joints for segmental thermoplastic liners.
   c. Certification that the pipe liner supplied will provide a minimum 75 year service life based on site characteristics such as such as soil resistivity, soil and water pH, and abrasion potential.
5. Mix Designs
   a. Grout Mix design
   b. Trial batch test data

PART 2 PRODUCTS

2.1 PVC FOLD-AND-FORM LINER

A. PVC resin manufactured from virgin materials containing no fillers.
   1. Meet or exceed the physical property requirements in ASTM F 1504 or ASTM F 1871 for the cell classification as defined in ASTM D 1784.

B. Do not use greater than 24 inch diameter.

2.2 CIPP LINER

A. Fabric tube consisting of one or more layers of absorbent non-woven felt fabric, felt/fiberglass, or fiberglass meeting the requirements of ASTM D 5813 and ASTM F 1216, ASTM F 1743, and ASTM F 2019.
   1. CIPP liner that meets or exceeds the following physical properties outlined in Table 1.

Table 1

Minimum Physical Properties		
Property	**Test Method ASTM**	**Value**
Initial Flexural Modulus	ASTM D 790	250,000 PSI @73º F
Flexural Strength	ASTM D 790	4,500 PSI @73º F

2. Use a sufficient quantity of resin for impregnation to fill the volume of air voids in the pipe liner with additional allowance for polymerization and for any migration of resin into the cracks and joints in the host pipe.
   a. Color the resin with a pigment compatible with the resin system as specified by the resin manufacturer.

2.3 SEGMENTAL THERMOPLASTIC LINER

A. Solid wall or profile wall segmental thermoplastic pipe liner having fused or interlocking joints.
   1. Solid wall polyethylene pipe. Refer to AASHTO M 326.
   2. Profile wall thermoplastic pipe. Refer to Section 02610.

2.4 SEGMENTAL METAL LINER

A. Not used

2.5 GROUT

A. Cementitious grout mixture that is approved by the pipe liner manufacturer having the following characteristics.
   1. Suitable with the site conditions, construction methods, and pipe liner structural capacity.
   2. Compressive strength between 100 and 400 psi
      a. Determine strength from trial batches at 28 days
   3. Fluidity to completely fill voids and the annular space between the host pipe and the pipe liner without segregating
   4. Fly ash not to exceed 30 percent of cementitious material
   5. Shrinkage not to exceed 1 percent by volume

B. Obtain approval from the Engineer for an alternate material.

PART 3 EXECUTION

3.1 GENERAL

A. Furnish the type of drainage pipe liner shown in the plans with the following exception:
   1. Select from any of the drainage pipe liner products listed in this Section, Part 2 meeting the allowable pipe size reduction when no specific product is shown in the plans.

3.2 PREPARATION

A. General
   1. Perform all work within the limits of the Department right of way unless written agreements are in place with adjacent property owners.
   2. Provide adequate control of water in the host pipe when necessary.
      a. Repair damage caused as a result of flow control or lack thereof.
   3. Provide the necessary controls to prevent material from being transported downstream.

B. Host Pipe Cleaning
   1. Remove all material to include sediment, rocks, and miscellaneous debris to inspection and install the pipe liner.
   2. Use a cleaning method and tools that will not cause damage to the pipe or surrounding roadway features.
      a. Notify the Engineer when cleaning could result in damage.
      b. Do not cause erosion of surrounding areas from cleaning operations.
      c. Minimize sediment from being transported downstream.
   3. Collect and properly dispose of all material removed.

C. Host Pipe Inspection
   1. Perform remote inspection for pipes with a nominal diameter less than 48 inches using a closed-circuit television (CCTV) crawler.
   2. Perform a visual inspection for pipes with diameter greater than 48 inches.
   3. Inspect the condition of the host pipe and the suitability of the pipe liner installation. Document and notify the Engineer of the following:
      a. Collapsed or impassable sections of the pipe
      b. Horizontal or vertical alignment deviations
      c. Structural concerns
      d. Loss of material surrounding the pipe exterior
      e. Infiltration of water

f. Repairs required to perform the installation

4. The Department reserves the right to eliminate pipe lining from the contract if the Engineer determines that a host pipe cannot be lined.

D. Drainage Pipe Liner

1. Verify host pipe internal size and length before ordering pipe liner.
2. PVC fold-and-form and CIPP liner dimensions
   a. Size the pipe liner to have an outside diameter that will tightly fit the inside of the host pipe.
   b. Provide sufficient pipe liner length to continuously line the host pipe with no intermediate joints.
3. Segmental Thermoplastic liner dimensions
   a. Size the pipe liner to have an outside dimension that will freely pass through the host pipe and accommodate grout placement.
   b. Use only one type of pipe liner and joint system in any single host pipe.

3.3 INSTALLATION

A. General

1. Remove all sediment and debris that might have accumulated after the initial cleaning immediately before installing the pipe liner.
2. Handle and install the pipe liner in a manner that will not cause damage to the pipe liner.
3. Provide a smooth finish and a tight seal between the pipe liner and the drainage structure walls at pipe penetrations.
4. Restore all lateral and inlet connections.
5. Reinspect the rehabilitated pipe upon completion and before acceptance by the Engineer.
   a. Evaluate pipe liners that contain dry spots, wrinkles, delamination, holes, cracks, joint gaps, soft spots, blisters, or other defects.
      1) Repair or replace damaged or improperly installed pipe liner.

B. PVC fold-and-form and CIPP Liner

1. Meet minimum installation requirements according to ASTM F 1867 or ASTM F 1947 for PVC fold-and form
2. Meet minimum installation requirements according to ASTM F 1216 or ASTM F 1743 for CIPP.
3. Follow the manufacturer's recommended curing and relaxation period required to hold the pipe liner against the host pipe.

a. Provide sufficient gauges, monitoring devices, and tests to determine the effectiveness of the curing.

C. Segmental Thermoplastic Liner

1. Construct a bulkhead at each end of the host pipe to fully support the fluid thrust loads exerted by the placement of grout.
   a. Vent bulkheads to allow release of trapped air as the grout flows into the annular space.
2. Provide a minimum of 24 hrs for the pipe liner temperature to equalize within the host pipe before placing grout.
3. Fill the entire full length of annular space between the host pipe and the pipe liner with grout.
   a. Provide sufficient gauges, monitoring devices, and tests to determine the effectiveness of the grout placement.
4. Do not exceed the pipe liner maximum specified grouting pressure.
   a. Use a pumping unit with a pressure meter and valves capable of limiting grout pumping pressures to the maximum pressure recommended by the manufacturer at the end of the discharge pipe.
5. Place grout in lifts to avoid excessive buoyant forces or grouting pressures.
   a. Allow each lift to cure sufficiently before proceeding with next lift.
6. Remove any internal braces or bands once the grout is sufficiently cured and before acceptance.

END OF SECTION

June 30, 2016

SECTION 02621S

PIPELINE COATING AND LINING

Add Section 02621:

PART 1 GENERAL

1.1 REQUIREMENTS

A. This section covers the work necessary to apply external coating and internal lining on steel pipe, field coating of joints, and field repair of coating damage, complete.

B. Steel pipe shall be supplied from the fabricator with a tape wrap coating system and the dielectric coating system shall be over coated with cement mortar.

C. Schedule and coordinate the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.

1.2 RELATED SECTIONS

A. Section 02570S: Steel Pipe

B. Section 02575S: Steel Pipe Fabricated Specials

C. Section 13114S: Corrosion Monitoring

D. Section 13115S: Cathodic Protection

1.3 REFERENCES

A. This specification recognizes AWWA, NACE, and SSPC standards as minimum industry standards and they are referenced for purpose of conformance, except where modified in this section. The requirements of this specification section have been written to a higher design standard with the intent of achieving a long term coating performance of 100 years.

B. AWWA C205: Cement-Mortar Protective Lining and Coating for Steel Water Pipe-4-inch and Larger- Shop Applied.

C. AWWA C210: Liquid-Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines.

D. AWWA C214: Tape Coating Systems for the Exterior of Steel Water Pipelines.

E. AWWA C216: Heat-shrinkable Cross-linked Polyolefin Coatings for the Exterior of Special Sections, Connections, and Fittings for Steel Water Pipelines.

F. NACE RP-0274: High Voltage Electrical Inspection of Pipeline Coatings Prior to Installation.

G. SSPC-SP-1: Solvent Cleaning Surface Preparation

H. SSPC-SP-2: Hand Tool Cleaning Surface Preparation

I. SSPC-SP-3: Power Tool Cleaning Surface Preparation

J. SSPC-SP-5: White metal Abrasive Blast Surface Preparation

K. SSPC-SP-6: Commercial Abrasive Blast Surface Preparation

L. SSPC-SP-10: Near White Metal Abrasive Blast Surface Preparation

M. SSPC-SP-11: Power Tool Cleaning to Bare Metal

1.4 DEFINITIONS

A. Manufacturer's Representative: Employee of coating manufacturer who is factory trained and knowledgeable in all technical aspects of their products and systems. Sales representatives are not acceptable as a technical representative unless written authorization from the coating manufacture is provided which states the sales representative has full authority to act on the behalf of the coating manufacturer.

1.5 SUBMITTALS

A. Shop Drawings: Catalog cuts and other information for all products proposed. Provide copy of approved coating system submittals to the coating applicator.

Quality Control Submittals: Furnish the following:

1. Applicator's Experience with list of references substantiating compliance.
2. Coating manufacturer's certification stating the individual coating applicators have met the qualification certification requirements as specified this section.
3. Coating manufacturer shall provide a copy of the manufacturer's coating application quality assurance manual.
4. If the manufacturer of field-applied coating differs from that of the shop applied primer, provide written confirmation from both manufacturers' that the two coating materials are compatible.

1.6 QUALITY ASSURANCE

A. Coating Applicator's Experience and Certification:
   1. Coating Application Company and coating application supervisor (Certified Applicator) shall have a minimum of 5 year's experience applying the specified coating system.
   2. Coating application personnel, whom have direct coating application responsibility, shall have a minimum of 2 years practical experience in application of the indicated coating system.
   3. Coating applicator shall be certified by the coating manufacturer as an approved applicator.

B. Coating and/or lining manufacturer technical representative shall be present for a minimum of one day technical assistance and instruction at the start of coating and/or lining operations within the shop. During this visit, the technical representative shall observe surface preparation and coating application and conduct tests of the coating to insure conformance with application instructions, recommended methods, and conditions.

C. Coating and/or lining manufacturer's technical representative shall be onsite for one working day, minimum, at the start of each construction season to inspect coating application and procedures in the field. During this visit, the technical representative shall observe surface preparation and coating application and conduct tests of the coating to insure conformance with application instructions, recommended methods, and conditions.

D. Coating and/or lining manufacturer shall include 8 hours per month of field or shop coating technical support when requested by the Engineer.

E. Technical representative shall provide a written report to the Engineer for each visit. Report shall include copies of test data collected, description of observations, and all recommended corrective actions. Report shall be submitted within 5 working days after the visit. When deemed necessary by the Engineer, work will not be permitted to proceed until the recommended corrective actions have been implemented. After all corrective recommendations have been completed; the manufacturer representative shall return and certify that the application complies with the manufacturer's coating application recommendations.

F. Additional visits by the manufacturer's representative shall be made at sufficient intervals during surface preparation and coating or lining as may be required for product application quality assurance, and to determine compliance with manufacturer's instructions, and as may be necessary to resolve problems attributable to, or associated with, manufacturer's products furnished for this project.

1.7 ABBREVIATIONS

MDFT	Minimum Dry Film Thickness
mil	Thousandths of an Inch

1.8 SPECIAL WARRANTY REQUIREMENTS

A. Warrant to the Department and guarantee the work under this section against defective workmanship and materials for a period of two (2) years commencing on the date of final acceptance of the work.

1.9 OBSERVATION OF WORK

A. Give the Department Representative a minimum of 14 days advance notice of the start of any work to allow scheduling for shop or field observation.

B. Provide Department Representative a minimum 3 days' notice for actual start of surface preparation and coating application work.

C. Provisions shall be made to allow Department's representative full access to facilities and appropriate documentation regarding coating application.

D. Observation by the Department's representative or the waiver of observation of any particular portion of the work shall not be construed to

relieve the responsibility to perform the work in accordance with these Specifications.

E. Materials shall be subject to testing for conformance with this specification as the Department's representative may elect, prior to or during incorporation into the work.

PART 2 PRODUCTS

2.1 GENERAL

A. Coatings and linings will be stored and handled per manufacturer's written directions.

B. Exterior and interior pipe and fitting surfaces shall be prepared and coated in accordance with referenced standards, written instructions of the coating or lining manufacturer, and these specifications, whichever is more stringent.

C. Pipeline coating or lining shall be the product of a single manufacturer. Product substitutions during the project will not be permitted, without ENGINEER approval.

2.2 SHOP-APPLIED EXTERIOR COATINGS

A. General
1. Steel pipe shall be coated in accordance with AWWA C214, except as modified herein.
2. Mortar over coat of dielectric coating shall be provided over Tape Wrap coating system (C214) and where specified or indicated on the Drawings. Steel pipe to receive a cement mortar overcoat shall be shop-coated with the required coating system and a 1-inch thick, minimum, cement mortar overcoat as specified herein.
3. Buried dielectrically coated pipe and fittings passing through a concrete structure wall or floor shall be coated for a minimum of two-inches beyond the interior wall or floor surface.

B. Polyethylene Tape Wrap:
1. Pipe shall be coated with an 80 mil (nominal), tape-coating systems applied in accordance with AWWA C214, except as modified herein.
   a. Primer: Polyken 1019, 1027, 1029, or as recommended by the coating manufacturer.

b. Weld Stripe Tape: Polyken 931 (no backing), 25 mils nominal, 4-inches wide minimum.
c. Inner Wrap: Polyken 989 YGIII, 20 mils nominal, corrosion protection layer.
d. Middle Wrap: Polyken 955 YGIII, 30-mils nominal, mechanical protection layer. **Middle wrap may be eliminated when a cement mortar overcoat is required.**
e. Outer Wrap: Polyken 956 YGIII, 30 mils nominal, mechanical protection layer.
f. Surface Preparation:
(1) Steel Pipe: SSPC-SP5, White Metal blast, 2.5 mils blast profile, minimum.

2. Tape Coating:
a. Tape layers shall have adhesive for the full width of the tape. Adhesive shall have the ability to stick to itself and to the proceeding tape layer or pipe.
b. Each layer shall be a different color or shade with the outer layer white.
c. Outer wrap shall have sufficient ultraviolet (UV) inhibitors to resist above grade exposure for a minimum of 12 months or the proposed storage and construction time, whichever is greater.
d. Tape width shall be 12-inches maximum. Wider tape will be conditionally allowed if the coating applicator can demonstrate that proper tensioning can be maintained and mechanical wrinkling prevented throughout the coating application. If at any time during the pipe fabrication tape quality becomes inconsistent with a wider tape, the Engineer can require the remainder of the pipe to be coated using the maximum specified tape width.
e. Tape coated steel pipe shall be provided with a cement mortar overcoat as specified this section.

C. Plural Component Epoxy:
1. General:
a. Plural component, epoxy coating system shall be applied as specified herein with the exception that AWWA C210 is incorporated by reference for product qualification and application requirements only.
b. Where there is a conflict between C210 and this specification, the more stringent requirement shall apply.
2. Shop Surface Preparation:

a. Steel pipe: SSPC-SP5, White Metal blast, 3.00 mil profile, minimum, or as required by the manufacturer, whichever is greater.

3. Shop Applied Coating Requirements:
   a. Thickness: One coat, 35 mils total dry film thickness, minimum, or as required to meet limits specified for holiday and coating defects, this section.
   b. Epoxy: Self-priming, plural component, 100 percent solids, non-extended epoxy, suitable for burial or immersion, and meeting the requirements of AWWA C210 and the following, whichever is more stringent:
      1) Resistance to Water Immersion (ASTM D870) or Wet Adhesion
         a) Acceptance criteria:
            (1) Not greater than 10 percent loss of substrate adhesion when compared to substrate adhesion in an unexposed area of the same sample with adhesion tests completed within 12 to 24 hours after test termination. Average of three pulls per exposure area.
            (2) No blistering or underfilm corrosion when viewed at 10x magnification.
         b) Adhesion Testing:
            (1) Method: ASTM D4541, Method E
            (2) Equipment: Type V, Delfesko Automatic AT Positest
            (3) Dollies: 20 mm and 14 mm, scored to metal substrate
            (4) Test Speed: 100 psi per second (both 14 and 20 mm)
         c) Test Duration: 30 and 60 days
      2) Cathodic Disbondment (ASTM G95)
         a) Acceptance criteria: 8 mm, maximum
         b) Potential: -3.00 volts
         c) Test Duration: 28 days
         d) Evaluation: Measured from original holiday radius to edge of staining on metal surface.
      3) Water Absorption (ASTM D570)
         a) Acceptance Criteria: 1.80 percent, maximum
         b) Test Duration: 30 day and 60 day
      4) Long-Term Adhesion Test:

(a) Acceptance Criteria: Not more than 10 percent loss of adhesion over duration of test. Differential based on the highest average adhesion result to the lowest average adhesion result.

(b) Test Duration: 1 day, 7 days, 3 weeks, 2 months, and then monthly for total test duration of 12 months.

(c) Sample Preparation:

(1) SSPC-SP5, white metal abrasive blast, 3.00 mils profile, minimum.

(2) Test area shall not exceed 18-inches by 18-inches.

(3) Steel plate shall be a curved steel plate with a minimum radius of 15 inches to minimize standing water on the test panel.

(4) Sample shall be exposed to ambient, outdoor conditions for the full duration of the test.

(d) Test Procedure:

(5) Long term adhesion shall be based on an 8 pulls per test period with the 3 lowest pulls discarded.

(6) Test results per each test period shall be an average of the five highest pulls.

(7) All adhesion pulls and their failure mode shall be recorded and those included in the average calculation shall be identified.

(8) All adhesion tests shall be repaired to prevent water runoff from affecting subsequent adhesion tests.

c. Shall be one of the following products:

(1) Tnemec Series 431, Kansas City, MO

(2) Or approved equal

D. Cement Mortar Overcoat

1. Cement mortar overcoat shall be applied over tape wrap coating system (C214) on steel pipe and fittings in accordance with AWWA C205, except as modified herein.

2. Holdback:

a. Mortar overcoat shall be held back of dielectric coating a minimum of 3 inches for overlap of field applied joint coating onto dielectric coating system.

3. Shop Applied Coating System:
   a. Cement: Conform to ASTM C150, Type II.
   b. Aggregate shall be silica sand or other aggregate that is not subject to leaching. Conform to ASTM C33.
   c. Cement mortar mixture shall consist of 1 part cement to not more than 3 parts aggregate.
   d. Water for cement mortar: Clean and free from organic matter, strong alkalis, vegetable matter, and other impurities. Use no more than 4-1/2 gallons of water per sack of cement.
   e. Cement mortar coating: Nominal 1-inch thick coating with permitted tolerance of ±1/4-inch.

2.3 SHOP-APPLIED INTERIOR LININGS

A. Cement Mortar Lining:
   1. Clean and cement mortar line steel pipe and fittings in accordance with AWWA C205.
   2. Cement: Conform to ASTM C150, Type II.
   3. Shop applied cement mortar lining shall be uniform in thickness over the full length of the pipe joint.
   4. Aggregate shall be silica sand or other aggregate that is not subject to leaching. Conform to ASTM C33.
   5. Water for cement mortar: Clean and free from organic matter, strong alkalis, vegetable matter, and other impurities.

B. Liquid Applied Epoxy Coating:
   1. Cement Mortar Lined Steel Pipe:
      a. Provide liquid epoxy primer and lining in all cement mortar lined metallic pipe at insulating joints for a minimum of two pipe diameters centered over the insulated joint.
      b. Epoxy lining shall be polyamine or polyamide cured, NSF approved for potable water contact in accordance with ANSI/NSF Standards 60 and 61, and capable of achieving full cure before placement in service or exposure to water.
      c. Application:
         (1) Apply in two coats at equivalent spread rate for 6 mils dry film thickness per coat with coating application efficiency of 80 percent.
         (2) Epoxy shall be applied over the cement mortar lining where specified for the pipeline lining material.

(3) Cement mortar shall be allowed to cure for a minimum of 15 days prior to surface preparation and coating application or 7 days with steam curing. Mortar lining shall be dry when epoxy lining is applied.

(4) Prepare the cement mortar lining by abrasive blasting to remove all laitance and provide a surface profile equivalent to 80 grit sandpaper.

2. Steel Pipe Lining:
   a. Where epoxy lining is specified or shown on drawings, epoxy lining shall be applied directly to the steel surface.
   b. Surface Preparation: SP-5, White Metal Abrasive Blast
   c. Epoxy Lining: Polyamine or polyamide high build epoxy, NSF 60 and 61 approved, suitable for continuous immersion, and capable of achieving full cure before placement in service or exposing to water.
   d. Application: Apply in three coats at 5 mils minimum dry film thickness per coat with separate stripe coat at welds.

2.4 FIELD APPLIED COATINGS

A. General
   1. All buried miscellaneous metal components installed on the pipeline and that is supplied bare or with a shop coating system that is not equal to the specified pipeline coating shall be coated in the field with one of the following coating systems.
   2. Miscellaneous metal components shall include, but not be limited too, all exposed metals surfaces, including bolts, couplings, flanges, valves, adapters, pipe spools, and other miscellaneous metal components.
   3. Coating system applied shall conform to the manufacturer's requirements and shall be applied in accordance with the application requirements of the coating system.

B. Epoxy Coating:
   1. Coating System:
      a. Surface Preparation: SP11 Power Tool to Bare Metal or SSPC-SP10, near white abrasive blast, 2.5 mils blast profile, minimum.
      b. Primer: As required by the coating manufacturer.
      c. High Build Epoxy Coating:
         (1) Two component, high build polyamide or polyamine cured epoxy coating, suitable for direct burial or immersion, dries to touch in 2 or more hours, suitable for immersion or burial after full cure of coating.

(2) Acceptable manufacturers:
(a) ICI Devoe
(b) Sherwin Williams
(c) Carboline
(d) Or approved equal

d. Fast Cure Epoxy Coating:
(1) Two component, 100% solids by volume, fast cure epoxy coating suitable for direct burial or immersion, dry to touch in less than 1 hour at 72 degrees, capable of curing while immersed or buried.
(2) Acceptable Manufacturers:
(a) TC 7010, Tapecoat Inc
(b) Protal 7125, North American Denso

2. Application:
a. Epoxy coatings on interior of pipe shall be NSF approved coatings suitable for potable water contact in accordance with ANSI/NSF Standards 60 and 61, unless otherwise approved by the Engineer.
b. Ensure that epoxy coating selected is suitable for the application temperatures anticipated and that project schedule will allow adequate cure time before backfill or immersion based on surface temperatures at the time of application.
c. Epoxy coating shall be used for coating concrete embedded surfaces to a distance of 4 inches outside the interior and exterior surfaces of concrete wall or floors. Epoxy coating at concrete penetrations shall be a minimum of 12 mils dry film thickness.

C. Heat Shrink Sleeves:
1. Coating System:
a. Surface preparation: SP11 Power Tool to Bare Metal or SSPC-SP10, near white abrasive blast.
b. Filler Material:
(1) Filler material shall adhere to the pipe and heat shrink sleeve. Size and type shall be as recommended by the sleeve manufacturer for type of pipe and joint.
(2) Filler mastic for joints subject to weld after backfill shall exceed 500 degrees F melting temperature.
c. Heat Shrink Sleeve:
(1) Heat shrink, cross-linked polyolefin wrap or sleeve with a mastic sealant, 85-mils nominal thickness, suitable for pipeline operating temperature, as recommended by the manufacturer.

(2) Provide standard recovery sleeve for welded or bell and spigot steel pipe joints. High recovery sleeves shall be provided for mechanical or bell and spigot ductile iron pipe, flange joints, and coupling style joints.

(3) Width of heat shrink sleeves shall be sufficient to overlap existing coating 2-inches minimum. Overlap on tape coated steel pipe shall be based on a sequential 2-inch wide step from outer wrap to middle wrap to inner wrap.

(4) Sleeve shall meet requirements for "Well After Backfill" when allowed and approved by Engineer.

d. Coating Manufacturer's:

(1) Canusa,

(2) Raychem-Covalence,

(3) Or equal.

2. Application:

a. Heat shrink sleeves shall be applied to buried or concrete encased pipeline joints only. Application on vault piping or where exposed to the weather will not be allowed.

b. Provide filler material for all rolled or Carnegie joints, flanges, and couplings and all step changes greater than 1/8-inch.

c. Filler material shall be applied in a manner and of sufficient thickness that no tenting or voids remain under the heat shrink sleeve.

d. Consider sleeve shrinkage and joint profile in determining sleeve width required. Overlapping of two or more heat shrink sleeves to achieve the necessary width on pipe joints will not be permitted without Engineer approval.

e. All transitions from tape wrap to epoxy or other brush, roller, or spray applied protective coating system shall be coated at the transition with a heat shrink sleeve with minimum 3-inch overlap onto both coating systems.

2.5 SPECIALS, FITTINGS, AND CONNECTIONS

A. Coating and lining application for special sections, connections, and fittings for steel pipe shall conform to coating system and application requirements as specified this section.

B. Specials, fittings, and connections shall be defined as any pipe section with turnouts for blowoffs, interconnects, any valve, or other appurtenances; tees; crosses; wyes; laterals; manholes; mitered angles or elbows; and pipes which require special fabrication that prevents

mechanical production application of the specified coating system from end to end of pipe joint.

C. In addition to the items listed as specials, the following items shall also be considered as specials:
   1. All pipe joint sections entering a structure.
   2. Pipe joints with pass through holes.

D. Hand applied tape coatings will not be permitted on any specials, valves, fittings, connections, and couplings.

E. Specials, fittings, and connections shall be externally coated with a plural component epoxy coating system, applied from end to end of pipe joint on all specials, fittings, and connections.

2.6 EXTERIOR PIPE JOINT FIELD COATING

A. Pipe joints shall be field coated after pipe assembly in accordance with AWWA C216, except as modified this section.

B. Field joint coating shall be compatible with the shop-applied coating system.

C. All joints on pipe shall be coated with a heat shrink coating material.

D. Field joint coating materials shall be as specified for Field Applied Coatings, this section.

2.7 FIELD APPLIED INTERIOR JOINT COATING

A. Mortar Lining:
   1. After the backfill has been completed to final grade, the interior joint recess shall be filled with grout. The grout shall be tightly packed into the joint recess and trowelled flush with the interior surface. Excess shall be removed.
   2. At no point shall there be an indentation or projection of the mortar exceeding 1/16-inch.
   3. With pipe smaller than 24-inches in diameter, before the spigot is inserted into the bell, the bell shall be daubed with grout. The joint shall be completed and excess mortar on the inside of the joint shall be swabbed out.

2.8 REPAIR OF COATINGS AND LININGS

A. General
   1. Coating or lining repair materials shall be compatible with the shop-applied coating or lining system and shall be approved by the coating or lining manufacturer.
   2. Coating repair materials shall be as required for the coating system and repair classification as defined this section.

B. Coating Repair Materials
   1. Heat Shrink Sleeves (major repair):
      a. Filler Mastic: Provide mastic filler to fill tape void as required.
      b. Full Wrap Coating: Cross-linked polyolefin wrap with a mastic sealant, 85-mil thickness nominal, suitable for pipeline operating temperature, sleeve material recovery as recommended by the manufacturer. Sleeve length shall provide a minimum of 3 inches overlap onto intact pipe coating.
      c. Manufacturer's: Canusa, Raychem (Polyken), or equal
   2. Heat-Applied Patches (minor repair)
      a. Heat applied adhesive, polyolefin backed, mastic coated tape, 12-inches maximum size.
      b. Patch shall provide a minimum of 2 inches overlap onto intact pipe coating.
      c. CRP patch as manufactured by Canusa, PERP patch as manufactured by Raychem (Polyken), or equal.
   3. Plural Component Epoxy Coating or Lining
      a. Major repairs in the shop will be completed using the coating material specified for the coating or the lining. Coating shall be reapplied using plural component spray equipment by a manufacturer certified coating applicator.
      b. Major repairs in the shop or field shall be completed using heat shrink sleeves as specified this section.
      c. Coating material for minor repairs shall be single use epoxy or polyurethane kits similar to the existing coating
      d. Pinhole holidays or adhesion test coating repairs shall be with minor repair coating material specified or fast cure epoxy, such as Protal 7125 as manufactured by North American Denso, Inc.

PART 3 EXECUTION

3.1 ENVIRONMENTAL LIMITATIONS

A. General

1. Products shall comply with federal, state, and local requirements limiting the emission of volatile organic compounds and worker exposure.
2. Comply with applicable federal, state, and local, air pollution and environmental control regulations for surface preparation, blast cleaning, disposition of spent aggregate and debris, and coating application.
3. Do not perform abrasive blast cleaning whenever the relative humidity exceeds 85 percent, whenever surface temperature is less than 5 degrees above the dew point of the ambient air.
4. Do not apply coatings when:
   a. Surface and ambient temperatures exceeds the maximum or minimum temperatures recommended by the coating manufacturer or these specifications,
   b. In dust or smoke-laden atmosphere, blowing dust or debris, damp or humid weather, or under conditions that could cause icing on the metal surface.
   c. When it expected that surface temperatures would drop below 5 degrees above dew point within 4 hours after application of coating.
   d. Whenever relative humidity exceeds 85 percent.
5. Where weather conditions or project requirements dictate, provide and operate heaters and/or dehumidification equipment to allow pipe surfaces to be abrasive blasted and coated as specified and in accordance with the manufacturers coating application recommendations.
6. Work activities can be restricted by the ENGINEER until adequate temperature and humidity controls are in place and functioning within the environmental limits specified.
7. Coating applicator shall provide a monitoring system approved by the coating manufacturer that constantly records pipe and coating conditions during coating application. Recorded monitoring parameters shall include pipe temperature, line speed, holiday test and other parameters applicable to the type of coating.

B. Temperature Control
1. In cold weather or if moisture collects on the pipe, preheat pipe to a temperature between 45 and 90 degrees or 5 degrees above dew point, whichever is greater.
2. When temperatures are above or below the coating manufacturers recommended application temperatures, provide temperature controls as necessary to permit work to precede within the manufacturer's temperature limitations.

3. Provide tenting, insulating blankets, baffles, or bulkheads as required to zone and control heating or cooling effectiveness.
4. Heating shall be with indirect fired heaters that do not increase humidity levels within the work area. Heaters shall be sized for the area to be heated.

3.2 SURFACE PREPARATION

A. General
1. Inspect and provide substrate surfaces prepared in accordance with these Specifications and the printed directions and recommendations of coating manufacturer whose product is to be applied.
2. Visible oil, grease, dirt, and contamination shall be removed in accordance with SSPC-SP1, solvent cleaning.
3. Surface imperfections such as metal slivers, burrs, weld splatter, gouges, or delaminations in the metal shall be removed by filing or grinding prior to abrasive surface preparation.
4. Protect prepared pipe from humidity, moisture, and rain. All flash rust, imperfections, or contamination on cleaned pipe surface shall be removed by reblasting.
5. Priming and coating of pipe shall be completed the same day as surface preparation.

B. Weld Surface Preparation
1. Requirements:
   a. Spray applied coating systems do not require weld grinding.
   b. Welds on tape wrap coated pipe shall be either ground flush or a weld stripe tape applied over the weld, at the pipe fabricator's option, unless otherwise specified.
2. Weld Grinding:
   a. Under the weld grinding option, welds higher than 1/32 inch above pipe surface shall be ground to a tolerance of +1/32 inch to 0-inch above the pipe surface as measured on the lowest side of the weld.
3. Weld Stripe Tape:
   a. Weld stripe tape will be applied to primed metal.
   b. Tape will either have no polyethylene backing or will be double sided adhesive tape to permit adhesion of the inner corrosion protection layer to the weld stripe tape.
   c. Apply tape with a pressure roller to fully conform the tape to the weld surface.
   d. Adhesion of the weld stripe tape shall be as specified for the coating system.

C. Steel Surface Preparation

1. Surface preparation of steel pipe shall be in accordance with SSPC surface preparation standards utilizing the degree of cleanliness specified for the coating system to be applied or as specified herein, whichever is more stringent.
2. Grit and/or shot abrasive mixture and gradation shall be as required to achieve the degree of cleanliness and coating adhesion specified.
3. Pipe cleaned by abrasive blasting with recyclable steel grit and/or shot or other abrasive shall be cleaned of debris and spent abrasive in an air wash separator.
4. Polyurethane coated steel shall have a sharp angular surface profile equal to or greater than the minimum depth specified.
5. After abrasive blasting surfaces and before coating application, the metal surface shall be cleaned of residual dust to a minimum of Grade 2 per ISO Standard 8502-3, Test for the Assessment of Surface Cleanliness.
6. Work shall be performed in a manner that does not permit the cleaned metal surface to rust back or flash rust.
7. Rust back or flash rust shall be fully removed with the steel surface cleanliness equal to the metal surface cleanliness prior to rust back or flash rusting. Determination of the equivalent surface cleanliness shall be at the Engineer's sole discretion.

3.3 SHOP-APPLIED COATING SYSTEMS

A. Tape Wrap Coating

1. Applicator shall provide a monitoring system approved by the tape manufacturer that constantly records pipe and tape conditions during coating application. Recorded monitoring parameters shall include, but not be limited to, pipe temperature; line speed, primer and tape roll body temperature, and tape tension.
2. Pipe surface temperature shall be between 45 and 120 degrees and 5 degrees above dew point, whichever is greater.
3. Tape roll temperature shall be in accordance with the manufacturer's recommendations, but shall not be less than 55 degrees for the inner wrap and 65 degrees for the outer wraps.
4. Apply a uniform coat of primer as recommended by the manufacturer without skips, runs, or sags. Allow to properly dry prior to applying the tape as required by the tape manufacturer and as necessary to achieve maximum tape adhesion. Rug type application will not be allowed.
5. If welds are not ground flush, apply a weld stripe tape to longitudinal or spiral pipe welds prior to application of the inner wrap.
6. Tape layers shall be applied continuously with the use of hydro-tension tape stands. Tension shall be maintained between the manufacturer's minimum and maximum tension recommendations or as required to achieve approximately 2.0 percent reduction in tape width.
7. Inner tape wrap shall adhere tightly to the pipe surface. Coating shall be 100 percent adhering to the metal surface and shall not have any visible damage, wrinkles, voids, disbondment, contamination, or holidays.
8. Tape coating adhesion testing shall be performed on the pipe as specified this section.
9. Holidays testing shall be conducted on the inner layer tape prior to proceeding with subsequent tape layers. All holidays detected shall be primed and patch using coating repair procedures specified herein.
10. Perform coating and lining repairs as specified in this section.

B. Plural Component Epoxy Coating

1. Applicator Qualifications:
   a. Equipment will be certified by the coating manufacturer to meet the requirements for material mixing, temperature control, application rate, and ratio control for multi-part coatings.

b. Equipment not meeting the written requirements of the coating manufacturer shall be rejected for coating application until repairs or replacement of the equipment is made to the satisfaction of the Engineer.

c. Personnel responsible for the application of the coating system shall have certification of attendance at the coating manufacturer's training class within the last three years. The certified applicator shall be present during all coating application work and shall have responsibility for controlling all aspects of the coating application.

2. Pipe surface temperature shall be between 50 and 100 degrees or 5 degrees above dew point, whichever is greater.

3. Coating application shall be performed in an environmentally controlled shop area that meets or exceeds the written environmental application requirements of the coating manufacturer. Application in outdoor conditions will not be acceptable without adequate environmental shelter, environmental controls, and/or dehumidification.

4. Coating adhesion and holidays testing shall be tested as specified this section.

5. Coating manufacturer shall provide to the Engineer a copy of the manufacturer's coating application quality assurance manual prior to beginning coating application. Strict conformance to the requirements of the manual will be required. Deviation from the requirements of the manual will be grounds for the Engineer to reject the applied coating.

6. Unacceptable Coating Application

   a. Coating applied under improper environmental conditions will be rejected.

   b. Pipes that exceed the allowable quantity of coating defects, regardless of size or cause, shall be rejected.

   c. Coating which fails the adhesion or holiday testing as specified this section shall be rejected.

   d. Pipe coating that is subject to off ratio application, blistering, or is not applied in conformance with the coating manufacturer's written instructions or recommendations shall be rejected.

7. Rejected coating shall be removed from the full length of the pipe to bare metal and reapplied using proper application methods in accordance with the coating manufacturer's written instruction and the requirements of these specifications.

8. Perform coating and lining repairs as specified in this section.

C. Cement Mortar Overcoat Coatings

1. Dielectrically coated steel pipe, when specifically required or specified, shall have a cement mortar overcoat applied over the dielectric pipe coating in accordance with AWWA C205, except as modified herein.
2. Cement Mortar Overcoat:
   a. Cement mortar overcoat dielectrically coated steel pipe as specified in AWWA C205, except mortar coating shall be applied over exterior pipe coating.
   b. Mortar coating shall be held back 3 inches, minimum, behind dielectric coating system cut back at joints.
3. Coating Defects:
   a. Cracking in the mortar "armor" coat less than 1/8-inch in width will be acceptable.
   b. Disbondment of the cement coating over a dielectric coating system should be anticipated and will not be grounds for repair or rejection of the pipe.
   c. Losses of cement mortar coating due to impact, movement, or shipping damage shall be repaired in accordance with C205.
4. Joint Coating:
   a. Joints do not require field application of cement mortar overcoat when properly coated with heat shrink sleeve joint coating system.

3.4 EXTERIOR COATING HOLDBACK

A. Coating holdbacks shall be straight and cut through the full thickness of the coating.

B. Cutbacks shall be completed in a manner that permits field coating of joints in accordance with the manufacturer's recommendations and as specified herein.

C. Holdbacks shall be as required for pipe joints as listed below. Pipe manufacturer may adjust holdback limits as required for special joint assemblies, and with consideration for the joint coating provided and joint welding requirements.

Tape wrap coating	
Push-on joint, spigot	4-inches, minimum
Push-on, bell	Flush with bell end
Welded, spigot	3 inches, minimum

Welded, Bell	4-inches, minimum
Polyurethane coating	
Push-on joint, spigot	1-inch before centerline of gasket
Push-on, bell	Flush with bell end
Welded, spigot	3 inches, minimum
Welded, Bell	4-inches, minimum
Extruded polyolefin	
Welded joints	As specified in AWWA C215
Push-on joints	Not applied to bell or spigot

D. Holdback Corrosion Protection:
   1. Holding primer for corrosion protection of cutbacks or holdbacks shall be compatible with the specified joint coating system and weld after backfill requirements, where applicable.
   2. Approved holdback primers are:
      a. Tnemec Omnithane – Suitable for all joints, except joints subject to weld after backfill
      b. Tnemec 90E-92 Ethyl Silicate Inorganic Zinc Primer – suitable for all joints, including weld after backfill joints.
      c. ICI Devoe Cathacoat 304V Ethyl Silicate Inorganic Zinc Primer – suitable for all joints including weld after backfill joints.
      d. Polyken Tape Primers – Not allowed
   3. Primer shall not result in running or melting of the coating or cause toxic fumes when heated during welding on weld after backfill joints.
   4. Application and thickness of holding primer shall be in accordance with the coating manufacturer's recommendations, but shall not impair the clearances required for proper joint installation.
   5. Primer application on spigot end of weld after backfill pipe joints shall be held back 1 to 2 inches from end of spigot or as necessary to prevent toxic fumes during field welding.
   6. Any corrosion within the holdback areas shall be abrasively blasted to near white metal in accordance with SP10 or power tool cleaned to bare metal in accordance with SP11 prior to applying joint coating.

3.5 PIPE LINING APPLICATION

A. Shop-applied Cement Mortar Lining:
   1. Centrifugally line straight sections of pipe. Lining of special pieces or fittings shall be by mechanical, pneumatic, or hand placement. Provide cement mortar lining of uniform thickness. Finish to a smooth dense surface.
   2. Steel plate specials larger than 16 inches in diameter shall have lining reinforced with 2-inch by 4-inch No. 13-gage welded steel wire mesh.
   3. Centrifugally line straight sections of pipe. Lining of special pieces or fittings shall be by mechanical, pneumatic, or hand placement. Provide cement mortar lining of uniform thickness. Finish to a smooth dense surface.
   4. Brace and support pipe during lining application to minimize pipe distortion or vibration. Bracing and supports shall not damage the pipe, coating, or lining.
   5. Tightly close ends of pipe and fittings with plastic sheet caps. Plastic end caps shall be of sufficient thickness and strength to resist shipping, handling, and storage stresses.
   6. Damage to the cement mortar lining, including disbondment, cracking, or blistering, caused by improper curing, shipping, handling, or installation shall be repaired in accordance with AWWA specifications and to the satisfaction of the Engineer.
   7. Other requirements of mortar lining materials and processes: As specified in AWWA C205.

B. Liquid Epoxy Lining:
   1. Where epoxy lining is specified or shown on drawings, epoxy lining shall be applied directly to the steel surface after abrasively blasting to SSPC SP-5, White metal blast.
   2. Prepare and coat the interior of cement mortar lined pipe at insulating joints with two coats of epoxy coating.
   3. Mortar lining shall be prepared by abrasive blasting to remove all laitance and create a suitable anchor profile
   4. Epoxy coating applied at insulating joints shall be applied to both sides of the insulating joint for a minimum of one pipe diameter. If only one side of the joint can be coated the coating shall be applied for a minimum of two pipe diameters.
   5. Mortar lining shall be allowed to cure 15 days or steam cured not less than 7 days prior to surface preparation of the mortar and epoxy coating application. Hand applied mortar lining shall be allowed to cure a minimum of 15 days or as required to meet the coating manufacturer's requirements for application on cement or concrete, whichever is greater.

6. Mortar lining shall be dry during epoxy lining application.
7. Epoxy coating shall be applied in two coats minimum, at a total coating thickness of 16 mils dry film thickness. Coating applied over cement mortar lining shall be applied in a manner that will minimize gassing and pinholes in the completed lining.

3.6 FIELD COATING JOINTS

A. Surface Preparation:
   1. All joints shall be prepared as follows:
      a. Remove all oil and grease contamination from pipe and adjacent coating in accordance with SSPC-SP1, Solvent cleaning.
      b. Without Holdback Primer:
         (1) Clean pipe surface and adjacent coating of all corrosion and other foreign contaminates in accordance with SSPC-SP11, Power Tool Cleaning to Bare Metal or abrasive blast joints in accordance with SSPC-SP10, near white metal blast.
         (2) Clean the full circumference of the pipe and a minimum of 4 inches onto the existing coating.
         (3) No profile is required with SP-11 preparation and heat shrink sleeve joint coating.
      c. With Holdback Primer:
         (1) All joints with a holdback primer shall be prepared by removing all oil and grease in accordance with SSPC-SP1, Solvent Cleaning, followed by spot preparation of visible corrosion or rust in accordance with SSPC-SP11, Power Tool Cleaning to Bare Metal.
         (2) Clean the full circumference of the pipe and a minimum of 4 inches onto the existing coating.
   2. Remove all loose or damage pipe coating at joint and either repair the coating as specified herein or increase the length of the joint coating, where reasonable and practical.
   3. Electrically test completed joint coating for holidays with high voltage spark tester at Engineer's direction or if damage to the joint coating occurs.

B. Weld After Backfill' Joint Requirements:
   1. Post welding of joints (weld after backfill) is not allowed.

C. Heat Shrink Sleeve Joint Coating:
   1. Store, handle, and apply field heat shrink sleeve coatings in accordance with AWWA C216 and these specifications.

2. Store sleeves in shipping box until use is required. Keep dry and sheltered from exposure to direct sunlight. Store off the ground or concrete floors and maintain at a temperature between 60 and 100 degrees as recommended by the sleeve manufacturer.
3. Metal surface shall be free of all dirt, dust, and surface corrosion prior to sleeve application.
4. Complete surface preparation of joint as specified.
5. Preheat pipe uniformly as recommended by the sleeve manufacturer. Monitor pipe temperature using a surface temperature gauge, infrared thermometer, or color changing crayons. Protect preheated pipe from rain, snow, frost, or moisture with tenting or shields and do not permit the joint to cool.
6. Fill all cracks, crevices, gaps, and step changes greater than 1/8 inch with filler mastic. Application of filler material shall be in accordance with the manufacturer's instructions for the full circumference of the pipe and in a manner that does not cause tenting of the applied sleeve.
7. Apply heat shrink sleeve when it is at a minimum temperature of 60 degrees and while maintaining the pipe temperature above the preheat temperature specified. Apply sleeve in accordance with the manufacturer's instructions and center the sleeve over the joint to provide a minimum 2-inch overlap onto the existing pipe coating.
8. Completed joint sleeve shall be fully bonded to the pipe and existing coating surface without voids. Mastic beading shall be visible along the full circumference of the sleeve. There shall be no wrinkling or excessive burns on the sleeves. Sleeves that do not meet these requirements shall be removed and the joint recoated as directed by the Engineer. Minor damage may be repaired using heat applied patch material as specified for minor coating repairs.
9. Allow the sleeve to cool before backfilling. In hot climates, provide shading from direct sunlight. Water quenching will be allowed only when permitted by the sleeve manufacturer.
10. Heat shrink joint coatings which have become wrinkled or disbonded because of prolonged exposure to UV light or thermal cycling shall be removed and replaced.
11. Double coating of defective or damaged heat shrink coatings will not be permitted. Any double coated heat shrink sleeves shall be immediately rejected, removed, and recoated.

D. Cement Mortar Joint Coating:
1. Joints of cement mortar coated pipe shall be cement mortar coated in accordance with AWWA C205.
2. Polyethylene Foam Joint Diapers:

a. Cut into strips wide enough to match uncoated field joint area.
b. Slit to thickness of 1/4 inch that will expose a hollow or open cell surface on one side.
c. Foam liner shall be attached to fabric backing with open or hollow cells facing towards pipe.
d. Foam strip shall cover full interior circumference of grout band with sufficient length to permit 8-inch overlap of foam at or near top of joint.
e. Splices to provide continuity of material will be permitted.
f. Protect polyethylene foam material from direct sunlight.

3. Field repair cement mortar coating in accordance with AWWA C205.

3.7 REPAIR OF COATING AND LININGS

A. General:
1. All areas where holidays are detected or coating is visually damaged, such as blisters, tears, rips, bubbles, wrinkles, cuts, or other defects shall be repaired. Areas where no holidays are detected, but are visually damaged shall also be repaired.
2. Maximum defects allowable shall be as specified herein for the coating system.

B. Tape Wrap Coating Repairs:
1. General:
a. No more than five repairs per joint of pipe will be permitted with tape wrap coating, excluding adhesion test damage. The coating on any pipe with more than five coating repairs or with more than two areas of coating damage greater than five square feet will be rejected.
b. Pipes exceeding the maximum number or size of coating defects shall be stripped, reblasted, and recoated.
c. Pipe arriving in the field with defects or repairs exceeding the maximum number or size of coating defects will be returned to the shop for recoated.
d. The number of layers and total thickness of the tape repair coating shall be the same as the shop-applied coating; unless heat applied coating materials is used.
e. Wipe the area to be repaired with solvent for a minimum distance of 4 inches outside the damaged area.
2. Defect Size:
a. Minor repairs - repairs that are less than 8 inches in the greatest dimension, measured after cutout of damaged tape

layers. Damage to the inner tape layer will be considered minor only if repairs are made using heat applied patch materials.

b. Major repairs - repairs that exceed 8-inches in the greatest dimension or where damage to the inner tape layer has occurred and hand applied tape repairs will be used.

3. Minor Repairs:
   a. Complete minor repairs using a heat applied coating patch material.
   b. Cut patch material to overlap onto the undamaged coating a minimum of 2 inches on all sides with 1-inch radius on each corner of the patch.
   c. Carefully remove damaged layers by cutting the coating with a sharp knife without cutting or damaging the inner wrap.
   d. Cut middle and outer layers in stepped fashion to expose 1-inch or more of the underlying tape layer for the circumference of the repair.
4. Major Repairs (Over 24-inches Diameter):
   a. Cigarette wrap coating repairs shall be with heat shrink sleeves as specified for joints.
   b. Carefully remove damaged layers by cutting the coating with a sharp knife without cutting or damaging the inner wrap.
   c. Holiday test the inner wrap and if a holiday is detected cut outer layers back to fully exposed the holiday(s) and retest for holidays.
   d. Cut middle and outer layers in stepped fashion to expose 1-inch or more of the underlying tape layer for the circumference of the repair.
   e. Width of sleeve shall be the width of the damaged area plus 4-inch overlap. Multiple sleeves may be used for larger repairs, but must be overlapped a minimum of 2 inches.
5. Major Repairs (24-inch Diameter or Less)
   a. Cigarette wrap repairs on pipe less than 24-inches with either hand applied tapes as specified or heat shrink sleeves as specified for major repairs on pipe over 24-inches in diameter at the Contractor's option.
   b. Carefully remove damaged layers by cutting the coating with a sharp knife without cutting or damaging the inner wrap. Holiday test the inner wrap and if a holiday is detected apply one extra layer of repair tape.
   c. Clean surfaces by solvent wiping and applying primer over the inner tape layer for a minimum of 6-inches onto the outer wrap in all directions.

d. Apply first layer of repair coating, over lapping 1-inch or more onto undamaged coating in all directions. On larger areas, lap the repair tape within a minimum of 1-inch overlap, offsetting the overlap from the previous layer overlap, until the area is properly covered.

e. Repeat for each tape layer damaged with each succeeding layer applied at 90 degrees to the preceding layers and overlapping onto the undamaged coating a minimum of 2-inches.

f. Apply the last tape layer, use the cigarette wrap method for the full pipeline circumference covering all previous repair layers and overlapping a minimum of 2-inches onto undamaged coating. The ends of the cigarette wrap shall be pointed downward.

C. Plural Component Epoxy Coating or Lining Repairs

1. General

a. Complete coating or lining repairs in accordance with the coating manufacturers written instructions and these specifications, whichever is stricter.

2. Defect Size:

a. Minor repairs - repairs that are less than 8-inches in the greatest dimension.

b. Major repairs - repairs that exceed 8-inches in the greatest dimension.

3. Maximum Quantity of Defects Allowed:

a. Coating or lining repairs on any joint of pipe shall not exceed 1.5 per 100 square feet of surface area.

(1) Two or more minor repairs within a 6-inches diameter circle will be considered a single repair.

(2) Repairs for adhesion testing will not be included in the total number of repairs.

b. Major repairs shall not exceed three per pipe joint and the combined area shall not be greater than 30 percent of the pipe.

c. Pipes exceeding the maximum number or size of coating defects shall be stripped of coating, reblasted, and recoated.

d. Pipe arriving in the field with defects or repairs exceeding the maximum number or size of coating defects will be returned to the shop for recoated.

4. Minor Repairs:

a. Surface Preparation: Clean and feather the defect by power tool sanding with 80 grit or coarser sandpaper to roughen

the existing coat and feather the edges of the defect for a minimum of 2-inches around the defect.

b. Shop repair Materials:
   (1) Single use polyurethane coating kits that controls mix ratio.
   (2) Two component, fast cure epoxy coating, in controlled mix ratio packaging.
      (a) Protal 7125, North American Denso Inc, or equal
      (b) Or equal.
   (3) Coating Manufacturer's polyurethane coating repair products subject to Engineer approval.

c. Field Repair Materials:
   (1) Heat applied coating materials; CRP Patch, Canusa; PERP Patch, Tyco Adhesives, or approved equal.
   (2) Two component, fast cure epoxy coating, in controlled mix ratio packaging.
      (a) Protal 7125, North American Denso, Inc,
      (b) Or equal.
   (3) Single use polyurethane coating kits using single use packaging that controls mix ratio.
   (4) Coating Manufacturer's polyurethane coating repair products subject to Engineer approval.

d. Clean and feather the defect by power tool sanding with 80 grit or coarser sandpaper to roughen the existing coating and feather defect edges minimum of 2-inches.

e. Apply a single coat of the specified patch coating material at the specified coating thickness.

f. Repair coating adhesion shall be 50 percent of the specified coating adhesion.

5. Major Repairs:

a. Surface Preparation:
   (1) The metal surface and surrounding coating shall be abrasively blasted in accordance with SSPC-SP10, near white metal, or to equal in cleanliness and profile as the original surface preparation.
   (2) Existing coating shall be feathered and roughened to the equivalent of 40 grit sandpaper.

b. Shop Repair Materials:
   (1) Same material as the pipeline coating or lining and shall be applied by using plural component spray equipment.

c. Field Repair Materials:

(1) Same material as the pipeline coating or lining and shall be applied by using plural component spray equipment.
(2) Heat shrink sleeves as specified for pipeline joints.

d. One coat of the specified original coating material shall be applied over the repaired surface at the specified thickness.
e. Repair adhesion shall be equal to the specified coating adhesion.

3.8 INSPECTION AND TESTING

A. General
1. Applicator shall inspect and test the coating system in accordance with referenced standards and these specifications, whichever is more stringent.
2. Quality control testing as specified in AWWA standards are minimum industry standards and it is the intent of this specification to provide a higher level of quality control for the objective of achieving maximum coating performance. If any conflict between this specification and referenced standards occurs, the more stringent requirement shall apply and any interpretation of this requirement or results shall be with the objective of achieving maximum coating performance.
3. The frequency of the testing shall be determined by the applicator, but shall not be less than the requirements of this specification.

B. Surface Profile Testing
1. Surface profile of abrasive blasted surfaces to be tested with “Press-O-Film” tester tape or equivalent in accordance with NACE RP287.
2. Tester tape shall be suitable for the intended profile height.
3. Profile shall be measured to a minimum tolerance of 0.1 mils, maximum.
4. Electronic surface profilometer shall be used, where deemed necessary, to verify tester tape measurements.

C. Adhesion Testing
1. General
a. Adhesion testing shall be conducted at the shop prior to shipment. Pipe shipped without adhesion testing will be field-tested. Pipe rejected in the field will be returned to the shop for repair.

b. Coating adhesion testing shall be conducted on each pipe lot coated. The quantity of coating adhesion tests shall be the greater of the following:
   (1) Two pipes will be tested for the first 3,000 square feet of coating application plus on additional pipe for each increment of 2,000 square feet of coating application in excess of the first 3,000 square feet
   (2) Not less than 25 percent of each pipe produced within a lot.
c. A pipe lot is defined as the quantity of pipe that is coated by a single crew within a 12 hour or less work shift.
d. The pipe coating applicator shall repair all coating damage from shop adhesion testing.
e. Adhesion tests will be performed not less than 24 hours after coating application. Tests conducted prior to 24-hours will be acceptable only if the test meets or exceeds the adhesion criteria specified and the test was requested by the pipe fabricator.
f. Pipe for adhesion testing shall be randomly selected.
g. Department or Department's Representative has the right to conduct additional adhesion testing as deemed necessary to assure the pipe meets or exceeds the requirements of this specification at any time and location.
h. Prior to beginning any QA/QC testing, the pipe fabricator, coating manufacturer, and Engineer shall review dolly attachment procedures, adhesion test procedures, and data recording requirements for the project and ensure that test personnel are qualified and capable of performing the testing in accordance with required test standards and these specifications.

2. Rejection of Pipeline Coating or Lining
   a. Each pipe that fails the adhesion criteria, as defined this section, shall be rejected.
   b. If any pipe within a lot that fails to meet the adhesion criteria specified for the coating type, the pipe coating will be rejected and all pipes within the lot will be classified as rejected. Each remaining pipe within the rejected pipe lot will then be individually tested and rejected on a pipe-by-pipe basis in conformance with the test procedures and criteria specific to the coating type.
   c. All rejected pipe shall have the coating fully removed from the pipe and the pipe abrasive blasted and recoated.
3. Tape Coating Adhesion Testing:
   a. Adhesion Acceptance Criteria:

(1) Inner tape coating shall have an adhesion to substrate of 20 pounds per inch width, minimum, for steel pipe when tape is pulled in a continuous manner at an angle of 180 degrees to the pipe surface. .

b. Test Procedures

(1) Adhesion testing shall be conducted prior to application of the cement mortar overcoat, where applicable. Pipe that has been mortar coated prior to adhesion testing shall have the mortar coating removed as directed by the Engineer and of sufficient dimensional area to permit the adhesion test to be conducted.

(2) Adhesion tests shall be conducted at temperatures above 60 degrees and less than 75 degrees.

(3) Pulling tension shall be continuous, without stopping, and monitored throughout the length of the pull, which shall be not less than 12-inches in length.

(4) Adhesion test shall be prepared by making two parallel cuts through the coating, 1-inch apart, of sufficient length for the test pull. Peel the coating back at one end and attach the tension scale to the coating with a suitable clamp. Mark the coating at one (1) inch increments from 0 to 12-inches.

(5) The pull tension shall be recorded for each inch of pull. The two highest and two lowest readings shall be discarded and the remaining values averaged. Pull speed shall be between 5 and 10 seconds per inch. If significant elongation of the tape backing occurs, pull speeds may exceed 10 seconds per inch provided the minimum adhesion rating can still be achieved.

c. Adhesion Pull Records and Evaluation

(1) Failure shall be by cohesive failure of the adhesive only. Delamination failure, defined as separation of the adhesive from the backing material, will result in rejection of the tape lot.

(2) Intermittent skip failures will be counted as zero pounds of adhesion and included in the calculations for average coating adhesion.

(3) Adhesive failure, defined as separation of the adhesive from the metal substrate, will be rejected.

(4) Pipe that fails the test by delamination will be retested on two other pipes within the same lot of coated pipe.

Failure of any two pipes within the lot will result in rejection of all pipes coated with the rejected tape lot.

4. Plural Component Epoxy Adhesion Testing:
   a. General:
      (1) Adhesion testing shall be performed in accordance with this specification section.
      (2) Adhesion testing procedures and evaluations per AWWA C210 are specifically excluded under this specification.
   b. Coating and Lining Adhesion Acceptance Criteria
      (1) Coating applied to each pipe is acceptable if first dolly pull test exceeds 1,750 psi, minimum.
      (2) If first dolly pull is less than 1,750 psi, two additional tests shall be performed with acceptance based on "Best of Three" evaluation method defined herein.
   c. Pipe Lot Performance Criteria:
      (1) Each lot of coated pipe shall be evaluated for general coating application based a median value for all coating or lining adhesion tests performed on a lot of pipe, which shall be greater than 2,000 psi.
      (2) Any pipe lot failing the Pipe Lot Performance Criteria shall be classified as rejected until 100 percent of the pipe within the pipe lot has been tested for adhesion. Each pipe that fails the coating adhesion criteria shall be rejected.
   d. Test Procedures
      (1) Coating adhesion testing shall be with self-aligning pneumatic pull off equipment, such as the Delfesko Positest AT-A, and test procedures in accordance with ASTM D4541, except as modified in this section.
         (a) All adhesion tests shall be performed at an applied load rate of 100 psi per second, plus or minus 10 psi. Automatic pull rate adhesion test equipment shall be used.
         (b) Adhesion tests shall be based on the ASTM D4541 using standard 20 mm dollies.
         (c) Adhesion testing shall be based on three tests. All three tests shall be conducted by the same person, test equipment, and test procedure, and must be completed within a 30 minute period.
         (d) All adhesion tests shall be conducted within an area not to exceed 6-inches by 6-inches.

(e) All dollies shall be scored to metal substrate using manual methods and tools, normal to the pipe surface, and in a manner that does not stress or over heat the coating.

(f) All adhesion tests shall be performed to glue or coating failure or test termination, whichever comes first.

(2) Dollies for adhesion testing shall attached to the coating surface using an two part epoxy or cyanoacrylate glue and allowed to cure for a minimum of 12 hours before testing or until full cure, whichever is greater. Glue type used shall be determined by the pipe fabricator and coating manufacturer for the pipe diameter, temperatures, and environmental conditions.

(3) Adhesion testing shall be performed at temperatures between 55 and 90 degrees F or at temperatures as recommended by the coating manufacturer. Testing up to 115 degrees F or below 45 degrees will be permitted if tests can demonstrate no statistically detectable effect on test results and subject to Coating Manufacturer and Engineer approval.

e. Adhesion Test Evaluation and Records

(1) The “Best of three” evaluation method shall be defined as two of three test values less than the Acceptance Criteria, which shall result in rejection of the pipe coating.

(2) All adhesion tests shall be considered as valid and suitable for acceptance or rejection of the coating, except where retesting is allowed.

(3) Adhesion test failure shall be by adhesive or substrate and cohesive failure as defined below:

(a) Adhesive or substrate failure is defined as a percentage of separation of the coating from the steel substrate or between distinct coating layers.

(b) Cohesive failure is defined as a percentage of failure within the coating, resulting in coating remaining both on the steel substrate and test dolly.

(4) Retesting of coating adhesion tests will be allowed when any test is glue failure at 25 percent or more of dolly surface area and the test value is less than the Acceptance Criteria or the Minimum Criteria.

(5) All coating adhesion retesting shall be within the same 6-inch by 6-inch test area as the original adhesion testing.

(6) Disputed adhesion tests shall be retested as defined for adhesion retesting. Dolly attachment and adhesion retesting shall be witnessed by the Department's representative.

(7) Adhesion tests will be conducted on pipe coating and lining independently and will be accepted or rejected independently.

(8) Records of all adhesion tests shall be maintained in an electronic spreadsheet that includes the following information:

(a) Pipe identification,
(b) Pipe coating date,
(c) Adhesion test date,
(d) Surface tested (interior or exterior),
(e) Surface temperature at time of test,
(f) Coating thickness,
(g) tensile force applied,
(h) Applied load rate per second,
(i) Mode of failure, and
(j) Percentage of failure types, previously defined, relative to dolly surface area,
(k) Dolly size and attachment glue used.
(l) If different coatings are tested, the records shall include coating manufacturer and product number.

f. Adhesion Test Repairs

(1) Complete adhesion repairs as specified this section.

(2) Repair patches on the polyurethane coating shall be randomly selected for adhesion testing in a manner as described herein and at the discretion of the coating inspector conducting the adhesion tests. Adhesion of repairs shall be as specified for the type of repair.

D. Holiday Testing

1. Holiday test the inner layer of tape wrap coatings after application and prior to the subsequent tape layer in accordance with AWWA C214 and NACE Standard RP-0274.

2. Holiday tests on epoxy or polyurethane coatings or linings will be conducted on the completed coating or lining after cure or 24-hours, whichever is less, using a high voltage spark test in

accordance with NACE Standard RP-0274 and these specifications.

3. Coating thickness used for high voltage holiday testing setting shall be the minimum specified coating thickness.

E. Dry Film Thickness Testing

1. Coatings shall be tested for dry film thickness using a properly calibrated magnetic pull off, eddy current, or ultrasonic equipment.
2. Coating thickness measurements shall be conducted as necessary and without limitation. Testing conformance to the requirements of SSPC PA-2 is specifically excluded from this specification.

3.9 HANDLING, TRANSPORTATION, AND STORAGE

A. Pipe shall be handled in such a manner as to protect the pipe and coating from damage.

B. Coated pipe shall not be shipped or installed until coating has developed full adhesion and cure.

C. During coating application, storage, loading, transportation, unloading, laying and installation, every precaution shall be taken to protect and prevent damage to pipe, lining, and coating. Forklift equipment shall have all bearing surfaces padded with suitable padding material. Lift pipe with web slings a minimum of 12-inch wide and of a type that will not damage the coating. Metal chains, cable, tongs, forklifts or other equipment likely to damage the coating will not be permitted. Dragging or skidding of pipe on grade or in the trench will not be permitted.

D. Provide transportation vehicles with padded bolsters between each layer of pipe and heavy padding under load ties. Bolsters shall be curved to fit the outside of the pipe and 12 inches wide, minimum. All pipe contact locations shall be heavily padded with carpet and strips of the outer tape wrap material (adhesive side against the carpet) during shipment to the project site and from the storage yard to the point of installation.

E. Pipe shall not be stored on rocks, gravel, or other hard materials that might damage the coating. Pipe shall not be laid on asphalt without suitable padding at all contact points.

F. Pipe shall be inspected at the project site for damage. Any damage to the pipe, lining, or coating shall be repaired as directed if, in the opinion of the Engineer, a satisfactory repair can be made; otherwise, the damaged section shall be replaced.

G. No metal tools or heavy objects shall be permitted to come into contact unnecessarily with the finished coating. Workmen shall not be permitted to walk on the coating except when absolutely necessary and approved by the Engineer. When permitted, shoes with rubber or composition soles and heels or other suitable footwear that will not damage coating shall be used.

H. Long-term Exposure:
   1. Pipe shall either be provided with UV inhibitor for lengthy of above grade exposure or covered to prevent UV degradation of outer wrap.
   2. Amount of UV stabilizers required will depend on the project location, laying schedule, anticipated length of exposure, and type of coating.
   3. Manufacturer shall be consulted for recommended UV inhibitors requirements.
   4. Protective covering can be colored plastic sheeting, canvas, or other UV blocking material. Clear plastic sheets are not acceptable.
   5. Areas of coating that display UV degradation shall be removed and repaired.

END OF SECTION

June 30, 2016

SECTION 02641S

FLEXIBLE INTERNAL JOINT REPAIR

Add Section 02641:

PART 1 GENERAL

1.1 THE REQUIREMENTS

H. Install and test all flexible rubber joints seals, retaining bands, and accessories to ensure a bottle tight seal around the full inside circumference of the pipe joint area.

I. Test and remove all flexible rubber joint seals following completion of the SR-154 highway reconstruction by others.

1.2 RELATED SECTIONS

A. Section 02612S: Steel Pipe

B. Section 02621S: Pipeline Coating and Lining

1.3 REFERENCES **Not Used**

1.4 DEFINITIONS **Not Used**

1.5 SUBMITTALS

A. Certifications of experience for the flexible internal joint repair installer.

B. Submit manufacturer's product data and installation instructions.

C. Provide documentation from all test and surveys associated with flexible internal joint installation and repair.

D. Confined Space Entry Permit which covers the scope of work to be performed inside the pipe.

1.8 QUALITY CONTROL

A. All components used for potable water applications are NSF 61 drinking water approved classified by Underwriters Laboratories.

B. Installer shall have at a minimum 30 years of turnkey installation experience and have installed over 225,000 seals.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Flexible seals, retaining rings and hardware will be supplied by the Department. Materials will be located at the Utah Department of Transportation maintenance shop at 4632 West 7800 South in West Jordan, Utah.

B. Receive the materials at the UDOT location and transport them to and from the job site.

C. Equipment and personal will be available to load the materials.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Weko-Seal by Miller Pipeline Corporation.

B. Engineer approved equal.

2.2 FLEXIBLE INTERNAL SEAL (WATER)

A. Ethylene Propylene Diene Monomer (EPDM) rubber seal and type 304 stainless steel retaining bands which are designed to internally stop joint leakage or infiltration.

PART 3 EXECUTION

3.1 PRECONSTRUCTION INSPECTION

A. Perform visual inspection of the pipe to document condition of existing pipe interior prior to construction

B. Survey (3D Laser Scan) section of pipeline to document pre construction vertical dimension (roundness) of pipe and vertical alignment of pipe (elevation, slope, bends and offsets).

C. Stage materials and tooling as close to the entry points as possible.

D. Insure all safety policies and guidelines are in place, including training of all personnel. A written confined space plan and job hazard analysis (JHA) shall be in place before entry or any work begins.

3.2 MORTAR LINED STEEL PIPE JOINT PROTECTION

A. Remove the mortar lining at the joint locations where the seals will seat directly on the steel pipe wall. Create a clean neat cut line of the mortar at least 3” beyond either side of the seal position.

B. Remove dirt, scale, and any other debris from the steel pipe walls in areas where the seals are to be installed. Cleaning shall be performed everywhere the mortar is removed and the steel is exposed. Cleaning operations shall be accomplished by hand brushing and scraping, pneumatic wire brush, pneumatic grinder, and/or oil free air jet.

C. Aquad Epoxy shall be applied and cured on each side of the spiral welds and where the restraining bands intersect to create a feathered, smooth transition and a good smooth sealing surface.

D. After completion of the installation of the flexible joint seal, any bare metal on either side of the seal shall be repaired using a sand / cement mix per AWWA standard.

E. Air test joints for leakage in accordance with manufacturer’s requirements. Provide documentation of air test results.

F. Survey (3D Laser Scan) section of pipeline to document preconstruction vertical dimension (roundness) of pipe and vertical alignment of pipe (elevation, slope, bends, and offsets).

G. Flush, test, and disinfect pipeline prior to filling per AWWA.

3.3 REINFORCED CONCRETE PIPE JOINT PROTECTION

A. Remove dirt, scale, and any other debris from pipe walls in areas where the seals are to be installed. Cleaning shall be performed at least 3” beyond either side of seal position. Cleaning operations shall be

accomplished by hand brushing and scraping, pneumatic wire brush, pneumatic grinder, and/or oil free air jet.

B. All high/low surface imperfections running axially through or part way through the sealing surface must be removed before installation of the seals. Any joint gaps, low areas, or deep imperfections must be properly filled with approved non-toxic joint filler and rendered smooth to suit the prepared surface of the joint area.

C. Install flexible interior joint seal in accordance with manufacturer's requirements.

D. Air test joints for leakage in accordance with manufacturer's requirements. Provide documentation of air test results.

E. Survey (3D Laser Scan) section of pipeline to document preconstruction vertical dimension (roundness) of pipe and vertical alignment of pipe (elevation, slope, bends, and offsets).

F. Flush, test, and disinfect pipeline prior to filling per AWWA.

3.4 POST CONSTRUCTION INSPECTION AND JOINT REPAIR

A. Perform visual inspection of the pipe to document condition of existing pipe interior after construction.

B. Air test joints for leakage in accordance with manufacturer's requirements. Provide documentation of air test results.

C. Survey (3D Laser Scan) section of pipeline to document post construction vertical dimension (roundness) of pipe and vertical alignment of pipe (elevation, slope, bends, and offsets).

D. After air test of joints do the following:

1. No Settlement or Damage Observed:
   - Remove flexible internal joint seal.
   - Repair cement mortar lining as required.

2. Failure of Joint Air Test:
   - Remove flexible joint seal and install interior a butt-strap on the 78" Reach 2 steel pipe, or install an interior weld around the circumference on the 66" concrete cylinder Reach 3 pipe as shown on the plans.
   - Repair cement mortar lining as required.

3. Joint Air Test Passes:

- At the discretion of governing agency, remove flexible joint seal and install interior butt-strap repair or interior weld per governing agencies standards.
- Repair cement mortar lining as required.

E. Flush, test, and disinfect pipeline prior to filling per AWWA.

END OF SECTION

SECTION 02651S

CORROSION MONITORING SYSTEM

Add Section 02651:

PART 1 GENERAL

1.1 WORK INCLUDED:

A. This section covers the work necessary to furnish and install a corrosion monitoring system, which includes test stations and pipe joint bonds for electrical continuity, complete.

B. Have a third party Corrosion Expert to perform Contractor required quality control testing as defined this section.

1.2 STANDARDS

A. The following standards are included by reference:
1. NACE SP-0169
2. NACE SP-0177

1.3 QUALITY CONTROL

A. All CONTRACTOR specified testing shall be performed by a third party Corrosion Expert whom holds a current NACE accreditation as a Cathodic Protection Specialist (CP-4) or Cathodic Protection Technologist (CP-3), and/or a registered professional engineer with verifiable expertise in corrosion control and cathodic protection.

B. Performed quality control testing shall include the following tests, which shall be performed as defined this section.
1. Joint Bond Resistance test
2. Other Testing as specified in Section 13115, Cathodic Protection

1.4 DEFINITIONS

A. Electrically Continuous Pipeline: A pipeline which has a linear electrical resistance equal to or less than the sum of the resistance of the pipe plus the maximum allowable joint bond resistance for each bonded pipe joint as specified in this section.

B. Electrical Isolation: The condition of being electrically isolated from other metallic structures (including, but not limited to, piping, reinforcement, casings) and the environment as defined in NACE Recommended Practice SP0169.

1.5 SUBMITTALS:

A. Shop Drawings: Catalog cuts and other information for products proposed for use.

B. Quality Assurance Submittals:
1. Manufacturers' Certificates of Compliance.
2. Field Test Reports.
3. Qualifications of NACE Accredited Testing Personnel.

PART 2 MATERIALS

2.1 GENERAL:

A. Like items of materials provided hereunder shall be the end product of one manufacturer to achieve standardization for appearance, maintenance, and replacement.

B. Materials and workmanship as specified in this section shall be installed concurrently with pipe installation. Coordinate all work specified herein with related sections.

2.2 SUPPLIERS:

A. Alternate suppliers will be considered, subject to approval of the ENGINEER. Address given is that of the general office; contact these offices for information regarding the location of their representative nearest the project site.
1. Corrpro, Inc., Chicago, IL www.corrpro.com
2. Farwest Corrosion Control, Gardena, CA www.farwestcorrosion.com

3. Hoff Company, Inc. , Denver, CO www.pipelinesupplies.com
4. MESA Products, Tulsa, OK www.mesaproducts.com
5. Northtown Products, Huntington Beach, CA www.northtownproducts.com

2.3 JOINT BONDS

A. General:

1. All joint bonds provided either by pipe manufacturer or meet the following minimum requirements:
   a. All connections on a joint bond shall be welded or soldered.
   b. Mechanical or compression type connections shall not be permitted.
   c. Bonds and welds shall exhibit sufficient strength and flexibility to allow thermal movement of the pipe after pipe backfill without cracking or breakage.
   d. Bond connections to pipe shall be with an Engineer approved welding method.
2. All installed bonds shall be insulated or coated copper with all exposed copper field coated to prevent galvanic corrosion of the pipe.

B. Ductile or Cast Iron Pipe, External Bonds:

1. Single-conductor, No. 2 AWG stranded copper wire with 600-volt HMWPE insulation, 18 inches long, with formed copper sleeve on each end of the wire.
2. Quantity of joint bonds per pipe joint by pipe diameter shall be as defined below:

Bond Type	Two Bonds	Three Bonds	Four Bonds
#2 AWG Wire	16” or less	42” or less	Over 42”

3. Connection of wire joint bonds to pipe shall be with the thermite weld method using molds and cartridges as recommended by the welder manufacturer for bond type used.
4. Bonds shall be as manufactured by Erico Products, Continental Industries, or approved equal. Third party manufactured bonds shall be approved by the Engineer for conformance with the requirements of this specification and proper thermite welding.

C. Coated Steel Pipe, External Bonds:

1. Rolled joint or Carnegie joint bonds shall be one of the following types at the CONTRACTOR’s option:

a. Wire Bond: Single-conductor, No. 2 AWG stranded copper wire with 600-volt HMWPE or THWN insulation, 18 inches long, with a formed copper sleeve on each end of the wire.

b. Strap Bond:

(1) Solid copper strap, 1-1/4-inch wide by 1/16-inch thick, equivalent to 1/0 AWG wire, with two punched holes for thermite welding to the pipe. Strap holes shall be sized for the thermite weld mold and shall provide for physical centering of the mold over the hole.

(2) Strap bond shall be 12-inches long with dielectric coating applied to the center 8-inches of the strap bond. Strap bonds provided without a dielectric coating shall be coated prior to installation with filler mastic as specified for heat shrink sleeves in Section 09 90 10, Pipeline Coating and Lining.

(3) Strap bonds shall be as manufactured by Erico Products, Continental Industries, Hoff Company, or approved equal. Third party manufactured strap bonds shall be approved by the Engineer for conformance with the requirements of this specification and proper thermite welding.

c. Use of manufactured steel bonding clips will not be permitted with heat shrink sleeve coated joints.

D. Flange joints:

1. Flanged joint bonds shall be one of the following types at the CONTRACTOR's option:

a. Steel rod, 5/8-inch diameter, length as required, arc welded to flange. Steel rod bonds will not be allowed where welding to the flange is not approved by the Engineer.

b. Single-conductor, No. 2 AWG stranded copper wire with 600-volt HMWPE insulation, 18 inches long, with a formed copper sleeve on each end of the wire.

2. Quantity of joint bonds per pipe joint shall be as defined below:

Bond Type	Two Bonds	Three Bonds	Four Bonds
Steel Rod	36" or less	72" or less	Over 72"
#2 AWG Wire	NA	30" or less	Under 60"

3. Connection of wire joint bonds to pipe shall be with the thermite weld method using molds and cartridges as recommended by the welder manufacturer for bond type used.

4. Coat steel rod bonds with fast curing epoxy after welding to joint as specified in this Section, except when pipe is specified to be coated in accordance with Section 09900, PAINTING.

E. Cement Mortar Coated Steel or Concrete Cylinder Pipe, External Bonds:
1. Steel pipe with dielectric coating and cement mortar overcoat shall be bonded as specified for coated steel pipe.
2. Joint bonds shall be one of the following types at the CONTRACTOR's option:
   a. Manufactured steel bonding clips for arc welding to bell and spigot of joint, as shown on the Drawings..
   b. Z-Bar bond fabricated of 3/8-inch diameter steel rod with total length not to exceed 6-inches. Bond shall be bent with offset of ends to fit between the bell and spigot of the joint and shall allow for 2-inches of weld length to both the bell and the spigot.
   c. Three bonds per joint, minimum.
3. Quantity of joint bonds per pipe joint shall be as defined below:

Bond Type	Two Bonds	Three Bonds	Four Bonds
Manufactured Clip	NA	54" or less	Over 54"
Z-Bar	NA	54" or less	Over 54"

4. Arc welding of bonds to pipe shall be performed by a qualified welder.
5. Completed welds shall have electrical resistance less than specified maximum joint bond resistance and shall not crack or break due to thermal contraction of pipe following pipe backfill.

F. Sleeve Coupling, Flanged Coupling Adapter, and Other Non-standard Joints:
1. Ductile Iron Pipe:
   a. Bond: No. 2 AWG wires, 24 inches long, HMWPE insulation, with two 12-inch long THHN insulated No. 12 AWG wire pigtails,
   b. Manufacturer: Erico Products Inc. (Cadweld), Cleveland, OH, Hoff Company, Denver, Colorado, or equal.
2. Steel Pipe:
   a. Solid copper strap, 1-1/4-inch wide by 1/16-inch thick, equivalent to 1/0 AWG wire, with five punched holes for thermite welding to the coupling follower rings, middle, ring, and pipe. Strap bond shall be fabricated for the length of the coupling with sufficient additional length for 1 inch of joint movement. Strap holes shall be sized for the thermite weld

mold and shall provide for physical centering of the mold over the hole.

b. Strap bond shall be as manufactured by Erico Products, Continental Industries, Hoff Company, or approved equal. Third party manufactured copper strap bonds shall be approved by the Engineer for conformance with the requirements of this specification and proper thermite welding.

3. Bond Quantity per Joint: Provide the quantity of bonds per pipe diameter as defined below:

Bond Type	Two Bonds	Three Bonds	Four Bonds
Copper Strap	NA	54” or less	Over 54”
No. 2 Wire Bond	NA	54” or less	Over 54”

a. Connection of wire or copper strap joint bonds to pipe shall be with the thermite weld method using molds and cartridges as recommended by the welder manufacturer for the bond type used.

2.4 CATHODIC PROTECTION TEST STATIONS

A. Post Style, Steel Conduit:

1. Test Box:

a. Cast aluminum with thread hub suitable for mounting to a 2-inch x 3-inch reducer. Reducing bushings will not be permitted.

b. Manufacturer and Product:

(1) Type T, C, and I Stations: Gerome Manufacturing, Testox 700 series (rectangle), except where Type TR stations required for remote monitoring capable.

(2) Type F, A, and TR Stations: Gerome Manufacturing, Testox 2000 series (rectangle) with 2” threaded hub.

B. Street Reducer:

a. Hot dipped galvanized 2-inch x 3-inch reducer and close nipple.

1. Terminal Block:

a. Plastic or glass-reinforced laminated, 1/4-inch thick with seven terminals for Type T, C, and I test stations.

b. Plastic or glass-reinforced laminated, 1/4-inch thick with eleven terminals for Type F, A, and TR test stations.

c. Terminal heads shall have special heads to keep them from turning or shall be easily accessible from both sides of the terminal block without requiring its removal.
d. Terminal studs, washers, and nuts shall be stainless steel.

2. Mounting Structure:
   a. Rigid hot dipped galvanized steel conduit 3-inches diameter, threaded at one end (minimum), length as required for installation requirements.
   b. PVC long radius sweep elbow, 1-inch diameter, for wire protection as shown on Drawings.

2.5 REFERENCE ELECTRODES:

A. Prepackaged Copper-Copper Sulfate Reference Electrodes:
1. Material: Permanent type, copper-copper sulfate reference electrode suitable for direct burial with a minimum design life of 40 years, minimum.
2. Lead Wire:
   a. As specified under wire, this section,
   b. Length of 50 feet or as required for splice free installation.
3. Backfill: As recommended by the reference electrode manufacturer.

2.6 WIRE:

A. Pipe and Test Lead Wires:
1. Pipe Test Wires: No. 10 AWG wire, single-conductor, stranded copper with 600-volt, TW, THWN, or HMWPE insulation. Color coded insulation as specified.
2. Insulation Color: Color shall indicate the function of each test wire and shall be as follows:
   a. Pipe: White
   b. Reference electrodes: Yellow
   c. Casings: Orange
3. Reference Electrode Wires: No. 14 or 12 AWG wire single-conductor, stranded copper with 600-volt, TW, THWN, USE2, or HMWPE insulation. Color code insulation as specified. Wire length of 25 feet or as required for splice free installation.

2.7 CONDUIT, LOCKNUTS, AND STRAPS:

A. Outdoors, Exposed Conduit
1. Rigid conduit shall be rigid galvanized steel.
2. Fittings, junction boxes, pull boxes, and outlet bodies shall be hot-dipped galvanized iron.

3. Locknuts, conduit clamps, and other miscellaneous hardware shall be hot dipped galvanized steel. Galvanized items shall be hot-dipped galvanized in accordance with ASTM A153.
4. Conduit clamps shall be two piece, malleable iron, one hole, strap and clamp back spacer, O. Z. Gedney 14-100G and 143G or similar, for mounting to surfaces with either lag bolts or concrete wedge anchors, as shown on the Drawings.

B. Buried Conduit:
1. Conduit shall be PVC coated rigid steel.

2.8 THERMITE WELD MATERIALS:

A. General:
1. Thermite weld materials consist of wire sleeves, welders, and weld cartridges according to the weld manufacturer's recommendations for each wire size and pipe or fitting size and material.
2. Welding materials and equipment shall be the product of a single manufacturer. Interchanging materials of different manufacturers is not acceptable.

B. Molds: Graphite, as recommended by manufacture for pipe and wire size.

C. Adapter Sleeves:
1. For No. 12 AWG and No. 2 AWG wires.
2. Prefabricated factory sleeve joint bonds or bond wires with formed sleeves made in the field are acceptable. Attach field-formed joint bonds sleeves with the appropriate size and type of hammer die furnished by the thermite weld manufacturer.
3. Extend wire conductor 1/8 inch beyond the end of the adapter sleeve.

D. Cartridges:
1. Steel: 32 grams, maximum.
2. Cast and Ductile Iron: 45 grams, maximum, XF-19 Alloy.

E. Welders and Cartridges: For attaching copper wire to pipe material:

Pipe Material	**Weld Type**	**Cartridge Size, Max.**
No. 6 AWG Wire & Smaller		
Steel	HA, VS, HC	15 gm

Ductile or Cast Iron	HB, VH, HE	25 gm
No. 4 AWG Wire & Smaller		
Steel	HA, VS, HC	25 gm
Ductile or Cast Iron	HB, VH, HE	32 gm
No. 2 Wire Joint Bonds		
Steel	FS	32 gm
Ductile or Cast Iron	FC	45 gm
Concrete Cylinder Pipe	HA, GR	32 gm
Copper Strap Joint Bonds		
Steel	M-128	15 gm

F. Welding Materials Manufacturers:
1. Erico Products Inc. (Cadweld), Cleveland, OH.
2. Continental Industries, Inc. (Thermo-Weld), Tulsa, OK.

2.9 COATING REPAIR MATERIAL FOR PIPE AND FITTINGS

A. General:
1. Complete coating repairs in accordance with recommendations of the pipe or fitting manufacturer.

B. Coating Requirements:
1. Steel Pipes:
   a. Coal tar based coatings: Koppers Bitumastic 50 or Denso or Tapecoat wax tape coatings; or equal, 20 mils dry film thickness, minimum.
   b. Polyurethane or Epoxy Coatings: Fast cure epoxy, 20 mils dry film thickness, minimum
   c. Tape Wrap or Extruded Polyethylene Coating: Thermite Weld Cap, Canusa CRP Patch, or Raychem PERP patch, or equal
   d. Cement Mortar Coating: Same as required for Concrete Cylinder Pipe.
2. Ductile iron Pipe:
   a. Fast cure epoxy
   b. Thermite weld cap
3. Concrete Cylinder Pipe:
   a. Cement mortar, 1-inch minimum cover.

C. Coating Materials:
1. Thermite Weld Caps:
   a. Royston Laboratories Handi-Cap IP, prefabricated primerless thermite weld cap and coating system.
   b. Provide primer unless specifically stated in product data sheet that no primer is required.
2. Fast Cure Epoxy Coating:
   a. 100 percent solids, fast curing epoxy suitable for submerged or buried conditions.
   b. Acceptable products or equal:
      (1) Denso Protal 7125 (low temperature) or Protal 7300
      (2) Tapecoat TC 7010
      (3) 3M ScotchKote 323

2.10 CONCRETE

A. ASTM C94-90, Option A

B. Cement: ASTM C150-89, type II with minimum cement content of 6.5 bags (611 pounds) per cubic yard.

C. Coarse Aggregate Size: ¾ inches

D. Minimum Compressive Strength: 4,000 psi at 28 days with maximum water-cement ratio of 0.45.

E. Air Entrainment:
1. ASTM C260, nontoxic after 30 days and containing no chlorides.
2. Not less than 5 nor more than 7.5 percent entrained air at the project site.

2.11 OTHER MISCELLANEOUS MATERIALS

A. Test Station Wire Terminations: One-piece, tin-plated crimp-on ring tongue connector as manufactured by Burndy Co. or Thomas and Betts.

PART 3 EXECUTION

3.1 GENERAL:

A. The installation of the facilities herein specified and described shall conform to the latest applicable NEC rules.

B. The workmanship shall be of the highest grade and shall be in strict accordance with material manufacturer's instructions. Equipment or materials damaged in shipment or in the course of installation shall be replaced.

C. Examine all Drawings and coordinate his work so as to avoid conflicts, errors, delays, and unnecessary interference with the construction of the facilities and to avoid duplication of the work such as excavation, filling, etc. In the event of any conflicts in the Specifications, the ENGINEER shall be consulted.

3.2 PIPE JOINT BONDING, NEW PIPE

A. To form an electrically continuous pipeline and associated appurtenances, all metallic pipe joints shall be electrically bonded; including buried, vault, and manhole pipe, fittings, and restrained joints; except threaded, welded, or insulated joints.

B. Install the quantity of joint bonds at each joint required to be bonded as specified this section or shown on the Drawings. Should the specifications and drawings conflict, the larger quantity shall apply.

C. Electrical connection of bonds to pipe and fittings shall be by thermite or arc welding process. Bolted, compression, or mechanical connections will not be permitted.

D. Test each bonded joint for electrical resistance as specified under CONTRACTOR QUALITY CONTROL TESTING, this section.

3.3 TEST STATION INSTALLATION

A. General:
1. Test station location, type, and style shall be as shown on the Drawings.
2. Test stations may be relocated up to ±25 feet for site conditions without ENGINEER approval. Relocation greater than ±25 feet must be approved by the ENGINEER.
3. Maintain records showing actual pipeline stationing of test station wire connections to the pipe.
4. Records of actual pipeline stationing shall be provided to ENGINEER prior to preliminary electrical continuity testing by ENGINEER.
5. Test stations shall be generally located as follows:
   a. Install Type T test stations or other type test stations as required or at 1/4 mile intervals, but not greater than 1,500 feet.
   b. Install a Type C test station at both end of cased crossings.
6. Locate post-mounted test stations directly over the pipe and, where possible, at protected locations such as structures, fences, manholes, power poles, or edges of cultivated land.
7. All offset test station wires shall be protected with PVC coated rigid steel conduit from pipeline centerline to within 6-inches of test station as shown on the Drawings. Do not connect rigid conduit to test station.

B. Style:
1. Test station style shall be as shown on the Drawings and as follows:
2. Post mount style test stations shall be steel conduit style as shown on the Drawings.

C. Installation:
1. Post mounted test station:
   a. Height shall be between 36 to 42 inches above finish grade.
   b. Post shall be concrete encased as shown on the Drawings.

D. Test Wires:
1. Wires shall be attached to the pipe as specified under WIRE CONNECTIONS, this section.
2. Wire connections shall be an individual connection with not less than 6-inches separation from other connections. Common connections will not be allowed. Where a steel tab is welded to pipe for test wire connections, a separate tab shall be provided for each wire connection.
3. Wires shall be buried a minimum of 24 inches below finished grade, except in undeveloped or cultivated areas where test wires shall be a minimum of 30-inches below finished grade.

4. Wires shall be direct buried except where test station offset is required. Offset wires shall be installed in PVC coated rigid steel conduit from the centerline of the pipeline to 6-inches from test station. Rigid conduit shall not be connected to the test station.
5. Provide 12-inch diameter loop in wires at the pipeline connection, at each end of rigid conduit when required, and below post mounted test stations to prevent wires from being stressed or broken.
6. Connect all wires to terminal board.
7. Make wire connections to test station terminals with crimp-on ring tongue terminals, except where solid wire is specified.

3.4 REFERENCE ELECTRODE INSTALLATION

A. Remove plastic or paper wrapper and place reference electrode within the pipeline trench excavation 6 inches from pipe in a vertical position and activate reference electrode per manufacturer's written instructions.

B. Install reference electrode centered between foreign pipelines and utility owner's pipeline at pipe crossing location as shown on Drawings.

C. Backfill hole with select native material in 6-inch layers and hand tamp each layer around anode. Use only native soil for backfill; do not use sand or flowable fill. Exercise care not to strike reference cell or lead wire with tamper.

D. Terminate reference electrode wire in test station on separate terminal.

3.5 THERMITE WELD WIRE CONNECTIONS:

A. Use thermite weld method for electrical connection of copper wire to steel, ductile iron, and cast iron surfaces. Observe proper safety precautions, welding procedures, thermite weld material selection, and surface preparation as recommended by the material manufacturer. Assure that pipe or fitting wall thickness is of sufficient thickness that the thermite weld process will not damage the pipe or fitting wall's integrity or damage the lining in any way.

B. Before the connection is made, the surface shall be cleaned to bare metal by making a 2-inch by 2-inch window in the coating, and then filing or grinding the surface with a vitrified wheel to produce a bright metal finish. Wire sleeves shall be installed on the ends of the wire before welding to the metal surface.

C. After the weld connection is cooled, remove slag, visually inspect, and physically test wire connection by hitting with a hammer. Remove and replace any defective connections.

D. Make wire connections to concrete cylinder pipe by thermite welding to the shop welded steel plates provided on the pipe for this purpose.

E. Coat each completed wire connection as specified, this section. If lining is damaged by welding, repaired in accordance with the lining applicator's recommendations.

3.6 TRENCHING AND BACKFILL

A. General
1. Complete excavations and trenching regardless of the type, nature, or condition of materials encountered, and as required to accomplish specified construction to lines and grades shown.
2. Complete all utility notifications prior to performing trenching and excavations work.
3. Take care to avoid damage to existing structures and utilities during excavating and trenching process. Location may be modified, where approved by the ENGINEER, to minimize possible damage to existing structures. Trench shall be of uniform depth and width, level, smooth, and free of sharp objects.

B. Trench Depths:
1. Trench depths vary for conditions and requirements. Trench depths provided are minimum requirements. Meet minimum requirements or that required by local utilities, ordinances, or regulations, whichever is more stringent.
2. Minimum depths for cathodic protection or corrosion monitoring work shall be as defined herein or shown on the Drawings. If in conflict, the more stringent shall apply.

a.	Pipeline Test wires, undeveloped	24-inches (direct bury)
b.	Pipeline Test wires, roadways	30-inches (conduit)
c.	All other	30-inches

C. Safety
1. Slope, shore, or brace excavations and trenches in accordance with OSHA regulations as necessary to prevent caving during excavation in unstable material, or to protect adjacent structures, property, workers, and the public.

2. Assume sole responsibility for ensuring safety of trenches and conformance to OSHA trench safety requirements.

D. Backfill and Compaction
1. Backfill trench with import backfill materials, as specificed.
2. Compaction requirements shall be as specified for the pipeline or 90 percent compaction, whichever is more stringent. Backfill within 5 feet of roadways, paved areas, or other traffic areas shall be compacted to 95 percent.
3. Do not use backfill material of frozen or consolidated debris. Leave the trench with the excess backfill material neatly mounded, but not more than 4 inches above the existing ground level, for the entire width of the trench in undeveloped areas.
4. Replace topsoil in developed, landscaped, or cultivated areas.

3.7 CONCRETE:

A. Concrete used for slabs shall conform to the requirements for concrete in Section CONCRETE.

B. Finish all concrete work to a smooth trowelled finish with radius edges.

C. All forms shall be removed from concrete work prior to final acceptance and removed from the project site.

3.8 QUALITY CONTROL TESTING

A. General:
1. Correct all construction defects identified during testing.
2. Provide engineer with 7 days advance notice of completion for Engineer acceptance testing.
3. Contractor required testing as defined herein shall be performed by a Corrosion Expert, with qualifications as specified this section, whom is an employee or subcontractor to the Contractor.

B. Joint Bond Resistance Test:
1. General
   a. Test completed joint bonds for electrical continuity using a digital low resistance ohmmeter.
   b. Joint bond quality control test shall be performed on all bonded joints after the bonds are installed but before backfilling of the pipe.
   c. Furnish all equipment and materials as required for test.
2. Digital Low Resistance Ohmmeter Test Method:

a. Required Equipment And Materials:
   (1) One AVO Model DLRO10, digital low resistance ohmmeter or equivalent instrument.
   (2) One set of duplex, helical spring point leads with current and potential points, AVO Model No. 242011-7, or equivalent wire lead set.

b. Test Procedure:
   (1) Measure the resistance of joint bonds with the low resistance ohmmeter in accordance with the manufacturer's written instructions.
   (2) Use the helical handspikes to contact the pipe on each side of the joint, without touching the thermite weld or the bond. The contact area shall be cleaned to bright metal by filing or grinding and without any surface rusting or oxidation.
   (3) Record the measured joint bond resistance on the test form described herein.
   (4) Repair any damaged pipe coating in accordance with WIRE CONNECTIONS, this section.

3. Joint Bond Acceptance:
   a. Joint bond resistance shall be less than or equal to the maximum allowable bond resistance values shown below.

	Max. Allowable Resistance (micro-ohms)		
Joint Type	**Two Bonds/Joint**	**Three Bonds/Joint**	**Four Bonds/Joint**
No. 2 AWG wire (Steel)	162	108	81
No. 2 AWG wire (DIP)	185	123	93
Copper Strap (12-inch)	64	43	32
Copper Strap (9-inch)	48	32	24
Coupling, 24” No. 2 AWG	212	142	106
Coupling, 24” Copper Strap	128	85	64
MLC Steel Pipe Clips	NA	55	42
Z-bars	142	95	71

   b. For bond quantities greater than shown above obtain maximum allowable bond resistance from the Engineer.
   c. Temove and replace all joint bonds on a joint that exceeds the maximum allowable resistance. Replacement joint

bonds shall be retested for compliance with the specified bond resistance.

d. Any defective joint bond discovered during SYSTEM TESTS AND INSPECTION shall be located, excavated, repaired, and backfilled.

4. Test Records: Records shall be made of each bonded pipeline during the test and submitted to the ENGINEER. These records shall include:
   a. Description and location of the pipeline tested.
   b. Starting location and direction of test.
   c. Date of test.
   d. Joint type.
   e. Measured joint bond resistance
5. Report: Submit a QC report upon completion of joint bond resistance testing which includes the information listed above.

C. Concrete Reinforcement Isolation Test:
1. Pipe penetrations as listed below shall be tested for electrical isolation from electrical grounding and concrete reinforcement by a Corrosion Expert.
2. Perform concrete reinforcement isolation tests where concrete reinforcement isolation is required on the Drawings.
3. Electrical isolation test method and evaluation criterion to be utilized by Corrosion Expert is to be submitted in writing for approval by ENGINEER prior to beginning field testing.
4. Testing shall be conducted prior to concrete placement and shall be monitored during concrete placement to ensure no electrical shorts between the pipe and tank occur.
5. Corrosion Expert shall prepare a report certifying the concrete reinforcement is properly isolated and describe test method used to verify electrical isolation upon completion of the isolation test.
6. Electrical shorted detected and identified during Engineer performed SYSTEM TESTS AND INSPECTIONS, shall be located and repaired at Contractor's sole expense.
7. Submit a written report prepared by the Corrosion Expert certifying concrete reinforcement isolation, testing method(s), test data, and any corrective action required.

3.9 SYSTEM TESTS AND INSPECTION

A. General
1. All testing specified herein shall be performed by the Engineer and shall include:
   a. Preliminary electrical continuity testing of the full pipeline.

b. Other tests as specified in Section 13115, Cathodic Protection.

2. Correct all construction defects identified during testing.
3. Provide ENGINEER with one week advance notice of completion of corrosion monitoring system work.

B. Electrical Continuity Testing:

1. Preliminary Continuity Test By Engineer
   a. After the pipeline construction is completed and all test stations have been installed, the ENGINEER shall test all pipelines with joint bonds for electrical continuity using the four-wire lineal pipe resistance test method.
   b. Test will be conducted with a minimum test current of 15 amperes using a portable rectifier or dc welder.
   c. An electrically continuous pipeline will be defined as a pipe or section of pipe that has a linear electrical resistance equal to or less than the sum of the resistance of the pipe plus the maximum allowable joint bond resistance for each joint as specified in this section.
   d. Locate electrically discontinuous joints at his sole expense as specified herein.
   e. Each discontinuous section of pipe shall be retested by the Engineer after all continuity repairs are completed to demonstrate that the pipeline is electrically continuous. Engineer retesting costs shall be at the Contractor's expense.
2. Electrical Discontinuity Location:
   a. Assume sole responsibility for location and repair of all discontinuous or high resistance joints bonds using a test method determined by the CONTRACTOR. Regardless of test method used to locate discontinuous joints, final acceptance of discontinuous sections shall be determined by the lineal pipe resistance method.
   b. After all discontinuous or high resistance joint bonds are repaired, the repaired section shall have a resistance less than or equal to the calculated allowable lineal pipe resistance as determined by the initial final continuity testing.
   c. Existing joint bonds damaged during excavation of the pipe for repairs or temporary wire connections shall be repaired.
   d. Existing test stations shall be protected from damage. When damage occurs complete repairs while the excavation is open. Undisclosed test station damage that requires repairs to be made after backfilling the excavation will be repaired at the CONTRACTOR sole expense.

e. Upon completion of continuity repairs, the ENGINEER shall retest the continuity of repaired sections at the CONTRACTOR's expense.

END OF SECTION

June 30, 2016

SECTION 02652S

CATHODIC PROTECTION SYSTEM

Add Section 02652:

PART 1 GENERAL

1.1 WORK INCLUDED:

A. This section covers the work necessary to furnish and install an impressed current cathodic protection system, complete.

B. Coordinate and install electrical service to each cathodic protection (CP) station as shown on the Drawings.

C. Utility service connection and service extension fees and charges to be paid by JVWCD/BOR.

1.2 STANDARDS

A. The following standards are included by reference:
1. NACE SP-0169
2. NACE SP-0177

1.3 QUALITY CONTROL

B. All CONTRACTOR specified testing shall be performed by a Corrosion Expert whom is NACE accredited as a Cathodic Protection Specialist or Cathodic Protection Technologist, or registered professional engineer with verifiable expertise in corrosion control and cathodic protection.

D. Contractor performed testing shall include the following tests, which shall be performed as defined this section.
1. Functional testing of cathodic protection stations
2. Other testing as specified in Section 13114, Corrosion Monitoring System.

E. Connection of anodes, energizing and testing of cathodic protection system, and other tests as defined under “System Tests and Inspections” shall be performed by the Engineer unless specifically stated otherwise this section.

1.4 DEFINITIONS

A. Active column: Active column of a Deep Well groundbed shall be that portion of the groundbed which discharges current, and consist of anodes and coke breeze.

F. Inactive column: Inactive column of a groundbed shall be that portion of the column that does not discharge current, and consist of the backfill, casing, and/or grout or concrete seal that is above the active column.

G. Cathodic Protection Station: A cathodic protection station or CP Station shall consist of the rectifier, remote monitoring, electrical service, subpanel or safety disconnect switch, all conduits, and concrete slab required for a complete and functional station.

1.5 SUBMITTALS:

A. Shop Drawings: Catalog cuts and other information for products proposed for use.

B. Quality Assurance Submittals:
   1. Field Test Reports.
   2. Qualifications of NACE Accredited Testing Personnel.

PART 2 MATERIALS

2.1 GENERAL:

A. Like items of materials provided hereunder shall be the end product of one manufacturer to achieve standardization for appearance, maintenance, and replacement.

B. Materials and workmanship as specified in this section shall be installed concurrently with pipe installation. Coordinate all work specified herein with related sections.

2.2 SUPPLIERS:

A. Alternate suppliers will be considered, subject to approval of the ENGINEER. Address given is that of the general office; contact these offices for information regarding the location of their representative nearest the project site.

1. Corrpro, Inc., Chicago, IL www.corrpro.com
2. Farwest Corrosion Control, Gardena, CA www.farwestcorrosion.com
3. Hoff Company, Inc. , Denver, CO www.pipelinesupplies.com
4. MESA Products, Tulsa, OK www.mesaproducts.com
5. Northtown Products, Huntington Beach, CA www.northtownproducts.com

2.3 REFERENCE ELECTRODES:

A. Prepackaged Copper-Copper Sulfate Reference Electrodes:
1. Material: Permanent type, copper-copper sulfate reference electrode suitable for direct burial with a design life of 40 years, minimum.
2. Wire: No. 14 AWG stranded copper wire with yellow, 600-volt TW, THWN, or USE2 insulation. Wire length of 50 feet or as required for splice free installation.
3. Connection: The wire shall be attached to the electrode and insulated with the manufacturer's standard connection. Connection shall be stronger than the wire.
4. Backfill: As recommended by reference electrode manufacturer.

2.4 WIRE:

A. Rectifier DC Wires:
1. No. 2 AWG wire shall be single-conductor, stranded copper wire with 600-volt, high molecular weight polyethylene (HMWPE) insulation, black.

B. Impressed Current Anode Wire:
1. Single-conductor, No. 8 AWG stranded copper.
2. Deep Well Anodes: 20-mil thick cross-linked Kynar or ECTFE floropolymer (Halar) primary insulation and high molecular weight polyethylene (HMWPE) outer insulation.

C. Test Wires:
1. Pipe Test Wires: No. 10 AWG wire, single-conductor, stranded copper with 600-volt, TW, THWN, or HMWPE insulation. Color coded insulation as specified.
2. Reference Electrode Wires: No. 14 AWG wire single-conductor, stranded copper with 600-volt, TW, THWN, USE2, or HMWPE insulation. Color coded insulation as specified.
3. Insulation Color: Color shall indicate the function of each test wire and shall be as follows:

a. Pipe: White
b. Reference electrodes: Yellow

D. AC Power Service:
1. Subpanel to Rectifier: No. 10 AWG, minimum, stranded copper wire, Type THHN or THWN cable with quantity of conductors as required for source voltage and phasing with ground wire. Colors in conformance with NEC requirements.
2. Underground Service: Provided by electrical utility from transformer to meter base.

2.5 DEEP WELL GROUNDBED

A. Surface Casing
1. PVC well casing, conforming to ASTM F-480, Schedule 40.

B. Street Reducer:
1. General
a. Sealing materials for wells shall conform to the State of Utah water well regulations or as specified herein, whichever is more stringent.
2. External Sanitary Seal (annulus area between the surface casing and soil):
a. Bentonite Grout:
(1) Mixture of granular bentonite and water in a ratio of not less than 8 pounds of bentonite or expansive clay per gallon of water.
(2) Slurry shall not be less than 50 percent expansive clay with the grain size of the remainder to be not greater than coarse sand.
(3) Bentonite shall be commercially produced product specifically designed for well sealing. Acceptable products are **Aquaguard, Quick-Grout, Plug-Gel, Shur-Gel, Enviro-Plug,** or equivalent material.
b. Unhydrated Bentonite Chips
(1) Material: Unhydrated sodium bentonite, specifically designed for well sealing.
(2) Gradation: Medium chips, 1/4 inch, minimum, to 3/8 inch, maximum, dust and fines not to exceed 2 percent by weight.
(3) Application Restrictions:
(a) Not allowed for sanitary sealing casings over 50 feet in length,

(b) Gravity feeding from the surface at depths greater than 30 feet or with water in the hole will shall require monitor rod to insure bentonite chips do not bridge and that annular space fills from bottom to top.

(4) Manufacturers:
- (a) Wyoming Ben, Enviroplug Medium
- (b) Baroid, Holeplug
- (c) Or Equal

3. Casing Internal Seal (inactive column area): Unhydrated Bentonite chips.

C. Vent Pipe:
1. Active Column Vent
   a. Loresco "Allvent", 1-inch diameter, solvent welded joints, slotted PVC vent pipe as manufactured by Loresco International, Hattiesburg, MS.
   b. Slotted vent pipe shall be installed in the active anode column area and extend 15 feet into the inactive column.
2. Inactive Column Vent
   a. Inactive column vent pipe shall be 1-inch, schedule 40 PVC with solvent welded joints.
3. Surface Vent:
   a. ASTM A53-90b standard hot dipped galvanized steel pipe, 1-inch diameter with 180-degree gooseneck at the top.
   b. Coat threads and any damage to the galvanized coating with one coat of inorganic zinc rich primer.

D. Anode Centralizers
1. Metal assemblies that can be securely attached to the anodes to center them in the drilled well.
2. No sharp edges or bolts will be permitted on the centralizers.
3. Centralizers shall not block the well or impair installation of the anode, anode wires, or coke breeze.

E. Deep Well Seal:
1. Two-piece, cast iron seal with a rubber packer to form a watertight seal.
2. Seals shall permit conduit and vent pipe penetrations through the seal with the rubber packing sealing the annular space watertight.
3. Provide plugs for all unused holes.
4. Seal installation shall be watertight.
5. Manufactured by Campbell Manufacturing, Inc., Bechtelsville, PA; Berkeley Pump Company; Jacuzzi Brothers Inc.; or equal.

2.6 IMPRESSED CURRENT ANODES

A. Cast Iron Anodes

1. Impressed current anodes for shall be Modified high silicon cast iron of the following alloy composition:

MODIFIED HIGH-SILICON CAST IRON

Silicon	14.20 to 14.75 percent
Chromium	3.25 to 5.00 percent
Manganese	1.50 percent, maximum
Carbon	0.70 to 1.10 percent
Copper	0.50 percent, maximum
Molybdenum	0.20 percent, maximum
Iron	Remainder

2. Anodes shall be TA equivalent tubular anodes for center tapped anode wire connections as shown on the drawings.
3. Anodes shall be 45 pounds bare weight, minimum, and 84 inches long, minimum, tubular anodes with center tapped anode wire connections.
4. Lead Wire:
   a. No. 8 AWG stranded copper with insulation as specified under WIRE, this section.
   b. Lead wire shall be of sufficient length to extend splice-free from anode connection to the anode junction box.
   c. Connection of lead wire to the anode shall be by the manufacturer's standard connection and shall be stronger than the wire.
5. Packaging:
   a. Lead wire shall be coiled and bound in such a manner as necessary to protect the insulation from damage during shipment.
   b. Anodes shall be protected from breakage.
   c. Damaged anodes or lead wire will be cause for replacement of the lead wire and anode.
6. Wire Labels: Label the end of each deep well anode wire with the anode number and lead wire length. Number anodes sequentially from bottom to top.

2.7 COKE BREEZE:

A. Coke breeze shall be lubricated calcined petroleum of the following composition:

Volatile Matter	0.7 to 1.8 percent
Ash	1.3 percent maximum
Sulfur	1.9 percent maximum
Fixed Carbon	95.0 percent minimum
Particle Size	100 percent less than 16-mesh
Density	68 pounds per cubic foot, minimum

B. Acceptable coke breeze shall be Loresco SC-3 as manufactured by Loresco International, Hattiesburg, MS.

2.8 ANODE JUNCTION BOX

A. Terminal Box:
   1. NEMA 250-85, Type 3R, 14-gauge steel, minimum thickness, with inside dimensions not less than 12 inches by 12 inches by 4 inches deep or as required for the quantity of anodes.
   2. Hinged door with padlock hasp.

B. Hardware: Secure door with stainless steel quick release latches and hinges. Screw or bolt mounted or secured doors will not be acceptable

C. Coating: Hot dipped galvanized in accordance with ASTM A153

D. Terminals and Connectors: Furnish a separate panel board, buss bar, and terminal strip or terminal block connectors, and nickel plated brass fasteners for connecting the anode lead terminals to the rectifier positive lead. Provide separate terminal and shunt for each anode lead. Quantity of terminals shall be as shown on the Drawings for quantity of anodes per groundbed

E. Shunts: Holloway Type RS, 0.01 ohm.

F. Equipment Tags: Provide each junction box with original manufacturer's equipment tag that identifies the original equipment manufacturer, model number, serial number, and any applicable electrical ratings. Equipment tags with vendor or distributor name will not be acceptable.

G. Manufacturer: Anode junction box shall be Universal Model ATB or ATB-S as manufactured by Universal Rectifiers Inc., Rosenberg, TX.

2.9 RECTIFIER:

A. Rectifiers shall be air cooled, constant current controlled rectifier meeting NEMA MR-20-1958 standards.

B. Voltage output shall be controlled with a minimum of 24 evenly divided transformer tap settings.

C. Constant current solid state control circuits shall maintain the current output within 2 percent of the set value while varying the voltage or current from 1 to 100 percent of the rated dc voltage. The solid state controller boards shall be fully encapsulated and/or plated as required to prevent corrosion of the boards, components, and connections in an industrial exposure

D. The rectifiers shall be designed to operate continuously at full rated output at an ambient temperature of 45 degrees C with an ac input of 120/240 volts, single phase, 60-Hz. The rectifier shall be capable of operation at 110 percent of rated input without damage to the rectifier components.

E. Push button type circuit breakers for ac input or secondary ac breaker shall not be permitted.

F. The stack shall provide a continuous DC output as shown on the Drawings, minimum. The rectifying elements shall be a full wave bridge, silicon diode stack. The rectifier stack shall be protected from over voltage surge with metal oxide varisters and over current with current-limiting devices.

G. Lightning protection devices shall be provided on the ac input and dc output of rectifier.

H. Supply the rectifier with separate DC voltage and current meter and external panel mounted shunt in series with the ammeter. The meters shall be accurate to within 2 percent of the actual voltage and current output and shall be d'varsonal-jeweled movement. Meters shall be tested and calibrated at the factory. Meters will be tested in the field for accuracy. The manufacturer shall replace inaccurate meters.

I. Transformer, ac circuit breaker, rectifier stacks, constant current control circuit boards, lightning arrestors, DC output meters, and all wiring connections shall be housed in an 11 -gauge steel, hot dipped galvanized cabinet suitable for pole mounting. The cabinet shall be provided with hinge doors on the front and one side with slide out rack assembly. Cabinet shall be provided with hasp for padlocking and shall be sealed to

protect the interior components from weather, vandalism, and nest building insects.

J. Rectifiers shall be manufactured to include remote monitoring equipment connections and internal mercury relay switch for current interruption as specified, this section. Remote monitoring provisions included with rectifiers shall include:
   1. Mercury relay switch with current capacity of 120 percent of the rated DC output, minimum, and input switching voltage of 10 to 14 volts DC, 500 mA maximum, or as specified for remote monitoring equipment this section.
   2. Terminal strips with individual terminals for pipe test wires, reference electrodes, and power supply to remote monitoring equipment.
   3. Power terminals shall be 2-ampere, minimum, 10 to 25 volt ac, supply power for remote monitoring unit, as specified this section.
   4. AC power supply to remote monitoring unit shall be protected with an independent overload circuit breaker and isolating transformer.

K. Remote monitoring connection terminals shall be provided by the rectifier manufacturer with double screw terminal strips mounted on the panel board for connection of remote monitoring equipment to be supplied by others. Terminal strip shall have all rectifier connections completed and terminated on the terminal strip with engraved identification or approved equivalent for the following connections:
   1. Terminal Block No. 1 (Eight Terminals)
      a. DC Volts, Positive
      b. DC Volts, Negative
      c. DC Shunt Millivolts, Positive
      d. DC Shunt Millivolts, Negative
      e. Power Terminal #1, 10 to 25 volts ac
      f. Power Terminal #2, 10 to 25 volts ac
      g. Relay Switch, Positive, 10 to 14 volts DC
      h. Relay Switch, Negative, 10 to 14 volts DC
   2. Terminal Block No. 2 (Eight Terminals)
      a. Reference
      b. Pipe #1a
      c. Pipe #1b

L. Supply each rectifier with an operation and maintenance manual that includes an electrical schematic of the rectifier, parts list with replacement part numbers, and troubleshooting procedures.

M. Provide each rectifier with original manufacturer's equipment tag that identifies the original equipment manufacturer, rectifier model number, serial number, ac input, and dc output ratings. Equipment tags with vendor or distributor name will not be permitted and will be rejected and replaced.

N. Rectifier manufacturer shall be Universal Rectifiers Inc. Rosenberg, Texas.

2.10 REMOTE MONITORING

A. Provide Watchdog Model Scout remote monitoring unit (RMU) manufactured by Elecsys, Olathe, Kansas, with CDMA cellular telemetry.

B. Supply one RMU per rectifier or rectifier circuit and provide all mounting hardware needed for external or internal mounting as required by the JVWCD/BOR.

C. RMU shall have interruption capabilities compatible with the relay supplied with the rectifier. Coordinate RMU supply power and relay electrical requirements with the rectifier manufacturer.

D. Connect RMU to rectifier and provide the following monitoring:
   1. Rectifier output voltage, ±200 volts DC range
   2. Rectifier output amperage, ±100 millivolts DC range
   3. Pipe to Soil Potential, ±10 volts DC range
   4. AC voltage detection
   5. Rectifier interrupter relay output, 10 to 14 volts dc

2.11 AC ELECTRICAL SERVICE:

A. Utility Underground Service
   1. Meter base and disconnect switch as shown on Drawings.
   2. Single Phase Meter base: 240-volt, single-phase, three-wire, 100-ampere, 2-inch threaded hubs, manual link bypass, per electrical utility requirements.
   3. Electrical Subpanel:
      a. Heavy-duty, outdoor, NEMA 3R rainproof rated at 240 volts, single phase, 75 amperes, and six single pole circuit capacity, minimum.
      b. Supply with thermal break circuit breakers sized for electrical loads and voltages as follows:
         (1) Rectifier Circuit: Two Pole, 30 ampere.
         (2) Convenience Outlet: Single pole, 20 ampere.

4. Subpanel: Heavy-duty, NEMA 3R rain tight, rated at 240 volts, 60 amperes, two-pole, six circuit spaces, minimum. Supply with two pole thermal break circuit breaker sized for the ac current flow at maximum rectifier output but not to exceed 125 percent of maximum rectifier output.
5. Conduit:
   a. General: Must conform to electrical utility requirements
   b. Size: 2-inch diameter minimum, 36-inch minimum long radius sweeps, or as required by the electrical utility.
   c. Material: Rigid fiberglass or electrical grade Schedule 40 gray PVC.

B. Grounding
1. Ground Rod: Copper-clad steel, 5/8-inch diameter, 8-feet long.
2. Ground Wire and Clamp: No. 6 AWG solid copper wire with a high copper content alloy or bronze bolt-on ground rod clamp.

2.12 RACEWAY AND DUCT BANKS:

A. Outdoors, Exposed Conduit
1. Conduit: Rigid hot dipped galvanized steel, 1-inch diameter, minimum, or as shown on Drawings.
2. Fittings and outlet bodies: Cast malleable iron, hot-dipped galvanized iron.
3. Joints: Threaded, watertight.

B. Buried or Concrete Encased Conduit:
1. Conduit: Rigid, electrical grade, schedule 40 gray PVC, 1-inch diameter, minimum, or as shown on Drawings.
2. Joints: Solvent welded or threaded, watertight.
3. Sweep elbows: PVC coated rigid steel with threaded joints.

C. Flexible conduit:
1. Flexible conduit for ac power from the entrance switch to the rectifier shall be PVC coated, waterproof flexible conduit.
2. Use of flexible conduit shall be minimized and shall be acceptable for use only where other fittings and elbows are not readily available.

D. Conduit Hardware and Supports;
1. Conduit Mounting - Hot dipped galvanized Unistrut modular supports and hardware. Cadmium or electroplated zinc coating will not be allowed.

2. Locknuts, conduit clamps, and other miscellaneous hardware shall be hot dipped galvanized steel. Galvanized items shall be hot-dipped galvanized in accordance with ASTM A153. Two hole straps will not be permitted.
3. Conduit clamps shall be two piece, malleable iron, one hole, strap and clamp back spacer, O. Z. Gedney 14-100G and 143G or similar, for mounting to surfaces with either lag bolts or concrete wedge anchors, as shown on the Drawings.
4. All miscellaneous hardware shall be hot dipped galvanized steel or the same material as the conduit.

E. Precast Electrical Boxes:
1. Cover: HDPE or Fiberlyte cover, 3,000 lbs vertical load minimum, or as required for application, whichever is greater, 10-inch by 15-inch minimum dimensions.
2. Body: Fiberlyte or polymer concrete, slope sides, minimum depth 18-inches.
3. Hardware: Stainless steel hex cover lock.
4. Load Requirements: As required for location as follows.
   a. Open or non-traffic areas: 3,000 lbs vertical
   b. Parkway or Greenbelt: 3,000 lbs vertical
   c. Intermittent Light Vehicle Traffic: 12,000 lbs vertical

F. Protective Coatings:
1. Galvanized items shall be hot-dipped galvanized in accordance with ASTM A153.

2.13 PROTECTIVE BARRIERS

A. CP Station Railing
1. Posts: New steel pipe, standard weight, 4-inch diameter, 8 feet maximum on center spacing.
2. Post Caps: Welded steel plate with vent hole or concrete filled at CONTRACTOR's option.
3. Rails: New steel pipe, standard weight, 2-inch diameter
4. Joints: Welded, except for front rails which shall be bolted.
5. Coating: Hot dipped galvanized, in accordance with ASTM A153 after fabrication.
6. Bolts: Galvanized steel or Type 304 stainless steel
7. Configuration and Size: As shown on the Drawings.

B. Deep Well Railing
1. Posts: New steel pipe, standard weight, 2-inch diameter

2. Post Caps: Welded steel plate with vent hole or concrete filled at CONTRACTOR's option.
3. Rails: New steel pipe, standard weight, 2-inch diameter
4. Joints: Welded
5. Coating: Hot dipped galvanized, in accordance with ASTM A153 after fabrication.
6. Configuration and Size: As shown on the Drawings.

2.14 THERMITE WELD MATERIALS:

A. General:
1. Thermite weld materials consist of wire sleeves, welders, and weld cartridges according to the weld manufacturer's recommendations for each wire size and pipe or fitting size and material.
2. Welding materials and equipment shall be the product of a single manufacturer. Interchanging materials of different manufacturers is not acceptable.

B. Molds: Graphite, as recommended by manufacture for pipe and wire size.

C. Adapter Sleeves:
1. For No. 12 AWG and No. 2 AWG wires.
2. Prefabricated factory sleeve joint bonds or bond wires with formed sleeves made in the field are acceptable. Attach field-formed joint bonds sleeves with the appropriate size and type of hammer die furnished by the thermite weld manufacturer.
3. Extend wire conductor 1/8 inch beyond the end of the adapter sleeve.

D. Cartridges:
1. Steel: 32 grams, maximum.
2. Cast and Ductile Iron: 45 grams, maximum, XF-19 Alloy

E. Welders and Cartridges: For attaching copper wire to pipe material:

Pipe Material	**Weld Type**	**Cartridge Size, Max.**
No. 6 AWG Wire & Smaller		
Steel	HA, VS, HC	15 gm
Ductile or Cast Iron	HB, VH, HE	25 gm
No. 4 AWG Wire & Smaller		
Steel	HA, VS, HC	25 gm
Ductile or Cast Iron	HB, VH, HE	32 gm

F. Welding Materials Manufacturers:
1. Erico Products Inc. (Cadweld), Cleveland, OH.
2. Continental Industries, Inc. (Thermo-Weld), Tulsa, OK.

2.15 COATING REPAIR MATERIAL FOR PIPE AND FITTINGS

A. General:
1. Complete coating repairs in accordance with recommendations of the pipe or fitting manufacturer.

B. Coating Requirements:
1. Steel Pipe:
   a. Coal tar based coatings: Koppers Bitumastic 50 or Denso or Tapecoat wax tape coatings; or equal, 20 mils dry film thickness, minimum.
   b. Polyurethane or Epoxy Coatings: Fast cure epoxy, 20 mils dry film thickness, minimum
   c. Tape Wrap or Extruded Polyethylene Coating: Thermite Weld Cap, Canusa CRP Patch, or Raychem PERP patch, or equal
   d. Cement Mortar Coating: Same as required for Concrete Cylinder Pipe.
2. Ductile iron Pipe:
   a. Fast cure epoxy
   b. Thermite weld cap
3. Concrete Cylinder Pipe:
   a. 1-inch, minimum, cover of cement mortar.

C. Coating Materials:

1. Thermite Weld Caps:
   a. Royston Laboratories Handi-Cap IP, prefabricated primerless thermite weld cap and coating system.
   b. Provide primer unless specifically stated in product data sheet that no primer is required.
2. Fast Cure Epoxy Coating:
   a. 100 percent solids, fast curing epoxy suitable for submerged or buried conditions.
   b. Acceptable products or equal:
      (1) Denso Protal 7125 (low temperature) or Protal 7300
      (2) Tapecoat TC 7010
      (3) 3M ScotchKote 323

2.16 CONCRETE

A. Class AA(AE) per UDOT specification Section 03055 Portland Cement Concrete.

2.17 ROCK MULCH

A. Where indicated on the Drawings for landscape rock mulch.

B. Color of rock mulch to be selected by Jordan Valley WCD.

C. Material shall consist of hard, durable particles of proper size and gradation, and it shall be free from loam, clay, excess fines, coal and coal byproduct materials, and deleterious materials. Submit certified laboratory testing depicting chloride limits of less than 100 parts per million and pH exceeding 6.5. The size of the particles shall be uniformly graded as follows:

Sieve No. or Size	Percent Passing (by weight)
1 1/2"-inch	100
3/4 inch	20 - 55
¼-inch or smaller	5

D. Acceptable aggregate shall be angular with some rounded aggregate.

PART 3 EXECUTION

3.1 GENERAL:

A. The installation of the facilities herein specified and described shall conform to the latest applicable NEC rules.

B. The workmanship shall be of the highest grade and shall be in strict accordance with material manufacturer's instructions. Equipment or materials damaged in shipment or in the course of installation shall be replaced.

C. Examine all Drawings and coordinate his work so as to avoid conflicts, errors, delays, and unnecessary interference with the construction of the facilities and to avoid duplication of the work such as excavation, filling, etc. In the event of any conflicts in the Specifications, the ENGINEER shall be consulted.

3.2 STORAGE AND HANDLING:

A. Store all cathodic protection rectifiers and electrical components off the ground and keep them dry at all times.

B. Protect against weather, condensation, and mechanical damage.

C. Immediately remove from the project site all mechanically damaged anodes.

3.3 REFERENCE ELECTRODE INSTALLATION

A. Remove plastic or paper wrapper and place reference electrode within the pipeline trench excavation 12 inches from pipe in a vertical position.

B. Soak reference electrode in water for 30 minutes, minimum, before installation. Test potential of reference electrode against standard reference electrode in soak water at end of 30 minutes.

C. Install one reference electrode within 12-inches of pipeline. At foreign pipe crossings provide two reference electrodes and place one reference electrode within 12-inch of each pipeline and with corrosion coupons as shown on the Drawings.

D. Backfill hole with select native material in 6-inch layers and hand tamp each layer around anode. Use only native soil for backfill; do not use sand. Exercise care not to strike reference cell or lead wire with tamper.

E. Terminate reference electrode wire in rectifier, as required.

3.4 CATHODIC PROTECTION STATION ABANDONMENT

A. Existing cathodic protection station (CPS) located at approximately 5200 South Bangerter Highway as shown on the Plan and Profile drawings.
B. CPS shall be removed and deep anode groundbed abandoned in accordance with State of Utah Well Abandonment regulations and as shown on the Drawings.
C. Original design drawings of Cathodic Protection Station No. 1 are included with reference drawings.
D. Cathodic protection abandonment shall be completed after the new cathodic protection system is installed and functional testing is completed as defined this section.
E. Removal of the existing cathodic protection station shall include:
   1. Obtaining a State of Utah Well Abandonment permit and complying with all required submittals and procedures.
   2. Filling the deep anode groundbed vent pipe with neat cement by pumping through a tremie pipe from the bottom of the vent pipe.
   3. Excavation, cutting of the surface casing, and placement of the sealing materials as shown on the Drawings.
   4. Coordinating with UP&L for the disconnection of the existing electrical service.
   5. Disassembly, removal, and salvage of rectifier, ac meter, anode junction box, concrete slabs, and all above grade appurtenances.
   6. Removal of any existing test stations on the existing section of Jordan Aqueduct Reach 3 to be abandoned in place.
   7. Excavating and removal of all wires to the pipeline to a minimum depth of two feet and seal the ends of the remaining wire. Removal of wires to the pipe is not required.

3.5 DEEP WELL GROUNDBED INSTALLATION:

A. General:
   1. Drilling, electrical logging of well, lowering of anodes, coke breeze placement, and backfilling shall be done in a continuous operation and shall be observed by the ENGINEER.
   2. A certified water well driller in current standing in the State of Utah and shall obtain all drilling permits, start cards, submit notification of work completion, and submit drilling logs in accordance with state regulations.
   3. Driller will be solely responsible for all aspects of the drilling and well construction until well completion.
   4. Drilling of the groundbed shall be in accordance with the methods and procedures of the best recognized drilling practices and shall

comply with the rules and regulations of the State, County, City, or other governing bodies having jurisdiction.

5. Deep well groundbeds shall be sealed as specified herein or as required by well drilling regulations. The most stringent requirements shall apply.
6. Take necessary precautions to avoid entrance of foreign matter, movement of soil strata, or collapsing of the well during the progress of the work. Should movement of soil strata or collapse of the drilled well interfere with proper completion of the ground bed, recover the wires and anode strings, where possible, and ream or redrill the well.
7. The driller shall maintain a log describing the depth and type of formations encountered during drilling. Copies of the log shall be submitted to the ENGINEER and appropriate government authorities.
8. Wells not completed in accordance with the State water well or other applicable regulations and this specification will be subject to rejection and replacement at the CONTRACTOR's sole expense.

B. Drilling:

1. Coordinate the actual location of the ground bed in the field with the ENGINEER before drilling begins. Verify and locate all buried utilities prior to beginning drilling operations.
2. Provide a holding sump to contain and store drilling fluids and cuttings.
3. Excavation of a temporary mud pit on the project site will not be permitted.
4. Provide drilling mud containment and disposal system to prevent mud from entering drainages, storm drains, gutters, streams, or leaving the project site.
5. Size the holding sump for the project and take all precautions necessary to prevent spillage or overflow of drilling fluids. All overflow or spillage shall be contained. Clean all spills and overflows and, if necessary, will clean drainages, storm drains and manholes impacted by uncontained drilling fluids.
6. Transport and dispose of all drilling fluids and cuttings to an approved disposal location.
7. Spillage or leakage of oil or hydraulic fluids shall be contained and controlled by the Driller. All oil contamination on the drilling site resulting from drilling equipment shall be contained, cleaned up, and properly disposed of the project site.
8. Over drill well to compensate for sloughing or heaving during anode installation.

C. Casing
   1. Construct the well and set surface casing straight and plumb. Casing length as shown on drawings is the minimum length, determine casing requirements based on anticipated drilling conditions and as defined in this section.
   2. Surface casing shall be set prior to completion of the first 100 feet of the well.
   3. Casing, other than surface casing, shall not be installed or left in the well unless in the driller's estimation it is necessary for successful completion of the well.
   4. Plastic casing may be installed in the inactive column, at the CONTRACTOR's option, but shall not extend into the active column.
   5. If steel casing is installed into the active column, it shall be cut 100 feet below the ground surface and the top portion jacked up to provide a 25 foot, minimum, separation between the upper casing and the top of the active column. Complete cutting of the steel casing before anodes are installed. Jacking operations must be completed before installation of anodes.
   6. Drilled hole for surface casing shall be 4 inches in diameter greater than casing outside diameter, minimum.
   7. Surface casing shall be provided with a sanitary seal as specified herein and in accordance with State water well regulations, whichever is more stringent.

D. Placement of Casing Seals:
   1. External Sanitary Seal
      a. Install sanitary seal in annular space between casing and soil.
      b. Place casing sanitary seal by tremie pipe and pumping of bentonite grout if casing is greater than 50 feet or groundwater is present within the well.
      c. The seal placement shall be done continuously and in a manner that will ensure the entire filling of the annular space in one operation.
      d. No drilling operations will be permitted until neat cement or grout has cured.
         (1) Curing time for portland cement, Type I or II, is a minimum of 72 hours and for type III a minimum of 36 hours.
         (2) Addition of an accelerator will be permitted subject to written approval from the State Water Engineer.

(3) Bentonite grout set time shall be determined based on manufacturer's recommendations or observations of a mixed grout sample taken from the pumped stream.

2. Casing Internal Seal
   a. After the coke breeze settlement is completed and anode settlement is stopped, the casing shall be filled with the specified sealing material.
   b. Placement of the sealing material will be with plastic tremie pipe only for slurry type seals. Inserting of the tremie pipe shall be performed in a manner that will not damage the wire insulation.
   c. Granular sealing materials may be top loaded, but shall be performed at a rate that will not result in bridging of the seal material.

E. Electrical Logging:
   1. Flush the well and electrically log the well in the presence of the ENGINEER to determine the soil characteristic along the length of the well.
   2. Electrical Logging Method: Measure current output of first anode as it is lowered into the well. Test using suitable meters, connections to a low resistance ground, and a method to measure the down hole wire length or provide footage identification markings on the wire.
   3. Record current output readings and depth from the surface continuously or at 5-foot increments for the entire well depth. Note depth of groundwater at time of electrical logging.

F. Lowering of Anodes:
   1. Anode installation to be observed by the ENGINEER
   2. Install anodes and coke breeze the same day as the completion of the drilling and electrical logging.
   3. If loading is delayed more than 8 hours after drilling is completed or if loading cannot be completed before sunset or end of working hours, whichever comes first, the drill stem and bit should be reinserted and run back to the bottom of the well with sufficient rotation and circulation to ensure that the drilled well is prepared for anode installation.
   4. If the well is drilled with mud, the well shall be flushed out with clean water in a continuous process before or after the anodes are lowered, at the CONTRACTOR's option, until the return fluid has a mud weight of not more than 9.2 pounds per gallon to allow for proper settlement of coke. The ENGINEER shall inspect the return fluid before coke breeze pumping will be permitted to begin.
   5. Attach anode centralizers to each of the anodes prior to lowering. Attach deepest anode to the vent pipe. Lower anode and vent pipe to the bottom of the well. Lower the remaining anodes individually until all anodes are suspended in the well.
   6. The bottom of the vent pipe shall be capped and each joint of pipe solvent welded in accordance with the manufacturer's recommendations. Drilling of the vent pipe to prevent floating is prohibited and will result in rejection of the vent pipe.
   7. Prevent foreign matter from entering the vent pipe during anode installation and casing seal placement. Clear any blockage of the vent pipe. Failure to clear the vent pipe will result in rejection of the ground bed. Vent pipe shall be permitted to flow water during coke breeze pumping to flush any mud and cuttings from within the vent.
   8. Any damage to anodes or cut, gouged, or scraped wire insulation will result in rejection of the anode and lead wire. Implement means to protect the anode lead wires during and following anode installation.

G. Backfilling of Anode Well:
   1. Keep well full of water during installation of the coke breeze.
   2. Prepare coke breeze slurry with potable water in accordance with the manufacturer's written recommendations. Pump the slurry into the well through a steel or plastic tremie pipe. Pump coke breeze in an even and continuous manner from the bottom of the well to the top as the tremie pipe is slowly withdrawn. Top-loading the coke breeze, by pouring coke breeze into the well will not be permitted.

3. Throughout coke breeze pumping, displaced water and mud shall be collected and stored for disposal. Discharge of mud and water into the storm drains or public right-of-ways, or roadways will not be allowed. Determine and provide the storage capacity required. Should the water and mud storage capacity be inadequate for the project, work will be terminated until adequate capacity is provided. Loss of materials or collapse of the well due to termination of the loading operation will be at the CONTRACTOR's sole expense.
4. Care shall be taken during pumping of the coke breeze to avoid coke breeze bridging or collapse of the well. If the well collapses or coke breeze bridges, take necessary steps to resolve the problem at his sole expense.
5. Restrain anodes from settling during and following coke breeze installation for 24 hours, minimum, for coke breeze settlement and compaction. Maintain anode restraint until all anode settlement stops.
6. After the coke breeze is installed and has settled for 24 hours the ENGINEER shall measure the depth to the top of the coke breeze column. If required, additional coke breeze shall be added by pumping or top loading to the specified elevation. Coke breeze shall not be less than 100 feet below finished grade elevation. Remove any excess coke breeze at his sole expense.
7. When the coke breeze has properly settled and has been placed to the proper depth, fill the inactive column with the specified sealing material to within 4 feet of ground surface.

H. Anode Wire Terminations:
1. Cut a smooth hole in the side of the casing for routing wires to the anode junction box. All below grade penetrations of the surface casing shall be watertight.
2. Anode wires shall be installed in conduit from the ground bed to the anode junction box. The completed electrical conduit shall be watertight.
3. Seal both ends of all conduits from the ground bed with urethane foam to prevent ground bed gases from entering the conduit, anode junction box, or rectifier.
4. Anode lead shall be terminated in numerical order in correspondence to anode depth.

I. Groundbed and Vent Pipe Termination:
1. Connect the surface pipe directly to the plastic vent pipe with a solvent welded by threaded connection adapter.
2. Terminated vent pipe as shown on the Drawings.

3. After all wire terminations and vent pipe connections are completed, complete filling of the inactive column with the specified sealing material.
4. Plumb and support vent pipe during seal placement and while the seal sets or compacts.

J. Cleanup:
1. The drilling site shall be kept neat and orderly under all circumstances.
2. All excess equipment and cuttings shall be removed daily when required by the prevailing conditions at the drilling site.
3. Remove all mud, waste products, and tailings from the project site and dispose of at an approved disposal site.
4. The project sites shall be restored to a condition equivalent to their original condition before construction started and to the satisfaction of the ENGINEER.
5. Damage to sidewalks, curbs, roads, and driveways shall be restored to original condition or better.

3.6 ANODE TERMINAL BOX INSTALLATION

A. Connect the rectifier positive wire and anode wires to the anode junction box terminals.

B. Label wires in the terminal box with permanent tags identifying the anode number and rectifier lead.

C. Connect numbered anodes in consecutive order from top to bottom with anode terminals starting at number 1 on the top left-hand side.

D. Maintain sufficient slack to keep the wire from being unduly stressed, damaged, or broken during backfill.

E. All conduits entering the anode junction box shall be sealed with urethane foam to prevent groundbed gases from entering the junction box.

F. Anode junction boxes shall be not less than 24 inches above the concrete slab. Concrete slabs shall be not less than 3 inches above finish grade and provided with soil retention curbing or walls in finish grades with slopes greater than 1:3

3.7 CATHODIC PROTECTION STATION INSTALLATION:

A. Install a cathodic protection (CP) station, which includes rectifier mounting pad, ac power from the subpanel to the rectifier, and all AC and DC electrical hardware necessary for the rectifier installation.

B. Install and connect an AC power service to each CP Station location as shown on Drawings.

C. Furnish and install AC electrical service except as follows:
   1. Conductors from utility power source utility to meter base to be provided by Electrical Utility.
   2. Underground splice boxes and transformers as required to be furnished by the electrical utility.
   3. Underground conduit and trenching shall be furnished and installed and shall in conformance with the electrical utility requirements.

D. Cathodic protection (CP) station installation and location shall be as shown on the Drawings, except when the Drawings and local or State electrical codes are contradictory. In such cases, local or State electrical codes shall prevail. Final site location and orientation shall be adjusted in the field for site conditions and installation requirements and shall be approved by the Engineer.

E. DC leads to the rectifier shall be as specified this section. Wires shall be buried in accordance with Trenching and Backfill, this section. All wire leads shall be free of splices. Insulation on leads shall be free of cuts or abraded areas.

F. Provide two pipe test lead wires from the protected structure and one reference electrode and terminate all wires on the rectifier panel board.

G. Rectifier negative, structure test wires, and reference electrode wire shall be installed in direct buried DC conduit as shown on the drawings.

H. Upon completion of CP station installation CONTRACTOR to perform functional test of system in accordance with Quality Control Testing, this section.

3.8 ELECTRICAL SERVICE:

A. General
   1. Electrical service to be provided under Rocky Mountain Power Work Order #6211105, electrical service estimator is Henry Tsosie.

2. Electrical power service shall be installed by the CONTRACTOR in accordance with local electrical utility requirements and shall meet or exceed local or NEC codes.
3. Electrical service shall be underground unless shown otherwise on the Drawings.
4. Electrical service shall be installed by a licensed electrician.
5. CONTRACTOR shall obtain a local building permit and coordinate inspection of the completed electrical service.
6. Electrical utility connection fees and electrical extension costs will be paid by the OWNER.

B. Underground Service
1. Provide all materials, trenching, backfill, compaction, conduit, and equipment bases necessary for installation of a conduit from the originating power source to the meter pedestal service panel.
2. Provide flat pull string or poly rope with 500 pounds tensional capacity for utility installation of power conductors from the originating pole or source to the meter base.
3. Underground service shall be installed in conduit, buried 24 inches, minimum, below finish grade in sand backfill in conformance with electrical utility requirements.
4. Underground conduit shall not be greater than 150 feet and more than 270 degrees of combined bends between pull boxes without written approval of the electrical utility.
5. Conduit shall be free of dirt and debris, sealed to prevent infiltration of water, and ends capped.

3.9 ELECTRICAL AND COMMUNICATION DUCTWORK:

A. Underground AC and communication duct bank, DC duct bank, vault raceway, and all electrical conductors shall be installed by a Utah licensed electrician.

B. AC electrical, dc wires, and communication conduits shall be separate conduits installed in accordance with NEC and as shown on the Drawings.

C. All duct banks less than shall be sand backfilled.

D. Underground conduit, except electrical utility conduits, shall not be greater than 250 feet long with not more than 360 degrees of combined bends between pull boxes without written approval of the ENGINEER.

E. Conduit shall be free of dirt and debris, joints solvent welded to prevent infiltration of water and debris, and ends capped.

F. Provide each conduit with a flat pull string or poly rope with 500 pounds tensional capacity for installation of conductors.

G. Electrical contractor shall be furnished and installed AC conductors, circuit breakers, and all associated hardware for electrical service to the rectifiers from subpanel.

3.10 THERMITE WELD WIRE CONNECTIONS:

A. Use thermite weld method for electrical connection of copper wire to steel, ductile iron, and cast iron surfaces. Observe proper safety precautions, welding procedures, thermite weld material selection, and surface preparation as recommended by the material manufacturer. Assure that pipe or fitting wall thickness is of sufficient thickness that the thermite weld process will not damage the pipe or fitting wall's integrity or damage the lining in any way.

B. Before the connection is made, the surface shall be cleaned to bare metal by making a 2-inch by 2-inch window in the coating, and then filing or grinding the surface with a vitrified wheel to produce a bright metal finish. Wire sleeves shall be installed on the ends of the wire before welding to the metal surface.

C. After the weld connection is cooled, remove slag, visually inspect, and physically test wire connection by tapping with a hammer. Remove and replace any defective connections.

D. Make wire connections to concrete cylinder pipe by thermite welding to the shop welded steel plates provided on the pipe for this purpose.

E. Coat each completed wire connection as specified, this section. If lining is damaged by welding, repaired in accordance with the lining applicator's recommendations.

3.11 TRENCHING AND BACKFILL

A. General:
   1. Complete excavations and trenching regardless of the type, nature, or condition of materials encountered, and as required to accomplish specified construction to lines and grades shown.
   2. Complete all utility notifications prior to performing trenching and excavations work.

3. Take care to avoid damage to existing structures and utilities during excavating and trenching process. Locations may be modified, where approved by the ENGINEER, to minimize possible damage to existing structures.
4. Trench shall be of uniform depth and width, level, smooth, and free of sharp objects.

B. Trench Depths:
   a. Trench depths provided are minimum requirements. Meet minimum requirements listed, as required by local utilities, ordinances, or regulations, or as shown on the Drawings, whichever is more stringent.
   b. Minimum depths for cathodic protection or corrosion monitoring work shall be as follows:
      (1) Secondary Electrical Services: 30-inches (conduit)
      (2) Primary Electrical Services 42-inches (conduit)
      (3) Pipeline Test wires, undeveloped 30-inches (direct bury)
      (4) Pipeline Test wires, roadways 24-inches (conduit)
      (5) Rectifier Connection Wires, undeveloped 30-inches (direct bury)
      (6) Rectifier Connection Wires, developed 24-inches (conduit)
      (7) Rectifier Connection Wires, plant 30-inches (duct bank)
      (8) All other 30-inches

C. Safety
   1. Slope, shore, or brace excavations and trenches in accordance with OSHA regulations.
   2. Provide shoring as necessary to prevent caving during excavation in unstable material, or to protect adjacent structures, property, workers, and the public.
   3. Assume sole responsibility for ensuring safety of trenches and conformance to OSHA trench safety requirements.

D. Backfill and Compaction
   1. Backfill trench with excavated backfill materials, unless excavated material is unsuitable for meeting compaction requirements.
   2. Provide imported backfill material where indicated on the Drawings or where excavated material is unsuitable for compaction.
   3. All trenches shall be compacted to 90 percent, minimum, or as specified for the pipeline whichever is more stringent.

4. Concrete slab base material and trenches within 5 feet of roadways, paved areas, or other traffic areas shall be compacted to 95 percent, minimum.
5. Within roadways or where required by local entities, provide a control low strength material (CLSM) to cover the pipe for a minimum of 12-inches or to fill vacuum holes within paved areas. CLSM shall meet the following performance requirements:
6. Total calculated air content: Not less than 8.0 percent nor greater than 12.0 percent.
7. Minimum unconfined compressive strength: Not less than 50 pounds per square inch measured at 28 days.
8. Maximum unconfined compressive strength: Not greater than 150 pounds per square inch measured at 28 days.
9. Wet Density: No greater than 132 pounds per cubic foot.
10. Do not use backfill material of frozen or consolidated debris. Leave the trench with the excess backfill material neatly mounded, but not more than 4 inches above the existing ground level, for the entire width of the trench in undeveloped areas.
11. Replace topsoil in developed, landscaped, or cultivated areas as specified in Surface Restoration, this section.

3.12 QUALITY CONTROL TESTING

A. General:
1. Correct all construction defects identified during testing.
2. Provide engineer with 7 days advance notice of completion for Engineer acceptance testing.
3. Contractor required testing as defined herein shall be performed by a Corrosion Expert, with qualifications as specified this section, whom is an employee or subcontractor to the Contractor.

B. Functional Testing of Cathodic Protection Stations
1. Perform a function test of each cathodic protection station installed.
2. Functional testing shall demonstrate the following items are functional and ready for Engineer performed energizing and testing:
   a. AC power service from meter base to rectifier circuit breaker is operational and functional.
   b. Rectifier produces dc voltage and current output up to the maximum dc current output rating of the rectifier.
   c. Rectifier controller cards are fully functional and providing control of the rectifier output as specified.
   d. All impressed current anodes are discharging dc current.
   e. Remote monitoring system is installed and correctly wired.

3. Upon completion of functional testing, the rectifier shall be left in a de-energized state for Engineer performed System Tests and Inspection.
4. If electrical service is not installed at the time of the functional test, provide a generator with the wattage and voltage output necessary to power the system from the meter base utility connection terminals and complete all testing as defined for functional testing.

3.13 SYSTEM TESTS AND INSPECTION

A. General
1. All testing specified herein shall be performed by the Engineer and shall include:
   a. Preliminary electrical continuity testing of the full pipeline.
   b. Cathodic protection system energizing and testing.
2. Correct all construction defects identified during testing.
3. Provide ENGINEER with one week advance notice of completion of cathodic protection work.

B. Cathodic Protection System Energizing and Testing:
1. After the installation of the cathodic protection system is completed, the ENGINEER shall energize and adjust the system output and ensure proper installation of the cathodic protection system.

END OF SECTION

September 10, 2007

SECTION 02662S

CORE AND GROUT

PART I GENERAL

1.1 SECTION INCLUDES

A. Core cut and grout new pipe into an existing concrete structure wall.

1.2 RELATED SECTIONS

A. Section 03211: Reinforcing Steel and Welded Wire

1.3 REFERENCES

A. ASTM C 109 Compressive Strength of Hydraulic Cement Mortars (Using 2-in or [50-mm] Cube Specimens)

PART 2 PRODUCTS

2.1 MATERIALS

A. Grout
1. Proportions by Volume: One part Portland Cement to two parts Sand.
2. Mix thoroughly with water to form a stiff workable plastic putty.
3. Compressive Strength: ASTM C 109, 2800 psi in 28 days.

PART 3 EXECUTION

3.1 CONSTRUCTION

A. Core drill the existing concrete structure wall so that the flow line of the new pipe matches the pipe flow line shown on the plans. Core the hole 2 inch to 4 inch larger than the outside diameter of the connecting pipe.

B. Recoat exposed rebar per Section 03211.

C. Center the connecting pipe within the core hole and adequately brace to carry the full weight of the pipe prior to grouting of the void area.

D. Grout the void between the pipe and the hole cored in the existing concrete wall. Fill joints, voids, and pockets, completely. Form a watertight joint, uniformly finished inside and out.

END OF SECTION

August 9, 2016

SECTION 02721S

UNTREATED BASE COURSE (UTBC)

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Production, construction, and compaction of UTBC used for pavements, shoulders, and incidental construction.

1.2 RELATED SECTIONS

A. Section 01572: Dust Control and Watering

1.3 REFERENCES

A. AASHTO T 11: Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing

B. AASHTO T 19: Bulk Density ("Unit Weight") and Voids in Aggregate

C. AASHTO T 27: Sieve Analysis of Fine and Coarse Aggregates

D. AASHTO T 89: Determining the Liquid Limit of Soils

E. AASHTO T 90: Determining the Plastic Limit and Plasticity Index of Soils

F. AASHTO T 96: Resistance to Degradation of Small-Sized Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

G. AASHTO T 180: Moisture-Density Relations of Soils Using a 4.54 kg (10 lb) Rammer and 457 mm (18 in) Drop

H. AASHTO T 193: The California Bearing Ratio

I. AASHTO T 255: Total Evaporable Moisture Content of Aggregate by Drying

J. AASHTO TP 61: Determining the Percent of Fracture in Coarse Aggregate

K. UDOT Minimum Sampling and Testing Requirements

1.4 DEFINITIONS Not Used

1.5 SUBMITTALS

A. Submit a written report for approval for each aggregate class and source, a minimum of five working days prior to placement. Include the following:
   1. Aggregate suitability. Refer to this Section, Part 2, Products.
   2. Name of supplier and location of source.
   3. Maximum Dry Density and Optimum Moisture Content. Refer to AASHTO T 180, Method D.
   4. Job mix gradation including single values for each sieve size 1 inch and finer, within the gradation limits of Table ~~2~~ 3.

1.6 ACCEPTANCE

A. Acceptance sampling and testing of material is in accordance with UDOT Minimum Sampling and Testing Requirements.

B. Type I Placement – Pavement Section includes placement for Curb or Curb and Gutter when in conjunction with placement for pavement section.
   1. Use Class A aggregate, Table ~~1~~ 2.
   2. The Engineer takes random samples from the grade and tests for moisture, gradation, and laboratory density, and performs In-place Density determinations.
   3. Meet gradation limits and applicable tolerances of Table ~~2~~ 3 for each gradation test. Each sublot will be evaluated separately and not averaged with other sublots.
   4. Meet minimum density test average of 97 percent of maximum laboratory density with no test less than 94 percent.

C. Type II Placement – Incidental includes placement for Curb, Curb & Gutter, Driveways, Pedestrian Access Ramps, Sidewalk, Waterways, Flatwork, and other items of work in the contract to which UTBC is included and not measured or paid for separately.
   1. Use Class A or B aggregate, Table ~~1~~2.
   2. The Engineer takes random samples from the grade and tests for moisture, gradation, and laboratory density, and performs In-place Density determinations.
   3. Meet gradation limits and applicable tolerances of Table ~~2~~ 1 for each gradation test. Each sublot will be evaluated separately and not averaged with other sublots.

4. Meet minimum density test average of 95 percent of maximum laboratory density with no test less than 92 percent.

D. Type III Placement – Shoulder
1. Use Class A, B or C aggregate, Table ~~1~~ 2.
2. Adjust moisture content prior to compaction.

E. Price Adjustments – Gradation:
1. Based upon the number of samples and the minimum pay factor.
2. Pay factor for aggregate gradation when tested in accordance with ASHTO T 27 are indicated in Table 1.

Table 1
Pay Factors for Aggregate Gradation

SIEVE SIZES	PAY FACTOR	GRADATION TOLERANCE Max-Min
1/2 inch and larger	1.00	0.0 – 10.8
	0.95	10.9 – 12.4
	0.90	12.5 – 13.5
	0.80	13.6 – 15.3
	0.70	15.4 – 16.7
3/8 inch	1.00	0.0 – 9.8
	0.95	9.9 – 11.3
	0.90	11.4 – 12.3
	0.80	12.4 – 13.9
	0.70	14.0 – 15.2
No. 4	1.00	0.0 – 8.8
	0.95	8.9 – 10.1
	0.90	10.2 – 11.0
	0.80	11.1 – 12.5
	0.70	12.6 – 13.6
No. 16	1.00	0.0 – 6.9
	0.95	7.0 – 7.9
	0.90	8.0 – 8.6
	0.80	8.7 – 9.8
	0.70	9.9 – 10.7
No. 200	1.00	0.0 – 2.9
	0.95	3.0 – 3.3
	0.90	3.4 – 3.6
	0.80	3.7 – 4.1
	0.70	4.2 – 4.5

F. Correct material that does not meet the specified criteria by scarifying, placing additional material, re-mixing, reshaping and re-compacting when directed by the Engineer. Rework unacceptable material at no additional cost to the Department.

G. Do not place additional material on any unaccepted layer. Cease production when any two out of three consecutive production days are in a price reduction.

H. Remove products found defective after placement and replace with acceptable products at no additional cost to the Department when directed by the Engineer.

I. Any sublot lower than 0.70 pay factor is considered reject able material. Any sublot in reject may stay in place at the direction of the Engineer, with a 50 percent pay factor.

J. Contractor is allowed 1 retroactive target change per year, per project, to be applied within seven calendar days from notification of out of specification gradation.

PART 2 PRODUCTS

2.1 AGGREGATES

A. Well-graded, clean, hard, tough, durable and sound mineral aggregates consisting of crushed stone, crushed gravel or crushed slag; free of organic matter and contamination from chemical or petroleum products; meeting the requirements of Table 2.

Table 2

Aggregate Properties				
	Aggregate Class			
	A	**B**	**C**	
Dry Rodded Unit Weight	Not less than 75 lb/ft^3			AASHTO T 19
Liquid Limit/Plastic Index	Non-plastic		PI ≤ 6	AASHTO T 89 AASHTO 90
Aggregate Wear	Not to exceed 50 percent.			AASHTO T 96
Gradation	Table 2			AASHTO T 11 AASHTO T 27
CBR with a 10 lb surcharge measured at 0.20 inch penetration	70% Minimum		N/A	AASHTO T 193
Two Fractured Faces	50 % Min	N/A	N/A	AASHTO TP 61

B. Establish the job mix (target) gradation for the 1 inch sieve and finer within the gradation limits. Refer to AASHTO T 11 and AASHTO T 27.

Table 3

Gradation Limits		
Sieve Size	**Job Mix Gradation Target Band**	**~~Job Mix Gradation Tolerance~~**
1½ inch	100	
1 inch	90 – 100	~~±9.0~~
¾ inch	70 – 85	~~±9.0~~
½ inch	65 – 80	~~±9.0~~
⅜ inch	55 – 75	~~±9.0~~
No. 4	40 – 65	~~±7.0~~
No. 16	25 – 40	~~±5.0~~
No. 200	7 – 11	~~±3.0~~

Percent passing based on total aggregate (dry weight), and fine and coarse aggregate having approximately the same bulk specific gravities. See Table 1 for gradation tolerances and pay factors.

PART 3 EXECUTION

3.1 INSTALLATION

A. Mixing: Provide moisture content of ± 2 percent of optimum at the time of placement. Refer to AASHTO T 180, Method D and AASHTO T 255.

B. Procedures for changing the Job-Mix Gradation
   1. Submit changes in writing 24 hours prior to placement for approval by the Engineer.

C. Placing: Place in layers of uniform thickness and compact each layer to a thickness not to exceed a 6 inch depth. Do not place on any frozen surface. Refer to Section 01572.

D. Finishing: Uniform line and grade with surface deviations no more than ⅜ inch in 10 ft in any direction.
   1. Profile Tolerance — Correct any profile deviations greater than ⅜ inch.
      a. Rework minimum of 4-inch lift to achieve homogeneous density.
      b. Determine limits of correction based on extent of deviation.
      c. Continue finishing until existing deviation is less than ⅜ inch.

E. Compaction: Maintain optimum moisture content ± 2 percent.
   1. Use appropriate compaction equipment adjacent to abutments, backwalls, approach slabs, wing walls, retaining walls, and other structures.
   2. Use a minimum of two passes with a roller for Type III placement or as directed by the Engineer.

END OF SECTION

December 16, 2014

SECTION 02735M

MICRO-SURFACING

Delete Article 1.3, paragraph Q through S and replace with the following:

Q. AASHTO PP 72-11: Recovering Residue from Emulsified Asphalt Using Low-Temperature Evaporative Techniques

R. ASTM D 6372: Testing and Construction of Micro-Surfacing

S. ASTM D 7405: Multiple Stress Creep and Recovery (MSCR) of Asphalt Binder Using a Dynamic Shear Rheometer

Delete Table 3 and replace with the following:

Table 3

Modified Emulsion Residue By Distillation		
Test Method	**Description**	**Specification**
AASHTO T 49	Penetration, 25° C	40-90
AASHTO T 53	Softening point	57° C Min
AASHTO T 59-modified (a)	Residue by distillation	62% Min.
AASHTO T 316	Rotational Viscosity 135° C	650 CPS Min
Modified Emulsion Residue By Evaporation, AASHTO PP 72-11 Procedure B		
AASHTO T 315 (b)	Original DSR, G* at 58º C, kPa	7 - 14
AASHTO T 315 (b)	Original DSR, Phase Angle, δ, at 58º C	75 Max.
ASTM D 7405 (b)	Multiple Stress Creep Recovery (MSCR) at 64º C, % recovery at 3.2 kPa stress level	25 Min.
(a) Modified distillation procedure – Heat emulsion residue to 177 ± 5° C and maintain that temperature for 20 min. Perform the distillation within 60 ± 15 min. (b) Do not reheat on completion of evaporation. Complete residue testing within 48 hr of performing the evaporation procedure. Pull small specimens from the evaporation sample for rheological testing and ball by hand using gloves that will not affect the residue such as nitrile gloves.		

END OF SECTION

July 19, 2016

SECTION 02742S

PROJECT SPECIFIC SURFACING REQUIREMENTS

Add Section 02742:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Required PG Asphalt Binder or emulsion

B Required minimum asphalt binder content for SMA mixes

C. Number of gyrations (N_{values}) to use for Superpave Mix Design

D. PCCP Pavement Texture Type

E. Acceptance criteria for pavement smoothness

1.2 RELATED SECTIONS Not Used

1.3 REFERENCES Not Used

1.4 DEFINITIONS Not Used

1.5 SUBMITTALS Not Used

1.6 ACCEPTANCE

A. Pavement Smoothness Incentives/Disincentives.

Table 1

Incentives and Disincentives for Category 1 Pavements		
MRI Range (inches/mile by pavement section)	**Dollars/Pavement Section**	
	Asphalt Pavements	Portland Cement Concrete
≤ 40.0	$750	$1500
40.1 - 50.0	$500	$1000
50.1 – 60.0	$250	$500
60.1 – 70.0	0	0
70.1 – 80.0	-$250	-$500

80.1 – 90.0	-$500	-$100
>90.0	Corrective Action	

B. Localized Roughness Limits

Table 2

Localized Roughness Limits	
Roadway	**IRI w/base length of 25 ft. (in./mile)**
Interstate including ramps	≤ 160
Bridge decks, approach slabs & transitions, manholes and valves	≤ 200
Non-interstate	≤ 160
Urban roadways with speed limits less than 45 mph	≤ 160
Shoulders and Bike Lanes	≤ 190 (single profile)

C. Percent Improvement Incentives/Disincentives

Table 3

Category 2 Pavements	
% Improvement per Pavement Section	Incentive/Disincentive Dollars/Pavement Section
≥85.0	$500
75.0 to 84.9	$400
65.0 to 74.9	$300
55.0 to 64.9	$200
45.0 to 54.9	$100
40.0 to 44.9	0
30.0 to 39.9	-$100
20.0 to 29.9	-$200
<20.0	Corrective Action

PART 2 PRODUCTS

2.1 MIXES

A. Hot Mix Asphalt (HMA): (HMA – ½" not under PCCP)
   1. PG 64-34 Asphalt
   2. $N_{initial}$ 7 N_{design} 75 N_{final} 115

B. Hot Mix Asphalt (HMA): (HMA – ½" under PCCP)
   1. PG 58-28 Asphalt
   2. $N_{initial}$ 7 N_{design} 75 N_{final} 115

PART 3 EXECUTION

A. PCCP Pavement Texture
   1. Texture Type: Longitudinal Tining

END OF SECTION

November 14, 2012

SECTION 02746M

HYDRATED LIME

Add the following to Article 1.6:

B. Comply with UDOT Quality Management Plan 514 Hot Mix Asphalt

Delete Article 3.1, paragraph B and replace with the following:

B. Method A: Dynamic Feed Lime Slurry
   1 Lime Slurry – One part lime and at least three parts water by weight. The amount of added water to meet the 3:1 lime slurry may be adjusted to account for the moisture in the stockpile. Use lime slurry with a minimum of one part water by weight of lime.
   2. Add at least 1 percent lime by weight of the virgin aggregate.
   3. Deliver lime slurry to the twin shaft pugmill for mixing with aggregate. The virgin aggregate/lime mixture will contain at least 3 percent water by weight of the virgin aggregate after the pugmill
   4. Adjust quantity (percent) of lime as necessary, based on results of Hamburg Wheel Tracker test.
   5. Verify that Lime Slurry equipment is operating at all times. The Engineer may require Method B, marination of the aggregate/hydrated lime mixture in the stockpile if the HMA is supplied without hydrated lime slurry treatment.

Delete Article 3.1, paragraph C4 and replace with the following:

4. Provide sufficient free moisture to thoroughly wet the aggregate and activate the lime before introducing hydrated lime.
   a. The aggregate/lime mixture will contain at least 3 percent water by weight of the virgin aggregate.

Delete Article 3.2, paragraph A and replace with the following:

A. Control, monitor, and document the lime addition process according to the requirements of the UDOT Quality Management Plan 514 Hot-Mix Asphalt.

END OF SECTION

February 18, 2015

SECTION 02752S

PORTLAND CEMENT CONCRETE PAVEMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials and procedures for constructing Portland Cement Concrete Pavement.

1.2 RELATED SECTIONS

A. Section 00555: Prosecution and Progress

B. Section 01452: Pavement Smoothness

C. Section 03055: Portland Cement Concrete

D. Section 03152: Concrete Joint Control

E. Section 03211: Reinforcing Steel and Welded Wire

1.3 REFERENCES

A. AASHTO M 157: Ready-Mixed Concrete

B. AASHTO T 22: Compressive Strength of Cylindrical Concrete Specimens

C. AASHTO T 24: Obtaining and Testing Drilled Cores and Sawed Beams of Concrete

D. AASHTO T 325: Estimating the Strength of Concrete in Transportation Construction by Maturity Tests

E. American Concrete Institute (ACI) Standards

F. UDOT Minimum Sampling and Testing Requirements

G. UDOT Quality Management Plan

1.4 DEFINITIONS

A. Panel – Area of pavement within a traffic lane or shoulder bound by two transverse joints.

1.5 SUBMITTALS

A. All submittals required in Section 03055.
   1. Mix design trial batch information to include flexural test results.

B. Certified scale axle weights for each haul unit for yardage to be hauled when requested by the Engineer.

C. Portland cement concrete pavement texturing plan for approval at least 14 calendar days before concrete placement to the Engineer and the Region Pavement Engineer.

D. A written plan for approval at least 14 calendar days before concrete placement specifically showing:
   1. Production methods
   2. Handling and placing
   3. Protection and curing including hot or cold weather plan or both

E. Verification that the batch plant meets the requirements of the UDOT Quality Management Plan for Ready-Mix Concrete.

F. Joint layout plan to the Engineer for approval at least 14 calendar days before concrete placement.

G. Cylinder storage device
   1. Written procedures for approval at the request of the Engineer, explaining operation and required monitoring or care of the device. Refer to this Section, article 2.7.

1.6 ACCEPTANCE

A. Acceptance sampling and testing of material is according to UDOT Minimum Sampling and Testing Requirements.

B. Point of acceptance for air content is the in-place pavement.
   1. Sampling and testing will be performed at the point of placement with necessary adjustments applied based on correlation testing. The Department will:
      a. Perform air test on concrete placed in front of the paver and again from the same load in the finished pavement. Record any change in air content.
      b. Adjust acceptance limits for air content according to results of correlation testing to provide final in-place air content that meets the requirements specified in Section 03055.

c. Perform at least one correlation test for each day of paving operations.

2. The Engineer will mark for later removal any areas determined to be reject material.
   a. Coordinate the timing for removal of reject material with the Engineer

C. Department will assess price adjustments for strength, thickness, and surface smoothness separately on the contract bid price**.**

D. Thickness
1. Contractor obtains cores for thickness according to AASHTO T 24 after all grinding for smoothness is completed.
   a. The Engineer marks core location.
   b. One thickness core per 12,000 ft^2
2. Determine the acceptability and pay factors for deficient thickness areas using Table 1.

Table 1

Price Reductions for Deficient Thickness	
Deficient Thickness (inches)	**Pay Factor**
0 to ⅛	1.00
⅛ to ¼	0.90
¼ to ½	0.75
½ to ¾	0.60
>¾	Reject

a. The Engineer may accept pavement deficient by more than ¾ inch at 50 percent pay or require removal and replacement.
b. Make all corrections, including removal and replacement, at no additional cost to the Department.
c. Contractor takes two additional cores for any deficient core (one on each side) where the thickness varies by ⅛ inch. Locate the new core midway between the deficient core and each of the adjacent cores.
d. The Engineer graphs the deficient areas by plotting new cores and the original cores to define deficient areas, assuming the following:

   1) The graph represents the thickness of the pavement.
   2) The thickness varies linearly along the pavement length from core depth to core depth.
   3) The pavement is a constant depth in the transverse direction.

3. Acceptance for thickness may be determined through alternate methods from coring with written approval from the Engineer.
   a. The Engineer obtains concurrence and written approval from the District Engineer and Region Materials Engineer.

E. Compressive Strength Acceptance
1. Compressive strength is determined by the average of three cylinders, which constitutes one strength test. Department will use Table 2 to determine pay adjustments for concrete compressive strength.
   a. The pay adjustment applies to the test lot represented by the strength test.
   b. The Engineer evaluates all concrete with a compressive strength of more than 400 PSI below specification to determine structural integrity of the concrete pavement. This pavement may be accepted at 50 percent pay factor or removed and replaced at the discretion of the Engineer.

Table 2

Pay Adjustments for Compressive Strength Based on 28 days	
psi below f ’$_c$ (4,000)*	**Pay Factor**
1 to 100	0.95
101 to 200	0.90
201 to 300	0.85
301 to 400	0.80

*Section 03055 Table 4

2. Hand-placement areas will be considered separately, refer to Section 03055 testing frequency.
3. Retesting –
   a. The Engineer notifies the Contractor, within three calendar days of determining the 28-day compressive strength, if any test is below specifications. The Contractor has the option to contest the compressive strength results. If contesting the results, the Contractor obtains one set of three cores at no additional cost to the Department and at the approximate location where the contested test cylinders were obtained as determined by the Engineer. Compressive strength shall be the average of the results of the three cores and payment will be based on Table 2. However, if the compressive strength of any one of the cores differs by 10% or more than the average of the three, payment will be based on the lowest compressive strength of the individual cores, as per Table 2. Do not apply a correction factor to compressive strength results. Results of the core testing replaces the

results of the cylinder test results and are binding on both the Contractor and the Department. .

b. An independent third party testing agency will conduct referee testing at no additional cost to the Department. Testing laboratories must:
   i. Be a Department qualified concrete lab.
   ii. Use UDOT TTQP personnel qualified as Concrete Testing Technician and Concrete Strength Testing Technician.

c. Retesting must be completed within 40 calendar days after placement.

d.. Obtain and test cores. Refer to AASHTO T 22 and AASHTO T 24. e. Fill the core holes with the same concrete mix or product approved by the Engineer within 24 hours after coring.

f. Ensure the holes are cleaned, with no standing water before filling with concrete.

g. Consolidate the concrete by rodding or vibrating.

h. Strike off level with the pavement surface and texture.

i. Protect concrete in core holes from any damage for at least 48 hrs.

4. Dispute of the original cylinder compressive strength test results will not be considered when the contractor does not fully comply with the requirements of providing a cylinder storage device, refer Section 02752.2.7.

F. Smoothness
   1. Evaluate and refer to Section 01452.

G. Quantity adjustment when paving over existing pavement surfaces.
   1. Adjust quantity when accepted batched volume overruns or under runs neat-line volume.
      a. The Engineer and Contactor determine accepted batched volume at time of placement.
      b. Accepted batched volume is the total batched material adjusted to design yield minus rejected or wasted material.
   2. Adjust quantity before any price adjustment for non-specification material.
   3. Determine overrun/underrun quantity by the following formula:

$$QA = 0.5\left(\frac{V_a - V_n}{V_n}\right)Q_m$$

QA	=	Adjusted quantity in yd^2
V_a	=	Accepted Volume
V_n	=	Neat-line Volume
Q_m	=	Measured quantity in yd^2

PART 2 PRODUCTS

2.1 CONCRETE

A. Use AA(AE) concrete. Refer to Section 03055.
   1. Meet a 28 day flexural strength of 650 psi verified through trial batch.

2.2 CONCRETE CURING COMPOUND

A. . ASTM C309, Type 2, Class A

2.3 EXPANSION JOINT MATERIALS

A. Refer to Section 03152.

2.4 JOINT SEALERS

A. Use hot applied joint sealant for all joints meeting Section 03152.

2.5 STEEL REINFORCEMENT

A. Tie Bar – Grade 60 or higher, deformed reinforcing steel. Refer to Section 03211.

B. Dowel Bars – Grade 60 or higher, smooth steel rod. Refer to Section 03211.

C. Chairs and Basket assemblies. Refer to Section 03211.

2.6 BATCH PLANT

A. Meet the requirements of the UDOT Quality Management Plan for Ready-Mix Concrete.

2.7 CYLINDER STORAGE DEVICE

A. Use a device that maintains a temperature of 60 degrees F to 80 degrees F and is equipped with an automatic 24 hour temperature recorder, accurate within 2 degrees and with a permanent recording feature. A 24 hour test run may be required.

B. Use device or devices with the capacity to accommodate the required test cylinders for at least two day's operation.
   1. Cease concrete operation when the storage capacity is reached.

C. Make the storage devices available on the job site at least 48 hours before placement.

2.8 VEHICLES FOR HAULING

A. Permissible to use:
   1. End dump trucks with watertight beds and end gates and rounded corners.
   2. Agitator trucks with open tops.
   3. Transit mixers that conform to AASHTO M 157.

B. Do not use bottom or belly dump units.

2.9 SLIP FORM PAVER

A. Self-propelled machine with no fluid leaks equipped with automatic line and grade control capability.

B. Capabilities
   1. Spreading the dumped concrete uniformly across the grade by an auger or a traveling strike-off device.
   2. Vibrating, tamping, striking-off, and shaping the concrete to the desired line grade and thickness in one continuous pass.

C. Vibrator Minimum Requirements
   1. Eccentric Diameter 1⅞ inch
   2. Frequency7,000 to 9,000 vibrations per minute
   3. Spacing 18 inch maximum, mounted longitudinally

D. Mount vibrators to provide adequate concrete consolidation. Do not interfere with dowel bar basket assemblies.

E. Monitor the Operation of Vibrators
   1. Check each vibrator at the beginning and ending of each day.
   2. Repair or replace vibrators as necessary.
   3. Stop paving operations immediately if any indication of malfunction occurs.

4. Resume operations only after repairing or replacing the vibrator.

F. Use trailing forms long enough to leave a smooth, straight, vertical edge.

2.10 FINISHING/TEXTURING EQUIPMENT

A. Burlap drag unless using artificial-turf drag.

B. Texturing equipment as approved by the Engineer.

C. Curing compound application machine with a fully atomizing type power spray and a wind protection hood.

PART 3 EXECUTION

3.1 LINE AND GRADE CONTROL

A. Use a system that limits deviations in the pavement surface to ⅛ inch and deviations in the vertical edge of the pavement to ¼ inch and maintains specified pavement thickness.

B. Slip Form Paving
1. Establish the necessary stakes for line and grade control over existing surfaces and provide the elevation control benchmarks.
2. Equip machinery with a control system that automatically controls concrete placement to the specified longitudinal grades.

C. Formed Paving
1. Keep forms free from warps, bends, kinks, and equal in depth to the specified pavement edge.
2. Tightly join form sections by an interlocking joint free of vertical and horizontal movement.
3. Stop paving operations if the side forms do not meet or hold line and grade.

D. Profile grind pre-existing adjacent pavement before concrete placement. Profile grinding of pre-existing pavement is measured and paid separately, or as extra work.

3.2 BATCH AND MIX

A. Refer to AASHTO M 157.

B. Separate and stockpile in two sizes coarse aggregate sizes 2 inch to No. 4 sieve and 1½ inch to No. 4 sieve with the separation being made on the 1 inch and ¾ inch respectively.

C. Mixing – Conform to the standard and operate the drum at manufacturer's recommended speed.
   1. Conduct mixing efficiency tests at the start of concrete placement and evaluate as specified in AASHTO M 157, Annex A-1.
   2. Increase mixing time in 10-second increments if necessary until the mixer efficiency evaluation is passed.3. Correct poor mixing efficiency at no additional cost to the Department.
   3. Do not allow buildup of cement or mortar on the mixer drums and blades.
   4. Mix for at least 30 seconds after the last addition of water or cement is made after initial batching.

D. Maintain a minimum mixing time of 80 seconds at the manufacturer's recommended mixing speed after all materials are in the drum. The actual mixing time is required to be part of the information automatically printed on each computerized batch ticket. Each individual batch ticket is to accompany the mix to the job site and be delivered to the Department at the job site.

E. Do not add water to the mix after acceptance testing.

3.3 PLACE CONCRETE

A. Keep the base surface moistened 500 ft in front of the paver without allowing areas of standing water.

B. Discharge and place the mixed concrete within the time frame listed below after introducing the mixing water to the cement and aggregates. Concrete not placed within the following time period may be rejected. The Engineer, in conjunction with the Region Materials Engineer, may approve alternate time periods based on concrete and ambient temperatures.
   1. Non-agitating Haul Equipment 45 minutes
   2. Agitating Haul Equipment 75 minutes

C. Do not interfere with dowel basket assemblies if redistributing the concrete in front of the paver. Minimize redistributing the concrete in front of the paver. The Engineer may retest the concrete if redistribution occurs.

D. Provide vibrators to thoroughly consolidate concrete.
   1. Position vibrators on finishing equipment ahead of strike-off auger or final screed.

2. Vibrate, screed, and mechanically tamp the spread concrete. Thoroughly vibrate adjacent to and along the faces of the forms.
   a. Stop vibrating and tamping elements when the forward movement of the paver stops.
3. Use hand-operated vibrators on a regular pattern, not to exceed 12 inches in each direction, for hand placements.

E. Workmanship conforms to ACI 304R-00.

F. Do not add water to the surface for finishing.
   1. Paving operations may be shut down and the concrete rejected if water is added.
   2. Do not use evaporation retarders unless directed by the Engineer.

G. Provide protection for existing surfaces when placing concrete in an adjoining longitudinal section (companion placement).
   1. Do not place concrete for companion placement before existing concrete has achieved a compressive strength of at least 2,500 psi, determined by Maturity Method, AASHTO T 325, or cast cylinders.
   2. Repair any damage to existing pavement resulting from companion placement at no cost to the Department.

3.4 HANDLE AND PLACE REINFORCING STEEL

A. Keep reinforcing steel clean, free from damage, and free from distortion.

B. Place tie bars in the middle third of the slab as shown in the plans.
   1. Refer to PV Series Standard Drawings.
   2. Place in the direction of paving and parallel to the slab surface.
   3. Place by using automatic bar inserters, support on chairs, through forms, or drilled and epoxied. Manual insertion is not permitted.
   4. Maintain at least 6 inch clearance between tie bars and dowel bars.
      a. Adjust tie bar spacing at the transverse joints to provide specified clearance.
   b. Do not adjust dowel bar locations.

C. Place load transfer dowel bars in the middle third of the slab depth, parallel to the centerline and surface of the slab. Limit deviations from parallel to ¼ inch for the length of the dowel bar.

D. Verify location of reinforcing steel.
   1. Provide nondestructive verification of reinforcing steel location within the hardened concrete slab for 10% of the pavement at no additional cost to the Department.

a. Calibrate verification equipment within 7 days prior to the first paving day and provide a copy of calibration report to the Engineer.
b. The Engineer randomly selects the testing sites and witnesses the testing.
c. Verify steel placement within 5 days after each production day's paving.
d. Test all joints for each of the selected pavement panels.
e. Test all of the joints for each adjacent panel when noncompliant steel locations are identified.

2. Individual Dowel/Tie Bar Rejection Criteria
   a. Rotational Alignment: any dowel bar with misalignment greater than 1.5 in. from perpendicular to the joint.
   b. Longitudinal shift: any bar not embedded a minimum of 1/3 of the bar length on each side of the joint.
   c. Depth: any bar within 3 inches of the pavement surface.
3. Provide documentation of verification testing results to the Department for each pavement panel tested. Include the following information:
   a. Test location, identified by station and offset.
   b. Rotational Alignment, identify steel orientation and amount of misalignment.
   c. Longitudinal shift, location of steel with respect to joint. Identify length of steel bar embedded on each side of joint.
   d. Depth, identify the depth of the steel bar, at each end, from the pavement surface.
   e. Paving date of pavement panel and the date of verification testing.
   f. Name of individual conducting verification testing and name of UDOT representative witnessing testing.
4. Remove and replace a full pavement panel where the reinforcing steel meets or exceeds the dowel/tie bar rejection criteria or, at the sole discretion of the Engineer, the full pavement panels may be accepted at 50% of the original unit bid price.
   a. Pavement panels accepted at the reduced rate: saw cut only the reinforcing steel identified as noncompliant for each joint.
   b. A maximum of 3 consecutive transverse joints per sublot may be saw cut and the associated pavement panels accepted at the reduced price.
   c. Pavement panels with reinforcing steel within 3 inches of the pavement surface are not eligible to be left in place with the price reduction.

3.5 FINISH

A. Finish the surface smooth and true to grade by machine float immediately after placing concrete. Finish at a rate equal to the progress of the paving operation.

B. Shut down the mixing operation until the situation is resolved if preliminary finishing is delayed more than 30 minutes after initial screeding.

C. Fill honeycomb areas in the vertical edge of the pavement with mortar.

D. Texture the pavement by burlap drag unless the final texture includes artificial turf drag.
   1. Use at least three plies of wet burlap and drag parallel to the centerline without tearing.
   2. Complete the drag finish with one pass.
   3. Spray water directly on the final burlap drag only in the quantity necessary to keep the burlap wet.

3.6 PAVEMENT TEXTURE

A. Provide a written texturing plan to the Engineer for approval before placing pavement. Show texturing locations and describe methods that will be used for hand texturing. Refer to Table 3.

Table 3

Pavement Texturing Options	
> 50 mph	**≤ 50 mph**
Longitudinal Tining	Longitudinal Tining
Diamond Grinding	Diamond Grinding
Transverse Tining	Transverse Tining
	Artificial Turf Drag

B. Demonstrate the performance of the texturing application method before starting main line paving.

C. Longitudinal Tining
   1. Produce grooves of approximately ⅛ inch wide by ⅛ inch deep spaced ¾ inch apart and parallel to the longitudinal joint.
   2. Keep tining devices clean and free from encrusted mortar and debris to provide uniform groove dimensions.
   3. Time tining so that the grooves do not close up.

D. Diamond Grinding
   1. Produce resultant surface in a parallel, corrugated type texture.
      a. Allowable width of grooves is $^{1}/_{16}$ inch to ¼ inch.
      b. Allowable distance between grooves is $^{1}/_{16}$ inch to ¼ inch.
      c. Maximum allowable height of ridges is approximately $^{1}/_{16}$ inch.
   2. Maintain cross slope drainage.

E. Transverse Tining
   1. Produce randomly spaced ½ inch to ¾ inch transverse grooves approximately ⅛ inch deep.

F. Artificial Turf Drag
   1. Drag artificial turf along the pavement in the direction of paving.
   2. Use plastic turf that is wide enough to cover the entire pavement width and produce a uniform texture with corrugations $^{1}/_{16}$ inch to ⅛ inch deep.
   3. Use turf with a blade density of 7,200 blades/ft^2 and each blade at least ¾ inch long.
   4. Continuously monitor the texturing operation.
   5. Weight the turf if necessary to produce an acceptable texture using a uniformly distributed load.
   6. Remove buildup of cementitious or other materials that may produce an uneven or unacceptable texture.

G. Grinding may be required to correct unacceptable texturing.

H. Rumblestrips
   1. Install by diamond grinding when required.
   2. Rotomilling is not an acceptable method of installation.

3.7 CURE

A. Apply curing compound to the entire pavement surface and exposed edges immediately after completing finishing operations.
   1. Apply the curing compound in two approximately equal applications.
   2. Apply the second application in the opposite longitudinal direction as the first at a combined application rate equal to 100 ft^2/gal.
   3. Allow at least 30 minutes between applications.
   4. Hand spray small and irregular areas and areas inaccessible to mechanical spraying equipment.
   5. Immediately apply curing compound to the edges of the pavement after form removal.

B. Stop the paving operations if the curing compound application behind the paving machine is delayed until the problem is resolved.
   1. Use fogging to keep the pavement moist until the curing compound application resumes.
   2. Prevent damage to the pavement surface texture.

3.8 PROTECTION

A. Protect pavement against all damage and marring.
   1. Construct crossings to bridge the concrete as approved by the Engineer when necessary at no additional cost to the Department.

B. Do not allow Contractor hauling equipment or traffic on the pavement until 100 percent of the design strength has been achieved. Verify strength by one of the following:
   1. Maturity method – AASHTO T 325
   2. Cast cylinders

C. Do not permit hauling equipment or traffic on the pavement before all sawed joints are sealed.

3.9 JOINTS

A. Construct contact joints, sawed joints, or transverse expansion joints as shown in the plans and approved joint layout.

B. Keep the faces of all joints at right angles to the top surface of the pavement with all longitudinal joints parallel to the centerline and coinciding with the traffic lane lines.

C. Longitudinal Contact Joints
   1. Do not allow the finished surface across longitudinal contact joints to deviate from a straight line by more than ¼ inch in 10 ft when tested with a straight edge.
   2. Cease operations until specified tolerances are achieved if the edge slump requirements are not satisfied within 200 ft.
   3. Repair the edge by the following procedures if the edge slump exceeds the specified ¼ inch in 10 ft before placing adjacent concrete:
      a. Saw off the slumped edge to the full thickness with a diamond saw.
      b. Drill holes in the sawed edge and epoxy in new tie bars.
      c. Profile grinding may be considered as approved by the Engineer.
   4. Straighten bent tie bars and re-coat with epoxy paint at the bend point before placing concrete in the adjacent lane.

D. Transverse Contact Joints
   1. Construct transverse contact joints normal to the centerline without keyways on the vertical face.
   2. Use No. 10 by 18 inch dowel bars placed midpoint in the slab at 12 inches on center and embedded 9 inches on each side.
   3. Form joints with bars placed through the form or saw joints with bars drilled and epoxied.

E. Longitudinal and Transverse Sawed Joints
   1. Single cut all transverse and longitudinal joints. Refer to PV Series Standard Drawings.
   2. Saw joints before uncontrolled cracking occurs.
   3. Conduct continuous sawing operations during both day and night regardless of weather conditions.
   4. Provide lighting during nighttime sawing.
   5. Thoroughly clean and dry joints before placing sealant.
      a. Clean the joint using at least 100 psi air.
      b. Equip air compressors with operating oil and water traps.
   6. Fill the longitudinal joints to within 1/4 inch of the finished surface. Overfilling joints may require removal and replacement of joint sealant at no cost to the Department. Refer to PV Series Standard Drawings.
   7. Match joints in adjacent lanes to form a continuous line across the pavement width including the concrete shoulders.

3.10 DEFECTIVE PAVEMENT PANELS

A. The Engineer determines defective panels before substantial completion.

B. Repair or replace defective pavement panels at no additional cost to the Department.
   1. Complete repairs before acceptance testing for smoothness.

C. Remove and replace panels when multiple full depth cracks separate the panel into three or more pieces.

D. Use methods that do not disturb or damage adjacent panels.

E. Remove and replace panel portions with any full depth transverse crack within 4 ft or less of a transverse sawed joint.

F. Drill and epoxy tie-bars/dowel bars as required into existing pavement.

G. Match the profile and texture of existing pavement.

H. Repair any crack connecting joints appearing before substantial completion.
   1. Rout to a 1 inch depth by ⅛ inch width and seal with silicone sealant. Refer to Section 03152.

I. Leave tight random cracks less than $^{1}/_{64}$ inch wide undisturbed.

3.11 LIMITATIONS – GENERAL

A. Meet to limitations of Section 03055 except as modified below.

B. Night Operations
   1. Provide proper lighting from ½ hour after sunset to ½ hour before sunrise according to Section 00555.

C. Precipitation
   1. Cease operation when rain is threatening.
   2. Remove, replace, or repair any pavement damaged by rain or hail as directed at no additional cost to the Department.

D. Surface Evaporation
   1. Limitations apply at any time of the year when any combination of air temperature, relative humidity, and wind velocity have the potential to impair the quality of fresh or hardened concrete or otherwise result in abnormal properties. .
   2. Prepare all materials required for accepted evaporation control measures and have them available on site so that specified measures can be executed as necessary.
   3. Initiate accepted evaporation control measures when concrete and air temperatures, relative humidity of the air, and the wind velocity have the capacity to evaporate water from a free water surface at a rate that is equal to or greater than 0.2 lb/ft^2/h. Determine the evaporation rate of surface moisture by use of the Menzel Formula. Refer to ACI 305 3.1.

E. Mix Consistency
   1. Cease operations when 3 consecutive paving sublots warrant acceptance at a reduced rate due to compressive strength.
   2. Cease operations upon having 4 consecutive batches rejected due to noncompliant air content of the mix.
   3. Operations may not resume until the issues have been resolved to the satisfaction of the Engineer. Associated delays are not compensable monetarily or to the project schedule.

F. Verification of Reinforcing Steel

Cease operations upon identifying 20% or more of the pavement panels with non-compliant steel reinforcement. Operations may not resume until the issues have been resolved to the satisfaction of the Engineer. Associated delays are not compensable monetarily or to the project schedule.

3.12 LIMITATIONS – COLD WEATHER

A. Cold weather limitations apply when the temperature is forecast to fall below 40 degrees F within 14 calendar days of placement.

B. Provide written description of methodology used to comply with cold weather requirements. Comply with the following requirements for placing concrete in cold weather:
   1. Do not use chemical additives in the concrete to prevent freezing.
   2. Provide all necessary cold weather protection for in-place concrete using items such as covers, insulation, and heat.
   3. Do not place concrete in contact with frozen surfaces.
   4. Adequately vent combustion-type heaters that produce carbon monoxide.
   5. Protect the concrete from freezing when the ambient air temperature drops to 36°F or below until a compressive strength of at least 3,500 psi has been achieved, determined by either:
      a. Maturity method – AASHTO T 325
      b. Field cure cylinders
   6. Maintain moist conditions for exposed concrete to avoid loss of moisture from the concrete due to heat applied.
   7. Limit the drop in temperature next to the concrete surfaces when removing heat to 20 degrees F during any 12 hour period until the surface temperature of the concrete reaches that of the atmosphere.
   8. Determine the concrete surface temperature.
   9. Paving may begin when base surface temperature is 36 degrees F in the shade and rising.
   10. Cease operations when the ambient temperature is 45 degrees F in the shade and decreasing.
   11. Remove and replace concrete damaged by frost action at no additional cost to the Department.
   12. Do not use material containing frost or lumps.

C. Heating Aggregate and Water
   1. Provide and operate heating devices at no additional cost to the Department when heated aggregates are required.
   2. Use aggregates free of ice.
   3. Heat aggregates uniformly, avoid overheating or developing hot spots.

4. Use either steam or dry heat.

3.13 LIMITATIONS – HOT WEATHER

A. Discontinue paving when ambient air temperature exceeds 100 degrees F in the shade.

END OF SECTION

July 30, 2015

SECTION 02769S

GRINDING FOR GROOVED-IN PAVEMENT MARKINGS

Add Section 02769:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Procedures for the grinding of pavement markings for the installation of Grooved-In Pavement Marking Paint.

B. The grinding provides that the markings are below the surface to prevent damage by snowplows or other traffic that might damage or cause the paint to be lifted.

1.2 RELATED SECTIONS

A. Section 02765S: Pavement Marking Paint

B. Section 02768: Pavement Marking Materials

1.3 REFERENCES Not Used

1.4 DEFINITIONS

A. Non-Contrast Striping – striping that is applied over bare pavement without the use of black accents.

B. Contrast Striping – broken lines, lane drop lines, and dotted lines that are applied over or in conjunction with an 8 inch black line.

C. Contrasting options
1. Continuous: created by applying pavement markings over an 8 inch solid black line.
2. Background Option 1: Created by applying colored markings simultaneously with a 2 inch to 3 inch black line on each side of the marking for paint. A 1.5 inch minimum black is acceptable for tape.
3. Background: Option 2: Created by applying colored markings over an 8 inch broken black line. The black line extends 6 inches past the overlying marking on each end.

1.5 SUBMITTALS Not Used

PART 2 PRODUCTS

2.1 EQUIPMENT

A. Provide and operate a grooving machine, grinder, or saw that is:
   1. Capable of grinding or cutting to the required depth and cross section.
   2. Self-propelled with sufficient power, traction, and stability to maintain an accurate depth of cut.

B. Do not allow walk behind machines for longitudinal lines.

C. Dry grind only. Do not use water in the grinding process unless approved in writing by the Engineer.

D. Use appropriate cleaning equipment capable of sweeping and picking up millings during and after grinding operations.

2.2 PAVEMENT MARKING PAINT

A. Refer to Section 02765S.

PART 3 EXECUTION

3.1 PREPARATION

A. Establish line control as specified in Section 02765S or Section 02768 whichever is applicable prior to grinding.

3.2 GRINDING

A. Grind pavement along lane lines or in pavement message areas to specified depth, width, length.

B. Depth.
   1. 140 mils minimum for contrast striping or messages.
   2. 120 mils minimum non-contrast striping and messages.
   3. Use manufacturers recommended depth for non-painted messages.

C. Width
   1. 8-9 inches for 8 inch lines or contrast striping.
   2. 5.5-6 inches for 4 inch non-contrast striping.
   3. As necessary to apply messages.

D. Length
   1. Match line length and spacing as specified in standard drawings for broken lines, lane drop lines, and dotted lines (non-contrast or contrast).
   2. Grind as continuous groove for solid lines.

3.3 CLEANING

A. Remove and clean all millings from the surface as work progresses.
   1. Milled material is the property of the Contractor.

B. Thoroughly clean grooved areas with an adequate compressed air acceptable by the Engineer before applying pavement-marking paint.

C. Remove all remaining pavement markings that are to be contrasted prior to application of black paint. Do not apply black contrast paint over any existing markings.

3.4 APPLYING PAVEMENT MARKING PAINT

A. Apply black paint first or in conjunction for contrast striping. Do not use glass beads in black contrast paint.

B. Apply white and yellow lines in groove. Refer to Section 02765S.

C. Black and white lines may be applied in a single application if the appropriate application rates can be achieved, in which case Background Option 1 would be used.

END OF SECTION

March 15, 2016

SECTION 02776M

CONCRETE FLATWORK

Add Article 3.4, paragraph D:

D. Expansion Joints for Curbs (B3, B5, & M2, single and back-to-back)
   1. Follow the Expansion-Contraction Joint Detail shown in Standard Drawing GW 4A.
   2. Place an expansion joint between each plowable end section and the curb located behind it.
   3. Place expansion joints a minimum of every 150 linear feet of curb (single or back-to-back) installed. Match the joint locations when placing on PCCP.

END OF SECTION

July 11, 2016

SECTION 02831S

RETAINING WALL- ALTERNATE SYSTEMS

Add Section 02831:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Select from the following wall systems for retaining walls indicated as Contractor-selected alternative systems. Refer to the project plans for situation and layout drawings.

1. MSE Wall- Reinforced Earth Company Retaining Wall (refer to Section 02833S or 02837S)
2. MSE Wall- SSL MSE *Plus* Retaining Wall (refer to Section 02833S or 02837S)
3. MSE Wall- Tricon Retained Soil Wall (refer to Section 02833S or 02837S)
4. MSE Wall- VISTAWALL Stabilized Earth Wall (refer to Section 02833S or 02837S)
5. MSE Wall- HRW Eureka MSE Wall (refer to Section 02837S)
6. MSE Wall- ARES Geogrid Retaining Wall (refer to Section 02834S or 02838S)
7. MSE Wall- KeySystem I Retaining Wall (refer to Section 02835S)
8. MSE Wall - KeySystem II Retaining Wall (refer to Section 02836S)
9. MSE Wall- Genesis Geogrid Retaining Wall (refer to Section 02836S)
10. MSE Wall – MESA Retaining Wall (refer to Section 02836S)
11. MSE Wall – Versa-Lok/Miragrid Soil Wall (refer to Section 02836S)
12. MSE Wall – Anchor Landmark Reinforced Soil Wall (refer to Section 02836S)
13. MSE Wall – Alan Block AB Three and AB Clasics Segmental Retaining Walls (refer to Section 02836S)

14. MSE Wall – Vertica Retaining Wall (refer to Section 02836S)
15. PMGW – Mountain West Precast Redi-Rock Wall (refer to Section 02839S)
16. PMGW – Harper Precast ReCon Wall (refer to Section 02839S)
17. PMGW – Nephi Sandstone Precast Redi-Rock Wall (refer to Section 02839S)

1.2 RELATED SECTIONS

A. Section 02832S: Select Backfill for MSE Walls

B. Section 02833S: MSE Walls Using Concrete Facing Panels and Metal Reinforcing Elements

C. Section 02834S: MSE Walls Using Concrete Facing Panels and Geogrid Reinforcing Elements

D. Section 02835S: MSE Walls Using Modular Block Units and Metal Reinforcing Elements

E. Section 02836S: MSE Walls Using Modular Block Units and Geogrid Reinforcing Elements

F. Section 02837S: Two-Stage MSE Walls Using Concrete Facing Panels and Metal Reinforcing Elements

G. Section 02838S: Two-Stage MSE Walls Using Concrete Facing Panels and Geogrid Reinforcing Elements

H. Section 02839S: Prefabricated Modular Gravity Wall (PMGW) Systems Using Large Modular Block Units

1.3 REFERENCES

A. AASHTO LRFD Bridge Design Specifications

B. FHWA Design of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes – Volume I, Federal Highway Administration Report No. FHWA-NHI-10-024

1.4 DEFINITIONS Not Used

1.5 WALL SYSTEM SELECTION

A. Notify the Engineer in writing before the preconstruction conference which option listed in Article 1.1 will be used.

B. Use only one wall system for the Contractor-selected alternative.

C. Do not change the wall type after the preconstruction conference without written approval from the Engineer.

1.6 DESIGN REQUIREMENTS

A. Incorporate FHWA Design of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes guidelines, and AASHTO LRFD Specifications, and Interim Specifications for Highway Bridges in design of the selected wall system in addition to, or as modified by, the following:
   1. For all walls, or sections of walls, located within 50 feet of abutments for essential or critical bridges, use a design earthquake peak horizontal ground acceleration coefficient corresponding to a 3% probability of exceedance in 75 years. For walls near normal bridges and all other walls, or sections of walls, more than 50 feet away from bridge abutments, use an acceleration coefficient corresponding to a 7% probability of exceedance in 75 years.
   2. Design retaining wall panel/modular block connections in all cases to not fail during the seismic event corresponding to 3% probability of exceedance in 75 years.

3. The Contractor-selected Wall Company is responsible for all stability calculations, except global stability and bearing capacity.
4. Minimum service life of 75 years.
5. The Wall Company is responsible to ensure that drainage features do not negatively impact the wall system, and that the drainage system can function properly through/beneath the wall as the Project Designer intends, without negatively impacting the wall system. This includes checking the drainage system details, and/or developing appropriate MSE reinforcement design details in the vicinity of the drainage features (pipes, catch basins, etc.) within the reinforcement mass, and for the outlet point at the wall face (see article 1.6.A.2).
6. Sections 02832S through 02839S as applicable for the selected wall system.
7. Provide corrosion protection for metallic reinforcement by one of the following two measures:
    a. Provide sacrificial steel sufficient for a corrosion rate of at least 0.80 mils per exposed surface per year after 16 years of corrosion protection service allowed for the galvanized coating.
    b. Provide a protective geomembrane (either PVC or HDPE) of at least 30 mils thickness a minimum of 2 feet below the base of the pavement section (below the bottom of the granular borrow layer), sloping downwards towards the back of the reinforced mass (i.e. away from the wall face) at a grade of 4 percent, and lapped upward against the back side of the wall facing. Design the metallic reinforcement to provide sacrificial steel sufficient for the following minimum corrosion rates per exposed surface per year, after 16 years of corrosion protection service for the galvanized coating:
        - Above the Geomembrane: 0.80 mils
        - Below the Geomembrane: 0.50 mils
8. Use a vertical spacing of primary reinforcement not exceeding 30 inches for single-stage walls, or 24 inches for two-stage walls to provide a coherent MSE reinforced soil mass. This may require modification of panels.
9. In accordance with Section 11 of the AASHTO LRFD Bridge Design Specifications, provide horizontal benches at least 4 feet in width at the base of walls to be founded on earth slopes.
    a. Benches may be eliminated for walls located adjacent to concrete slope-protected slopes.
10. Use the following soil design properties:
    a. Select Backfill for MSE Walls: properties determined by the Wall Company with the concurrence of the Design-Builder's Geotechnical Engineer, based on testing of representative

samples of the material to be used, and consistent with the requirements of Section 02832S.

b. Retained soil and foundation soil: properties specified by the Design-Builder's Geotechnical Engineer based on the results of subsurface investigations and laboratory testing.

1.7 SUBMITTALS

A. Submit to the Design-Builder's Structural and Geotechnical Engineers for review and approval, and to the Engineer and the Department's Geotechnical Engineer, working drawings and design calculations for the wall construction prepared and signed by a licensed professional engineer, including all plans, profiles, cross sections, quantities, and details that address the following:

1. Cast-in-place concrete coping/cap to the facing panels/blocks to be aesthetically pleasing and to adequately support any fence and/or barrier. Do not use precast coping without prior written approval from the Engineer.

2. Provisions for facilities which penetrate the wall face or soil reinforcing elements (including, but not limited to, drainage catch basins, piping, foundation elements, guard-rail posts, and other buried facilities).

3. MSE wall design measures to accommodate surface and subsurface drainage details.

4. Proposed architectural treatment detail for wall facing elements and proposed color of concrete. Provide architectural treatment for all walls consistent throughout the project and matching all other structural elements incorporated in the project.

5. Design calculations sufficient to demonstrate the walls have been designed in accordance with the required criteria.

B. Allow up to 10 working days for review. Within this time, the Design-Builder's Engineers provide either written approval of the submittals with any exceptions noted, or notification the submittals are insufficient.

1. Upon receiving notification the submittals are insufficient, provide new or revised submittals for review and approval.
2. Do not start wall construction until receiving written approval.
3. Address to the Engineer's satisfaction any comments provided by the Department, prior to proceeding with the work.

1.8 ACCEPTANCE

A. Non-Conformance of Select Backfill for MSE Walls

1. Select Backfill placed and found to be out of conformance with the chemical characteristic requirements of Section 02832S may be allowed to remain in place at a reduced price in accordance with this paragraph as decided by the Engineer. Refer to Section 02832S for sampling and testing requirements.

2. The Engineer will use Table 5-1 (Unit Prices for Determining Pay Adjustments For Nonconforming Work) and the applicable pay factor in Table 1 to calculate the price adjustment.

3. When deviations exceed those listed for a pay factor of 0.50 in Table 1, replace nonconforming work.

B. Non-Conformance for Out-of-Tolerance Wall Facing Elements

1. If structural adequacy can be demonstrated, facing elements either placed or that become out-of-tolerance from those specified in the applicable wall system section (02833S through 02839S) before final acceptance may be allowed to remain in place at a reduced price in accordance with this paragraph as decided by the Engineer.
2. The Engineer will use the Table 5-1 (Unit Prices for Determining Pay Adjustments For Nonconforming Work) and the applicable pay factor in Table 2 to calculate the price adjustment.
3. The Wall Company and the Engineer will evaluate all wall facing element cases when deviations exceed those listed for a pay factor of 0.50 in Table 2 , replace nonconforming work.

C. Price adjustment calculation. The applicable pay factors in Tables 1 and 2 will be applied to the entire wall. However, only the most critical of any one of the backfill criteria or the facing elements tolerances (i.e. the one having the lowest pay factor), will be applied.

PART 2 PRODUCTS

2.1 MATERIALS

A. As specified in Sections 02832S through 02839S for the selected wall system.

PART 3 EXECUTION

3.1 INSTALLATION

A. As specified in Sections 02832S through 02836S for the selected wall system.

3.2 PRICE REDUCTION FOR NON-COMFORMING WORK

A. See Tables 1 and 2 for pay factors.

Table 1

PAY FACTORS FOR NON-CONFORMING MSE WALL SELECT BACKFILL						
Deviations of Backfill Chemical Test Results from the Limits Specified in Section 02832S*						
	Pay Factor	1 Test	Avg. of 2 Tests	Avg. of 3 Tests	Avg. of 4 Tests	Avg. of 5 or More Tests
Resistivity (ohm-cm) AASHTO T 288	1.00	0 to 200	0 to 190	0 to 180	0 to 170	0 to 150
	0.95	201 to 400	191 to 380	181 to 360	171 to 340	151 to 300
	0.90	401 to 600	381 to 570	361 to 540	341 to 510	301 to 450
	0.80	601 to 800	571 to 760	541 to 720	511 to 680	451 to 600
	0.70	801 to 1000	761 to 950	721 to 900	681 to 850	601 to 750
	0.60	1001 to 1200	951 to 1140	901 to 1080	851 to 1020	751 to 900
	0.50a	over 1200	over 1140	over 1080	over 1020	over 900
a - But no one test below 1600 ohm-cm will be accepted.						
pH AASHTO T 289	1.00	0 to 0.20	0 to 0.18	0 to 0.16	0 to 0.14	0 to 0.12
	0.90	0.21 to 0.40	0.19 to 0.36	0.17 to 0.32	0.15 to 0.28	0.13 to 0.24
	0.80	0.41 to 0.60	0.37 to 0.54	0.33 to 0.48	0.29 to 0.42	0.25 to 0.36
	0.70	0.61 to 0.80	0.55 to 0.72	0.49 to 0.64	0.43 to 0.56	0.37 to 0.48
	0.60	0.81 to 1.00	0.73 to 0.90	0.65 to 0.80	0.57 to 0.70	0.49 to 0.60
	0.50b	---	over 0.90	over 0.80	over 0.70	over 0.60
b - But no one test below 5.0 or above 10.0 will be accepted						
Chlorides (ppm) AASHTO T 291	1.00	0 to 14	0 to 12	0 to 10	0 to 8	0 to 6
	0.95	15 to 28	13 to 24	11 to 20	9 to 16	7 to 12
	0.90	29 to 42	25 to 36	21 to 30	17 to 24	13 to 18
	0.80	43 to 56	37 to 48	31 to 40	25 to 32	19 to 24
	0.70	57 to 70	49 to 60	41 to 50	33 to 40	25 to 30
	0.60	71 to 84	61 to 72	51 to 60	41 to 48	31 to 36
	0.50c	over 84	over 72	over 60	over 48	over 36
c - But no one test above 200 ppm will be accepted.						
Sulfates (ppm) AASHTO T 290	1.00	0 to 50	0 to 45	0 to 40	0 to 35	0 to 30
	0.95	51 to 90	46 to 80	41 to 70	36 to 60	31 to 50
	0.90	91 to 130	81 to 115	71 to 100	61 to 85	51 to 70
	0.80	131 to 170	116 to 150	101 to 130	86 to 110	71 to 90
	0.70	171 to 210	151 to 185	131 to 160	111 to 135	91 to 110
	0.60	211 to 250	186 to 220	161 to 190	136 to 160	111 to 130
	0.50d	over 250	over 220	over 190	over 160	over 130
d - But no one test above 500 ppm will be accepted.						

* Refer to Section 02832S for minimum sampling and testing frequency. The Engineer determines locations and any additional tests required to evaluate the overall backfill mass.

Table 2

PAY FACTORSFOR OUT-OF-TOLERANCE MSE WALL FACING ELEMENTS						
Mean of the Deviations of Wall Placement Tolerances from the Limits Specified in Section 02833S to 02839S (based on the percentage of wall face having the maximum out-of-tolerance measurements)						
	Pay Factor	**1 to 5%**	**6 to 10%**	**11 to 20%**	**21 to 30%**	**30% or more**
Horizontal Alignment (percent) Spec: 0.7%	1.00	0 to 0.40	0 to 0.35	0 to 0.30	0 to 0.25	0 to 0.20
	0.90	0.41 to 0.80	0.36 to 0.70	0.31 to 0.60	0.26 to 0.50	0.21 to 0.40
	0.80	0.81 to 1.20	0.71 to 1.05	0.61 to 0.90	0.51 to 0.75	0.41 to 0.60
	0.70	1.21 to 1.60	1.06 to 1.40	0.91 to 1.20	0.76 to 1.00	0.61 to 0.80
	0.60	1.61 to 2.00	1.41 to 1.75	1.21 to 1.50	1.01 to 1.25	0.81 to 1.00
	0.50	2.01 or more	1.76 or more	1.51 or more	1.26 or more	1.01 or more
Vertical Alignment* (percent) Spec: 0.7%	1.00	0 to 0.40	0 to 0.35	0 to 0.30	0 to 0.25	0 to 0.20
	0.90	0.41 to 0.80	0.36 to 0.70	0.31 to 0.60	0.26 to 0.50	0.21 to 0.40
	0.80	0.81 to 1.20	0.71 to 1.05	0.61 to 0.90	0.51 to 0.75	0.41 to 0.60
	0.70	1.21 to 1.60	1.06 to 1.40	0.91 to 1.20	0.76 to 1.00	0.61 to 0.80
	0.60	1.61 to 2.00	1.41 to 1.75	1.21 to 1.50	1.01 to 1.25	0.81 to 1.00
	0.50	2.01 or more	1.76 or more	1.51 or more	1.26 or more	1.01 or more
Plumbness* (percent) Spec: 0.5%	1.00	0 to 0.50	0 to 0.41	0 to 0.32	0 to 0.23	0 to 0.18
	0.95	0.51 to 0.64	0.42 to 0.54	0.33 to 0.43	0.24 to 0.33	0.19 to 0.26
	0.90	0.65 to 0.78	0.55 to 0.66	0.44 to 0.54	0.34 to 0.43	0.27 to 0.35
	0.85	0.79 to 0.92	0.67 to 0.79	0.55 to 0.66	0.44 to 0.52	0.36 to 0.43
	0.80	0.93 to 1.06	0.80 to 0.91	0.67 to 0.77	0.53 to 0.62	0.44 to 0.52
	0.70	1.07 to 1.20	0.92 to 1.04	0.78 to 0.88	0.63 to 0.72	0.53 to 0.60
	0.60	1.21 to 1.34	1.05 to 1.17	0.89 to 0.99	0.73 to 0.82	0.61 to 0.68
	0.50	1.35 or more	1.18 or more	1.00 or more	0.83 or more	0.69 or more
Levelness (percent) Spec: 0.5%	1.00	0 to 0.30	0 to 0.28	0 to 0.26	0 to 0.24	0 to 0.22
	0.90	0.31 to 0.60	0.29 to 0.56	0.27 to 0.52	0.25 to 0.48	0.23 to 0.44
	0.80	0.61 to 0.90	0.57 to 0.84	0.53 to 0.78	0.49 to 0.72	0.45 to 0.66
	0.70	0.91 to 1.20	0.85 to 1.12	0.79 to 1.04	0.73 to 0.96	0.67 to 0.88
	0.60	1.21 to 1.50	1.13 to 1.40	1.05 to 1.30	0.97 to 1.20	0.89 to 1.10
	0.50	1.51 or more	1.41 or more	1.31 or more	1.21 or more	1.11 or more
Joint Width (inches) Specs: Panel: 0.5 – 1.2 Block: 0.12– 0.5	1.00	0 to 0.10	0 to 0.09	0 to 0.08	0 to 0.07	0 to 0.06
	0.90	0.11 to 0.20	0.10 to 0.18	0.09 to 0.16	0.08 to 0.14	0.07 to 0.12
	0.80	0.21 to 0.30	0.19 to 0.27	0.17 to 0.24	0.15 to 0.21	0.13 to 0.18
	0.70	0.31 to 0.40	0.28 to 0.36	0.25 to 0.32	0.22 to 0.28	0.19 to 0.24
	0.60	0.41 to 0.50	0.37 to 0.45	0.33 to 0.40	0.29 to 0.35	0.25 to 0.30
	0.50	0.51 or more	0.46 or more	0.41 or more	0.36 or more	0.31 or more
Joint Offset (inches) Specs: Panel: 0.4 Block: 0.25	1.00	0 to 0.20	0 to 0.19	0 to 0.18	0 to 0.17	0 to 0.16
	0.90	0.21 to 0.40	0.20 to 0.38	0.19 to 0.36	0.18 to 0.34	0.17 to 0.32
	0.80	0.41 to 0.60	0.39 to 0.57	0.37 to 0.54	0.35 to 0.51	0.33 to 0.48
	0.70	0.61 to 0.80	0.58 to 0.76	0.55 to 0.72	0.52 to 0.68	0.49 to 0.64
	0.60	0.81 to 1.00	0.77 to 0.95	0.73 to 0.90	0.69 to 0.85	0.65 to 0.80
	0.50	1.01 or more	0.96 or more	0.91 or more	0.86 or more	0.81 or more

* For modular block walls these tolerances are measured from the specified wall batter as indicated in 02835 S and 02836 S.

END OF SECTION

September 1, 2016

SECTION 02832S

SELECT BACKFILL FOR MSE WALLS

Add Section 02832:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Placement procedures and requirements for backfill used in constructing MSE walls.

1.2 RELATED SECTIONS

A. Section 02056: Embankment, Borrow, and Backfill

B. Section 02831S: Retaining Wall-Alternate Systems

1.3 REFERENCES

A. AASHTO T 27: Sieve Analysis of Fine and Coarse Aggregates

B. AASHTO T 90: Determining the Plastic Limit and Plasticity Index of Soils

C. AASHTO T 99: Moisture-Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and a 305-mm (12 in.) Drop

D. AASHTO T 104: Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate

E. AASHTO T 236: Direct Shear Test of Soils Under Consolidated Drained Conditions

F. AASHTO T 267: Determination of Organic Content in Soils by Loss on Ignition

G. AASHTO T 288: Determining Minimum Laboratory Soil Resistivity

H. AASHTO T 289: Determining pH of Soil for Use in Corrosion Testing

I. AASHTO T 290: Determining Water-Soluble Sulfate Ion Content in Soil

J. AASHTO T 291: Determining Water-Soluble Chloride Ion Content in Soil

K. AASHTO T 310: In-Place Density and Moisture Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

FHWA Publication No. FHWA-NHI-09-087, Corrosion/Degradation of Soil Reinforcements for MSE Walls and Reinforced Soil Slopes

1.4 SUBMITTALS

A. Provide the Engineer with a certificate of compliance, from an AASHTO accredited and UDOT qualified testing lab, certifying the material complies with this section.
   1. Provide the Engineer with copies of the results of all tests performed to determine the Select Backfill source meets the requirements of this section.

B. Provide the Engineer with copies of test results from a UDOT qualified lab for the tests described under article 1.5, Acceptance.

1.5 ACCEPTANCE

A. In addition to the initial testing to verify the Select Backfill source meets the requirements of this section, at a minimum, obtain on-site samples during construction and perform testing at the following frequencies.
   1. Gradation: Every 5,000 cubic yards of backfill used
   2. Electrochemical: Every 10,000 cubic yards of backfill used

B. Include all costs for sampling and testing in the bid price for the work.
   1. The Department will make no separate payment for the cost of sampling and testing required in accordance with this section, except as follows:
   2. The Engineer reserves the right to require additional testing, such as when suspecting a change in the Select Backfill.
      a. When additional testing performed at the direction of the Engineer indicates there is no change in the material and the material is in compliance with the requirements of this section, the Department will pay for the cost of additional sampling and testing as extra work.

C. Density
   1. The Department will perform at least one in-place moisture/density determination per lift of backfill for each 100 feet of wall length (minimum two tests per lift) in accordance with AASHTO T 310.
      a. Tests will be made at random locations and/or at specific locations determined by the Engineer.
   2. Do not proceed with the placement of each layer of soil reinforcement and overlying lift of backfill until the Engineer indicates and records that all backfill placement and density requirements (including in the 3-foot light equipment zone) have been met.

PART 2 PRODUCTS

2.1 SELECT BACKFILL

A. Use backfill free from frozen, organic, and otherwise deleterious materials. Conform to the following gradation limits as determined by AASHTO T 27:

Table 1

Select Backfill Gradation (percent passing)		
Sieve Size	**Metallic Reinforcement**	**Geogrid Reinforcement**
4 inch	100	–
¾ inch	–	100
No. 40	0 – 60	0 – 60
No. 200	0 –15	0 –15

B. Geogrid reinforcement may use the Select Backfill gradation specified in Table 1 for metallic reinforcement only under the following conditions:

1. Make arrangements with the wall company to perform site and material specific installation damage testing with a representative sample of the proposed backfill.
   a. Perform testing in accordance with the guidelines provided in FHWA Publication No. FHWA-NHI-09-087. Determine the installation damage reduction factor in accordance with the test, but no less than 1.2.
   b. Assume all costs for performing the tests and certification of the test results by a registered engineer qualified in this subject/field.
   c. Assume any additional costs for the purchase of materials and/or construction of the wall based on the installation damage reduction factor obtained from the testing.

2. Provide additional material specific installation damage testing at the direction of the Engineer when a change in the backfill characteristics from the original tested representative sample is suspected.
   a. Assume all costs for performing this additional testing and certification of the test results by a registered engineer.
   b. Assume any additional costs for the purchase of materials and/or construction of the wall based on the installation damage reduction factor obtained from additional testing.

C. Use backfill with a Plasticity Index (PI) of 6 or less, as determined by AASHTO T 90.

D. Use backfill with an internal friction angle of not less than 34 degrees as determined by AASHTO T 236, using a sample of the material compacted to 95 percent of maximum density at optimum moisture content, determined by AASHTO T 99, Method D.
   1. Internal friction angle testing is not required for backfill material that has at least 80 percent of the material retained on the 3/4 inch sieve.

E. Use backfill that:
   1. Is substantially free of shale or other soft particles of poor durability.
   2. Has a sodium sulfate soundness loss of less than 15 percent after 5 cycles, determined in accordance with AASHTO T 104.
   3. Has an organic content less than one percent as determined by AASHTO T 267 on the portion of the material finer than the No. 10 sieve.

F. Meet electrochemical properties specified in Table 2

2.2 FREE DRAINING GRANULAR BACKFILL

A. Place Free Draining Granular Backfill along the wall face in accordance with this Section.
   1. Refer to Section 02056 for Free Draining Granular Backfill gradation requirements.
   2. For geogrid reinforcement applications, use a maximum particle size of 3/4 inch.

B. Meet the electrochemical properties specified in Table 2

Table 2

Electrochemical Requirements			
Property	**Metallic Reinforcement**	**Geogrid Reinforcement**	**Test Method**
Resistivity	Minimum 3000 ohm-cm, at 100% saturation*	N/A	AASHTO T 288
pH	6.0 – 10.0	5.5 – 10.0**	AASHTO T 289
Chlorides	Maximum 100 ppm	N/A	AASHTO T 291
Sulfates	Maximum 200 ppm	N/A	AASHTO T 290

*Do not follow Note 6 of AASHTO T 288 to find lowest possible resistivity (where soil is in a slurry state). Only saturate soil to 100% saturation, where a sheen of water is seen at the top surface of the sample in the soil box.
**Maximum pH value for polyester geogrid is 9.0 unless long-term immersion testing performed according to FHWA-NHI-09-087 shows acceptable performance. For pH> 8.0, use a durability reduction factor (RF_D) of 1.3 for polyester geogrid.

PART 3 EXECUTION

3.1 INSTALLATION

A. Excavation and Foundation Preparation:
   1. Excavate and grade foundation area to the lines and grades shown on the drawings, or as directed by the Engineer.
   2. Make the width of excavation equal to or exceeding the length of soil reinforcing elements.
   3. Compact the foundation using at least three passes of a lightweight, steel, smooth-drum vibratory roller, or as otherwise determined by the Engineer before the wall construction.
   4. Remove unsuitable foundation soils and replace with Select Backfill, or with other suitable material determined by the Engineer, placed and compacted as specified in this article

B. MSE Wall:
   1. Follow erection of each course of panel/modular block with placement of Select Backfill.
      a. Complete backfill at the front of the wall before backfilling more than 4 feet above the bottom of the lowermost facing element.
   2. Do not damage or disturb wall materials or misalign facing panels/modular blocks during backfill placement.
   3. Remove and replace or correct, as directed by the Engineer, wall materials damaged or disturbed during backfill placement at no cost to the Department.
   4. Remove and replace or correct, as directed by the Engineer, Select Backfill not meeting the specified requirements at no cost to the Department.
   5. Make the moisture content of the Select Backfill during placement and compaction uniform throughout each layer.
   6. Determine the optimum moisture content in accordance with AASHTO T 99, Method D.
   7. Place Select Backfill with the moisture not greater than the optimum moisture content, nor less than four percentage points below optimum.

8. Remove any Select Backfill with placement moisture content in excess of the optimum moisture content.
   a. Select Backfill may be reused, provided it is aerated or otherwise reworked until the moisture content is uniform and acceptable throughout the entire lift.
9. Do not exceed 12 inches (loose) in lift thickness.
   a. Decrease the lift thickness as necessary to obtain the specified density.
   b. Place backfill in uniformly thick layers.
10. Compact backfill to at least 95 percent of the maximum density, AASHTO T 99, Method D.
11. When placing backfill over the soil reinforcement, begin placement 3 to 5 feet from the wall face and proceed away from the wall to prevent the reinforcement from bunching towards the wall face.
12. Operate all placement and compaction equipment parallel to the wall face.
13. Place and compact each layer of backfill in a level manner before placing subsequent backfill layers.
14. Rubber-tired equipment may pass over the reinforcement only at slow speeds (less than 5 mph). Avoid sudden braking and sharp turning.
15. Do not use sheeps-foot or other grid-type rollers for compacting backfill within the limits of the soil reinforcement.
16. During the initial stage of wall construction, to avoid pushing the facing elements out of alignment, do not place or compact backfill against the facing elements until the first layer of soil reinforcement has been installed and one lift of Select Backfill has been placed and compacted over the reinforcement layer.
17. For all subsequent layers of backfill, before placement of the reinforcement, place and compact the backfill to an elevation 2 inches above the reinforcement connection from a point approximately 18 inches behind the back face of the wall facings (panels, modular blocks) to the end of the reinforcing, unless otherwise shown on the plans at specific locations.
18. Achieve compaction within 4 to 5 feet of the back face of the wall facing units and within 2 feet of any obstructions ("light equipment zone"), by at least three passes of a suitable lightweight or medium-weight (hand-held or hand-guided) mechanical roller, tamper, or vibratory compactor.
    a. When compacting a thin leveling lift along the reinforcement connections level, use compaction equipment with a static weight of less than 800 pounds within this zone.
    b. Use a maximum lift thickness within this zone as warranted by the type of compaction equipment actually used.
    c. Compact within this light equipment zone to within 3 inches of the facing elements.

d. Exercise care in the compaction process to avoid misalignment of the facing elements.

19. Place Free Draining Granular Backfill within a zone behind the wall extending at least 30 inches from the front face of the wall facings (but at least 12 inches in width measured from the bottom of each backfill lift), and at least 24 inches in width behind the first-stage wire/grid facing of 2-stage wall systems and behind the wire/grid facing of internal phased-construction walls.
    a. Place and compact Free Draining Granular Backfill as specified above for the light equipment zone.
20. Use backfill placement and compaction methods to assure that no voids are present beneath the soil reinforcement elements before backfilling over the reinforcement.
21. Place soil reinforcing elements normal to face of wall in plan view.
    a. If necessary, skew elements (minimizing skew angle) to avoid obstructions, but no more than 15 degrees unless approved by the Wall Company.
22. At the end of each day's operation, slope the backfill away from the wall to direct runoff of rainwater away from the wall face.
    a. Do not allow surface runoff from adjacent areas or groundwater to enter the wall construction site, including at the front face of the wall.
23. Place the top level of soil reinforcement parallel to the top of the facing unit a distance below the top of the wall as shown on the plans.
    a. Place the top level of soil reinforcement at least 3 inches below the bottom of the barrier slab lip or the bottom of the concrete gutter behind the coping.
24. Gradually deflect the upper reinforcement elements downward to avoid conflicts with paving and subgrade preparation.
    a. Pay particular attention to special conditions such as where roadway super-elevation is anticipated.
    b. Maximum deflection of the reinforcement elements is 8 inches or as otherwise noted on the plans.
25. Slope the top of the backfill along the wall such that the top reinforcement layer is covered with at least 16 inches of Select Backfill.

END OF SECTION

July 11, 2016

SECTION 02833S

MSE WALLS USING CONCRETE FACING PANELS AND METAL REINFORCING ELEMENTS

Add Section 02833:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials and construction requirements for mechanically stabilized earth (MSE) walls using a wall system (refer to Section 02831S) approved by the Engineer using concrete facing panels and metal reinforcing elements.

B. Provide and install face panels, reinforcing steel, tie strips, fasteners, joint filler, select backfill, and all necessary attachments from the selected Wall Company.

1.2 RELATED SECTIONS

A. Section 02831S: Retaining Wall-Alternate Systems

B. Section 02832S: Select Backfill for MSE Walls

C. Section 03055: Portland Cement Concrete

D. Section 03211: Reinforcing Steel and Welded Wire

E. Section 03310: Structural Concrete

F. Section 03390: Concrete Curing

G. Section 03924: Structural Concrete Repair and Sealing

1.3 REFERENCES

A. AASHTO M 111: Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

B: AASHTO M 232: Zinc Coating (Hot-Dip) on Iron and Steel Hardware

C. ASTM A 325: Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength

D. ASTM A 572: High-Strength Low-Alloy Columbium-Vanadium Structural Steel

E. ASTM A 709M: Structural Steel for Bridges

F. ASTM A 1011: Standard Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength

G. UDOT Quality Management Plans

1.4 SUBMITTALS

A. Submit sample of the texture of the panel face for the Engineer's approval.

B. Provide submittals in accordance with Section 02831S and working drawings including design details which protect the reinforcement connections from corrosion.

C. Do not start work on any wall until working drawings have been reviewed and approved by the Design-Builder's Engineers and all Department comments have been addressed.

D. Certificate of compliance for incorporated materials along with copies of results of any tests performed.

E. Wall Company's construction manual for the specific wall system.

F. Certification from the Wall Company that the completed wall(s) meet all Department and Wall Company specifications/requirements for the specific wall system.
   1. Where the Department's and the Wall Company's specifications or requirements differ, apply the stricter of the two.

1.5 ACCEPTANCE

A. Panel Acceptance
   1. Meet 28-day minimum compressive strength of 4000 psi.
   2. Do not transport panels to the site before seven days after fabrication and until:
      a. A minimum 28-day compressive strength of 4000 psi has been achieved, or

b. A minimum compressive strength of 3000 psi has been achieved at 14 days.

3. All panels to be visually free of defects and will be rejected if they:
   a. Do not meet the above requirements.
   b. Contain defects due to imperfect molding.
   c. Have any honeycomb.
   d. Have open texture on front face.
   e. Have cracks or spalls that exceed the limits specified in article 3.4

PART 2 PRODUCTS

2.1 PRECAST CONCRETE WALL PANELS

A. Obtain approval from the Engineer for the architectural treatment for all MSE panel walls.

B. Concrete. Class AA(AE) per Section 03055 and Section 03310, having a minimum 28-day compressive strength of 4000 psi.

C. Reinforcing steel to have a minimum cover of 2.0 inches.

D. Casting
   1. Use only a UDOT qualified supplier for precast concrete panel fabrication in accordance with UDOT Precast/Prestressed Concrete Structures Quality Management Plan.
      a. Do not cast panels on site.
   2. Cast panels on a flat area or approved architectural treatment, with the front face down.
      a. Set tie strip guides at back face.
   3. Place concrete in each unit without interruption.
      a. Vibrate with approved equipment to prevent stone pockets or cleavage planes.
      b. Use clean, unused form oil.

E. Reinforcement Connections
   1. Cast at least two soil reinforcement connection levels into all full-size concrete panels.
      a. Where only two connection levels are cast in panels, locate the levels in two different horizontal planes separated by at least one-third the panel height.

F. Curing
   1. Keep surfaces wet and moist until the curing compound is applied.

2. Complete all patching or surface finishing before applying compound.
3. Spray the entire surface of the concrete with a membrane curing compound. Apply the curing compound at a uniform rate of 1.25 oz/ft^2.
4. Immediately re-spray any membrane damage which occurs during the curing period.
5. Leave forms in place until they can be removed without damage to the unit.

G. Concrete Finish
1. Provide a Class 1 finish for front face of panels.
   a. The thickness of the architectural treatment is in addition to the required design thickness.
2. Provide a uniform surface finish for the back face of panels.
   a. Roughly screen the finish to eliminate open pockets of aggregate and surface distortions in excess of 1/4 inch.

H. Tolerances
1. All dimensions ± 1/8 inch.
2. Angular distortion with regard to the height of panel not to exceed 3/16 inch in 5 feet.
3. Surface defects on form surfaces not more than 1/8 inch in 5 feet.

I. Marking
1. Mark the date of manufacture and panel-type designation on the rear of each panel so that it is legible during installation.

2.2 REINFORCING STEEL

A. Epoxy coated in accordance with Section 03211.

2.3 LEVELING PAD CONCRETE

A. Class A or Class B concrete mixes in accordance with Section 03055.

2.4 REINFORCING ELEMENTS

A. Hot rolled from steel bars, galvanize coated 3.4 mils thick, meeting minimum requirements of ASTM A 572, Grade 65; AASHTO M 111.

B. All reinforcing elements to be the specified size and free from defects.

2.5 REINFORCED WELDED WIRE MESH AND LOOP INBEDS

A. Meet minimum requirements of Section 03211 with galvanized coating at least 3.4 mils thick.

2.6 TIE STRIPS

A. Shop fabricated, hot rolled steel conforming to minimum requirements of ASTM A 709M, Grade 345; AASHTO M 111; and ASTM A 1011 Grade 345 or equivalent, galvanize coated at least 3.4 mils thick.

2.7 PANEL FASTENERS

A. Bolts and nuts to be hexagonal cap screw and galvanize coated, meeting minimum requirements of ASTM A 325 and AASHTO M 232.

2.8 OTHER FASTENERS

A. Fasteners to wingwalls and abutment walls, if required, to be provided by the Wall Company.

2.9 DAMAGED GALVANIZATION

A. Spray with zinc paint, covering the entire area that has been damaged, as an alternative to replacement of any reinforcing steel, reinforcing elementss, wire mesh or fasteners that have damaged galvanization.

2.10 CURING COMPOUND

A. Refer to Section 03390

2.11 GEOTEXTILE

A. Cover horizontal and vertical joints between panels, when required, by a geotextile of type and grade recommended by the Wall Company.

2.12 ADHESIVE

A. Per Wall Company's standard.

2.13 BEARING PADS

A. Horizontal rubber bearing pads to be of the type and grade recommended and supplied by the Wall Company.

2.14 LIFTING DEVICES

A. Per Wall Company’s standard.

2.15 SELECT BACKFILL

A. Refer to Section 02832S.

2.16 MATERIALS FOR CRACK AND SPALL REPAIR

A. Refer to Section 03924.

PART 3 EXECUTION

3.1 GENERAL

A. Arrange for a qualified representative (minimum five years experience with MSE wall design and construction) from the selected Wall Company to be directly involved and provide technical assistance during all phases of construction of the wall(s).
   1. The Wall Company representative is to be at the project site for at least the first five working days of wall construction and until all aspects of wall construction have been satisfactorily demonstrated to the MSE Wall Company representative and the Engineer. The MSE Wall Company representative is to subsequently visit the site at least once every 10,000 sq. ft. of wall face construction, or as otherwise determined by the Engineer.
   2. The Wall Company representative is responsible for training the Contractor's wall construction crew(s) and Department inspectors in proper quality control for construction of the walls.
      a. If one or more construction crew members change, the Wall Company representative is responsible to train the new crew member(s).
   3. During each site visit, the representative is to meet with the Engineer near the conclusion of the visit to report on the observed wall construction procedures, including providing a copy of the field report.

B. Provide the Wall Company's construction manual to the Engineer, and assure that the wall system-specific requirements in the manual are integrated into the wall construction.

C. Provide a final field observations report from the Wall Company that specifically addresses that the completed wall(s) meet all Department and Wall Company specifications/requirements and what deficiencies exist, if any.

1. Where the Department's and the Wall Company's specifications/requirements differ, apply the stricter of the two requirements.

D. Haul, store, and ship wall materials so as to minimize the potential of producing any type of defects.
   1. Store panels to avoid damage to connection pieces, such that the tie strips do not bend.

E. Perform excavation and foundation preparation (including removal of unsuitable soils) as specified in Section 02832S.

F. Construct wall system in accordance with the approved plans, specifications, and the Wall Company's recommendations and construction manual.

3.2 LEVELING PAD

A. Prepare the subgrade soils and/or fill so as to cast the leveling pad to the design elevations shown on the drawings and to ensure complete contact of the retaining wall units with the base.

B. Furnish and place concrete in accordance with Section 03055.

C. Place cast-in-place concrete leveling pad upon undisturbed in-situ soils, or upon properly placed and compacted fill as per Section 02832S.

D. If shown on the Wall Company's approved drawings, a maximum 3-inch wide gap may be left between the end of the leveling pad and the adjacent higher panel where the wall steps up
   1. Ensure the entire pad is poured on firm compacted fill or undisturbed subgrade soils.
   2. Provide for the MSE backfill in the zone behind the gap to be fully retained.
   3. Backfill the gap before the remaining backfill in front of the wall face is placed.

E. Place leveling pad to a thickness of at least 6 inches.

F. Allow leveling pad to cure for at least 12 hours before placing concrete panels.

3.3 WALL CONSTRUCTION

A. Place wall backfill and reinforcement as specified in Section 02832S.

B. Handle panels by means of lifting device set into upper edge or side of the panels and set in position vertically.

C. Place panels on successive horizontal lifts in the sequence shown on the approved plans as backfill placement proceeds.

D. Place panels initially at a slight batter towards the backfill as recommended by the Wall Company to compensate for outward rotation of the panel upon fill placement and compaction.

E. Place bearing pads as required by the Wall Company to prevent concrete-to-concrete contact between panels.

F. Use rubber, wood, or metal shims as necessary to make final adjustments to the wall panel to facilitate level placement of the panel.
   1. Do not leave wood shims at any location.

G. Where reinforcement is obstructed by elements such as piles, drilled shafts, guardrail posts, catch basins, drop inlets, culverts, etc. in the wall soil reinforcement zone, modify the reinforcement design using one of the following alternatives:
   1. If the reinforcement is modified, design the surrounding reinforcement layers to carry the additional load.
   2. Place a structural frame around the obstruction which is capable of transferring loads from the reinforcements on one side of the obstruction to reinforcements on the other side of the obstruction.
   3. If the soil reinforcement consists of discrete strips or bar mats rather than continuous sheets, splay the reinforcement around the obstruction.

H. Place soil reinforcement elements normal to the face of the wall in plan view.
   1. Where required to splay the reinforcement around obstructions, skew the reinforcement (minimizing the skew angle to no more than 15 degrees).
      a. Maintain a set-back for reinforcement of at least 2 inches from piles or other metallic obstructions.
      b. Do not exceed horizontal spacing between longitudinal reinforcing of 7 feet.
      c. Separate any overlapping soil reinforcing elements with a minimum thickness of select backfill specified by the Wall Company.

I. Where reinforcement elements are to be connected using bolts and nuts, use a crescent or socket-head ratchet wrench to securely hand-tighten the nut.

1. Do not use pneumatic equipment.

J. Wall alignment tolerances.
   1. Horizontal alignment: 0.7 percent (for example 2.5 inches in 30 feet).
   2. Vertical tolerance: 0.7 percent (for example 0.85 inches in 10 feet).
   3. Overall vertical tolerance of the wall (plumbness from top to bottom): 0.5 percent (for example 1.2 inches in 20 feet of wall height).
   4. Wall panel levelness tolerance: 0.5 percent (for example 1.2 inches in 20 feet).

K. Install panels so that joints are uniform.
   1. The maximum allowable offset in any panel joint is 0.40 inch.
   2. Joint width is 1.2 inches maximum and 0.50 inch minimum.

L. Check panel tolerance and reset before placement of the next panel if out of tolerance.

3.4 CRACK AND SPALL REPAIR CRITERIA FOR CONCRETE PANELS

A. A fully penetrating crack is defined as a crack extending through the cross-section of the precast panel from the front face to the back face of the unit.

B. Cracks at Front Face of Panel:
   1. Panels with one or two partially penetrating cracks with widths less than or equal to 12 mils are acceptable.
   2. Reject panels with fully penetrating cracks, or cracks wider than 12 mils.
   3. No more than two cracks per individual panel are allowed without further evaluation.

C. Cracks at Back Face of Panel:
   1. Partially penetrating cracks with widths less than or equal to 12 mils are acceptable.
   2. Partially penetrating cracks with widths between 12 mils and 30 mils are acceptable when repaired with surface sealant according to subparagraph F, Crack Repair Procedures.
   3. Evaluate partially penetrating cracks wider than 30 mils for acceptance with epoxy injection according to subparagraph F, Crack Repair Procedures.
   4. No more than two repairable cracks per individual panel are allowed without further evaluation.

D. Spalls at Front Face of Panel:

1. Spalls with widths less than 4.0 inches and depths less than 2.0 inches may be repaired with a patching material acceptable to the Engineer of the same color as panel concrete. Resultant repair to be approved by the Engineer.
2. Reject panels with spalls wider than 4.0 inches or deeper than 2.0 inches.
3. Measure spall depth from the structural thickness of the panel excluding architectural surface finish.
4. Panels with more than two spalls are subject to further evaluation before acceptance.

E. Spalls at Back Face of Panel:
1. Spalls with widths less than 4.0 inches and depths less than 2.0 inches may be repaired with a patching material acceptable to the Engineer. Resultant repair to be approved by the Engineer.
2. Reject panels with spalls wider than 4.0 inches or deeper than 2.0 inches.
3. Panels with more than four spalls are subject to further evaluation before acceptance.

F. Crack Repair Procedures:
1. Surface Sealing: Prepare surface and apply a sealant acceptable to the Engineer according to Manufacturer's instructions.
2. Epoxy Injection: Prepare surface and inject cracks with Department-approved product according to Manufacturer's instructions.

G. Spall Repair Procedures:
1. Prepare surface and apply patching material according to Manufacturer's instructions, and as acceptable to the Engineer.

END OF SECTION

July 11, 2016

SECTION 02834S

MSE WALLS USING CONCRETE FACING PANELS AND GEOGRID REINFORCING ELEMENTS

Add Section 02834:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials and construction requirements for mechanically stabilized earth (MSE) walls using a wall system (see Section 02831S) approved by the Engineer using concrete facing panels and geogrid reinforcing elements.

B. Provide and install face panels, reinforcing steel, geogrid, fasteners, joint filler, select backfill, and all necessary attachments from the selected Wall Company.

1.2 RELATED SECTIONS

A. Section 02831S: Retaining Wall -Alternate Systems

B. Section 02832S: Select Backfill for MSE Walls

C. Section 03055: Portland Cement Concrete

D. Section 03211: Reinforcing Steel and Welded Wire

E. Section 03310: Structural Concrete

F. Section 03390: Concrete Curing

G. Section 03924: Structural Concrete Repair and Sealing

1.3 REFERENCES

B. AASHTO M 32: Steel Wire, Plain, for Concrete Reinforcement

C. AASHTO M 55: Steel Welded Wire Reinforcement, Plain, for Concrete

D. AASHTO M 111: Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

E. AASHTO M 232: Zinc Coating (Hot-Dip) on Iron and Steel Hardware

F. ASTM D 5262: Standard Test Method for Evaluating the Unconfined Tension Creep and Creep Rupture Behavior of Geosynthetics

G. ASTM D 6637: Standard Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-Rib Tensile Method

H. UDOT Quality Management Plans

1.4 SUBMITTALS

A. Submit sample of the texture of the panel face for the Engineer's approval.

B. Provide submittals in accordance Section 02831S and working drawings including all design details.

C. Do not start work on any wall until working drawings have been reviewed and approved by the Design-Builder's Engineers and all Department comments have been addressed.

D. Certificate of Compliance for incorporated materials along with copies of results of any tests performed.

E. Wall Company's construction manual for the specific wall system.

F. Certification from the Wall Company that the completed wall(s) meet all Department and Wall Company specifications/requirements for the specific wall system.
   1. Where the Department's and the Wall Company's specifications or requirements differ, apply the stricter of the two.

1.5 ACCEPTANCE

A. Panel Acceptance

   1. Meet 28-day minimum compressive strength of 4000 psi.
   2. Do not transport panels to the site before seven days after fabrication and until:
      a. A minimum 28-day compressive strength of 4000 psi has been achieved, or
      b. A minimum compressive strength of 3000 psi has been achieved at 14 days.
   3. All panels to be visually free of defects and will be rejected if they:
      a. Do not meet the above requirements
      b. Contain defects due to imperfect molding

c. Have any honeycomb
d. Have open texture on front face
e. Have cracks or spalls that exceed the limits specified in article 3.5

PART 2 PRODUCTS

2.1 PRECAST CONCRETE WALL PANELS

A. Obtain approval from the Engineer for the architectural treatment for all MSE panel walls.

B. Concrete. Class AA(AE) per Section 03055 and Section 03310, having a minimum 28-day compressive strength of 4000 psi.

C. Reinforcing steel to have a minimum cover of 2.0 inches.

D. Casting
1. Use only a UDOT-qualified supplier for precast concrete panel fabrication in accordance with UDOT Precast/Prestressed Concrete Structures Quality Management Plan
   a. Do not cast panels on site.
2. Cast panels on a flat area or approved architectural treatment, with the front face down.
   a. Set tie strip guides at back face.
3. Place concrete in each unit without interruption.
   a. Vibrate with approved equipment to prevent stone pockets or cleavage planes.
   b. Use clean, unused form oil.

E. Reinforcement Connections
1. Cast at least two soil reinforcement connection levels into all full-size panels.
   a. Where only two connection levels are cast in panels, locate the levels in two different horizontal planes separated by at least one-third the panel height.

F. Curing.
1. Keep surfaces wet and moist until the curing compound is applied.
2. Complete all patching or surface finishing before applying compound.
3. Spray the entire surface of the concrete with a membrane curing compound. Apply the compound at a uniform rate of 1.25 oz/ft^2 of area.

4. Immediately re-spray any membrane damage which occurs during the curing period.
5. Leave forms in place until they can be removed without damage to the unit.

G. Concrete Finish
1. Provide a Class 1 finish for front face of panels.
   a. The thickness of the architectural treatment is in addition to required design thickness.
2. Provide a uniform surface finish for the back face of panels.
   a. Roughly screen the finish to eliminate open pockets of aggregate and surface distortion in excess of 1/4 inch.

H. Tolerances
1. All dimensions ± 1/8 inch.
2. Angular distortion with regard to the height of panel not to exceed 3/16 inch in 5 feet.
3. Surface defects on form surfaces not more than 1/8 inch in 5 feet.

I. Marking
1. Mark the date of manufacture and panel type designation on the rear side of each panel so that it is legible during installation.

2.2 REINFORCING STEEL

A. Epoxy coated in accordance with Section 03211.

2.3 LEVELING PAD CONCRETE

A. Use Class A or Class B concrete mixes in accordance with Section 03055.

2.4 GEOGRID

A. Use geogrid consisting of a regular grid network of integrally connected, discontinuous, select high-density polyethylene or polypropylene resin polymer tensile elements.
1. Aperture geometry sufficient to permit significant mechanical interlock with the surrounding soil and/or rock.
2. Structure to be dimensionally stable and be able to retain its geometry under manufacture, transport, and installation.

B. Provide creep rupture test for 75-year design life per ASTM D5262.

C. Provide ultimate strength, minimum per ASTM D6637 and utilize geogrid reinforcement reduction factors as appropriate for the Project.

D. Carefully inspect all soil reinforcement and attachment devices to ensure they are true to size and free from defects.

E. Prevent mud, wet concrete, epoxy, and other contaminants from coming in contact with and affixing to the soil reinforcement and inserts, that would interfere with the geogrid connections.

F. Store soil reinforcement products as recommended by the Wall Company.

2.5 REINFORCED WELDED WIRE MESH AND LOOP INBEDS

A. Meet minimum requirements of Section 03211 with galvanized coating at least 3.4 mils thick.

2.6 PANEL FASTENERS

A. Bolts and nuts to be hexagonal cap screw and galvanize coated, meeting minimum requirements of ASTM A-325 and AASHTO M 232.

2.7 OTHER FASTENERS

A. Fasteners to wingwalls and abutment walls, if required, to be provided by the Wall Company.

2.8 CURING COMPOUND

A. Refer to Section 03390.

2.9 GEOTEXTILE

A. Cover horizontal and vertical joints between panels, when required, by a geotextile of the type and grade recommended by the Wall Company.

2.10 ADHESIVE

A. Per Wall Company's standard.

2.11 LIFTING DEVICES

A. Per Wall Company’s standard.

2.12 BEARING PADS

A. Horizontal rubber bearing pads to be of the type and grade recommended and supplied by the Wall Company.

2.13 SELECT BACKFILL

A. Refer to Section 02832S.

2.14 MATERIALS FOR CRACK AND SPALL REPAIR

A. Refer to Section 03924.

PART 3 EXECUTION

3.1 GENERAL

A. Arrange for a qualified representative (minimum five years experience with MSE wall design and construction) from the selected Wall Company to be directly involved and provide technical assistance during all phases of construction of the wall(s).
   1. The Wall Company representative is to be at the project site for at least the first five working days of wall construction and until all aspects of wall construction have been satisfactorily demonstrated to the MSE Wall Company representative and the Engineer. The MSE Wall Company representative is to subsequently visit the site at least once every 10,000 sq. ft. of wall face construction, or as otherwise determined by the Engineer.
   2. The Wall Company representative is responsible for training the Contractor's wall construction crew(s) and Department inspectors in proper quality control for construction of the walls.
      a. If one or more construction crew members change, the Wall Company representative is responsible to train the new crew member(s).
   3. During each site visit, the representative is to meet with the Engineer near the conclusion of the visit to report on the observed wall construction procedures, including providing a copy of the field report.

B. Provide the Wall Company's construction manual to the Engineer, and assure that the wall system-specific requirements in the manual are integrated into the wall construction.

C. Provide a final field observations report from the Wall Company that specifically addresses that the completed wall(s) meet all Department and Wall Company specifications/requirements and what deficiencies exist, if any.
   1. Where the Department's and the Wall Company's specifications/requirements differ, apply the stricter of the two requirements.

D. Haul, store, and ship wall materials so as to minimize the potential of producing any type of defects.
   1. Store panels to avoid damage to connection pieces, such that the tie strips do not bend.

E. Perform excavation and foundation preparation (including removal of unsuitable soils) as specified in Section 02832S.

F. Construct wall system in accordance with the approved plans, specifications, and the Wall Company's recommendations and construction manual.

3.2 LEVELING PAD

A. Prepare the subgrade soils and/or fill so as to cast the leveling pad to the design elevations shown on the drawings and to ensure complete contact of the retaining wall units with the base.

B. Furnish and place concrete in accordance with Section 03055.

C. Place cast-in-place concrete leveling pad upon undisturbed in-situ soils, or upon properly placed and compacted fill as per Section 02832S.

D. If shown on the Wall Company's approved drawings, a maximum 3-inch wide gap may be left between the end of the leveling pad and the adjacent higher panel where the wall steps up.
   1. Ensure the entire pad is poured on firm compacted fill or undisturbed subgrade soils.
   2. Provide for the MSE backfill in the zone behind the gap to be fully retained.
   3. Backfill the gap before the remaining backfill in front of the wall face is placed.

E. Place leveling pad to a thickness of at least 6 inches.

F. Allow leveling pad to cure for at least 12 hours before placing concrete panels.

3.3 GEOGRID INSTALLATION

A. Verify the correct orientation (roll direction) of the geogrid.

B. Place geogrid horizontally on the compacted backfill at the proper design.

C. Connect geogrid to the concrete wall units as specified by the Wall Company.

D. Pull the geogrid taut to eliminate loose folds and remove slack in the geogrid at the wall unit connections, pretension the geogrid, and stake or otherwise secure the back edge of the geogrid before and during backfill and compaction.

E. Follow the Wall Company's overlap requirements for uniaxial and biaxial geogrids.

F. Where reinforcement is obstructed by elements such as piles, drilled shafts, guardrail posts, catch basins, drop inlets, culverts, etc. in the wall soil reinforcement zone, modify the reinforcement design using one of the following alternatives:
   1. If the reinforcement is modified, design the surrounding reinforcement layers to carry the additional load.
   2. Place a structural frame around the obstruction which is capable of transferring loads from the reinforcements on one side of the obstruction to reinforcements on the other side of the obstruction.
   3. If the soil reinforcement consists of discrete strips or bar mats rather than continuous sheets, splay the reinforcement around the obstruction.

3.4 WALL CONSTRUCTION

A. Place wall backfill and reinforcement as specified in Section 02832S.

B. Handle panels by means of lifting device set into upper edge or side of the panels and set in position vertically.

C. Place panels on successive horizontal lifts in the sequence shown on the approved plans as backfill placement proceeds.

D. Place panels initially at a slight batter towards the backfill as recommended by the Wall Company to compensate for outward rotation of the panel upon fill placement and compaction.

E. Place bearing pads as required by the Wall Company to prevent concrete-to-concrete contact between panels.

F. Use rubber, wood, or metal shims as necessary to make final adjustments to the wall panel to facilitate lever placement of the panel.
   1. Do not leave wood shims at any location.

G. Wall alignment tolerances.

1. Horizontal alignment: 0.7 percent (for example 2.5 inches in 30 feet).
2. Vertical tolerance: 0.7 percent (for example 0.85 inches in 10 feet).
3. Overall vertical tolerance of the wall (plumbness from top to bottom): 0.5 percent (for example 1.2 inches in 20 feet of wall height).
4. Wall panel levelness tolerance: 0.5 percent (for example 1.2 inches in 20 feet).

H. Install panels so that joints are uniform.
1. The maximum allowable offset in any panel joint is 0.40 inch.
2. Joint width is 1.2 inches maximum and 0.50 inch minimum.

I. Check panel tolerance and reset before placement of the next panel if out of tolerance.

3.5 CRACK AND SPALL REPAIR CRITERIA FOR CONCRETE PANELS

A. A fully penetrating crack is defined as a crack extending through the cross-section of the precast panel from the front face to the back face of the unit.

B. Cracks at Front Face of Panel:
4. Panels with one or two partially penetrating cracks with widths less than or equal to 12 mils are acceptable.
5. Reject panels with fully penetrating cracks, or cracks wider than 12 mils.
6. No more than two cracks per individual panel are allowed without further evaluation.

C. Cracks at Back Face of Panel:
5. Partially penetrating cracks with widths less than or equal to 12 mils are acceptable.
6. Partially penetrating cracks with widths between 12 mils and 30 mils are acceptable when repaired with surface sealant according to subparagraph F, Crack Repair Procedures.
7. Evaluate partially penetrating cracks wider than 30 mils for acceptance with epoxy injection according to subparagraph F, Crack Repair Procedures.
8. No more than two repairable cracks per individual panel are allowed without further evaluation.

D. Spalls at Front Face of Panel:
1. Spalls with widths less than 4.0 inches and depths less than 2.0 inches may be repaired with an approved patching material of the same color as panel concrete. Resultant repair to be approved by the Engineer.

2. Reject panels with spalls wider than 4.0 inches or deeper than 2.0 inches.
3. Measure spall depth from the structural thickness of the panel excluding architectural surface finish.
4. Panels with more than two spalls are subject to further evaluation before acceptance.

E. Spalls at Back Face of Panel:
1. Spalls with widths less than 4.0 inches and depths less than 2.0 inches may be repaired with a patching material acceptable to the Engineer. Resultant repair to be approved by the Engineer.
2. Reject panels with spalls wider than 4.0 inches or deeper than 2.0 inches.
3. Panels with more than four spalls are subject to further evaluation before acceptance.

F. Crack Repair Procedures:
1. Surface Sealing: Prepare surface and apply a sealant acceptable to the Engineer according to Manufacturer's instructions.
2. Epoxy Injection: Prepare surface and inject cracks in accordance with Section 03924.

G. Spall Repair Procedures:
1. Prepare surface and apply patching material according to Manufacturer's instructions, and as acceptable to the Engineer.

END OF SECTION

July 11, 2016

SECTION 02835S

MSE WALLS USING MODULAR BLOCK UNITS AND METAL REINFORCING ELEMENTS

Add Section 02835:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials and construction requirements for mechanically stabilized earth (MSE) walls using a wall system (see Section 02831S) approved by the Engineer using modular block units for the wall face and metal reinforcing elements.

B. Provide and install modular block wall units, metal reinforcement, joint filler, and all necessary attachments from the selected Wall Company.

1.2 RELATED SECTIONS

A. Section 02831S: Retaining Wall- Alternate Systems

B. Section 02832S: Select Backfill for MSE Walls

C. Section 03055: Portland Cement Concrete

D. Section 03211: Reinforcing Steel and Welded Wire

E. Section 03310: Structural Concrete

1.3 REFERENCES

A. ASTM C 140: Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units

B. ASTM C 331: Standard Specification for Lightweight Aggregates for Concrete Masonry Units

C. ASTM C 1262: Standard Test Method for Evaluating the Freeze-Thaw Durability of Dry-Cast Segmental Retaining Wall Units and Related Concrete Units

D. ASTM C 1372: Standard Specification for Dry-Cast Segmental Retaining Wall Units

E. ASTM D 5262: Standard Test Method for Evaluating the Unconfined Tension Creep and Creep Rupture Behavior of Geosynthetics

F. ASTM D 6637: Standard Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-rib Tensile Method

1.4 SUBMITTALS

A. Submit for acceptance at least 10 days before beginning manufacture of the concrete modular block units, a sample of the proposed block texture and at least three color samples of the proposed block units, matched to colors of local features or as otherwise indicated by the Engineer.

B. Provide the Engineer submittals in accordance with Section 02831S and the appropriate working drawings.

C. Do not start work on any wall until all required submittal items have been reviewed and approved by the Design-Builder's Engineers and all Department comments have been addressed.

D. Provide certificates of compliance from a UDOT-qualified testing lab, certifying that the select backfill, the modular block facing units, and the geogrid complies with this section, and the results of all tests performed for the tests described in this section.

E. Provide the Wall Company's construction manual for the specific wall system.

F. Certification from the Wall Company that the completed wall(s) meet all Department and Wall Company specifications/requirements for the specific wall system.
   1. Where the Department's and the Wall Company's specifications or requirements differ, apply the stricter of the two.

1.5 ACCEPTANCE

A. Modular Block Units and Cap Blocks: Meet 28-day compressive strength of 4000 psi.
   1. Do not transport block units to the site until:
      a. A minimum 28-day compressive strength of 4000 psi has been achieved.
      b. Regardless of strength gain, do not transport block units to the site before seven days after fabrication.

B. All modular block facing units and cap blocks to be visually free of defects and will be rejected for not meeting any of the requirements specified in article 2.1. In addition, any of the following defects will be cause for rejection:
   1. Defects that indicate imperfect molding.
   2. Defects indicating honeycomb or other open-texture concrete .
   3. Cracked or severely chipped block units.
   4. Color variation on exposed face(s) of block unit due to excess form oil or other reasons.

PART 2 PRODUCTS

2.1 CONCRETE MODULAR BLOCK UNITS

A. Meet the following requirements for drycast concrete block units and cap blocks:

   1. Have a minimum 28-day compressive strength of 4,000 psi in accordance with ASTM C 140.
   2. Conform to ASTM C 1372, except as otherwise specified.
   3. Conform to the following freeze-thaw test requirements for the lot of block units produced for use in this project in accordance with ASTM C 1262.
      a. Minimum acceptable performance defined as weight loss at the conclusion of 150 freeze-thaw cycles not exceeding 1 percent of the block unit's initial weight for a minimum of 4 of the 5 block unit specimens tested.
      b. Per Engineer's approval, Project specific freeze-thaw durability tests may be substituted by the tests of units made with the same material, concrete mix design, manufacturing process, and curing method, conducted not more than 12 months prior to delivery. An independent laboratory to provide reports and certifications of the above tests as per ASTM C 1262 and C 1372 as appropriate.
   4. Have a maximum water absorption in accordance with ASTM C 140 no greater than 1 percent above the water absorption content of the lot of block units produced and successfully tested for the freeze-thaw test specified in item 3 above for all concrete block units.
   5. Conform to ASTM C 140 for testing of drycast concrete block units.

B. Manufactured using a combination of cement, aggregates, admixtures, and other constituents meeting the requirements of Section 03055.

1. Verify the compatibility of all components and with the environment in which the block will be used, including sulfate soils and/or groundwater.
2. Lightweight aggregates are subject to the Engineer's approval and must meet the requirements of ASTM C 331.

C. Provide block units with permissible variations of plus 0.12 inch and minus 0.06 inch.

D. Provide block units having angled sides capable of producing concave and convex alignment curves with a minimum radius of 3.3 feet.

E. Provide block units having a polymeric efflorescence control admixture.

F. Finish and Appearance
1. All units to be sound and free from cracks or other defects that would interfere with the proper placement of the unit or significantly impair the strength or permanence of the construction.
2. Minor cracks incidental to the usual method of manufacture or minor chipping resulting from shipment and delivery are not grounds for rejection.
3. Assure the exposed face or faces of units are free of chips, cracks or other imperfections when viewed from a distance of 30 feet under diffused lighting.
4. Up to five percent of a shipment may contain slight cracks or small chips not longer than 1 inch.

G. Notify the Engineer in writing at least 72 hours before beginning the casting of concrete modular block units.

H. Sampling
1. Acceptance of the concrete units with respect to compressive strength will be determined on a lot-by-lot basis.
   a. Randomly sample the lot in accordance with ASTM C 140. Core compressive strength test specimens or conform to the saw-cut coupons provisions of Section 5.2.4 of ASTM C 140. Refer to Table 1 for sampling frequency.

Table 1

Lot Size	Samples
0-8,000	3 units
Greater than 8,000	2 additional units per additional 8000

2. Provide additional samples if required by the Engineer.

I. Acceptance
   1. Units will be rejected for not meeting any of the requirements specified above. In addition, any of the following defects will be cause for rejection:
      a. Defects that indicate imperfect molding.
      b. Defects indicating honeycomb or open-texture concrete.
      c. Cracked or severely chipped units.
      d. Color variation on exposed face(s) of unit due to excess form oil or other reasons.

2.2 LEVELING PAD CONCRETE

A. Use Class AA, A or B concrete mixes in accordance with Section 03055.

2.3 MODULAR BLOCK-UNIT FILL

A. Use free-draining crushed stone, 3/8 to 3/4-inch within the modular block units requiring fill material.

2.4 REINFORCING ELEMENTS

A. Hot rolled from steel bars, galvanize coated 3.4 mils thick, meeting minimum requirements of ASTM D1784, Grade 65; AASHTO M-111 and ASTM A-123.

B. To be the specified size (see 02831S, article 1.1E-1) and free from defects.

2.5 REINFORCED WELDED WIRE MESH AND LOOP INBEDS

A. Meet minimum requirements of AASHTO M-32 and AASHTO M-55; and have galvanized coating 3.4 mils thick as per AASHTO M-111 (ASTM A-123).

2.6 FIBERGLASS AND STEEL PINS

A. Provide ½ inch diameter fiberglass connecting pins, where used, having a minimum flexural strength of 128 ksi and short beam shear of 6.5 ksi.

B. Provide steel connecting pins galvanized coated 3.4 mils thick, meeting Wall Company requirements.

2.7 OTHER FASTENERS

A. Fasteners to wingwalls and abutment wall, if required, to be provided by the selected Wall Company.

2.8 DAMAGED GALVANIZATION

A. Spray with zinc paint, covering the entire area that has been damaged, as an alternative to replacement of any reinforcing steel, reinforcing elements, wire mesh or fasteners that have damaged galvanization.

2.9 GEOTEXTILE

A. Cover horizontal and vertical joints between block units by a geotextile of the type and grade recommended by the Wall Company.

2.10 WALL CAP ADHESIVE

A. Use a medium-viscosity synthetic elastomeric polymer adhesive, such as "Titebond Heavy Duty Construction Adhesive", or Engineer approved equivalent.

2.11 SELECT BACKFILL

A. Refer to Section 02832S- Select Backfill for MSE Walls.

PART 3 EXECUTION

3.1 GENERAL

A. Arrange for a qualified representative (minimum 5 years experience with MSE wall design and construction) from the selected Wall Company to be directly involved and provide technical assistance during all phases of construction of the wall(s).
   1. The Wall Company representative is to be at the project site for at least the first five working days of wall construction and until all aspects of wall construction have been satisfactorily demonstrated to the MSE Wall Company representative and the Engineer. The MSE Wall Company representative is to subsequently visit the site at least once every 10,000 sq. ft. of wall face construction, or as otherwise determined by the Engineer.
   2. The Wall Company representative is responsible for training the Contractor's wall construction crew(s) and Department inspectors in proper quality control for construction of the walls.
      a. If one or more construction crew members change, the Wall Company representative is responsible to train the new crew member(s).
   3. During each site visit, the representative is to meet with the Engineer near the conclusion of the visit to report on the observed

wall construction procedures, including providing a copy of the field report.

B. Provide the Wall Company's construction manual to the Engineer, and assure that the wall system-specific requirements in the manual are integrated into the wall construction.

C. Provide a final field observations report from the Wall Company that specifically addresses that the completed wall(s) meet all Department and Wall Company specifications/requirements and what deficiencies exist, if any.
   1. Where the Department's and the Wall Company's specifications/requirements differ, the stricter of the two requirements applies.

D. Haul, store and ship wall materials so as to minimize the potential of producing any type of defects.

E. Perform excavation and foundation preparation (including removal of unsuitable soils) as described in Section 02832S.

F. Construct the wall system in accordance with the approved plans, this specification, and the Wall Company's recommendations and construction manual.

3.2 LEVELING PAD

A. Prepare the subgrade soils and/or fill so as to cast the leveling pad to the design elevations shown on the drawings to ensure complete contact of the retaining wall units with the base.

B. Place cast-in-place concrete leveling pad upon undisturbed in-situ soils or upon properly placed and compacted fill as per Section 02832S.

C. Place leveling pad to a minimum thickness of 6 inches.

D. Placement requirements in accordance with Section 03055.

E. Allow leveling pad to cure for at least 12 hours before placing modular block units.

3.3 MODULAR BLOCK UNIT INSTALLATION

A. Place wall backfill as described in Section 02832S.

B. Place the first course of modular block units on the leveling pad. Check the wall units for level and alignment. The first course is the most important to ensure accurate and acceptable results.

C. Ensure block units are in full contact with the leveling pad.

D. Install connecting devices in block units as required by the Wall Company.

E. For block units requiring fill material, fill all voids in block units with modular block unit fill. Tamp fill. Ensure each wall course is completely filled, backfilled, and compacted before proceeding to the next wall course.

F. Where connecting pins are used, lay up each course ensuring connecting pins protrude into adjoining courses above at least 1 inch.

G. Pull each block unit forward, away from the embankment, against connecting pins in the previous course and backfill as the course is completed. Repeat procedure to the extent of the wall height.

H. As appropriate where the wall changes elevation, the units can be stepped with grade or turned into the embankment with a convex return end. Provide appropriate buried units on the compacted leveling pad in the area of the convex return end.

I. Wall alignment tolerances.
1. Horizontal alignment: 0.7 percent (for example 2.5 inches in 30 feet).
2. Vertical tolerance: 0.7 percent (for example 0.85 inches in 10 feet).
3. Overall vertical tolerance of the wall (plumbness from top to bottom): 0.7 percent (for example 1.7 inches in 20 feet of wall height).
4. Levelness tolerance: 0.5 percent (for example 1.2 inches in 20 feet).

J. Install block units so that joints are uniform.
1. During construction the maximum allowable offset in any block joint is 0.25 inch.
2. Joint width is 0.50 inch maximum and 0.12 inch minimum.

3.4 STEEL SOIL REINFORCEMENT INSTALLATION

A. Lay the steel reinforcement horizontally on the compacted backfill at the proper elevations as designed.

B. Connect steel reinforcement to the block units as required by Wall Company.

C. Pull the reinforcement taut to eliminate any slack; then secure the back edge of the reinforcement before and during backfilling and compaction.

D. Assuming reinforcement is obstructed by elements such as piles, drilled shafts, guardrail posts, catch basins, drop inlets, culverts, etc. in the wall soil reinforcement zone, modify the reinforcement design using one of the following alternatives:
   1. If reinforcement is modified, design the surrounding reinforcement layers to carry the additional load.
   2 Place a structural frame around the obstruction which is capable of transferring loads from the reinforcements on one side of the obstruction to reinforcements on the other side of the obstruction.
   3. If the soil reinforcement consists of discrete strip or bar mats rather than continuous sheets, splay the reinforcements around the obstruction.

E. Place soil reinforcement normal to the face of the wall in plan view.
   1. Where required to splay the reinforcement around obstructions, skew the reinforcement (minimizing the skew angle to no more than 15 degrees).
   2. Maintain a set-back for reinforcement of at least 2 inches from piles or other metallic obstructions. Do not exceed horizontal spacing between longitudinal reinforcement of 7 feet.
   3. Separate any overlapping soil reinforcement elements with a minimum thickness of select backfill specified by the Wall Company.

3.5 WALL CAP INSTALLATION

A. Provide a permanent connection between the wall cap and the top course of the wall units using wall cap adhesive as described in article 2.10. Construct according to the Wall Company drawings and specifications.

3.6 CERTIFICATES OF COMPLIANCE

A. Furnish to the Engineer copies of the certificate of compliance for materials and the results of any tests performed.

END OF SECTION

July 11, 2016

SECTION 02836S

MSE WALLS USING MODULAR BLOCK UNITS AND GEOGRID REINFORCING ELEMENTS

Add Section 02836:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials and construction requirements for mechanically stabilized earth (MSE) walls using a wall system (see Section 02831S) approved by the Engineer using modular block units for the wall face and geogrid reinforcing elements.

B. Provide and install modular block units, geogrid reinforcement, joint filler, and all necessary attachments from the selected Wall Company.

1.2 RELATED SECTIONS

A. Section 02831S: Retaining Wall-Alternate Systems

B. Section 02832S: Select Material for MSE Walls

C. Section 03055: Portland Cement Concrete

D. Section 03211: Reinforcing Steel and Welded Wire

E. Section 03310: Structural Concrete

1.3 REFERENCES

A. ASTM C 140: Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units

B. ASTM C 331: Standard Specification for Lightweight Aggregates for Concrete Masonry Units

C. ASTM C 1262: Standard Test Method for Evaluating the Freeze-Thaw Durability of Dry-Cast Segmental Retaining Wall Units and Related Concrete Units

D. ASTM C 1372: Standard Specification for Dry-Cast Segmental Retaining Wall Units

E. ASTM D 5262: Standard Test Method for Evaluating the Unconfined Tension Creep and Creep Rupture Behavior of Geosynthetics

F. ASTM D 6637: Standard Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-rib Tensile Method

1.4 SUBMITTALS

A. Submit for acceptance at least 10 days before beginning manufacture of the concrete modular block units, a sample of the proposed block texture and at least three color samples of the proposed block units, matched to colors of local features or as otherwise indicated by the Engineer.

B. Provide the Engineer submittals in accordance with Section 02831S and the appropriate working drawings.

C. Do not start work on any wall until all required submittal items have been reviewed and approved by the Design-Builder's Engineers and all Department comments have been addressed.

D. Provide certificates of compliance from a UDOT-qualified testing lab, certifying that the select backfill, the modular block facing units, and the geogrid complies with this section, and the results of all tests performed for the tests described in this section.

E. Provide the Wall Company's construction manual for the specific wall system.

F. Certification from the Wall Company that the completed wall(s) meet all Department and Wall Company specifications/requirements for the specific wall system.
   1. Where the Department's and the Wall Company's specifications or requirements differ, apply the stricter of the two.

1.5 ACCEPTANCE

A. Modular Block Units and Cap Blocks: Meet 28-day compressive strength of 4000 psi.
   1. Do not transport block units to the site until:
      a. A minimum 28-day compressive strength of 4000 psi has been achieved
      b. Regardless of strength gain, do not transport block units to the site before seven days after fabrication.

B. All modular block facing units and cap blocks to be visually free of defects and will be rejected for not meeting any of the requirements specified in article 2.1. In addition, any of the following defects will be cause for rejection:
   1. Defects that indicate imperfect molding.
   2. Defects indicating honeycomb or other open-texture concrete .
   3. Cracked or severely chipped block units.
   4. Color variation on exposed face(s) of block unit due to excess form oil or other reasons.

C. Geogrid: Free of defects and will be rejected if it does not meet the requirements stated in article 2.3.

PART 2 PRODUCTS

2.1 CONCRETE MODULAR BLOCK UNITS

A. Meet the following requirements for drycast concrete modular block units and cap blocks:
   3. Have a minimum 28-day compressive strength of 4,000 psi in accordance with ASTM C 140.
   4. Conform to ASTM C 1372, except as otherwise specified.
   5. Conform to the following freeze-thaw test requirements for the lot of block units produced for use in this project in accordance with ASTM C 1262.
      a. Minimum acceptable performance defined as weight loss at the conclusion of 150 freeze-thaw cycles not exceeding 1 percent of the block unit's initial weight for a minimum of 4 of the 5 block unit specimens tested.
      b. Per Engineer's approval, Project specific freeze-thaw durability tests may be substituted by the tests of units made with the same material, concrete mix design, manufacturing process, and curing method, conducted not more than 12 months prior to delivery. An independent laboratory to provide reports and certifications of the above tests as per ASTM C 1262 and C 1372 as appropriate.
   4. Have a maximum water absorption in accordance with ASTM C 140 no greater than 1 percent above the water absorption content of the lot of block units produced and successfully tested for the freeze-thaw test specified in item 3 above for all concrete block units.
   5. Conform to ASTM C 140 for testing of drycast concrete block units.

B. Provide concrete block manufactured using a combination of cement, aggregates, admixtures, and other components meeting the requirements of Section 03055.
   1. Verify the compatibility of all components and the environment in which the block will be used, including sulfate soils and/or groundwater.
   2. Lightweight aggregates are subject to the Engineer's approval and must meet the requirements of ASTM C 331.

C. Provide block units with permissible variations of plus 0.12 inch and minus 0.06 inch.

D. Provide block units having angled sides capable of producing concave and convex alignment curves with a minimum radius of 4 feet.

E. Provide block units having a polymeric efflorescence control admixture.

F. Finish and Appearance
   1. All block units to be sound and free from cracks or other defects that would interfere with the proper placement of the unit or significantly impair the strength or permanence of the construction.
   2. Minor cracks incidental to the usual method of manufacture or minor chipping resulting from shipment and delivery are not grounds for rejection.
   3. Assure the exposed face or faces of units are free of chips, cracks or other imperfections when viewed from a distance of 30 feet under diffused lighting.
   4. Up to five percent of a shipment may contain slight cracks or small chips not longer than 1 inch.
   5. The faces of the exposed corner facing block units to have the same approved architectural finish as the main face.

G. Notify the Engineer in writing at least 72 hours before beginning the casting of concrete modular block units.

H. Sampling
   1. Acceptance of the block units with respect to compressive strength will be determined on a lot-by-lot basis.
      a. Randomly sample the lot in accordance with ASTM C 140. Core compressive strength test specimens or conform to the saw-cut coupons provisions of Section 5.2.4 of ASTM C 140. Refer to Table 1 for sampling frequency.

Table 1

Lot Size	Samples
0-8,000	3 units
Greater than 8,000	2 additional units per additional 8000

2. Provide additional samples if required by the Engineer.

2.2 LEVELING PAD CONCRETE

A. Use Class AA, A ,or B concrete mix as per Section 03055.

2.3 GEOGRID

A. Use geogrid consisting of a regular grid network of integrally connected, discontinuous, select high-density polyethylene, polypropylene resin polymer or polyester tensile elements (specified for wall system selected) with aperture geometry sufficient to permit significant mechanical interlock with the surrounding soil and/or rock.
   1. Geogrid structure to be dimensionally stable and be able to retain its geometry under manufacture, transport, and installation.

B. Provide creep rupture test for 75-year design life per ASTM D5262.

C. Provide ultimate strength, minimum per ASTM D6637 and utilize geogrid reinforcement reduction factors as appropriate for the Project.

D. Inspect all soil reinforcement and attachment devices to ensure they are true to size and free from defects that may impair their strength and durability.

E. Prevent mud, wet concrete, epoxy and similar contaminants from coming in contact with and affixing to the soil reinforcement and inserts, that would interfere with the geogrid connections.

F. Store soil reinforcement products as recommended by the Wall Company.

2.4 FIBERGLASS PINS

A. If required, provide ½-inch diameter fiberglass connecting pins having a minimum flexural strength of 128 ksi and short beam shear of 6.5 ksi.

2.5 OTHER FASTENERS

A. If required, provide fasteners to wingwalls and abutment wall from the selected Wall Company.

2.6 SELECT BACKFILL

A. Refer to Section 02832S- Select Backfill for MSE Walls.

2.7 MODULAR BLOCK UNIT FILL

A. Use free-draining crushed stone, predominantly 3/8 to 3/4-inch, with no more than 5 percent passing the No 200 sieve, within the modular block units requiring fill material.

2.8 GEOTEXTILE

A. Cover horizontal and vertical joints between block units by a geotextile of the type and grade as recommended by the Wall Company.

2.9 WALL CAP ADHESIVE

A. Use a medium-viscosity synthetic elastomeric polymer adhesive, such as “Titebond Heavy Duty Construction Adhesive”, or Engineer-approved equivalent.

PART 3 EXECUTION

3.1 GENERAL

A. Arrange for a qualified representative (minimum 5 years experience with MSE wall design and construction) from the selected Wall Company to be directly involved and provide technical assistance during all phases of construction of the wall(s).
   1. The Wall Company representative is to be at the project site for at least the first five working days of wall construction and until all aspects of wall construction have been satisfactorily demonstrated to the MSE Wall Company representative and the Engineer. The MSE Wall Company representative is to subsequently visit the site at least once every 10,000 sq ft of wall face construction, or as otherwise determined by the Engineer.
   2. The Wall Company representative is responsible for training the Contractor’s wall construction crew(s) and Department inspectors in proper quality control for construction of the walls.
      a. If one or more construction crew members change, the Wall Company representative is responsible to train the new crew member(s).
   3. During each site visit, the representative is to meet with the Engineer near the conclusion of the visit to report on the observed

wall construction procedures, including providing a copy of the field report.

B. Provide the Wall Company's construction manual to the Engineer, and assure that the wall system-specific requirements in the manual are integrated into the wall construction.

C. Provide a final field observations report from the Wall Company that specifically addresses that the completed wall(s) meet all Department and Wall Company specifications/requirements and what deficiencies exist, if any.
   1. Where the Department's and the Wall Company's specifications/requirements differ, apply the stricter of the two requirements.

D. Perform excavation and foundation preparation (including removal of unsuitable soils) as described in Section 02832S.

E. Construct the wall system in accordance with the approved plans, this specification, and the Wall Company's recommendations and construction manual.

3.2 LEVELING PAD

A. Prepare the subgrade soils and/or fill so as to cast the leveling pad to the design elevations shown on the drawings, to ensure complete contact of the retaining wall units with the base.

B. Place cast-in-place concrete leveling pad as per Section 03055 upon undisturbed in-situ soils, or upon properly placed and compacted fill as per Section 02832S.

C. Place leveling pad to a minimum thickness of 6 inches.

D. Placement requirements in accordance with Section 03055.

E. Allow leveling pad to cure for at least 12 hours before placing modular block units.

3.3 MODULAR BLOCK UNIT INSTALLATION

A. Place wall backfill as described in Section 02832S.

B. Place the first course of modular block units on the leveling pad. Check the wall units for level and alignment. The first course is the most important to ensure accurate and acceptable results.

C. Ensure block units are in full contact with the leveling pad.

D. Install connecting devices in block units if required by the Wall Company.

E. For block units requiring fill material, fill all voids in block units with modular block unit fill. Tamp fill. Ensure each wall course is completely filled, backfilled, and compacted before proceeding to the next wall course.

F. Where connecting pins are used, ensure connecting pins protrude into adjoining courses above at least 1 inch.

G. Pull each block unit forward, away from the embankment, against connecting devices in the previous course and backfill as the course is completed. Repeat procedure to the extent of the wall height.

H. As appropriate where the wall changes elevation, the units can be stepped with grade or turned into the embankment with a convex return end. Provide appropriate buried units on the compacted leveling pad in the area of the convex return end.

I. Wall alignment tolerances.
1. Horizontal alignment: 0.7 percent (for example 2.5 inches in 30 feet).
2. Vertical tolerance: 0.7 percent (for example 0.85 inches in 10 feet).
3. Overall vertical tolerance of the wall (plumbness from top to bottom): 0.7 percent (for example 1.7 inches in 20 feet of wall height).
4. Levelness tolerance: 0.5 percent (for example 1.2 inches in 20 feet).

J. All joints to be uniform.
1. During construction the maximum allowable offset in any block joint is 0.25 inch.
2. Joint width is 0.50 inch maximum and 0.12 inch minimum.

3.4 GEOGRID INSTALLATION

A. Verify the correct orientation (roll direction) of the geogrid.

B. Lay the geogrid soil reinforcement horizontally on the compacted backfill at the proper elevations as designed.

C. Connect geogrid to the concrete wall units as required by Wall Company.

D. Pull the geogrid taut to eliminate loose folds and removing slack in the geogrid at the wall unit connections, pretension the geogrid, and then stake or otherwise secure the back edge of the geogrid before and during backfill and compaction.

E. Follow the Wall Company's guidelines relative to overlap requirements of uniaxial and biaxial geogrid.
   1. Assuming reinforcement is obstructed by elements such as piles, drilled shafts, guardrail posts, catch basins, drop inlets, culverts, etc. in the wall soil reinforcement zone, modify the reinforcement design using one of the following alternatives:
   2. If reinforcement is modified, design the surrounding reinforcement layers to carry the additional load.
   3. Place a structural frame around the obstruction which is capable of transferring loads from the reinforcements on one side of the obstruction to reinforcements on the other side of the obstruction.

3.5 WALL CAP INSTALLATION

A. Provide a permanent connection between the wall cap and the top course of the block units using wall cap adhesive as described in article 2.9. Construct according to the Wall Company drawings and specifications.

3.6 CERTIFICATES OF COMPLIANCE

A. Furnish to the Engineer copies of the certificate of compliance for materials and the results of any tests performed.

END OF SECTION

July 11, 2016

SECTION 02837S

TWO-STAGE MSE WALLS USING CONCRETE FACING PANELS AND METAL REINFORCING ELEMENTS

Add Section 02837S:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials and construction requirements for two-stage mechanically stabilized earth (MSE) walls using a wall system (refer to Section 02831S) approved by the Engineer using concrete facing panels and metal reinforcing elements.

B. Provide and install face panels, reinforcing steel, tie strips, fasteners, joint filler, select backfill, and all necessary attachments from the selected Wall Company.

1.2 RELATED SECTIONS

A. Section 02831S: Retaining Wall-Alternate Systems

B. Section 02832S: Select Backfill for MSE Walls

C. Section 03055: Portland Cement Concrete

D. Section 03211: Reinforcing Steel and Welded Wire

E. Section 03310: Structural Concrete

F. Section 03390: Concrete Curing

G. Section 03924: Epoxy Injection and Sealing

1.3 REFERENCES

A. AASHTO M 111: Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

B: AASHTO M 232: Zinc Coating (Hot-Dip) on Iron and Steel Hardware

C. ASTM A 325: Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength

D. ASTM A 572: High-Strength Low-Alloy Columbium-Vanadium Structural Steel

E. ASTM A 709M: Structural Steel for Bridges

F. ASTM A 1011: Standard Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength

G. UDOT Quality Management Plans

1.4 SUBMITTALS

A. Submit sample of the texture of the panel face for the Engineer's approval.

B. Provide submittals in accordance with Section 02831S and working drawings including design details which protect the reinforcement connections from corrosion.

C. Do not start work on any wall until working drawings have been reviewed and approved by the Design-Builder's Engineers and all Department comments have been addressed.

D. Certificate of compliance for incorporated materials along with copies of results of any tests performed.

E. Wall Company's construction manual for the specific wall system.

F. Certification from the Wall Company that the completed wall(s) meet all Department and Wall Company specifications/requirements for the specific wall system.
   1. Where the Department's and the Wall Company's specifications or requirements differ, apply the stricter of the two.

1.5 ACCEPTANCE

A. Panel Acceptance
   1. Meet 28-day minimum compressive strength of 4000 psi.
   2. Do not transport panels to the site before seven days after fabrication and until:
      a. A minimum 28-day compressive strength of 4000 psi has been achieved, or

b. A minimum compressive strength of 3000 psi has been achieved at 14 days.

3. All panels to be visually free of defects and will be rejected if they:
   a. Do not meet the above requirements.
   b. Contain defects due to imperfect molding.
   c. Have any honeycomb.
   d. Have open texture on front face.
   e. Have cracks or spalls that exceed the limits specified in article 3.4

PART 2 PRODUCTS

2.1 PRECAST CONCRETE WALL PANELS

A. Obtain approval from the Engineer for the architectural treatment for all MSE panel walls.

B. Concrete. Class AA(AE) per Section 03055 and Section 03310, having a minimum 28-day compressive strength of 4000 psi.

C. Reinforcing steel to have a minimum cover of 2.0 inches.

D. Casting
   1. Use only a UDOT qualified supplier for precast concrete panel fabrication in accordance with UDOT Precast/Prestressed Concrete Structures Quality Management Plan.
      a. Do not cast panels on site.
   2. Cast panels on a flat area or approved architectural treatment, with the front face down.
      a. Set tie strip guides at back face.
   3. Place concrete in each unit without interruption.
      a. Vibrate with approved equipment to prevent stone pockets or cleavage planes.
      b. Use clean, unused form oil.

E. Reinforcement Connections
   1. Cast at least two soil reinforcement connection levels into all concrete panels.
      a. Where only two connection levels are cast in panels, locate the levels in two different horizontal planes separated by at least one-third the panel height.

F. Curing
   1. Keep surfaces wet and moist until the curing compound is applied.

2. Complete all patching or surface finishing before applying compound.
3. Spray the entire surface of the concrete with a membrane curing compound. Apply the curing compound at a uniform rate of 1.25 oz/ft^2.
4. Immediately re-spray any membrane damage which occurs during the curing period.
5. Leave forms in place until they can be removed without damage to the unit.

G. Concrete Finish
1. Provide a Class 1 finish for front face of panels.
   a. The thickness of the architectural treatment is in addition to the required design thickness.
2. Provide a uniform surface finish for the back face of panels.
   a. Roughly screen the finish to eliminate open pockets of aggregate and surface distortions in excess of 1/4 inch.

H. Tolerances
4. All dimensions ± 1/8 inch.
5. Angular distortion with regard to the height of panel not to exceed 3/16 inch in 5 feet.
6. Surface defects on form surfaces not more than 1/8 inch in 5 feet.

I. Marking
1. Mark the date of manufacture and panel-type designation on the rear of each panel so that it is legible during installation.

2.2 REINFORCING STEEL

A. Epoxy coated in accordance with Section 03211.

2.3 LEVELING PAD CONCRETE

A. Class A or Class B concrete mixes in accordance with Section 03055.

2.4 REINFORCING ELEMENTS

A. Hot rolled from steel bars, galvanize coated 3.4 mils thick, meeting minimum requirements of ASTM A 572, Grade 65; AASHTO M 111.

B. All reinforcing elements to be the specified size and free from defects.

2.5 REINFORCED WELDED WIRE MESH AND LOOP INBEDS

A. Meet minimum requirements of Section 03211 with galvanized coating at least 3.4 mils thick.

2.6 WIRE FACING UNITS

A. Wire facing units to be shop fabricated of cold-drawn steel wire conforming to the minimum requirements of AASHTO M-32 (ASTM A-182) and welded into the finished configuration in accordance with AASHTO M-55 (ASTM A-185). Galvanizing to conform to the minimum requirements of AASHTO M-111 (ASTM A-123).

2.7 TIE STRIPS

A. Shop fabricated, hot rolled steel conforming to minimum requirements of ASTM A 709M, Grade 345; AASHTO M 111; and ASTM A 1011 Grade 345 or equivalent, galvanize coated at least 3.4 mils thick.

2.8 PANEL FASTENERS

A. Bolts and nuts to be hexagonal cap screw and galvanize coated, meeting minimum requirements of ASTM A 325 and AASHTO M 232.

2.9 OTHER FASTENERS

A. Fasteners to wingwalls and abutment walls, if required, to be provided by the Wall Company.

2.10 CONNECTOR RODS

A. Connector rods to be fabricated from cold-drawn steel wire conforming to the minimum requirements of AASHTO M-32 (ASTM A-82); and be galvanized in accordance with AASHTO M-111 (ASTM A-123).

2.11 HAIRPIN CONNECTORS

A. Hairpin connectors to be shop fabricated of hot-rolled steel conforming to the minimum requirements of ASTM A-572, Grade 345 or equivalent; and be galvanized in accordance with AASHTO M-111 (ASTM A-123).

2.12 DAMAGED GALVANIZATION

A. Spray with zinc paint, covering the entire area that has been damaged, as an alternative to replacement of any reinforcing steel, reinforcing elements, wire mesh or fasteners that have damaged galvanization.

2.13 CURING COMPOUND

A. Refer to Section 03390

2.14 GEOTEXTILE

A. Cover horizontal and vertical joints between panels, when required, by a geotextile of type and grade recommended by the Wall Company.

2.15 ADHESIVE

A. Per Wall Company's standard.

2.16 BEARING PADS

A. Horizontal rubber bearing pads to be of the type and grade recommended and supplied by the Wall Company.

2.17 LIFTING DEVICES

A. Per Wall Company's standard.

2.18 SELECT BACKFILL

A. Refer to Section 02832S.

2.19 MATERIALS FOR CRACK AND SPALL REPAIR

A. Refer to Section 03924.

PART 3 EXECUTION

3.1 GENERAL

A. Arrange for a qualified representative (minimum five years experience with MSE wall design and construction) from the selected Wall Company to be directly involved and provide technical assistance during all phases of construction of the wall(s).

1. For both the first and second stage of wall construction, the Wall Company representative is to be at the project site for at least the first five working days of wall construction and until all aspects of wall construction have been satisfactorily demonstrated to the MSE Wall Company representative and the Engineer. The MSE Wall Company representative is to subsequently visit the site at least

once every 10,000 sq. ft. of wall face construction, or as otherwise determined by the Engineer.

2. The Wall Company representative is responsible for training the Contractor's wall construction crew(s) and Department inspectors in proper quality control for construction of the walls.
   a. If one or more construction crew members change, the Wall Company representative is responsible to train the new crew member(s).
3. During each site visit, the representative is to meet with the Engineer near the conclusion of the visit to report on the observed wall construction procedures, including providing a copy of the field report.

B. Provide the Wall Company's construction manual to the Engineer, and assure that the wall system-specific requirements in the manual are integrated into the wall construction.

C. Provide a final field observations report from the Wall Company that specifically addresses that the completed wall(s) meet all Department and Wall Company specifications/requirements and what deficiencies exist, if any.
   1. Where the Department's and the Wall Company's specifications/requirements differ, apply the stricter of the two requirements.

D. Haul, store, and ship wall materials so as to minimize the potential of producing any type of defects.
   1. Store panels to avoid damage to connection pieces such that the tie strips do not bend.

E. Perform excavation and foundation preparation (including removal of unsuitable soils) as specified in Section 02832S.

F. Construct wall system in accordance with the approved plans, specifications, and the Wall Company's recommendations and construction manual.

3.2 LEVELING PAD

A. Prepare the subgrade soils and/or fill so as to cast the leveling pad or reinforced concrete footing to the design elevations shown on the drawings and to ensure complete contact of the retaining wall units with the base.

B. Furnish and place concrete in accordance with Section 03055.

C. Place cast-in-place concrete leveling pad upon undisturbed in-situ soils, or upon properly placed and compacted fill as per Section 02832S. Place leveling pad to a thickness of at least 6 inches after the required settlement has been achieved following the first-stage wall construction.

D. Allow leveling pad to cure for at least 12 hours before placing concrete panels.

3.3 WALL CONSTRUCTION

A. Place wall backfill and reinforcement for two-stage MSE walls as specified in Section 02832S, and in the Wall Company's Approved-for-Construction drawings.

B. Backfill the void behind the first-stage facing by placing the backfill in two approximately equal lifts, and compacting with lightweight equipment in accordance with Section 02832S.

C. Placement of Select Material as wall backfill to closely follow the erection of each course of wire facing units.

D. Place backfill in such a manner as to avoid any damage or disturbance to the wall materials or misalignment of the wire facing units.

E. Where reinforcement is obstructed by elements such as piles, drilled shafts, guardrail posts, catch basins, drop inlets, culverts, etc. in the wall soil reinforcement zone, modify the reinforcement design using one of the following alternatives:

1. If the reinforcement is modified, design the surrounding reinforcement layers to carry the additional load.
2. Place a structural frame around the obstruction which is capable of transferring loads from the reinforcements on one side of the obstruction to reinforcements on the other side of the obstruction.
3. If the soil reinforcement consists of discrete strips or bar mats rather than continuous sheets, splay the reinforcement around the obstruction.

F. Place soil reinforcement elements normal to the face of the wall in plan view.

1. Where required to splay the reinforcement around obstructions, skew the reinforcement (minimizing the skew angle to no more than 15 degrees).
   a. Maintain a set-back for reinforcement of at least 2 inches from piles or other metallic obstructions.

2. Do not exceed horizontal spacing between longitudinal reinforcing of 7 feet.
3. Separate any overlapping soil reinforcing elements with a minimum thickness of select backfill specified by the Wall Company.

G. Where reinforcement elements are to be connected using bolts and nuts, use a crescent or socket-head ratchet wrench to securely hand-tighten the nut.
   1. Do not use pneumatic equipment.

H. Construct the first-stage facing within 2 inches of the design vertical and horizontal alignments (excluding bulging).

I. Prevent significant bulging of the first-stage facing between reinforcing layers.
   1. Where bulging exceeds 3 inches between reinforcing layers, remove and reconstruct this portion of the wall.
   2. Bulging will be measured by a plumb straight-edge, or by using a plumb-bob string held in front of the wall face.
   3. The bulge measurement is the difference in the horizontal measurement from the straight edge or plumb-bob string to the location of maximum bulge and the reinforcement layer immediately above or below the budge (whichever is greater).

J. Proceed with placement of the second stage wall panels after confirmation is given by the Engineer that the required settlement has been achieved.

K. Handle panels by means of lifting device set into upper edge of the panels and set in position vertically.

L. Place bearing pads as required by the Wall Company to prevent concrete-to-concrete contact between panels.

M. Use rubber, wood, or metal shims as necessary to make final adjustments to the wall panel to facilitate level placement of the panel.
   1. Do not leave wood shims at any location.

N. Construct to and maintain wall facing tolerances as follows:
   1. Horizontal alignment: 0.7 percent (for example 2.5 inches in 30 feet)
   2. Vertical tolerance: 0.7 percent (for example 0.85 inches in 10 feet)
   3. Overall vertical tolerance (plumbness from top to bottom): 0.7 percent (for example 1.7 inches in 20 feet of wall height)
   4. Levelness: 0.5 percent (for example 1.2 inches in 20 feet)

O. Install panels so that joints are uniform. The maximum allowable offset in any panel joint is 0.40 inch. Joint width is 1.2 inches maximum and 0.50 inch minimum.

P. Check panel tolerance and reset before placement of the next panel if out of tolerance.

3.4 CRACK AND SPALL REPAIR CRITERIA FOR CONCRETE PANELS

G. A fully penetrating crack is defined as a crack extending through the cross-section of the precast panel from the front face to the back face of the unit.

H. Cracks at Front Face of Panel:
1. Panels with one or two partially penetrating cracks with widths less than or equal to 12 mils are acceptable.
2. Reject panels with fully penetrating cracks, or cracks wider than 12 mils.
3. No more than two cracks per individual panel are allowed without further evaluation.

I. Cracks at Back Face of Panel:
1. Partially penetrating cracks with widths less than or equal to 12 mils are acceptable.
2. Partially penetrating cracks with widths between 12 mils and 30 mils are acceptable when repaired with surface sealant according to subparagraph F, Crack Repair Procedures.
3. Evaluate partially penetrating cracks wider than 30 mils for acceptance with epoxy injection according to subparagraph F, Crack Repair Procedures.
4. No more than two repairable cracks per individual panel are allowed without further evaluation.

J. Spalls at Front Face of Panel:
1. Spalls with widths less than 4.0 inches and depths less than 2.0 inches may be repaired with a patching material acceptable to the Engineer of the same color as panel concrete. Resultant repair to be approved by the Engineer.
2. Reject panels with spalls wider than 4.0 inches or deeper than 2.0 inches.
3. Measure spall depth from the structural thickness of the panel excluding architectural surface finish.
4. Panels with more than two spalls are subject to further evaluation before acceptance.

K. Spalls at Back Face of Panel:

1. Spalls with widths less than 4.0 inches and depths less than 2.0 inches may be repaired with a patching material acceptable to the Engineer. Resultant repair to be approved by the Engineer.
2. Reject panels with spalls wider than 4.0 inches or deeper than 2.0 inches.
3. Panels with more than four spalls are subject to further evaluation before acceptance.

L. Crack Repair Procedures:

1. Surface Sealing: Prepare surface and apply a sealant acceptable to the Engineer according to Manufacturer's instructions.
2. Epoxy Injection: Prepare surface and inject cracks with Department-approved product according to Manufacturer's instructions.

G. Spall Repair Procedures:

1. Prepare surface and apply patching material according to Manufacturer's instructions, and as acceptable to the Engineer.

END OF SECTION

July 11, 2016

SECTION 02838S

TWO-STAGE MSE WALLS USING CONCRETE FACING PANELS AND GEOGRID REINFORCING ELEMENTS

Add Section 02838S:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials and construction requirements for two-stage mechanically stabilized earth (MSE) walls using a wall system (refer to Section 02831S) approved by the Engineer using concrete facing panels and geogrid reinforcing elements.

B. Provide and install face panels, reinforcing steel, geogrid, fasteners, joint filler, select backfill, and all necessary attachments from the selected Wall Company.

1.2 RELATED SECTIONS

A. Section 02831S: Retaining Wall-Alternate Systems

B. Section 02832S: Select Backfill for MSE Walls

C. Section 03055: Portland Cement Concrete

D. Section 03211: Reinforcing Steel and Welded Wire

E. Section 03310: Structural Concrete

F. Section 03390: Concrete Curing

G. Section 03924: Epoxy Injection and Sealing

1.3 REFERENCES

A. AASHTO M 32: Steel Wire, Plain, for Concrete Reinforcement

B. AASHTO M 55: Steel Welded Wire Reinforcement, Plain, for Concrete

C. AASHTO M 111: Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

D: AASHTO M 232: Zinc Coating (Hot-Dip) on Iron and Steel Hardware

E. ASTM A 325: Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength

F. ASTM A 572: High-Strength Low-Alloy Columbium-Vanadium Structural Steel

G. ASTM A 709M: Structural Steel for Bridges

H. ASTM A 1011: Standard Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength

I. ASTM D5262: Standard Test Method for Evaluating the Unconfined Tension Creep and Creep Rupture Behavior of Geosynthetics

J. ASTM D6637: Standard Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-Rib Tensile Method

K. UDOT Quality Management Plans

1.4 SUBMITTALS

A. Submit sample of the texture of the panel face for the Engineer's approval.

B. Provide submittals in accordance with Section 02831S and working drawings including design details.

C. Do not start work on any wall until working drawings have been reviewed and approved by the Design-Builder's Engineers and all Department comments have been addressed.

D. Certificate of compliance for incorporated materials along with copies of results of any tests performed.

E. Wall Company's construction manual for the specific wall system.

F. Certification from the Wall Company that the completed wall(s) meet all Department and Wall Company specifications/requirements for the specific wall system.
   1. Where the Department's and the Wall Company's specifications or requirements differ, apply the stricter of the two.

1.5 ACCEPTANCE

A. Panel Acceptance
   1. Meet 28-day minimum compressive strength of 4000 psi.
   2. Do not transport panels to the site before seven days after fabrication and until:
      a. A minimum 28-day compressive strength of 4000 psi has been achieved, or
      b. A minimum compressive strength of 3000 psi has been achieved at 14 days.
   3. All panels to be visually free of defects and will be rejected if they:
      a. Do not meet the above requirements.
      b. Contain defects due to imperfect molding.
      c. Have any honeycomb.
      d. Have open texture on front face.
      e. Have cracks or spalls that exceed the limits specified in article 3.4

PART 2 PRODUCTS

2.1 PRECAST CONCRETE WALL PANELS

A. Obtain approval from the Engineer for the architectural treatment for all MSE panel walls.

B. Concrete. Class AA(AE) per Section 03055 and Section 03310, having a minimum 28-day compressive strength of 4000 psi.

C. Reinforcing steel to have a minimum cover of 2.0 inches.

D. Casting
   1. Use only a UDOT qualified supplier for precast concrete panel fabrication in accordance with UDOT Precast/Prestressed Concrete Structures Quality Management Plan.
      a. Do not cast panels on site.
   2. Cast panels on a flat area or approved architectural treatment, with the front face down.
      a. Set tie strip guides at back face.
   3. Place concrete in each unit without interruption.
      a. Vibrate with approved equipment to prevent stone pockets or cleavage planes.
      b. Use clean, unused form oil.

E. Reinforcement Connections

1. Cast at least two soil reinforcement connection levels into all concrete panels.
   a. Where only two connection levels are cast in panels, locate the levels in two different horizontal planes separated by at least one-third the panel height.

F. Curing
1. Keep surfaces wet and moist until the curing compound is applied.
2. Complete all patching or surface finishing before applying compound.
3. Spray the entire surface of the concrete with a membrane curing compound. Apply the curing compound at a uniform rate of 1.25 oz/ft^2.
4. Immediately re-spray any membrane damage which occurs during the curing period.
5. Leave forms in place until they can be removed without damage to the unit.

G. Concrete Finish
1. Provide a Class 1 finish for front face of panels.
   a. The thickness of the architectural treatment is in addition to the required design thickness.
2. Provide a uniform surface finish for the back face of panels.
   a. Roughly screen the finish to eliminate open pockets of aggregate and surface distortions in excess of 1/4 inch.

H. Tolerances
7. All dimensions ± 1/8 inch.
8. Angular distortion with regard to the height of panel not to exceed 3/16 inch in 5 feet.
9. Surface defects on form surfaces not more than 1/8 inch in 5 feet.

I. Marking
1. Mark the date of manufacture and panel type designation on the rear of each panel so that it is legible during installation.

2.2 REINFORCING STEEL

A. Epoxy coated in accordance with Section 03211.

2.3 LEVELING PAD CONCRETE

A. Class A or Class B concrete in accordance with Section 03055.

2.4 GEOGRID

A. Use geogrid consisting of a regular grid network of integrally connected, select high-density polyethylene or polypropylene resin polymer tensile elements.
   1. Aperture geometry sufficient to permit significant mechanical interlock with the surrounding soil and/or rock.
   2. Structure to be dimensionally stable and be able to retain its geometry under manufacture, transport, and installation.

B. Provide creep rupture test for 75-year design life per ASTM D5262.

C. Provide ultimate strength, minimum per ASTM D6637 and utilize geogrid reinforcement reduction factors as appropriate for the Project.

D. Carefully inspect all soil reinforcement and attachment devices to ensure they are true to size and free from defects.

E. Prevent mud, wet concrete, epoxy, and other contaminants from coming in contact with and affixing to the soil reinforcement and inserts, that would interfere with the geogrid connections.

F. Store soil reinforcement products as recommended by the wall company.

2.5 REINFORCED WELDED WIRE MESH AND LOOP INBEDS

A. Meet minimum requirements of Section 03211 with galvanized coating at least 3.4 mils thick.

2.6 WIRE FACING UNITS

A. Wire facing units to be shop fabricated of cold-drawn steel wire conforming to the minimum requirements of AASHTO M-32 (ASTM A-182) and welded into the finished configuration in accordance with AASHTO M-55 (ASTM A-185). Galvanizing to conform to the minimum requirements of AASHTO M-111 (ASTM A-123).

2.7 FASTENERS

A. Fasteners to wingwalls and abutment walls, if required, to be provided by the Wall Company.

2.8 CONNECTOR RODS

A. If steel connector rods are required, fabricate from cold-drawn steel wire conforming to the minimum requirements of AASHTO M-32 (ASTM A-82); and be galvanized in accordance with AASHTO M-111 (ASTM A-123).

2.9 HAIRPIN CONNECTORS

A. If steel hairpin connectors are required, shop fabricate hot-rolled steel conforming to the minimum requirements of ASTM A-572, Grade 345 or equivalent; and be galvanized in accordance with AASHTO M-111 (ASTM A-123).

2.10 DAMAGED GALVANIZATION

A. Spray with zinc paint, covering the entire area that has been damaged, as an alternative to replacement of any reinforcing steel, wire mesh or fasteners that have damaged galvanization.

2.11 CURING COMPOUND

A. Refer to Section 03390

2.12 GEOTEXTILE

A. Cover horizontal and vertical joints between panels, when required, by a geotextile of type and grade recommended by the Wall Company.

2.13 ADHESIVE

A. Per Wall Company's standard.

2.14 BEARING PADS

A. Horizontal rubber bearing pads to be of the type and grade recommended and supplied by the Wall Company.

2.15 LIFTING DEVICES

A. Per Wall Company’s standard.

2.16 SELECT BACKFILL

A. Refer to Section 02832S.

2.17 MATERIALS FOR CRACK AND SPALL REPAIR

A. Refer to Section 03924.

PART 3 EXECUTION

3.1 GENERAL

A. Arrange for a qualified representative (minimum five years experience with MSE wall design and construction) from the selected wall company to be directly involved and provide technical assistance during all phases of construction of the wall(s).
   1. For both the first and second stage of wall construction, the wall company representative is to be at the project site for at least the first five working days of wall construction and until all aspects of wall construction have been satisfactorily demonstrated to the MSE wall company representative and the Engineer. The MSE wall company representative is to subsequently visit the site at least once every 10,000 sq. ft. of wall face construction, or as otherwise determined by the Engineer.
   2. The wall company representative is responsible for training the Contractor's wall construction crew(s) and Department inspectors in proper quality control for construction of the walls.
      a. If one or more construction crew members change, the wall company representative is responsible to train the new crew member(s).
   3. During each site visit, the representative is to meet with the Engineer near the conclusion of the visit to report on the observed wall construction procedures, including providing a copy of the field report.

B. Provide the wall company's construction manual to the Engineer, and assure that the wall system-specific requirements in the manual are integrated into the wall construction.

C. Provide a final field observation report from the wall company that specifically addresses that the completed wall(s) meet all Department and wall company specifications/requirements and what deficiencies exist, if any.
   1. Where the Department's and the wall company's specifications/requirements differ, apply the stricter of the two requirements.

D. Haul, store, and ship wall materials so as to minimize the potential of producing any type of defects.
   1. Store panels to avoid damage to connection pieces, such that the tie strips do not bend.

E. Perform excavation and foundation preparation (including removal of unsuitable soils) as specified in Section 02832S.

F. Construct wall system in accordance with the approved plans, specifications, and the wall company's recommendations and construction manual.

3.2 LEVELING PAD

A. Prepare the subgrade soils and/or fill so as to cast the leveling pad or reinforced concrete footing to the design elevations shown on the drawings and to ensure complete contact of the retaining wall units with the base.

B. Furnish and place concrete in accordance with Section 03055.

C. Place cast-in-place concrete leveling pad upon undisturbed in-situ soils, or upon properly placed and compacted fill as per Section 02832S. Place leveling pad to a thickness of at least 6 inches after the required settlement has been achieved following the first-stage wall construction.

D. Allow leveling pad to cure for at least 12 hours before placing concrete panels.

3.3 GEOGRID INSTALLATION

A. Verify the correct orientation (roll direction) of the geogrid.

B. Place geogrid horizontally on the compacted backfill at the proper design.

C. Connect geogrid to the first-stage facing as specified by the wall company.

D. Pull the geogrid taut to eliminate loose folds and remove slack in the geogrid at the wire facing connections, pretension the geogrid, and stake or otherwise secure the back edge of the geogrid before and during backfill and compaction.

E. Follow the wall company's overlap requirements for uniaxial and biaxial geogrids.

F. Where reinforcement is obstructed by elements such as piles, drilled shafts, guardrail posts, catch basins, drop inlets, culverts, etc. in the wall soil reinforcement zone, modify the reinforcement design using one of the following alternatives:

4. If the reinforcement is modified, design the surrounding reinforcement layers to carry the additional load.

5. Place a structural frame around the obstruction which is capable of transferring loads from the reinforcements on one side of the obstruction to reinforcements on the other side of the obstruction.

3.4 WALL CONSTRUCTION

A. Place wall backfill and reinforcement for two-stage MSE walls as specified in Section 02832S, and in the Wall Company's Approved-for-Construction drawings.

B. Backfill the void behind the first-stage facing by placing the backfill in two approximately equal lifts, and compacting with lightweight equipment in accordance with Section 02832S.

C. Placement of Select Material as wall backfill to closely follow the erection of each course of wire facing units.

D. Place backfill in such a manner as to avoid any damage or disturbance to the wall materials or misalignment of the wire facing.

E. Construct the first-stage facing within 2 inches of the design vertical and horizontal alignments (excluding bulging).

F. Prevent significant bulging of the first-stage facing between reinforcing layers.
   1. Where bulging exceeds 3 inches between reinforcing layers, remove and reconstruct this portion of the wall.
   2. Bulging will be measured by a plumb straight-edge, or by using a plumb-bob string held in front of the wall face.
   3. The bulge measurement is the difference in the horizontal measurement from the straight edge or plumb-bob string to the location of maximum bulge and the reinforcement layer immediately above or below the budge (whichever is greater).

G. Proceed with placement of the second stage wall panels after confirmation is given by the Engineer that the required settlement has been achieved.

H. Handle panels by means of lifting device set into upper edge or side of the panels and set in position vertically.

I. Place bearing pads as required by the Wall Company to prevent concrete-to-concrete contact between panels.

J. Use rubber, wood, or metal shims as necessary to make final adjustments to the wall panel to facilitate level placement of the panel.
   1. Do not leave wood shims at any location.

K. Construct to and maintain wall facing tolerances as follows:
   3. Horizontal alignment: 0.7 percent (for example 2.5 inches in 30 feet)
   4. Vertical tolerance: 0.7 percent (for example 0.85 inches in 10 feet)
   3. Overall vertical tolerance (plumbness from top to bottom): 0.7 percent (for example 1.7 inches in 20 feet of wall height)
   4. Levelness: 0.5 percent (for example 1.2 inches in 20 feet)

L. Install panels so that joints are uniform. The maximum allowable offset in any panel joint is 0.40 inch. Joint width is 1.0 inch maximum and 0.50 inch minimum.

M. Check panel tolerance and reset before placement of the next panel if out of tolerance.

3.4 CRACK AND SPALL REPAIR CRITERIA FOR CONCRETE PANELS

A. A fully penetrating crack is defined as a crack extending through the cross-section of the precast panel from the front face to the back face of the unit.

B. Cracks at Front Face of Panel:
   4. Panels with one or two partially penetrating cracks with widths less than or equal to 12 mils are acceptable.
   5. Reject panels with fully penetrating cracks, or cracks wider than 12 mils.
   6. No more than two cracks per individual panel are allowed without further evaluation.

C. Cracks at Back Face of Panel:
   5. Partially penetrating cracks with widths less than or equal to 12 mils are acceptable.
   6. Partially penetrating cracks with widths between 12 mils and 30 mils are acceptable when repaired with surface sealant according to subparagraph F, Crack Repair Procedures.
   7. Evaluate partially penetrating cracks wider than 30 mils for acceptance with epoxy injection according to subparagraph F, Crack Repair Procedures.
   8. No more than two repairable cracks per individual panel are allowed without further evaluation.

D. Spalls at Front Face of Panel:
   5. Spalls with widths less than 4.0 inches and depths less than 2.0 inches may be repaired with a patching material acceptable to the

Engineer of the same color as panel concrete. Resultant repair to be approved by the Engineer.

6. Reject panels with spalls wider than 4.0 inches or deeper than 2.0 inches.
7. Measure spall depth from the structural thickness of the panel excluding architectural surface finish.
8. Panels with more than two spalls are subject to further evaluation before acceptance.

E. Spalls at Back Face of Panel:

4. Spalls with widths less than 4.0 inches and depths less than 2.0 inches may be repaired with a patching material acceptable to the Engineer. Resultant repair to be approved by the Engineer.
5. Reject panels with spalls wider than 4.0 inches or deeper than 2.0 inches.
6. Panels with more than four spalls are subject to further evaluation before acceptance.

F. Crack Repair Procedures:

3. Surface Sealing: Prepare surface and apply a sealant acceptable to the Engineer according to Manufacturer's instructions.
4. Epoxy Injection: Prepare surface and inject cracks with Department-approved product according to Manufacturer's instructions.

G. Spall Repair Procedures:

1. Prepare surface and apply patching material according to Manufacturer's instructions, and as acceptable to the Engineer.

END OF SECTION

July 11, 2016

SECTION 02839S

PREFABRICATED MODULAR GRAVITY WALL (PMGW) SYSTEMS USING LARGE MODULAR BLOCK UNITS

Add Section 02839S:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials and construction requirements for PMGW walls as specified in Section 02831S.

B. Provide and install the prefabricated modular gravity block wall units and all necessary appurtenances from the selected Wall Company.

1.2 RELATED SECTIONS

A. Section 02056: Embankment, Borrow, and Backfill

B. Section 02317: Structural Excavation

C. Section 03055: Portland Cement Concrete

D. Section 03310: Structural Concrete

E. Section 02831S: Retaining Wall - Alternate Systems

1.3 REFERENCES

A. ASTM C140: Sampling and Testing Concrete Masonry Units and Related Units

B. ASTM C331: Lightweight Aggregates for Concrete Masonry Units

C. ASTM D412: Vulcanized Rubber and Thermoplastic Elastomers-Tension

D. ASTM D1248: Polyethylene Plastics Extrusion Materials For Wire and Cable

E. ASTM D3034: Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings

F. American Association of State Highway and Transportation Officials (AASHTO) LRFD Bridge Design Specifications

G. National Concrete Masonry Association (NCMA):
   1. NCMA SRWU-1 Test Method for Determining Connection Strength of SRW
   2. NCMA SRWU-2 Test Method for Determining Shear Strength of SRW

1.4 SUBMITTALS

A. Submit sample of the texture for the Engineer's approval.

B. Submit for approval at least 3 color samples of proposed segmental concrete unit colors (if integral color is required), matched to colors of local features or as otherwise indicated, at least four weeks before beginning manufacture of the block units.

C. Provide working drawings and other applicable submittals in accordance with Section 02831S.

D. Do not start work on any wall until working drawings have been reviewed and approved by the Design-Builder's Engineers and all Department comments have been addressed.

E. Certificate of compliance for incorporated materials along with copies of results of any tests performed.

F. Certification from the Wall Company that the completed wall(s) meet all Department and Wall Company specifications.
   1. Where the Department's and the Wall Company's specifications differ, the stricter of the two apply.

1.5 ACCEPTANCE

A. Prefabricated Modular Gravity Block Units:
   1. Compressive Strength: Minimum 28-day of 4000 psi. Modular gravity block units which meet 75 percent of 28-day strength within 7 days are acceptable for placement in the wall.
      a. Acceptance is determined on a lot basis.
      b. The lot will be randomly sampled in accordance with ASTM Specification C140.
      c. Test specimens will be cored or conform to the saw-cut coupons provisions of ASTM Specification C140, Section 6.2.4.
      d. Block sampling frequency:

Table 1

Lot Size	Samples
0-2,000	4 units
Greater than 2,000	1 unit per 1,000

e. Provide additional samples if requested by the Engineer.

2. Dimension Tolerances:
   a. Height: +/- 3/16”
   b. Width: +/- 1/2” unless field cut for fitting purposes.
   c. Depth: No less than the unit design depth of the blocks.

3. Finish and Appearance:
   a. Modular gravity block units to be sound, free from visual defects, and free from cracks or other defects that interfere with the proper placement of the unit or impair the strength or durability of the construction.
   b. Assure the exposed face or faces of units are free of chips, cracks, or other imperfections when viewed from a distance of 30 feet under diffused lighting.
   c. Acceptance will be at the Engineer’s discretion.
   d. Up to five percent of a shipment may contain slight cracks or small chips not longer than 1 inch.

4. Block units will be rejected for failure to meet any of the above specified requirements. In addition, units will be rejected for any of the following defects:
   a. Defects that indicate imperfect molding
   b. Defects indicating honeycomb or open-texture concrete
   c. Cracked or severely chipped units
   d. Color variation on exposed face(s) of unit

B. Completed Wall Construction Tolerances:
   1. Horizontal alignment (including curves and corners) is 0.7 percent (for example 2.5 inches in 30 feet).
   2. Adjacent block tolerance is 1 percent (for example 0.4 inches in 3 feet).
   3. The overall vertical tolerance of the wall (plumbness from top to bottom) not to exceed 1 percent (for example 0.8 inches in 6 feet of wall height).
   4. Level tolerance not to exceed 0.5 percent (for example 1.2 inches in 20 feet).
   5. Ensure all joints are uniform. Maximum allowable offset in any block joint is 0.5 inch. Maximum joint width is 0.25 inch.

PART 2 PRODUCTS

2.1 CONCRETE MODULAR BLOCK UNITS

A. Concrete. Class AA(AE) per Section 03055 and Section 03310, having a minimum 28-day compressive strength of at least 4000 psi.

B. Manufacture concrete block using a combination of cement, aggregates, admixtures, and other components meeting the requirements of Section 03055.
   1. Verify the compatibility of all components and the environment in which the block will be used, including sulfate soils and/or groundwater.
   2. Lightweight aggregates are subject to the Engineer's approval and meet the requirements of ASTM C331.

C. Provide block units having angled sides capable of producing concave and convex alignment curves with a minimum radius as specified in the Wall Company's layout drawings.

D. Notify the Engineer in writing at least 72 hours before beginning the casting of concrete modular block units.

2.2 ADHESIVE

A. Use a urethane or polyurethane adhesive which is specifically described as forming a bond with concrete and masonry materials. Minimum tensile stress of 225 psi and minimum elongation of 600% (ASTM D412).
   1. Product examples meeting these criteria are Sikabond Construction Adhesive and Geocel 3500.

2.3 DRAINAGE PIPE

A. If required in Construction Drawings, use perforated or slotted PVC drainage pipe manufactured in accordance with ASTM D3034 or corrugated HDPE pipe manufactured in accordance with ASTM D1248.

2.4 SELECT MATERIAL FOR PMGW

A. Use Select Material for PMGW which is free from frozen, organic and otherwise deleterious materials.

B. Conform to the following gradation limits as determined by AASHTO T-27 / ASTM D422:

Table 2

Gradation for Select Material for PMGW Walls	
Sieve Size	**Percent passing**
2 inch	100
¾ inch	75-100
No. 4	0-60
No. 40	0-30
No. 200	0-5

C. Use Select Material for PMGW that:
   1. Is substantially free of shale or other soft, poor durability particles.
   2. Has an organic content less than 1 percent as determined by AASHTO T-267 on the portion of the material finer than the No. 10 sieve.

D. Furnish the Engineer with a copy of all test results performed to meet the requirements of this section of the specification.

PART 3 EXECUTION

3.1 GENERAL

A. Arrange for a qualified representative (minimum five years experience with PMGW wall design and construction) from the selected Wall Company to be directly involved and provide technical assistance during all phases of construction of the wall(s).
   1. The Wall Company representative is to be at the project site for at least the first five working days of wall construction and until all aspects of wall construction have been satisfactorily demonstrated to the PMGW Wall Company representative and the Engineer. The PMGW Wall Company representative is to subsequently visit the site at least once every 10,000 sq. ft. of wall face construction, or as otherwise determined by the Engineer.
   2. The Wall Company representative is responsible for training the Contractor's wall construction crew(s) and Department inspectors in proper quality control for construction of the walls.
      a. If one or more construction crew members change, the Wall Company representative is responsible to train the new crew member(s).
   3. During each site visit, the representative is to meet with the Engineer near the conclusion of the visit to report on the observed wall construction procedures, including providing a copy of the field report.

B. Provide the Wall Company's construction manual to the Engineer, and assure that the wall system-specific requirements in the manual are integrated into the wall construction.

C. Provide a final field observations report from the Wall Company that specifically addresses that the completed wall(s) meet all Department and Wall Company specifications/requirements and what deficiencies exist, if any.
   1. Where the Department's and the Wall Company's specifications/ requirements differ, the stricter of the two requirements applies.

D. Haul, store, and ship wall materials to minimize the potential of producing any type of defects.

E. Perform excavation and foundation preparation (including removal of unsuitable soils) as specified in Section 02317.

F. Construct the wall system in accordance with the approved plans, specifications, and the Wall Company's recommendations and construction manual.

G. Do not place any block until it has been cured for at least 7 days and meets all acceptance criteria.

3.2 LEVELING PAD INSTALLATION

A. Prepare the subgrade soils and/or fill to install the leveling pad to the design elevations shown on the drawings, to ensure complete contact of the retaining wall units with the base so that there are no voids beneath or between units.
   1. Remove all foundation soils found to be unsuitable and replace with Select Material for PMGW placed and compacted as described in this Section.

B. Place Select Material for PMGW leveling pad to a thickness of at least 6 inches on undisturbed in-situ soils or on properly placed and compacted fill as per this Section.

C. Provide a level surface on which to place the first course of block units.

D. Width of the leveling pad extends at least 6 inches in front and 6 inches in back of the base unit footprint.

E. Compact leveling pad material in accordance with Section 02056 so as to provide a smooth, hard surface on which to place the first course of units.

3.3 PMGW BLOCK UNIT INSTALLATION

A. Make the width of excavation equal to or exceeding the required backfill. Refer to the approved plans for backfill dimensions from the back face of the wall.

B. Place the first course of modular block units on the leveling pad. Verify that the wall units are level and properly aligned.

C. Ensure block units are in full contact with the leveling pad.

D. Place unit faces in contact end to end. Do not allow any gaps one-half inch or greater.

E. Follow erection of each course of wall blocks with placement of Select Material for PMGW. Complete backfill at the front of the wall prior to backfilling more than 4 feet above the bottom of the lowermost facing block.
   1. Minimum bury depth of the bottom block is 1.0 ft.
   2. Do not damage, disturb or misalign block units during backfill placement.
   3. Do not exceed individual block height (loose) in lift thickness. Decrease the lift thickness as necessary to obtain the specified density. Place backfill in uniformly thick layers.

F. Ensure each wall course is completely filled, backfilled, and compacted before proceeding to the next wall course.
   1. Compact backfill to at least 95 percent of the maximum density, AASHTO T-99, Method C or D (with oversized correction, outlined in Note 7 of T-99).
   2. Place and compact each layer of backfill in a level manner before placing subsequent backfill layers.

G. Lay each successive course making sure that the bottom recess is in full contact with the unit locators of the course below. Pull unit forward as far as possible.

H. Check and maintain level and wall batter. Do not use shims.

I. Clean the top of each course before setting additional courses.

J. At the end of each day's operation, slope the backfill away from the wall to direct runoff of rainwater away from the wall face.
   1. Do not allow surface runoff from adjacent areas to enter the wall construction site.

3.4 WALL CAP INSTALLATION

A. Provide a permanent connection between the wall cap and the top course of the wall units. Construct according to the Wall Company's drawings and specifications.
   1. Use a urethane or polyurethane adhesive which is specifically described as forming an excellent bond with concrete and masonry materials.
      a. Minimum tensile stress of 225 psi (ASTM D412).
      b. Minimum elongation of 600% (ASTM D412).

B. Clean and apply exterior concrete cap adhesive to top course of wall units before placement of cap unit.

C. Trim sides of interior cap units to insure proper fit of wall cap. Do not leave cut surfaces exposed to view in the finished wall.

D. Fill and compact soil to finished grade.

END OF SECTION

March 16, 2011

SECTION 02845S

MEDIAN REFLECTORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials and construction requirements for median reflectors.

1.2 RELATED SECTIONS Not Used

1.3 REFERENCES Not Used

1.4 DEFINITIONS Not Used

1.5 SUBMITTALS

A. Submit manufacturer's specifications and product information to Engineer for approval prior to ordering median reflectors.

PART 2 PRODUCTS

2.1 MEDIAN REFLECTOR

A. Use a reflector product that is designed for use as a raised pavement marker that will not break or detach from the surface under normal traffic loading conditions.

B. Use a product that provides adequate retroreflectivity to be easily seen by approaching traffic in all approaching lanes. Use yellow reflectors.

2.2 CONSTRUCTION ADHESIVE

A. Use construction adhesive that meets the recommendation of the reflector manufacturer. Adhesive should create a permanent bond with the concrete curb surface that will not become dislodged under normal roadway conditions including rain, snow, and ice.

PART 3 EXECUTION

3.1 MEDIAN REFLECTOR

A. Place median reflectors per manufacturer's recommendations.

B. Place median reflectors so that reflectors are aligned with the direction of oncoming lanes in both directions.

C. Install reflectors within one foot of the object marker signs on the ends of the raised medians between the plowable end sections and the signs, then install reflectors at even spacing along raised median curbing with a maximum spacing of 50 feet and a minimum spacing of 40 feet.

D. Place two additional pavement markers at intersecting streets and driveways spaced 12 inches apart located at approximately the center of the approaching lane of the cross street. Align these reflectors toward the cross street approaching traffic

END OF SECTION

July 13, 2016

SECTION 02871S

SOIL NAIL RETAINING WALLS

Add Section 02871:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Requirements for the design and construction of permanent soil nail retaining walls.

B. All labor, materials, and equipment to complete the work, including the following:
1. Excavate in staged lifts
2. Drill soil nail drill holes
3. Install soil nail bars with centralizers
4. Grout soil nails
5. Supply and install specified drainage features
6. Supply and install bearing plates, washers, nuts, and other required hardware
7. Construct the initial and final soil nail wall facing.

C. Monitoring and control of deformations of the soil nail wall, surrounding ground, utilities, and other facilities existing at the time of construction.

D. Requirements for verification and proof tests including, load schedules, expected soil grout bond strengths, frequency of tests, and testing equipment.

1.2 RELATED SECTIONS

A. Section 02342S: Shotcrete

B. Section 03055: Portland Cement Concrete

C. Section 03211: Reinforcing Steel

D. Section 05120: Structural Steel

1.3 REFERENCES

A. AASHTO M 31: Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

B. AASHTO M 85: Portland Cement

C. AASHTO M 111: Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

D. AASHTO M 232: Zinc Coating (Hot-Dip) on Iron and Steel Hardware

E. AASHTO M 252: Corrugated Polyethylene Drainage Pipe

F. AASHTO M 270: Structural Steel for Bridges

G. AASHTO T 106: Compressive Strength of Hydraulic Cement Mortar

H. ACI 506.2: Specification for Shotcrete

I. ASTM A 615: Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

J. ASTM A 722: High-Strength Steel Bars for Prestressed Concrete

K. ASTM A 775: Epoxy-Coated Steel Reinforcing Bars

L. ASTM C 33: Concrete Aggregates

M. ASTM C 109: Compressive Strength of Hydraulic Cement Mortars

N. ASTM C 642: Density, Absorption, and Voids in Hardened Concrete

O. ASTM D 1621: Compressive Properties of Rigid Cellular Plastics

P. ASTM D 1784: Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds

Q. ASTM D 1785: Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120

R. ASTM D 3034: Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings

S. ASTM D 4285: Indicating Oil or Water in Compressed Air

T. ASTM D 4380: Density of Bentonitic Slurries

U. ASTM D 4716: Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head

V. FHWA Geotechnical Engineering Circular No. 7: Soil Nail Walls - Reference Manual, Report No. FHWA-NHI-14-007, February 2015 (FHWA GEC7)

1.4 DEFINITIONS

A. Soil Nail Bar: Generic term referring to a reinforcing bar grouted into a drilled hole installed in the ground.

B. Soil Nail Retaining Wall: An earth-retaining structure built from the top down in existing ground using steel reinforcement grouted into the ground to reinforce the earth adjacent to the excavation with a reinforced shotcrete facing.

C. Soil Nailing Work: Includes, but is not limited to, excavation according to the phasing shown in the Contractor's accepted plans; drilling soil nail holes to the specified length and orientation; providing, placing, and grouting soil nail bars into the drill holes; testing installed bars; installing wall drainage elements; placing shotcrete reinforcement, applying shotcrete facing over the reinforcement; attaching bearing plates and nuts; conducting soil nail testing; placing the final structural and architectural facing, and installing instrumentation.

D. Soil Nail Designer: Professional Engineer licensed in the State of Utah having the required experience in design of soil nail walls, and retained by the Design-Builder to design the soil nail wall system and provide soil nail design services during construction of the system.

E. Solid Bar Soil Nail (SBSN): Soil nail with solid steel reinforcing bar, installed by placing bar in a drilled hole then grouted.

F. Hollow Bar Soil Nail (HBSN): Hollow core and self-drilling bar advanced into the soil by drilling with a sacrificial bit as grout is injected through the bar.

G. Facing and Wall Drainage Work: Includes, but is not limited to, furnishing all materials and labor necessary for placing and securing geocomposite drainage material, connection pipes, footing drains, weep holes, and horizontal drains, drainage gutter, permanent facing, leveling pads, and connectors, and free-draining granular backfill.

H. Working Drawings: Plans produced by the Contractor that supplement the contract plans to provide information not included in the contract documents, but that is required to fabricate, erect, transport or temporarily support the structure or structural elements in the completion of the work.
   1. Working drawings do not supersede the contract plans.

I. Bird's Beak: The spaces above the bottom elevations of the inclined drill hole openings at the face of the wall after grout placement.

1.5 SUBMITTALS

A. Submit all soil nail working drawings and other design and construction submittals outlined below to the Design-Builder's Structural and Geotechnical Engineers, as well as to the Department.
   1. Where the requirements below indicate that a submittal is for approval, obtain the written approval of the Design-Builder's Structural and Geotechnical Engineers prior to proceeding with the work.
   2. In all cases, address to the Engineer's satisfaction any comments provided by the Department, prior to proceeding with the work.

B. At least 30 days before the planned start of wall excavation, submit for approval the Soil Nail Contractor Qualifications, including:
   1. The company name.
   2. List of at least three projects in the last five years demonstrating successful construction of permanent soil nail retaining walls totaling at least 10,000 ft^2 of wall face area and at least 500 permanent soil nails. Include the following for each project:
      a. Project name and location.
      b. Owner's name and current phone number.
      c. A brief description of the scope of work and approximate date of the project completion.
      d. List of any planned subcontractors for design or construction.
   3. List of the following personnel and their experience with permanently anchored or nailed structures:
      a. Supervising engineer
      b. Drill operators
      c. On-site supervisors assigned to the project.
   4. Written documentation of the shotcrete finisher's and nozzlemen's qualifications including proof of ACI Shotcrete Nozzleman certification for approval at least seven days before beginning wall excavation.
   5. Use only those individuals meeting experience requirements for this project.

a. Do not substitute for these individuals without written approval.
b. Suspend soil nailing work if the Contractor substitutes unapproved project personnel for approved personnel.
c. Contractor is fully liable for all additional costs and schedule impacts resulting from work suspension due to substitution of unapproved personnel.

C. At least 30 days before planned start of wall excavation, submit for approval the Soil Nail Designer Qualifications, including:
1. The company name.
2. List of at least three projects in the last five years demonstrating successful design of permanent soil nail retaining walls, including:
   a. Project names and locations.
   b. Owner's names and current phone numbers.
   c. Brief descriptions of the scope of work and approximate completion dates for each project.
3. The name of the Soil Nail Designer and professional engineer licensing information.
4. Use only those individuals meeting experience requirements for this project.
5. Do not substitute for these individuals without written approval.
   a. Suspend work if Contractor substitutes unapproved project personnel for approved personnel.
   b. Contractor is fully liable for all additional costs and schedule impacts resulting from work suspension due to substitution of unapproved personnel.

D. Site Survey Information
1. Provide necessary survey and alignment control for the excavation of each lift, location of drill holes, and verification of limits of soil nail wall construction.
2. Establish a pre-excavation baseline by making not less than one set of readings two weeks prior to soil nail wall excavation.
   a. Survey equipment to be capable of resolving vertical settlements of as little as 0.08 inches and lateral deflections to 0.04 inches.
   b. All readings to reference a fixed point or benchmark that will remain unaffected by excavation or other construction activities.
   c. Continue readings for at least two months following the completion of soil nail wall.
   d. Submit a report of the readings within 24 hours of obtaining the readings.

E. Working Drawings

1. At least 21 calendar days before the planned start of wall excavation, submit for approval Detailed Soil Nail Wall Drawings..
2. Verify the limits of the wall and ground survey data before preparing drawings.
3. Include the following in the drawings:
    a. Details, dimensions, quantities, ground profiles, utilities, existing structures, and cross-sections necessary to construct the wall.
    b. Specifications for all materials, procedures, and quality control applicable to the construction of the soil nail walls.
    c. Specifications for sacrificial verification nail testing (minimum of two nails per wall) and for proof testing of production nails, along with necessary detail drawings for the proposed jacking support, framing, and bracing to be used.
4. Provide a plan view of each wall that identifies the following:
    a. A reference baseline and elevation datum.
    b. The offset from the construction centerline or baseline to the face of the wall at its base at all changes in horizontal alignment.
    c. Beginning and end of wall stations.
    d. Right-of-way and permanent or temporary construction easement limits.
    e. Locations of all known active and abandoned existing utilities/structures or other potential interferences.
    f. The centerline of any drainage structure, sewer, or pipe behind, passing through, or passing under or over the wall.
    g. Details on how soil nail walls will avoid bridge abutment piles, if applicable.
    h. Limit of longest nails.
    i. Subsurface exploration logs, with locations shown on a plan view of the proposed wall alignment with appropriate reference base lines to fix the locations of the explorations relative to the wall.
5. Provide an elevation view of each wall that identifies the following:
    a. The elevation at the top of the wall, at all horizontal and vertical break points, and at least every 10 ft along the wall.
    b. Beginning and end of wall stations.
    c. The distance along the face of the wall to all steps in the wall base.
    d. Wall elevation view showing nail locations and elevations; vertical and horizontal nail spacing; and the location of wall drainage elements and permanent facing expansion/contraction joints (as required) along the wall length.
    e. Existing and finish grade profiles both behind and in front of the wall.

6. Include the following additional information and details:
   a. All necessary cross section(s) to construct the wall
   b. Elevations at the base of the wall and the top of leveling pads for casting CIP facing (if applicable).
   c. Design parameters and applicable codes.
   d. General notes for constructing the wall including construction sequencing or other special construction requirements.
   e. Horizontal and vertical curve data affecting the wall and wall control points. Match lines or other details to relate wall stationing to centerline stationing.
   f. A listing of the summary of quantities on the elevation drawing of each wall showing estimated square feet of wall face areas and other quantities.
   g. Soil nail wall typical sections including staged excavation lift elevations, wall and excavation face batter, nail spacing and inclination, nail bar sizes, and corrosion protection details.
   h. A typical detail of production and test nails defining the nail length, minimum drill hole diameter, inclination, and test nail bonded and unbonded test lengths.
   i. Details, dimensions, and schedules for all nails, reinforcing steel, wire mesh, bearing plates, headed studs, etc. and/or attachment devices for shotcrete.
   j. Details, dimensions, and schedules of all reinforcing steel including reinforcing bar bending details.
   k. Details and dimensions for wall appurtenances such as barriers, coping, drainage gutters, fences, etc.
   l. Details for terminating walls and adjacent slope construction.
   m. Method of soil nail corrosion protection.
   n. Facing finishes, color and architectural treatment requirements for permanent wall facing elements, if applicable.
7. Submit supporting engineering calculations, including the following:
   a. A written summary that describes the overall soil nail wall design.
   b. Applicable code requirements and design references.
   c. Design criteria including estimated soil shear strengths (friction angle and cohesion), unit weights, and ground-grout pullout resistances, steel resistances, shotcrete resistances, and nail drill hole diameter assumptions.
   d. Include data from any additional subsurface borings, laboratory work, or other subsurface data collected.
   e. Values and associated load factors used in design for pullout resistance, surcharges, soil/rock unit weights, nail head strengths, and strengths of steel, shotcrete, and concrete materials. Global stability and soil resistance/load factors used in LRFD verifications.

f. Design calculation sheets with the project number, wall location, designation, date of preparation, initials of designer and checker, and page number at the top of each page. Provide an index page with the design calculations.

g. An explanation of any symbols and computer programs used in the design.

h. Critical wall cross-section geometry including soil/rock strata and location, magnitude, and direction of slope or external surcharge loads, and piezometric levels (if applicable) with critical slip surface shown along with minimum calculated global stability soil factor of safety, and required nail lengths and strengths (nail bar sizes and grades) for each nail row.

i. Structural design calculations for wall facing and nail head/facing connections including consideration of facing flexural and punching shear strength, headed stud tensile strength, upper cantilever, minimum reinforcement ratio, cover and splice requirements.

j. Other design calculations including, but not limited to, soil nail wall stability at critical stages of construction under prevailing surcharge loads; external soil nail wall stability; and fill compaction criteria.

8. Prepare drawings according to the following:

a. Submit drawings electronically in PDF format. Use 11 x 17 inch sheets with a 1½ inch blank margin on the left edge. Place the following information in the title block in the lower right corner of each sheet:

1) State Project Designation
2) State Project Name
3) State Structure Number
4) Contractor, Fabricator, or Erector Name
5) Contractor, Fabricator, or Erector Drawing Number
6) Contractor, Fabricator, or Erector Sheet Number

b. Revise and resubmit drawings when directed by the Design-Builder's Engineers or when necessary to address Department comments.

c. Provide the seal of a PE or SE licensed in the State of Utah.

9. Prepare engineering calculations according to the following:

a. Submit calculations electronically in PDF format. Use 8½ x 11 inch sheets with a 1-inch blank margin on the left edge or 11 x 17 inch sheets with a 1½ inch blank margin on the left edge. Title block location is at the top of 8½ x 11 inch sheets or the lower right corner of 11 x 17 inch sheets. Place the following information in the title block:

1) State Project Designation
2) State Project Name
3) State Structure Number

4) Contractor, Fabricator, or Erector Name
5) Contractor, Fabricator, or Erector Drawing Number
6) Contractor, Fabricator, or Erector Sheet Number

b. Provide the seal of a PE or SE licensed in the State of Utah on the cover sheet of all engineering calculations.

c. Certify that engineering calculations have been checked according to the Department QC/QA Procedures.

10. Allow at least 14 calendar days for review and approval of working drawings and supporting calculations.

a. This review period applies each time the drawings and calculations are submitted.

11. Do not deviate from the approved drawings unless the deviation is recommended in writing by the Soil Nail Designer and authorized by the Engineer.

a. Assume the responsibility for costs incurred due to faulty detailing or fabrication.

b. Revise the drawings when plan dimensions are revised due to field conditions or for other reasons.

F. Submit As-Built Drawings within 30 days after completion of the work.

1. Provide the locations of the nails in the top row for each wall. Include Northings, Eastings, elevation, azimuth, and inclination (to the nearest 0.1 inch and 0.5 degrees).
2. Include survey datum.
3. Provide revised design calculations signed and sealed by a PE or SE licensed in the State of Utah for all design changes made during the construction of the wall.

G. At least 21 days before beginning wall excavation, submit for approval the Construction Plan, including the following:

1. Project start date and proposed detailed wall construction sequence and phasing plan.
2. Proposed methods to contain grout, shotcrete, and void-filling materials within the project area and the UDOT ROW.
3. Proposed drilling methods, equipment, and drill hole diameters.
4. Proposed methods of soil nail installation.
5. Shotcrete wet or dry-mix methods and procedures for placing shotcrete.
6. Monitoring and instrumentation plan indicating how the wall facing will be surveyed daily to monitor displacements. Include locations of measurement points and frequency and methods of measurement.
7. Procedures for placing nail grout, grout quality control plan, and equipment.

H. At least 14 days before beginning wall excavation, submit the following Equipment Calibration and quality control items:
   1. Calibration data for all testing equipment including load cells, test jacks, pressure gages, and grout pumps.
   2. Calibrations must have been performed by an independent testing lab within 60 days of the submittal date.
      a. Calibrate jack and pressure gage as a single unit.
      b. Include date tested, device identification number, and calibration results, certified with an accuracy of at least 2% of the applied certification loads by a qualified independent testing laboratory within 90 days of submittal.
      c. Testing may not be performed until the Design-Builder's Engineers approve the calibration reports.

I. Material Submittals
   1. Manufacturer's certificates of compliance, product data, specifications, and recommended installation instructions for furnished materials, including, but not limited to:
      a. soil nail bar ultimate strength
      b. soil nail bar yield strength
      c. welded wire reinforcement steel
      d. reinforcement steel
      e. couplers
      f. studded anchor plates
      g. epoxy coating
      h. encapsulation
      i. geocomposite drainage strip
      j. centralizers
      k. geotextiles
      l. prefabricated drain grates
   2. Nail grout mix design, including:
      a. Compressive strength test results, per AASHTO T106/ASTM C109, supplied by a qualified independent testing lab and verifying specified minimum 3-day and 28-day grout compressive strengths.
      b. Test nail grout at a frequency of no less than one test cube for every 50 cubic yards of grout placed.
         1) Report grout cube shrinkage.
         2) Provide grout cube test results within 24 hours of testing.
      c. For neat cement grout, include specific gravity test results of the fresh grout used for compressive testing.
   3. Shotcrete mix design with compressive strength test results.

J. Soil Nail Wall Verification and Proof Test Results
   1. Submit Verification and Proof test reports within 48 hours of the test.

2. Report failed Verification and Proof Nail test results immediately to the Engineer and the Soil Nail Designer, with the soil nail location, bonded and unbonded length, maximum load held, and the failure load.

K. Document the pre-construction condition of the site, existing structures and facilities before beginning any wall construction activity.
   1. During construction, observe the conditions above the soil nail wall on a daily basis for signs of ground movement in the vicinity of the wall.
   2. Immediately notify the Soil Nail Designer, the Design-Builder's Engineers, and the Engineer if signs of movement such as new cracks in structures, increased size of old cracks or separation of joints in structures, foundations, or paved and unpaved surfaces are observed.

L. Shotcrete production summary
   1. Prepare for each shift and submit within 24 hours.
   2. Include the following:
      a. Quantity and location of shotcrete applied including Sketches.
      b. Observations of success or problems of equipment operation, application, final product conditions, and any other relevant issues during production and application.
      c. Description of placement equipment.
      d. Batch number(s) if applicable

M. Shotcrete quality control records
   1. Submit field quality control test reports within 2 working days of performing the tests.
   2. Include the following:
      a. Sample identification, including mix design and test panel number and orientation.
      b. Date and time of sample preparation including sample dimensions.
      c. Date, time, and type of test.
      d. Complete test results including load and deformation data during testing, sketch of sample before and after testing, visual grade of cores, and any unusual occurrences observed.
      e. Names and signatures of people performing the test
      f. Location of steel reinforcement, if used, covered by shotcrete.
      g. Name of nozzle operator.

PART 2 PRODUCTS

2.1 SOIL NAILS AND HARDWARE

A. Provide fully threaded solid- or hollow-bars continuous with approved couplings, threaded to allow proper attachment of bearing plate, washer, and nut.
   1. SBSNs
      a. AASHTO M 31 Grade 75, or better, #7 solid threaded bar
   2. HBSNs
      a. Fully threaded hollow-steel tubing that serves as drilling steel, grout transfer medium, and reinforcing element of the soil nail.
      b. AASHTO M 31 Grade 75 or better, 0.60 in^2 minimum cross sectional area.
      c. Uniform elongation without necking $A_{gt} \geq 5\%$
      d. Minimum Charpy impact resistance of 40 Joules at -20 degrees C
      e. If required, provide bar couplers with seals or similar mechanism to ensure minimum grout loss and means of transferring percussive drilling forces.
      f. Select drill bits based on subsurface data and minimum grout column requirements, with a minimum of 2 ports for grout exit.

B. Provide bar couplings that develop the full nominal tensile capacity of the soil nail bar as certified by the manufacturer.

C. Provide the following corrosion protection methods:
   1. For SBSNs, use fusion-bonded epoxy-coated bars with 0.012 to 0.017 inch coating thickness.
      a. Conform to ASTM A775 but omit bend test requirements.
      b. The design may omit coating at the wall anchorage end over the length provided for threading the nut against the bearing plate.
      c. Zinc galvanized coating a minimum of 3.4-mil thick may be used in lieu of epoxy coating.
         1) Meet AASHTO M 111 for galvanized bars and AASHTO M 232 for galvanized hardware.
   2. For HBSNs, provide sacrificial steel in accordance with FHWA GEC 7.
   3. For all bars, provide at least 1.0 inch of grout cover between the soil nail bar and the surrounding soil.
   4. Store and protect all bars such that epoxy or galvanized coating and bar surface and threads are undamaged.

D. Centralizers
   1. For SBSNs, use centralizers manufactured from Schedule 20 or 40 PVC pipe securely attached to the soil nail bar with coated wire.
      a. Size centralizers to position the soil nail bar within 1.0 inch of the center of the drill hole
      b. Space centralizers no greater than 10 ft apart and 1.5 ft from the end of each nail.
      c. Use centralizers that allow tremie pipe insertion to the bottom of the hole, and to allow grout to freely flow up the hole.
   2. For HBSNs used in permanent applications, use steel centralizers attached to the bar in front of the couplings, at spacing no greater than 10 feet.

E. Provide nail grout consisting of neat cement or sand/cement mixture having a minimum 3-day compressive strength of 1,500 psi and a minimum 28-day compressive strength of 3,000 psi per AASHTO T 106, and specific gravity between 1.80 and 1.90.
   1. For SBSNs, use sand for grout and meeting requirements of ASTM C33.
   2. For HBSNs, do not use sand in the nail grout mix.
   3. Use Type II Portland Cement meeting AASHTO M 85.
   4. Admixtures may be used to control bleed, improve flowability, reduce water content, and/or retard set as specified in the accepted submittals.
      a. Use only admixtures that are compatible with the grout and mixed according to the manufacturer's recommendations.
      b. Do not use accelerators.
   5. Do not add water to grout conforming to the mix design to improve workability.
   6. Test grout specific gravity with a mud balance according to the procedure in ASTM D4380.
      a. Comply with any requests by the Engineer to test the grout with a mud balance at any time, particularly if the specific gravity appears to be less than 1.80.

2.2 SHOTCRETE

A. Use shotcrete conforming to Section 02342S.
   1. Produce shotcrete by either a wet-mix or dry-mix process.
   2. Apply shotcrete in one or more layers, pneumatically projected through a hose at high velocity against a prepared surface.

2.3 CONCRETE

A. Class AA(AE). Refer to Section 03055.

2.4 REINFORCING STEEL AND WELDED WIRE

A. Refer to Section 03211.

2.5 GEOCOMPOSITE DRAIN STRIP

A. Use a drainage strip consisting of a drainage core (e.g., geonet) and an attached or encapsulating filtration geotextile, with the drainage core meeting the following:
   1. At least 85% by mass polypropylenes, polyester, polyamine, polyvinyl chloride, polyolefin, or polystyrene.
   2. Compressive strength of at least 40 psi in accordance with ASTM D1621 Procedure A.
   3. Flow rate of at least 0.1 gallons per second per foot of strip width under a gradient of 1.0 tested in accordance with ASTM D4716.

B. Use Miradrain 6000, Amerdrain 500, or equivalent geocomposite drainage strip recommended by the Soil Nail Designer and accepted by the Engineer.

C. Provide drainage geotextile and geocomposite drain strips in rolls wrapped with a protective covering and labeled to identify the production run.
   1. Store/stockpile geotextiles and geocomposites in a manner which protects the fabric from mud, dirt, dust, debris, and shotcrete rebound.
   2. Do not remove the protective wrapping until immediately before material is installed.
      a. Avoid extended exposure to ultraviolet light.

2.6 UNDERDRAIN ELEMENTS

A. Use underdrain and perforated pipe meeting requirements of ASTM D1785 Schedule 40 PVC solid and perforated wall; cell classification 12454-B or 12454-C, wall thickness SDR 35, with solvent or elastomeric joints

B. Use fittings for underdrain and perforated pipe meeting requirements of ASTM D3034, cell classification 12454-B or 12454-C, wall thickness SDR-35, with solvent or elastomeric joints.

2.7 STUDDED ANCHOR PLATES

A. AASHTO M270, Grade 36. Refer to Section 05120.

B. Galvanize after fabrication according to AASHTO M 111.

2.8 ARCHITECTURAL SURFACE FINISH

A. Cast-in-place concrete or pre-cast concrete panels with formed surface texture meeting the project aesthetics plan.

2.9 EQUIPMENT

A. Equipment for mixing and placing grout shall have the following characteristics.
   1. Mix grout with a high-shear colloidal mixer with separate holding tank and water and cement dosing system to ensure continuous grouting independent from mixing.
   2. Minimum grout pump flow rate 15 gpm for bars < 2 inch diameter and 45 gpm for bars ≥ 2 inch diameter.
   3. Minimum grout pump pressure capability of 250 psi in sands/gravels and 1,500 psi in clays/silts.

B. For dry-mix shotcrete, provide a water storage tank at the job site and a positive displacement pump with regulating valve that is accurately controlled to provide water at the pressures and volumes recommended by the delivery machine manufacturer.

C. Use equipment capable of handling and applying shotcrete containing the specified maximum size aggregate and admixtures.

D. Provide and air hose and blow pipe to clear dust and rebound during shotcrete application.

E. Use an air supply system capable of supplying the delivery machine and hose with air at the pressures and volumes recommended by the machine manufacturer.
   1. Do not use air supply systems that are incapable maintaining constant air pressure or deliver oil-contaminated air measured as described in ASTM D 4285.

F. Use a shotcrete delivery machine capable of supplying material to the delivery hose at a uniform rate.
   1. The ejection from the nozzle must adhere to the treated surface with minimum rebound and maximum density when the nozzle is held in the range of 3-6 ft from the target surface.

PART 3 EXECUTION

3.1 SOIL NAIL WALL GENERAL REQUIREMENTS

A. Design and construct permanent soil nail retaining walls at the locations shown on the drawings.

B. Perform additional exploration and testing to supplement the Department-provided geotechnical data as deemed appropriate to complete final design.

3.2 SOIL NAIL WALL DESIGN REQUIREMENTS

A. Design the soil nail walls using the LRFD procedures contained in FHWA GEC 7.

B. Account for applicable traffic and construction equipment surcharge loads in the design.

C. Extend shotcrete and permanent facing at the toe of the walls to at least 2 ft below the finished grade at front face of wall at all points.

D. Provide a total reinforced structural concrete facing thickness of at least 10 inches, including initial shotcrete and final cast-in-place concrete facing (if used), but excluding precast facing panels and architectural relief.
   1. At a minimum, provide reinforcement in the structural concrete wall face consisting of No. 4 bars at 12-inch spacing in both directions.
      a. Supplement this minimum reinforcing with additional bars or with wire mesh as required by the design.

E. Provide expansion joints and contraction joints at appropriate intervals for the wall design, as specified in FHWA GEC 7.

F. Locate the top row of nails within 2 ft of the top of the wall.

G. Arrange soil nails so that the distance between the lower course of nails and the average base of the wall is less than two thirds of the average vertical nail spacing.

H. Provide a minimum design life of 75 years for the soil nail walls and all components, and include supporting data and calculations in the design submittal.

I. Perform the soil nail design to consider the locations of existing utilities or obstructions in the area of construction.

J. Wall locations and wall batter angles are shown on the plans.

1. The minimum permissible wall facing batter for the soil nail design is 2 degrees.

K. Provide backwall drainage through weep holes.
   1. Transmit backwall drainage down the wall through geotextile drainage mats.
   2. Drainage from multiple mats may be collected and conveyed to a single weep hole if the conduit is appropriately sized.

L. Include provisions to prevent concentrated flow over the top surface of the walls.

M. Design all soil nail walls to withstand seismic ground shaking having a 3% probability of exceedance in 75 years.

3.3 SOIL NAIL WALL CONSTRUCTION REQUIREMENTS

A. Excavation
   1. Do not exceed the short-term ground stand-up height or a distance equal to the vertical nail spacing plus the required reinforcing lap distance, whichever is less, for the exposed unsupported excavation face height.
      a. Flash coat exposed surface with up to 1” of shotcrete as required to maintain cut face stability where recommended by the Soil Nail Designer.
   2. Excavate the final wall excavation line and apply shotcrete during the same work shift, unless otherwise approved.

B. Soil Nail Installation
   1. Provide a soil nail length necessary to develop the load capacity and satisfy acceptance criteria for the required design load.
   2. Place soil nail drill holes at the locations, elevations, orientations, and lengths shown on the plans.
   3. Use drilling methods and equipment that are suited to the ground conditions and in accordance with the submittals.
   4. Use cased drilling methods or other suitable means to support the sides of the drill holes if needed.
   5. Replace soil nail bars exhibiting abrasions, cuts, welds, weld spatter, corrosion, or pitting.
   6. Replace or repair soil nail bars exhibiting damage to epoxy coating at no additional cost.
   7. Inspect epoxy coating on soil nail bars before insertion into the drill hole.

C. Install Soil Nails
   1. Conform to stationing and horizontal spacing shown on the plans.

2. Install top row of nails no more than 2 feet vertically from the design elevation of the finished soil nail retaining wall elevation.
   a. Install subsequent rows at a maximum 4 feet vertical spacing under the bridge structure and under median, and a maximum 5 feet vertical spacing elsewere.
3. Install bottom row of nails a minimum of 2 feet and a maximum of 3 feet above the bottom of the excavation.
4. Eliminate bottom row of nails where second row from bottom is within 2 feet of the bottom of the excavation.
5. Horizontally stagger every other row of each column of nails midway between nail columns.
   a. Maintain maximum horizontal spacings noted on plans.
6. Place soil nail bars within 6 inches of layout in any direction
7. Install nails to the lengths shown on the plans.
8. Maintain nail vertical inclination within 2 degrees of the inclination shown on plans.
9. Nails may be splayed up to 10 degrees horizontally to avoid obstructions such as piles, drainage features, utilities, etc.
   a. Note location of splayed nails and reason for splay on working drawings.
10. Inform the Soil Nail Designer and the Engineer immediately if nails cannot be installed at plan locations.
    a. Resolve conflicts as recommended in writing by the Soil Nail Designer after receiving authorization from the Engineer.

D. Grouting
1. Grout the drill hole after installation of the soil nail bar and within 2 hours of completing drilling.
2. Inject grout at the lowest point of each drill hole through a hollow bar soil nail, grout tube, casing, hollow-stem auger, or drill rods.
3. Place the outlet end of the grout delivery tube below the surface of the grout as the conduit is withdrawn to prevent the creation of voids.
4. Fill the drill hole in one continuous operation.
   a. Do not allow cold joints in the grout column except at the top of the test-bond length of proof-tested production nails.
5. For hollow-bar soil nails, use a high-shear colloidal mixer with a separate holding tank capable of continuous grouting that is independent from mixing.
   a. Minimum pump flow rate of 15 gpm.
6. Consider the hollow bar soil nails to be completed when the final grout returns to the excavation face, signaling that drilling spoils have been removed.
7. Fill bird's beaks with additional grout after placing a temporary cover in front of the drill hole.
   a. Alternatively, fill bird's beaks with shotcrete.

E. Soil Nail Testing

1. General
   a. Conduct verification tests on sacrificial nails at locations shown on the Nailing Pattern sheets in the plans.
   b. Perform proof testing on production soil nails.
      1. Test at least 5 percent of production soil nails, and
      2. Test no fewer than one production nail per row on each soil nail wall, and distribute the locations of proof tests evenly across the vertical and horizontal extent of the wall face.
   c. Perform testing at any nail after the nail grout and shotcrete facing have cured for at least 72 hours, or have attained their specified 3-day compressive strength.
   d. Do not apply loads greater than 80% of the minimum guaranteed ultimate tensile strength of the soil nail bar for Grade 150 bars, or 90% of the yield strength of the soil nail bar for minimum Grade 75 bars.
   e. Calculate nominal pullout resistance per unit length of soil nail utilizing a bond strength q_u of 16psi.
      1. Alternately calculate the design load DL based on the allowable design soil-grout adhesion bond strength of 8psi.
   f. Use Verification and Proof test nails having a minimum 3 feet unbonded length.
      1. Clean out the hollow bar unbonded length after bar installation.
      2. Placing a PVC pipe bond breaker without cleanout will not be sufficient to provide unbonded length.
   g. Measure and verify void for unbonded length prior to testing.
   h. Provide Verification test nails having a minimum 10-ft bonded length and Proof test nails having a minimum of 10 feet bonded length, unless tests are performed on production nails less than 12 feet in length.
2. Equipment
   a. Provide testing equipment including dial gages, dial gage support, jack and pressure gage, load cell, and a reaction frame as shown on plans.
   b. Use a pressure gage with a maximum graduation of 50 psi or use calibrated load cell for load steps.
   c. Support dial gages on a frame that is independent from the jacking and the wall.
   d. Measure nail head movement with at least 2 dial gages capable of measuring to 0.001 inch
3. Verification Testing

a. Perform the 2 verification tests per wall at locations shown on the plans.
b. Conduct on sacrificial nails prior to installation of production soil nails in order to confirm the appropriateness of the Contractor's drilling and installation methods and validate the design nail pullout resistance.
c. Conduct on nails of the same design and constructed with the same methods to be used on production nails.
d. Perform verification tests on soil nails with a known bonded length and a measured unbonded length.
e. Select a bonded length, L_{BVT}, as follows:
   1. Select L_{VBTmax}

      For Grade 75 or better, and other mild steel in accordance with ASTM A615, calculate the maximum length, L_{BVTmax} as

$$L_{BVT\max} = \frac{A_t \times f_y \times C_{RTY}}{r_{PO}} \qquad \text{EQ1}$$

      For Grade 150 and other high strength steel in accordance with ASTM A722, calculate the maximum length as

$$L_{BVT\max} = \frac{A_t \times f_u \times C_{RTU}}{r_{PO}} \qquad \text{EQ2}$$

      Where:

      C_{RTY} = reduction coefficient for mild-grade steel = 0.9
      C_{RTU} = reduction coefficient for high-grade steel = 0.8
      At = cross-sectional area of the test soil nail bar
      f_y = nominal yield resistance of test soil nail bar (mild steel)
      f_u = minimum ultimate tensile strength of test soil nail bar (high-strength steel)
      r_{PO} = nominal pullout resistance per unit length of soil nail = $\pi \times q_u \times D_{DH}$
      q_u = bond strength
      D_{DH} = drill hole diameter

   2. If LVBTmax > 10 ft, 10 ft ≤ LVBT ≤ LVBTmax

3. If LVBTmax < 10 ft, LVBT = 10 ft, increase the test soil nail bar size as needed, and recalculate LVBTmax until LVBTmax > 10 ft.

4. Calculate the maximum load during the verification test, defined as the Verification Test Load (VTL), as follows:

$$VTL = L_{BVT} \times r_{PO} \qquad \text{EQ3}$$

f. Conduct verification tests by incrementally loading verification test nails to pullout or a maximum test load VTL in accordance with the loading schedule presented in Table 1.

g. Record soil nail movements at each load increment and at each time step. Zero dial gages after the alignment load (AL) has been applied.

h. Optionally, load verification test nails beyond VTL. After applying VTL, reduce loading to the AL and record the permanent set. Hold each load increment for at least 10 minutes.

i. Monitor the verification test nail for creep at a load of 0.75 VTL. Measure and record nail movements during the creep portion of the test in increments of 1 minute, 2, 3, 5, 6, 10, 20, 30, 50, and 60 minutes. Maintain the load during the creep test to within 2% of the intended load by using a load cell. Repump jack as needed to maintain load during hold times.

j. Optionally, perform stepped unloading. Consider between 1 to 7 intermediate steps in stepped unloading. If performed, hold each load step until gage readings are stable.

Table 1

Verification Test Loading Schedule		
Load	**Load**	**Hold Time (minutes)[2]**
AL	AL[1]	1
0.25DL	0.13 VTL	10 (record soil nail head movement at 1, 2, 5, 6, 10)
0.5DL	0.25 VTL	10 (record soil nail head movement at 1, 2, 5, 6, 10)
0.75DL	0.38 VTL	10 (record soil nail head movement at 1, 2, 5, 6, 10)
1.0DL	0.50 VTL	10 (record soil nail head movement at 1, 2, 5, 6, 10)
1.25DL	0.63 VTL	10 (record soil nail head movement at 1, 2, 5, 6, 10)
1.5DL	0.75 VTL (Creep Test)	10 (record soil nail head movement at 1, 2, 5, 6, 10, 30, 50, 60)

1.75DL	0.88 VTL	10
2.0DL	1.00 VTL	10
AL	AL	1[3]

[1]AL = 0.025 VTL or 0.05DL
[2]Measure soil nail head movement after each load increment has been achieved and at each indicated time step
[3]Record permanent soil nail movement

4. Proof Testing
   a. Demonstrate successful proof testing on at least 5% of production soil nails in each nail row or a minimum of one per row.
   b. Do not count verification tests towards the minimum of 5% of production nails.
   c. Perform proof tests on soil nails with a known bonded length and a measured temporary unbonded length.
   d. Select a bonded length (L_{BPT}) for the proof tests such that L_{BPT} is 10 ft or L_{BPTmax}, whichever is smaller.
   e. For Grade 75 or better, and other mild steel in accordance with ASTM A615, calculate the maximum length L_{BPTmax} as

$$L_{BPT\,\max} = \frac{A_t \times f_y \times C_{RTY}}{r_{PO} \times 0.75} \qquad \text{EQ4}$$

   f. For Grade 150 and other high strength steel in accordance with ASTM A722, calculate the maximum length L_{BPTmax} as

$$L_{BPT\,\max} = \frac{A_t \times f_u \times C_{RTU}}{r_{PO} \times 0.75} \qquad \text{EQ5}$$

   g. Allow for bond lengths less than 10 ft for production proof nails shorter than 12 ft.
   h. Do not proof test fully grouted nails
   i. Calculate the maximum load for proof tests, defined as the Proof Test Load (PTL), as follows:

$$PTL = L_{BPT} \times r_{PO} \times 0.75 \qquad \text{EQ6}$$

   j. Conduct proof tests by incrementally loading the proof test nail according to the test loading schedule in Table 2.
   k. Hold each load increment until stabilized and record soil nail movements at each load increment and time interval shown in Table 2.

l. Maintain all load increments to within 5% of the intended load. Repump jack as needed to maintain load during hold times.

m. Rezero dial gages after the alignment load is applied.

n. Perform creep tests at 1.00 PTL, beginning as soon as PTL is applied. Measure and record soil nail movement at 1 minute, 2, 3, 5, 6, and 10 minutes. If the nail movement measured between 1 minute and 10 minutes exceeds 0.04 inch, maintain the maximum test load for 50 additional minutes, and record soil nail movements at 20, 30, 50, and 60 minutes.

Table 2

Proof Test Loading Schedule		
Load	**Load**	**Hold Time (minutes)[3]**
AL[1]	AL[1]	1
0.25DL	0.17 PTL	Until movement stabilizes
0.5DL	0.33 PTL	Until movement stabilizes
0.75DL	0.50 PTL	Until movement stabilizes
1.0DL	0.67 PTL	Until movement stabilizes
1.25DL	0.83 PTL	Until movement stabilizes
1.5DL	1.0 PTL (Creep Test)[2]	10 (record soil nail head movement at 1, 2, 5, 6, 10)
AL	AL	1

[1]AL = alignment load ≤ 0.025 VTL or 0.05DL
[2]If soil nail movement measured between 1 and 10 minutes exceeds 0.04 inch, maintain PTL for 50 more minutes and record movements at 20, 30, 50, and 60 minutes. Record permanent soil movement.
[3]If the soils reinforced with nails are relatively susceptible to deformation or creep, hold each load increment for 10 minutes and record soil nail movement at 1, 2, 5, 6, and 10 minutes.

F. Soil Nail Test Acceptance Criteria

1. Verification test results: meet all of the following criteria:

a. The total creep movement is less than 0.08 inch between the 6- and 60- minute readings, and the creep rate is linear or decreasing throughout the creep test load hold period.

b. The total movement (ΔVTL) measured at VTL exceeds 80% of the theoretical elastic elongation of the unbonded length (L_{UB}) of the test nail, as depicted below in Equation 7.

$$\Delta VTL > 0.8 \frac{VTL \times L_{UB}}{E \times A_t} \qquad \text{EQ7}$$

Where: E = Young's Modulus of steel (29,000 ksi)

c. Pullout does not occur before achieving 0.1 x VTL

2. Proof test results
   a. Creep movement between the 1- and 10-minute readings is less than 0.04 inch.
   b. If creep movement exceeds 0.04 inch between the 1- and 10-minute readings, the creep movement between the 6- and 60-minute readings must be less than 0.08 inch, and the creep rate must be linear or decreasing throughout the creep test load hold period.
   c. The total soil nail movement (ΔPTL) measured at PTL exceeds 80% theoretical elastic elongation of the unbonded length, as depicted below in Equation 8:

$$\Delta PTL > 0.8 \frac{PTL \times L_{UB}}{E \times A_t} \qquad \text{EQ8}$$

   d. Pullout does not occur before the test load is 1.0 x PTL
   e. The temporary unbonded test length in proof tests is successfully maintained for subsequent satisfactory grouting. If the unbonded test length of production proof test nails cannot be satisfactorily grouted after testing, consider the proof nail to be sacrificial and replace with an additional production nail installed at no additional cost.

G. Soil Nail Test Rejection
   1. Verification Test Soil Nails
      a. Develop alternative design and/or installation methods recommended by the Soil Nail Designer, and install replacement verification test nails.
   2. Proof Test Soil Nails
      a. Provide the Soil Nail Designer's recommended resolution.
      b. The Engineer may require replacement of some or all installed production nails between a failed proof test nail and the adjacent passing proof test nail.
      c. Alternatively, the Engineer may require installation and testing of additional proof test nails to verify that adjacent previously installed production nails have sufficient nominal pullout resistance.

H. Wall Drainage
   1. Install and secure all elements of the soil nail wall drainage as shown on the drawings.

2. Wall drainage includes geocomposite drainage mat, PVC connection pipes, soil nail wall footing drains, and weep holes, as shown on the drawings.
3. Construct wall drainage to provide continuous and unrestricted flow to discharge water collected behind the wall face.
4. Excluding wall footing drains, construct all wall drainage elements prior to shotcreting.
5. Geocomposite drainage mats
   a. Center between columns of soil nails, as shown on the drawings.
   b. Minimum width = 12 inches
   c. Secure to the excavation face in a vertically continuous manner, with the geotextile side against the ground
   d. Prevent contamination of the geotextile with shotcrete.
6. Footing drains
   a. Install at the bottom of the wall, as shown on the drawings
   b. Envelop the footing drain aggregate and pipe with drainage geotextile such that they conform to the dimensions of the trench.
   c. Overlap the drainage geotextile on top of the drainage aggregate as shown on the drawings.
   d. Repair or replace damage drainage geotextile.

I. Shotcrete
1. Prepare shotcrete application surface according to the following:
   a. Prepare surface to line and grade.
   b. Clean loose material, mud, rebound, and other foreign matter.
   c. Remove curing compound on previously placed shotcrete surfaces by sandblasting.
   d. Install approved depth gages to indicate the thickness of shotcrete layers.
   e. Install depth gages on 6-ft centers longitudinally and transversely with at least 2 gages per increment of surface area to receive shotcrete.
   f. Moisten surfaces.
2. Place when ambient temperature is 40 degrees F or greater. Do not apply shotcrete during high winds or heavy rain. Protect and maintain shotcrete at a temperature above 40 degrees F until shotcrete has achieved a minimum strength of 750 psi.
3. Do not apply to frozen surfaces.
4. Use acceptable nozzle operators who have fabricated acceptable test panels for this project.
5. Apply dry-mix shotcrete within 45 minutes of batching. Apply wet-mix shotcrete within 90 minutes of batching.

6. Direct shotcrete at right angles to the receiving surface except when shooting ground reinforcing bars.
7. Apply in a steady and uninterrupted flow, in a circular fashion to build up the required layer thickness. If flow becomes intermittent, direct the flow away from the work area until it becomes steady.
8. Make the surface of each shotcrete layer uniform and free of sags, drips, or runs.
9. Limit the layer thickness of each shotcrete application to 2 inch. Thicker applications may be approved if the contractor can demonstrate that no sloughing or sagging is occurring. If additional thickness is required, broom or scarify the applied surface and allow the layer to harden. Dampen the surface before applying an additional layer.
10. Remove laitance, loose material, and rebound. Promptly remove rebound from the work area.
11. Taper construction joints to a thin edge over a distance of at least 1 ft. Wet the joint surface before placing additional shotcrete on the joint. Do not use square construction joints.
12. Install shotcrete final face finish using undisturbed gun finish as applied from the nozzle or a rod, broom, wood float, rubber float, steel trowel, or rough screeded finish as shown on the plans.
13. Where shotcrete is used to backfill bird's beaks position shotcrete nozzle into the mouth of the drillhole to completely fill the void.
14. Attachment of bearing plate and nut
    a. Attach a bearing plate, washers, and nut to each nail head as shown on the plans.
    b. Seat the bearing plate uniformly on the shotcrete while the facing is still plastic and before its initial set. Hand-wrench tighten the nut.
    c. Set the bearing plate in a bed of grout if needed to provide uniform contact between the plate and the shotcrete. Re-tighten the nut by hand with a wrench after the grout has set for 24 hours.
15. Refer to Table 3 for tolerances

Table 3

Construction Tolerances	
Item	**Tolerance**
Horizontal location of welded wire reinforcement, reinforcing bars, and headed studs	3/8 inch
Location of headed studs on bearing plate	¼ inch
Spacing between reinforcing bars	1 inch
Reinforcing lap	1 inch
Thickness of shotcrete if troweled or screeded	9/16 inch
Thickness of concrete if left as shot	1 1/8 inch
Planeness of finish surface, gap under 10-ft straight edge, if troweled or screeded	9/16 inch
Planeness of finish surface, gap under 10-ft straight edge, if left as shot	1 1/8 inch
Nail head bearing plate deviation from parallel to wall face	10 degrees

16. Do not place welded wire reinforcement directly against the soil. Place welded wire reinforcement in a manner to provide a minimum of 1 inch of shotcrete cover between the soil and the welded wire reinforcement.
17. Provide shotcrete test cores both from preconstruction test panels, construction test panels, and if needed from the constructed wall face. Conduct shotcreting and coring of test panels and the wall face using qualified personnel in the presence of the Engineer according to ACI 506.2. Refer to Section 02342S.
18. Deliver, store and handle materials in a manner that will prevent contamination, segregation, corrosion or damage.

END OF SECTION

August 3, 2016

SECTION 02924S

NOXIOUS WEED CONTROL

Add Section 02924:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Controlling the introduction and spread of noxious weeds on construction projects.

1.2 RELATED SECTIONS Not Used

1.3 REFERENCES

A. Utah Noxious Weed Act, Utah Administrative Code (UAC) Rule R68-9

1.4 DEFINITIONS

A. Noxious weeds subject to control are those identified on Utah Noxious Weed Act and County Declared Noxious Weed List which are currently found growing within the project location.

B. Refer to the Section, article 3.3 for a list of the Utah State Noxious Weeds (Table 1) and the County Declared Noxious Weeds (Table 2).

1.5 SUBMITTALS Not Used

1.6 PAYMENT PROCEDURES

A. Include payment for cleaning earth-moving construction equipment under mobilization.

B. Pay for the control of noxious weeds using pre-emergent, selective, and non-selective herbicides by the unit area.

1.7 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Follow all regulatory, application, and safety precautions listed by the herbicide manufacturer.
   2. Apply herbicides using only state licensed pesticide applicators.

1.8 SEQUENCING

A. Clean all earth-moving equipment before bringing them on the project.

B. Treat existing noxious weeds 10 days before starting earthwork operations.

PART 2 PRODUCTS

2.1 HERBICIDE

A. Refer to this Section, article 3.3 for a list of noxious weeds subject to control and the recommended herbicide for each species.

B. Use commercially available herbicides specified to control the noxious weed species identified.

PART 3 EXECUTION

3.1 PREPARATION

A. Use high-pressure water blasting or steam cleaning methods to clean all earth-moving construction equipment (scrapers, bulldozers, excavators, backhoes, trenchers) of dirt, mud, and seed residue before initially entering the project.

3.2 EXAMINATION

A. Verify and locate all noxious weeds on the project. Coordinate with Engineer if assistance is needed for identification.

3.3 CONTROLLING NOXIOUS WEEDS

A. Spray noxious weeds located within the project limits before starting earth disturbing activities and if they appear during construction. Use appropriate herbicides and recommended rates to control spread of noxious weeds (See Noxious Weed Tables 1 and 2 below). Apply herbicide as directed on the manufacturer's label.

B. State of Utah and County Declared Noxious Weed Tables:

Table 1 – State of Utah Noxious Weed List

Class 1A: Early Detection Rapid Response (EDRR) – Watch List Declared noxious and invasive weeds not native to the state of Utah and not known to exist in the State that pose a serious threat to the state and should be considered as a very high priority.		
Common Name	***Scientific Name***	**Herbicide** (Active Ingredient)
Common crupina	*Crupina vulgaris*	aminocyclopyrachlor + chlorsulfuron
African rue	*Peganum harmala*	glyphosate, imazapyr or metsulfuron
Small bugloss	*Anchusa arvensis*	2,4-D + dicamba
Mediterranean sage	*Salvia aethiopis*	2,4-D, clopyralid or picloram
Spring millet	*Milium vernale*	2,4-D
Syrian beancaper	*Zygophyllum fabago*	glyphosate, imazapic, picloram or metsulfuron
Ventenata (North Africa grass)	*Ventenata dubia*	imazapic or sulfosulfuron
Plumeless thistle	*Carduus acanthoides*	Clopyralid or 2,4-D
Malta starthistle	*Centaurea melitensis*	Aminopyralid, 2,4-D, clopyralid or dicamba
Class 1B: Early Detection Rapid Response (EDRR) Declared noxious and invasive weeds not native to the State of Utah that are known to exist in the state in very limited populations and pose a serious threat to the state and should be considered as a very high priority.		
Common Name	***Scientific Name***	**Herbicide** (Active Ingredient)
Camelthorn	*Alhagi maurorum*	2,4-D or dicamba
Garlic mustard	*Alliaria petiolata*	glyphosate
Purple starthistle	*Centaurea calcitrapa*	picloram or clopyralid
Goatsrue	*Galega officinalis*	2,4-D, dicamba or metsulfuron
African mustard	*Brassica tournefortii*	glyphosate, 2,4-D, or triclopyr
Giant reed	*Arundo donax*	glyphosate, triclopyr, or imazapyr
Japanese knotweed	*Polygonum cuspidatum*	dicamba

Blueweed (Vipers bugloss)	*Echium vulgare*	2,4-D amine
Elongated mustard	*Brassica elongata*	metsulfuron or chlorsulfuron
Common St. Johnswort	*Hypericum perforatum*	2,4-D or metsulfuron
Ox-eye daisy	*Chrysanthemum leucanthemum*	dicamba, picloram or clopyralid
Cutleaf vipergrass	*Scorzonera laciniata*	2,4-D

Class 2: Control

Declared noxious and invasive weeds not native to the state of Utah, that pose a threat to the state and should be considered a high priority for control. Weeds listed in the control list are known to exist in varying populations throughout the state. The concentration of these weeds is at a level where control or eradication may be possible.

Common Name	*Scientific Name*	**Herbicide** (Active Ingredient)
Leafy spurge	*Euphorbia esula*	dicamba or picloram
Medusahead	*Taeniatherum caput-medusae*	glyphosate
Rush skeletonweed	*Chondrilla juncea*	picloram, clopyraid or 2,4-D
Spotted knapweed	*Centaurea maculosa*	2,4-D + dicamba, picloram or clopyralid
Purple loosestrife	*Lythrum salicaria*	glyphosate (aquatic label)
Squarrose knapweed	*Centaurea virgata*	2,-4D, dicamba or picloram
Dyer's woad	*Isatis tinctoria*	2,4-D + dicamba or chlorsulfuron
Yellow starthistle	*Centaurea solstitialis*	picloram or clopyralid
Yellow toadflax	*Linaria vulgaris*	picloram
Diffuse knapweed	*Centaurea diffusa*	2,4-D + dicamba, picloram or clopyralid
Black Henbane	*Hyoscyamus niger*	picloram + metsulfuron
Dalmation toadflax	*Linaria dalmatica*	imazapic or picloram

Class 3: Containment

Declared noxious and invasive weeds not native to the State of Utah that are widely spread. Weeds listed in the containment noxious weeds list are known to exist in various populations throughout the state. Weed control efforts may be directed at reducing or eliminating new or expanding weed populations. Known and established weed populations, as determined by the weed control authority, may be managed by any approved weed control methodology, as determined by the weed control authority. These weeds pose a threat to the agricultural industry and agricultural products.

Common Name	*Scientific Name*	**Herbicide** (Active Ingredient)

Russian knapweed	*Centaurea repens*	picloram, clopyralid or chlorsulfuron
Houndstounge	*Cynoglossum officinale*	picloram
Perennial pepperweed (Tall whitetop)	*Lepidium latifolium*	metsulfuron or chlorsulfuron
Phragmites (Common reed)	*Phragmites australis ssp.*	glyphosate (aquatic label)
Tamarisk (Saltcedar)	*Tamarix ramosissima*	aminopyralid + triclopyr
Hoary cress (Whitetop)	*Cardaria draba*	2,4-D + dicamba or shlorsulfuron
Canada thistle	*Cirsium arvense*	2,4-D, dicamba, picloram
Poison hemlock	*Conium maculatum*	picloram
Musk thistle	*Carduus nutans*	2,4-D amine, metsulfuron, picloram
Quackgrass	*Elytrigia repens*	glyphosate
Jointed goatgrass	*Aegilops cylindrica*	glyphosate, impazapic
Bermudagrass *	*Cynodon dactylon*	glyphosate
Perennial Sorghum spp. (Johnsongrass)	*Sorghum halepense* and *Sorghum almum*	glyphosate
Scotch thistle (Cotton thistle)	*Onopordum acanthium*	2,4-D amine, metsulfuron, or picloram
Field bindweed (Wild Morning-glory)	*Convolvulus ssp.*	2,4-D + dicamba or picloram
Puncturevine (Goathead)	*Tribulus terrestris*	2,4-D anime

* Bermudagrass (*Cynodon dactylon*) shall not be a noxious weed in Washington County and shall not be subject to provisions of the Utah Noxious Weed Law within the boundaries of that county. It shall be a noxious weed throughout all other areas of the State of Utah and shall be subject to the laws therein.

Class 4: Prohibited

Declared noxious and invasive weeds, not native to the State of Utah, that pose a threat to the state through the retail sale or propagation in the nursery and greenhouse industry. Prohibited noxious weeds are annual, biennial, or perennial plants that the commissioner designates as having the potential or are known to be detrimental to human or animal health, the environment, public roads, crops, or other property.

Common Name	***Scientific Name***	**Herbicide** (Active Ingredient)
Cogongrass (Japanese blood grass)	*Imperata cylindrica*	glyphosate or imazapyr
Myrtle spurge	*Euphorbia myrsinites*	glyphosate or dicamba
Dames Rocket	*Hesperis matronalis*	glyphosate or triclopyr

Scotch broom	*Cytisus scoparius*	glyphosate or triclopyr
Russian olive	*Elaeagnus angustifolia*	aminopyralid + triclopyr

Table 2 – County Declared Noxious Weeds

Common Name	*Scientific Name*	Herbicide (Active Ingredient)
Beaver County		
Bull thistle	*Cirsium vulgare*	2,4-D amine or dicamba
Davis County		
Buffalobur	*Solanum rostratum*	2,4-D or dicamba
Duchesne County		
Western Water hemlock	*Cicuta douglasii*	2,4-D amine or dicamba
Garfield County		
Rubber Rabbitbrush	*Ericameria nauseosa*	2,4-D, dicamba, clopyralid or metsulfuron
Iron County		
Bull thistle	*Cirsium vulgare*	2,4-D amine or dicamba
Whorled milkweed	*Asclepias subverticillata*	2,4-D + dicamba or picloram
Juab County		
Blue flowering lettuce	*Lactuca tatarica*	2,4-D amine, impazapyr or metsulfuron
Morgan County		
Burdock	*Arctium minus*	2,4-D + dicamba
San Juan County		
Buffalobur	*Solanum rostratum*	2,4-D or dicamba
Whorled milkweed	*Asclepias subverticillata*	2,4-D + dicamba or picloram
Summit County		
Burdock	*Arctium minus*	2,4-D + dicamba
Uintah County		
Common teasel	*Dipsacus fullonum*	2,4-D amine
Washington County		
Halogeton	*Halogeton glomeratus*	2,4-D
Silverleaf nightshade	*Solanum elaegnifolium*	glyphosate or imazapyr
Whorled milkweed	*Asclepias subverticillata*	2,4-D + dicamba or

		picloram
Wayne County		
Bull thistle	*Cirsium vulgare*	2,4-D amine or dicamba

END OF SECTION

March 7, 2013

SECTION 03152M

CONCRETE JOINT CONTROL

Add the* following*:

PART 3 EXECUTION

3.1 RE-SEALING JOINTS WITH HOT-APPLIED JOINT SEALANT

A. Clean joints using compressed air at a minimum of 100 psi.

B. Apply hot-poured joint sealant to the joint prior to opening to traffic.

C. <u>Do not overfill joints.</u>

D. Allow hot-poured joint sealant to cure prior to opening to traffic to prevent tracking of the sealant.

E. Apply sealant with a fine tip nozzle capable of placing the material in the joint.

F. Plowable pavement marker sealant removed by grinding operation
   1. Seal the cavities left from the removed plowable pavement markers the same as above.

END OF SECTION

July 12, 2016

SECTION 03310M

STRUCTURAL CONCRETE

Delete Article 2.1, paragraph A and replace with the following:

A. Class AA(AE) concrete, maximum shrinkage 0.03 percent at 28 days - refer to AASHTO T 160. Maximum water to cementitious ratio (w/c) 0.40. All other properties refer to Section 03055.

END OF SECTION

July 12, 2016

SECTION 03312S

STRUCTURAL CONCRETE FOR DECKS AND APPROACH SLABS

Add Section 03312:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials and procedures for producing low shrinkage Portland Cement Concrete for bridge decks and approach slabs.

B. Materials and procedures for constructing structural concrete for bridge decks and approach slabs.

1.2 RELATED SECTIONS

A. Section 03055: Portland Cement Concrete

B. Section 03152: Concrete Joint Control

C. Section 03211: Reinforcing Steel and Welded Wire

D. Section 03310: Structural Concrete

E. Section 05832: Expansion Joints

1.3 REFERENCES

A. AASHTO M 6: Fine Aggregate for Portland Cement Concrete

B. AASHTO M 80: Coarse Aggregate for Portland Cement Concrete

C. AASHTO M 85: Portland Cement

D. AASHTO M 111: Zinc (Hot-dip Galvanized) Coatings on Iron and Steel Products

E. AASHTO M 154: Air-Entraining Admixtures for Concrete

F. AASHTO M 157: Ready-Mixed Concrete

G. AASHTO M 194: Chemical Admixtures for Concrete

H. AASHTO M 235: Epoxy Resin Adhesives

I. AASHTO M 295: Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete

J. AASHTO M 307: Silica Fume Used in Cementitious Mixtures

K. AASHTO T 121: Density (Unit Weight), Yield, and Air Content of Concrete

L. AASHTO LRFD Bridge Construction Specifications

M. ASTM C 150: Portland Cement

N. ASTM C 157: Length Change of Hardened Hydraulic Cement Mortar and Concrete

O. ASTM C 309: Liquid Membrane-Forming Compounds for Curing Concrete

P. ASTM C 578: Rigid, Cellular Polystyrene Thermal Insulation

Q. ASTM C 1116/C 1116M - Standard Specification for Fiber-Reinforced Concrete

R. ASTM C 595: Blended Hydraulic Cements

S. ASTM C 1157: Hydraulic Cement

T. ASTM C 1579 - Standard Test Method for Evaluating Plastic Shrinkage Cracking of Restrained Fiber Reinforced Concrete (Using a Steel Form Insert)

U. ASTM C 1567: Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)

V. ASTM C 1602: Mixing Water Used in the Production of Hydraulic Cement Concrete

W. UDOT Minimum Sampling and Testing Requirements Manual

X. UDOT Quality Management Plan

Y. UDOT Quality Control/Quality Assurance (QC/QA) Procedures

1.4 DEFINITIONS

A. Microsynthetic Fiber – Synthetic fibers with diameters or equivalent diameters less than 0.012 inch.

B. Macrosynthetic Fiber – Synthetic fibers with diameters or equivalent diameters greater than 0.012 inch.

C. Monofilament- Single filament fiber, typically cylindrical in cross-section.

1.5 SUBMITTALS

A. Mix design for Class AA(AE) concrete for approval.
   1. Provide, as a key component to the mix design, a well graded combined aggregate structure.
   2. Submit a combined gradation for the mix design. Provide targets for each required sieve ($^3/_4$", $^1/_2$", $^3/_8$", #4, #8, #16, #30, #50, #100, #200), for the purpose of production control and acceptance.
   3. Perform the trial batch using full production operations.
      a. Use the same components in the trial batches that will be used in the project. Accelerators and site-added air-entrainment can be incorporated in the trial batch but are not required. The Contractor assumes responsibility for the compatibility of all admixtures with the mix design and their potential effects on concrete properties.
      b. Personnel performing and witnessing trial batches and performing compressive and flexural strength testing must be Department TTQP Concrete and Concrete Strength Testing qualified.
      c. The Department or its representative is to witness the trial batch.
      d. Compressive and flexural strength testing for verification of trial batches will be performed by an AASHTO accredited laboratory, approved through the Department Laboratory Qualification Program.

C. Test results establishing a density (unit weight) target of freshly mixed concrete according to AASHTO T 121.

D. Test results verifying the coarse and fine aggregate used according to this Section, article 2.1, paragraph D.

E. Test results for any proposed mix design for potential reactivity of coarse and fine aggregates according to the requirements of the UDOT Quality Management Plan for Ready-Mix Concrete.

F. Test results to determine the ability of the combinations of cementitious materials and aggregates to control the reactivity when using potentially reactive aggregates in a mix design.

G. Shrinkage test results according to ASTM C 157.

H. Verification that cement used is from a pre-qualified supplier. Refer to this Section, article 2.1, paragraph B.5.

I. Written plan for admixtures. Refer to this Section, article 2.1, paragraph

J. Verification that fly ash or other pozzolan used is from a pre-qualified supplier. Refer to this Section, article 2.1, paragraph G.

K. Verification that the batch plant meets the requirements of the UDOT Quality Management Plan for Ready-Mix Concrete.

L. Cold and hot weather plans.

M. Surface evaporation plan according to Section 03310.

N. Concrete Placement and Finishing Plan for approval at least 10 days before the Pre-Activity Meeting.
   1. Include the following:
      a. Description of equipment, materials, and personnel for placing, finishing, and curing concrete
      b. Methods for placing, finishing, and curing concrete.
      c. Placement schedule, including placement rates, time of day, duration, deck section being placed, etc.
      d. Quality control plan.

1.6 ACCEPTANCE

A. Acceptance is according to UDOT Minimum Sampling and Testing Requirements Section 03055 with the following exceptions:
   1. Frequency requirements for Slump are suspended
   2. Test fresh concrete density (unit weight) according to AASHTO T121 at the same frequency as Air Content and Concrete Temperature.
      a. Batch fails if the unit weight of the fresh concrete in the field varies more than ± 5 lb/ft^3 from the target density for fresh concrete established by the mix design
   3. Reject batch if water/cementitious ratio exceeds the water/cementitious ratio established in the trial batch.

B. Pre-approve stockpiles before production. Provide quality control sieve analysis during production.

1. For acceptance, allow a variance of the sieve targets established by the mix design and submitted to the Department (this Section, article 1.5, paragraph A) as determined in Table 1.

Table 1

Sieve Size	Percent Passing Allowable Tolerance
$^3/_4$", $^1/_2$", $^3/_8$"	± 10%
#4, #8	± 5 %
#16, #30, #50	± 4%
#100 and #200	± 3%

C. The Department may accept the item at a reduced price when concrete is below specified strength and does not have a separate strength pay factor.

1. The pay factor will be applied to the quantity of the bid item that is represented by the strength tests that fall below a specified strength.
2. The Department will calculate the pay factor using Table 2 based on 28 day compressive strength.

Table 2

Price Reduction for 28 Day Compressive Strength	
Psi below Specified Strength	**Pay Factor**
1-200	0.98
201-400	0.95
More than 400	Reject

3. The Engineer may accept a "reject" lot based on an engineering analysis and concurrence from the Region Materials Engineer. Apply a pay factor of 0.50 if a reject lot is allowed to remain in- place.

PART 2 PRODUCTS

2.1 CONCRETE

A. Concrete Class and Mix Requirements

1. Refer to the requirements in Table 3.

Table 3

Class	Coarse Aggregate or Sieve Size	Max. Water/ Cementitious Ratio	Air Content Percent (%)*	Mix Design Compressive Strength *f'*cr (psi)	28 Day Minimum Compressive Strength *f'*c (psi) **
AA(AE)	1" to No. 4	0.40	5.0 - 7.5	5,200	4,000
	¾" to No. 4	0.40	5.0 - 7.5	5,200	4,000

* Values listed represent in-place air content. Make necessary adjustments for impacts to air content due to placement.

2. Maximum nominal size of coarse aggregate:
   a. Not larger than $^1/_5$ the narrowest dimension between sides of forms.
   b. Not larger than ⅓ the depth of slabs.
   c. Not larger than ¾ the minimum clear distance between reinforcing bars or between bars and forms, whichever is less.

3. Do not exceed water/cementitious ratio.
   a. Calculate the water/cementitious ratio (w/c) according to the following formula:

$$\frac{W}{C} = \frac{Water}{Cement + Pozzolan}$$

4. Do not exceed 30 percent total pozzolan in any mix unless approved or otherwise specified.

5. Do not exceed a shrinkage limit of 0.03 percent at 28 days when tested according to ASTM C 157.

B. Cement
   1. Use Type II Portland cement or blended hydraulic cement unless otherwise specified. Refer to ASTM C 150, ASTM C 595, ASTM C 1157.

   2. Portland Cement
      a. Refer to Tables 1 and 3 in ASTM C 150.
      b. Refer to Table 2 in ASTM C150 for low-alkali cement.

   3. Blended Hydraulic Cement
      a. Blended hydraulic cement substituted for portland cement:
         1) Use ASTM C 1567 to verify that expansion is less than 0.1 percent 14 days after the zero reading.
         2) Refer to the equivalent cements listed in Table 4.

b. Do not exceed 30 percent total pozzolan limit when adding flyash to a blended hydraulic cement.
   1) Submit documentation of the total pozzolan content with the mix design.

Table 4

Portland Cement/Blended Hydraulic Cement Equivalencies		
AASHTO M 85 (Low Alkali)	**ASTM C 595**	**ASTM C 1157**
*Type I	IP	GU
Type II	IP (MS)	MS
*Type III	-	HE
*Type V	-	HS

* Use only when specified

4. Do not use cement that contains lumps or is partially set.
5. Use cement from the list of Department qualified suppliers list maintained by the Department Materials Quality Assurance Section.
6. Do not mix cements originating from different sources.
7. Do not use air-entrained cement.
8. Department will sample and test the cement according to UDOT Quality Management Plan 502: Cement.

C. Synthetic Fiber Reinforcement
1. Provide products from one manufacturer.
2. Microsynthetic fiber, use monofilament synthetic fibers at 2 lb. per cu. yd. of concrete mix.
3. Macrosynthetic fiber, a minimum flexural strength ratio ($R_{e,3}$) of 25 percent when tested in accordance with ASTM C 1609/C 1609M is required. Use 4 lb. per cu. yd. of concrete mix.
4. Store the fibers in a dry, covered area, free of contamination.
5. Evaluate trial batches to ensure workability of the concrete.
6. Conform to ASTM C 1116/C 1116M, Type III and the requirements of ICC-ES AC32 Section 3.1.1 (plastic shrinkage reinforcement) and Section 3.1.2 (shrinkage and temperature reinforcement).
7. Do not introduce fibers at the same time as the cement is being introduced. Mix for at least five minutes after the addition of the fibers.

D. Aggregate
1. Coarse Aggregate for Normal Concrete Mixes
   a. Use coarse aggregate that meets AASHTO M 80 physical properties.
   b. Do not exceed percentages of deleterious substances as specified in AASHTO M 80, Table 2, for Class A aggregates.

2. Fine Aggregate for Normal Concrete Mixes
   a. Use fine aggregate that meets AASHTO M 6 physical properties.
   b. Do not exceed percentages of deleterious substances as specified in AASHTO M 6, Table 2, for class A aggregates, using option “b” for material finer than the No. 200 sieve.
3. Provide a well graded combined gradation.

E. Water
1. Use potable water or water that meets ASTM C 1602, including Table 2.

F. Admixtures
1. Do not use calcium chloride.
2. Air Entrainment according to AASHTO M 154, including Section 5.
3. Water Reducing Agents
   a. Refer to AASHTO M 194.
   b. High Range Water Reducer (HRWR) – Submit a written plan for approval with the trial batch that shows proper attention will be given to ingredients, production methods, handling, and placing.
4. Accelerators – Refer to AASHTO M 194.
5. Set Retarding Admixtures – Refer to AASHTO M 194.
   a. Establish the effective life of the set-retarding admixture by trial batch if set retarding admixtures are required due to haul times exceeding the time limitations in Section 03055.
   b. Do not exceed any manufacturer recommendations for the use of the set retarding admixture.
   c. Do not re-dose the concrete with additional set retarding admixture.
   d. Add set retarding admixture at the batch plant at the time of initial batching operations.
   e. Show on batch tickets the amount of admixture used.
   f. Time of placement is established by the trial batch and supersedes the requirements in Section 03055 .
6. Site-added air-entrainment – Refer to AASHTO M 154.
   a. Limit the use of site-added air-entraining agents to one addition per load, regardless of quantity.
   b. Use pre-measured admixtures.
   c. Record amount used on batch ticket.
   d. Rotate the drum at least 30 revolutions at the mixing speed recommended by the supplier.
   e. Retest fresh concrete density (unit weight). Refer to this

Section,
article 1.6, paragraph

G. Pozzolan
   1. Fly Ash
      a. Class F according to AASHTO M 295 except Table 2.
      b. Fly ash may be sampled and tested for compliance at any time.
         1) Loss on Ignition (LOI) - Not to exceed 3 percent.
         2) Allowable CaO content - Not to exceed 15 percent.
         3) Use fly ash from the list of Department pre-qualified sources maintained by Department Central Materials.
         4) Label the storage silo for fly ash to distinguish it from cement.
         5) Use different size unloading hoses and fittings for cement and fly ash.
   2. Use pozzolan from the list of Department qualified suppliers list maintained by the Department Central Materials.
   3. Department will sample and test the pozzolan according to the UDOT Quality Management Plan 507: Flyash and Pozzolan.

2.2 REINFORCING STEEL AND WELDED WIRE

A. Refer to Section 03211.

2.3 JOINTS AND SEALERS

A. Premolded and Preformed Joint Filler – Refer to Section 03152.

2.4 BACKER ROD

A. Use backer rod composed of closed-cell polyethylene foam of sufficient size to prevent the sealant from passing to the bottom of the groove. Refer to Section 03152.

2.5 WATERSTOPS

A. Refer to Section 03152.

2.6 RIGID PLASTIC FOAM

A. Preformed, extruded, cellular polystyrene thermal insulation material that has a water absorption property of 0.3 or less. Refer to ASTM C 578.

2.7 CURING COMPOUND

A. Refer to ASTM C 309, Type I D, Class A.

2.8 FORMS

A. Plywood, wood, metal, glass, or a combination of these materials.

2.9 MISCELLANEOUS STEEL ITEMS

A. Galvanize all miscellaneous steel items permanently cast into structural concrete elements. Refer to AASHTO M 111.

2.10 EPOXY ADHESIVE

A. Refer to AASHTO M 235, Type II.

PART 3 EXECUTION

3.1 PREPARATION

A. Pre-Activity Meeting
   1. Contractor, Department, and Supplier personnel involved with completing the work must attend the Pre-Activity Meeting.
   2. Conduct Pre-Activity meeting within 48 hours prior to concrete placement.
   3. Provide notification of the meeting to the Engineer 10 days in advance.
   4. Discuss items specific to bridge deck and approach slab concrete work including the following:
      a. Methods for placing, finishing, and curing.
      b. Schedule, production rates, construction practices, and quality control procedures.
      c. Required submittals.
      d. Sampling and testing.
      e. Verification of placement and clearances of reinforcing steel.

B. Aggregate Stockpiles
   1. Construct stockpile platforms so that subgrades are prevented from intruding into aggregates.
   2. Build stockpiles at least two days before use.
   3. Provide an operator and front-end loader to help the Engineer take aggregate samples.
   4. Aggregate may not be accepted more than 30 days before use.
   5. Construct stockpiles to minimize segregation of aggregates.

6. Allow washed aggregates to drain to uniform moisture content before use (12 hr minimum).

C. Falsework
1. Refer to Section 03310.

D. Forms
1. Refer to Section 03310.

3.2 BATCH MATERIALS

A. Refer to AASHTO M 157.

3.3 MIX DESIGN

A. Design the cementitious system to mitigate potential alkali-aggregate reactivity.
1. Use a minimum of 20 percent flyash by weight of the total cementitious system.

B. Use only concrete mixes that have been approved by the Department

3.3 DECK SLABS

A. Do not place parapet forms or parapet for at least seven days and until it has attained required design strength or leave all falsework in place and design it to carry all additional loads that are part of the parapet placement process.

3.5 PLACE CONCRETE

A. Place concrete according to the approved Concrete Placement and Finishing Plan.

B. Refer to Section 03310

3.6 PUMP CONCRETE

A. Refer to Section 03310

3.7 LIMITATIONS

A. Refer to Section 03310.

3.8 CYLINDER STORAGE DEVICE

A. Refer to Section 03055.

3.9 EXPANSION JOINTS

A. Expansion joints – Refer to Section 05832

B. Adjust joint widths as shown on the plans.

3.10 CONSTRUCTION JOINTS

A. Refer to Section 03310.

3.11 CONCRETE SURFACE FINISHING CLASSIFICATIONS

A. Refer to Section 03310.

3.12 CONCRETE SURFACE FINISHING

A. Refer to Section 03310.

3.13 CONCRETE SURFACE FINISHING PROCEDURES

A. Finish concrete according to the approved Concrete Placement and Finishing Plan

B. Refer to Section 03310

3.14 CURE BRIDGE DECKS AND APPROACH SLABS

A. Cure all newly placed concrete to prevent loss of water for at least 14 continuous days as follows:
   1. Formed surfaces
      a. Cure formed surfaces of concrete by retaining the forms in place without loosening for the required curing time period.
      b. Seal formed surfaces by applying a liquid membrane curing compound immediately after forms are removed and necessary finishing has been done when forms are removed during the required curing time period.
         1) Apply membrane-curing compound uniformly at the manufacturer's recommended rate, but not less than 100 ft2/gal.
         2) Immediately repair any areas damaged during the specified curing period by re-spraying.
         3) Do not use on surfaces where rubbed finish is required or on surfaces of construction joints unless it

is removed by sand blasting before placing concrete against the joint.

2. Exposed surfaces
   a. Cure the top surfaces of bridge decks and approach slabs by a combination of the liquid membrane-curing compound method and the water method.
   b. Apply membrane-curing compound so that no portion of the deck or approach slab is exposed to the atmosphere for more than 20 minutes after the tining or finishing operation.
      1) Apply membrane-curing compound uniformly at the manufacturer's recommended rate but not less than 100 ft2/gal.
      2) Use a work bridge that follows immediately after the finishing machine to allow application of the curing compound while the concrete is still plastic.
   c. Completely cover all newly placed concrete areas in bridge decks and approach slabs with material that retains moisture and does not prevent evaporation, such as cotton or burlap mats as soon as the concrete is sufficiently set to support the materials.
      1) Secure the cotton or burlap mats to prevent wind or other forces from removing them.
      2) Do not damage the finish.
   d. Keep the entire area of newly placed concrete damp continuously for 14 days after placement.
      1) Do not erode or damage the surface.
      2) Prevent excess water from impacting traffic on in- service roadways.
3. Fogging
   a. Fogging may be used to increase the relative humidity above the fresh concrete and minimize the loss of moisture through evaporation when necessary.
   b. To curb effects of low humidity, wind or high temperatures before the application of curing materials, concrete being placed and finished for bridge decks and approach slabs may be protected from damage due to rapid evaporation by fogging.
   c. Incorporate the use of compressed air misters that atomize the water, producing a very fine mist and not a spray when fogging equipment is used.
      1) Use equipment that allows for adjusting the rate of fogging depending on the conditions that are present.
      2) Do not aim misters in a direction lower than horizontal at 5 ft above the concrete surface.

3) Do not use fogging to apply excess water to the concrete surface to aid finishing.
4) Discontinue fogging when a fine coating of water or sheen is visible on the concrete surface.

d. Do not affect the water/cement ratio of the concrete.

B. Follow the cold and hot weather limitations for curing according to Section 03310.

3.15 FORM REMOVAL

A. Refer to Section 03310.

3.16 CLEAN

A. Refer to Section 03310.

END OF SECTION

3—EXCEPTIONS

Exceptions to UDOT Standard Specifications and Supplemental Specifications

These Contract provisions revise the Utah Department of Transportation's *2012 Standard Specifications for Road and Bridge Construction* as modified by the 2012 Supplemental Specifications, and contain requirements generally applicable to the Work to be performed by Design-Builder. In certain cases, provisions in the Standard Specifications have been superseded by other provisions of the Contract Documents.

Any conflicts, ambiguities, or lack of clarity in regards to items included in this Exceptions, will be interpreted and defined by the Department in its sole discretion. The Design-Builder shall not take advantage of any apparent conflict, omission, ambiguity, inconsistency, inaccuracy, deficiency, or inadequacy related to the definition of roles and responsibilities in the execution of the Work. Should it appear that any definition of roles and responsibilities is contrary to the philosophy of such established by this exception, it is the responsibility of the Design-Builder to request a determination by the Department related to the respective roles and responsibilities of the Design-Builder and the Department.

The Standard Specifications are incorporated herein except as otherwise provided in the Contract Documents, and with the following general exceptions:

General Exceptions

1. When these Standard Specifications refer to "Engineer", such reference shall mean the definition given in Part 1, Appendix A (Acronyms and Definitions List), except when specified otherwise within these General Exceptions.
2. When these Standard Specifications refer to "Contractor", such reference shall mean the Design-Builder, except when specified otherwise within these General Exceptions.
3. Decisions regarding price adjustments outlined in these Standard Specifications shall be the responsibility of the Engineer as defined in Part 1, Appendix A (Acronyms and Definitions List), with such decisions coordinated with the Department.
4. Decisions regarding reject materials, especially in regards to allowing nonconforming Work to remain in place at a reduced payment, will always be the Department's.
5. When these Standards Specifications refer to the project, projects, or UDOT project, such references shall mean the Project.
6. All references to measurement and payment shall be disregarded except as provided in General Exception 7 below.
7. When these Standard Specifications refer to any payments or adjustments above the Contract Amount, or similar phrases, such references will be disregarded. It is the intent that the payment of the Contract Amount will be full compensation for all Work performed pursuant to the Design-Build Contract unless provided for in Part 2 (General Provisions). An exception is that a Change

Order pursuant to Part 2 (General Provisions) may be issued by the Department for incentives provided for in the Standard Specifications.

8. When these Standard Specifications describe actions, materials, means, or methods that are required and that are qualified by phrases of direction, designation, or permission of the Engineer (e.g., "directed by the Engineer", "direction of the Engineer", "Engineer may direct", "discretion of the Engineer", "designated by the Engineer", "Engineer designated", or "permission from the Engineer"), such phrases shall be disregarded. If it is not clear whether a phrase should be disregarded, the Department will make that decision in its sole discretion. When these Standard Specifications refer to persons, offices, or divisions within the Department, such reference shall mean Department.

9. When an approval or authorization of the Engineer is required in these Standard Specifications for the use of alternative or substituted processes, material, or components, the Engineer shall mean Department.

10. When these Standard Specifications refer to an approval of any correction or repair that deviates from the Contract requirements, follow the requirements of Part 2 (General Provisions).

11. When these Standard Specifications provide that reports, records, or other documents shall be submitted or furnished to the Department, such reports shall be made available upon request to the Department and do not have to be submitted, provided no other requirement exists for submittal.

12. When these Standard Specifications require approval of shop drawings, falsework drawings, or erection plans, such approval shall be from the Engineer as defined in Part 1, Appendix A (Acronyms and Definitions List).

13. When these Standard Specifications require actions, materials, means, or methods that are not designated in the Released for Construction Documents, such phrases shall be disregarded.

14. When these Standard Specifications refer to the "Engineer" ordering work beyond the scope of work in the Contract, such phrases shall be disregarded, and the Design-Builder shall refer to Part 2 (General Provisions).

15. Wherever references to "Engineer" result in testing or acceptance procedures being assigned to the Engineer, acceptance shall be on behalf of the Department.

16. Any references in these Standard Specifications to the Engineer that refer to the time period after Final Acceptance shall mean the Department.

17. When these Standard Specifications require notifications to the Engineer, Engineer shall mean the Department and Engineer.

18. When these Standard Specifications refer to approval of the ability to work during times and dates other than those specified, the Approval shall be the Department's.

19. Wherever these Standard Specifications refer to an approved product or laboratory, such references shall mean Department Approved product or laboratory

20. Wherever these Standard Specifications refer to a pre-qualified supplier, such references shall mean Department pre-qualified suppliers; pre-qualified according to the UDOT Quality Management Plans.

21. Unless otherwise specified, when these Standard Specifications refer to Department performing tests, such references shall mean the Design-Builder.

22. For any references to Liquidated Damages, refer to Part 2 (General Provisions). This does not apply to incentive/disincentive provision.

23. For references to Substantial Completion, construction completion, project completion, and Contract Completion, refer to Part 2 (General Provisions).

24. Warranties shall be covered under the Warranty Provisions of Part 9 (Warranty Provisions).

REQUEST FOR PROPOSALS

UTAH DEPARTMENT OF TRANSPORTATION

4 Interchanges on Bangerter HWY (SR-154)

Project No. S-0154(12)11

Salt Lake County

CONTRACT DOCUMENTS

PART 6:

THIRD-PARTY AGREEMENTS

Addendum 2 - October 6, 2016

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2. CenturyLink Statewide Utility Relocation Agreement (Executed)
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6. Kearns Improvement District (Draft)
7. Manuel Bros., Inc. Master Utility Agreement (Draft)
8. MCI Communications Services (Verizon Business) Master Utility Agreement (Executed)
9. Questar Gas Company Statewide Utility Relocation Agreement (Executed)
10. Rocky Mountain Power (PacifiCorp) Statewide Utility Relocation Agreement (Executed)
11. Rocky Mountain Power (PacifiCorp) Project Agreement No. 1 (Executed)
12. South Jordan City Master Utility Agreement (Draft)
13. South Valley Sewer District Master Utility Agreement (Executed)
14. Syringa Networks, LLC Telecommunications Facility Exchange Agreement (Executed)
15. Taylorsville City Master Utility Agreement (Draft)
16. Taylorsville Bennion Improvement District Master Utility Agreement (Executed)
17. United States Bureau of Reclamation & Jordan Valley Water Conservancy District Project Agreement (Executed) - Revised
18. Welby Jacobs Canal (Revised Draft)
19. City of West Jordan Master Utility Agreement (Executed)
    a. City of West Jordan Master Utility Agreement Amendment 1 (Draft)
20. Zayo Group, LLC Master Utility Agreement (Executed)

A. GENERAL

The Design-Builder shall perform all of the Department's obligations in each Third-Party Agreement, except for payment to Third Parties for Third-Party-performed work. The Department retains its rights and responsibilities pertaining to cost share reimbursement, audit, oversight, and any other elements of the Third-Party Agreements at the Department's sole discretion.

178262

BANGERTER

Project No. S-0154(12)11, Salt Lake County
4 Interchanges on Bangerter Highway
AT & T CORP
25914 Charge ID No. 71939 PIN 12566

A T & T CORP.
MASTER UTILITY AGREEMENT

THIS MASTER UTILITY AGREEMENT, made and entered into this 12 day of Sept, 2016, by and between the **Utah Department of Transportation**, ("UDOT") and **AT&T Corp.**, doing business as AT & T Corp., a Registered Corporation in the State of New York licensed to operate in the State of Utah , ("Company") (each as "Party" and jointly as "Parties").

RECITALS

WHEREAS, UDOT is preparing to request proposals for and award a design-build contract for the highway project identified as Project Number S-0154(12)11, 4 Interchanges on Bangerter Highway in Salt Lake County, Utah, ("Project"); and

WHEREAS, UDOT's design-build contractor ("Design-Builder") will complete the design and administer construction of the Project; and

WHEREAS, UDOT has identified Company facilities within the limits of the Project which may necessitate the relocation, protection, or adjustment of the facilities, ("Utility Work"); and

WHEREAS, the Company desires for the Design-Builder to design and construct the Company's Utility Work necessitated by the Project with the exception of cable/hand hold procurement, pulling, and splicing; and

WHEREAS, the Company will perform the necessary design review, inspection, cable/hand hold procurement, pulling, and splicing to accommodate the Project; and

WHEREAS, for the purpose of expediting any required Utility Work and reimbursement the Parties are entering into this Project Master Utility Agreement with the understanding that future supplemental agreements to this Agreement will be entered into covering Utility Work to be accomplished by the Company and UDOT at specific Project locations.

THIS AGREEMENT is made to set out the terms and conditions where under the Utility Work shall be performed.

AGREEMENT

NOW THEREFORE, the Parties agree as follows:

1. CONTACT INFORMATION

UDOT's Project Representative is Alana Spendlove, UDOT Project Utility and Railroad Leader, telephone number (801) 887-3462, and e-mail aspendlove@utah.gov.

UDOT's Resident Engineer for 5400 South and 7000 South interchanges is Bryan Chamberlain, telephone number (801) 887-3405, and e-mail bchamberlain@utah.gov, or their designated representative, as assigned.

UDOT's Resident Engineer for 9000 South and 11400 South interchanges is Ken Talbot, telephone number (801) 360-8750, and e-mail kentalbot@utah.gov, or their designated representative, as assigned.

UDOT's Field Representative contact person will be identified in subsequent supplemental agreements.

Company's contact person is Rob Williamson, telephone number (208) 338-2816, and e-mail rlwilliamson@att.com.

After awarding the Project, UDOT will provide the Company with the Design-Builder contact information, hereinafter referred to as "Design-Builder Third Party Manager".

2. AUTHORIZATION FOR DESIGN WORK

In order to facilitate coordination and obtain technical information about the Company's facilities and requirements for inclusion in this Agreement and the request for proposals, UDOT gave the Company authorization for preliminary design engineering on April 26, 2016.

3. SUBSURFACE UTILITY ENGINEERING

UDOT has performed Subsurface Utility Engineering (SUE) within the limits of the Project. Additional SUE work to determine the precise location of underground facilities at specific, critical locations on the Project will be reviewed with the Company.

4. PROJECT COORDINATION

Company and UDOT agree to have the Design-Builder include in the Project, items of Utility Work for the Company's facilities.

During the development of the Project design, the Company and UDOT, along with its Design-Builder, shall consult as necessary in an effort to determine if conflicts with the Company's facilities can be avoided. If Utility Work is required, UDOT will be responsible to propose and provide a location for the facilities. UDOT will provide the Company with Project design plans as early as possible, and will schedule and meet with the Company to review the design, construction, estimates of cost, and scheduling for the Company's Utility Work at specific locations

on the Project to ensure maximum lead time for advance order of materials and work force scheduling.

The Company shall advise UDOT's Project Representative of the approximate time required for completion of the Utility Work and shall diligently pursue its Utility Work so that completion can be accomplished according to the pre-determined time schedule negotiated by the Company and UDOT in the supplemental agreement issued hereto for a specific Project location. The Company shall immediately notify UDOT's Project Representative by phone call or email, of its discovery of any occurrence or unforeseen circumstances that would prevent the Company from completing its Utility Work according to the time schedule provided. In addition, the Company shall describe the circumstances in writing within 24-hours of the discovery to UDOT's Project Representative.

5. COMPANY REQUIREMENTS

UDOT will comply with the following Company Utility Work requirements:

a. The Company requires two 2 months per location to engineer Utility Work estimates.
b. Exercise all due caution while working near the facilities in order to prevent damage to the facilities.
c. To notify Company by telephone at (800) 252-1133 at least 48 hours prior to performing any construction, demolition or repairs at the facilities location.
d. To perform construction, demolition, repair, modifications, additions, and any other activities in compliance with all applicable laws and regulations and in a manner that does not interfere with the operations of Company.

6. UDOT TO DESIGN AND CONSTRUCT A PORTION OF UTILITY WORK

UDOT shall perform the necessary design work, cost estimating for its Utility Work, field and office engineering, furnish all materials (except cables and hand holds necessary to accommodate the Utility Work), and perform the Utility Work (except pulling and splicing), necessitated by the Project.

UDOT will design the Utility Work in accordance with Company's standards regularly followed by the Company in its own work and not considered a betterment. In the event of a conflict between UDOT and Company standards, the higher standard will be applied.

UDOT will secure permits required for Utility Work for Company's facilities.

UDOT shall protect existing facilities, including services, which are not to be relocated or adjusted, belonging to Company after notice to and in coordination with Company.

UDOT will supply as-constructed plans for the Utility Work it performs, in AutoCAD format, upon completion of any required Utility Work.

7. COMPANY TO PERORM INSPECTION AND CONSTRUCT A PORTION OF THE UTILITY WORK

The Company will perform inspection of the Utility Work for the Company's facilities that will be performed by UDOT. UDOT will accomplish the Utility Work on the Company's facilities in

accordance with the plans and specifications approved by the Company. Changes or additions to the plans and specifications shall be approved by the Company and UDOT through a supplemental agreement.

The Company will provide all cables, hand holds, pulling, and splicing, necessary to accommodate the Utility Work of its facilities on the Project. The Company requires 30 days' notice to schedule splicing and fiber pulls and will determine the splicing window based on the circuit.

8. STANDARD SPECIFICATIONS AND REGULATIONS

The Company, while engaged in the preliminary design and Utility Work of its facilities, shall comply with UDOT's 2012 Standard Specifications for Road and Bridge Construction and Utah Administrative Code R930-7.

9. UNDERBUILT AND FACILITY REMOVAL REQUIREMENTS

The Company is responsible to see to the removal of all Company-owned underbuilt facilities from utility poles that will be relocated or removed due to the Project.

10. RIGHT-OF-WAY

Any easements or replacement right-of-way required in conjunction with the Utility Work of Company's facilities will be acquired by UDOT in accordance with the requirements of Utah Administrative Code R930-8-7.

11. MAINTENANCE OF TRAFFIC (MOT), TRAFFIC CONTROL, CLEAR/GRUB, AND SURVEYING

UDOT will provide MOT and traffic control for Utility Work at no cost to the Company. The Company is responsible to coordinate Utility Work schedules and traffic control needs with UDOT to facilitate the Project schedule and minimize impacts to the public. Except in the case of emergencies, Company's Utility Work on the Project will be scheduled in compliance with the requirements of the Limitation of Operations contained in UDOT's Design-Builder contract with respect to lane closures, peak hour Utility Work restrictions, holiday and special event limitations, etc.

UDOT will provide, at no cost to the Company, clearing and grubbing for the Utility Work as required by the Company and in accordance with UDOT's Standard Specifications.

Surveying and staking of roadway facilities as required by the Company will be provided by UDOT in accordance with UDOT's Standard Specifications. The cost of the surveying and staking will be at UDOT's expense and the Company will have no obligation for the cost of surveying. Any of UDOT's survey control stakes or bench markers, which are removed or damaged by the Company, shall be reestablished by UDOT at Company's expense.

12. BETTERMENT WORK

If the Company desires to include betterment work in the Project at any specific location, UDOT may agree to the betterment work providing the difference in costs between the functionally

equivalent required Utility Work and the Company's desired betterment work, that is not required by the Project, shall be at the sole cost of the Company and the betterment work can reasonably be accommodated without delaying UDOT's Project. The betterment work will be addressed by a separate supplemental agreement between UDOT and the Company.

Once a Design-Builder has been selected by UDOT, any betterment work request will be negotiated directly with the Design-Builder. However, it is at UDOT's sole discretion to approve the betterment work.

13. SUPPLEMENTAL AGREEMENTS

UDOT and the Company shall enter into individual supplemental agreements to cover Utility Work at specific Project locations. Each supplemental agreement will include a description and location of the Utility Work to be performed, design drawings showing the original and proposed locations of the Company's facilities, Utility Work schedules, cost estimates from all Parties, participation shares for UDOT and the Company, any proposed betterment work, and any necessary right-of-way documents. The estimates do not account for increases due to unknown and unforeseen hardships in accomplishing the Utility Work. A copy of the format of the proposed supplemental agreement is marked Exhibit "A" that is incorporated by reference.

The Company will require a 2 week review and approval period for any final supplemental agreement submitted to the Company by UDOT.

In the event there are changes in the scope of the Utility Work, extra Utility Work, or changes in the planned Utility Work covered by a supplemental agreement, a modification to the supplemental agreement approved in writing by the Parties is required prior to the start of Utility Work on the changes or additions.

14. UDOT AUTHORIZATION TO PROCEED WITH UTILITY WORK

The Company shall not perform any Utility Work until the supplemental agreement for the Utility Work is signed by the Company and received by UDOT. UDOT will review and approve the supplemental agreement and will issue an authorization to proceed to the Company for each specific Utility Work location.

15. UDOT TO NOTIFY THE COMPANY BEFORE BEGINNING UTILITY WORK

UDOT will notify the Company at least 2 business days in advance of beginning any Utility Work covered by any supplemental agreements hereto, to allow the Company time to schedule an inspector to be present during the Utility Work. Subsequent notification of when and where Utility Work will be performed will be given on a day-to-day basis. Should UDOT fail to give advance notification and Utility Work is performed without the presence of a Company inspector, UDOT will, at no cost to the Company, facilitate inspection of the Utility Work including, if necessary, uncovering the Utility Work.

16. COMPANY TO NOTIFY UDOT AND THE DESIGN-BUILDER BEFORE BEGINNING COMPANY PERFORMED UTILITY WORK

The Company will notify UDOT's Project Representative as well as the Design-Builder Project Representative at least 2 business days in advance of beginning any Utility Work covered by any supplemental agreements hereto. The Company will give subsequent notifications of when

and where the Company will be performing Utility Work to UDOT's Field Representative and the Design-Builder Project Representative on a day-to-day basis. Such subsequent notifications can be informal. Failure on the part of the Company to give proper notification to UDOT's Field Representative and the Design-Builder Project Representative will be cited to the Company and that portion of the Company's Utility Work performed while not under the surveillance of the UDOT Field Representative may be deducted from the reimbursement at UDOT's discretion for.

17. INSPECTION

The Company shall provide on-call engineering support by the Company's engineer or appropriate representative for design review, schedule coordination, or to correct or clarify issues during the Utility Work, and to perform the necessary inspection for the Company's Utility Work installed by UDOT.

a. The Company engineer and/or inspector shall work with and through UDOT's Project Representative and shall give no orders directly to UDOT's Design-Builder unless authorized in writing to do so. UDOT will accomplish the Utility Work covered herein on Company's facilities in accordance with the plans and specifications provided and/or approved by the Company, including changes or additions to the plans and specifications, which are approved by the Parties hereto.
b. The Company shall immediately notify UDOT's Project Representative and the Design-Builder Project Representative of any deficiencies in the Utility Work on the Company's facilities. The Company shall follow up with written detail to UDOT's Project Representative and the Design-Builder Project Representative of its findings within 24-hours of making its initial notification.
c. UDOT will respond to the Company's concerns within 24-hours of written notification.
d. The Company, through its inspection of the Utility Work, will provide UDOT's Project Representative with information covering any problems or concerns the Company may have with acceptance of the facilities upon completion of the Utility Work.
e. Any periodic plan and specification review or construction inspection performed by UDOT arising out of the performance of the Company's Utility Work does not relieve the Company of its duty in the performance of the Utility Work or to ensure compliance with acceptable standards.

18. DAILY RECORDKEEPING

UDOT's Field Representative, will keep daily records of the inspection and Utility Work performed by the Company forces. Daily records will be in duplicate on a form to be prepared by the Company or UDOT. The type of form to be used shall be preapproved by UDOT's Contracts, Compliance, and Certification Manager. The daily records shall be signed by UDOT's Field Representative, the Company or its authorized representatives.

19. REIMBURSEMENT FOR COMPANY'S UTILITY WORK

In accordance with Utah Code §72-6-116(3)(a)(ii), UDOT will reimburse the Company 50% of the cost of Utility Work of its facilities on state highways and the Company shall pay the remainder of the cost of the Utility Work. UDOT will reimburse the Company 100% of the cost of Utility Work of its facilities located on a public utility easement, on a Company-owned private easement or fee property. The Company shall provide UDOT with a copy of the public utility easement or subdivision plat, private easement or fee title. The Utility Work and reimbursement

for Company's facilities required by the Project will be in conformance with the requirements of Utah Administrative Code R930-8.

The Company shall submit itemized bills covering its actual costs incurred for performing the Utility Work covered by supplemental agreements to UDOT's Contracts and Compliance Specialist:

UDOT Contracts and Compliance Specialist
4501 South 2700 West
Construction Office, Box 148220
Salt Lake City, Utah 84114-8220

Itemized bills shall bear the Project and supplemental agreement numbers, supporting sheets, and a complete billing statement of all actual costs incurred, following the order of the items in the detailed estimates contained in the supplemental agreement, and be submitted to UDOT within 60 days following completion of the Utility Work by the Company on the Project. Otherwise, previous payments to the Company may be considered final, except as agreed to between the Parties in advance. UDOT will reimburse the Company within 60 days after receipt of the billings, but only for those items complying fully with the provisions of Utah Administrative Code R930-8. Failure on the part of the Company to submit final billings within 6 months of the completion of the Utility Work will result in UDOT's disallowance of that portion of Utility Work reimbursement.

If the Company owes a balance to UDOT, the Company will reimburse UDOT within 60 days after receipt of billing from UDOT.

20. SALVAGE CREDIT

In accordance with 23 C.F.R. §645.117 all materials from Company's existing facilities which are recovered by UDOT while performing the Utility Work and not reused on this Project shall become the property of the Design-Builder unless otherwise agreed to in advance by the Parties hereto.

In accordance with 23 C.F.R. §645.117, all materials from the existing facilities, which are recovered in suitable condition for reuse by the Company and not reused on the Project, shall be credited to the cost of the Project at current stock prices. If the materials are not suitable for reuse, they shall be credited at such other prices as agreed upon between the Company and UDOT following inspection of the recovered material.

21. PROJECT DESIGN CHANGES

If UDOT changes the Project design after the Company has completed its design review; or if the Company has completed its portion of the Utility Work of its facilities based on previously approved design plans; the cost of the second design review and/or Utility Work is to be paid in full by UDOT. UDOT will make adjustments for any additional time that may be required for the Company to perform Utility Work on its facilities when required.

22. COMPANY'S COSTS DIFFER BY MORE THAN 10%

If the Company's actual costs incurred for its force account work differs more than 10% plus or minus per line item from the amount contained in the supplemental agreements, the

Company is required to submit a letter of explanation with its billings indicating how and why the difference in costs occurred.

23. RIGHT TO AUDIT

UDOT and FHWA shall have the right to audit all cost records and accounts of the Company pertaining to this Project in accordance with the auditing procedure of the Federal Highway Administration and 23 C.F.R. §645, subpart A. Should this audit disclose that the Company has been underpaid, UDOT will reimburse the Company within 60 days upon submission of additional billing to cover the underpayment. Should this audit disclose that the Company has been overpaid, the Company will reimburse UDOT within 60 days of notification of audit findings in the amount of the overpayment. For the purpose of audit the Company is required to keep and maintain its records of Utility Work covered herein for a minimum of 3 years after final payment is received by the Company from UDOT.

The Company shall have the right to review UDOT's cost documentation for the Utility Work performed on behalf of the Company.

24. ACCEPTANCE

UDOT will provide notification to the Company for acceptance of the Utility Work upon completion of the final inspection. Company will have 60 days to respond in writing to UDOT with any additional comments in regards to the Utility Work. In the event that UDOT does not receive a written response within 60 days, UDOT will designate the Utility Work accepted by the Company. Upon acceptance of the Utility Work, the Company will accept, own and maintain its facilities. To the extent it may lawfully do so, Company further agrees to relieve UDOT from any responsibility or liability that may result for its new facilities or the operation thereof.

25. ACCESS & MAINTENANCE

Access for maintenance and servicing of Company's facilities located on the Project right-of-way will be allowed only by permit issued by UDOT. Company will obtain the permit and abide by conditions thereof for policing and other controls in conformance with Utah Administrative Code R930-7.

26. FORCE MAJEURE

An event of force majeure is an unforeseeable event or circumstance which is beyond the control and without the fault or negligence of the party affected and which by the exercise of reasonable diligence the party affected was unable to prevent, which by way of illustration can include, but is not limited to the following:

a. riot, war, invasion, act of foreign enemies, hostilities, acts of terrorism, civil war or rebellion;

b. tornados, earthquakes, flood, fire or other physical natural disaster; and

c. strikes at a national level or industrial disputes at a national level, or strike or industrial disputes by labor not employed by the affected party, its subcontractors or its suppliers and which affect an essential portion of the works but excluding any industrial dispute

which is specific to the performance of the utility relocation or this Agreement.

Neither party is responsible for any failure to perform its obligations under this Agreement if it is prevented or delayed in performing those obligations by an event of force majeure. Only those obligations directly affected by an event of force majeure are excused. Where there is an event of force majeure, the party prevented from or delayed in performing its obligations in this Agreement must immediately notify the other party giving full particulars of the event of force majeure preventing that party from, or delaying that party in performing its obligations in this Agreement and that party must use its reasonable efforts to mitigate the effect of the event of force majeure upon its performance of the contract and to fulfill its obligations.

Upon completion of the event of force majeure, the party affected must as soon as reasonably practicable recommence the performance of its obligations in this agreement. If the effected party is the Company, the Company must provide a revised schedule to minimize the effects of the prevention or delay caused by the event of force majeure.
UDOT shall not be responsible for any costs or losses to the Company caused by the event of force majeure.

27. **MISCELLANEOUS**

a. Each Party agrees to undertake and perform all further acts that are reasonably necessary to carry out the intent and purpose of this Agreement at the request of the other Party.

b. This Agreement in no way creates any type of agency relationship, joint venture, or partnership between UDOT and Company.

c. The failure of either Party to insist upon strict compliance of any of the terms and conditions, or failure or delay by either Party to exercise any rights or remedies provided in this Agreement, or by law, will not release either Party from any obligations arising under this Agreement.

d. This Agreement shall be deemed to be made under and shall be governed by the laws of the State of Utah in all respects. Each person signing this Agreement warrants that the person has full legal capacity, power, and authority to execute this Agreement for and on behalf of the respective Party and to bind such Party. This Agreement may be executed in one or more counterparts, each of which shall be an original, with the same effect as if the signatures were made upon the same instrument. This Agreement may be delivered by facsimile or electronic mail.

****

IN WITNESS WHEREOF, the Parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first above written.

AT & T Corp.

Alvin S. Richardson

Title: Senior Technical Project Mgr.

Date: 8/4/16

Recommended For Approval:

Alana Spendlove

Title: Utility and Railroad Leader

Date: 9/12/16

Utah Department of Transportation

Marvin Dand

Title: Project Director

Date: Sept 12, 2016

Approved as to Form

Renee Spencer

Title: Assistant Attorney General

Date: 09/19/2016

UDOT Comptroller Office Contract Administrator

Cherise Young

Title:

Date: 9-21-16

AT & T CORP
SUPPLEMENTAL AGREEMENT NO. ___

Supplement to UDOT Finance No. _____

THIS SUPPLEMENTAL AGREEMENT, made and entered into this _____ day of _____, 20____, **Utah Department of Transportation**, ("UDOT"), and **AT & T**, a Registered Corporation of the State of New York licensed to operate in the State of Utah, ("Company") each as ("Party") and jointly as ("Parties").

The Parties hereto entered in to a Master Utility Agreement (MUA) dated _____, UDOT Finance No. _____. All the terms of the MUA remain in full force and effect unless otherwise specified herein.

The Parties agree as follows:

UDOT and Company will perform the following described Utility Work in accordance with the terms and conditions of the MUA:

a. Description of Utility Work to be performed, including proposed location, described in Exhibit "A" that is incorporated by reference: (Plan Sheets Attached)

b. The Company requirements as shown in the MUA – Company Requirements, are modified as follows:

c. Anticipated duration of Utility Work as shown on Exhibit "B" that is incorporated by reference:

d. Betterments included:

TOTAL ESTIMATED COST OF SUPPLEMENTAL AGREEMENT _____	**$0.00**
TOTAL ESTIMATED COST OF COMPANY PERFORMED UTILITY WORK	$0.00
TOTAL ESTIMATED COST OF UDOT PERFORMED UTILITY WORK	$0.00
COMBINED TOTAL ESTIMATED COST OF UTILITY WORK	**$0.00**
TOTAL ESTIMATED AMOUNT OF COMPANY PARTICIPATION @ 50%	$0.00
TOTAL ESTIMATED AMOUNT OF UDOT PARTICIPATION @ 50%	$0.00

2. UDOT will notify the Company's contact person, Rob Williamson, Telephone No. (208) 338-2816, email rlwilliamson@att.com at least 48 hours in advance of beginning the Utility Work covered herein, or in accordance with the specific terms of the MUA, as applicable.

IN WITNESS WHEREOF, the Parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first written above.

AT & T Corp.

_____

Title: _____

Date: _____

. . . . . .

Recommended For Approval:

_____

Title: Utility and Railroad Leader

Date: _____

Utah Department of Transportation

_____

Title: Project Director

Date: _____

UDOT Comptroller Office Contract Administrator

_____

Title:

Date: _____

158015

STATEWIDE UTILITY RELOCATION AGREEMENT

E 20832

THIS STATEWIDE UTILITY RELOCATION AGREEMENT, made and entered into this 1st day of April, 2014, by and between the **UTAH DEPARTMENT OF TRANSPORTATION**, hereinafter referred to as **"UDOT"** and Qwest Corporation dba CenturyLink QC (**CENTURYLINK**), a Registered Corporation in the State of Colorado, and on behalf of itself and its affiliates, hereinafter referred to as the **"COMPANY."**

RECITALS:

WHEREAS, UDOT has jurisdiction over state Highway Rights of Way and administers the programming, development and completion of State and Federal highway projects (referred to herein as Project or collectively as Projects); and

WHEREAS, the **COMPANY** is a telecommunication utility owning and operating cable and fiber optic and related facilities (Facilities), within state highway rights-of-way under Statewide License Agreement and within **COMPANY** owned easements and fee title property; and

WHEREAS, certain highway Projects will require the relocation, adjustment, or protection of **COMPANY** Facilities; and

WHEREAS, for the purpose of expediting the performance and reimbursement of required relocation work on State and Federal Aid Highway Projects, it is the desire of the parties to enter into this Statewide Utility Relocation Agreement (Agreement) with the understanding that the parties will enter into future Project Agreements, which are supplemental to this Agreement, to address the scope of work, schedule, and other requirements for specific Projects; and

WHEREAS, this Agreement, along with the Project Agreements supplemental hereto, is made to set out the terms and conditions that will govern the relocation work.

TERMS:

1. PROJECT AGREEMENTS

A. For each Project, **UDOT** will prepare a Project Agreement. All terms in the Project Agreements shall be supplemental to the terms of this Agreement. In the case of an inconsistency between the terms of this Agreement and the terms of a Project Agreement, the terms of the Project Agreement shall control. In some cases, particularly when **UDOT** engages a design builder or a construction manager general contractor, the parties may enter into Supplemental Agreements to the Project Agreement. The Project Agreements and Supplemental Agreements should address utility relocation work for specific Project locations and include a description of the work, the party to perform the work, the location of the work, review times, the estimated duration of the work, scheduled completion date, an estimate of the cost to each party, any proposed betterments, including a plan showing the existing and proposed locations of the Facilities, and any necessary right-of-way documents as applicable. The estimates contained in the Project Agreements will be based upon material and labor prices as of the date of the estimate and do not account for increases due to unforeseen circumstances in accomplishing the relocation work.

B. The parties hereto agree to use a form Project Agreement to describe and perform the actual work on individual Projects, a copy of which is marked "EXHIBIT B" attached hereto and thereby made a part hereof.

2. PROJECT DEVELOPMENT AND COORDINATION

A. During the design phase of any Project, **UDOT** and **COMPANY** will identify the extent of the conflicts and propose and provide a mutually agreeable location to which the Facilities can be relocated. **UDOT** will provide the **COMPANY** with Project design plans as early as possible, and will schedule and meet with the **COMPANY** to review the right-of-way and environmental requirements, design, construction, cost estimates, and scheduling for the **COMPANY's** utility relocation work at specific locations on the Project to ensure maximum lead time for advance order of materials and scheduling of work force.

B. **COMPANY** shall advise **UDOT** of the approximate time required for completion of the Relocation Work and all known limitations including permit and regulatory approvals, dependency upon work of other parties, lead times for acquiring materials, notifications, and scheduling work crews. **UDOT** will, by its standard specifications and/or special provisions, make its contractor aware of the coordination and cooperation required for timely completion of utility work. **UDOT**'s contractor shall be advised of the approximate schedule for completion of said work and the **COMPANY** shall diligently pursue its work so that completion can be accomplished according to an agreed upon schedule, and as soon as possible after having been authorized to proceed.

C. If either party or their contractors intend to implement a redesign, scope or schedule change, **UDOT** and **COMPANY** shall meet in advance and coordinate to identify the change and the potential impact to both parties, including but not limited to costs and scheduling.

D. The **COMPANY** shall notify **UDOT**, or its contractor if so designated by **UDOT**, within seventy two (72) hours of its discovery of any occurrence or unforeseen circumstances that would prevent the **COMPANY** from completing the Relocation Work according to the time schedule established in the Project Agreement.

E. For Projects subject to federal Buy America requirements, as determined by **UDOT**, materials composed predominantly of iron or steel that are permanently incorporated into the work are subject to 23 CFR 635.410, Buy America requirements. **COMPANY** will provide **UDOT's** Resident Engineer with signed Buy America Certifications prior to or at the time subject materials are delivered to the project site, according to the specific instructions and format set forth in the attached Exhibit A.

3. DESIGN BUILD PROJECTS

A. During the proposal phase of any design build Project, **UDOT** shall schedule a meeting with **COMPANY** and **UDOT's** prospective contractors. The purpose of the meeting will be to determine if conflicts with the **COMPANY's** Facilities can be avoided and to provide prospective contractors with parameters within which **COMPANY's** Facilities can be relocated. **COMPANY** and **UDOT** will also meet one time individually with each prospective contractor.

B. All provisions of this Agreement apply to Design Build Projects unless stated otherwise.

4. BETTERMENT WORK

If the **COMPANY** desires to include a betterment in the utility work at any specific location, **UDOT** will allow for betterment work to be performed, provided the parties can reasonably coordinate the Project schedule to accommodate the betterment work without increasing Project costs or delaying the Project. Betterment is defined as set forth in 23 CFR 645, Section 645.105, Definitions. Specifically, betterment is any upgrading of the facility being relocated that is not attributable to the highway construction and is made solely for the benefit of and at the election of the **COMPANY**. Any upgraded facility due solely to the lack of equivalent replacement does not constitute a betterment. The difference in costs between the minimum construction required as a result of the Project and the **COMPANY's** desired construction shall be at the **COMPANY's** sole expense. The actual costs for the **COMPANY's** participation shall be determined upon completion and final billing for the relocation work.

5. COMPANY REQUIREMENTS

A. The **COMPANY** is required to comply with all applicable service interruption notification times and restrictions required by their customer service contracts, the Public Service Commission, Public Safety Agencies, the Federal Aviation Administration, etc.

B. Existing fiber loops will not be cut to add additional splices. Replacement fiber will be placed between designated splice points, even if it extends beyond the project limits. Replacement copper will be placed from pedestal to pedestal. No buried splices will be allowed under new pavement sections. These requirements may be modified upon written agreement by the Parties.

6. UDOT PROJECT RESPONSIBILITIES

A. In accordance with current policies and directives, **UDOT** may perform Subsurface Utility Engineering, Quality Levels A and B, within the limits of a Project. Additional work required to determine the vertical location of underground Facilities at specific, critical locations will be reviewed and if test holes are required, such costs will be shared between the parties on the same basis of responsibility as described in Section 7. A summary of the costs will be provided to the **COMPANY,** and the **COMPANY's** proportional share of the actual cost will be withheld from the **COMPANY**'s relocation reimbursement.

B. If, during the design phase of a Project, a major scope change is implemented after **COMPANY**'s design has been finalized and approved, **COMPANY** will be reimbursed 100% for redesign costs. **UDOT** will adjust any existing schedules to allow for any reasonable time that may be required for the **COMPANY** to redesign or modify its plans and relocate its Facilities when **UDOT** or its contractors requires the redesign.

C. **UDOT,** through its contractors, will provide surveying and staking of roadway facilities as required by the **COMPANY,** in accordance with **UDOT's** Standard Specifications, Section 01721, Survey, 3.16, Utilities. The cost of the surveying and staking will be at **UDOT**'s expense and will not be recovered from the **COMPANY**. Any of **UDOT**'s survey control stakes or bench markers which are removed or damaged by the **COMPANY** shall be reestablished by **UDOT** at **COMPANY's** expense.

D. **UDOT** will require its contractors to protect in place any existing facilities belonging to the **COMPANY**, including services, which, with the concurrence of the **COMPANY**, will not be relocated or adjusted during the proposed construction activities.

E. If, during the construction phase, **UDOT**'s contractor is allowed to accelerate the agreed upon baseline or proposal schedule, **UDOT** will hold the contractor responsible for 100% of the cost for a **COMPANY** approved contract engineer to perform tasks needed to meet the accelerated schedule which exceeds the **Company's** anticipated engineering schedule.

F. **UDOT** will require its contractor to reopen any splice pits the contractor covered prior to **COMPANY** crews completing splicing activities at no cost to the **COMPANY**, provided **COMPANY** is following their work schedule as agreed upon by **UDOT** and **COMPANY**.

7. COMPANY TO DESIGN AND CONSTRUCT UTILITY WORK

A. The **COMPANY**, with its regular engineering and construction forces at its standard schedule of wages and working hours, or through its qualified contractors with whom it has continuing contracts or has obtained contracts upon appropriate solicitation, will perform the necessary design work, field and office engineering, and shall furnish all materials and perform the construction work on its Facilities, necessitated by the Project. In performance of said work, the **COMPANY** and its contractors will adhere to the requirements of Utah Administrative Code R930-7 Utility Accommodation, as amended.

B. The **COMPANY** is required to meet clear zone requirements as defined in AASHTO's "Roadside Design Guide" and minimum vertical and horizontal clearances as defined in R930-7 Utility Accommodation, as amended.

C. The **COMPANY**, while engaged in the relocation of its Facilities, shall comply with **UDOT's** Standard Specification for Road and Bridge Construction Section 01355, Subpart 1.13, Discovery of Historical, Archeological or Paleontological Objects, if performing work within UDOT's right-of-way.

D. **COMPANY** provided traffic control devices shall conform to the standards set forth in the Manual on Uniform Traffic Control Devices ("MUTCD"), as adopted by **UDOT**. All flagging personnel shall be certified.

E. **COMPANY** employees and contractors working in the highway right-of-way shall comply with requirements of MUTCD Section 6D.03. concerning high-visibility safety apparel, as amended.

8. UDOT MAY DESIGN AND CONSTRUCT CERTAIN UTILITY FACILITIES

A. The **COMPANY** will perform design review and cost estimating; provide electronic equipment and splicing; and perform inspection with its own forces. The **COMPANY** may, at its discretion, allow **UDOT** to perform relocation design and/or construction work through qualified engineering and construction contractors appearing on the **COMPANY's** current preapproved list to perform the Utility Work, necessitated by a Project. If conduit, cable, fiber, pedestals and placing of such are required for the Utility Work, **UDOT** will obtain the materials from the contractors on the **COMPANY's** preapproved list. The **COMPANY** makes no representations as to the quality of work performed by the engineers and construction contractors on the **COMPANY's** preapproved list.

B. The **COMPANY** will require a four (4) week period after proposed design plans are delivered to the **COMPANY**, to review **UDOT**'s engineer's or contractor's design plans and the **COMPANY**'s pricing, and for internal approvals**. UDOT,** or its engineer or contractor shall provide to **COMPANY,** design plans in the following two (2) formats: (1) a civil engineered design package and (2) a format consistent with **COMPANY**'s internal telecommunications record keeping system. The **COMPANY** will approve the relocation plans and cost estimates in writing before incorporation into the Project or Supplemental Agreements.

C. **UDOT's** engineer or contractor will be required to provide the **COMPANY** with a schedule for the completion of their performed work before the **COMPANY** can prepare and submit a schedule for their performed work.

D. The **COMPANY** will perform inspection of the work on the **COMPANY's** facilities that will be performed by **UDOT**'s contractor. It is agreed that **UDOT**'s contractor will accomplish the work on the **COMPANY's** facilities in accordance with the plans and specifications approved by the **COMPANY**. Changes or additions to said plans and specifications shall be approved by the **COMPANY**. The **COMPANY** through their inspection of the contractor's work, will provide **UDOT's** Resident Engineer with information covering any problems or concerns the **COMPANY** may have with acceptance of said Facilities upon completion of construction.

E. The **COMPANY** will require two (2) business days notice to schedule a construction inspector for each location.

F. The **COMPANY** requires at least ninety (90) days notice to schedule splicing, and will determine the splicing window based on the types of circuit(s) and the requirements of Home Land Security and the Federal Aviation Administration (FAA).

G. If **UDOT's** contractor will be installing betterment facilities for the **COMPANY**, the Contractor will provide the **COMPANY** with a schedule of prices or a price breakdown for any betterment work requested. If the cost of the betterment work is not within 15% of the standard **COMPANY** costs, **COMPANY** will be allowed to have one of its approved contractors perform the betterment work in accordance with Paragraph 4 of this agreement. If **COMPANY's** contractor is to place the betterment, UDOT's contractor will grant reasonable access to open trenches and any area within the project limits required to construct the betterment, as determined by UDOT.

9. CHANGES IN WORK

In the event there are changes in the scope of the work, extra work, or changes in the planned work covered by this Agreement or Project Agreement, a modification will be approved in writing by the parties thereto prior to the start of work on said changes or additions.

10. COMPANY TO NOTIFY UDOT AND ITS CONTRACTOR BEFORE BEGINNING CONSTRUCTION WORK

The **COMPANY** will notify **UDOT's** Resident Engineer or authorized representative as identified in the Project Agreement at least 48 hours in advance of beginning any work. Such notification can be by telephone, email or in writing.

11. EMERGENCY WORK

When the **COMPANY** experiences an emergency unrelated to its work on the highway Project, it will take care of said emergency, after which it will again notify **UDOT** as to when work will be resumed on the Project.

12. DAILY RECORD KEEPING

UDOT, through its Resident Engineer or authorized representative, will keep daily record of the work performed by the **COMPANY**. The daily record shall be signed by **UDOT's** Project representative and the **COMPANY** or their authorized representatives as required and a copy shall be retained by the parties to this Agreement. If emergencies occur requiring the **COMPANY's** work forces to leave the job, record keeping shall be resumed upon return to the Project.

13. REIMBURSEMENT FOR COMPANY'S WORK

A. Pursuant to Utah Code Section 72-6-116, as amended, **UDOT** will reimburse the **COMPANY** 50% of the cost of all **COMPANY** costs related to the relocation work for its Facilities within State right-of-way, and 100% of the cost of all **COMPANY** costs related to the relocation work for its Facilities located within **COMPANY** owned easement, fee property or a public utility easement as defined in Section 54-3-27.

If the **COMPANY**'s Facilities are relocated from a **COMPANY** owned easement, fee title or public utility easement to State right-of-way and the **COMPANY** transfers its property interest without cost to **UDOT**, **UDOT** will reimburse the **COMPANY** 100% of the relocation costs caused by **UDOT**'s projects in the future.

B. Reimbursable costs will be developed in accordance with 23 CFR, Part 645, Subpart A.

C. The **COMPANY** will submit itemized bills covering its actual costs incurred for performing the work covered by the Project Agreements hereto, bearing the Project number together with supporting sheets on a monthly or quarterly basis.

D. **COMPANY** will also send one final and complete billing of all actual costs incurred within six months following completion of the work by the **COMPANY** on the Project to:

UDOT Contracts, Estimates and Agreements Specialist
4501 South 2700 West, Box 148220
Salt Lake City, Utah 84114-8220

E. In the event **COMPANY** fails to send a final bill to **UDOT** within six months of completion of **Company** work, **UDOT** may send notice to **COMPANY** requesting a final bill. **COMPANY** will have 45 days to respond with a final bill or will forfeit payment for the unbilled portion of the work. Both parties agree to cooperatively work together in good faith to resolve any disputes on the final billing within sixty (60) days after UDOT receives the final bill from **COMPANY**.

F. **UDOT** will reimburse the **COMPANY** within sixty (60) days after receipt of said billings but only for items complying fully with the provisions of 23 CFR, Part 645, Subpart A, Utility Relocations, Adjustments and Reimbursements. **UDOT** will provide a written explanation of any billings not reimbursed and the **COMPANY** shall have thirty (30) days from the date of such explanation to cure any deficiencies and re-submit to **UDOT**.

14. SALVAGE CREDIT

All materials from the existing **COMPANY** Facilities, which are recovered in suitable condition for reuse by the **COMPANY** and not reused on the Project, shall be credited to the cost of the Project at current stock prices in accordance with 23 CFR 645.117. If the recovered materials are not suitable for reuse, they shall be credited at salvage prices or such other prices as agreed upon between the **COMPANY** and **UDOT** following inspection of the recovered material.

15. COSTS DIFFER BY MORE THAN TEN PERCENT

If **COMPANY's** actual costs incurred for its reimbursable work differs more than 10% (plus or minus) per line item from the amount contained in the Project Agreement Cost Estimate, then **COMPANY** is required to submit a letter of explanation with its billings indicating why and how said difference in costs occurred.

16. AUDIT

UDOT and/or the Federal Highway Administration shall have the right to audit all cost records and accounts of the **COMPANY** pertaining to the Project in accordance with 23 CFR, Part 645, Subpart A. Should this audit disclose that the **COMPANY** has been underpaid, the **COMPANY** will be reimbursed by **UDOT** upon submission of additional billing to cover the underpayment. Should this audit disclose that the **COMPANY** has been overpaid, the **COMPANY** will reimburse **UDOT** in the amount of the overpayment. For the purpose of audit the **COMPANY** is required to keep and maintain its records of work covered herein for a minimum of three years after final payment is received by the **COMPANY** from **UDOT**.

17. MISCELLANEOUS

A. In the event of any dispute relating to this Agreement, resulting in litigation, the prevailing party shall be entitled to recover all costs, including reasonable attorney fees.The provisions of this Agreement are severable, and should any provision be deemed void, unenforceable or invalid, such provision shall not affect the remainder of this Agreement.

B. This Agreement shall be governed by the laws of the State of Utah and applicable federal law. Any litigation shall be instituted only in a court of competent jurisdiction, whether state or federal, located within the State of Utah.

C. This Agreement may be terminated by either party by providing 30 day written notice of termination to the other party. Any such termination shall not affect the validity of any previously executed Project Agreements or any other agreements supplemental to this Agreement.

****

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed by their duly authorized officers as of the day and year first above written.

STATE OF UTAH)

) §

COUNTY OF Salt Lake)

Subscribed and sworn to before me this 1 Day of April, 2014.

Notary Public

Residing in: Davis County

Commissions Expires: 2/12/17

(IMPRESS SEAL)

APPROVED AS TO FORM:

By: _____
Counsel for **COMPANY**

Qwest Corporation dba CenturyLink QC (CENTURYLINK), A Registered Corporation in the State of Colorado on behalf of itself and its affiliates

By: _____

Title:: Director of Network operations

Date: 4/1/14

WHITNEY BENTZ
Notary Public State of Utah
My Commission Expires on:
February 12, 2017
Comm. Number: 662761

****

UTAH DEPARTMENT OF TRANSPORTATION

RECOMMENDED FOR APPROVAL:

By: _____

Title: UDOT Statewide Utilities Engineer

Date: 02 April 2014

APPROVED:

By: _____

Title: UDOT Project Development Director

Date: 4/2/14

APPROVED AS TO FORM:

By: _____

Title: Assistant Attorney General

Date: 4/1/2014

COMPTROLLER'S OFFICE

By: _____

Title: UDOT Comptroller Office Contract Administrator

Date: 4-15-14

Exhibit A
BUY AMERICA

Federal-aid projects are subject to Title 23 CFR Part 635.410, Buy America Requirements. This federal regulation requires a domestic manufacturing process for all steel or iron products that are permanently incorporated into federal-aid highway construction projects. This includes relocation projects performed by utility companies and reimbursed by the Utah Department of Transportation. This exhibit establishes the required documentation and Utility Company responsibilities to demonstrate compliance with this federal law. A copy of the federal regulation can be found at: http://www.fhwa.dot.gov/construction/contracts/buyam_qa.cfm

A. All products predominantly manufactured from steel and iron must be manufactured in the United States to be considered domestic.

   1. All manufacturing processes of the steel and iron material in a product such as melting, rolling, extruding, machining, bending, grinding, drilling, and coating must occur within the United States.
   2. Coating includes all processes that protect or enhance the value of the material to which the coating is applied. The material applied as a coating is not subject to Buy America.

B. Maintain Material Certifications of Compliance for each manufacturing and coating process for three (3) years after delivery to project site. Upon request provide access to these documents to the Utah Department of Transportation and the Federal Highway Administration.

   1. Include as a minimum the following information for Material Certifications of Compliance for Buy America:
      a. Signed mill test report.
      b. Signed certification by each Fabricator and Manufacturer that has handled the steel or iron product affirming that every process, including the application of a coating, performed on the steel or iron product has been carried out in the United States.
      c. Material descriptions, quantities, and means of material identification such as heat numbers, lot numbers, and other industry identification markings for each process the material underwent so the final product can be tracked through a step process from melting to final product.
      d. Tracking of quantities is not required for coating operations.

   2. Include all steel or iron materials that can't be substantiated as being of domestic origin in cost documentation for foreign steel or iron.

C. The above requirement does not preclude a minimal use of foreign steel or iron, provided the cost of the steel or iron used does not exceed one tenth of one percent (0.1 percent) of the total contract amount or $2,500, whichever is greater. The contract referenced here is the contract between the Utah Department of Transportation and the Utility Company. Maintain satisfactory cost documentation to describe the minimal use materials being incorporated into the project when foreign steel or iron is used.

D. The following are exempt from Buy America:
   1. Temporary steel or iron materials.
   2. Materials left in place for the contractor's convenience
   3. Nuts, bolts, washers, screws, tie wire, spacers, and other miscellaneous steel or iron parts that are considered common off-the-shelf products.
   4. Fencing stays, clips, staples, or other miscellaneous fencing components.
   5. Manufactured products that are less than 90% steel or iron content by volume when it is delivered to the job site for installation. Pre-cast concrete items such as pipe, manholes, boxes and vaults still need to meet the Buy America requirements.
   6. Miscellaneous steel or iron components, subcomponents and hardware necessary to encase, assemble and construct predominately steel or iron products are not subject to Buy America requirements. These miscellaneous items include but are not limited to, lifting hooks, concrete chairs, cabinets, covers, shelves, clamps, fittings, and sleeves.

E. Provide a written Company Certification (using the included form below) that all delivered steel and iron items subject to Buy America as defined above are manufactured domestically.

COMPANY CERTIFICATION

Certification Requirement for 23 CFR 635.410 Buy America

This project will be utilizing federal funds. Please complete, sign and submit this Buy America Certification to UDOT's Resident Engineer prior to or at the time subject materials are delivered to the project site.

Buy America Certification

I certify that all materials provided for use on Federal Aid Highway Project #_____, except for minimal use materials, meet the requirements of 23 CFR 635.410 Buy America and any amendments thereto. Material Certificates of Compliance for each manufacturing and coating process performed during the production of these materials are on file and will be made available for review by the Utah Department of Transportation and the Federal Highway Administration upon request.

Signature _____

Name _____

Title _____

Company Name _____

Date _____

Estimated Dollar Value of Minimal Use Materials Provided _____

Project No. _____; _____ County
Project Name:_____
CenturyLink
Job No. _____
CID No. _____ PIN _____

EXHIBIT B

CENTURYLINK

PROJECT AGREEMENT

Supplement to Statewide Utility Relocation Agreement, Finance No. XXXXXX

THIS PROJECT AGREEMENT, made and entered into this_____ day of _____, 20_____, by and between the **UTAH DEPARTMENT OF TRANSPORTATION**, hereinafter referred to as **"UDOT"** and **QWEST CORPORATION DBA CENTURYLINK QC**, a Registered Corporation in the State of Colorado, hereinafter referred to as the **"COMPANY",**

The parties hereto entered in to a **STATEWIDE UTILITY RELOCATION AGREEMENT** dated _____ **UDOT** Finance No. XXXXXX. All the terms of said **STATEWIDE AGREEMENT** remain in full force and effect unless otherwise specified herein.

NOW THEREFORE, it is agreed by and between the parties hereto as follows:

1. The **COMPANY** will perform the following described work in accordance with the terms and conditions of the **STATEWIDE UTILITY RELOCATION AGREEMENT.**

   Description of work to be performed, including location:

   (Plan Sheets and Right of Way Documents, if applicable, attached)

   Party performing the work:

   Anticipated duration of work:

   Estimated Total Cost of Work:
   (Detailed Estimate attached)

Project No. _____; _____ County
Project Name:_____
CenturyLink
Job No. _____
CID No. _____ PIN _____

Betterments Included:

2. **UDOT** will perform the following described work in accordance with the terms and conditions of the **STATEWIDE UTILITY RELOCATION AGREEMENT.**

   Description of work to be performed, including location:

3. Work to be completed under this Project Agreement is subject to the following:

   Special Provisions

   -
   -
   -

4. The **COMPANY** shall be reimbursed by **UDOT** for XXX% of the actual costs incurred by the **COMPANY** for performing the work covered herein. An Estimate of the total cost of said work was furnished by the **COMPANY** to **UDOT** under date of _____ in the total amount of _____Dollars ($_____). A copy of the details of said estimates are marked "EXHIBIT A" attached hereto and thereby made a part hereof.

   TOTAL ESTIMATED COST TO UDOT IS $_____

   TOTAL ESTIMATED COST TO THE COMPANY IS $_____

   NOTE: The above are estimates only. Total payment to the **COMPANY** by **UDOT** will be based on the actual costs incurred as determined after completion of construction.

5. Upon signature and return of four copies of this Project Agreement to **UDOT**, the **COMPANY** is authorized to proceed with the work covered herein.

Project No. _____; _____ County
Project Name:_____
CenturyLink
Job No. _____
CID No. _____ PIN _____

****

IN WITNESS WHEREOF, the parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first written above.

STATE OF UTAH)
§
COUNTY OF)

Subscribed and sworn to before me this
_____Day of _____, 20____.

_____
Notary Public
Residing in:
Commissions Expires:

QWEST CORPORATION DBA CENTURYLINK QC, A Registered Corporation
in the State of Colorado

By: _____

Title:: _____

Date: _____

(IMPRESS SEAL)
****

RECOMMENDED FOR APPROVAL:

_____
Utility and Railroad Coordinator
Date: _____

UTAH DEPARTMENT OF TRANSPORTATION

By_____
Region Director
Date: _____

APPROVED AS TO FORM:

The Utah State Attorney General's Office has previously approved all paragraphs in this Agreement as to form.

UDOT COMPTROLLER'S OFFICE:

_____
Contract Administrator
Date: _____

01 April 2014

178260

BANGERTER

Project No. S-0154(12)11, Salt Lake County
4 Interchanges on Bangerter Highway
CENTURYLINK QC
25912 Charge ID No. 71939 PIN 12566

CenturyLink™

CENTURYLINK QC
PROJECT AGREEMENT

Supplement to Statewide Utility Relocation Agreement, Finance No. 158015

THIS PROJECT AGREEMENT, made and entered into this 12 day of Sept, 2016, by and between the **UTAH DEPARTMENT OF TRANSPORTATION**, hereinafter referred to as **"UDOT"** and **QWEST CORPORATION DBA CENTURYLINK QC**, a Registered Corporation in the State of Colorado, hereinafter referred to as the **"COMPANY."**

The parties hereto entered in to a **STATEWIDE UTILITY RELOCATION AGREEMENT** dated April 2, 2014, **UDOT** Finance No. 158015. All the terms of the **STATEWIDE UTILITY RELOCATION AGREEMENT** remain in full force and effect unless otherwise specified herein.

NOW THEREFORE, it is agreed by and between the parties hereto as follows:

1. **PROJECT INFORMATION**

UDOT is preparing to request proposals for and award a design-build contract for the highway project identified as S-0154(12)11, Salt Lake County, 4 Interchanges on Bangerter Highway hereinafter referred to as the "Project". UDOT's design-build contractor will complete the design and administer construction of the Project. The project contractor will hereinafter be referred to as the "Design-Builder".

2. **PROJECT CONTACT INFORMATION**

UDOT's Project Representative is Alana Spendlove, UDOT Project Utility and Railroad Leader, telephone number (801) 887-3462 and e-mail aspendlove@utah.gov.

UDOT's Resident Engineer for 5400 South and 7000 South interchanges is Bryan Chamberlain, telephone number (801) 887-3405, and e-mail bchamberlain@utah.gov, or their designated representative, as assigned.

UDOT's Resident Engineer for 9000 South and 11400 South interchanges is Ken Talbot, telephone number (801) 360-8750, and e-mail kentalbot@utah.gov, or their designated representative, as assigned.

Company's contact person for the Project is Daren Keller, telephone number (801) 356-6975, e-mail darren.keller@centurylink.com, and mailing address 75 East 100 North, Provo, Utah 84601.

After awarding the Project, UDOT will provide the Company with the Design Builder contact information, hereinafter referred to as "Design-Builder Project Representative."

75 E 100 N, 203
Provo, UT 84606
www.centurylink.com

3. AUTHORIZATION FOR DESIGN WORK

In order to facilitate coordination and obtain technical information about the Company's Utilities and requirements for inclusion in this Agreement and the Request for Proposals, UDOT gave the Company authorization for preliminary design engineering on April 26, 2016.

4. PROJECT REQUIREMENTS

The Company desires to design and construct its own Utility Work necessitated by the Project and shall conduct the Utility Work in accordance with the specific terms of the Statewide Utility Relocation Agreement.

The Company shall not commence performing any Utility Work until the Project Agreement is executed by both Parties and the Company receives an Authorization to Proceed letter.

****

IN WITNESS WHEREOF, the parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first written above.

QWEST CORPORATION DBA CENTURYLINK QC,
A Registered Corporation in the State of Colorado

By: K.C. [signature]

Title: Mgr Engineering & Construction

Date: 8/24/16

Recommended For Approval:

[signature]

Title: Utility and Railroad Leader

Date: 9/6/16

Utah Department of Transportation

[signature]

Title: Project Director

Date: Sept 12, 2016

Approved as to Form

[signature]

Title: Assistant Attorney General

Date: 09/19/2016

UDOT Comptroller Office Contract Administrator

[signature]

Title:

Date: 9-21-16

178140

Project No. S-0154(12)11, Salt Lake County
4 Interchanges on Bangerter Highway
COMCAST CABLE
Charge ID No. 71939 PIN 12566

25695

COMCAST CABLE
MASTER UTILITY AGREEMENT

THIS MASTER UTILITY AGREEMENT, made and entered into this 8 day of Aug, 2016, by and between the **Utah Department of Transportation**, ("UDOT") and **Comcast Cable**, doing business as Comcast Cable, a Registered Corporation in the State of Utah, ("Company") (each as "Party" and jointly as "Parties").

RECITALS

WHEREAS, UDOT is preparing to request proposals for and award a design-build contract for the highway project identified as Project Number S-0154(12)11, 4 Interchanges on Bangerter Highway in Salt Lake County, Utah, ("Project"); and

WHEREAS, the design-build contractor will complete the design and administer construction of the Project ("Design-Builder"); and

WHEREAS, UDOT has identified Company facilities within the limits of the Project, which may necessitate the relocation, protection or adjustment of the facilities ("Utility Work"); and

WHEREAS, the Company desires to design and construct its own Utility Work necessitated by the Project; and

WHEREAS, for the purpose of expediting any required Utility Work and reimbursement, the Parties are entering into this Project Master Utility Agreement with the understanding that future supplemental agreements to this Agreement will be entered into covering Utility Work to be accomplished by the Company at specific Project locations.

THIS AGREEMENT is made to set out the terms and conditions where under the Utility Work shall be performed.

AGREEMENT

NOW THEREFORE, the Parties agree as follows:

1. CONTACT INFORMATION

UDOT's Project Representative is Alana Spendlove, UDOT Project Utility and Railroad Leader, telephone number (801) 887-3462, and e-mail aspendlove@utah.gov.

UDOT's Resident Engineer for 5400 South and 7000 South interchanges is Bryan Chamberlain, telephone number (801) 887-3405, and e-mail bchamberlain@utah.gov, or their designated representative, as assigned.

UDOT's Resident Engineer for 9000 South and 11400 South interchanges is Ken Talbot, telephone number (801) 360-8750, and e-mail kentalbot@utah.gov, or their designated representative, as assigned.

UDOT's Field Representative contact person will be identified in subsequent supplemental agreements.

Company's contact person is David Mascarenas, telephone number (801) 831-6622, and e-mail david_mascarenas@cable.comcast.com.

After awarding the Project, UDOT will provide the Company with the Design-Builder contact information, hereinafter referred to as "Design-Builder Project Representative."

2. AUTHORIZATION FOR DESIGN WORK

In order to facilitate coordination and obtain technical information about the Company's facilities and requirements for inclusion in this Agreement and the request for proposals, UDOT gave the Company authorization for preliminary design engineering on April 26, 2016.

3. SUBSURFACE UTILITY ENGINEERING

UDOT has performed Subsurface Utility Engineering (SUE) within the limits of the Project. Additional SUE work to determine the precise location of underground facilities at specific, critical locations on the Project will be reviewed with the Company

4. PROJECT COORDINATION

During the development of the Project design, Company and UDOT, along with its Design-Builder, shall consult as necessary in an effort to determine if conflicts with the Company's facilities can be avoided. The Parties shall confer until a resolution is reached on each potential conflict.

If Utility Work for the Company's facilities is required to accommodate the Project, UDOT will be responsible to propose and provide a location for the facilities. UDOT will provide the Company with Project design plans as early as possible, and will schedule and meet with the

Company to review the design, construction, estimates of cost, and scheduling for the Company's Utility Work at specific locations on the Project to insure maximum lead time for advance order of materials and work force scheduling.

The Company shall advise UDOT's Project Representative of the approximate time required for completion of the Utility Work and shall diligently pursue its Utility Work so that completion can be accomplished according to the pre-determined time schedule negotiated by the Company and UDOT in the supplemental agreement issued hereto for a specific Project location. The Company shall immediately notify UDOT's Project Representative by, phone call or email, of its discovery of any occurrence or unforeseen circumstances that would prevent the Company from completing its Utility Work according to the time schedule provided. In addition, the Company shall describe the circumstances in writing within 24-hours of the discovery to UDOT's Project Representative.

5. COMPANY REQUIREMENTS

UDOT will comply with the following Company requirements:

a. Company requires advance notice of 72 hours for emergency splicing, 5 business days for normal splicing, and 2-4 weeks' notice for larger distribution lines.

b. Company's maintenance hours of operation are between 1:00 a.m. and 6:00 a.m. The Company does not allow disruption of its cable television services.

6. COMPANY TO DESIGN AND CONSTRUCT ITS UTILITY WORK

The Company, with its regular engineering and construction forces at its standard schedule of wages and working hours, or through qualified contractors with whom they have continuing contracts, shall perform the necessary design work in accordance with Company's standards regularly followed by the Company and not considered a betterment, cost estimating, field and office engineering, furnish all materials, and perform the Utility Work necessitated by the Project.

7. STANDARD SPECIFICATIONS AND REGULATIONS

The Company, while engaged in the preliminary design and Utility Work of its facilities, shall comply with UDOT's 2012 Standard Specifications for Road and Bridge Construction and Utah Administrative Code R930-7.

8. UNDERBUILT AND FACILITY REMOVAL REQUIREMENTS

The Company is responsible to remove all Company-owned underbuilt facilities from utility poles that will be relocated or removed due to the Project.

9. RIGHT-OF-WAY

Any easements or replacement right-of-way required in conjunction with the Utility Work of Company's facilities will be acquired by UDOT in accordance with the requirements of Utah Administrative Code R930-8-7.

10. MAINTENANCE OF TRAFFIC (MOT), TRAFFIC CONTROL, CLEAR/GRUB, AND SURVEYING

UDOT will provide MOT and traffic control for Utility Work at no cost to the Company. The Company is responsible to coordinate Utility Work schedules and traffic control needs with UDOT to facilitate the Project schedule and minimize impacts to the public. Except in the case of emergencies, Company's Utility Work on the Project will be scheduled in compliance with the requirements of the Limitation of Operations contained in UDOT's Design-Builder contract with respect to lane closures, peak hour work restrictions, holiday and special event limitations, etc.

UDOT will provide, at no cost to the Company, clearing and grubbing of the roadway as required by the Company and in accordance with UDOT's Standard Specifications.

Surveying and staking of roadway facilities as required by the Company will be provided by UDOT in accordance with UDOT's Standard Specifications. The cost of the surveying and staking will be at UDOT's expense and the Company will have no obligation for the cost of surveying. Any of UDOT's survey control stakes or bench markers which are removed or damaged by the Company shall be reestablished by UDOT at the Company's expense.

11. BETTERMENT WORK

If the Company desires to include betterment work in the Project at any specific location, UDOT may agree to the betterment work provided the difference in costs between the functionally equivalent required Utility Work and the Company's desired betterment work shall be at the sole cost of the Company, and the betterment work can reasonably be accommodated without delaying UDOT's Project. The betterment work will be addressed by a separate supplemental agreement between UDOT and the Company.

Once a Design-Builder has been selected by UDOT, any betterment work request will be negotiated directly with the Design-Builder. However, it is at UDOT's sole discretion to approve the betterment work.

12. SUPPLEMENTAL AGREEMENTS

UDOT and the Company shall enter into individual supplemental agreements to cover Utility Work at specific Project locations. Each supplemental agreement will include a description and location of the Utility Work to be performed, design drawings showing the original and proposed locations of the facilities, Utility Work schedules, cost estimates, participation shares for UDOT and the Company, any proposed betterment work, and any necessary right-of-way documents. The cost estimates will be based upon the prices of materials and labor current as of the date of the estimates. The estimates do not account for increases due to unknown and unforeseen hardships in accomplishing the Utility Work. A copy of the format of the proposed supplemental agreement is marked Exhibit "A" that is incorporated by reference.

The Company will require a 2 week review and approval period for any final supplemental agreement submitted to the Company by UDOT.

In the event there are changes in the scope of the Utility Work, extra Utility Work, or changes in the planned Utility Work covered by a supplemental agreement, a modification to the supplemental agreement signed by the Parties is required prior to the start of Utility Work on the changes or additions.

13. UDOT AUTHORIZATION TO PROCEED WITH UTILITY WORK

The Company shall not perform any Utility Work until the supplemental agreement for the Utility Work is signed by the Company and received by UDOT. UDOT will review and approve the supplemental agreement and will issue an authorization to proceed to the Company for each specific Utility Work location.

14. COMPANY TO NOTIFY UDOT AND THE DESIGN-BUILDER BEFORE BEGINNING COMPANY-PERFORMED UTILITY WORK

The Company will notify UDOT's Resident Engineer as well as the Design-Builder Project Representative at least 2 business days in advance of beginning any Utility Work covered by any supplemental agreements hereto. The Company will give subsequent notifications of when and where the Company will be performing Utility Work to UDOT's Field Representative and the Design-Builder Project Representative on a day-to-day basis. Such subsequent notifications can be informal. Failure on the part of the Company to give proper notification to UDOT's Field Representative and the Design-Builder Project Representative will be cited to the Company and that portion of the Company's Utility Work performed while not under the surveillance of the UDOT Field Representative may be deducted from the reimbursement at UDOT's discretion

15. DAILY RECORD KEEPING

UDOT's Field Representative will keep daily records of the Utility Work performed by the Company forces. Daily records will be kept on forms to be prepared by the Company or UDOT. The type of form to be used shall be preapproved by UDOT's Contracts, Compliance, and Certification Manager. The daily records shall be signed by UDOT's Field Representative, and the Company or its authorized representative. Copies of the Utility Work daily records shall be retained by the Parties.

16. REIMBURSEMENT FOR COMPANY'S UTILITY WORK

In accordance with Utah Code §72-6-116(3)(a)(ii), UDOT will reimburse the Company 50% of the cost of Utility Work to accommodate a state highway project and the Company shall pay the remainder of the cost. UDOT will reimburse the Company 100% of the cost of Utility Work for facilities located on a public utility easement or subdivision plat, on a Company-owned private easement, or fee property. The Company shall provide UDOT with a copy of the public utility easement, private easement or fee title. The Utility Work and reimbursement will be in conformance with the requirements of Utah Administrative Code R930-8.

The Company shall submit itemized bills covering its actual costs incurred for performing the Utility Work covered by supplemental agreements to UDOT's Contracts and Compliance Specialist:

UDOT Contracts and Compliance Specialist
4501 South 2700 West
Construction Office, Box 148220
Salt Lake City, Utah 84114-8220

Itemized bills shall bear the Project number, supplemental agreement number, supporting sheets, and a complete billing statement of all actual costs incurred, following the order of the items in the detailed estimates contained in the supplemental agreement and be submitted to UDOT within 60 days following completion of the Utility Work by the Company on the Project. Otherwise, previous payments to the Company may be considered final, except as agreed to between the Parties in advance.

UDOT will reimburse the Company within 60 days after receipt of the billings, but only for those items complying fully with the provisions of Utah Administrative Code R930-8. Failure on the part of the Company to submit the billings within 6 months of the completion of the Utility Work will result in UDOT's disallowance of reimbursement for that portion of Utility Work.

17. SALVAGE CREDIT

In accordance with 23 C.F.R. §645.117, all materials from the existing facilities, which are recovered in suitable condition for reuse by the Company and not reused on the Project, shall be credited to the cost of the Project at current stock prices. If the materials are not suitable for reuse, they shall be credited at such other prices as agreed upon between the Company and UDOT following inspection of the recovered material.

18. REDESIGN AND REWORK OF UTILITY WORK DUE TO PROJECT CHANGES

If the Company's design of Utility Work has been completed and accepted by UDOT and the Company is required to redesign the Utility Work or redesign and reconstruct the Utility Work as a result of UDOT changing the Project design, the cost of the redesign or redesign and increased cost for the reconstruction of Utility Work will be paid in full by UDOT. UDOT will make adjustments for any additional time that may be required for the Company to redesign or modify its plans or re-work Utility Work due to UDOT changing the design after acceptance of the design plans for the Utility Work.

19. COMPANY'S COSTS DIFFER BY MORE THAN 10%

If the Company's actual costs incurred for its force account work differs more than 10% plus or minus per line item from the amount contained in the supplemental agreements, the Company is required to submit a letter of explanation with its billings indicating how and why the difference in costs occurred.

20. AUDIT

UDOT and the Federal Highway Administration shall have the right to audit all cost records and accounts of the Company pertaining to the Project in accordance with the auditing procedure of the Federal Highway Administration and 23 C.F.R. §645, subpart A. Should this audit disclose that the Company has been underpaid, UDOT will reimburse the Company upon submission of

additional billing to cover the underpayment. The Company shall submit the additional billing within 60 days from the date of the notification of the underpayment. Should this audit disclose that the Company has been overpaid, the Company will reimburse UDOT in the amount of the overpayment within 60 days of notification of audit findings. For the purpose of audit the Company is required to keep and maintain its records of Utility Work covered herein for a minimum of 3 years after final payment is received by the Company from UDOT.

21. ACCESS AND MAINTENANCE

Access for maintenance and servicing of Company's facilities located on the right-of-way of the Project will be allowed only by permit issued by UDOT to the Company. The Company will obtain the permit and abide by conditions thereof for policing and other controls in conformance with Utah Administrative Code R930-7.

22. MISCELLANEOUS

a. Each Party agrees to undertake and perform all further acts that are reasonably necessary to carry out the intent and purpose of the Agreement at the request of the other Party.

b. This Agreement in no way creates any type of agency relationship, joint venture, or partnership between UDOT and Company.

c. The failure of either Party to insist upon strict compliance of any of the terms and conditions, or failure or delay by either Party to exercise any rights or remedies provided in this Agreement, or by law, will not release either Party from any obligations arising under this Agreement.

d. This Agreement shall be deemed to be made under and shall be governed by the laws of the State of Utah in all respects. Each person signing this Agreement warrants that the person has full legal capacity, power, and authority to execute this Agreement for and on behalf of the respective Party and to bind such Party. This Agreement may be executed in one or more counterparts, each of which shall be an original, with the same effect as if the signatures were made upon the same instrument. This Agreement may be delivered by facsimile or electronic mail.

****

IN WITNESS WHEREOF, the Parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first above written.

Comcast Cable

Title: Merlin Jensen
VP of Operations

Date: 7/26/16

. . . . . .

Recommended For Approval:

Title: Utility and Railroad Leader

Date: 8/8/16

Utah Department of Transportation

Title: Project Director

Date: Aug 8, 2016

Approved as to Form

Title: Assistant Attorney General

Date: 8/09/2016

UDOT Comptroller Office Contract Administrator

Title:

Date: 8-10-16

COMCST CABLE
SUPPLEMENTAL AGREEMENT NO. ___

Supplement to UDOT Finance No. _____

THIS SUPPLEMENTAL AGREEMENT, made and entered into this _____ day of _____, 20____, **Utah Department of Transportation**, ("UDOT") and **Comcast Cable**, **doing business as** Comcast Cable, a Registered Corporation in the State of Utah, ("Company") (each as "Party" and jointly as "Parties").

The Parties hereto entered in to a Master Utility Agreement (MUA) dated _____, UDOT Finance No. _____. All the terms of the MUA remain in full force and effect unless otherwise specified herein.

The Parties agree as follows:

1. Company will perform the following described Utility Work in accordance with the terms and conditions of the MUA:

   a. Description of Utility Work to be performed, including proposed location, described in Exhibit "A" that is incorporated by reference: (Plan Sheets Attached)

   b. The Company requirements as shown in MUA – Company Requirements, are modified as follows:

   c. Anticipated duration of Utility Work as shown on Exhibit "B" that is incorporated by reference:

   d. Betterments included:

TOTAL ESTIMATED COST OF SUPPLEMENTAL AGREEMENT _____	**$0.00**
TOTAL ESTIMATED AMOUNT OF COMPANY PARTICIPATION @ 50%	$0.00
TOTAL ESTIMATED AMOUNT OF UDOT PARTICIPATION @ 50%	$0.00

2. The Company will notify UDOT's Project Representative, _____, Telephone No. _____, email_____ and the Design-Builder's Representative, _____, Telephone No. _____, email_____ at least 48 hours in advance of beginning the Utility Work covered herein, or in accordance with the specific terms of the MUA, as applicable.

IN WITNESS WHEREOF, the Parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first written above.

Comcast Cable

_____

Title: _____

Date: _____

. . . . . .

Recommended For Approval:

_____

Title: Utility and Railroad Leader

Date: _____

Utah Department of Transportation

_____

Title: Project Director

Date: _____

UDOT Comptroller Office Contract Administrator

_____

Title:

Date: _____

FIRST DIGITAL TELECOM
MASTER UTILITY AGREEMENT

THIS MASTER UTILITY AGREEMENT, made and entered into this _____ day of_____, 20_____, by and between the **Utah Department of Transportation**, ("UDOT") and **First Digital Telecom**, , a Company in the State of Utah, ("Company") (each as "Party" and jointly as "Parties").

RECITALS

WHEREAS, UDOT is preparing to request proposals for and award a design-build contract for the highway project identified as Project Number S-0154(12)11, 4 Interchanges on Bangerter Highway in Salt Lake County, Utah, ("Project"); and

WHEREAS, UDOT's design-build contractor ("Design-Builder") will complete the design and administer construction of the Project; and

WHEREAS, UDOT has identified Company facilities within the limits of the Project which may necessitate the relocation, protection, or adjustment of the facilities, ("Utility Work"); and

WHEREAS, the Company desires for the Design-Builder to design and construct the Company's Utility Work except cable/pedestal procurement, pulling, and splicing necessitated by the Project; and

WHEREAS, the Company will perform the necessary review and approval for the design and construction of its Utility Work, provide cable/pedestal procurement, pulling, splicing, and construction inspection to accommodate the Project Utility Work; and

WHEREAS, for the purpose of expediting any required Utility Work and reimbursement the Parties are entering into this Project Master Utility Agreement with the understanding that future supplemental agreements to this Agreement will be entered into covering Utility Work to be accomplished by the Company and UDOT at specific Project locations.

THIS AGREEMENT is made to set out the terms and conditions where under the Utility Work shall be performed.

DRAFT

AGREEMENT

NOW THEREFORE, the Parties agree as follows:

1. INFORMATION

UDOT's Project Representative is Alana Spendlove, UDOT Project Utility and Railroad Leader, telephone number (801) 887-3462, and e-mail aspendlove@utah.gov.

UDOT's Resident Engineer for 5400 South and 7000 South interchanges is Bryan Chamberlain, telephone number (801) 887-3405, and e-mail bchamberlain@utah.gov, or their designated representative, as assigned.

UDOT's Resident Engineer for 9000 South and 11400 South interchanges is Ken Talbot, telephone number (801) 360-8750, and e-mail kentalbot@utah.gov, or their designated representative, as assigned.

UDOT's Field Representative contact person will be identified in subsequent supplemental agreements.

Company's contact person is Ryan Finch, telephone number (801) 636-5350, and e-mail rfinch@firstdigital.com.

After awarding the Project, UDOT will provide the Company with the Design-Builder contact information, hereinafter referred to as "Design-Builder Project Representative".

2. AUTHORIZATION FOR DESIGN WORK

In order to facilitate coordination and obtain technical information about the Company's facilities and requirements for inclusion in this Agreement and the request for proposals, UDOT gave the Company authorization for preliminary design engineering on April 26, 2016.

3. SUBSURFACE UTILITY ENGINEERING

UDOT has performed Subsurface Utility Engineering (SUE) within the limits of the Project. Additional SUE work to determine the precise location of underground facilities at specific, critical locations on the Project will be reviewed with the Company.

4. PROJECT COORDINATION

Company and UDOT agree to have the Design-Builder include in the Project, items of Utility Work for the Company's facilities.

During the development of the Project design, the Company and UDOT, along with its Design-Builder, shall consult as necessary in an effort to determine if conflicts with the Company's facilities can be avoided. If Utility Work is required, UDOT will be responsible to propose and provide a location for the facilities. UDOT will provide the Company with Project design plans as early as possible, and will schedule and meet with the Company to review the design, construction, estimates of cost, and scheduling for the Company's Utility Work at specific locations

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on the Project to ensure maximum lead time for advance order of materials and work force scheduling.

The Company shall advise UDOT's Project Representative of the approximate time required for completion of the Utility Work and shall diligently pursue its Utility Work so that completion can be accomplished according to the pre-determined time schedule negotiated by the Company and UDOT in the supplemental agreement issued hereto for a specific Project location. The Company shall immediately notify UDOT's Project Representative by phone call or email, of its discovery of any occurrence or unforeseen circumstances that would prevent the Company from completing its Utility Work according to the time schedule provided. In addition, the Company shall describe the circumstances in writing within 24-hours of the discovery to UDOT's Project Representative.

5. COMPANY REQUIREMENTS

UDOT will comply with the following Company Utility Work requirements**:**

1. Company splicing hours are from 12:00 p.m. to 5:00 a.m.
2. Provide minimum 12 inch separation of conduit from power in joint trench.
3. Include #14 gauge tracer wires in all conduits.
4. The Company will require a 2 week review and approval period for proposed designs, estimate review, and internal approvals after design plans and estimates are delivered to the Company.

6. UDOT TO DESIGN AND CONSTRUCT A PORTION OF UTILITY WORK

UDOT shall perform the necessary design work, cost estimating, field and office engineering, furnish all materials except cables and pedestals, and perform the Utility Work except pulling and splicing, necessitated by the Project.

UDOT will design the Utility Work in accordance with Company's standards regularly followed by the Company in its own work and not considered a betterment. In the event of a conflict between UDOT and Company standards, the higher standard will be applied.

UDOT will secure permits required for Utility Work for Company's facilities.

UDOT will supply as-constructed plans for the Utility Work it performs, in PDF format**,** upon completion of any required Utility Work.

7. COMPANY TO PERORM INSPECTION AND CONSTRUCT A PORTION OF THE UTILITY WORK

The Company will perform inspection of the Utility Work for the Company's facilities that will be performed by UDOT. UDOT will accomplish the Utility Work on the Company's facilities in accordance with the plans and specifications approved by the Company. Changes or additions to the plans and specifications shall be approved by the Company and UDOT through a supplemental agreement.

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The Company will provide all cables, pedestals, pulling, and splicing necessary to accommodate the Utility Work of its facilities on the Project. The Company requires 2 weeks' notice to schedule splicing and fiber pulls and will determine the splicing window based on the circuit.

8. STANDARD SPECIFICATIONS AND REGULATIONS

The Company, while engaged in the preliminary design and Utility Work of its facilities, shall comply with UDOT's 2012 Standard Specifications for Road and Bridge Construction and Utah Administrative Code R930-7.

9. UNDERBUILT AND FACILITY REMOVAL REQUIREMENTS

The Company is responsible to see to the removal of all Company-owned underbuilt facilities from utility poles that will be relocated or removed due to the Project.

10. RIGHT-OF-WAY

Any easements or replacement right-of-way required in conjunction with the Utility Work of Company's facilities will be acquired by UDOT in accordance with the requirements of Utah Administrative Code R930-8-7.

11. MAINTENANCE OF TRAFFIC (MOT), TRAFFIC CONTROL, CLEAR/GRUB, AND SURVEYING

UDOT will provide MOT and traffic control for Utility Work at no cost to the Company. The Company is responsible to coordinate Utility Work schedules and traffic control needs with UDOT to facilitate the Project schedule and minimize impacts to the public. Except in the case of emergencies, Company's Utility Work on the Project will be scheduled in compliance with the requirements of the Limitation of Operations contained in UDOT's Design-Builder contract with respect to lane closures, peak hour Utility Work restrictions, holiday and special event limitations, etc.

UDOT will provide, at no cost to the Company, clearing and grubbing for the Utility Work as required by the Company and in accordance with UDOT's Standard Specifications.

Surveying and staking of roadway facilities as required by the Company will be provided by UDOT in accordance with UDOT's Standard Specifications. The cost of the surveying and staking will be at UDOT's expense and the Company will have no obligation for the cost of surveying. Any of UDOT's survey control stakes or bench markers, which are removed or damaged by the Company, shall be reestablished by UDOT at Company's expense.

12. BETTERMENT WORK

If the Company desires to include betterment work in the Project at any specific location, UDOT may agree to the betterment work providing the difference in costs between the functionally equivalent required Utility Work and the Company's desired betterment work, that is not required by the Project, shall be at the sole cost of the Company and the betterment work can reasonably

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be accommodated without delaying UDOT's Project. The betterment work will be addressed by a separate supplemental agreement between UDOT and the Company.

Once a Design-Builder has been selected by UDOT, any betterment work request will be negotiated directly with the Design-Builder. However, it is at UDOT's sole discretion to approve the betterment work.

13. SUPPLEMENTAL AGREEMENTS

UDOT and the Company shall enter into individual supplemental agreements to cover Utility Work at specific Project locations. Each supplemental agreement will include a description and location of the Utility Work to be performed, design drawings showing the original and proposed locations of the Company's facilities, Utility Work schedules, cost estimates from all Parties, participation shares for UDOT and the Company, any proposed betterment work, and any necessary right-of-way documents. The estimates do not account for increases due to unknown and unforeseen hardships in accomplishing the Utility Work. A copy of the format of the proposed supplemental agreement is marked Exhibit "A" that is incorporated by reference.

The Company will require a 2 week review and approval period for any final supplemental agreement submitted to the Company by UDOT.

In the event there are changes in the scope of the Utility Work, extra Utility Work, or changes in the planned Utility Work covered by a supplemental agreement, a modification to the supplemental agreement approved in writing by the Parties is required prior to the start of Utility Work on the changes or additions.

14. UDOT AUTHORIZATION TO PROCEED WITH UTILITY WORK

The Company shall not perform any Utility Work until the supplemental agreement for the Utility Work is signed by the Company and received by UDOT. UDOT will review and approve the supplemental agreement and will issue an authorization to proceed to the Company for each specific Utility Work location.

15. UDOT TO NOTIFY THE COMPANY BEFORE BEGINNING UTILITY WORK

UDOT will notify the Company at least 2 business days in advance of beginning any Utility Work covered by any supplemental agreements hereto, to allow the Company time to schedule an inspector to be present during the Utility Work. Subsequent notification of when and where Utility Work will be performed will be given on a day-to-day basis. Should UDOT fail to give advance notification and Utility Work is performed without the presence of a Company inspector, UDOT will, at no cost to the Company, facilitate inspection of the Utility Work including, if necessary, uncovering the Utility Work.

16. COMPANY TO NOTIFY UDOT AND THE DESIGN-BUILDER BEFORE BEGINNING UTILITY WORK

The Company will notify UDOT's Project Representative as well as the Design-Builder Project Representative at least 2 business days in advance of beginning any Utility Work covered by any supplemental agreements hereto. The Company will give subsequent notifications of when

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and where the Company will be performing Utility Work to UDOT's Field Representative and the Design-Builder Project Representative on a day-to-day basis. Such subsequent notifications can be informal. Failure on the part of the Company to give proper notification to UDOT's Field Representative and the Design-Builder Project Representative will be cited to the Company and that portion of the Company's Utility Work performed while not under the surveillance of the UDOT Field Representative may be deducted from the reimbursement at UDOT's discretion for.

17. INSPECTION

The Company shall provide on-call engineering support by the Company's engineer or appropriate representative for design review, schedule coordination, or to correct or clarify issues during the Utility Work, and to perform the necessary inspection for the Company's Utility Work installed by UDOT.

a. The Company engineer and/or inspector shall work with and through UDOT's Project Representative and shall give no orders directly to UDOT's Design-Builder unless authorized in writing to do so. UDOT will accomplish the Utility Work covered herein on Company's facilities in accordance with the plans and specifications provided and/or approved by the Company, including changes or additions to the plans and specifications, which are approved by the Parties hereto.
b. The Company shall immediately notify UDOT's Project Representative and the Design-Builder Project Representative of any deficiencies in the Utility Work on the Company's facilities. The Company shall follow up with written detail to UDOT's Project Representative and the Design-Builder Project Representative of its findings within 24-hours of making its initial notification.
c. UDOT will respond to the Company's concerns within 24-hours of written notification.
d. The Company, through its inspection of the Utility Work, will provide UDOT's Project Representative with information covering any problems or concerns the Company may have with acceptance of the facilities upon completion of the Utility Work.
e. Any periodic plan and specification review or construction inspection performed by UDOT arising out of the performance of the Company's Utility Work does not relieve the Company of its duty in the performance of the Utility Work or to ensure compliance with acceptable standards.

18. DAILY RECORDKEEPING

The Company will keep daily records of the inspection and Utility Work performed by the Company forces. Daily records will be in duplicate on a form to be prepared by the Company or UDOT. The type of form to be used shall be preapproved by UDOT's Contracts, Compliance, and Certification Manager. The daily records shall be signed by UDOT's Field Representative and the Company or its authorized representatives.

19. REIMBURSEMENT FOR COMPANY'S UTILITY WORK

In accordance with Utah Code §72-6-116(3)(a)(ii), UDOT will reimburse the Company 50% of the cost of Utility Work of its facilities on state highways and the Company shall pay the remainder of the cost of the Utility Work. UDOT will reimburse the Company 100% of the cost of Utility Work of its facilities located on a public utility easement, on a Company-owned private

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easement or fee property. The Company shall provide UDOT with a copy of the public utility easement or subdivision plat, private easement or fee title. The Utility Work and reimbursement for Company's facilities required by the Project will be in conformance with the requirements of Utah Administrative Code R930-8.

The Company shall submit itemized bills covering its actual costs incurred for performing the Utility Work covered by supplemental agreements to UDOT's Contracts and Compliance Specialist:

UDOT Contracts and Compliance Specialist
4501 South 2700 West
Construction Office, Box 148220
Salt Lake City, Utah 84114-8220

Itemized bills shall bear the Project and supplemental agreement numbers, supporting sheets, and a complete billing statement of all actual costs incurred, following the order of the items in the detailed estimates contained in the supplemental agreement, and be submitted to UDOT within 60 days following completion of the Utility Work by the Company on the Project. Otherwise, previous payments to the Company may be considered final, except as agreed to between the Parties in advance. UDOT will reimburse the Company within 60 days after receipt of the billings, but only for those items complying fully with the provisions of Utah Administrative Code R930-8. Failure on the part of the Company to submit final billings within 6 months of the completion of the Utility Work will result in UDOT's disallowance of that portion of Utility Work reimbursement.

If the Company owes a balance to UDOT, the Company will reimburse UDOT within 60 days after receipt of billing from UDOT.

20. SALVAGE CREDIT

In accordance with 23 C.F.R. §645.117 all materials from Company's existing facilities which are recovered by UDOT while performing the Utility Work and not reused on this Project shall become the property of the Design-Builder unless otherwise agreed to in advance by the Parties hereto.

In accordance with 23 C.F.R. §645.117, all materials from the existing facilities, which are recovered in suitable condition for reuse by the Company and not reused on the Project, shall be credited to the cost of the Project at current stock prices. If the materials are not suitable for reuse, they shall be credited at such other prices as agreed upon between the Company and UDOT following inspection of the recovered material.

21. PROJECT DESIGN CHANGES

If UDOT changes the Project design after the Company has completed its design review; or if the Company has completed its portion of the Utility Work of its facilities based on previously approved design plans; the cost of the second design review and/or Utility Work is to be paid in full by UDOT. UDOT will make adjustments for any additional time that may be required for the Company to perform Utility Work on its facilities when required.

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22. **COMPANY'S COSTS DIFFER BY MORE THAN 10%**

If the Company's actual costs incurred for its force account work differs more than 10% plus or minus per line item from the amount contained in the supplemental agreements, the Company is required to submit a letter of explanation with its billings indicating how and why the difference in costs occurred.

23. **RIGHT TO AUDIT**

UDOT and FHWA shall have the right to audit all cost records and accounts of the Company pertaining to this Project in accordance with the auditing procedure of the Federal Highway Administration and 23 C.F.R. §645, subpart A. Should this audit disclose that the Company has been underpaid, UDOT will reimburse the Company within 60 days upon submission of additional billing to cover the underpayment. Should this audit disclose that the Company has been overpaid, the Company will reimburse UDOT within 60 days of notification of audit findings in the amount of the overpayment. For the purpose of audit the Company is required to keep and maintain its records of Utility Work covered herein for a minimum of 3 years after final payment is received by the Company from UDOT.

The Company shall have the right to review UDOT's cost documentation for the Utility Work performed on behalf of the Company.

24. **ACCEPTANCE**

UDOT will provide notification to the Company for acceptance of the Utility Work upon completion of the final inspection. Company will have 60 days to respond in writing to UDOT with any additional comments in regards to the Utility Work. In the event that UDOT does not receive a written response within 60 days, UDOT will designate the Utility Work accepted by the Company. Upon acceptance of the Utility Work, the Company will accept, own and maintain its facilities. To the extent it may lawfully do so, Company further agrees to relieve UDOT from any responsibility or liability that may result for its new facilities or the operation thereof.

25. **ACCESS & MAINTENANCE**

Access for maintenance and servicing of Company's facilities located on the Project right-of-way will be allowed only by permit issued by UDOT. Company will obtain the permit and abide by conditions thereof for policing and other controls in conformance with Utah Administrative Code R930-7.

26. **MISCELLANEOUS**

a. Each Party agrees to undertake and perform all further acts that are reasonably necessary to carry out the intent and purpose of this Agreement at the request of the other Party.

b. This Agreement in no way creates any type of agency relationship, joint venture, or partnership between UDOT and Company.

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c. The failure of either Party to insist upon strict compliance of any of the terms and conditions, or failure or delay by either Party to exercise any rights or remedies provided in this Agreement, or by law, will not release either Party from any obligations arising under this Agreement.

d. This Agreement shall be deemed to be made under and shall be governed by the laws of the State of Utah in all respects. Each person signing this Agreement warrants that the person has full legal capacity, power, and authority to execute this Agreement for and on behalf of the respective Party and to bind such Party. This Agreement may be executed in one or more counterparts, each of which shall be an original, with the same effect as if the signatures were made upon the same instrument. This Agreement may be delivered by facsimile or electronic mail.

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IN WITNESS WHEREOF, the Parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first above written.

First Digital Telecom

_____

Title: _____

Date: _____

Recommended For Approval:

_____

Title: Utility and Railroad Leader

Date: _____

Utah Department of Transportation

_____

Title: Project Director

Date: _____

Approved as to Form

_____

Title: Assistant Attorney General

Date: _____

UDOT Comptroller Office Contract Administrator

_____

Title:

Date: _____

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FIRST DIGITAL TELECOM
SUPPLEMENTAL AGREEMENT NO. ___

Supplement to UDOT Finance No. _____

THIS SUPPLEMENTAL AGREEMENT, made and entered into this _____ day of _____, 20____, **Utah Department of Transportation**, ("UDOT"), and **First Digital Telecom**, a Company in the State of Utah, ("Company") each as ("Party") and jointly as ("Parties").

The Parties hereto entered in to a Master Utility Agreement (MUA) dated _____, UDOT Finance No. _____. All the terms of the MUA remain in full force and effect unless otherwise specified herein.

The Parties agree as follows:

1. UDOT and Company will perform the following described Utility Work in accordance with the terms and conditions of the MUA:

   a. Description of Utility Work to be performed, including proposed location, described in Exhibit "A" that is incorporated by reference: (Plan Sheets Attached)

   b. The Company requirements as shown in the MUA – Company Requirements, are modified as follows:

   c. Anticipated duration of Utility Work as shown on Exhibit "B" that is incorporated by reference:

   d. Betterments included:

TOTAL ESTIMATED COST OF SUPPLEMENTAL AGREEMENT _____	**$0.00**
TOTAL ESTIMATED COST OF COMPANY PERFORMED UTILITY WORK	$0.00
TOTAL ESTIMATED COST OF UDOT PERFORMED UTILITY WORK	$0.00
COMBINED TOTAL ESTIMATED COST OF UTILITY WORK	**$0.00**
TOTAL ESTIMATED AMOUNT OF COMPANY PARTICIPATION @ 50%	$0.00
TOTAL ESTIMATED AMOUNT OF UDOT PARTICIPATION @ 50%	$0.00

2. UDOT will notify the Company's contact person, Ryan Finch, Telephone No. (801)636-5350, email rfinch@firstdigital.com at least 48 hours in advance of beginning the Utility Work covered herein, or in accordance with the specific terms of the MUA, as applicable.

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IN WITNESS WHEREOF, the Parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first written above.

First Digital Telecom

_____

Title: _____

Date: _____

. . . . . .

Recommended For Approval:

_____

Title: Utility and Railroad Leader

Date: _____

Utah Department of Transportation

_____

Title: Project Director

Date: _____

UDOT Comptroller Office Contract Administrator

_____

Title:

Date: _____

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KEARNS IMPROVEMENT DISTRICT
MASTER UTILITY AGREEMENT

THIS MASTER UTILITY AGREEMENT, made and entered into this _____day of_____, 20_____, by and between the **Utah Department of Transportation**, ("UDOT"), and **Kearns Improvement District**, a Local Improvement District of the State of Utah, ("District") each as ("Party") and jointly as ("Parties").

RECITALS

WHEREAS, UDOT is preparing to request proposals for and award a design-build contract for the highway project identified as Project Number S-0154(12)11, 4 Interchanges on Bangerter Highway in Salt Lake County, Utah, ("Project"); and

WHEREAS, the design-build contractor will complete the design and administer construction of the Project ("Design-Builder"); and

WHEREAS, UDOT has identified District facilities within the limits of the Project which may necessitate the relocation, protection, or adjustment of the facilities, ("Utility Work"); and

WHEREAS, the District desires for the Design-Builder to design and perform the Utility Work on the District's facilities necessitated by the Project; and

WHEREAS, the District will perform the necessary design review and inspection to accommodate the Project; and

WHEREAS, for the purpose of expediting any required Utility Work and reimbursement, the Parties are entering into this Project Master Utility Agreement with the understanding that future supplemental agreements to this Agreement will be entered into covering the Utility Work to be accomplished by UDOT at specific Project locations.

THIS AGREEMENT is made to set out the terms and conditions where under the Utility Work shall be performed.

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AGREEMENT

NOW THEREFORE, the Parties agree as follows:

1. PROJECT RESPONSIBLE FOR COST

In accordance with Utah Code § 72-6-116(3)(a)(ii), UDOT is responsible for 100% of the cost of the Utility Work of District's facilities for those costs that comply with Utah Administrative Code R930-8.

2. CONTACT INFORMATION

UDOT's Project Representative is Alana Spendlove, UDOT Project Utility and Railroad Leader, telephone number (801) 887-3462, and e-mail aspendlove@utah.gov.

UDOT's Resident Engineer for 5400 South and 7000 South interchanges is Bryan Chamberlain, telephone number (801) 887-3405, and e-mail bchamberlain@utah.gov, or their designated representative, as assigned.

UDOT's Resident Engineer for 9000 South and 11400 South interchanges is Ken Talbot, telephone number (801) 360-8750, and e-mail kentalbot@utah.gov, or their designated representative, as assigned.

UDOT's Field Representative contact person will be identified in subsequent supplemental agreements.

District's contact person is Greg Anderson, telephone number (801) 912-0282, and e-mail ganderson@kearnsid.org.

After awarding the Project, UDOT will provide the District with the Design Builder contact information, hereinafter referred to as "Design-Builder Project Representative".

3. AUTHORIZATION FOR DESIGN WORK

In order to facilitate coordination and obtain technical information about the District's facilities and requirements for inclusion in this Agreement and the Request for Proposals, UDOT gave the District authorization for preliminary design engineering on April 26, 2016.

4. SUBSURFACE UTILITY ENGINEERING

UDOT has performed Subsurface Utility Engineering (SUE) within the limits of the Project. Additional SUE work to determine the precise location of underground facilities at specific, critical locations on the Project will be reviewed with the District.

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5. PROJECT COORDINATION

The District requested that UDOT include items of Utility Work for relocating and adjusting District's facilities in the Project.

During the development of the Project design, the District and UDOT, along with its Design-Builder, shall consult as necessary in an effort to determine if conflicts with the District's facilities can be avoided. If Utility Work for the District's facilities is required by the Project, UDOT will be responsible to identify the conflicts and to design and construct the Utility Work of the District's facilities. The District will perform the necessary design reviews prior to the start of Utility Work. UDOT's Project Representative will be responsible for coordinating with other utility companies as it relates to District's facilities.

6. DISTRICT REQUIREMENTS

UDOT will comply with the following District Utility Work requirements**:**

a. Size and depth of District Utility crossings must be determined and recorded prior to any Project directional boring or excavation activities near the District's facilities.
b. A District representative must be present during potholing, crossing, or relocation activities of District facilities.
c. The District requires review of material and product specification submittals for District approval prior to installation.
d. All District water service interruptions require following activities:
    i. Coordinate with the District for notification procedures to its serviced customer(s) and for processes to minimize service interruptions.
    ii. The District must approve the extent of service interruptions before Utility Work begins.
e. Notification must be given to the District prior to performing any potholing, crossing, or Utility Work on the District facilities. Utility Work installed without notification to the District will require remedial efforts for District acceptance. See section 11 below.
f. UDOT will supply as-constructed plans, in AutoCadd format, upon completion of any required Utility Work including betterment work.

7. UDOT TO DESIGN AND CONSTRUCT DISTRICT'S UTILITY WORK

UDOT will schedule and meet with the District to review the design and scheduling of the Utility Work for the District's facilities at specific locations on the Project to ensure maximum lead time for advance order of materials and work force scheduling.

UDOT will design the Utility Work in accordance with District's standards regularly followed by the District in its own work and not considered a betterment. In the event of a conflict between UDOT and District standards, the higher standard will be applied.

b. The District's current standards and specifications, dated September 2016, can be found at the District web site http://kearnsid.org/engspecs.PDF that is incorporated by reference.
c. UDOT will secure permits required for Utility Work of District's facilities.

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8. **RIGHT-OF-WAY**

Any easements or replacement right-of-way required in conjunction with the Utility Work of District's facilities will be acquired by UDOT in accordance with the requirements of Utah Administrative Code R930-8.

9. **BETTERMENT WORK**

If the District desires to include betterment work in the Project at any specific location UDOT may agree to the betterment providing the difference in costs between the functionally equivalent required Utility Work and the District's desired betterment work that is not required by the Project shall be at the sole cost of the District and the betterment work can be accommodated without delaying UDOT's Project. The betterment work will be addressed by separate supplemental agreement between UDOT and the District.

Once a Design-Builder has been selected by UDOT, any betterment work request will be negotiated directly with the Design-Builder. However, it is at UDOT's sole discretion to approve the betterment work.

10. **SUPPLEMENTAL AGREEMENTS**

UDOT and the District shall enter into supplemental agreements to cover Utility Work at specific Project locations. As part of the supplemental agreement, UDOT will provide design plans and Utility Work schedules for review and approval by the District prior to start of the Utility Work. A copy of the format of the proposed supplemental agreement is marked Exhibit "A" that is incorporated by reference.

The District will require a 2 week review and approval period for any final supplemental agreement submitted to the District by UDOT.

In the event there are changes in the scope of the Utility Work, extra Utility Work, or changes in the planned Utility Work covered by a supplemental agreement, a modification to the supplemental agreement approved in writing by the Parties is required prior to the start of Utility Work on the changes or additions.

11. **UDOT TO NOTIFY DISTRICT BEFORE BEGINNING UTILITY WORK**

UDOT will notify the District at least 2 business days in advance of beginning any Utility Work covered by any supplemental agreements hereto, to allow the District time to schedule an inspector to be present during the Utility Work. Subsequent notification of when and where Utility Work will be performed will be given on a day-to-day basis.

12. **DISTRICT TO NOTIFY UDOT**

District's personnel shall notify UDOT's Field Representative upon arriving and leaving the Project site for verification of inspecting Utility Work. District's personnel will comply with all applicable OSHA and Project safety requirements while within the Project limits.

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13. INSPECTION

The District shall provide on-call engineering support by District's engineer or appropriate representative for design review, schedule coordination, or to correct or clarify issues during Utility Work, and to perform the necessary inspection on the District's facilities installed by UDOT.

a. The District's engineer and/or inspector shall work with and through UDOT's Project Representative and shall give no orders directly to UDOT's Design-Builder unless authorized in writing to do so. UDOT will accomplish the Utility Work covered herein on District's facilities in accordance with the plans and specifications provided and/or approved by the District, including changes or additions to the plans and specifications, which are approved by the Parties hereto.
b. The District shall immediately notify UDOT's Project Representative and the Design-Builder Project Representative of any deficiencies in the Utility Work on the District's facilities. The District shall follow up with written detail to UDOT's Project Representative and the Design-Builder Project Representative of its findings within 24-hours of making its initial notification.
c. UDOT will respond to District's concerns within 24-hours of written notification.
d. The District, through its inspection of the Utility Work, will provide UDOT's Project Representative with information covering any problems or concerns the District may have with acceptance of the facilities upon completion of the Utility Work.
e. Any periodic plan and specification review or construction inspection performed by UDOT arising out of the performance of the Utility Work does not relieve the District of its duty in the performance of the Utility Work or to ensure compliance with acceptable standards.

14. DAILY RECORDKEEPING

UDOT's Field Representative will keep daily records of the inspection performed by the District. Daily inspection records will be in duplicate on a form to be prepared by the District or UDOT. The type of form to be used shall be preapproved by UDOT's Contracts, Compliance and Certification Manager. The inspection records shall be signed by UDOT's Field Representative, and the District or its authorized representatives. Copies of the inspection records shall be retained by the parties to this Agreement.

15. REIMBURSEMENT

UDOT will not reimburse the District for costs incurred by District personnel for design review, observation, inspection, and operation of valves performed as part of their regularly assigned duties. Should it become necessary for the District to procure outside services to perform design review, observation, or inspection to accommodate UDOT's Utility Work and Project schedule, the District shall notify UDOT. Upon concurrence by UDOT, a supplemental agreement for the cost of the services will be executed at which time the District may procure outside services through appropriate solicitation.

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16. **SUBMITTAL OF ITEMIZED BILLS**

The District shall submit itemized bills covering the actual costs incurred for outside services to perform design review, oversight, and inspection work covered by supplemental agreements to UDOT's Contracts and Compliance Specialist:

UDOT Contracts and Compliance Specialist
Utah Department of Transportation
PO Box 141510
SLC, UT 84114-1510

Itemized bills shall bear the Project and supplemental agreement numbers, supporting sheets, and a complete billing statement of all actual costs incurred, following the order of the items in the detailed estimates contained in the supplemental agreement and be submitted to UDOT within 60 days following completion of outside services by the District on the Project. Otherwise, previous payments to the District may be considered final, except as agreed to between the Parties in advance.

UDOT will reimburse the District within 60 days after receipt of the billings, but only for items complying fully with the provisions of Utah Administrative Code R930-8. Failure on the part of the District to submit final billings within 6 months of the completion of outside services will result in UDOT's disallowance of that portion of outside services performed by the District.

17. **SALVAGED MATERIALS**

All materials from District's existing facilities which are recovered by UDOT while performing the Utility Work and not reused on this Project shall become the property of the Design-Builder unless otherwise agreed to in advance by the Parties hereto.

18. **RIGHT TO AUDIT**

UDOT and the Federal Highway Administration shall have the right to audit all cost records and accounts of the District pertaining to this Project in accordance with the auditing procedure of the Federal Highway Administration and 23 C.F.R. § 645, subpart A. Should this audit disclose that the District has been underpaid, the District will be reimbursed by UDOT within 60 days upon submission of additional billing to cover the underpayment. Should this audit disclose that the District has been overpaid, the District will reimburse UDOT within 60 days of notification of audit findings in the amount of the overpayment. For purpose of audit the District is required to keep and maintain its records of outsides services covered herein for a minimum of 3 years after final payment is received by the District from UDOT.

19. **ACCEPTANCE AND MAINTENANCE**

Upon completion of the Utility Work of District facilities by UDOT, the District will accept, own, and maintain its own facilities. The District shall be the sole owner of the facilities upon completion of the Project unless otherwise agreed to by the Parties. To the extent it may lawfully do so, District further agrees to relieve UDOT from any responsibility or liability that may result from its new facilities or the operation thereof.

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20. **ACCESS**

It is understood that access for maintenance and servicing of District's facilities located on the right-of-way of the Project will be allowed only by permit issued by UDOT to the District, and that the District will obtain the permit and abide by conditions thereof for policing and other controls in conformance with Utah Administrative Code R930-7.

21. **INDEMNIFICATION**

UDOT and the District are both governmental entities subject to the Governmental Immunity Act. Each Party agrees to indemnify, defend, and save harmless the other from and against all claims, suits and costs, including attorneys' fees for injury or damage of any kind, arising out of its negligent acts, errors or omissions of its officers, agents, contractors or employees in the performance of this Agreement, and from and against all claims, suits, and costs, including attorneys' fees for injury or damage of any kind. Nothing in this paragraph is intended to create additional rights to third parties or to waive any of the provisions of the Governmental Immunity Act. The obligation to indemnify is limited to the dollar amounts set forth in the Governmental Immunity Act, provided the Act applies to the action or omission giving rise to the protections in this paragraph. The indemnification in this paragraph shall survive the expiration or termination of this Agreement.

22. **MISCELLANEOUS**

a. Each Party agrees to undertake and perform all further acts that are reasonably necessary to carry out the intent and purpose of this Agreement at the request of the other Party.

b. This Agreement in no way creates any type of agency relationship, joint venture, or partnership between UDOT and District.

c. The failure of either Party to insist upon strict compliance of any of the terms and conditions, or failure or delay by either Party to exercise any rights or remedies provided in this Agreement, or by law, will not release either Party from any obligations arising under this Agreement.

d. This Agreement shall be deemed to be made under and shall be governed by the laws of the State of Utah in all respects. Each person signing this Agreement warrants that the person has full legal capacity, power and authority to execute this Agreement for and on behalf of the respective Party and to bind such Party. This Agreement may be executed in one or more counterparts, each of which shall be an original, with the same effect as if the signatures were made upon the same instrument. This Agreement may be delivered by facsimile or electronic mail.

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IN WITNESS WHEREOF, the parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first above written.

ATTEST:

Kearns Improvement District

_____ _____

Title: _____ **Title:** _____

Date: _____ **Date:** _____

(IMPRESS SEAL)

. . . . . .

Recommended For Approval:

Utah Department of Transportation

_____ _____

Title: Utility and Railroad Leader **Title:** Project Director

Date: _____ **Date:** _____

Approved as to Form

Comptroller Office

_____ _____

Title: Assistant Attorney General **Title:** Contract Administrator

Date: _____ **Date:** _____

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KEARNS IMPROVEMENT DISTRICT
SUPPLEMENTAL AGREEMENT NO. ___

Supplement to UDOT Finance No. _____

THIS SUPPLEMENTAL AGREEMENT, made and entered into this _____ day of _____, 20____, **Utah Department of Transportation**, ("UDOT"), and **Kearns Improvement District**, a Local Improvement District of the State of Utah, ("District") each as ("Party") and jointly as ("Parties").

The parties hereto entered in to a Master Utility Agreement (MUA) dated _____, UDOT Finance No. _____. All the terms of the Master Utility Agreement remain in full force and effect unless otherwise specified herein.

The Parties agree as follows:

1. UDOT will perform the following described Utility Work in accordance with the terms and conditions of the MUA:

   a. Description of Utility Work to be performed, including proposed location, described in Exhibit "A" that is incorporated by reference: (Plan Sheets Attached)
   b. The District requirements as shown in the MUA – District Requirements, are modified as follows:
      i.
   c. Anticipated duration of Utility Work:
   d. Total estimated cost of District's (100% reimbursable) outside services: (Detailed Estimate Attached)

2. UDOT will notify the District's Project Representative, Greg Anderson, telephone number (801) 912-0282, and e-mail ganderson@kearnsid.org at least 48 hours in advance of beginning the Utility Work covered herein, or in accordance with the specific terms of the MUA, as applicable.

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IN WITNESS WHEREOF, the Parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first written above.

ATTEST:

Kearns Improvement District

_____ _____

Title: _____ **Title:** _____

Date: _____ **Date:** _____

(Impress Seal)

. . . . . .

RECOMMENDED FOR APPROVAL:

UTAH DEPARTMENT OF TRANSPORTATION

_____ _____

Title: Utility and Railroad Leader **Title:** Project Director

Date: _____ **Date:** _____

_____
UDOT Comptroller Office
Contract Administrator

. . . . . .

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MANUAL BROS., INC.
MASTER UTILITY AGREEMENT

THIS MASTER UTILITY AGREEMENT, made and entered into this _____ day of_____, 20_____, by and between the **Utah Department of Transportation**, ("UDOT") and **Manual Bros., Inc.**, a Company in Delaware, ("Company") (each as "Party" and jointly as "Parties").

RECITALS

WHEREAS, UDOT is preparing to request proposals for and award a design-build contract for the highway project identified as Project Number S-0154(12)11, 4 Interchanges on Bangerter Highway in Salt Lake County, Utah, ("Project"); and

WHEREAS, UDOT's design-build contractor ("Design-Builder") will complete the design and administer construction of the Project; and

WHEREAS, UDOT has identified Company facilities within the limits of the Project which may necessitate the relocation, protection, or adjustment of the facilities, ("Utility Work"); and

WHEREAS, the Company desires for the Design-Builder to design and construct the Company's Utility Work necessitated by the Project; and

WHEREAS, the Company will perform the necessary review and approval for the design and construction of its Utility Work to accommodate the Project; and

WHEREAS, for the purpose of expediting any required Utility Work and reimbursement the Parties are entering into this Project Master Utility Agreement with the understanding that future supplemental agreements to this Agreement will be entered into covering Utility Work to be accomplished by the Company and UDOT at specific Project locations.

THIS AGREEMENT is made to set out the terms and conditions where under the Utility Work shall be performed.

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AGREEMENT

NOW THEREFORE, the Parties agree as follows:

1. CONTACT INFORMATION

UDOT's Project Representative is Alana Spendlove, UDOT Project Utility and Railroad Leader, telephone number (801) 887-3462 and e-mail aspendlove@utah.gov.

UDOT's Resident Engineer for 5400 South and 7000 South interchanges is Bryan Chamberlain, telephone number (801) 887-3405, and e-mail bchamberlain@utah.gov, or their designated representative, as assigned.

UDOT's Resident Engineer for 9000 South and 11400 South interchanges is Ken Talbot, telephone number (801) 360-8750, and e-mail kentalbot@utah.gov, or their designated representative, as assigned.

UDOT's Field Representative contact person will be identified in subsequent supplemental agreements.

Company's contact person is Tony Cole, telephone number (303) 459-8368, and e-mail tcole@quantappower.net.

After awarding the Project, UDOT will provide the Company with the Design-Builder contact information, hereinafter referred to as "Design-Builder Project Representative".

2. AUTHORIZATION FOR DESIGN WORK

In order to facilitate coordination and obtain technical information about the Company's facilities and requirements for inclusion in this Agreement and the request for proposals, UDOT gave the Company authorization for preliminary design engineering on April 26, 2016.

3. SUBSURFACE UTILITY ENGINEERING

UDOT has performed Subsurface Utility Engineering (SUE) within the limits of the Project. Additional SUE work to determine the precise location of underground facilities at specific, critical locations on the Project will be reviewed with the Company.

4. PROJECT COORDINATION

Company and UDOT agree to have the Design-Builder include in the Project, items of Utility Work for the Company's facilities.

During the development of the Project design, the Company and UDOT, along with its Design-Builder, shall consult as necessary in an effort to determine if conflicts with the Company's facilities can be avoided. If Utility Work is required, UDOT will be responsible to propose and provide a location for the facilities. UDOT will provide the Company with Project design plans as early as possible, and will schedule and meet with the Company to review the design, construction, estimates of cost, and scheduling for the Company's Utility Work at specific locations

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on the Project to ensure maximum lead time for advance order of materials and work force scheduling.

The Company shall advise UDOT's Project Representative of the approximate time required for completion of the Utility Work and shall diligently pursue its Utility Work so that completion can be accomplished according to the pre-determined time schedule negotiated by the Company and UDOT in the supplemental agreement issued hereto for a specific Project location. The Company shall immediately notify UDOT's Project Representative by phone call or email, of its discovery of any occurrence or unforeseen circumstances that would prevent the Company from completing its Utility Work according to the time schedule provided. In addition, the Company shall describe the circumstances in writing within 24-hours of the discovery to UDOT's Project Representative.

5. COMPANY REQUIREMENTS

UDOT will comply with the following Company Utility Work requirements:

a. Comply with design, material, and construction standards shown in Exhibit "A", that is incorporated by reference.
b. Notify Company a minimum of 21 days in advance of all Utility Work.
c. Entire new duct bank structure must be installed and fiber optic cable installed/spliced BEFORE any part of existing duct bank structure is removed.
d. Color coding must be replicated in the new structure using Duct Configuration shown in Exhibit "B", that is incorporated by reference.
e. The Company will require a 2 week review and approval period for proposed designs, estimate review, and internal approvals after design plans and estimates are delivered to the Company.

6. UDOT TO DESIGN AND CONSTRUCT UTILITY WORK

UDOT shall perform the necessary design work, cost estimating, field and office engineering, furnish all materials and perform the Utility Work necessitated by the Project.

UDOT will design the Utility Work in accordance with Company's standards regularly followed by the Company in its own work and not considered a betterment. In the event of a conflict between UDOT and Company standards, the higher standard will be applied.

UDOT will secure permits required for Utility Work for Company's facilities.

UDOT will supply as-constructed plans for the Utility Work it performs, in AutoCad format**,** upon completion of any required Utility Work. See Company standards shown in Exhibit "A" for as-constructed requirements.

7. COMPANY TO PERORM INSPECTION OF THE UTILITY WORK

The Company will perform inspection of the Utility Work for the Company's facilities that will be performed by UDOT. UDOT will accomplish the Utility Work on the Company's facilities in accordance with the plans and specifications approved by the Company. Changes or additions to

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the plans and specifications shall be approved by the Company and UDOT through a supplemental agreement.

8. STANDARD SPECIFICATIONS AND REGULATIONS

The Company, while engaged in the preliminary design and Utility Work of its facilities, shall comply with UDOT's 2012 Standard Specifications for Road and Bridge Construction and Utah Administrative Code R930-7. Company specification are listed as Exhibit "A". In the event of a conflict between UDOT and Company standards, the more stringent standard will be applied.

9. RIGHT-OF-WAY

Any easements or replacement right-of-way required in conjunction with the Utility Work of Company's facilities will be acquired by UDOT in accordance with the requirements of Utah Administrative Code R930-8-7.

10. MAINTENANCE OF TRAFFIC (MOT), TRAFFIC CONTROL, CLEAR/GRUB, AND SURVEYING

UDOT will provide MOT and traffic control for Utility Work at no cost to the Company. Except in the case of emergencies, the Utility Work on the Project will be scheduled in compliance with the requirements of the Limitation of Operations contained in UDOT's Design-Builder contract with respect to lane closures, peak hour Utility Work restrictions, holiday and special event limitations, etc.

UDOT will provide, at no cost to the Company, clearing and grubbing for the Utility Work as required by the Company and in accordance with UDOT's Standard Specifications.

Surveying and staking of roadway facilities as required by the Company will be provided by UDOT in accordance with UDOT's Standard Specifications. The cost of the surveying and staking will be at UDOT's expense and the Company will have no obligation for the cost of surveying. Any of UDOT's survey control stakes or bench markers, which are removed or damaged by the Company, shall be reestablished by UDOT at Company's expense.

11. BETTERMENT WORK

If the Company desires to include betterment work in the Project at any specific location, UDOT may agree to the betterment work providing the difference in costs between the functionally equivalent required Utility Work and the Company's desired betterment work, that is not required by the Project, shall be at the sole cost of the Company and the betterment work can reasonably be accommodated without delaying UDOT's Project. The betterment work will be addressed by a separate supplemental agreement between UDOT and the Company.

Once a Design-Builder has been selected by UDOT, any betterment work request will be negotiated directly with the Design-Builder. However, it is at UDOT's sole discretion to approve the betterment work.

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12. SUPPLEMENTAL AGREEMENTS

UDOT and the Company shall enter into individual supplemental agreements to cover Utility Work at specific Project locations. Each supplemental agreement will include a description and location of the Utility Work to be performed, design drawings showing the original and proposed locations of the Company's facilities, Utility Work schedules, cost estimates from all Parties, participation shares for UDOT and the Company, any proposed betterment work, and any necessary right-of-way documents. The estimates do not account for increases due to unknown and unforeseen hardships in accomplishing the Utility Work. A copy of the format of the proposed supplemental agreement is marked Exhibit "C" that is incorporated by reference.

The Company will require a 2 week review and approval period for any final supplemental agreement submitted to the Company by UDOT.

In the event there are changes in the scope of the Utility Work, extra Utility Work, or changes in the planned Utility Work covered by a supplemental agreement, a modification to the supplemental agreement approved in writing by the Parties is required prior to the start of Utility Work on the changes or additions.

13. UDOT AUTHORIZATION TO PROCEED WITH UTILITY WORK

The Company shall not perform any Utility Work inspection until the supplemental agreement for the Utility Work is signed by the Company and received by UDOT. UDOT will review and approve the supplemental agreement and will issue an authorization to proceed to the Company for each specific Utility Work location.

14. UDOT TO NOTIFY THE COMPANY BEFORE BEGINNING UTILITY WORK

UDOT will notify the Company at least 14 business days in advance of beginning any Utility Work covered by any supplemental agreements hereto, to allow the Company time to schedule an inspector to be present during the Utility Work. Subsequent notification of when and where Utility Work will be performed will be given on a day-to-day basis. Should UDOT fail to give advance notification and Utility Work is performed without the presence of a Company inspector, UDOT will, at no cost to the Company, facilitate inspection of the Utility Work including, if necessary, uncovering the Utility Work.

15. COMPANY TO NOTIFY UDOT AND THE DESIGN-BUILDER BEFORE BEGINNING UTILITY WORK

The Company will notify UDOT's Resident Engineer as well as the Design-Builder Project Representative at least 2 business days in advance of beginning any Utility Work covered by any supplemental agreements hereto. The Company will give subsequent notifications of when and where the Company will be performing Utility Work to UDOT's Field Representative and the Design-Builder Project Representative on a day-to-day basis. Such subsequent notifications can be informal. Failure on the part of the Company to give proper notification to UDOT's Field Representative and the Design-Builder Project Representative will be cited to the Company and that portion of the Company's Utility Work performed while not under the surveillance of the UDOT Field Representative may be deducted from the reimbursement at UDOT's discretion for.

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16. **INSPECTION**

The Company shall provide on-call engineering support by the Company's engineer or appropriate representative for design review, schedule coordination, or to correct or clarify issues during the Utility Work, and to perform the necessary inspection for the Company's Utility Work installed by UDOT.

a. The Company engineer and/or inspector shall work with and through UDOT's Project Representative and shall give no orders directly to UDOT's Design-Builder unless authorized in writing to do so. UDOT will accomplish the Utility Work covered herein on Company's facilities in accordance with the plans and specifications provided and/or approved by the Company, including changes or additions to the plans and specifications, which are approved by the Parties hereto.
b. The Company shall immediately notify UDOT's Project Representative and the Design-Builder Project Representative of any deficiencies in the Utility Work on the Company's facilities. The Company shall follow up with written detail to UDOT's Project Representative and the Design-Builder Project Representative of its findings within 24-hours of making its initial notification.
c. UDOT will respond to the Company's concerns within 24-hours of written notification.
d. The Company, through its inspection of the Utility Work, will provide UDOT's Project Representative with information covering any problems or concerns the Company may have with acceptance of the facilities upon completion of the Utility Work.
e. Any periodic plan and specification review or construction inspection performed by UDOT arising out of the performance of the Company's Utility Work does not relieve the Company of its duty in the performance of the Utility Work or to ensure compliance with acceptable standards.

17. **DAILY RECORDKEEPING**

The Company and UDOT will keep daily records of the inspection and Utility Work performed by the onsite forces. Daily records will be in duplicate on a form to be prepared by the Company and UDOT. The type of form to be used shall be preapproved by UDOT's Contracts, Compliance, and Certification Manager. The daily records shall be signed by UDOT's Field Representative and the Company or its authorized representatives.

18. **REIMBURSEMENT FOR COMPANY'S UTILITY WORK**

In accordance with Utah Code §72-6-116(3)(a)(ii), UDOT will reimburse the Company 50% of the cost of Utility Work of its facilities on state highways and the Company shall pay the remainder of the cost of the Utility Work. UDOT will reimburse the Company 100% of the cost of Utility Work of its facilities located on a public utility easement, on a Company-owned private easement or fee property. The Company shall provide UDOT with a copy of the public utility easement or subdivision plat, private easement or fee title. The Utility Work and reimbursement for Company's facilities required by the Project will be in conformance with the requirements of Utah Administrative Code R930-8.

The Company shall submit itemized bills covering its actual costs incurred for performing the Utility Work covered by supplemental agreements to UDOT's Contracts and Compliance Specialist:

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UDOT Contracts and Compliance Specialist
4501 South 2700 West
Construction Office, Box 148220
Salt Lake City, Utah 84114-8220

Itemized bills shall bear the Project and supplemental agreement numbers, supporting sheets, and a complete billing statement of all actual costs incurred, following the order of the items in the detailed estimates contained in the supplemental agreement, and be submitted to UDOT within 60 days following completion of the Utility Work by the Company on the Project. Otherwise, previous payments to the Company may be considered final, except as agreed to between the Parties in advance. UDOT will reimburse the Company within 60 days after receipt of the billings, but only for those items complying fully with the provisions of Utah Administrative Code R930-8. Failure on the part of the Company to submit final billings within 6 months of the completion of the Utility Work will result in UDOT's disallowance of that portion of Utility Work reimbursement.

If the Company owes a balance to UDOT, the Company will reimburse UDOT within 60 days after receipt of billing from UDOT.

19. SALVAGE CREDIT

In accordance with 23 C.F.R. §645.117 all materials from Company's existing facilities which are recovered by UDOT while performing the Utility Work and not reused on this Project shall become the property of the Design-Builder unless otherwise agreed to in advance by the Parties hereto.

In accordance with 23 C.F.R. §645.117, all materials from the existing facilities, which are recovered in suitable condition for reuse by the Company and not reused on the Project, shall be credited to the cost of the Project at current stock prices. If the materials are not suitable for reuse, they shall be credited at such other prices as agreed upon between the Company and UDOT following inspection of the recovered material.

20. PROJECT DESIGN CHANGES

If UDOT changes the Project design after the Company has completed its design review; or if the Company has completed its portion of the Utility Work of its facilities based on previously approved design plans; the cost of the second design review and/or Utility Work is to be paid in full by UDOT. UDOT will make adjustments for any additional time that may be required for the Company to perform Utility Work on its facilities when required.

21. COMPANY'S COSTS DIFFER BY MORE THAN 10%

If the Company's actual costs incurred for its inspection differs more than 10% plus or minus per line item from the amount contained in the supplemental agreements, the Company is required to submit a letter of explanation with its billings indicating how and why the difference in costs occurred.

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22. **RIGHT TO AUDIT**

UDOT and FHWA shall have the right to audit all cost records and accounts of the Company pertaining to this Project in accordance with the auditing procedure of the Federal Highway Administration and 23 C.F.R. §645, subpart A. Should this audit disclose that the Company has been underpaid, UDOT will reimburse the Company within 60 days upon submission of additional billing to cover the underpayment. Should this audit disclose that the Company has been overpaid, the Company will reimburse UDOT within 60 days of notification of audit findings in the amount of the overpayment. For the purpose of audit the Company is required to keep and maintain its records of Utility Work covered herein for a minimum of 3 years after final payment is received by the Company from UDOT.

The Company shall have the right to review UDOT's cost documentation for the Utility Work performed on behalf of the Company.

23. **ACCEPTANCE**

UDOT will provide notification to the Company for acceptance of the Utility Work upon completion of the final inspection. Company will have 60 days to respond in writing to UDOT with any additional comments in regards to the Utility Work. In the event that UDOT does not receive a written response within 60 days, UDOT will designate the Utility Work accepted by the Company. Upon acceptance of the Utility Work, the Company will accept, own and maintain its facilities. To the extent it may lawfully do so, Company further agrees to relieve UDOT from any responsibility or liability that may result for its new facilities or the operation thereof.

24. **ACCESS & MAINTENANCE**

Access for maintenance and servicing of Company's facilities located on the Project right-of-way will be allowed only by permit issued by UDOT. Company will obtain the permit and abide by conditions thereof for policing and other controls in conformance with Utah Administrative Code R930-7.

25. **MISCELLANEOUS**

a. Each Party agrees to undertake and perform all further acts that are reasonably necessary to carry out the intent and purpose of this Agreement at the request of the other Party.
b. This Agreement in no way creates any type of agency relationship, joint venture, or partnership between UDOT and Company.
c. The failure of either Party to insist upon strict compliance of any of the terms and conditions, or failure or delay by either Party to exercise any rights or remedies provided in this Agreement, or by law, will not release either Party from any obligations arising under this Agreement.
d. This Agreement shall be deemed to be made under and shall be governed by the laws of the State of Utah in all respects. Each person signing this Agreement warrants that the person has full legal capacity, power, and authority to execute this Agreement for and on behalf of the respective Party and to bind such Party. This Agreement may be executed in one or more counterparts, each of which shall be an original, with the

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same effect as if the signatures were made upon the same instrument. This Agreement may be delivered by facsimile or electronic mail.

26. **ASSIGNMENT**

Company may assign this Agreement in whole, or in part, to a Permitted Assignee. As used herein, the term "Permitted Assignee" shall mean (a) any Affiliate of Company, (b) any Person that purchases all or substantially all of the assets of Company, or any other Person formed by or surviving the merger or consolidation of Company and any other person or (c) any institutional lender to whom this Agreement is assigned as collateral security for any indebtedness of Company or any Affiliate of Company, provided that such collateral assignment is subject to the terms of this Agreement. Upon any assignment to a Permitted Assignee, the assignor shall remain jointly and severally liable with the Permitted Assignee for the performance under this Agreement. Company may assign this agreement to any other assignee that is not a Permitted Assignee, provided that Company is not in default under this Agreement and that such other assignee shall expressly assume in writing all obligations and liabilities with respect to this Agreement, with the prior written consent of UDOT which consent shall not be unreasonably withheld.

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IN WITNESS WHEREOF, the Parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first above written.

Manual Bros., Inc.

_____

Title: _____

Date: _____

Recommended For Approval:

_____

Title: Utility and Railroad Leader

Date: _____

Utah Department of Transportation

_____

Title: Project Director

Date: _____

Approved as to Form

_____

Title: Assistant Attorney General

Date: _____

UDOT Comptroller Office Contract Administrator

_____

Title:

Date: _____

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STANDARDS

COMPANY DRAWINGS REQUIREMENTS:

UDOT will supply as-constructed plans for the Utility Work it performs for the Company Utility Work upon completion. In the event UDOT performs including any services which alter the route, including but not limited to line, depth of cover, adding or removing hand-holes markers or conduits, etc.,

In the event the re-route is greater than 1,000 feet, UDOT shall provide updates in both hard copy and electronic format (Auto-CAD Release 14.0 or 2000) within 30 days of completion of the change, i.e. completion of cable relocation project.

AS-CONSTRUCTED DRAWINGS MUST CONTAIN A MINIMUM OF THE FOLLOWING:

a) Drawing size of 11" by 17".

b) Table showing the list of drawings.

c) As-constructed Drawings showing the following:

- Conduit length summary
- Number of Terminals
- Number of POPs
- Number of Splice Manholes
- Number of Intermediate Manholes
- Number of Leased Manholes First Digital
- Number of Buried Splice Vaults
- Number of Buried Pull Vaults

d) Information showing the location of the running line, relative to permanent landmarks, including but not limited to, railroad mileposts, boundary crossings and utility crossings. All information shall be geographically accurate. The running line will be stationed horizontally.

e) Splice locations with amount of slack coil.

f) Manhole and hand-hole locations with any amount of slack coil noted.

g) Conduit information (type, length, expansion joints, etc.).

h) ROW detail (type, centerline distances, boundaries, waterways, and road crossings, known utilities and obstacles).

Drawings will be updated with actual field data during and after construction.

MATERIALS:

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PVC conduit shall be a minimum of schedule 40 wall thickness, HDPE conduit shall be SDR-11. Follow Duct Configuration shown in Exhibit "B".

The use of steel pipe shall be avoided, whenever possible. If carbon steel pipe must be used, written approval of Company is required.

Hand-holes (vaults) and covers shall be constructed from polymer concrete with a vault load-bearing capacity as per ANSI/SCTE 77 2002 as shown in Table 1 below:

TABLE 1: ANSI/SCTE 77 2002 VAULT LOAD BEARING REQUIREMENTS			
APPLICATION	LOADING	REQUIREMENTS	
TIER 8: Sidewalk or off-roadway applications with a safety factor for non-deliberate vehicular traffic.	Vertical	Design Load	8000 pounds
		Test Load	12000 pounds
	Lateral	Design Load	600 pounds/sq. ft.
		Test Load	900 pounds/sq. ft.
TIER 15: Driveway, parking lot, and off-roadway applications subject to occasional non-deliberate heavy vehicular traffic.	Vertical	Design Load	15000 pounds
		Test Load	22500 pounds
	Lateral	Design Load	800 pounds/sq. ft.
		Test Load	1200 pounds/sq. ft.
AASHTO H-20: Deliberate vehicular traffic applications.	Certified pre-cast concrete, cast iron or AASHTO recognized materials		
Ratings are for vaults to be installed at grade level to 48 inches of cover. Installation at depth greater than 48 inches requires an increase in the vault rating.			

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First Digital

Hand-hole lids shall be equipped with an EMS marker for electronic locating capability. If a hand-hole lid is not equipped with an EMS marker, an EMS ball must be buried 2 - 4 feet below ground directly over the hand-hole box.

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MINIMUM DEPTH OF COVER:
(a) Minimum cover required in placement of conduit shall be 42 inches to top of conduit, except where field conditions dictate otherwise as referenced below.

(b) For conduit systems with manhole access, the depth of cover shall be a minimum 36 inches to top of conduit.

(c) At locations where conduit crosses other subsurface utilities or other structures, the conduit shall be installed to provide adequate vertical clearance (minimum of 12 inches) and the applicable minimum depth can be maintained; otherwise the conduit will be installed under the existing utility or other structure. If, however, adequate clearance cannot be obtained and the conduit must be placed above, the cable shall be encased in steel pipe and HDPE conduit.

(d) At road crossings, the conduit shall be placed at a minimum depth of 60" below the bottom of the ditch.

(e) In rock, the conduit depth shall be:
36 inches - 42 inches in HDPE,

24 inches - 36 inches in HDPE encased in steel,
18 inches - 24 inches in HDPE or PVC or steel and concrete encased.

(f) PVC and HDPE conduit will be back-filled with 6 inches of select materials (padding) in rock areas. MDl Polyurethane channel (Fiber-Rockgard by Chempro, Inc. or equivalent) may be used as protective cover in lieu of select material padding.

(g) Buried Hand-holes: 36 inches minimum depth to top of the hand-hole. The placement of hand-holes in cropland and pastures shall be avoided if at all possible, for access reasons. If this cannot be avoided, then the top of the hand-hole shall be placed at least 3 feet below the maximum depth attained by the agricultural equipment, due to hand-dig zone requirements.

BURIED CABLE WARNING TAPE:
All conduits will be installed with buried cable warning tape except where existing steel pipelines or existing conduit systems are used. Buried cable warning tape shall be 6 inches wide and display a written message similar to: “Warning: Buried Fiber Optic Cable," Manuel Bros. name and 800 number one call number repeated every 24 inches. The warning tape shall generally be placed at 12 to 24 inches below grade and directly above the conduit.

CONDUIT CONSTRUCTION:
Conduits may be placed by means of trenching, plowing, jack and bore, push-pull method, or directional bore. Conduits will generally be placed on a level grade parallel to the surface, with only gradual changes in grade elevation.

Conduit crossings of roads maintained by government bodies and railroad crossings will be encased in steel conduit, except where the cable is placed with 10 feet or more of cover. In the latter case, HDPE is adequate.

Conduit placed by the push-pull method (that is using a push rod, followed by pulling conduit) may use HDPE, PVC, or steel conduit.

All directional bores will use HDPE equivalent to Schedule 80 PVC or better or steel conduit.
In areas prone to lightning, HDPE is the preferred material.

All conduits placed on bridges shall have expansion joints placed at each structural (bridge) expansion joint or at least every 300 feet, whichever is the shorter distance. For bridges under 100 feet, at least one conduit expansion joint will be placed, even if there is no bridge expansion joint.

INNERDUCT INSTALLATION:
Innerduct(s) shall be installed in all steel conduits. No cable will be placed directly in any split/solid steel conduit without innerduct.
Innerduct(s) shall extend beyond the end of all conduits a minimum of eighteen (18) inches.

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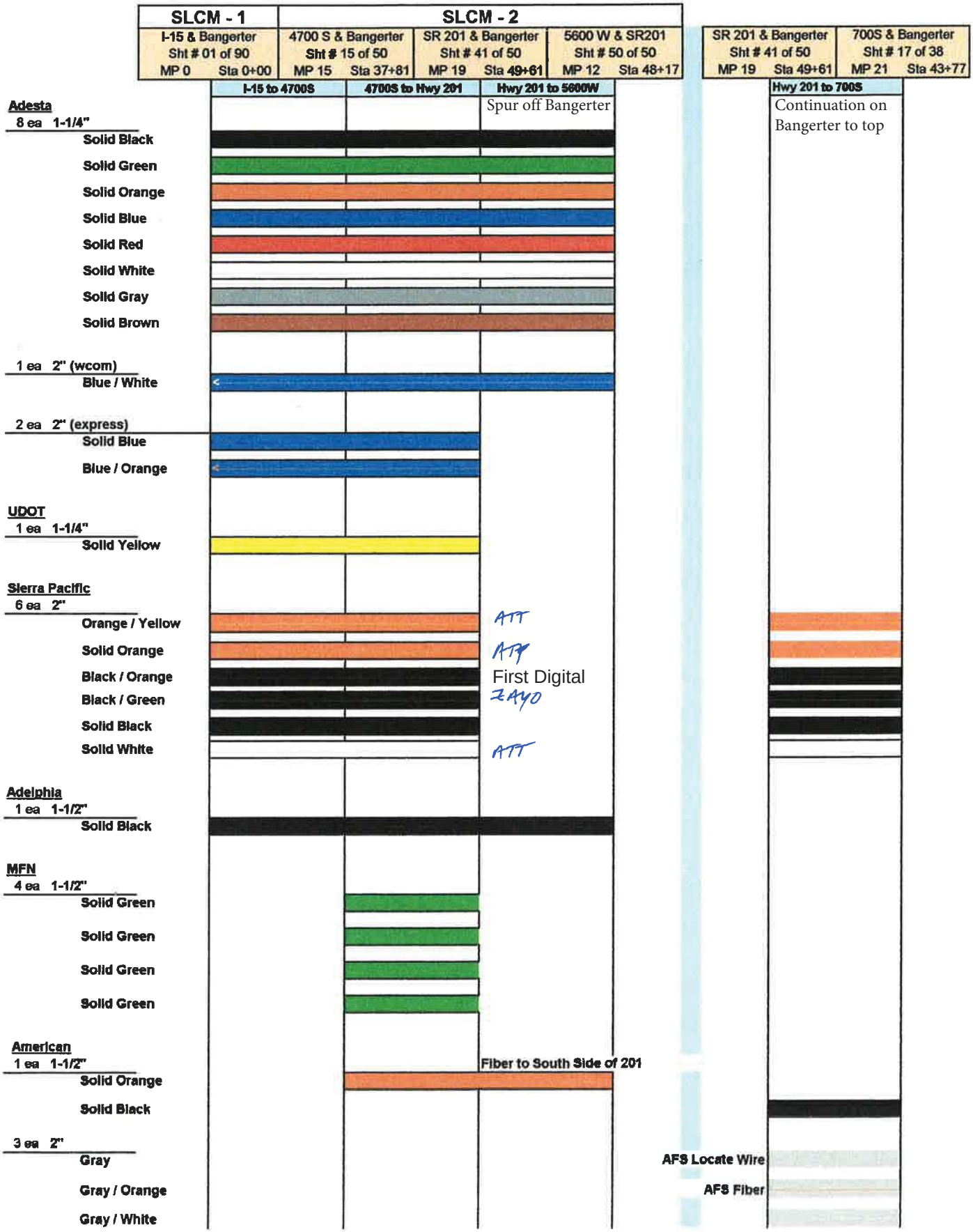
EXHIBIT B
DUCT CONFIGURATION



178278

Project No. S-0154(12)11, Salt Lake County
4 Interchanges on Bangerter Highway
MCI COMMUNICATIONS SERVICES, INC.
Charge ID No. 71939 PIN 12566

25940

MCI COMMUNICATIONS SERVICES, INC.
MASTER UTILITY AGREEMENT

THIS MASTER UTILITY AGREEMENT, made and entered into this 20 day of Sept, 20 16, by and between the **Utah Department of Transportation**, ("UDOT") and **MCI Communications Services, Inc.** a Delaware Corporation, ("Company") (each as "Party" and jointly as "Parties").

RECITALS

WHEREAS, UDOT is preparing to request proposals for and award a design-build contract for the highway project identified as Project Number S-0154(12)11, 4 Interchanges on Bangerter Highway in Salt Lake County, Utah, ("Project"); and

WHEREAS, UDOT's design-build contractor ("Design-Builder") will complete the design and administer construction of the Project; and

WHEREAS, UDOT has identified Company facilities within the limits of the Project which may necessitate the relocation, protection, or adjustment of the facilities, ("Utility Work"); and

WHEREAS, the Company desires for the Design-Builder to design and construct the Company's Utility Work except cable and pedestal procurement, pulling, and splicing necessitated by the Project; and

WHEREAS, the Company will perform the necessary review and approval for the design, cable and pedestal procurement, pulling, and splicing, and construction inspection to accommodate the Project; and

WHEREAS, for the purpose of expediting any required Utility Work and reimbursement the Parties are entering into this Project Master Utility Agreement with the understanding that future supplemental agreements to this Agreement will be entered into covering Utility Work to be accomplished by the Company and UDOT at specific Project locations.

THIS AGREEMENT is made to set out the terms and conditions where under the Utility Work shall be performed.

AGREEMENT

NOW THEREFORE, the Parties agree as follows:

1. CONTACT INFORMATION

UDOT's Project Representative is Alana Spendlove, UDOT Project Utility and Railroad Leader, telephone number (801) 887-3462, and e-mail aspendlove@utah.gov.

UDOT's Resident Engineer for 5400 South and 7000 South interchanges is Bryan Chamberlain, telephone number (801) 887-3405, and e-mail bchamberlain@utah.gov, or their designated representative, as assigned.

UDOT's Resident Engineer for 9000 South and 11400 South interchanges is Ken Talbot, telephone number (801) 360-8750, and e-mail kentalbot@utah.gov, or their designated representative, as assigned.

UDOT's Field Representative contact person will be identified in subsequent supplemental agreements.

Company's contact person is David McAllister, telephone number (303) 214-7115, and e-mail david.mcallister@verizon.com.

After awarding the Project, UDOT will provide the Company with the Design-Builder contact information, hereinafter referred to as "Design-Builder Project Representative".

2. AUTHORIZATION FOR DESIGN WORK

In order to facilitate coordination and obtain technical information about the Company's facilities and requirements for inclusion in this Agreement and the request for proposals, UDOT gave the Company authorization for preliminary design engineering on April 26, 2016.

3. SUBSURFACE UTILITY ENGINEERING

UDOT has performed Subsurface Utility Engineering (SUE) within the limits of the Project. Additional SUE work to determine the precise location of underground facilities at specific, critical locations on the Project will be reviewed with the Company.

4. PROJECT COORDINATION

Company and UDOT agree to have the Design-Builder include in the Project, items of Utility Work for the Company's facilities.

During the development of the Project design, the Company and UDOT, along with its Design-Builder, shall consult as necessary in an effort to determine if conflicts with the Company's facilities can be avoided. If Utility Work is required, UDOT will be responsible to propose and provide a location for the facilities. UDOT will provide the Company with Project design plans as early as possible, and will schedule and meet with the Company to review the design, construction, estimates of cost, and scheduling for the Company's Utility Work at specific locations

on the Project to ensure maximum lead time for advance order of materials and work force scheduling.

The Company shall advise UDOT's Project Representative of the approximate time required for completion of the Utility Work and shall diligently pursue its Utility Work so that completion can be accomplished according to the pre-determined time schedule negotiated by the Company and UDOT in the supplemental agreement issued hereto for a specific Project location. The Company shall immediately notify UDOT's Project Representative by phone call or email, of its discovery of any occurrence or unforeseen circumstances that would prevent the Company from completing its Utility Work according to the time schedule provided. In addition, the Company shall describe the circumstances in writing within 24-hours of the discovery to UDOT's Project Representative.

5. COMPANY REQUIREMENTS

UDOT will comply with the following Company Utility Work requirements:

a. The Project and/or Utility Work shall not impact the operation of Company's facilities from November 15 through January 15 without prior written approval from Company. The Project schedule shall be developed accordingly.

6. UDOT TO DESIGN AND CONSTRUCT A PORTION OF UTILITY WORK

UDOT shall perform the necessary design work, cost estimating, field and office engineering, furnish all materials (except cable and pedestal) and perform the Utility Work (except pulling and splicing) necessitated by the Project.

UDOT will design the Utility Work in accordance with Company's standards regularly followed by the Company in its own work and not considered a betterment. In the event of a conflict between UDOT and Company standards, the higher standard will be applied.

UDOT will secure permits required for Utility Work for Company's facilities.

UDOT will supply as-constructed plans for the Utility Work it performs, in PDF format, upon completion of any required Utility Work.

7. COMPANY TO PERORM INSPECTION AND CONSTRUCT A PORTION OF THE UTILITY WORK

The Company will perform inspection of the Utility Work for the Company's facilities that will be performed by UDOT. UDOT will accomplish the Utility Work on the Company's facilities in accordance with the plans and specifications approved by the Company. Changes or additions to the plans and specifications shall be approved by the Company and UDOT through a supplemental agreement.

The Company will provide all cables, pedestals, pulling and splicing necessary to accommodate the Utility Work of its facilities on the Project. The Company requires 30 days' notice to schedule splicing and fiber pulls and will determine the splicing window based on the circuit.

8. STANDARD SPECIFICATIONS AND REGULATIONS

The Company, while engaged in the preliminary design and Utility Work of its facilities, shall comply with UDOT's 2012 Standard Specifications for Road and Bridge Construction and Utah Administrative Code R930-7.

9. UNDERBUILT AND FACILITY REMOVAL REQUIREMENTS

The Company is responsible to remove all Company-owned underbuilt facilities from utility poles that will be relocated or removed due to the Project.

10. RIGHT-OF-WAY

Any easements or replacement right-of-way required in conjunction with the Utility Work of Company's facilities will be acquired by UDOT in accordance with the requirements of Utah Administrative Code R930-8-7.

11. MAINTENANCE OF TRAFFIC (MOT), TRAFFIC CONTROL, CLEAR/GRUB, AND SURVEYING

UDOT will provide MOT and traffic control for Utility Work at no cost to the Company. The Company is responsible to coordinate Utility Work schedules and traffic control needs with UDOT to facilitate the Project schedule and minimize impacts to the public. Except in the case of emergencies, Company's Utility Work on the Project will be scheduled in compliance with the requirements of the Limitation of Operations contained in UDOT's Design-Builder contract with respect to lane closures, peak hour Utility Work restrictions, holiday and special event limitations, etc.

UDOT will provide, at no cost to the Company, clearing and grubbing for the Utility Work as required by the Company and in accordance with UDOT's Standard Specifications.

Surveying and staking of roadway facilities as required by the Company will be provided by UDOT in accordance with UDOT's Standard Specifications. The cost of the surveying and staking will be at UDOT's expense and the Company will have no obligation for the cost of surveying. Any of UDOT's survey control stakes or bench markers, which are removed or damaged by the Company, shall be reestablished by UDOT at Company's expense.

12. BETTERMENT WORK

If the Company desires to include betterment work in the Project at any specific location, UDOT may agree to the betterment work providing the difference in costs between the functionally equivalent required Utility Work and the Company's desired betterment work, that is not required by the Project, shall be at the sole cost of the Company and the betterment work can reasonably be accommodated without delaying UDOT's Project. The betterment work will be addressed by a separate supplemental agreement between UDOT and the Company.

Once a Design-Builder has been selected by UDOT, any betterment work request will be negotiated directly with the Design-Builder. However, it is at UDOT's sole discretion to approve the betterment work.

13. SUPPLEMENTAL AGREEMENTS

UDOT and the Company shall enter into individual supplemental agreements to cover Utility Work at specific Project locations. Each supplemental agreement will include a description and location of the Utility Work to be performed, design drawings showing the original and proposed locations of the Company's facilities, Utility Work schedules, cost estimates from all Parties, participation shares for UDOT and the Company, any proposed betterment work, and any necessary right-of-way documents. The estimates do not account for increases due to unknown and unforeseen hardships in accomplishing the Utility Work. A copy of the format of the proposed supplemental agreement is marked Exhibit "A" that is incorporated by reference.

The Company will require a 2 week review and approval period for any final supplemental agreement submitted to the Company by UDOT.

In the event there are changes in the scope of the Utility Work, extra Utility Work, or changes in the planned Utility Work covered by a supplemental agreement, a modification to the supplemental agreement approved in writing by the Parties is required prior to the start of Utility Work on the changes or additions.

14. UDOT AUTHORIZATION TO PROCEED WITH UTILITY WORK

The Company shall not perform any Utility Work until the supplemental agreement for the Utility Work is signed by the Company and received by UDOT. UDOT will review and approve the supplemental agreement and will issue an authorization to proceed to the Company for each specific Utility Work location.

15. UDOT TO NOTIFY THE COMPANY BEFORE BEGINNING UTILITY WORK

UDOT will notify the Company at least 2 business days in advance of beginning any Utility Work covered by any supplemental agreements hereto, to allow the Company time to schedule an inspector to be present during the Utility Work. Subsequent notification of when and where Utility Work will be performed will be given on a day-to-day basis. Should UDOT fail to give advance notification and Utility Work is performed without the presence of a Company inspector, UDOT will, at no cost to the Company, facilitate inspection of the Utility Work including, if necessary, uncovering the Utility Work.

16. COMPANY TO NOTIFY UDOT AND THE DESIGN-BUILDER BEFORE BEGINNING UTILITY WORK

The Company will notify UDOT's Project Representative as well as the Design-Builder Project Representative at least 2 business days in advance of beginning any Utility Work covered by any supplemental agreements hereto. The Company will give subsequent notifications of when and where the Company will be performing Utility Work to UDOT's Field Representative and the Design-Builder Project Representative on a day-to-day basis. Such subsequent notifications can be informal. Failure on the part of the Company to give proper notification to UDOT's Field Representative and the Design-Builder Project Representative will be cited to the Company and that portion of the Company's Utility Work performed while not under the surveillance of the UDOT Field Representative may be deducted from the reimbursement at UDOT's discretion for.

17. INSPECTION

The Company shall provide on-call engineering support by the Company's engineer or appropriate representative for design review, schedule coordination, or to correct or clarify issues during the Utility Work, and to perform the necessary inspection for the Company's Utility Work installed by UDOT.

a. The Company engineer and/or inspector shall work with and through UDOT's Project Representative and shall give no orders directly to UDOT's Design-Builder unless authorized in writing to do so. UDOT will accomplish the Utility Work covered herein on Company's facilities in accordance with the plans and specifications provided and/or approved by the Company, including changes or additions to the plans and specifications, which are approved by the Parties hereto.
b. The Company shall immediately notify UDOT's Project Representative and the Design-Builder Project Representative of any deficiencies in the Utility Work on the Company's facilities. The Company shall follow up with written detail to UDOT's Project Representative and the Design-Builder Project Representative of its findings within 24-hours of making its initial notification.
c. UDOT will respond to the Company's concerns within 24-hours of written notification.
d. The Company, through its inspection of the Utility Work, will provide UDOT's Project Representative with information covering any problems or concerns the Company may have with acceptance of the facilities upon completion of the Utility Work.
e. Any periodic plan and specification review or construction inspection performed by UDOT arising out of the performance of the Company's Utility Work does not relieve the Company of its duty in the performance of the Utility Work or to ensure compliance with acceptable standards.

18. DAILY RECORDKEEPING

The Company will keep daily records of the inspection and Utility Work performed by the Company forces. Daily records will be in duplicate on a form to be prepared by the Company or UDOT. The type of form to be used shall be preapproved by UDOT's Contracts, Compliance, and Certification Manager. The daily records shall be signed by UDOT's Field Representative and the Company or its authorized representatives.

19. REIMBURSEMENT FOR COMPANY'S UTILITY WORK

In accordance with Utah Code §72-6-116(3)(a)(ii), UDOT will reimburse the Company 50% of the cost of Utility Work of its facilities on state highways and the Company shall pay the remainder of the cost of the Utility Work. UDOT will reimburse the Company 100% of the cost of Utility Work of its facilities located on a public utility easement, on a Company-owned private easement or fee property. The Company shall provide UDOT with a copy of the public utility easement or subdivision plat, private easement or fee title. The Utility Work and reimbursement for Company's facilities required by the Project will be in conformance with the requirements of Utah Administrative Code R930-8.

The Company shall submit itemized bills covering its actual costs incurred for performing the Utility Work covered by supplemental agreements to UDOT's Contracts and Compliance Specialist:

UDOT Contracts and Compliance Specialist
Utah Department of Transportation
PO Box 141510
SLC UT 84114-1510

Itemized bills shall bear the Project and supplemental agreement numbers, supporting sheets, and a complete billing statement of all actual costs incurred, following the order of the items in the detailed estimates contained in the supplemental agreement, and be submitted to UDOT within 60 days following completion of the Utility Work by the Company on the Project. Otherwise, previous payments to the Company may be considered final, except as agreed to between the Parties in advance. UDOT will reimburse the Company within 60 days after receipt of the billings, but only for those items complying fully with the provisions of Utah Administrative Code R930-8. Failure on the part of the Company to submit final billings within 6 months of the completion of the Utility Work will result in UDOT's disallowance of that portion of Utility Work reimbursement.

If the Company owes a balance to UDOT, the Company will reimburse UDOT within 60 days after receipt of billing from UDOT.

20. SALVAGE CREDIT

In accordance with 23 C.F.R. §645.117 all materials from Company's existing facilities which are recovered by UDOT while performing the Utility Work and not reused on this Project shall become the property of the Design-Builder unless otherwise agreed to in advance by the Parties hereto.

In accordance with 23 C.F.R. §645.117, all materials from the existing facilities, which are recovered in suitable condition for reuse by the Company and not reused on the Project, shall be credited to the cost of the Project at current stock prices. If the materials are not suitable for reuse, they shall be credited at such other prices as agreed upon between the Company and UDOT following inspection of the recovered material.

21. PROJECT DESIGN CHANGES

If UDOT changes the Project design after the Company has completed its design review; or if the Company has completed its portion of the Utility Work of its facilities based on previously approved design plans; the cost of the second design review and/or Utility Work is to be paid in full by UDOT. UDOT will make adjustments for any additional time that may be required for the Company to perform Utility Work on its facilities when required.

22. COMPANY'S COSTS DIFFER BY MORE THAN 10%

If the Company's actual costs incurred for its force account work differs more than 10% plus or minus per line item from the amount contained in the supplemental agreements, the Company is required to submit a letter of explanation with its billings indicating how and why the difference in costs occurred.

23. RIGHT TO AUDIT

UDOT and FHWA shall have the right to audit all cost records and accounts of the Company pertaining to this Project in accordance with the auditing procedure of the Federal Highway Administration and 23 C.F.R. §645, subpart A. Should this audit disclose that the Company has been underpaid, UDOT will reimburse the Company within 60 days upon submission of additional billing to cover the underpayment. Should this audit disclose that the Company has been overpaid, the Company will reimburse UDOT within 60 days of notification of audit findings in the amount of the overpayment. For the purpose of audit the Company is required to keep and maintain its records of Utility Work covered herein for a minimum of 3 years after final payment is received by the Company from UDOT.

The Company shall have the right to review UDOT's cost documentation for the Utility Work performed on behalf of the Company.

24. ACCEPTANCE

UDOT will provide notification to the Company for acceptance of the Utility Work upon completion of the final inspection. Company will have 60 days to respond in writing to UDOT with any additional comments in regards to the Utility Work. In the event that UDOT does not receive a written response within 60 days, UDOT will designate the Utility Work accepted by the Company. Upon acceptance of the Utility Work, the Company will accept, own and maintain its facilities. To the extent it may lawfully do so, Company further agrees to relieve UDOT from any responsibility or liability that may result for its new facilities or the operation thereof.

25. ACCESS & MAINTENANCE

Access for maintenance and servicing of Company's facilities located on the Project right-of-way will be allowed only by permit issued by UDOT. Company will obtain the permit and abide by conditions thereof for policing and other controls in conformance with Utah Administrative Code R930-7.

26. MISCELLANEOUS

a. Each Party agrees to undertake and perform all further acts that are reasonably necessary to carry out the intent and purpose of this Agreement at the request of the other Party.

b. This Agreement in no way creates any type of agency relationship, joint venture, or partnership between UDOT and Company.

c. The failure of either Party to insist upon strict compliance of any of the terms and conditions, or failure or delay by either Party to exercise any rights or remedies provided in this Agreement, or by law, will not release either Party from any obligations arising under this Agreement.

d. This Agreement shall be deemed to be made under and shall be governed by the laws of the State of Utah in all respects. Each person signing this Agreement warrants that the person has full legal capacity, power, and authority to execute this Agreement for

and on behalf of the respective Party and to bind such Party. This Agreement may be executed in one or more counterparts, each of which shall be an original, with the same effect as if the signatures were made upon the same instrument. This Agreement may be delivered by facsimile or electronic mail.

****

IN WITNESS WHEREOF, the Parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first above written.

MCI Communications Services, Inc

MARK WINGATE

Title: SR. MGR - NTWK ENG & OPS

Date: 9/7/16

Recommended For Approval:

Title: Utility and Railroad Leader

Date: 9/20/16

Utah Department of Transportation

Title: Project Director

Date: 9/20/2016

Approved as to Form

Title: Assistant Attorney General

Date: 09/26/2016

UDOT Comptroller Office Contract Administrator

Title:

Date: 9/27/16

MCI COMMUNICATIONS SERVICES, INC.
SUPPLEMENTAL AGREEMENT NO. ___

Supplement to UDOT Finance No. _____

THIS SUPPLEMENTAL AGREEMENT, made and entered into this _____ day of _____, 20____, **Utah Department of Transportation**, ("UDOT"), and **MCI Communications Services, Inc.**, a Delaware Corporation, ("Company") each as ("Party") and jointly as ("Parties").

The Parties hereto entered in to a Master Utility Agreement (MUA) dated _____, UDOT Finance No. _____. All the terms of the MUA remain in full force and effect unless otherwise specified herein.

The Parties agree as follows:

1. UDOT and Company will perform the following described Utility Work in accordance with the terms and conditions of the MUA:

   a. Description of Utility Work to be performed, including proposed location, described in Exhibit "A" that is incorporated by reference: (Plan Sheets Attached)

   b. The Company requirements as shown in the MUA – Company Requirements, are modified as follows:

   c. Anticipated duration of Utility Work as shown on Exhibit "B" that is incorporated by reference:

   d. Betterments included:

TOTAL ESTIMATED COST OF SUPPLEMENTAL AGREEMENT _____	**$0.00**
TOTAL ESTIMATED COST OF COMPANY PERFORMED UTILITY WORK	$0.00
TOTAL ESTIMATED COST OF UDOT PERFORMED UTILITY WORK	$0.00
COMBINED TOTAL ESTIMATED COST OF UTILITY WORK	**$0.00**
TOTAL ESTIMATED AMOUNT OF COMPANY PARTICIPATION @ 50%	$0.00
TOTAL ESTIMATED AMOUNT OF UDOT PARTICIPATION @ 50%	$0.00

2. UDOT will notify the Company's contact person, David McAllister, Telephone No. (303) 214-7115, email david.mcallister@verizon.com at least 48 hours in advance of beginning the Utility Work covered herein, or in accordance with the specific terms of the MUA, as applicable.

IN WITNESS WHEREOF, the Parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first written above.

MCI Communications Services, Inc.

_____

Title: _____

Date: _____

Recommended For Approval:

_____

Title: Utility and Railroad Leader

Date: _____

Utah Department of Transportation

_____

Title: Project Director

Date: _____

UDOT Comptroller Office Contract Administrator

_____

Title:

Date: _____

E 25592 178083

Statewide Agreement Covering the Coordination and Reimbursement for **COMPANY's** Facility Adjustments and Relocations Throughout the State of Utah
QUESTAR GAS COMPANY

STATEWIDE UTILITY RELOCATION AGREEMENT

THIS STATEWIDE UTILITY RELOCATION AGREEMENT, (Agreement) is made and entered into this 19 day of July, 2016, by and between the **UTAH DEPARTMENT OF TRANSPORTATION**, hereinafter referred to as "**UDOT**" and **QUESTAR GAS COMPANY**, a Registered Corporation in the State of Utah, hereinafter referred to as the "**COMPANY**." The Utah Department of Transportation and Questar Gas Company are referred to herein individually as a "Party" or collectively as the "Parties."

RECITALS:

WHEREAS, UDOT has jurisdiction over State Highway Rights of Way and administers the programming, development and completion of State and Federal-aid eligible projects (referred to herein as Project or collectively as Projects); and

WHEREAS, COMPANY is a natural gas utility and owns natural gas facilities (Facilities), that are located within State Highway Rights of Way under a Statewide Utility License Agreement and within **COMPANY** owned easements or fee title property; and

WHEREAS, certain Projects will require the relocation, adjustment, or protection of **COMPANY** Facilities, and the **COMPANY** is required by State Law to perform this work (Utility Work) when necessary to accommodate a Project; and

WHEREAS, to expedite the Utility Work and reimbursement of Utility Work on Projects, it is the desire of the Parties to enter into this Agreement with the understanding that the Parties will enter into future Project Agreements, which are supplemental to this Agreement, to address the scope of work, schedule, reimbursement amounts, and other requirements for each Project; and

WHEREAS, this Agreement, along with the Project Agreements shall govern the terms and conditions for each Project;

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which hereby acknowledged, the Parties agree to the following terms and conditions.

TERMS AND CONDITIONS

1. PROJECT IDENTIFICATION AND DEVELOPMENT

A. For each Project the Parties agree to enter into a Project Agreement. **UDOT** will prepare a Project Agreement in substantially the same form as the agreement attached hereto as Exhibit A. All terms in the Project Agreements shall be supplemental to the terms of this Agreement. In the case of an inconsistency between the terms of this Agreement and the terms of a Project Agreement, the terms of the Project Agreement shall control.

B. In some cases, particularly when **UDOT** engages a Design Builder or a Construction Manager General Contractor, the Parties may enter into Supplemental Agreements to the Project

Agreement. In this case, the Project Agreement may be limited to contact information and a description of anticipated work. The Supplemental Agreements will address Utility Work for specific Project locations and include a description of the work, the Party to perform the work, the location of the work, the estimated duration of the work, an estimate of the cost to each Party, any proposed betterments, a plan showing the existing and proposed location of the Facilities, and any necessary right-of-way documents. The estimates contained in the Project Agreement and Supplemental Agreements will be based upon material and labor prices as of the date of the estimate and do not account for increases due to unforeseen circumstances in accomplishing the Utility Work.

2. PROJECT COORDINATION

A. During the request for proposal phase of any Design Build Project, **UDOT** shall schedule a meeting with **COMPANY** and **UDOT's** prospective contractors. The purpose of the meeting will be to determine if conflicts with the **COMPANY's** Facilities can be avoided and to provide prospective contractors with parameters within which **COMPANY's** Facilities can be relocated. **COMPANY** and **UDOT** will also meet one (1) time individually with each prospective contractor for the same purpose.

B. During the design phase of any Project, **UDOT** and **COMPANY** will work in good faith to identify the extent of any conflicts and propose and provide a mutually agreeable location to which the Facilities can be relocated. **UDOT** will provide the **COMPANY** with Project design plans as early as possible, and will schedule and meet with the **COMPANY** to review the right-of-way and environmental requirements, design, construction, cost estimates, and scheduling for the **COMPANY's** Utility Work at specific locations on the Project to ensure maximum lead time for advance order of materials and scheduling of work force.

C. **COMPANY** shall provide **UDOT** with an estimated time for completion of the Utility Work and any potential limitations including permit and regulatory approvals, dependency upon work of other parties, lead times for acquiring materials, outage windows, and scheduling work crews. **UDOT** will, by its standard specifications and/or special provisions, make its contractor aware of the coordination and cooperation required for timely completion of the Utility Work and will advise the contractor of the approximate schedule for completion of the Utility Work during Project advertisement. After UDOT awards the Project to its contractor, UDOT will schedule a meeting with the COMPANY and the COMPANY shall meet with UDOT's representative and UDOT's contractor to develop a detailed work plan and schedule for Utility Work. The COMPANY shall submit to UDOT written acknowledgement of the approved schedule. The **COMPANY** shall diligently pursue its work so that completion can be accomplished according to the approved schedule after receiving written authorization to proceed.

D. The **COMPANY** shall notify **UDOT**, or its contractor if so designated by **UDOT**, as soon as practicable but no later than two (2) working days of its discovery of any occurrence or unforeseen circumstances that would prevent the **COMPANY** from completing the Utility Work according to the time schedule established in the Project Agreement.

E. After the Project Agreement is executed by the Parties, any change in the scope of the work, extra work, or change in the planned work covered by this Agreement or the Project Agreement will be noted in the daily records and is valid only if made by written authorization and Change Order executed by both Parties prior to the start of the revised work. The **COMPANY** will provide to **UDOT** detailed estimates for the Change Order work. If the change of work is significant, **UDOT** may require a Supplemental Agreement.

3. COMPANY REQUIREMENTS

A. After design work is complete and the Project Agreement has been executed, **COMPANY** may require up to six (6) months for the acquisition of materials for high pressure (HP) Facilities and seven (7) weeks for acquisition of materials for intermediate high pressure (IHP) Facilities.

B. The Parties shall develop a Project schedule for the relocation of **COMPANY's** Facilities. Utility Work on **COMPANY** Facilities from October 1 through April 15 will be avoided, unless otherwise agreed to in writing. Utility Work between April 16 and September 30 may be performed depending upon the **COMPANY's** system requirements.

C. The Parties may agree to abandon retired lines in place in accordance with **UDOT** and **COMPANY** procedures. Abandoned lines remain the property of **COMPANY**. If abandoned lines are removed, **COMPANY** will perform the work and the cost of removal will be included in the Project costs and shared by **UDOT** and **COMPANY** under the terms of the Project Agreement.

4. UDOT PROJECT RESPONSIBILITIES

A. **UDOT**, through its contractors, will provide surveying and staking of roadway facilities as required by the **COMPANY,** in accordance with **UDOT's** Standard Specifications, Section 01721, Survey, 3.16, Utilities. The cost of the surveying and staking will be at **UDOT's** sole expense and the **COMPANY** will have no obligation for surveying. Any of **UDOT's** survey control stakes or bench markers which are removed or damaged by the **COMPANY** shall be reestablished by **UDOT** at **COMPANY's** expense.

B. **UDOT** will adjust any existing schedule to allow for any reasonable time that may be required for the **COMPANY** to redesign or modify its plans and relocate its Facilities when **UDOT** requires the redesign. If **UDOT** substantially changes the Project design after the **COMPANY** has completed or is in the process of completing its relocation design; or if the **COMPANY** has completed the relocation of its Facilities based on previously approved design plans, the cost of the second design and/or relocation is to be paid in full by **UDOT**.

C. In accordance with current policies and directives, **UDOT** may perform Subsurface Utility Engineering, Quality Levels A and B, within the limits of a Project. Additional work required to determine the vertical location of underground Facilities at specific, critical locations will be reviewed with the **COMPANY**. A summary of the costs will be provided to the **COMPANY**, and the **COMPANY's** proportional share of the actual cost will be withheld from the **COMPANY's** relocation reimbursement.

5. COMPANY TO DESIGN AND CONSTRUCT UTILITY WORK

A. **COMPANY**, with its regular engineering and construction forces at its standard schedule of wages and working hours, or through its qualified contractors with whom it has continuing contracts or has obtained contracts upon appropriate solicitation, shall perform the necessary design work, field and office engineering, and shall furnish all materials and perform the construction work on its Facilities, necessitated by the Project.

The need for overtime or other additional costs necessary to meet **UDOT's** schedule, allowable outage windows or available lane closures for the completion of the Utility Work will be evaluated and agreed upon in advance by the Parties. In performance of the Utility Work, the **COMPANY**

and its contractors will adhere to the requirements of Utah Administrative Codes R930-7 and R930-8.

B. **COMPANY**, while engaged in the adjustment or relocation of its Facilities, will comply with any applicable requirements of 23 C.F.R. § 635.410, Buy America Requirements. Buy America Certification forms, if required, shall be included in Project Agreements. **COMPANY** may require additional time for the acquisition of materials due to the Buy America requirements.

C. **COMPANY** shall include within its design of the relocated Facilities the clear zone requirements as defined in AASHTO's "Roadside Design Guide" and minimum vertical and horizontal clearances as defined in R930-7.

D. **COMPANY**, while engaged in the relocation of its Facilities shall comply with **UDOT's** Standard Specification for Road and Bridge Construction Section 01355, Subpart 1.13, Discovery of Historical, Archeological or Paleontological Objects if performing work within **UDOT's** right-of-way.

E. **COMPANY** provided traffic control devices shall conform to the standards set forth in the Manual on Uniform Traffic Control Devices (MUTCD) as adopted by **UDOT**. All flagging personnel shall be certified.

F. **COMPANY** employees and contractors working in the highway right-of-way shall comply with current requirements of MUTCD Section 6D.03. concerning high-visibility safety apparel.

6. COMPANY TO NOTIFY UDOT AND ITS CONTRACTOR BEFORE BEGINNING CONSTRUCTION WORK

Parties agree to cooperatively work together during construction, communicate frequently and coordinate the Utility Work. The **COMPANY** will notify **UDOT's** Project Representative as identified in the Project Agreement at least forty-eight (48) hours in advance of beginning any work. Such notification can be by telephone, email, in person or in writing. Subsequent notification of when and where the **COMPANY** will be performing work will be given by the **COMPANY** to **UDOT's** Project Representative on a day-to-day basis. In the event **COMPANY** fails to provide notice of work, which results in conflicts with other contractors on the Project site, **COMPANY** will demobilize its personnel and contractor at its own cost. Any work performed without proper notification to **UDOT's** Project Representative must be made available at **COMPANY's** expense for inspection by **UDOT** upon request or verified in another acceptable manner to **UDOT**. Failure on the part of the **COMPANY** to give proper notification to **UDOT** may result in **UDOT's** disallowance of reimbursement for that portion of the **COMPANY's** work performed while not under the surveillance of the **UDOT's** Project Representative.

7. DAILY RECORD KEEPING

UDOT, through its Project Representative, will keep a daily record of the Utility Work performed by the **COMPANY** for each Project, in a form acceptable to both Parties. The daily record shall be signed by **UDOT's** Project Representative and the **COMPANY**, or its authorized representatives, as required and a copy shall be retained by the Parties to this Agreement. If emergencies occur requiring the **COMPANY's** work forces to leave the job, record keeping shall be resumed upon return to the Project.

8. EMERGENCY WORK

When the **COMPANY** experiences an emergency unrelated to its work on the Project, it will take care of said emergency, after which it will again notify **UDOT** as to when work will be resumed on the Project.

9. REIMBURSEMENT FOR COMPANY'S UTILITY WORK

A. Reimbursement eligibility will be determined in accordance with Utah Code Section 72-6-116 and Utah Administrative Code R930-8.

B. Reimbursable costs for the Utility Work will be developed in accordance with 23 C.F.R. § 645, Subpart A. The **COMPANY** will submit itemized bills covering its actual costs incurred for performing the work covered by the Project Agreements hereto, bearing the Project number together with supporting sheets on a monthly or quarterly basis.

C. **COMPANY** will send one (1) final and complete billing of all actual costs incurred within six (6) months following completion of Utility Work by the **COMPANY** on the Project to:

UDOT Contracts and Compliance Specialist
4501 South 2700 West, Box 148220
Salt Lake City, Utah 84114-8220

In the event **COMPANY** fails to send a final bill to **UDOT** within six (6) months of completion of its work, **UDOT** may send notice to **COMPANY** requesting a final bill. **COMPANY** will have forty-five (45) days to respond with a final bill or will forfeit payment for the unbilled portion of the work. Both Parties agree to cooperatively work together in good faith to resolve any disputes on the final billing within sixty (60) days after **UDOT** receives the final bill from **COMPANY**. **UDOT** will reimburse the **COMPANY** within sixty (60) days after receipt of said billings or after disputes on final bill are resolved. Reimbursement will be limited to items complying fully with the provisions of 23 C.F.R. § 645, Subpart A.

10. BETTERMENT WORK

Betterment work is defined as set forth in 23 C.F.R. § 645, Section 645.105, Definitions. Specifically, betterment is "any upgrading of the facility being relocated that is not attributable to the highway construction and is made solely for the benefit of and at the election of the utility". If the **COMPANY** desires to include betterment in the Utility Work at any specific location, **UDOT** will allow betterment work to be performed, provided the Parties can reasonably coordinate the Project schedule to accommodate the betterment work without delaying the Project. The difference in costs between the minimum construction required as a result of the Project and the **COMPANY's** desired construction shall be made at the sole expense of **COMPANY**.

11. SALVAGE CREDIT

All materials from the existing Facilities, which are recovered in suitable condition for reuse by the **COMPANY** and not reused on the Project, shall be credited to the cost of the Project at current stock prices in accordance with 23 C.F.R. § 645.117. If the recovered materials are not suitable for reuse, they shall be credited at salvage prices, if any, or such other prices as agreed upon between the **COMPANY** and **UDOT** following inspection of the recovered material.

12. COSTS DIFFER BY MORE THAN TEN PERCENT

The **COMPANY's** final billings of completed Utility Work should follow as closely as possible the order of the items in the detailed estimates contained in the Project Agreements or Supplemental Agreements, and will be provided in a format that allows comparisons to be made with the approved plans and estimates. If the **COMPANY's** actual costs incurred for its force account work differs more than ten percent (10%) plus or minus per cost category from the estimated amount contained in the Project Agreements or Supplemental Agreements, the **COMPANY** is required to submit a letter of explanation with its billings indicating how and why the difference in costs occurred.

13. AUDIT

UDOT and the Federal Highway Administration shall have the right to audit all cost records and accounts of the **COMPANY** pertaining to the Project in accordance with 23 C.F.R. § 645, Subpart A. Should this audit disclose that the **COMPANY** has been underpaid, the **COMPANY** will be reimbursed by **UDOT** upon submission of additional billing to cover the underpayment. Should this audit disclose that the **COMPANY** has been overpaid, the **COMPANY** will reimburse **UDOT** in the amount of the overpayment. For the purpose of audit the **COMPANY** is required to keep and maintain its records of Utility Work covered herein for a minimum of three (3) years after final payment is received by the **COMPANY** from **UDOT**.

14. RIGHT-OF-WAY ACQUISITION

COMPANY owns rights-of-way, easements and fee property (collectively the Existing Property) from which Facilities are relocated to accommodate Projects. For all Existing Property **COMPANY** relinquishes to accommodate a Project, **UDOT** will replace the property with new property (collectively, the New Property). The New Property will be at a location agreeable to both Parties, with dimensions comparable to the Existing Property, and the terms of the conveyance documents shall be acceptable to **COMPANY**. For New Property that **UDOT** may acquire through eminent domain, **COMPANY** may elect to have **UDOT** acquire such New Property on behalf of **COMPANY**. In the event **COMPANY** elects to have New Property with dimensions greater than the dimensions of the Existing Property, **COMPANY** shall be responsible for the incremental costs due to the increased dimensions of the New Property unless the increased dimensions are required by law or regulation.

15. FORCE MAJEURE

An event of force majeure is an unforeseeable event or circumstance which is beyond the control and without the fault or negligence of the party affected and which by the exercise of reasonable diligence the party affected was unable to prevent, including without limitation strikes, riots, earthquakes, epidemics, sabotage, terrorist actions, wars, fires, floods, weather, materials shortage, power failure, telecommunications outage, acts of God, governmental restrictions, regulations or controls, judicial orders, or other failures, interruptions or errors not directly caused by the parties.

Neither party is responsible for any failure to perform its obligations under this Agreement if it is prevented or delayed in performing those obligations by an event of force majeure. Only those obligations directly affected by an event of force majeure are excused.

Where there is an event of force majeure, the party prevented from or delayed in performing its obligations in this Agreement must immediately notify the other party giving full particulars of the event of force majeure preventing that party from, or delaying that party in performing its obligations in this Agreement and that party must use its reasonable efforts to mitigate the effect of the event of force majeure upon its performance of the contract and to fulfill its obligations.

Upon completion of the event of force majeure, the party affected must as soon as reasonably practicable recommence the performance of its obligations in this agreement. If the affected party is the Company, the Company must provide a revised schedule to minimize the effects of the prevention or delay caused by the event of force majeure.

An event of force majeure does not relieve a party from liability for an obligation to perform according to the Agreement. Neither party shall be responsible to the other for any costs or losses caused by the event of force majeure.

16. CONFIDENTIAL INFORMATION

UDOT is subject to the requirements of the Government Records Access Management Act ("GRAMA") or other applicable law. If Company provides a record that it believes should be protected pursuant to Utah Code Section 63G-2-305(1) or (2), the Company shall comply with Utah Code Section 63G-2-309 and mark the documents as confidential.

17. TERM AND TERMINATION

A. This Agreement expires five (5) years from the date of execution. Upon expiration of this Agreement, the parties will negotiate in good faith the terms of renewal. The terms and conditions of this Agreement will remain in effect until the new agreement between the parties becomes effective, but in no event shall such renewal period exceed twelve (12) months following expiration of this Agreement unless otherwise agreed to by the Parties.

B. This Agreement may be terminated by either party by providing sixty (60) day written notice of termination. Any such termination shall not affect the validity of any previously executed Project Agreement or Supplemental Agreement. Notice shall be given as follows:

UDOT:	Questar Gas Company:
UDOT Legal Counsel 4501 South 2700 West P.O. Box 148455 Salt Lake City, UT 84144	Questar Gas Company General Counsel P.O. Box 45360 Salt Lake City, UT 84145

18. ASSIGNMENT:

COMPANY may assign or transfer its rights and obligations under this Agreement to any parent, affiliate, or subsidiary of COMPANY, to any entity having fifty percent (50%) or more direct or indirect common ownership with COMPANY, or to any successor-in-interest, provided the assignee or transferee

agrees to be bound by all terms and conditions of this Agreement. Otherwise, COMPANY shall not transfer, assign or delegate its rights or obligations under this Agreement without the prior written consent of UDOT. This Agreement shall be binding upon and inure to the benefit of the Parties' permitted successors and assigns.

19. MISCELLANEOUS

A. In the event of any dispute relating to this Agreement, resulting in litigation, the prevailing Party shall be entitled to recover all costs, including reasonable attorney fees.

B. The provisions of this Agreement are severable, and should any provision be deemed void, unenforceable or invalid, such provision shall not affect the remainder of this Agreement.

C. This Agreement shall be governed by the laws of the State of Utah.

D. This Agreement supersedes the previously executed STATEWIDE UTILITY RELOCATION AGREEMENT between the Parties dated November 4th, 2009.

****

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be executed by their duly authorized officers as of the day and year first above written.

ATTEST:

By: _____
Name

Date: _____

QUESTAR GAS COMPANY, a Registered Corporation of the State of Utah

By: _____
Vaughn W. Shosted
Title: Vice President Operations

Date: 30 June 2016

APPROVED AS TO FORM:

By: _____
Counsel for **COMPANY**

****

UTAH DEPARTMENT OF TRANSPORTATION

RECOMMENDED FOR APPROVAL:

By: _____

Title: Statewide Utilities & Railroads Engineer

Date: 14 July 2016

APPROVED:

By: _____

Title: Project Development Director

Date: July 19, 2016

APPROVED AS TO FORM:

By: _____

Title: Assistant Attorney General

Date: 07/18/2016

COMPTROLLER'S OFFICE

By: _____

Title: Contract Administrator

Date: 7-27-16

Exhibit A
PROJECT AGREEMENT

Project No. _____, _____ County
Address
QUESTAR GAS COMPANY
QGC Ref No. _____
CID No._____ PIN _____

QUESTAR GAS COMPANY

PROJECT AGREEMENT

Supplement to Statewide Utility Relocation Agreement, Finance No. 160000

THIS PROJECT AGREEMENT, made and entered into this _____day of _____, 20__, by and between the **UTAH DEPARTMENT OF TRANSPORTATION**, hereinafter referred to as "**UDOT**" and **QUESTAR GAS COMPANY**, a Registered Corporation in the State of Utah, hereinafter referred to as the "**Company**."

This Project Agreement is part of and subject to the terms and conditions of the **STATEWIDE UTILITY RELOCATION AGREEMENT** dated _____ **UDOT** Finance No. 160000, hereinafter referred to as "Statewide Agreement". All the terms of the Statewide Agreement remain in full force and effect unless otherwise specified herein.

The parties hereto agree as follows:

1. **Company's** contact person for the Project is, [insert name], telephone number (XXX) XXX-XXXX and email, XXXX@XXXX.com.

   UDOT's Project Representative is [Insert name and title], telephone number (XXX) XXX-XXXX and email XXXXX@utah.gov.

   UDOT's Resident Engineer is [Insert name], telephone number (XXX) XXX-XXXX and email XXXX@utah.gov.

2. The **Company** will perform the following described Utility Work in accordance with the terms and conditions of the Statewide Agreement:

   Location of Utility Work:

   Description of Utility Work to be performed, including proposed location:

   (Plan Sheets and Right of Way Documents attached as "**EXHIBIT A**", that is incorporated by reference.)

   Party performing the Utility Work:

   Anticipated duration of Utility Work:

   Estimated dates of Utility Work:
   (Includes allowable outage windows)

   Estimated Total Cost of Utility Work:
   (Detailed Estimate attached)

SAMPLE

Betterments Included:

*[**UDOT** and **Company** will discuss and include these items in Project Agreement if applicable:*

- *Party responsible for and timing of removal of pavement, other hard surface, trees, fencing, signs, buildings etc.*
- *Party responsible for backfill, material and compaction requirements for backfill.*
- *Party responsible for final grading and hard surface restoration.*
- *Party responsible for traffic control, including safety barriers, plates, and restrictions/requirements for lane closures.]*

3. Utility Work to be completed under this Project Agreement is subject to the following:

Special Provisions

- Buy America. [*List specific Buy America requirements applicable to this Project.*] Specific certification requirements are marked "**EXHIBIT C**" that is incorporated by reference.

- Other limitations to the Project.

  [***UDOT** and **Company** will discuss and include these items in Project Agreement if applicable:*

  - *Limits of loading over pipe, including cover/equipment restrictions*
  - *High pressure inspection*
  - *Night Work]*

4. The **Company** shall be reimbursed by **UDOT** for XXX% of the actual costs incurred by the **Company** for performing the Utility Work covered herein. An estimate of the total cost of said Utility Work was furnished by the **Company** to **UDOT** in the total amount of $_____. A copy of the details of the estimate are marked "**EXHIBIT B**" that is incorporated by reference.

TOTAL ESTIMATED COST TO UDOT IS $_____

TOTAL ESTIMATED COST TO THE COMPANY IS $_____

NOTE: The above are estimates only. Total payment to the **Company** by **UDOT** will be based on the actual costs incurred as determined after completion of construction.

5. Upon signature and return of this Project Agreement to **UDOT**, the **Company** is authorized to proceed with the Utility Work covered herein.

****

SAMPLE

Project No. _____, _____ County
Address

QUESTAR GAS COMPANY

QGC Ref No. _____

CID No._____ PIN _____

IN WITNESS WHEREOF, the parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first written above.

ATTEST:

By:_____

Title:_____

Date: _____

QUESTAR GAS COMPANY (IHP),
a Registered Corporation of the State of Utah

By:_____

Title:_____

Date: _____

(IMPRESS SEAL)

****

RECOMMENDED FOR APPROVAL:

By:_____
Region Utility and Railroad Leader

Date: _____

UTAH DEPARTMENT OF TRANSPORTATION

By:_____
Region Director

Date: _____

APPROVED AS TO FORM:

The Utah State Attorney General's Office has previously approved all paragraphs in this Agreement as to form.

UDOT COMPTROLLER'S OFFICE:

_____
Contract Administrator

Date: _____

SAMPLE

168511

STATEWIDE UTILITY RELOCATION AGREEMENT

between

Utah Department of Transportation

&

PacifiCorp -24210

This Statewide Utility Relocation Agreement (referred to herein as Agreement), made and entered into this 7 day of Dec, 20 15, by and between the UTAH DEPARTMENT OF TRANSPORTATION, hereinafter referred to as "UDOT" and Rocky Mountain Power, an unincorporated division of PACIFICORP, an Oregon Corporation, hereinafter referred to as the "Company" or "RMP". The Utah Department of Transportation and Rocky Mountain Power are referred to herein individually as a "Party" or collectively as the "Parties."

RECITALS

1. UDOT has jurisdiction over state Highway rights of way and administers the programming, development and completion of State and Federal-aid eligible projects (referred to herein as "Project" or collectively as "Projects") in Utah.

2. RMP is a regulated electricity utility serving Utah, and owns, operates and maintains an extensive utility infrastructure, including transmission and distribution wirelines, poles, vaults, substations, plants and all associated facilities (referred to herein as "Facilities"). Some Facilities are located within State highway rights-of-way under Statewide Utility License Agreements.

3. Certain projects to expand or alter the transportation infrastructure occasionally necessitate the protection or relocation of Facilities.

4. The Parties have entered into an agreement titled Statewide Agreement for the Acquisition or Replacement of Utility Easements and Rights of Way, dated the 19th day of January 2005 that sets forth the manner in which property interests are addressed for the relocation of Facilities.

5. For the purpose of expediting the performance and reimbursement of the relocation work on Projects, it is the desire of the Parties to enter into this Agreement with the understanding that the Parties will enter into future Project Agreements which are supplemental to this Agreement which will address the scope of work, schedule, reimbursement amounts, and other requirements for each specific Project.

AGREEMENT

NOW THEREFORE, in accordance with the foregoing Recitals, which are incorporated into this Agreement by reference, and for and in consideration of the mutual covenants and agreements hereafter set forth, the mutual benefits to the Parties to be derived herefrom, and other valuable consideration, the receipt and sufficiency of which the Parties acknowledge, it is hereby agreed as follows:

1. Notification and Preliminary Design. UDOT will notify the Company of Projects where Company Facilities may require relocation or protection in place and will meet with the Company to review and discuss proposed Project plans.

2. Project Meetings. The Parties will participate in periodic Project status meetings, to be held at such times and places as the Parties mutually agree.

3. Company and UDOT Design Coordination. The Company and UDOT shall consult in good faith to reasonably minimize Facility relocation costs, Project costs and delays and determine an appropriate Project strategy for each potentially impacted Facility. The Parties will share Project design details throughout the design process. Company will submit documentation of existing property rights for Facilities within the proposed project limits as early as possible and proposed property rights needed as a result of the Project and Facility relocation designs.

4. Relocation Design, Betterments, Estimate and Construction Duration.

a. The Company, with its regular engineering forces at its standard schedule of wages and working hours, or through its qualified contractors with whom it has continuing contracts or has obtained contracts pursuant to a competitive process, shall diligently perform the necessary design, field and office engineering. Designs will adhere to Company's current standards. The Company may use external consultants to oversee any or all aspects of design, and permitting.

b. The Company will submit to UDOT any betterment requests as early as possible. UDOT will allow for betterment work to be performed, provided the Parties can reasonably coordinate the Project schedule to accommodate the betterment work without delaying the Project. Betterment is defined as set forth in 23 CFR, Section 645.105. Specifically, betterment is any upgrading of the Facility being relocated that is not attributable to the highway construction and is made solely for the benefit of and at the election of the Company. Betterment credit to a Project is not required for improvements which are required by law under governmental and appropriate regulatory commission code, or required by current design practices regularly followed by the Company in its own work, and there is a direct benefit to the highway project. The Company will be responsible for increased costs due to betterment. The actual costs for the Company's participation shall be determined upon completion and final billing for the relocation work.

c. UDOT may perform Subsurface Utility Engineering, Quality Levels A and B, within the limits of a Project. Additional work required to determine the vertical location of underground facilities at specific locations will be reviewed with the Company and subject to the proportional cost share as set forth in the Project Agreement.

d. UDOT and Company will work together in good faith to identify and resolve conflicts between the Project and Company's Facilities. UDOT acknowledges that, for typical projects, Company's design requires up to three (3) months for both underground and overhead power lines after approved roadway design plans are delivered to the Company. Facility design for relocation of transmission Facilities may require significantly longer lead time.

e. The Company shall include within its design of the relocated Facilities within UDOT's right of way the minimum vertical and horizontal clearances as defined in Utah Administrative Code R930-7 Utility Accommodation, as amended.

f. Company will submit to UDOT the Company's proposed design; detailed cost estimates; a reasonable construction duration including all known limitations including permit and regulatory approvals, anticipated outage windows, advance ordering of materials, dependency upon work of

other parties, and scheduling of work crews; communication contacts; and other details necessary for UDOT to prepare contract documents and a Project Agreement.

5. Project Agreements.

a. For each Project, UDOT will prepare a Project Agreement. In the case of an inconsistency between the terms of this Agreement and the terms of a Project Agreement, the terms of the Project Agreement shall control, unless expressly stated otherwise. The Project Agreement form is attached as "EXHIBIT A".

b. The Company shall designate a representative in the Project Agreement, who will be the Company's liaison with respect to the matters covered by the Project Agreement. The Company's representative shall coordinate with UDOT's Utilities Coordinator for the Project regarding the matters described in the Project Agreement.

6. Rights of Way. The replacement of rights-of-way shall be consistent with the terms and conditions set forth in the Statewide Agreement for the Acquisition or Replacement of Utility Easements and Rights of Way and Utah Administrative Code R930-8. In the event of a conflict Utah Administrative Code R930-8 controls.

7. UDOT Contractor Selection process. UDOT will engage in its process to bid and award Project work to a contractor. During the proposal phase of any Design Build Project, at UDOT's discretion, the Company and UDOT will meet with each prospective contractor to review the preliminary design with UDOT's bidders.

8. Notice to Proceed.

a. The Company shall not commence performing the work under any Project Agreement until the Project Agreement is executed by both Parties and the Company is authorized in writing by UDOT to begin work.

b. UDOT, through its contractors, will provide surveying and staking of roadway facilities as required by the Company, in accordance with UDOT's Standard Specifications, Section 01721, Survey, 3.16, Utilities. The cost of the surveying and staking will be at UDOT's expense and will not be recovered from the Company. Any of UDOT's survey control stakes or bench markers which are removed or damaged by the Company shall be reestablished by UDOT at Company's expense.

c. UDOT will adjust any existing schedule to allow for any reasonable time that may be required for the Company to redesign or modify its plans and relocate its Facilities when UDOT requires the redesign.

9. Company to Construct.

a. The Company, with its regular engineering and construction forces at its standard schedule of wages and working hours, or through its qualified contractors with whom it has continuing contracts or has obtained contracts pursuant to a competitive process, shall perform the necessary design work, construction and relocation work with commercially reasonable diligence. The Company may use external consultants to oversee any or all aspects of permitting, construction and relocation.

b. The Company while engaged in the relocation of its Facilities shall comply with UDOT's Standard Specification for Road and Bridge Construction Section 01355, Subpart 3.8, Discovery of Historical, Archeological or Paleontological Objects, Features, Sites, or Human Remains if performing work within UDOT's right-of-way.

c. Company provided traffic control devices shall conform to the standards set forth in the Manual on Uniform Traffic control Devices ("MUTCD") as adopted by UDOT. All flagging personnel shall be certified.

d. Company employees and contractors working in the highway right-of-way shall comply with current requirements of MUTCD Section 6D.03, concerning high-visibility apparel.

e. The Company shall notify UDOT's Project Representative as identified in the Project Agreement at least forty-eight (48) hours in advance of initiating construction under the Project Agreement. Subsequent notification of when and where the Company will be performing work will be given by the Company to UDOT's Project Representative on a day-to-day basis. In the event the Company fails to give proper notification to UDOT and UDOT's Project Representative is not available to execute the daily work record, UDOT may disallow reimbursement for that portion of the Company's work performed while not under the surveillance of UDOT's Project Representative. Notwithstanding the foregoing, in the event UDOT's Project Representative is not present while work is being performed despite notice having been given by the Company, then UDOT may not disallow reimbursement for such work for the sole reason that UDOT's Project Representative was not present. At its election, UDOT shall be permitted to observe the performance of all construction. The Company and its contractors will perform their work in adherence with the requirements of Utah Administrative Code R930-7 Utility Accommodation, as amended.

10. Company to Perform Work Consistent With Project Schedule.

a. The Parties hereby acknowledge the importance of completing the work in a manner consistent with the overall schedule for the Project. Accordingly, the Parties shall coordinate and agree upon a schedule for the design, construction and final completion of the work, including any Company elected betterment work to be performed by the Company in conjunction with the work. The Parties shall execute a written acknowledgement of the approved schedule which shall, upon execution, be incorporated into and made a part of a Project Agreement.

b. The Company agrees to begin its work as soon as possible after having received a written authorization to proceed and to use reasonable efforts to complete all work in accordance with the agreed upon schedule. The need for additional costs necessary to meet the Project schedule will be evaluated and agreed upon in advance by the Parties.

c. The Company shall notify UDOT within seventy two (72) hours of its discovery of any occurrence or unforeseen circumstances that would prevent the Company from completing its work according to the agreed upon Project schedule.

d. When the Company experiences an emergency unrelated to its work on the highway Project, it will address of said emergency, after which the Company will again notify UDOT as to when work will be resumed on the Project.

11. Daily Record Keeping. UDOT, through its Project Representative, will keep a daily record of the relocation work performed by the Company. The daily record shall be signed by UDOT's Project Representative and the Company's authorized representative and a copy shall be retained by the Parties to this Agreement. If emergencies occur requiring the Company's work forces to leave the job, record keeping shall be resumed upon return to the Project.

12. Change in Work. After each Project Agreement is executed by the Parties, significant changes in the planned scope of work covered by the Project Agreement or extra work is valid only if made in writing and executed by both Parties prior to the start of the revised work or extra work.

13. Standard of Care. The Company shall be solely responsible for the performance of all its work. The Company (including its contractors, consultants and other agents) shall perform all work in a good and workmanlike manner and in conformance with all applicable federal, state and local laws and regulations.

14. Company to Submit Invoices for Reimbursable Work.

a. Reimbursement eligibility will be determined in accordance with Utah Code Section 72-6-116, as amended. Reimbursable costs for the relocation work will be limited to items complying fully with the provisions of 23 CFR Part 645, Subpart A

RM 07 Dec '15

b. The Company will submit itemized bills to UDOT covering Company's actual costs incurred for performing the work covered by the Project Agreements, bearing the Project number together with supporting sheets on a monthly or quarterly basis.

c. The Company shall submit to UDOT one final and complete billing within six months of completion of the work for the actual Project costs, together with supporting documentation. In the event Company fails to send a final bill to UDOT within six months of completion of its work, UDOT may send notice to Company requesting a final bill. Company will have 45 days to respond with a final bill or will forfeit payment for the unbilled portion of the work.

d. The Parties agree to cooperatively work together in good faith to resolve any disputes on billings. UDOT will reimburse the Company within sixty (60) days after receipt of Company's billings or after disputes are resolved.

e. The billings and supporting documentation shall be submitted to:

UDOT Contracts, Estimates and Agreements Specialist
4501 South 2700 West, Box 148220
Salt Lake City, Utah 84114-8220

RM 07 Dec '15

15. Salvage Credit. All materials from the existing Facilities, which are recovered in suitable condition for reuse by the Company and not reused on the Project, shall be credited to the cost of the Project at current stock prices in accordance with 23 CFR 645.117. If the recovered materials are not suitable for reuse, they shall be credited at salvage prices or such other prices as agreed upon between the Company and UDOT following inspection of the recovered material.

16. Company's Costs Differ by More Than 10%. The Company shall match its billings of completed work with the detailed estimates contained in the Project Agreements. If the Company's actual costs incurred for reimbursable work differs more than ten percent (10%) plus or minus from the estimated amount contained in the Project Agreements, the Company shall submit a letter of explanation to UDOT with its billings describing how and why said difference in costs occurred.

17. Audit. UDOT and the Federal Highway Administration shall have the right to audit all cost records and accounts of the Company pertaining to the Project in accordance with 23 CFR, Part 645, Subpart A. Should this audit disclose that the Company has been underpaid, the Company will be reimbursed by

UDOT upon submission of additional billing to cover the underpayment. Should this audit disclose that the Company has been overpaid, the Company will reimburse UDOT in the amount of the overpayment after written notice. For the purpose of audit the Company is required to keep and maintain its records of work covered herein for a minimum of three years after final payment is received by the Company from UDOT.

18. Buy America. Materials composed primarily of iron or steel that are permanently incorporated into the work on this project are subject to 23 CFR 635.410, Buy America requirements. Company's responsibility for "Buy America" compliance is limited to providing UDOT's Project Representative with signed supplier certifications (which may be in electronic form) at or prior to the time of installation, according to the specific instructions and format set forth in the attached "EXHIBIT B". Buy America Certification is required only for the following specific items identified by UDOT: (i) steel transmission or distribution pole structures (exclusive of any cross arms, guy wires and anchors, transformers, insulators, cutouts, surge arrestors, switches, hardware, fasteners, brackets, base plate, conductor or other separately-provided attachments to be ordered separately and thereafter affixed to the poles structures); (ii) steel or iron conduit and risers; (iii) steel rebar to be furnished in conjunction with: concrete foundations, concrete transmission or distribution pole structures, or any pre-fabricated concrete vaults or similar concrete structures; and (iv) grates and covers for utility vaults and similar structures. Company shall have no obligation to furnish Buy America certificates with respect to any other materials, and shall have no further obligations regarding the domestic content of goods furnished.

Company has developed estimating, supply chain and materials handling procedures to implement these requirements and agrees to follow such procedures. In the event that Company fails to furnish Buy America certificates for any of the foregoing items in accordance with these requirements, UDOT may withhold reimbursement with respect to those items. Except for claims involving Company's fraud, willful misconduct or gross negligence, in no event shall Company's liability for its failure to comply with this Section exceed the reimbursement value of the items for which Company has failed to deliver the required certificate.

19. Terms.

a. The provisions of this Agreement are severable, and should any provision be deemed void, unenforceable or invalid, such provision shall not affect the remainder of this Agreement.

b. This Agreement does not supersede or modify any applicable federal or state statute, regulation, or rule.

c. This Agreement shall be governed by the laws of the State of Utah and applicable federal law. Any litigation shall be instituted only in a court of competent jurisdiction, whether state or federal, located within the State of Utah.

d. This Agreement supersedes the previously executed Master Agreement, State of Utah, Finance No. 998240, between the Parties dated January 6th, 1999.

e. This Agreement may be terminated by either Party by providing 30 day written notice of termination to the other Party. Any such termination shall not affect the validity of any Project Agreement executed prior to the date of termination of this Agreement.

f. To the fullest extent permitted by law, each of the Parties hereto waives any right it may have to a trial by jury in respect of litigation directly or indirectly arising out of, under or in connection with this Agreement. Each Party further waives any right to consolidate any action in which a jury trial has been waived with any other action in which a jury trial cannot be or has not been waived.

****

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be executed by their duly authorized officers as of the day and year first above written.

Rocky Mountain Power, a division of PACIFICORP, an Oregon Corporation doing business as Rocky Mountain Power

By: _____
Vice President, Operations
Rocky Mountain Power

Title: _____

Date: 11-24-15

****

UTAH DEPARTMENT OF TRANSPORTATION

RECOMMENDED FOR APPROVAL:

By: _____
Title: Statewide Utilities & Railroads Engineer

Date: 07 Dec 2015

APPROVED:

By: _____
Title: Project Development Director

Date: 12/07/15

APPROVED AS TO FORM:

By: _____
Title: Assistant Attorney General

Date: 12/07/15

COMPTROLLER'S OFFICE

By: _____
Title: Contract Administrator

Date: 12-16-15

Exhibit A

ROCKY MOUNTAIN POWER PROJECT AGREEMENT NO. _____

Supplement to Statewide Utility Relocation Agreement

This Project Agreement is made and entered into this _____ day of _____, 20___, by and between the UTAH DEPARTMENT OF TRANSPORTATION, an agency of the State of Utah hereinafter referred to as "UDOT" and Rocky Mountain Power, an unincorporated division of PACIFICORP, an Oregon Corporation, hereinafter referred to as the "Company" or "RMP", to that certain Statewide Utility Relocation Agreement between the Parties dated _____, UDOT Finance No. _____. All the terms of said Agreement remain in full force and effect unless otherwise specified herein.

The Parties hereto agree as follows:

1. The Company will perform the following described work in accordance with the terms and conditions of the Statewide Utility Relocation Agreement.

   Location of work:

   Description of work:

   Detailed work plans, specifications, and proposed locations are included in Exhibit A and incorporated by reference.

   Anticipated duration of work:

   Project specific special provisions:

   Betterments included:

   Buy America requirements:

   A detailed cost estimate is included in Exhibit B and incorporated by reference.

TOTAL ESTIMATED COST	**$_____**
TOTAL ESTIMATED UDOT PARTICIPATION	**$_____**
TOTAL ESTIMATED COMPANY PARTICIPATION	**$_____**

2. UDOT's Project Representative is, _____, Telephone No. ___-___-____, email _____. Company's Representative is, _____, Telephone No. ___-___-____, email _____.

3. Company shall notify UDOT's Project Representative at least forty-eight (48) hours in advance of beginning the work covered herein, in accordance with the specific terms of the Statewide Utility Relocation Agreement, as applicable.

(Add additional Paragraphs, if required)

3. The Company shall not commence performing the work covered herein until the Project Agreement is executed by both Parties and the Company receives an Authorization to Proceed letter.

IN WITNESS WHEREOF, the Parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first written above.

Rocky Mountain Power, a division of PACIFICORP, an Oregon Corporation doing business as Rocky Mountain Power

By: _____

Title: _____

Date: _____

****

RECOMMENDED FOR APPROVAL:

_____
Region Utility and Railroad Leader
Date: _____

UTAH DEPARTMENT OF TRANSPORTATION

By_____
Region Director
Date: _____

APPROVED AS TO FORM:

The Utah State Attorney General's Office has previously approved all paragraphs in this Agreement as to form.

Date__/__/__

UDOT COMPTROLLER'S OFFICE:

_____
Contract Administrator
Date: _____

Exhibit B

FORM OF BUY AMERICA CERTIFICATE TO BE UTILIZED

Certification Requirement for 23 CFR 635.410 Buy America

This project will be utilizing federal funds. Please complete this Buy America Certification and return at or prior to the time the applicable materials are delivered.

Buy America Certification

I certify that all materials provided to _____for use on a Federal Aid Highway Project meet the requirements of 23 CFR 635.410 Buy America and any amendments thereto. Material Certificates of Compliance for each manufacturing and coating process performed during the production of these materials are attached.

Signature _____

Name _____

Title _____

Supplier Company Name _____

Date _____

Purchase Order Number _____

INSTRUCTIONS FOR COMPLETING THE BUY AMERICA CERTIFICATE

A. All products manufactured from steel and iron must be manufactured in the United States to be considered domestic.
   1. All manufacturing processes of the steel and iron material in a product such as melting, rolling, extruding, machining, bending, grinding, drilling, and coating must occur within the United States.
   2. Nondomestic raw materials are permitted so long as the melting and all subsequent manufacturing processes occur domestically.
   3. Coating includes all processes that protect or enhance the value of the material to which the coating is applied. The material applied as a coating is not subject to Buy America.

B. Include as a minimum the following information for Material Certifications of Compliance for Buy America:
   1. Signed mill test report.
   2. Signed certification by each Fabricator and Manufacturer that has handled the steel or iron product affirming that every process, including the application of a coating, performed on the steel or iron product has been carried out in the United States.
   3. Material descriptions, quantities, and means of material identification such as heat numbers, lot numbers, and other industry identification markings for each process the material underwent so the final product can be tracked through a step process from melting to final product.
   4. Tracking of quantities is not required for coating operations.

C. Include all steel or iron materials that can't be substantiated as being of domestic origin in cost documentation for foreign steel or iron.

178092

ROCKY MOUNTAIN POWER PROJECT AGREEMENT NO. 1

Supplement to Statewide Utility Relocation Agreement

This Project Agreement is made and entered into this 19 day of July, 2016, by and between the UTAH DEPARTMENT OF TRANSPORTATION, an agency of the State of Utah hereinafter referred to as "UDOT" and Rocky Mountain Power, an unincorporated division of PACIFICORP, an Oregon Corporation, hereinafter referred to as the "Company" or "RMP", to that certain Statewide Utility Relocation Agreement between the Parties dated December 7, 2015, UDOT Finance No. 168511. All the terms of said Agreement remain in full force and effect unless otherwise specified herein.

The Parties hereto agree as follows:

1. **PROJECT INFORMATION**

   UDOT is preparing to request proposals for and award a design-build contract for the highway project identified as S-0154(12)11, 4 Interchanges on Bangerter Highway in Salt Lake County, Utah, hereinafter referred to as the "Project". UDOT's design-build contractor will complete the design and administer construction of the Project. The Project contractor will hereinafter be referred to as the "Design-Builder".

2. **PROJECT CONTACT INFORMATION**

   UDOT's Project Representative is Alana Spendlove, UDOT Project Utility and Railroad Leader, telephone number (801) 887-3462 and e-mail aspendlove@utah.gov.

   UDOT's Resident Engineer for 5400 South and 7000 South interchanges is Bryan Chamberlain, telephone number (801) 887-3405, and e-mail bchamberlain@utah.gov, or their designated representative, as assigned.

   UDOT's Resident Engineer for 9000 South and 11400 South interchanges is Ken Talbot, telephone number (801) 360-8750, and e-mail kentalbot@utah.gov, or their designated representative, as assigned.

   Company's Representative is Suzan Jensen, telephone number (801) 220-2444, and e-mail Suzan.Jensen@rockymountainpower.net.

3. **COMPANY PROJECT REQUIREMENTS**

   Company and UDOT shall conduct the Utility Work in accordance with the specific terms of the Statewide Utility Relocation Agreement.

   The Company shall not commence performing the Utility Work covered in any subsequent Project Agreement until each Project Agreement is executed by both Parties and the

Company receives an Authorization to Proceed letter from UDOT's Project Utility and Railroad Leader.

4. **UDOT PROJECT RESPONSIBILITIES**

After awarding the Project, UDOT will provide the Company with the Design-Builder contact information, hereinafter referred to as "Design-Builder Third Party Manager".

UDOT shall provide trenching, conduit, and bedding material per Company specifications for all underground Utility Work, unless otherwise agreed upon and coordinated through a Project Agreement with the Company. Reimbursement eligibility will be determined in accordance with Utah Code Section 72-6-116.

UDOT shall provide all coordination, survey, maintenance of traffic, traffic control, and clearing and grubbing for all Utility Work at no cost to the Company.

IN WITNESS WHEREOF, the Parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first written above.

Rocky Mountain Power

By:

Title: Vice President, Operations
Rocky Mountain Power

Date: 7-14-16

Recommended For Approval:

Title: Utility and Railroad Leader

Date: 7/19/16

Utah Department of Transportation

Title: Project Director

Date: Jul 19, 2016

Approved as to Form

Title: Assistant Attorney General

Date: 7/27/2016

UDOT Comptroller Office Contract Administrator

Title:

Date: 7-27-16

SOUTH JORDAN CITY
MASTER UTILITY AGREEMENT

THIS MASTER UTILITY AGREEMENT, made and entered into this _____day of_____, 20_____, by and between the **Utah Department of Transportation**, ("UDOT"), and the **City of South Jordan**, a Municipal Corporation of the State of Utah, ("City") each as ("Party") and jointly as ("Parties").

RECITALS

WHEREAS, UDOT is preparing to request proposals for and award a design-build contract for the highway project identified as Project Number S-0154(12)11, 4 Interchanges on Bangerter Highway in Salt Lake County, Utah, ("Project"); and

WHEREAS, the design-build contractor will complete the design and administer construction of the Project ("Design-Builder"); and

WHEREAS, UDOT has identified City facilities within the limits of the Project which may necessitate the relocation, protection, or adjustment of the facilities, ("Utility Work"); and

WHEREAS, City desires for the Design-Builder to design and perform the Utility Work on the City's facilities necessitated by the Project; and

WHEREAS, City will perform the necessary design review and inspection to accommodate the Project; and

WHEREAS, for the purpose of expediting any required Utility Work and reimbursement, the Parties are entering into this Project Master Utility Agreement with the understanding that future supplemental agreements to this Agreement will be entered into covering the Utility Work to be accomplished by UDOT at specific Project locations.

THIS AGREEMENT is made to set out the terms and conditions where under the Utility Work shall be performed.

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AGREEMENT

NOW THEREFORE, the Parties agree as follows:

1. PROJECT RESPONSIBLE FOR COST

In accordance with Utah Code § 72-6-116(3)(a)(ii), UDOT is responsible for 100% of the cost of the Utility Work of City's facilities for those costs that comply with Utah Administrative Code R930-8.

2. CONTACT INFORMATION

UDOT's Project Representative is Alana Spendlove, UDOT Project Utility and Railroad Leader, telephone number (801) 887-3462, and e-mail aspendlove@utah.gov.

UDOT's Resident Engineer for 5400 South and 7000 South interchanges is Bryan Chamberlain, telephone number (801) 887-3405, and e-mail bchamberlain@utah.gov, or his designated representative, as assigned.

UDOT's Resident Engineer for 9000 South and 11400 South interchanges is Ken Talbot, telephone number (801) 360-8750, and e-mail kentalbot@utah.gov, or his designated representative, as assigned.

UDOT's Field Representative contact person will be identified in subsequent supplemental agreements.

City's contact person is Brad Klavano, City Engineer, telephone number (801) 254-3742, and e-mail bklavano@sjc.utah.gov, or his designated representative, as assigned.

After awarding the Project, UDOT will provide the City with the Design Builder contact information, hereinafter referred to as "Design-Builder Project Representative".

3. AUTHORIZATION FOR DESIGN WORK

To facilitate coordination and obtain technical information about City's facilities and requirements for inclusion in this Agreement and the Request for Proposals, UDOT gave City authorization for preliminary design engineering on April 26, 2016.

4. SUBSURFACE UTILITY ENGINEERING

UDOT has performed Subsurface Utility Engineering (SUE) within the limits of the Project. UDOT shall review with City additional SUE work to determine the precise location of underground facilities at specific, critical locations on the Project.

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5. **PROJECT COORDINATION**

City requested that UDOT include items of Utility Work for relocating and adjusting City's facilities in the Project.

During the development of the Project design, City and UDOT, along with its Design-Builder, shall consult as necessary in an effort to determine if conflicts with City's facilities can be avoided. If Utility Work for City's facilities is required by the Project, UDOT shall be responsible to identify the conflicts and to design and construct the Utility Work of City's facilities. City shall perform the necessary design reviews prior to the start of Utility Work. UDOT's Project Representative shall be responsible for coordinating with other utility companies as it relates to City's facilities.

6. **CITY REQUIREMENTS**

UDOT will comply with the following City Utility Work requirements**:**

a. UDOT shall supply as-constructed plans, in PDF format, upon completion of any required Utility Work.

7. **UDOT TO DESIGN AND CONSTRUCT CITY'S UTILITY WORK**

UDOT shall schedule and meet with City to review the design and scheduling of the Utility Work for City's facilities at specific locations on the Project to ensure maximum lead time for advance order of materials and work force scheduling.

a. UDOT shall design the Utility Work in accordance with City's standards regularly followed by City in its own work and not considered a betterment. If there is a conflict between UDOT and City standards, the higher standard will be applied. A copy of City's standards can be found at http://www.southjordancity.org/engineering-CSS.asp that is incorporated by reference.
b. UDOT will secure permits required for Utility Work of City's facilities.

8. **RIGHT-OF-WAY**

Any easements or replacement right-of-way required in conjunction with the Utility Work of City's facilities shall be acquired by UDOT in accordance with the requirements of Utah Administrative Code R930-8.

9. **BETTERMENT WORK**

City Aesthetics and Landscaping Betterment Work ("Betterment Work") is described in attached Exhibit "A" that is incorporated by reference.

If City desires to include additional betterment work in the Project at any specific location UDOT may agree to the betterment provided the difference in costs between the functionally equivalent required Utility Work and City's desired betterment work that is not required by the Project shall be at the sole cost of City and the betterment work can be accommodated without delaying

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UDOT's Project. The additional betterment work shall be addressed by separate supplemental agreement between the Parties.

Once a Design-Builder has been selected by UDOT, any additional betterment work request will be negotiated directly with the Design-Builder. However, it is at UDOT's sole discretion to approve the additional betterment work.

10. SUPPLEMENTAL AGREEMENTS

UDOT and City shall enter into supplemental agreements to cover Utility Work at specific Project locations. As part of each supplemental agreement, UDOT shall provide design plans and Utility Work schedules for review and approval by City prior to starting the Utility Work. A copy of the format of the proposed supplemental agreement is marked Exhibit "B" that is incorporated by reference.

UDOT shall provide City e a two-week review and approval period for any final supplemental agreement submitted to City by UDOT.

If there are changes in the scope of the Utility Work, extra Utility Work, or changes in the planned Utility Work covered by a supplemental agreement, the Parties must first agree in writing to a modification to the supplemental agreement before the Utility Work on the changes or additions begins.

11. UDOT TO NOTIFY CITY BEFORE BEGINNING UTILITY WORK

UDOT shall notify City at least two business days before beginning any Utility Work covered by any supplemental agreements hereto, to allow City time to schedule an inspector to be present during the Utility Work. Subsequent notification of when and where Utility Work will be performed will be given on a day-to-day basis.

12. CITY TO NOTIFY UDOT

City's personnel shall notify UDOT's Resident Engineer upon arriving and leaving the Project site for verification of inspecting Utility Work. City's personnel will comply with all applicable OSHA and Project safety requirements while within the Project limits.

13. INSPECTION

City shall provide on-call engineering support by the City Engineer or appropriate representative for design review, schedule coordination, or to correct or clarify issues during Utility Work, and to perform the necessary inspection on City's facilities installed by UDOT.

a. The City Engineer and/or City's inspector shall work with and through UDOT's Project Representative and shall give no orders directly to UDOT's Design-Builder unless authorized in writing to do so. UDOT will accomplish the Utility Work covered herein on City's facilities in accordance with the plans and specifications provided and/or

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approved by City, including changes or additions to the plans and specifications, which are approved by the Parties.

b. City shall immediately notify UDOT's Project Representative and the Design-Builder Project Representative of any deficiencies in the Utility Work on City's facilities. City shall follow up with written detail to UDOT's Project Representative and the Design-Builder Project Representative of its findings within 24-hours of making its initial notification.

c. UDOT shall respond to City's concerns within 24-hours of written notification.

d. City, through its inspection of the Utility Work, will provide UDOT's Project Representative with information covering any problems or concerns City may have with acceptance of the facilities upon completion of the Utility Work.

e. Any periodic plan and specification review or construction inspection performed by UDOT arising out of the performance of the Utility Work does not relieve the City of its duty to review and inspect the Utility Work or to ensure compliance with acceptable standards.

14. DAILY RECORDKEEPING

UDOT's Resident Engineer will keep daily records of the inspection performed by City. Daily inspection records shall be in duplicate on a form to be prepared by City or UDOT. The type of form to be used shall be preapproved by UDOT's Contracts, Compliance and Certification Manager. The Parties shall sign the inspection records and retain copies of the inspection records.

15. REIMBURSEMENT

UDOT will not reimburse City for costs incurred by City personnel for design review, observation, inspection, and operation of valves performed as part of their regularly assigned duties. Should it become necessary for City to procure outside services to perform design review, observation, or inspection to accommodate UDOT's Utility Work and Project schedule, City shall notify UDOT. Upon concurrence by UDOT, a supplemental agreement for the cost of the services shall be executed at which time City may procure outside services through appropriate solicitation.

16. SUBMITTAL OF ITEMIZED BILLS

City shall submit itemized bills covering the actual costs incurred for outside services to perform design review, oversight, and inspection work covered by supplemental agreements to UDOT's Contracts and Compliance Specialist:

UDOT Contracts and Compliance Specialist
Utah Department of Transportation
PO Box 141510
SLC UT 84114-1510

Itemized bills shall include the Project and supplemental agreement numbers, supporting sheets, and a complete billing statement of all actual costs incurred, following the order of the items in the detailed estimates contained in the supplemental agreement, and be submitted to UDOT within 60 days following completion of outside services by City on the Project. Otherwise, previous payments

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to City may be considered final, except as agreed to between the Parties in advance.

UDOT will reimburse City within 60 days after receipt of the billings, but only for items complying fully with the provisions of Utah Administrative Code R930-8. Unless the parties otherwise agree in writing that more time is needed to submit a final billing, failure on the part of City to submit final billings within six months of the completion of outside services will result in UDOT's disallowance of that portion of outside services performed by City.

17. **SALVAGED MATERIALS**

Materials from City's existing facilities which are recovered by UDOT while performing the Utility Work and not reused on the Project shall become the property of the Design-Builder unless otherwise agreed to in advance by the Parties.

18. **RIGHT TO AUDIT**

UDOT and the Federal Highway Administration shall have the right to audit all City cost records and accounts pertaining to the Project in accordance with the auditing procedure of the Federal Highway Administration and 23 C.F.R. § 645, subpart A. Should an audit disclose that City has been underpaid, UDOT shall reimburse City within 60 days of notification of audit finding in the amount of underpayment. Should an audit disclose that City has been overpaid, City shall reimburse UDOT within 60 days of notification of audit findings in the amount of the overpayment. For purpose of audit City is required to keep and maintain its records of outside services covered herein for a minimum of three years after City receives final payment from UDOT.

19. **ACCEPTANCE AND MAINTENANCE**

Upon UDOT's completion of the Utility Work of City facilities, and City's acceptance of the Utility Work, City shall own and maintain its facilities. City shall be the sole owner of the facilities upon completion of the Project unless otherwise agreed to by the Parties.

20. **ACCESS**

City acknowledges that access for maintenance and servicing of City's facilities located on the Project right-of-way requires a permit issued by UDOT to City, and that City must obtain the permit and abide by conditions thereof for policing and other controls in conformance with Utah Administrative Code R930-7.

INDEMNIFICATION

UDOT and City are both governmental entities subject to the Governmental Immunity Act. Each Party agrees to indemnify, defend, and save harmless the other from and against all claims, suits and costs, including attorneys' fees for injury or damage of any kind, arising out of its negligent acts, errors or omissions of its officers, agents, contractors or employees in the performance of this Agreement, and from and against all claims, suits, and costs, including attorneys' fees for injury or damage of any kind. Nothing in this paragraph is intended to create additional rights to third parties or to waive any of the provisions of the Governmental Immunity Act. The obligation to indemnify is

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limited to the dollar amounts set forth in the Governmental Immunity Act, provided the Act applies to the action or omission giving rise to the protections in this paragraph. The indemnification in this paragraph shall survive the expiration or termination of this Agreement.

21. **MISCELLANEOUS**

a. Each Party agrees to undertake and perform all further acts that are reasonably necessary to carry out the intent and purpose of this Agreement at the request of the other Party.
b. This Agreement in no way creates any type of agency relationship, joint venture, or partnership between UDOT and City.
c. The failure of either Party to insist upon strict compliance of any of the terms and conditions, or failure or delay by either Party to exercise any rights or remedies provided in this Agreement, or by law, will not release either Party from any obligations arising under this Agreement.
d. This Agreement shall be deemed to be made under and shall be governed by the laws of the State of Utah in all respects. Each person signing this Agreement warrants that the person has full legal capacity, power and authority to execute this Agreement for and on behalf of the respective Party and to bind such Party. This Agreement may be executed in one or more counterparts, each of which shall be an original, with the same effect as if the signatures were made upon the same instrument. This Agreement may be delivered by facsimile or electronic mail.

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IN WITNESS WHEREOF, the parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first above written.

ATTEST:

City of South Jordan

_____ _____

Title: _____ **Title:** _____

Date: _____ **Date:** _____

(IMPRESS SEAL)

. . . . . .

Recommended For Approval:

Utah Department of Transportation

_____ _____

Title: Utility and Railroad Leader **Title:** Project Director

Date: _____ **Date:** _____

Approved as to Form

Comptroller Office

_____ _____

Title: Assistant Attorney General **Title:** Contract Administrator

Date: _____ **Date:** _____

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CITY OF SOUTH JORDAN AESTHETIC AND LANDSCAPE BETTERMENTS

City has requested the following Betterment Work be included with the Project Utility Work:

UDOT shall include the following Aesthetics and Landscaping Betterment Work items into the Project Utility Work. UDOT shall supplement up to $100,000.00 towards Aesthetics and Landscaping Betterment Work. UDOT and City shall enter into supplemental agreements to cover Aesthetics and Landscaping Betterment Work described below. City shall be responsible for paying the actual costs greater than $100,000.00 associated with the Aesthetics and Landscaping Betterment Work items, based on the items UDOT actually installs.

Description of Aesthetics and Landscaping Betterment Work:

Element	Desired City Betterment
Railing:	1. Black vinyl coated chain-link used for chain link within Project boundaries. 2. Black powder coat all galvanized railings.
Sidewalks:	1. Replace in kind six-foot sidewalk at no betterment cost.
Lighting and Traffic Signal Poles:	1. Black powder coated signal poles, mast arms, and lights. 2. Black powder coated sign poles with decorative slip bases, and dome caps. 3. Category 1 decorative street lighting along 11400 South (bridge) matching the spacing of existing Category 1 lights within City's limits.
Park Strip, Median & Island Treatments:	1. Landscaping with sod, trees, plants, and irrigation within 11400 South remaining area at "Oval-a-Bout," north and south of the "Oval-a-bout", for remaining area that will not be constructed as part of the 11400 South roadway reconfiguration. 2. Replace in kind City landscaped park strips at no betterment costs.
Landscaping:	1. Xeriscaping with plants and Irrigation similar to I-15 and 11400 South landscaping in the vicinity of Bangerter Highway and 11400 Interchange. 2. Any existing landscaping disturbed by the Project to be replaced in kind with all existing irrigation systems reconnected.

SOUTH JORDAN CITY
SUPPLEMENTAL AGREEMENT NO. ___

Supplement to UDOT Finance No. _____

THIS SUPPLEMENTAL AGREEMENT, made and entered into this _____ day of _____, 20____, **Utah Department of Transportation**, ("UDOT"), and the **City of South Jordan**, a Municipal Corporation of the State of Utah, ("City") each as ("Party") and jointly as ("Parties").

The parties hereto entered in to a Master Utility Agreement (MUA) dated _____, UDOT Finance No. _____. All the terms of the Master Utility Agreement remain in full force and effect unless otherwise specified herein.

The Parties agree as follows:

1. UDOT will perform the following described Utility Work in accordance with the terms and conditions of the MUA:

   a. Description of Utility Work to be performed, including proposed location, described in Exhibit "A" that is incorporated by reference: (Plan Sheets Attached)

   b. The City requirements as shown in the MUA – City Requirements, are modified as follows:
      i.

   c. Anticipated duration of Utility Work:

   d. Total estimated cost of City's (100% reimbursable) outside services: (Detailed Estimate Attached)

2. UDOT will notify the City's Project Representative, Raymond Garrison, Telephone No. (801) 253-5230, email rgarrison@sjc.utah.gov at least 48 hours in advance of beginning the Utility Work covered herein, or in accordance with the specific terms of the MUA, as applicable.

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IN WITNESS WHEREOF, the Parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first written above.

ATTEST:

City of South Jordan

_____ _____

Title: _____ **Title:** _____

Date: _____ **Date:** _____

(Impress Seal)

. . . . . .

RECOMMENDED FOR APPROVAL:

UTAH DEPARTMENT OF TRANSPORTATION

_____ _____

Title: Utility and Railroad Leader **Title:** Project Director

Date: _____ **Date:** _____

_____
UDOT Comptroller Office
Contract Administrator

. . . . . .

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BANGERTER

Project No. S-0154(12)11, Salt Lake County
4 Interchanges on Bangerter Highway
SOUTH VALLEY SEWER DISTRICT
Charge ID No. 71939 PIN 12566

25725

SOUTH VALLEY SEWER DISTRICT
MASTER UTILITY AGREEMENT

THIS MASTER UTILITY AGREEMENT, made and entered into this 19th day of July, 2016, by and between the **Utah Department of Transportation**, ("UDOT"), and **South Valley Sewer District**, a political subdivision of the State of Utah, ("District") each as ("Party") and jointly as ("Parties").

RECITALS

WHEREAS, UDOT is preparing to request proposals for and award a design-build contract for the highway project identified as Project Number S-0154(12)11, 4 Interchanges on Bangerter Highway in Salt Lake County, Utah, ("Project"); and

WHEREAS, the design-build contractor will complete the design and administer construction of the Project ("Design-Builder"); and

WHEREAS, UDOT has identified District facilities within the limits of the Project which may necessitate the relocation, protection, or adjustment of the facilities, ("Utility Work"); and

WHEREAS, the District desires for the Design-Builder to design and perform the Utility Work on the District's facilities necessitated by the Project; and

WHEREAS, the District will perform the necessary design review and inspection to accommodate the Project; and

WHEREAS, for the purpose of expediting any required Utility Work and reimbursement, the Parties are entering into this Project Master Utility Agreement with the understanding that future supplemental agreements to this Agreement will be entered into covering the Utility Work to be accomplished by UDOT at specific Project locations.

THIS AGREEMENT is made to set out the terms and conditions where under the Utility Work shall be performed.

AGREEMENT

NOW THEREFORE, the Parties agree as follows:

1. PROJECT RESPONSIBLE FOR COST

In accordance with Utah Code § 72-6-116(3)(a)(ii), UDOT is responsible for 100% of the cost of the Utility Work of District's facilities for those costs that comply with Utah Administrative Code R930-8.

2. CONTACT INFORMATION

UDOT's Project Representative is Alana Spendlove, UDOT Project Utility and Railroad Leader, telephone number (801) 887-3462, and e-mail aspendlove@utah.gov.

UDOT's Project Representative is Alana Spendlove, UDOT Project Utility and Railroad Leader, telephone number (801) 887-3462, and e-mail aspendlove@utah.gov.

UDOT's Resident Engineer for 5400 South and 7000 South interchanges is Bryan Chamberlain, telephone number (801) 887-3405, and e-mail bchamberlain@utah.gov, or their designated representative, as assigned.

UDOT's Resident Engineer for 9000 South and 11400 South interchanges is Ken Talbot, telephone number (801) 360-8750, and e-mail kentalbot@utah.gov, or their designated representative, as assigned.

UDOT's Field Representative contact person will be identified in subsequent supplemental agreements.

District's contact person is Mike Foerster, telephone number (801) 571-1166, and e-mail mikef@svsewer.com.

After awarding the Project, UDOT will provide the District with the Design Builder contact information, hereinafter referred to as "Design-Builder Project Representative".

3. AUTHORIZATION FOR DESIGN WORK

In order to facilitate coordination and obtain technical information about the District's facilities and requirements for inclusion in this Agreement and the Request for Proposals, UDOT gave the District authorization for preliminary design engineering on April 26, 2016.

4. SUBSURFACE UTILITY ENGINEERING

UDOT has performed Subsurface Utility Engineering (SUE) within the limits of the Project. Additional SUE work to determine the precise location of underground facilities at specific, critical locations on the Project will be reviewed with the District.

5. PROJECT COORDINATION

The District requested that UDOT include items of Utility Work for relocating and adjusting District's facilities in the Project.

During the development of the Project design, the District and UDOT, along with its Design-Builder, shall consult as necessary in an effort to determine if conflicts with the District's facilities can be avoided. If Utility Work for the District's facilities is required by the Project, UDOT will be responsible to identify the conflicts and to design and construct the Utility Work of the District's facilities. The District will perform the necessary design reviews prior to the start of Utility Work. UDOT's Project Representative will be responsible for coordinating with other utility companies as it relates to District's facilities.

6. UDOT TO DESIGN AND CONSTRUCT DISTRICT'S UTILITY WORK

UDOT will schedule and meet with the District to review the design and scheduling of the Utility Work for the District's facilities at specific locations on the Project to ensure maximum lead time for advance order of materials and work force scheduling.

a. UDOT will secure permits required for Utility Work of District's Utilities.
b. UDOT will supply as-constructed plans, in PDF format specified by the District, upon completion of any required Utility Work.
c. UDOT will issue a satisfactory 1 year warranty bond covering the Utility Work completed on the District's Utilities. UDOT will cause the bond to be issued by the Design Builder directly to the District.

7. DISTRICT REQUIREMENTS

UDOT will comply with the following District requirements:

a. The design and construction of the District's Utility Work shall be in accordance with the District's standards regularly followed by the District in its own work and not considered a betterment. In the event of a conflict between UDOT and District standards, the higher standard will be applied. A copy of the District's standards dated May 23, 2012 standards can be found at http://www.svsewer.com/wp-content/uploads/2012/08/Design-Standars-and-Construction-Specifications-of-SVSD-October-30-2014.pdf and are incorporated by reference.

8. REPLACEMENT RIGHT-OF-WAY

The District owns certain easements granting it the right to operate, construct and maintain its Utilities at its existing locations. To accommodate the Project, UDOT will relocate the District's existing Utilities by constructing a replacement facility that is both functionally equivalent to the existing facility and necessary for continuous operation of the District's Utilities, the Project economy, or sequence of highway construction in accordance with Utah Administrative Code R930-8. UDOT will acquire, at UDOT's sole expense, replacement right-of-way required for the Utility Work in

accordance with Utah Administrative Code R930-8. If the District's Utilities are relocated outside of UDOT's right-of-way, UDOT will obtain an easement for the District using the form provided by the District that is attached hereto as EXHIBIT "A". If the District's Utilities are relocated from a District-owned easement or fee property into UDOT's right-of-way and UDOT does not compensate the District for the easement or fee property, UDOT shall pay 100% of the costs to relocate the District's Utilities when future UDOT projects require the relocation. When the District's Utilities are relocated from a District-owned easement or fee property into UDOT's right-of-way and UDOT does not compensate the District for the easement or fee property, UDOT shall issue encroachment permits at no cost to the District in accordance with R930-7 to allow the District to operate, maintain, and replace its Utilities.

9. BETTERMENT WORK

If the District desires to include betterment work in the Project at any specific location UDOT may agree to the betterment providing the difference in costs between the functionally equivalent required Utility Work and the District's desired betterment work that is not required by the Project shall be at the sole cost of the District and the betterment work can be accommodated without delaying UDOT's Project. The betterment work will be addressed by separate supplemental agreement between UDOT and the District.

Once a Design-Builder has been selected by UDOT, any betterment work request will be negotiated directly with the Design-Builder. However, it is at UDOT's sole discretion to approve the betterment work.

10. SUPPLEMENTAL AGREEMENTS

UDOT and the District shall enter into supplemental agreements to cover Utility Work at specific Project locations. As part of the supplemental agreement, UDOT will provide design plans and Utility Work schedules for review and approval by the District prior to start of the Utility Work.

Should it become necessary for the District to schedule internal over-time inspection hours or to procure outside services to perform preliminary engineering, plan review, observation, or inspection, to accommodate UDOT's Utility Work and Project schedule, the District shall include an estimate of cost, to include in the supplemental agreement.

A copy of the format of the proposed supplemental agreement is marked EXHIBIT "B" that is incorporated by reference.

The District will require a 2 week review and approval period prior to its submission for Board approval for any final supplemental agreement submitted to the District by UDOT. District Board of Directors meets regularly on the 3rd Tuesday of each month, with the exception of holidays.

In the event there are changes in the scope of the Utility Work, extra Utility Work, or changes in the planned Utility Work covered by a supplemental agreement, a modification to the supplemental agreement approved in writing by the Parties is required prior to the start of Utility Work on the changes or additions.

11. UDOT TO NOTIFY DISTRICT BEFORE BEGINNING UTILITY WORK

UDOT shall not perform any Utility Work until the supplemental agreement for the Utility Work is signed by the District and received by UDOT. UDOT will review and approve the supplemental agreement and will issue an authorization to proceed to the District for each specific Utility Work location.

UDOT will notify the District at least 2 business days in advance of beginning any Utility Work covered by any supplemental agreement hereto, to allow the District to schedule an inspector to be present during the Utility Work.

12. DISTRICT TO PERFORM DESIGN REVIEW AND INSPECTION

District's personnel shall notify UDOT's Field Representative upon arriving and leaving the Project site for verification of inspecting Utility Work for reimbursement purposes. District's personnel will comply with all applicable OSHA and Project safety requirements while within the Project limits.

The District shall provide on-call engineering support by District's engineer or appropriate representative for design review, schedule coordination, or to correct or clarify issues during Utility Work, and to perform the necessary inspection on the District's facilities installed by UDOT.

a. The District's engineer and/or inspector shall work with and through UDOT's Project Representative and shall give no orders directly to UDOT's Design-Builder unless authorized in writing to do so. UDOT will accomplish the Utility Work covered herein on District's facilities in accordance with the plans and specifications provided and/or approved by the District, including changes or additions to the plans and specifications, which are approved by the Parties hereto.
b. The District shall immediately notify UDOT's Project Representative and the Design-Builder Project Representative of any deficiencies in the Utility Work on the District's facilities. The District shall follow up with written detail to UDOT's Project Representative and the Design-Builder Project Representative of its findings within 24-hours of making its initial notification.
c. UDOT will respond to District's concerns within 24-hours of written notification.
d. The District, through its inspection of the Utility Work, will provide UDOT's Project Representative with information covering any problems or concerns the District may have with acceptance of the facilities upon completion of the Utility Work.
e. Any periodic plan and specification review or construction inspection performed by UDOT arising out of the performance of the Utility Work does not relieve the District of its duty in the performance of the Utility Work or to ensure compliance with acceptable standards.

13. DAILY RECORDKEEPING

UDOT's Field Representative will keep daily records of the inspection performed by the District. Daily inspection records will be in duplicate on a form to be prepared by the District or UDOT. The type of form to be used shall be preapproved by UDOT's Contracts, Compliance and

Certification Manager. The inspection records shall be signed by UDOT's Field Representative, and the District or its authorized representatives. Copies of the inspection records shall be retained by the parties to this Agreement.

14. REIMBURSEMENT

The District shall notify UDOT in advance should it become necessary for the District to procure outside services to perform preliminary engineering, design review, observation, or inspection to accommodate UDOT's Utility Work and Project schedule. Upon concurrence by UDOT, the District may procure outside services through appropriate solicitation.

The District and UDOT will negotiate necessary internal over-time inspection hours during the development of each supplemental agreement. Upon execution of each supplemental agreement, the District may proceed with approved internal over-time inspection hours, and the cost will be reimbursed by UDOT. Upon completion of the Utility Work, the District must submit actual labor hours for approved internal over-time inspection hours, external service invoices, and daily records signed by all Parties for reimbursement to the District as outlined in Sections 11 and 12 above.

15. SUBMITTAL OF ITEMIZED BILLS

The District shall submit itemized bills covering the actual costs incurred for outside services to perform preliminary engineering, design review, oversight, and inspection work or for preapproved internal over-time inspection hours of the Utility Work covered by supplemental agreements to UDOT's Contracts and Compliance Specialist:

UDOT Contracts and Compliance Specialist
4501 South 2700 West
Construction Office, Box 148220
Salt Lake City, Utah 84114-8220

Itemized bills shall bear the Project and supplemental agreement numbers, supporting sheets, and a complete billing statement of all actual costs incurred, following the order of the items in the detailed estimates contained in the supplemental agreement and be submitted to UDOT within 60 days following completion of outside services or internal over-time inspection hours by the District on the Project. Otherwise, previous payments to the District may be considered final, except as agreed to between the Parties in advance.

UDOT will reimburse the District within 60 days after receipt of the billings, but only for items complying fully with the provisions of Utah Administrative Code R930-8. Failure on the part of the District to submit final billings within 6 months of the completion of outside services will result in UDOT's disallowance of that portion of outside services performed by the District.

16. SALVAGED MATERIALS

All materials from District's existing facilities which are recovered by UDOT while performing the Utility Work and not reused on this Project, except for manhole rings and covers, shall become the property of the Design-Builder unless otherwise agreed to in advance by the Parties hereto.

17. RIGHT TO AUDIT

UDOT and the Federal Highway Administration shall have the right to audit all cost records and accounts of the District pertaining to this Project in accordance with the auditing procedure of the Federal Highway Administration and 23 C.F.R. § 645, subpart A. Should this audit disclose that the District has been underpaid, the District will be reimbursed by UDOT within 60 days upon submission of additional billing to cover the underpayment. Should this audit disclose that the District has been overpaid, the District will reimburse UDOT within 60 days of notification of audit findings in the amount of the overpayment. For purpose of audit the District is required to keep and maintain its records of outsides services covered herein for a minimum of 3 years after final payment is received by the District from UDOT.

18. ACCEPTANCE AND MAINTENANCE

UDOT will provide notification to the District for acceptance of the Utility Work upon completion of the final inspection of the District's facilities. The District will have 60 days to respond in writing to UDOT with any additional comments in regards to the Utility Work. In the event that UDOT does not receive a written response within 60 days, UDOT will designate the Utility Work accepted by the District, subject to any outstanding warranties or warranty issue.

The District will accept, own, and maintain its own facilities. The District shall be the sole owner of the facilities upon completion of the Project unless otherwise agreed to by the Parties in writing. To the extent it may lawfully do so, District further agrees to relieve UDOT from any responsibility or liability that may result from its new facilities or the operation thereof, except for any repairs necessary under any applicable warranties.

19. ACCESS

It is understood that access for maintenance and servicing of District's facilities located on the right-of-way of the Project will be allowed only by permit issued by UDOT to the District, and that the District will obtain the permit and abide by conditions thereof for policing and other controls in conformance with Utah Administrative Code R930-7.

20. INDEMNIFICATION

UDOT and the District are both governmental entities subject to the Governmental Immunity Act. Each Party agrees to indemnify, defend, and save harmless the other from and against all claims, suits and costs, including attorneys' fees for injury or damage of any kind, arising out of its negligent acts, errors or omissions of its officers, agents, contractors or employees in the performance of this Agreement, and from and against all claims, suits, and costs, including attorneys' fees for injury or damage of any kind. Nothing in this paragraph is intended to create additional rights

to third parties or to waive any of the provisions of the Governmental Immunity Act. The obligation to indemnify is limited to the dollar amounts set forth in the Governmental Immunity Act, provided the Act applies to the action or omission giving rise to the protections in this paragraph. The indemnification in this paragraph shall survive the expiration or termination of this Agreement.

21. **MISCELLANEOUS**

a. Each Party agrees to undertake and perform all further acts that are reasonably necessary to carry out the intent and purpose of this Agreement at the request of the other Party.

b. This Agreement in no way creates any type of agency relationship, joint venture, or partnership between UDOT and District.

c. The failure of either Party to insist upon strict compliance of any of the terms and conditions, or failure or delay by either Party to exercise any rights or remedies provided in this Agreement, or by law, will not release either Party from any obligations arising under this Agreement.

d. This Agreement shall be deemed to be made under and shall be governed by the laws of the State of Utah in all respects. Each person signing this Agreement warrants that the person has full legal capacity, power and authority to execute this Agreement for and on behalf of the respective Party and to bind such Party. This Agreement may be executed in one or more counterparts, each of which shall be an original, with the same effect as if the signatures were made upon the same instrument. This Agreement may be delivered by facsimile or electronic mail.

e. If any portion of this Agreement is held to be invalid or unenforceable for any reason by a court of competent jurisdiction, such invalidity or unenforceability shall not affect any other provision hereof, and this Agreement shall be construed as if such invalid or unenforceable provision had never been contained herein.

****

BANGERTER

Project No. S-0154(12)11, Salt Lake County
4 Interchanges on Bangerter Highway
SOUTH VALLEY SEWER DISTRICT
Charge ID No. 71939 PIN 12566

IN WITNESS WHEREOF, the parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first above written.

ATTEST:

Title: District Clerk

Date: 7-19-16

South Valley Sewer District

Title: Chairman of the Board of Trustees

Date: 7-19-16

(IMPRESS SEAL)

Recommended For Approval:

FOR ALANA SPENDLOVE

Title: Utility and Railroad Leader

Date: 15 Aug 2016

Utah Department of Transportation

Title: Project Director

Date: Aug 15, 2016

Approved as to Form

Title: Assistant Attorney General

Date: 8/16/2016

Comptroller Office

Title: Contract Administrator

Date: 8-16-16

When Recorded Return to:
Mr. Craig L. White
South Valley Sewer District
P.O. Box 908
Draper, Utah 84020

PARCEL I.D.# _____
GRANTOR: _____

EASEMENT

A twenty (20) foot wide sanitary sewer easement located in the _____ Quarter of Section _____, Township _____, Range _____, Salt Lake Base and Meridian, U.S. Survey.

For the sum of One Dollar ($1.00) and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the undersigned as GRANTORS hereby grant, convey, sell, and set over unto South Valley Sewer District, a body politic of the State of Utah, hereinafter referred to as GRANTEE, its successors and assigns, a perpetual right-of-way and easement to construct, maintain, operate, repair, inspect, protect, install, remove and replace sewer pipelines, valves, valve boxes and other sewer transmission and distribution structures and facilities, hereinafter called the FACILITIES, said right-of-way and easement, being situate in Salt Lake County, State of Utah, over and through a parcel of the GRANTORS' land lying within a strip twenty (20) feet wide, said strip extending ten (10) feet on each side of and lying parallel and adjacent to a line of reference and projection thereof, more particularly described as follows:

Contains: _____ acres (approx. _____l.f.)

TO HAVE AND HOLD the same unto the GRANTEE, its successors and assigns, with the right of ingress and egress in the GRANTEE, its officers, employees, agents and assigns to enter upon the above-described property with such equipment as is necessary to construct, install, maintain, operate, repair, inspect, protect, remove and replace the FACILITIES. During construction periods, GRANTEE and its contractors may use such portion of GRANTORS' property along and adjacent to the right-of-way and easement as may be reasonably necessary in connection with the construction or repair of the FACILITIES. The contractor performing the work shall restore all property, through which the work traverses, to as near its original condition as is reasonably possible. GRANTORS shall have the right to use the above-described property except for the purposes for which this right-of-way and easement is granted to the GRANTEE, provided such use shall not interfere with the FACILITIES or with the discharge and conveyance of sewage through the FACILITIES, or any other rights granted to the GRANTEE hereunder.

GRANTORS shall not build or construct, or permit to be built or constructed, any building or other improvement over or across this right-of-way and easement nor change the contour thereof without the written consent of GRANTEE. This right-of-way and easement grant shall be binding upon, and inure to the benefit of, the successors and assigns of the GRANTORS and the successors and assigns of the GRANTEE, and may be assigned in whole or in part by GRANTEE.

IN WITNESS WHEREOF, the GRANTORS have executed this right-of-way and Easement this _____ day of _____, _____.

County Parcel No.	Acreage	GRANTOR(S)
_____	_____ (approx. _____l.f.)	

_____

_____

STATE OF UTAH)
:ss
COUNTY OF SALT LAKE)

On the _____ day of _____, 20_____ _____, the signers of the above instrument, personally appeared before me and duly acknowledged to me they executed the same.

_____
Notary Public

My Commission Expires:_____

Residing in:_____

SOUTH VALLEY SEWER DISTRICT
SUPPLEMENTAL AGREEMENT NO. ___

Supplement to UDOT Finance No. _____

THIS SUPPLEMENTAL AGREEMENT, made and entered into this _____ day of _____, 20____, **Utah Department of Transportation**, ("UDOT"), and **South Valley Sewer District**, a political subdivision of the State of Utah, ("District") each as ("Party") and jointly as ("Parties").

The parties hereto entered in to a Master Utility Agreement (MUA) dated _____, UDOT Finance No. _____. All the terms of the Master Utility Agreement remain in full force and effect unless otherwise specified herein.

The Parties agree as follows:

1. UDOT will perform the following described Utility Work in accordance with the terms and conditions of the MUA:

   a. Description of Utility Work to be performed, including proposed location, described in Exhibit "A" that is incorporated by reference: (Plan Sheets Attached)

   b. The City/District requirements as shown in the MUA – District Requirements, are modified as follows:
      i.

   c. Anticipated duration of Utility Work:

   d. Total estimated cost of City/District's (100% reimbursable) outside services: (Detailed Estimate Attached)

2. UDOT will notify the District's Project Representative, Mike Foerster, telephone No. (801) 571-1166, email mikef@svsewer.com at least 48 hours in advance of beginning the Utility Work covered herein, or in accordance with the specific terms of the MUA, as applicable.

IN WITNESS WHEREOF, the Parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first written above.

ATTEST:

South Valley Sewer District

_____ _____

Title: District Clerk

Title: Chairman of the Board of Trustees

Date: _____ _____

(IMPRESS SEAL)

. . . . . .

Recommended For Approval:

Utah Department of Transportation

_____ _____

Title: Utility and Railroad Leader

Title: Project Director

Date: _____

Date: _____

Approved as to Form

Comptroller Office

_____ _____

Title: Assistant Attorney General

Title: Contract Administrator

Date: _____

Date: _____

TELECOMMUNICATIONS FACILITY EXCHANGE AGREEMENT BETWEEN SYRINGA NETWORKS, LLC. AND THE UTAH DEPARTMENT OF TRANSPORTATION, STATE OF UTAH

THIS TELECOMMUNICATIONS FACILITY EXCHANGE AGREEMENT (hereinafter referred to as the "Agreement") is made and entered into as of the 28 day of July, 2010 (the "Effective Date"), between **SYRINGA Networks, LLC**, an Idaho limited liability company, with primary offices at 3795 S. Development Ave., Boise, ID 83705 ("SYRINGA"), and **Utah Department of Transportation, State of Utah**, located at 4501 S. 2700 W., Salt Lake City, UT 84119 ("UDOT") (hereafter referred to individually as "Party", and collectively as "Parties").

WHEREAS, each Party owns or will own telecommunication facilities within the State of Utah; and

WHEREAS, each Party owns (or will construct and own) or has (or will have upon completion of construction) ownership rights in a Conduit System and/or a Fiber System and each Party wishes to exchange the right to use certain conduit or fiber on their respective Conduit System or Fiber System for the right to use certain conduit or fiber on the other Party's Conduit System or Fiber System, and

WHEREAS, Sections 72-7-108 and 72-7-109, Utah Code Annotated, specifically authorize UDOT to enter into telecommunication facility exchange agreements with other third party telecommunication providers;

NOW, THEREFORE, for and in consideration of the mutual covenants and consideration set forth in this Agreement, the Parties do hereby agree as follows:

1. Definitions. The following terms, whether in the singular or in the plural, when used in this Agreement and initially capitalized, shall have the meaning specified:

1.1 Authorizations: All governmental or municipal approvals and authorizations; all rights-of-way; and all leases, licenses, consents or other agreements necessary for the Licensor to construct, install, maintain and repair its Conduit System.

1.2 Conduit System: A reference to a Party's conduit and associated Telecommunication Facilities.

1.3 SYRINGA Conduit System: The Conduit System owned by SYRINGA, including the conduit to be installed as identified in Exhibit B. UDOT will be authorized to use two (2) tubes in the Conduit System as identified in Exhibit B. SYRINGA's Conduit System shall be built in conformity with UDOT's written standards and specifications entitled UDOT Standards and Specifications 2008 Edition including the 2008 Supplemental Specifications, as of the last edit on November 18, 2009. Said UDOT Standards and Specifications are incorporated herein by reference.

1.4 Telecommunications Advisory Council: Telecommunications Advisory Council means the advisory council created pursuant to Utah Code--Title72—Chapter 07-- Section-109--Protection of Highways Act.

1.5 License: Authorization to use the Licensed Conduit for the License Term, subject to the terms and conditions of this Agreement.

1.6 License Term: The period of time for which each License is effective, as further defined in paragraph 7 of this Agreement.

1.7 Licensed Conduit: A specific portion of conduit, which is part of either the SYRINGA Conduit System or the UDOT. Conduit System, for which use of such conduit has been authorized by the owner of the Conduit System. The Licensed Conduit includes reasonable access and use of related Telecommunication Facilities necessary for the use of the Licensed Conduit.

1.8 Licensee: The Party (either UDOT or SYRINGA as the context requires) authorized to use Licensed Conduit within the other Party's Conduit System.

1.9 Licensor: SYRINGA as respects the SYRINGA Conduit System and UDOT as respects the UDOT Conduit System.

1.10 Telecommunication Facility(ies): All physical plant and data components of each party.

1.11 UDOT Conduit System: The unused portion of the Conduit System owned by UDOT, and available for use by SYRINGA, as more particularly identified on Exhibit B; provided that such Conduit System may be modified from time-to-time at UDOT's sole discretion and secured with an update to the UDOT/SYRINGA balance sheet .

1.12 UDOT Right-of-Way: UDOT Right-of-Way on any interstate or state road that UDOT has the legal right to use and manage

2. Obligations of SYRINGA. SYRINGA shall:

2.1 Construct, at its own cost and expense, the SYRINGA Conduit System identified and described in Exhibit B (hereinafter the "Planned Conduit").

2.2 Grant to UDOT, upon completion of the Planned Conduit, without further charge or fee or consideration, a License to use, for the Term of this Agreement, the exclusive use of two tubes in SYRINGA's Conduit as identified in Exhibit B in accordance with the Planned Conduit plans and specifications. SYRINGA shall issue a Conduit Use Authorization to UDOT when the conduit is available for occupancy and use by UDOT.

3. Obligations of UDOT. UDOT shall immediately:

3.1 Grant SYRINGA, without further charge or fee or consideration, a License to use, for the Term of this Agreement, the exclusive use of one tube in UDOT's Conduit System as identified in Exhibit B.

3.2 Grant SYRINGA non-exclusive access to the UDOT Right-of-Way throughout the term of this Agreement. In using said access, SYRINGA agrees to follow Utah Admin. Code R930-6 entitled Manual of Accommodation of Utility Facilities and the Control and Protection of State Highway Rights-of-Way, and Utah Admin. Code R907-1 entitled Appeal of Departmental Actions. SYRINGA may use said access for any lawful purpose without interference from UDOT or any third party.

4. Restrictions on Use.

4.1 This Agreement and each License is subject to the terms and conditions of the applicable Authorizations. Each License is for the use of the Licensed Conduit only. The Licensed Conduit will remain the sole and exclusive property of Licensor, and nothing contained

herein will give or convey to Licensee any property right, title or interest whatever in such Licensed Conduit, which will at all times be and remain Licensor's personal property **notwithstanding that** it may be or become attached to or embedded in realty. Licensee hereby grants to Licensor the right to recover all components of the Licensed Conduit from Licensee's premises upon expiration or earlier termination of this Agreement or any License.

4.2 Licensee may use the Licensed Conduit for its own business purposes. Licensor acknowledges that it has no right to use the Licensed Conduit during the applicable License Term.

4.3 Licensor shall not use its Conduit System in a way which interferes with or adversely affects the use of the Licensed Conduit by Licensee. Licensee shall not use the Licensed Conduit in a way which interferes with or adversely affects the use of Licensor's Conduit System.

5. Access and Escort.

5.1 Licensor shall provide Licensee access to the Licensed Conduit. It is the responsibility of Licensee to obtain any related governmental or other authority necessary to access and use the Licensed Conduit not available from Licensor.

5.2 Licensee shall be responsible for all cable locate services for the Licensed Conduit. All costs associated with Licensee's access to the Licensed Conduit will be borne by the Licensee.

6. Repair, Maintenance, and Continuity.

6.1 Licensor shall dispatch maintenance and repair personnel as soon as practical along the Conduit System to handle and repair problems detected by the Licensee that existed prior to the Effective Date.

a. UDOT shall coordinate all maintenance and repair activities with **SYRINGA's Network Operations Center at 1-800-454-7214.**

b. SYRINGA shall coordinate all maintenance and repair activities with UODT and follow the Utah Admin. Code R930-6 entitled Manual of Accommodation of Utility Facilities and the Control and Protection of State Highway Rights-of-Way. UDOT Permit fees for SYRINGA are waived for work with in the UDOT Right-of-Way. SYRINGA must follow all permitting processes according to the area that they are working in.

6.2 Maintenance.

a. From time to time, at the Licensor's reasonable discretion, and after adequate advance notice to the Licensee (which shall be at least ten (10) business days), the Licensor will schedule and perform specific periodic maintenance and repair checks and services on the Licensed Conduit. Licensee shall not be responsible for the repair or costs of repair for any defects in the Licensor conduit that existed prior to the Effective Date.

b. Non-emergency work that is reasonably expected to result in signal discontinuity must be coordinated between the Parties, and performed in accordance with Scheduled Maintenance Procedures. "Scheduled Maintenance Procedures" or "SMP" means a pre-arranged period of time reserved for performing certain work on Licensor's Fiber System that may impact communication services. Generally, SMP will be restricted to a Saturday or Sunday after midnight and before 6:00 a.m., local time. Major Fiber System work such as fiber rolls and hot cuts will also be scheduled utilizing SMP.

6.3 Emergency Maintenance. The Parties acknowledge that the transports on the Telecommunication Facilities are time sensitive. Each Party agrees to cooperate to bring the Telecommunication Facilities back to working order as quickly as possible.

6.4 The Licensor may hire a contractor to perform its maintenance and repair obligations.

6.5 The Licensee shall have the right, but not the obligation, to supervise and oversee any work performed by the Licensor in or to the Licensee's facilities, at Licensee's cost.

6.6 All of the Licensor's obligations under this Section shall be at the Licensor's sole cost and expense, subject to Section 13.

7. **Term.** The term of this Agreement, shall begin on the Effective Date, and shall terminate thirty (30) years later, or after either Party gives the other Party notice that it intends to terminate this agreement. ("Term"). After the initial thirty (30) year term, this Agreement shall renew automatically on its anniversary date for two (2) successive five (5) year periods, unless terminated with or without cause in writing by either Party. Upon termination of the agreement either Party will have five (5) years to arrange for removal and relocation of their telecommunication facilities.

8. **Trade-In of Occupied Conduit During Term.** Nothing in the Agreement shall preclude either party from substituting currently occupied conduit for substitute conduit at another location provided said conduit is available for use and the other party consents. The requesting party shall be solely responsible for any additional costs associate with the exchange, including any repair of the newly requested conduit or related identification and/or proofing.

9. **Express Warranty of Function-ability.**

9.1 The Parties mutually warrant that any Telecommunication Facility which either party has an obligation to furnish to the other by License or otherwise under this Agreement, shall be fully functional and fit for the intended purpose for which it was licensed.

10. **Representations Regarding Authorizations.**

10.1 Licensor represents, warrants and covenants that:

a. it has obtained, and will use commercially reasonable efforts to maintain all applicable Authorizations throughout each License Term; and

b. it has the full right and authority pursuant to the Authorizations to enter into this Agreement and perform its obligations hereunder, and will not violate the Authorizations (with or without the giving of notice or the lapse of time or both) and is not required to obtain any additional consent, approval, filing or notice under the Authorizations or under any provision of any law, rule or regulation, court order, judgment or decree applicable to the Licensor; and

c. it has no knowledge of any defect in the normal operating condition of the Conduit System that would have an adverse effect on the ability of the other Party to utilize the Licensed Conduit to provide telecommunications services to its customers; and

d. it will exercise its rights and perform its obligations hereunder only in accordance with all applicable laws, rules and regulations; and

e. it will perform all maintenance services in a professional and workmanlike manner in accordance with industry standards.

10.2 Licensee represents, warrants and covenants that:

a. Licensee's use of the Licensed Conduit will be limited to the provision of communication services in accordance with all Federal, State and local laws, rules, regulations, codes, statutes and subject to all Authorizations; and

b. Licensee has obtained all rights of way, authorizations and consents necessary to use the Licensed Conduit. Licensee will indemnify, defend and hold harmless Licensor from any claims related to its use of the Licensed Conduit; and

c. it has the full right and authority under the Authorizations to enter into this Agreement and perform its obligations hereunder, and the same will not violate the Authorizations (with or without the giving of notice or the lapse of time or both) and is not required to obtain any additional consent, approval, filing or notice under the Authorizations or under any provision of any law, rule or regulation, court order, judgment or decree applicable to the Licensee; and

d. it will perform all work related to access and use of the Licensed Conduit in a professional and workmanlike manner in accordance with industry standards.

11. Default and Termination.

11.1 Neither Party shall be in default under this Agreement unless and until such Party has received written notice of such default from the other Party, and has failed to cure the default within thirty (30) days after receipt of such notice, except for a payment default which must be cured within ten (10) days after receipt of such notice. Notwithstanding, when a default (unrelated to payment) cannot reasonably be cured within such thirty (30) day period, the time for curing such default shall be extended for a period no longer than ninety (90) days from the date of the receipt of the default notice if the Party proceeds promptly to cure the default with due diligence.

11.2 Unless otherwise provided herein, a Party shall be in default if (i) such Party breaches any term or provision of this Agreement or fails to comply with the provisions of this

License; (ii) such Party becomes insolvent; (iii) a petition under any of the bankruptcy laws is filed by or against such Party; (iv) such Party makes a general assignment for the benefit of creditors; or (v) a receiver, whether temporary or permanent, is appointed for the property of such Party or any part thereof.

11.3 Upon the failure by the defaulting Party to timely cure any default, the non-defaulting Party may (i) take such action as it determines, in its sole discretion, to be necessary to correct the default, and/or (ii) pursue any legal remedies it may have under applicable law or principles of equity relating to such breach. Notwithstanding the above, if the defaulting Party certifies to the non-defaulting Party in writing that a default has been cured, such default shall be deemed to be cured unless the non-defaulting Party notifies the defaulting Party in writing within fifteen (15) days of receipt of the defaulting Party's notice of cure.

12. Taxes.

12.1 Each Party shall be responsible for and shall timely pay any and all taxes and franchise, license and permit fees (hereinafter collectively referred to as "Taxes") based on the physical location or construction of its own Conduit System or otherwise assessed, levied or charged against such Conduit System.

12.2 If either Party wishes to contest any Taxes imposed on or assessed against it, it shall have the right to protest, by appropriate proceedings, the imposition or assessment of any such Taxes and the other Party shall provide reasonable cooperation at the challenging Party's cost, provided that the challenging Party shall indemnify and hold the other Party harmless from any expense, legal action or cost, including reasonable attorney's fees, resulting from the exercise of its rights under this paragraph. The challenging Party shall be entitled to any refund, rebate, reduction or abatement resulting from its challenge.

13. Relocation of the Facilities.

13.1 UDOT and SYRINGA, as Licensee, recognize that from time to time the Licensor may elect or be required to relocate the Conduit System, or a portion thereof. SYRINGA will relocate their facilities on UDOT Right-of-Way according to their Statewide Utility License Agreement with UDOT. UDOT will relocate any facilities on SYRINGA Right – of –Way at UDOT's expense.

14. Indemnification and Limitation of Liability.

14.1 NEITHER PARTY SHALL BE LIABLE TO THE OTHER FOR ANY INDIRECT, SPECIAL, PUNITIVE OR CONSEQUENTIAL DAMAGES (INCLUDING BUT NOT LIMITED TO, ANY DAMAGES ARISING OUT OF ANY CLAIM FROM ANY CUSTOMER FOR LOSS OF SERVICES) ARISING UNDER THIS AGREEMENT OR FROM ANY BREACH OF THIS AGREEMENT, OR ARISING OUT OF ANY ACT OR OMISSION OF EITHER PARTY HERETO, ITS EMPLOYEES, SERVANTS, CONTRACTORS AND/OR AGENTS.

14.2 Each Party shall indemnify, defend and hold the other harmless from and against any and all liabilities, losses, costs and expenses, including reasonable attorneys' fees, which are based upon or arise out of its acts or omissions, and the acts or omissions of its employees, agents or contractors. In no event will either Party indemnify the other Party

against claims brought by an employee against their employing Party. Nothing in this paragraph is intended to create additional rights to third parties or to waive any of the provisions of the Governmental Immunity Act. The obligation of UDOT to indemnify is limited to the dollar amounts set forth in the Governmental Immunity Act, provided said Act applies to the action or omission giving rise to the protections in this paragraph.

14.3 When a Party has actual knowledge of a claim falling within the other Party's indemnification obligations, such Party shall promptly so notify the other Party and provide reasonable assistance and information appropriate to the defense of the claim(s). In no event shall the Party against whom the claim is asserted have the right to pay, settle or compromise such claim without the prior written consent of the Party who may be obligated for such indemnity. The Parties agree that they will not unreasonably withhold their consent to any such payment, settlement or compromise.

Nothing contained herein shall operate as a limitation on the right of either Party to bring an action for damages, including consequential damages, against any third party (i.e., any person other than U.D.O.T., SYRINGA, and their respective officers, directors, agents and partners) based on any acts or omissions of such third party as such acts or omissions may affect the construction, operation or use of the Licensed Conduit.

15. Insurance.

15.1 During the Agreement Term, the Parties shall maintain not less than the following insurance:

Type of Coverage	Amount of Coverage
Worker's Compensation Insurance	Statutory Amount
Employer's Liability Occupational Disease and Bodily Injury Insurance	$1 million each accident $1 million disease each employee $1 million disease-policy limit
Commercial General Liability Insurance, including premises-operations, products/completed operations, independent contractors, contractual (blanket), broad form property damage, with umbrella excess liability (collectively, "Comprehensive Coverage")	Combined single limit personal injury and property damage on an occurrence policy form with policy amounts of (i) not less than $5 million per occurrence (without a limitation on aggregate amount); or (ii) not less than $5 million per occurrence with an aggregate annual amount of not less than $5 million
Automobile Liability Insurance for owned, hired and non-owned autos	$2 million combined single limit bodily injury/property damage

15.2 The comprehensive general liability policies and umbrella excess liability policies of each Party shall contain a provision naming the other Party, its parent, subsidiaries and affiliates, and each of its respective officers, directors, employees as Additional Insured.

15.3 Prior to commencement of any work pursuant to this Agreement, each Party must furnish to the other Party applicable certificates of insurance identifying the certificate holder as Additional Insured in accordance with subsection (15.2), and stating that the insurer will endeavor to notify Licensor at least 30 days prior to cancellation of, or any material change in, the coverage provided.

15.4 The foregoing insurance requirements are not intended to and shall not in any manner limit or qualify the liabilities and obligations assumed by U.D.O.T. or SYRINGA under this Agreement.

16. Force Majeure. Neither Party shall be liable to the other for any failure or delay of performance under this Agreement due to causes beyond its reasonable control (collectively, "Force Majeure Events").

17. Assignment. Except as provided below, neither Party may assign or otherwise transfer this Agreement or its rights or obligations hereunder without the prior written consent of the other Party, which consent will not be unreasonably withheld, conditioned or delayed. Notwithstanding the foregoing, both Parties shall have the right, without the other Party's consent, to assign or otherwise transfer this Agreement as collateral to any lender or to any parent or any corporation which purchases all or substantially all of its assets; provided, however, that any such assignment or transfer shall be subject to the terms and conditions of this Agreement and any assignee or transferee shall continue to perform the assigning Party's obligations pursuant to the terms and conditions of this Agreement.

18. Notice.

18.1 To be effective, notice must be in writing and delivered by pre-paid commercial overnight delivery service, or by first class mail, return receipt requested, addressed as follows:

If to SYRINGA: SYRINGA Networks, LLC
Attn: Greg Lowe, CEO
3795 S. Development Ave.
Boise, ID 83705

If to U.D.O.T.: U.D.O.T.
ATTN: Lynne Yocom
2060 S. 2760 W.
Salt Lake City, UT 84104

18.2 Either Party may change its notice address(es) by written notice to the other Party.

18.3 Notice shall be effective on the date of the addressee's receipt or refusal, as the case may be.

19. Dispute Resolution. Except as otherwise specifically provided in or permitted by this Agreement, all disputes, differences of opinion or controversies arising in connection with this

Agreement shall first be resolved through good faith negotiation to arrive at an agreeable resolution. If, after negotiating in good faith for a period of ninety (90) calendar days, or any agreed further period, the Parties are unable to resolve the dispute, then the Parties may seek resolution by mediation. Parties may meet together to resolve the controversy, claim, or breach or they may select a mutually acceptable mediator to do so. Parties shall bear their respective costs incurred in mediation.

20. Miscellaneous.

20.1 The relationship between the Parties shall not be that of partners, agents or joint ventures for one another, and nothing contained in this Agreement shall be deemed to constitute a partnership or agency agreement between them for any purposes, including, but not limited to federal income tax purposes. In performing any of their obligations hereunder, the Parties shall be independent contractors or independent Parties and shall discharge their contractual obligations at their own risk.

20.2 This Agreement shall be interpreted and enforced under the laws of the State of Utah without regard to its conflicts of law provisions.

20.3 If any provision of this Agreement is unenforceable, it shall be deemed stricken from this Agreement and shall have no effect on any other provision.

20.4 This Agreement shall be binding upon and inure to the benefit of Parties and their respective representatives, successors and assigns.

20.5 No waiver shall be valid unless in writing and signed by the Party against whom enforcement is sought. No waiver of any breach or obligation shall constitute a waiver of any subsequent breach or obligation.

21. ACCESS TO INTERSTATE RIGHT-OF-WAY

21.1 SYRINGA's Planned Conduit may occupy UDOT's Right-of-Way along various interstates. The value of the Right-of-Way has been assessed according to UDOT's 2004 Summary of Segment Values attached herein as Exhibit A. No additional Right-of-Way fees shall be assessed during the Term of this Agreement.

22. Entire Agreement.

22.1 This Agreement, including all Exhibits referred to herein, sets forth the entire agreement of the Parties with respect to the subject matter hereof and supersedes all prior understandings and agreements all prior or contemporaneous agreements, representations, statements, negotiations, and undertakings written or oral. The following Exhibits are attached to and incorporated into this Agreement:

EXHIBIT A: SUMMARY OF SEGMENT VALUES

EXHIBIT B: MAPS OF UDOT CONDUIT SYSTEM and SYRINGA CONDUIT SYSTEM (INCLUDING PLANNED CONSTRUCTION)

EXHIBIT C: UDOT/SYRINGA BALANCE SHEET

22.2 This Agreement and any of the provisions hereof may not be amended, altered or added to in any manner except by a written document signed by an authorized representative of each Party.

IN WITNESS WHEREOF, the Parties have caused this Conduit Exchange Agreement to be executed by their respective duly authorized representatives as of the day and year first above written.

SYRINGA NETWORKS, LLC

By: _____

Name: Greg Lowe
Title: CEO

UTAH DEPARTMENT OF TRANSPORTATION

By: _____

Name: Tracy Conti, PE
Title: Director of Operations

Approved as to Form and Compatibility with the Laws of the State of Utah

By: _____
Name: David Benard
Title: Assistant Attorney General

EXHIBIT A

Table 1 Summary of Segment Values

Segment	Miles	Adjustment to 2004	Lower Bound Value/Mile Annual ($1999)	Lower Bound Value/Mile Annual ($2004)	Lower Bound Value/Mile 30-Year Term	Upper Bound Value/Mile Annual ($1999)	Upper Bound Value/Mile Annual ($2004)	Upper Bound Value/Mile 30-Year Term	Annual Value/Mile Average ($1999)	Annual Value/Mile Average ($2004)
Interstate 15										
Idaho to Weber	49.32	14.0%	1,175	1,340	15,868	7,291	8,312	98,461	4,233	4,826
Weber to Parish Lane	29.88	7.0%	2,968	3,176	37,620	14,752	15,785	186,984	8,860	9,480
Parish Lane to Draper	35.81	13.4%	6,687	7,583	89,829	22,623	25,654	303,902	14,655	16,619
Draper to Springville	24.14	14.0%	7,290	8,311	98,447	11,065	12,614	149,426	9,178	10,462
Springville to Payson	13.31	9.2%	3,343	3,651	43,244	5,120	5,591	66,231	4,232	4,621
Payson to Arizona	248.87	0.0%	958	958	11,348	1,208	1,208	14,310	1,083	1,083
Average for I-15	401.33		2,105	2,293	27,159	5,597	6,179	73,196	3,851	4,236
Interstate 80										
Wyoming to Silver Creek	50.14	0.0%	543	543	6,432	5,508	5,508	65,248	3,026	3,026
Silver Creek to Parley's	18.36	14.0%	4,766	5,433	64,362	9,424	10,743	127,266	7,095	8,088
Parley's to Magna	16.90	13.4%	10,231	11,602	137,436	30,234	34,285	406,143	20,233	22,944
Magna to Nevada	109.59	0.0%	681	681	8,067	7,751	7,751	91,818	4,216	4,216
Averages for I-80	194.99		1,858	2,040	24,160	9,280	9,756	115,566	5,569	5,898
Interstate 215										
Total for I-215	50.14	13.4%	8,561	9,708	115,003	34,009	38,566	456,854	21,285	24,137
Interstate 84										
Echo to SR-89	32.13	14.0%	872	994	11,776	7,235	8,248	97,704	4,054	4,621
SR-89 to I-15	7.40	7.0%	1,341	1,435	16,997	8,668	9,275	109,869	5,005	5,355
Tremonton to Idaho	43.20	7.0%	186	199	2,358	4,942	5,288	62,641	2,564	2,743
Averages for I-84	82.73		556	618	7,325	6,165	6,794	80,483	3,361	3,706
Interstate 70										
Total for I-70	231.65	2.6%	364	373	4,424	1,855	1,903	22,546	1,110	1,138
Total ROW Miles	960.84									

Discount Rate	12.1%
Inflation Rate	3.5%
Overall Discount Rate	8.3%
Term in Years	30
Present Value Factor	11.84597

EXHIBIT B

3.1 Parameters of the Swap

		Syringa Build x 2	UDOT Duct
3.2	Core Ring	26,440	63,798
3.3	South Ring	3,166	177,291
3.4	Ogden	69,424	486,389
3.5	UEN DataCenter	6,358	5,473
3.6	East Ring	-	27,984
3.7	Farr West-Tremonton	323,010	-
3.8	Logan	216,480	45,112
		644,878	806,047
		122.1	152.7

** All units are in feet unless otherwise noted

Property of Syringa Networks, LLC. Do not distribute without written permission.

EXHIBIT C

Table 1 Summary of Segment Values

Segment	Miles	Adjustment to 2004	Lower Bound Value/Mile Annual ($1999)	Lower Bound Value/Mile Annual ($2004)	Lower Bound Value/Mile 30-Year Term	Upper Bound Value/Mile Annual ($1999)	Upper Bound Value/Mile Annual ($2004)	Upper Bound Value/Mile 30-Year Term	Annual Value/Mile Average ($1999)	Annual Value/Mile Average ($2004)
Interstate 15										
Idaho to Weber	49.32	14.0%	1,175	1,340	15,868	7,291	8,312	98,461	4,233	4,826
Weber to Parish Lane	29.88	7.0%	2,968	3,176	37,620	14,752	15,785	186,984	8,860	9,480
Parish Lane to Draper	35.81	13.4%	6,687	7,583	89,829	22,623	25,654	303,902	14,655	16,619
Draper to Springville	24.14	14.0%	7,290	8,311	98,447	11,065	12,614	149,426	9,178	10,462
Springville to Payson	13.31	9.2%	3,343	3,651	43,244	5,120	5,591	66,231	4,232	4,621
Payson to Arizona	248.87	0.0%	958	958	11,348	1,208	1,208	14,310	1,083	1,083
Average for I-15	401.33		2,105	2,293	27,159	5,597	6,179	73,196	3,851	4,236
Interstate 80										
Wyoming to Silver Creek	50.14	0.0%	543	543	6,432	5,508	5,508	65,248	3,026	3,026
Silver Creek to Parley's	18.36	14.0%	4,766	5,433	64,362	9,424	10,743	127,266	7,095	8,088
Parley's to Magna	16.90	13.4%	10,231	11,602	137,436	30,234	34,285	406,143	20,233	22,944
Magna to Nevada	109.59	0.0%	681	681	8,067	7,751	7,751	91,818	4,216	4,216
Averages for I-80	194.99		1,858	2,040	24,160	9,280	9,756	115,566	5,569	5,898
Interstate 215										
Total for I-215	50.14	13.4%	8,561	9,708	115,003	34,009	38,566	456,854	21,285	24,137
Interstate 84										
Echo to SR-89	32.13	14.0%	872	994	11,776	7,235	8,248	97,704	4,054	4,621
SR-89 to I-15	7.40	7.0%	1,341	1,435	16,997	8,668	9,275	109,869	5,005	5,355
Tremonton to Idaho	43.20	7.0%	186	199	2,358	4,942	5,288	62,641	2,564	2,743
Averages for I-84	82.73		556	618	7,325	6,165	6,794	80,483	3,361	3,706
Interstate 70										
Total for I-70	231.65	2.6%	364	373	4,424	1,855	1,903	22,546	1,110	1,138
Total ROW Miles	960.84									
Discount Rate	12.1%									
Inflation Rate	3.5%									
Overall Discount Rate	8.3%									
Term in Years	30									
Present Value Factor	11.84597									

3.2 SLC Core Ring

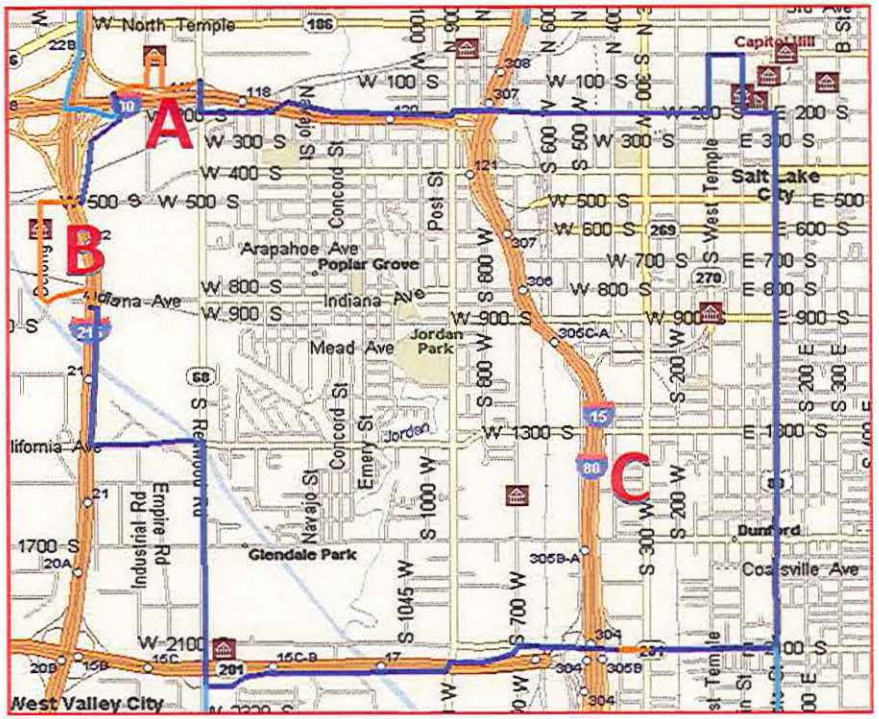
Ring Description:

Starting at Redwood road (Orange) going east along I-80 to West Temple, then going north to South Temple, then going east to Main Street, then going south to S Temple, then east to State Street; Continuing south on state to 2100 S, then west to Redwood road, then north to California, then west to I-215 and then north to Delong and then north to Orange.

Syringa Builds

A. Sprint MSC on Orange
B. Level 3 on Delong
C. 300 W 2100 S building west to 400 W

	Syringa	UDOT	
UDOT Conduit:		63,798	
Syr Build A:	*6140*		
Syr Build B:	*6360*		
Syr Build C:	*720*		
	13,220	63,798	
	2.5	*12.1*	Miles



3.3 SLC South Ring

Ring Description:

2100 S. State going south to 12600 S, then east to 12600 S Redwood Road, then going north to 2100 S.

SYRINGA BUILDS:

A. 3600 W 5400 S to Bangerter Hwy

UDOT LATERAL:

Kerns UDOT Lateral

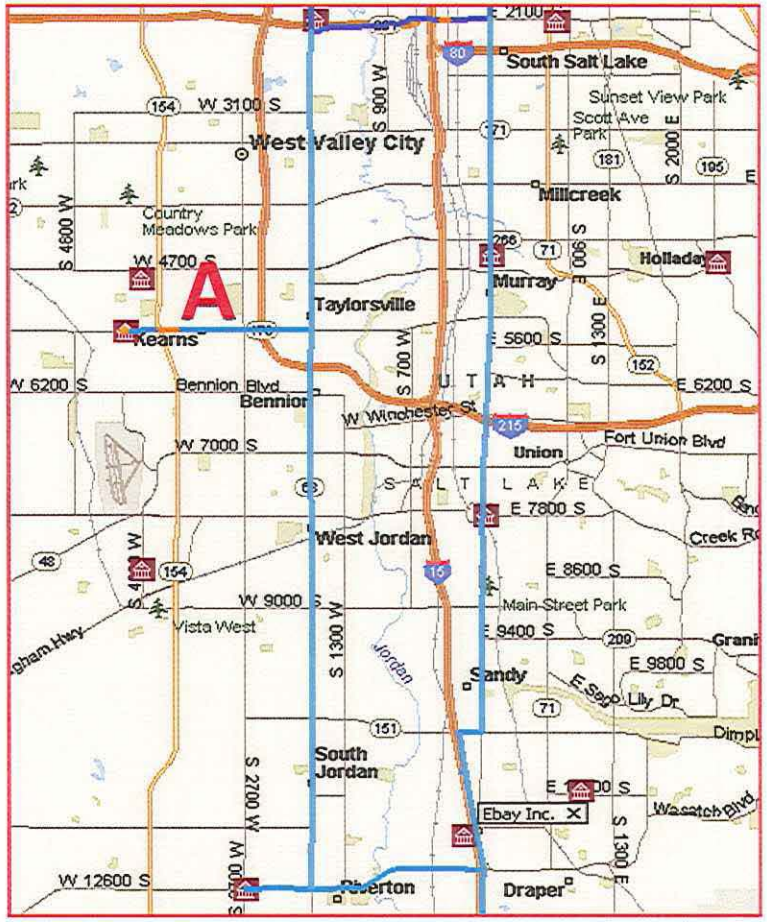
5400 S Redwood Road going west to 3600 W & 5400 S

Riverton UDOT Lateral

12600 S Redwood Road going west to 2700 W & 12600 S

Footage

	Syringa	UDOT	
UDOT South ring:		161,568	
Syr Build A:	*1,583*		
UDOT Lat Kearns:		10,560	
UDOT Lat Rvrtn:		5,163	
	1,583	*177,291*	
	0.3	33.6	Miles



3.4 Ogden Build

RING DESCRIPTION:

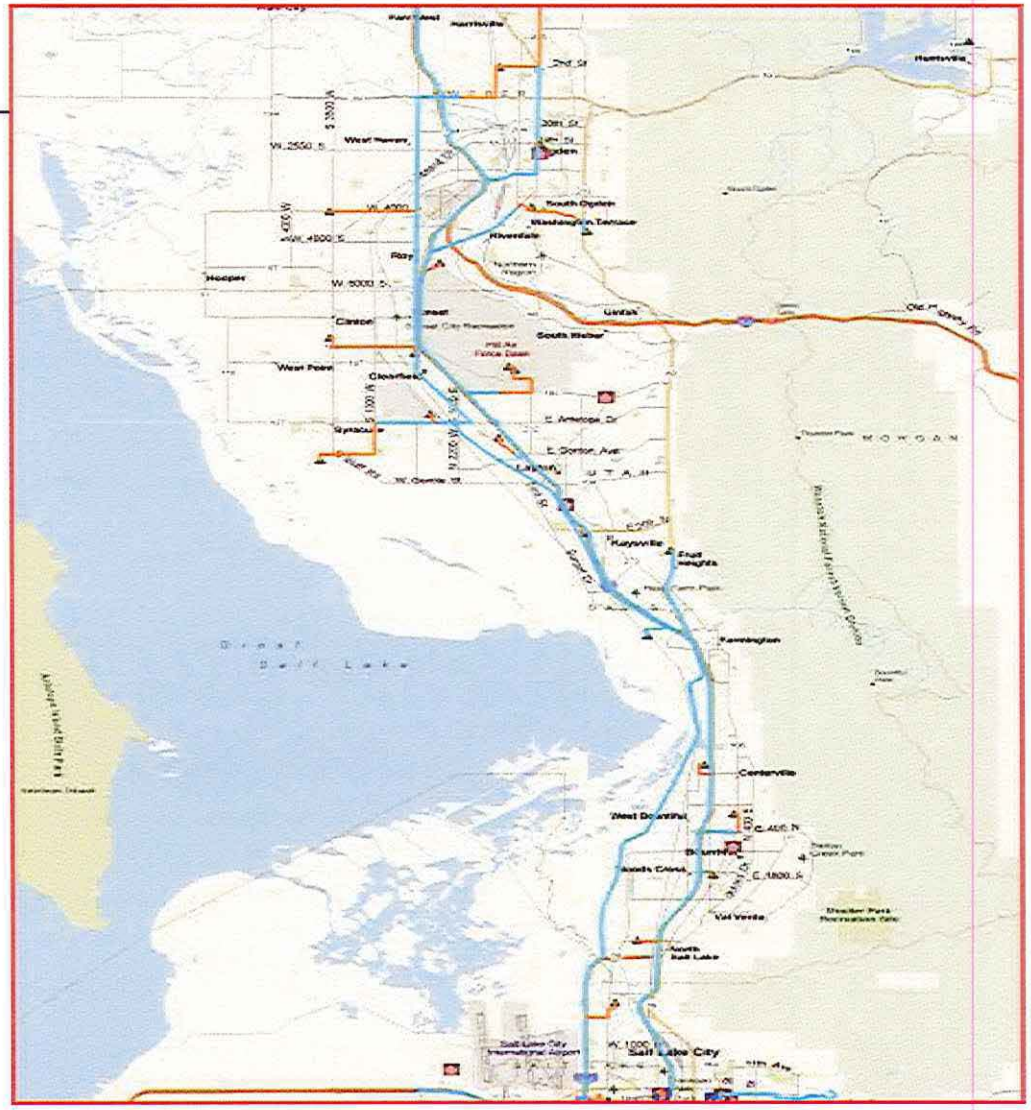
Primary Path: Starting at Core Ring at I-15 going north along I-15 on the east side, ending at Farr West intersection of 1-15 & 2700 N.
Backup Path: Starting at Core Ring at I-215 going north along Legacy parkway, and then north along the west side of I-15 and then north along Hwy 126 to instersection of I-15 & 1200 S.

SYRINGA BUILDS:

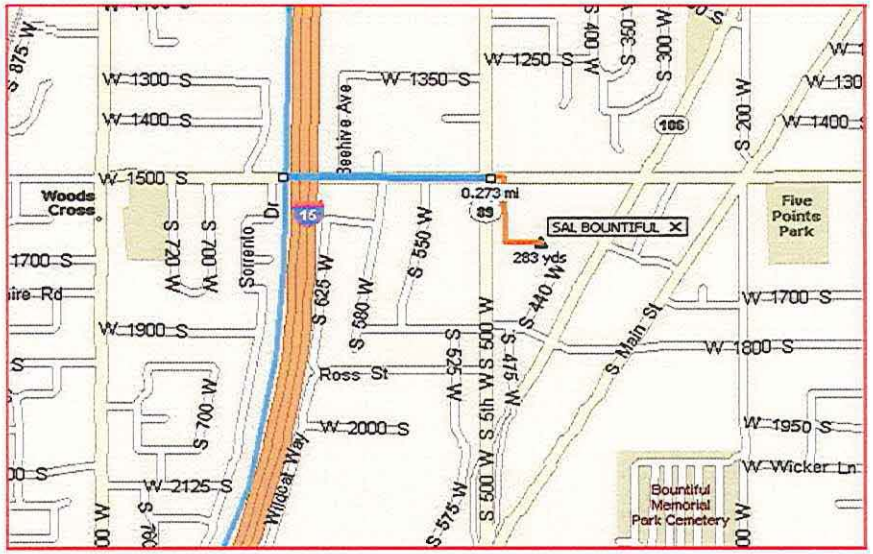
Multiple builds to carrier sites using UDOT and Syringa builds.

Footage

	Syringa	UDOT	
UDOT Conduit-East Primary		216,480	
UDOT Conduit-West backup		203,280	
Bountiful		1,441	
Bubble	3,538	5,280	
Kaysville-Downtown		570	
Ogden-Downtown		12,302	
Freeport		2,308	
Syracuse	13,042	7,392	
Fruit Heights		14,837	
Lagoon		4,182	
Layton	11,880	3,443	
Kaysville	3,712	1,674	
Newgate	2,540	13,200	
	34,712	486,389	
	6.57	92.12	Miles



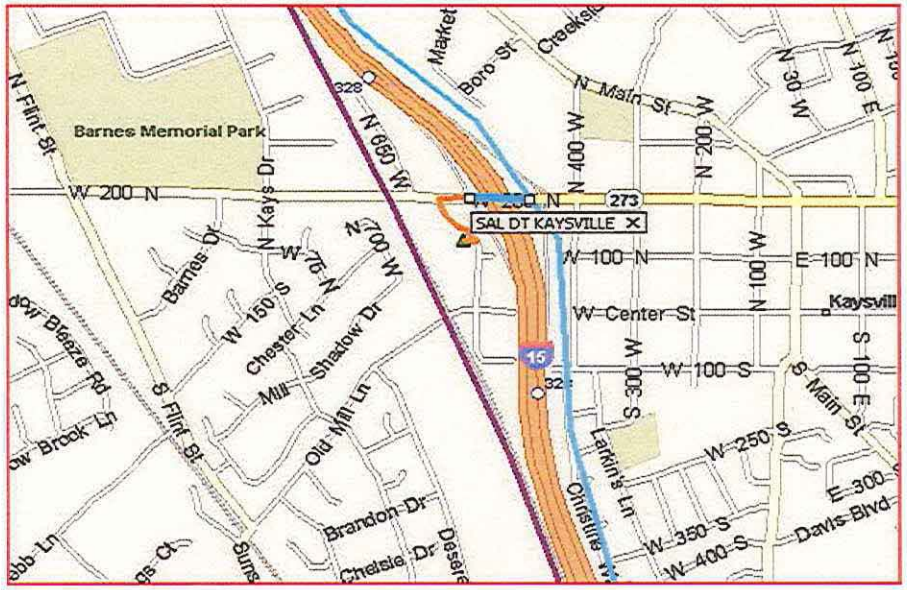
	Footage	Cost	Tower Address	Conduit Path
1. SAL BOUNTIFUL			1625 S 500 West, Bountiful, Ut	1500 South
	UDOT	Syringa		
UDOT Conduit:	1,441			
Syr Build:	849			



	Footage	Cost	Tower Address	Conduit Path
2. SAL BUBBLE			120 West 1000 North, Bountiful, UT	W. Wiley St.
UDOT Conduit:	5,280			
Syr Build:	3,538			

	Footage	Cost	Tower Address	Conduit Path
3. SAL DT KAYSVILLE			600 W 200 N, Kaysville, UT	W. 200 N

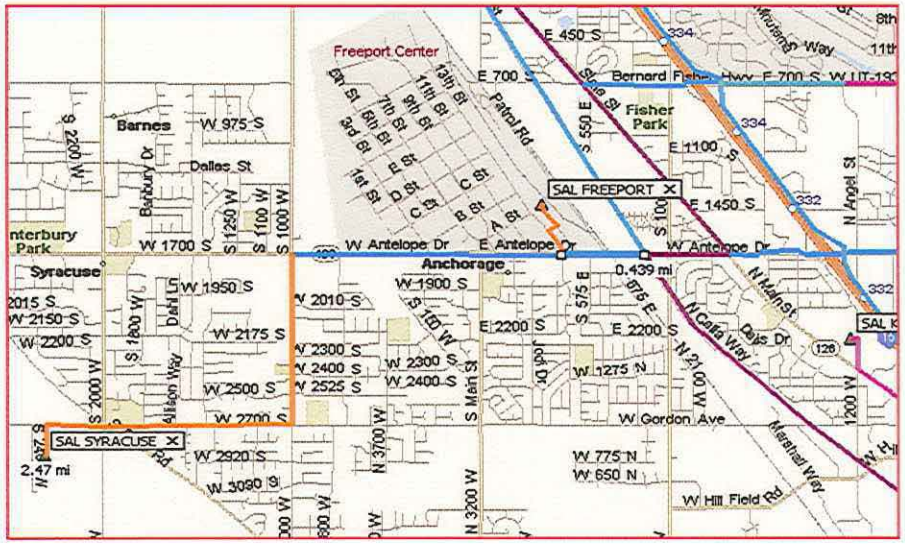
UDOT Conduit: 570
Syr Build: 1,000



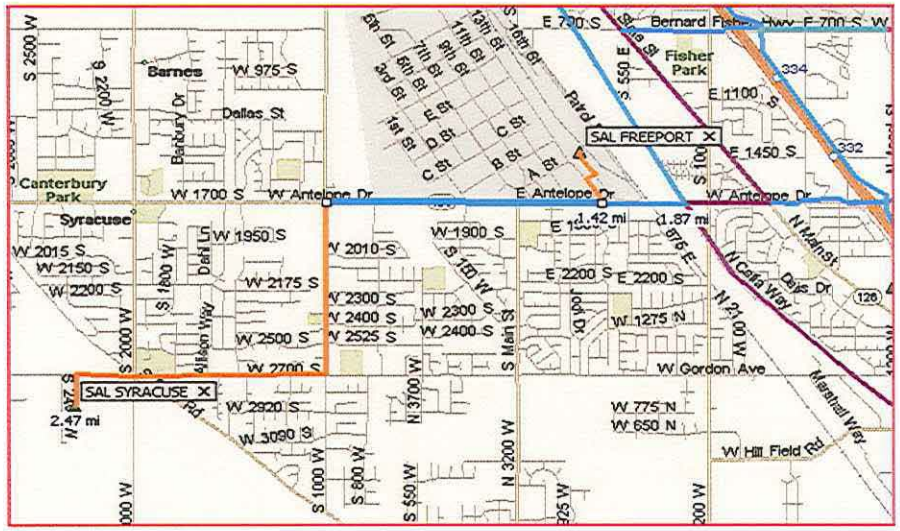
	Footage	Cost	Tower Address	Conduit Path
4. SAL DT OGDEN			2404 Washington Blvd, Ogden, Ut	31st St. & Washington Blvd.

UDOT Conduit: 12,302
Syr Build: 75

	Footage	Cost	Tower Address	Conduit Path
5. SAL FREEPORT			350 E 1700 S Freeport Ctr, Clearfield, Ut	W. Antelope Dr
UDOT Conduit:	2,308			
Syr Build:	1,943			

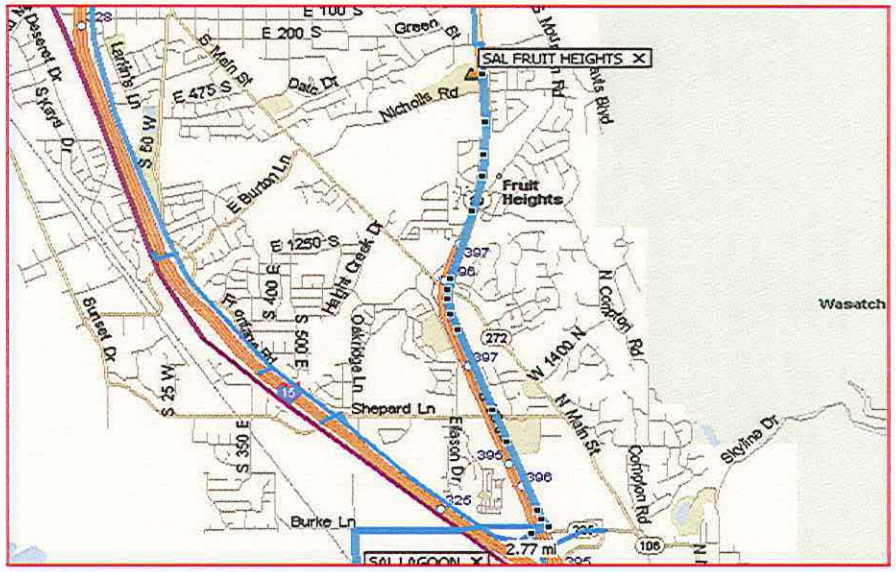


	Footage	Cost	Tower Address	Conduit Path
6. SAL SYRACUSE			2900 S 2400 W, Syracuse, Ut	W. Antelope Dr
UDOT Conduit:	7,392			
Syr Build:	13,042			



	Footage	Cost	Tower Address	Conduit Path
7. SAL FRUIT HEIGHTS			US HWY 89 & Nichols Rd, Fruit Heights, UT	Highway 89 - Lloyd Road

UDOT Conduit: 14,837
Syr Build: 75

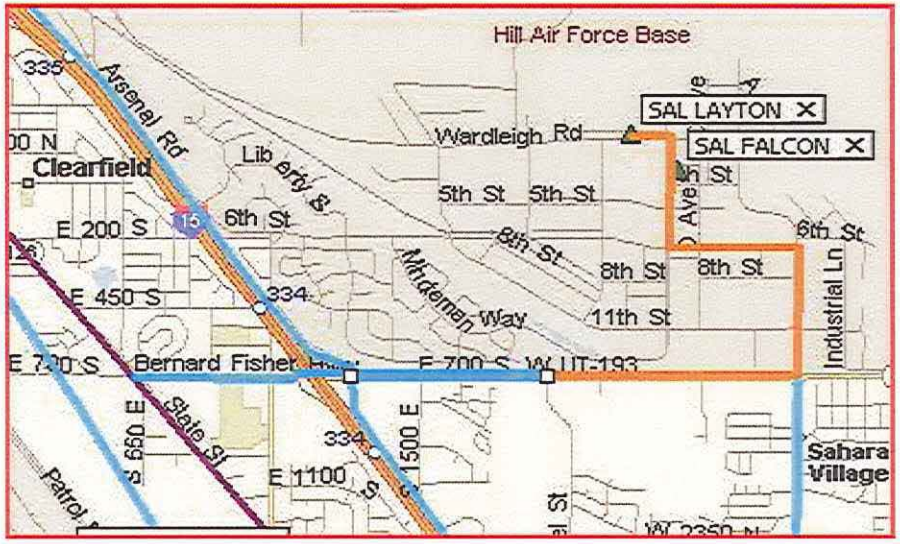


	Footage	Cost	Tower Address	Conduit Path
8. SAL LAGOON			540 N 1525 W, Farmington, Ut	Burke Ln & 1525 W

UDOT Conduit: 4,182
Syr Build: 0

	Footage	Cost	Tower Address	Conduit Path
9. SAL LAYTON			3895 N 1650 E, Layton, Ut	E 700 S

UDOT Conduit: 3,443
Syr Build: 11,880



	Footage	Cost	Tower Address	Conduit Path
10. SAL KAYSVILLE			1464 N. Main, Layton, Ut	Hill Field Rd - N. Main St.

UDOT Conduit: 1,674
Syr Build: 3,712

	Footage	Cost	Tower Address	Conduit Path
11. SAL NEWGATE			3855 Grant Ave, South Ogden, Ut	W Riverdale Rd
UDOT Conduit:	13,200			
Syr Build:	2,540			

3.5 UEN Datacenter Ring

Ring Description:

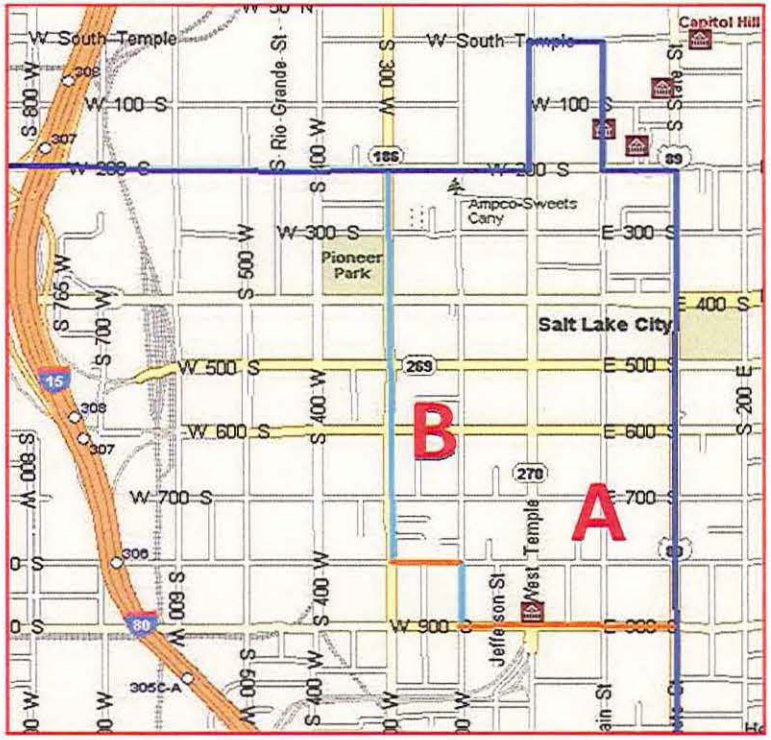
Starting at 200 S 300 W going south via UDOT conduit to 800 S. Then building west to 200 W, then using UDOT conduit south to 900 S. Then building west to 900 S State Street.

SYRINGA BUILDS:

A. 900 S State to 900 S 200 W
B. 800 S 200w to 800 S 300 W

Footage

	Sryinga	UDOT	
UDOT Conduit		*5,473*	
Syringa Build A	*2,381*		
Syringa Build B	*798*		
	3,179	*5,473*	
	0.60	1.04	Miles



3.6 SLC East Ring

Ring Description:

200 S State going north to South Temple, then east to 1000E then south to 100 S, then goint east on 100 S to 1300E, and then south on 1300 E to 500 S, then west to 300E, then south to 600 S then west to 200 E, then north to 400 S and then west to Core Ring.

SYRINGA BUILDS:

None

Footage:

	Syringa	UDOT	
UDOT Conduit		27,984	
	0	5.3	Miles

3.7 Farr West to Tremonton Build

Build Description:

Starting at Farr West heading north along I-15 to the I-15 Tremonton interchange.

SYRINGA BUILDS:

Syringa will build I-15 Farr West to Tremonton.

Footage:

	Syringa	UDOT
Syringa Build	*161,505*	
	30.6	0.0 Miles

3.8 Logan

Build Description:

Starting at Riverside at I-15 & 1520 N heading east along Hwy 30 to Logan meeting existing UDOT conduit in Logan.

SYRINGA BUILDS:

Syringa will build from I-15 to UDOT conduit in Logan.

Footage:

	Syringa	UDOT	
Syringa Build	*108,240*		
UDOT Conduit (Tremonton-Riverside)		31,680	
UDOT Conduit (Logan)		13,432	
	108,240	*45,112*	
	20.5	8.54	Miles

TAYLORSVILLE CITY
MASTER UTILITY AGREEMENT

THIS MASTER UTILITY AGREEMENT, made and entered into this _____day of_____, 20_____, by and between the **Utah Department of Transportation**, ("UDOT"), and **Taylorsville City**, a Municipal Corporation of the State of Utah, ("City") each as ("Party") and jointly as ("Parties").

RECITALS

WHEREAS, UDOT is preparing to request proposals for and award a design-build contract for the highway project identified as Project Number S-0154(12)11, 4 Interchanges on Bangerter Highway in Salt Lake County, Utah, ("Project"); and

WHEREAS, the design-build contractor will complete the design and administer construction of the Project ("Design-Builder"); and

WHEREAS, UDOT has identified City facilities within the limits of the Project which may necessitate the relocation, protection, or adjustment of the facilities, ("Utility Work"); and

WHEREAS, the City desires for the Design-Builder to design and perform the Utility Work on the City's facilities necessitated by the Project; and

WHEREAS, the City will perform the necessary design review and inspection to accommodate the Project; and

WHEREAS, for the purpose of expediting any required Utility Work and reimbursement, the Parties are entering into this Project Master Utility Agreement with the understanding that future supplemental agreements to this Agreement will be entered into covering the Utility Work to be accomplished by UDOT at specific Project locations.

THIS AGREEMENT is made to set out the terms and conditions where under the Utility Work shall be performed.

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AGREEMENT

NOW THEREFORE, the Parties agree as follows:

1. **PROJECT RESPONSIBLE FOR COST**

In accordance with Utah Code § 72-6-116(3)(a)(ii), UDOT is responsible for 100% of the cost of the Utility Work of City's facilities for those costs that comply with Utah Administrative Code R930-8.

2. **CONTACT INFORMATION**

UDOT's Project Representative is Alana Spendlove, UDOT Project Utility and Railroad Leader, telephone number (801) 887-3462, and e-mail aspendlove@utah.gov.

UDOT's Resident Engineer for 5400 South and 7000 South interchanges is Bryan Chamberlain, telephone number (801) 887-3405, and e-mail bchamberlain@utah.gov, or their designated representative, as assigned.

UDOT's Resident Engineer for 9000 South and 11400 South interchanges is Ken Talbot, telephone number (801) 360-8750, and e-mail kentalbot@utah.gov, or their designated representative, as assigned.

UDOT's Field Representative contact person will be identified in subsequent supplemental agreements.

City's contact person is Wayne Harper, telephone number (801) 647-8701, and e-mail wharper@taylorsvilleut.gov.

After awarding the Project, UDOT will provide the City with the Design Builder contact information, hereinafter referred to as "Design-Builder Project Representative".

3. **AUTHORIZATION FOR DESIGN WORK**

In order to facilitate coordination and obtain technical information about the City's facilities and requirements for inclusion in this Agreement and the Request for Proposals, UDOT gave the City authorization for preliminary design engineering on July 27, 2016.

4. **SUBSURFACE UTILITY ENGINEERING**

UDOT has performed Subsurface Utility Engineering (SUE) within the limits of the Project. Additional SUE work to determine the precise location of underground facilities at specific, critical locations on the Project will be reviewed with the City.

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5. **PROJECT COORDINATION**

The City requested that UDOT include items of Utility Work for relocating and adjusting City's facilities in the Project.

During the development of the Project design, the City and UDOT, along with its Design-Builder, shall consult as necessary in an effort to determine if conflicts with the City's facilities can be avoided. If Utility Work for the City's facilities is required by the Project, UDOT will be responsible to identify the conflicts and to design and construct the Utility Work of the City's facilities. The City will perform the necessary design reviews prior to the start of Utility Work. UDOT's Project Representative will be responsible for coordinating with other utility companies as it relates to City's facilities.

6. **CITY REQUIREMENTS**

UDOT will comply with the following City Utility Work requirements**:**

a. The City will require …
b. In general, the City cannot have …
c. UDOT will supply as-constructed plans, in _____ format, upon completion of any required Utility Work.

7. **UDOT TO DESIGN AND CONSTRUCT CITY'S UTILITY WORK**

UDOT will schedule and meet with the City to review the design and scheduling of the Utility Work for the City's facilities at specific locations on the Project to ensure maximum lead time for advance order of materials and work force scheduling.

a. UDOT will design the Utility Work in accordance with City's standards regularly followed by the City in its own work and not considered a betterment. In the event of a conflict between UDOT and City standards, the higher standard will be applied. A copy of the City's standards can be found at _____that is incorporated by reference.
a. UDOT will secure permits required for Utility Work of City's facilities.

8. **RIGHT-OF-WAY**

Any easements or replacement right-of-way required in conjunction with the Utility Work of City's facilities will be acquired by UDOT in accordance with the requirements of Utah Administrative Code R930-8.

9. **BETTERMENT WORK**

City Aesthetics and Landscaping Betterment Work is described in attached Exhibit "A" that is incorporated by reference.

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If the City desires to include additional betterment work in the Project at any specific location UDOT may agree to the betterment providing the difference in costs between the functionally equivalent required Utility Work and the City's desired betterment work that is not required by the Project shall be at the sole cost of the City and the betterment work can be accommodated without delaying UDOT's Project. The betterment work will be addressed by separate supplemental agreement between UDOT and the City.

Once a Design-Builder has been selected by UDOT, any betterment work request will be negotiated directly with the Design-Builder. However, it is at UDOT's sole discretion to approve the betterment work.

10. SUPPLEMENTAL AGREEMENTS

UDOT and the City shall enter into supplemental agreements to cover Utility Work at specific Project locations. As part of the supplemental agreement, UDOT will provide design plans and Utility Work schedules for review and approval by the City prior to start of the Utility Work. A copy of the format of the proposed supplemental agreement is marked EXHIBIT "A" that is incorporated by reference.

The City will require a 2 week review and approval period for any final supplemental agreement submitted to the City by UDOT. The City does not require council review for supplemental agreement approval.

In the event there are changes in the scope of the Utility Work, extra Utility Work, or changes in the planned Utility Work covered by a supplemental agreement, a modification to the supplemental agreement approved in writing by the Parties is required prior to the start of Utility Work on the changes or additions.

11. UDOT TO NOTIFY CITY BEFORE BEGINNING UTILITY WORK

UDOT will notify the City at least 2 business days in advance of beginning any Utility Work covered by any supplemental agreements hereto, to allow the City time to schedule an inspector to be present during the Utility Work. Subsequent notification of when and where Utility Work will be performed will be given on a day-to-day basis.

12. CITY TO NOTIFY UDOT

City's personnel shall notify UDOT's Resident Engineer upon arriving and leaving the Project site for verification of inspecting Utility Work. City's personnel will comply with all applicable OSHA and Project safety requirements while within the Project limits.

13. INSPECTION

The City shall provide on-call engineering support by City's engineer or appropriate representative for design review, schedule coordination, or to correct or clarify issues during Utility Work, and to perform the necessary inspection on the City's facilities installed by UDOT.

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a. The City's engineer and/or inspector shall work with and through UDOT's Project Representative and shall give no orders directly to UDOT's Design-Builder unless authorized in writing to do so. UDOT will accomplish the Utility Work covered herein on City's facilities in accordance with the plans and specifications provided and/or approved by the City, including changes or additions to the plans and specifications, which are approved by the Parties hereto.
b. The City shall immediately notify UDOT's Project Representative and the Design-Builder Project Representative of any deficiencies in the Utility Work on the City's facilities. The City shall follow up with written detail to UDOT's Project Representative and the Design-Builder Project Representative of its findings within 24-hours of making its initial notification.
c. UDOT will respond to City's concerns within 24-hours of written notification.
d. The City, through its inspection of the Utility Work, will provide UDOT's Project Representative with information covering any problems or concerns the City may have with acceptance of the facilities upon completion of the Utility Work.
e. Any periodic plan and specification review or construction inspection performed by UDOT arising out of the performance of the Utility Work does not relieve the City of its duty in the performance of the Utility Work or to ensure compliance with acceptable standards.

14. DAILY RECORDKEEPING

UDOT's Resident Engineer will keep daily records of the inspection performed by the City. Daily inspection records will be in duplicate on a form to be prepared by the City or UDOT. The type of form to be used shall be preapproved by UDOT's Contracts, Compliance and Certification Manager. The inspection records shall be signed by UDOT's Field Representative, and the City or its authorized representatives. Copies of the inspection records shall be retained by the parties to this Agreement.

15. REIMBURSEMENT

UDOT will not reimburse the City for costs incurred by City personnel for design review, observation, inspection, and operation of valves performed as part of their regularly assigned duties. Should it become necessary for the City to procure outside services to perform design review, observation, or inspection to accommodate UDOT's Utility Work and Project schedule, the City shall notify UDOT. Upon concurrence by UDOT, a supplemental agreement for the cost of the services will be executed at which time the City may procure outside services through appropriate solicitation.

16. SUBMITTAL OF ITEMIZED BILLS

The City shall submit itemized bills covering the actual costs incurred for outside services to perform design review, oversight, and inspection work covered by supplemental agreements to UDOT's Contracts and Compliance Specialist:

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UDOT Contracts and Compliance Specialist
Utah Department of Transportation
PO Box 141510
SLC UT 84114-1510

Itemized bills shall bear the Project and supplemental agreement numbers, supporting sheets, and a complete billing statement of all actual costs incurred, following the order of the items in the detailed estimates contained in the supplemental agreement and be submitted to UDOT within 60 days following completion of outside services by the City on the Project. Otherwise, previous payments to the City may be considered final, except as agreed to between the Parties in advance.

UDOT will reimburse the City within 60 days after receipt of the billings, but only for items complying fully with the provisions of Utah Administrative Code R930-8. Failure on the part of the City to submit final billings within 6 months of the completion of outside services will result in UDOT's disallowance of that portion of outside services performed by the City.

17. SALVAGED MATERIALS

All materials from City's existing facilities which are recovered by UDOT while performing the Utility Work and not reused on this Project shall become the property of the Design-Builder unless otherwise agreed to in advance by the Parties hereto.

18. RIGHT TO AUDIT

UDOT and the Federal Highway Administration shall have the right to audit all cost records and accounts of the City pertaining to this Project in accordance with the auditing procedure of the Federal Highway Administration and 23 C.F.R. § 645, subpart A. Should this audit disclose that the City has been underpaid, the City will be reimbursed by UDOT within 60 days upon submission of additional billing to cover the underpayment. Should this audit disclose that the City has been overpaid, the City will reimburse UDOT within 60 days of notification of audit findings in the amount of the overpayment. For purpose of audit the City is required to keep and maintain its records of outsides services covered herein for a minimum of 3 years after final payment is received by the City from UDOT.

19. ACCEPTANCE AND MAINTENANCE

Upon completion of the Utility Work of City facilities by UDOT, the City will accept, own, and maintain its own facilities. The City shall be the sole owner of the facilities upon completion of the Project unless otherwise agreed to by the Parties. To the extent it may lawfully do so, City further agrees to relieve UDOT from any responsibility or liability that may result from its new facilities or the operation thereof.

20. ACCESS

It is understood that access for maintenance and servicing of City's facilities located on the right-of-way of the Project will be allowed only by permit issued by UDOT to the City, and that the

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City will obtain the permit and abide by conditions thereof for policing and other controls in conformance with Utah Administrative Code R930-7. **INDEMNIFICATION**

UDOT and the City are both governmental entities subject to the Governmental Immunity Act. Each Party agrees to indemnify, defend, and save harmless the other from and against all claims, suits and costs, including attorneys' fees for injury or damage of any kind, arising out of its negligent acts, errors or omissions of its officers, agents, contractors or employees in the performance of this Agreement, and from and against all claims, suits, and costs, including attorneys' fees for injury or damage of any kind. Nothing in this paragraph is intended to create additional rights to third parties or to waive any of the provisions of the Governmental Immunity Act. The obligation to indemnify is limited to the dollar amounts set forth in the Governmental Immunity Act, provided the Act applies to the action or omission giving rise to the protections in this paragraph. The indemnification in this paragraph shall survive the expiration or termination of this Agreement.

21. **MISCELLANEOUS**

a. Each Party agrees to undertake and perform all further acts that are reasonably necessary to carry out the intent and purpose of this Agreement at the request of the other Party.
b. This Agreement in no way creates any type of agency relationship, joint venture, or partnership between UDOT and City.
c. The failure of either Party to insist upon strict compliance of any of the terms and conditions, or failure or delay by either Party to exercise any rights or remedies provided in this Agreement, or by law, will not release either Party from any obligations arising under this Agreement.
d. This Agreement shall be deemed to be made under and shall be governed by the laws of the State of Utah in all respects. Each person signing this Agreement warrants that the person has full legal capacity, power and authority to execute this Agreement for and on behalf of the respective Party and to bind such Party. This Agreement may be executed in one or more counterparts, each of which shall be an original, with the same effect as if the signatures were made upon the same instrument. This Agreement may be delivered by facsimile or electronic mail.

****

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IN WITNESS WHEREOF, the parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first above written.

ATTEST:

Taylorsville City

_____ _____

Title: _____ **Title:** _____

Date: _____ **Date:** _____

(IMPRESS SEAL)

. . . . . .

Recommended For Approval:

Utah Department of Transportation

_____ _____

Title: Utility and Railroad Leader **Title:** Project Director

Date: _____ **Date:** _____

Approved as to Form

Comptroller Office

_____ _____

Title: Assistant Attorney General **Title:** Contract Administrator

Date: _____ **Date:** _____

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TAYLORSVILLE CITY AESTHETIC AND LANDSCAPE BETTERMENTS

The City has requested the following Betterment Work be included with the Project Work:

UDOT will include the following Aesthetics and Landscaping Betterment Work items into the Project Work. UDOT will supplement up to $100,000.00 towards Aesthetics and Landscaping Betterment Work. UDOT and the City shall enter into supplemental agreements to cover Aesthetics and Landscaping Betterment Work described below. City will be responsible for paying the actual costs greater than $100,000.00 associated with the Aesthetics and Landscaping Betterment Work items, based on UDOT's actual quantities placed.

Description of Aesthetics and Landscaping Betterment Work:

Element	Desired City Betterment
Parapets:	Panel with "City of Taylorsville" raised lettering.
Retaining Walls:	Addition of a Taylorsville City logo plate onto the retaining wall or column.
Sidewalks:	1. Sidewalk on 5400 S to be at least 6-ft wide as part of a planned east-west trail system. 2. Include a sidewalk along the detention pond on parcel # 777 to connect Avalon Drive to 5400 S.
Lighting and Traffic Signal Poles:	Decorative street lights in project area similar to fixtures in front of city hall.
Park Strip, Median & Island Treatments:	1. Irrigation lines in sleeves under road to islands. 2. Rock mulch.
Landscaping:	Landscape areas, including detention ponds: Sprinklers and grass, with some trees. Trees should be tall growing evergreen and deciduous mix on 40' to 50' centers.

TAYLORSVILLE CITY
SUPPLEMENTAL AGREEMENT NO. ___

Supplement to UDOT Finance No. _____

THIS SUPPLEMENTAL AGREEMENT, made and entered into this _____ day of _____, 20____, **Utah Department of Transportation**, ("UDOT"), and **Taylorsville City,** a Municipal Corporation of the State of Utah, ("City") each as ("Party") and jointly as ("Parties").

The parties hereto entered in to a Master Utility Agreement (MUA) dated _____, UDOT Finance No. _____. All the terms of the Master Utility Agreement remain in full force and effect unless otherwise specified herein.

The Parties agree as follows:

1. UDOT will perform the following described Utility Work in accordance with the terms and conditions of the MUA:

   a. Description of Utility Work to be performed, including proposed location, described in Exhibit "A" that is incorporated by reference: (Plan Sheets Attached)

   b. The City requirements as shown in the MUA – City Requirements, are modified as follows:
      i.

   c. Anticipated duration of Utility Work:

   d. Total estimated cost of City's (100% reimbursable) outside services: (Detailed Estimate Attached)

2. UDOT will notify the City's Project Representative, City's contact person is Wayne Harper, telephone number (801) 647-8701, and e-mail wharper@taylorsvilleut.gov at least 48 hours in advance of beginning the Utility Work covered herein, or in accordance with the specific terms of the MUA, as applicable.

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IN WITNESS WHEREOF, the Parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first written above.

ATTEST:

Taylorsville City

_____ _____

Title: _____ **Title:** _____

Date: _____ **Date:** _____

(Impress Seal)

. . . . . .

RECOMMENDED FOR APPROVAL:

_____

Title: Utility and Railroad Leader

Date: _____

UTAH DEPARTMENT OF TRANSPORTATION

_____

Title: Project Director

Date: _____

_____

UDOT Comptroller Office
Contract Administrator

. . . . . .

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TAYLORSVILLE BENNION IMPROVEMENT DISTRICT MASTER UTILITY AGREEMENT

THIS MASTER UTILITY AGREEMENT, made and entered into this 20 day of Sept, 2016, by and between the **Utah Department of Transportation**, ("UDOT"), and **Taylorsville Bennion Improvement District**, a Special Improvement District of the State of Utah, ("District") each as ("Party") and jointly as ("Parties").

RECITALS

WHEREAS, UDOT is preparing to request proposals for and award a design-build contract for the highway project identified as Project Number S-0154(12)11, 4 Interchanges on Bangerter Highway in Salt Lake County, Utah, ("Project"); and

WHEREAS, the design-build contractor will complete the design and administer construction of the Project ("Design-Builder"); and

WHEREAS, UDOT has identified District facilities within the limits of the Project which may necessitate the relocation, protection, or adjustment of the facilities, ("Utility Work"); and

WHEREAS, the District is willing to allow the Design-Builder to design and perform the Utility Work on the District's facilities necessitated by the Project; and

WHEREAS, the District will perform the necessary design review and inspection to accommodate the Project; and

WHEREAS, for the purpose of expediting any required Utility Work and reimbursement, the Parties are entering into this Project Master Utility Agreement with the understanding that future supplemental agreements to this Agreement will be entered into covering the Utility Work to be accomplished by UDOT at specific Project locations.

THIS AGREEMENT is made to set out the terms and conditions where under the Utility Work shall be performed.

AGREEMENT

NOW THEREFORE, the Parties agree as follows:

1. PROJECT RESPONSIBLE FOR COST

In accordance with Utah Code § 72-6-116(3)(a)(ii), UDOT is responsible for 100% of the cost of the Utility Work of District's facilities for those costs that comply with Utah Administrative Code R930-8.

2. CONTACT INFORMATION

UDOT's Project Representative is Alana Spendlove, UDOT Project Utility and Railroad Leader, telephone number (801) 887-3462, and e-mail aspendlove@utah.gov.

UDOT's Resident Engineer for 5400 South and 7000 South interchanges is Bryan Chamberlain, telephone number (801) 887-3405, and e-mail bchamberlain@utah.gov, or their designated representative, as assigned.

UDOT's Resident Engineer for 9000 South and 11400 South interchanges is Ken Talbot, telephone number (801) 360-8750, and e-mail kentalbot@utah.gov, or their designated representative, as assigned.

UDOT's Field Representative contact person will be identified in subsequent supplemental agreements.

District's contact person is Kevin Fenn, telephone number (801) 968-9081, and e-mail kevin@tbid.org.

After awarding the Project, UDOT will provide the District with the Design Builder contact information, hereinafter referred to as "Design-Builder Project Representative".

3. AUTHORIZATION FOR DESIGN WORK

In order to facilitate coordination and obtain technical information about the District's facilities and requirements for inclusion in this Agreement and the Request for Proposals, UDOT gave the District authorization for preliminary design engineering on April 26, 2016.

4. SUBSURFACE UTILITY ENGINEERING

UDOT has performed Subsurface Utility Engineering (SUE) within the limits of the Project. Additional SUE work to determine the precise location of underground facilities at specific, critical locations on the Project will be reviewed with the District.

5. PROJECT COORDINATION

The District requested that UDOT include items of Utility Work for relocating and adjusting District's facilities in the Project.

During the development of the Project design, the District and UDOT, along with its Design-Builder, shall consult as necessary in an effort to determine if conflicts with the District's facilities can be avoided. If Utility Work for the District's facilities is required by the Project, UDOT will be responsible to identify the conflicts and to design and construct the Utility Work of the District's facilities. The District will perform the necessary design reviews prior to the start of Utility Work. UDOT's Project Representative will be responsible for coordinating with other utility companies as it relates to District's facilities.

6. DISTRICT REQUIREMENTS

UDOT will comply with the following District Utility Work requirements:

a. UDOT will supply as-constructed plans, in Auto Cad format, upon completion of any required Utility Work including betterment work.

7. DISTRICT TO DESIGN ITS UTILITY WORK

UDOT will schedule and meet with the District to review the design and scheduling of the Utility Work for the District's facilities at specific locations on the Project to ensure maximum lead time for advance order of materials and work force scheduling.

UDOT will design the Utility Work in accordance with District's standards regularly followed by the District in its own work and not considered a betterment. In the event of a conflict between UDOT and District standards, the higher standard will be applied. A copy of the District's standards can be found at the Districts web site http://www.tbid.org/images/2015-03-17TBIDUpdatedDetails.pdf that is incorporated by reference.

a. UDOT will secure permits required for Utility Work of District's facilities.

8. RIGHT-OF-WAY

Any easements or replacement right-of-way required in conjunction with the Utility Work of District's facilities will be acquired by UDOT in accordance with the requirements of Utah Administrative Code R930-8.

9. BETTERMENT WORK

The District has requested the following betterment work be added to the Project:

a. Replace approximately 160 feet of 18-inch ductile iron pipe and 225 feet of 8-inch PVC water line with 385 feet of 12-inch C-900 PVC.

b. Replace approximately 486 feet of 8-inch sewer ductile iron pipe with CIPP from manhole to manhole crossing the Bangerter Highway and 5400 South intersection.

Details for accommodating the betterment work will be addressed by a separate supplemental agreement.

If the District desires to include betterment work in the Project at any specific location UDOT may agree to the betterment providing the difference in costs between the functionally equivalent required Utility Work and the District's desired betterment work that is not required by the Project shall be at the sole cost of the District and the betterment work can be accommodated without delaying UDOT's Project. The betterment work will be addressed by separate supplemental agreement between UDOT and the District.

Once a Design-Builder has been selected by UDOT, any betterment work request will be negotiated directly with the Design-Builder. However, it is at UDOT's sole discretion to approve the betterment work.

10. SUPPLEMENTAL AGREEMENTS

UDOT and the District shall enter into supplemental agreements to cover Utility Work at specific Project locations. As part of the supplemental agreement, UDOT will provide design plans and Utility Work schedules for review and approval by the District prior to start of the Utility Work. A copy of the format of the proposed supplemental agreement is marked EXHIBIT "A" that is incorporated by reference.

The District will require a 2 week review and approval period for any final supplemental agreement submitted to the District by UDOT.

In the event there are changes in the scope of the Utility Work, extra Utility Work, or changes in the planned Utility Work covered by a supplemental agreement, a modification to the supplemental agreement approved in writing by the Parties is required prior to the start of Utility Work on the changes or additions.

11. UDOT TO NOTIFY DISTRICT BEFORE BEGINNING UTILITY WORK

UDOT will notify the District at least 2 business days in advance of beginning any Utility Work covered by any supplemental agreements hereto, to allow the District time to schedule an inspector to be present during the Utility Work. Subsequent notification of when and where Utility Work will be performed will be given on a day-to-day basis.

12. DISTRICT TO NOTIFY UDOT

District's personnel shall notify UDOT's Field Representative upon arriving and leaving the Project site for verification of inspecting Utility Work. District's personnel will comply with all applicable OSHA and Project safety requirements while within the Project limits.

13. INSPECTION

The District shall provide on-call engineering support by District's engineer or appropriate representative for design review, schedule coordination, or to correct or clarify issues during Utility Work, and to perform the necessary inspection on the District's facilities installed by UDOT.

a. The District's engineer and/or inspector shall work with and through UDOT's Project Representative and shall give no orders directly to UDOT's Design-Builder unless authorized in writing to do so. UDOT will accomplish the Utility Work covered herein on District's facilities in accordance with the plans and specifications provided and/or approved by the District, including changes or additions to the plans and specifications, which are approved by the Parties hereto.

b. The District shall immediately notify UDOT's Project Representative and the Design-Builder Project Representative of any deficiencies in the Utility Work on the District's facilities. The District shall follow up with written detail to UDOT's Project Representative and the Design-Builder Project Representative of its findings within 24-hours of making its initial notification.

c. UDOT will respond to District's concerns within 24-hours of written notification.

d. The District, through its inspection of the Utility Work, will provide UDOT's Project Representative with information covering any problems or concerns the District may have with acceptance of the facilities upon completion of the Utility Work.

e. Any periodic plan and specification review or construction inspection performed by UDOT arising out of the performance of the Utility Work does not relieve the District of its duty in the performance of the Utility Work or to ensure compliance with acceptable standards.

14. DAILY RECORDKEEPING

UDOT's Field Representative will keep daily records of the inspection performed by the District. Daily inspection records will be in duplicate on a form to be prepared by the District or UDOT. The type of form to be used shall be preapproved by UDOT's Contracts, Compliance and Certification Manager. The inspection records shall be signed by UDOT's Field Representative, and the District or its authorized representatives. Copies of the inspection records shall be retained by the parties to this Agreement.

15. REIMBURSEMENT

UDOT will not reimburse the District for costs incurred by District personnel for design review, observation, inspection, and operation of valves performed as part of their regularly assigned duties. Should it become necessary for the District to procure outside services to perform design review, observation, or inspection to accommodate UDOT's Utility Work and Project schedule, the District shall notify UDOT. Upon concurrence by UDOT, a supplemental agreement for the cost of the services will be executed at which time the District may procure outside services through appropriate solicitation.

16. SUBMITTAL OF ITEMIZED BILLS

The District shall submit itemized bills covering the actual costs incurred for outside services to perform design review, oversight, and inspection work covered by supplemental agreements to UDOT's Contracts and Compliance Specialist:

UDOT Contracts and Compliance Specialist
Utah Department of Transportation
PO Box 141510
SLC, UT 84114-1510

Itemized bills shall bear the Project and supplemental agreement numbers, supporting sheets, and a complete billing statement of all actual costs incurred, following the order of the items in the detailed estimates contained in the supplemental agreement and be submitted to UDOT within 60 days following completion of outside services by the District on the Project. Otherwise, previous payments to the District may be considered final, except as agreed to between the Parties in advance.

UDOT will reimburse the District within 60 days after receipt of the billings, but only for items complying fully with the provisions of Utah Administrative Code R930-8. Failure on the part of the District to submit final billings within 6 months of the completion of outside services will result in UDOT's disallowance of that portion of outside services performed by the District.

17. SALVAGED MATERIALS

All materials from District's existing facilities which are recovered by UDOT while performing the Utility Work and not reused on this Project shall become the property of the Design-Builder unless otherwise agreed to in advance by the Parties hereto.

18. RIGHT TO AUDIT

UDOT and the Federal Highway Administration shall have the right to audit all cost records and accounts of the District pertaining to this Project in accordance with the auditing procedure of the Federal Highway Administration and 23 C.F.R. § 645, subpart A. Should this audit disclose that the District has been underpaid, the District will be reimbursed by UDOT within 60 days upon submission of additional billing to cover the underpayment. Should this audit disclose that the District has been overpaid, the District will reimburse UDOT within 60 days of notification of audit findings in the amount of the overpayment. For purpose of audit the District is required to keep and maintain its records of outsides services covered herein for a minimum of 3 years after final payment is received by the District from UDOT.

19. ACCEPTANCE AND MAINTENANCE

Upon completion of the Utility Work of District facilities by UDOT, the District will accept, own, and maintain its own facilities. The District shall be the sole owner of the facilities upon completion of the Project unless otherwise agreed to by the Parties.

20. ACCESS

It is understood that access for maintenance and servicing of District's facilities located on the right-of-way of the Project will be allowed only by permit issued by UDOT to the District, and that the District will obtain the permit and abide by conditions thereof for policing and other controls in conformance with Utah Administrative Code R930-7.

21. INDEMNIFICATION

UDOT and the District are both governmental entities subject to the Governmental Immunity Act. Each Party agrees to indemnify, defend, and save harmless the other from and against all claims, suits and costs, including attorneys' fees for injury or damage of any kind, arising out of its negligent acts, errors or omissions of its officers, agents, contractors or employees in the performance of this Agreement, and from and against all claims, suits, and costs, including attorneys' fees for injury or damage of any kind. Nothing in this paragraph is intended to create additional rights to third parties or to waive any of the provisions of the Governmental Immunity Act. The obligation to indemnify is limited to the dollar amounts set forth in the Governmental Immunity Act, provided the Act applies to the action or omission giving rise to the protections in this paragraph. The indemnification in this paragraph shall survive the expiration or termination of this Agreement.

22. MISCELLANEOUS

a. Each Party agrees to undertake and perform all further acts that are reasonably necessary to carry out the intent and purpose of this Agreement at the request of the other Party.

b. This Agreement in no way creates any type of agency relationship, joint venture, or partnership between UDOT and District.

c. The failure of either Party to insist upon strict compliance of any of the terms and conditions, or failure or delay by either Party to exercise any rights or remedies provided in this Agreement, or by law, will not release either Party from any obligations arising under this Agreement.

d. This Agreement shall be deemed to be made under and shall be governed by the laws of the State of Utah in all respects. Each person signing this Agreement warrants that the person has full legal capacity, power and authority to execute this Agreement for and on behalf of the respective Party and to bind such Party. This Agreement may be executed in one or more counterparts, each of which shall be an original, with the same effect as if the signatures were made upon the same instrument. This Agreement may be delivered by facsimile or electronic mail.

****

IN WITNESS WHEREOF, the parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first above written.

ATTEST:

Taylorsville Bennion Improvement District

Title: ASSISTANT GENERAL MANAGER

Title: General Manager

Date: 9/12/16

Date: 9/12/16

(IMPRESS SEAL)

Recommended For Approval:

Title: Utility and Railroad Leader

Date: 9/20/16

Utah Department of Transportation

Title: Project Director

Date: 9/20/2016

Approved as to Form

Title: Assistant Attorney General

Date: 09/26/2016

Comptroller Office

Title: Contract Administrator

Date: 9/27/16

TAYLORSVILLE BENNION IMPROVEMENT DISTRICT SUPPLEMENTAL AGREEMENT NO. ___

Supplement to UDOT Finance No. _____

THIS SUPPLEMENTAL AGREEMENT, made and entered into this _____ day of _____, 20____, **Utah Department of Transportation**, ("UDOT"), and **Taylorsville Bennion Improvement District**, a Special Improvement District of the State of Utah, ("District") each as ("Party") and jointly as ("Parties").

The parties hereto entered in to a Master Utility Agreement (MUA) dated _____, UDOT Finance No. _____. All the terms of the Master Utility Agreement remain in full force and effect unless otherwise specified herein.

The Parties agree as follows:

1. UDOT will perform the following described Utility Work in accordance with the terms and conditions of the MUA:

   a. Description of Utility Work to be performed, including proposed location, described in Exhibit "A" that is incorporated by reference: (Plan Sheets Attached)

   b. The District requirements as shown in the MUA – District Requirements, are modified as follows:
      i.

   c. Anticipated duration of Utility Work:

   d. Total estimated cost of District's (100% reimbursable) outside services: (Detailed Estimate Attached)

2. UDOT will notify the District's Project Representative, Kevin Fenn, telephone number (801) 968-9081, email keven@tbid.org at least 48 hours in advance of beginning the Utility Work covered herein, or in accordance with the specific terms of the MUA, as applicable.

IN WITNESS WHEREOF, the Parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first written above.

ATTEST:

Taylorsville-Bennion Improvement District

_____ _____

Title: _____ **Title:** _____

Date: _____ **Date:** _____

(Impress Seal)

. . . . . .

RECOMMENDED FOR APPROVAL:

_____

Title: Utility and Railroad Leader

Date: _____

UTAH DEPARTMENT OF TRANSPORTATION

_____

Title: Project Director

Date: _____

_____

UDOT Comptroller Office
Contract Administrator

. . . . . .

178247

S-0154(12)11
4 Interchanges on Bangerter Highway
CID 71939 PIN 12566

United States Contract No. 16-LM-40-050350
UDOT Contract No._____

E 25873

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

PROJECT AGREEMENT
AMONG THE
UNITED STATES OF AMERICA
AND
UTAH DEPARTMENT OF TRANSPORTATION
AND
JORDAN VALLEY WATER CONSERVANCY DISTRICT

THIS PROJECT AGREEMENT, made this 8th day of September, 2016, pursuant to the Act of Congress of June 17, 1902 (32 Stat. 388), and acts amendatory thereof or supplementary thereto, all of which acts are commonly known and referred to as Reclamation Laws, and particularly pursuant to Section 10 of the Act of August 4, 1939, (53 Stat. 1187) among the UNITED STATES OF AMERICA, represented by the officer executing this Project Agreement, his duly appointed successor, or his duly authorized representative, hereinafter referred to as the "United States," UTAH DEPARTMENT OF TRANSPORTATION hereinafter referred to as "UDOT," and JORDAN VALLEY WATER CONSERVANCY DISTRICT, hereinafter referred to as "Jordan Valley."

WITNESSETH THAT:

WHEREAS, the United States has constructed and continues to own large projects for the storage and delivery of water; and

WHEREAS, the United States has contracted with various water user organizations to use, care for, operate and maintain its project facilities; and

WHEREAS, as a result, the United States holds real property interests (fee title and easements), hereinafter referred to as "Land Interests of the United States," located throughout the State of Utah which are acquired through the Bureau of Reclamation ("Reclamation"); and

WHEREAS, the United States owns certain project facilities located on the Land Interests of the United States, including the Jordan Aqueduct, and appurtenant structures and improvements, located in the vicinity of SR-154, Bangerter Highway corridor, hereinafter referred to as the "US Facilities"; and

WHEREAS, the Central Utah Project Completion Act (Titles II-VI of P.L. 102-575, as amended) ("CUPCA") was enacted on October 30, 1992; and

WHEREAS, Section 201(e) of CUPCA transferred Federal oversight responsibility for all phases of the Bonneville Unit of the Central Utah Project ("CUP") from Reclamation to the Secretary of the Interior ("Secretary"); and

WHEREAS, the Secretary desires to use Reclamation's engineering and technical services expertise to assist in the actions described herein; and

WHEREAS, UDOT, an agency of the State of Utah, constructed and continues to construct, operate, maintain, reconstruct, and rehabilitate highways throughout the State of Utah for the purpose of providing public transportation; and

WHEREAS, the parties entered into a Memorandum of Agreement 05-LM-40-02720 September 26, 2005, attached as Exhibit A; and

WHEREAS, UDOT will award a design–build contract to a third party, ("Design-Builder"), for the highway project identified as Project No. S-0154(12)11 4 Interchanges on Bangerter Highway (PIN 12566), in Salt Lake County, Utah, hereinafter referred to as the "Highway Project"; and

WHEREAS, UDOT shall require by contract that the Design-Builder administer construction of the Highway Project, including quality control; and

WHEREAS, the Highway Project necessitates expenditures consisting of design engineering and construction for protection of, or encroachment on, or impacts to, or relocation of Land Interests of the United States and/or US Facilities on the Highway Project, hereinafter referred to as "Work"; each encroachment or impact or relocation will be the subject of a separate agreement; and

WHEREAS, it is the desire of UDOT for the Design-Builder to construct the Work within a tightly controlled schedule that includes completion deadlines; and

WHEREAS, Jordan Valley and the Metropolitan Water District of Salt Lake & Sandy ("Metropolitan Water District") are contractors of the United States, and they care for, operate and maintain Jordan Aqueduct Reaches 2 and 3 ("JA-2" and "JA-3"). These water districts have the right to the capacity of JA-2 and JA-3 (5/7ths Jordan Valley and 2/7ths Metropolitan Water District). The day-to-day care, operation and maintenance of JA-2 and JA-3 have been delegated to Jordan Valley for the benefit of both districts; and

WHEREAS, the United States, its contractors, agents, and assigns will inspect and accept the Work as appropriate to accommodate the Highway Project; and

WHEREAS, for the purpose of expediting the Highway Project, any Work that will impact or encroach on Land Interests of the United States and/or US Facilities will require a separate encroachment or license agreement; and

WHEREAS, it is the desire of UDOT, the United States, and Jordan Valley to enter into this Project Agreement with the understanding that future agreements may be entered into covering Work to be accomplished by UDOT at specific Highway Project locations ("Supplemental Agreements"); and

WHEREAS, in accordance with Utah Code § 72-6-116(3)(a)(ii), UDOT will pay the cost of relocation of US Facilities located on Land Interests of the United States in compliance with 23 C.F.R. §645, subpart A; and

WHEREAS, in accordance with 23 C.F.R. § 645, subpart A, the United States has determined, with the concurrence of UDOT, that accrued depreciation credit is not required as a result of the Work; and

WHEREAS, the US Facilities convey drinking water that serves the residents of Salt Lake County.

NOW, THEREFORE, for good and valuable consideration, the sufficiency of which is hereby acknowledged, the parties agree as follows.

1. SEVERABILITY: Each provision of this Project Agreement shall be interpreted in such a manner as to be valid under applicable law, but if any provision of this Project Agreement shall be deemed or determined by competent authority to be invalid or prohibited hereunder, such provision shall be ineffective and void only to the extent of such invalidity or prohibition, but shall not be deemed ineffective or invalid as to the remainder of such provision or any other remaining provisions, or of the Project Agreement as a whole.

2. HOLD HARMLESS:

a. In consideration of the United States agreeing to encroachment upon the Land Interests of the United States by UDOT, UDOT hereby agrees to indemnify and hold the United States, its officers, agents, employees, and assigns harmless from any and all claims whatsoever for personal injuries or damages to property when such injuries or damages directly or indirectly arise out of UDOT or its Design-Builder's Work concerning the Highway Project's construction, maintenance, repair, use or the presence of the Highway Project upon the Land Interests of the United States; provided, however, that nothing in this Project Agreement shall be construed as releasing the United States from responsibility for its own negligence. Nothing herein shall be deemed to increase the liability of the United States beyond the provisions of the Federal Tort Claims Act, Act of June 25, 1948, 62 Stat. 989 (28 U.S.C. §1346(b), 2671 et seq.) or other applicable law. Nothing in this Project Agreement shall be construed as a waiver by UDOT of the provisions of the Governmental Immunity Act of Utah (Utah Code Ann. §§ 63G-7-101 et seq.). UDOT's obligation to indemnify shall be limited to the negligence claims allowed by the Federal Tort Claims Act.

b. In consideration of the United States agreeing to UDOT encroaching upon the Land Interests of the United States, UDOT agrees that the United States shall not be responsible for any damage caused to the Highway Project or related facilities of UDOT, unless such damage is caused by the negligence of the United States or by its contractors, officers, agents, employees or assigns as determined under the provisions of the Federal Tort Claims Act. UDOT hereby releases the United States, its officers, employees, agents, and assigns from liability for any and all loss or damage of every description or kind whatsoever which may result to UDOT from the construction, operation, and maintenance of the Highway Project upon Land Interests of the United States; provided that nothing in this Project Agreement shall be construed as releasing the United States from liability for its own negligence as determined under the provisions of the Federal Tort Claims Act.

c. UDOT and Jordan Valley are both governmental entities subject to the Utah Governmental Immunity Act. Each party agrees to indemnify, defend, and save harmless the other party from and against all claims, suits and costs, including attorneys' fees, for injury or damage of any kind, arising out of its negligent acts, errors or omissions and the negligent acts, errors or omissions of its officers, agents, contractors or employees in the performance of this Project Agreement. Nothing in this Project Agreement is intended to create additional rights for third parties or to waive any of the provisions of the Utah Governmental Immunity Act. The

obligation to indemnify is limited to the dollar amounts set forth in the Utah Governmental Immunity Act, provided the Act applies to the action or omission giving rise to indemnification under this subparagraph. The indemnification in this subparagraph shall survive the expiration or termination of this Agreement.

3. PROTECTION OF UNITED STATES INTERESTS: UDOT shall comply with all applicable laws, ordinances, rules, and regulations enacted or promulgated by any Federal, State, or local governmental body having jurisdiction over an issue applicable to the Highway Project.

4. ACCESS: The United States and Jordan Valley reserve the right of reasonable access for them and their respective contractors, officers, agents, employees, and assigns to make investigations of all kinds, dig test pits and drill test holes, and to survey for and construct, use, operate, and maintain US Facilities and other improvements related to or connected to JA-2 and JA-3. However, the United States and Jordan Valley and their respective contractors, officers, agents, employees, and assigns shall not access or perform any work on UDOT's right-of-way unless a permit is obtained from UDOT and such permit holder and its contractors, officers, agents, employees, and assigns comply with the permit requirements. The United States and Jordan Valley, and their respective contractors, officers, agents, employees, and assigns shall have the right to enter UDOT's right-of-way in the event of any emergency to make repairs required to prevent loss of life or significant damage to property. The party exercising such right of emergency access and its contractors, officers, agents, employees, and assigns must 1) provide notice to UDOT of entry onto the right-of-way via UDOT's right-of-way and permits officers as soon as practicable but in no event more than 24 hours after entering the right-of-way; and 2) follow guidelines for traffic control as outlined in the Manual of Uniform Traffic Control Devices (MUTCD).

5. PROJECT COORDINATION — FOR IMPACTS TO LAND INTERESTS OF THE UNITED STATES AND US FACILITIES:
   a. During the development of the Highway Project design, UDOT will consult with Jordan Valley to determine if conflicts, encroachments, and interference with Land Interests of the United States and US Facilities can be avoided. The United States agrees that Jordan Valley will be the designated point of contact for UDOT and its Contactor to consult and coordinate with during the Highway Project. Jordan Valley will consult and coordinate with the United States and the Metropolitan Water District as necessary during the Highway Project.

   b. If conflicts, encroachments, or interference with Land Interests of the United States and US Facilities are necessary and/or cannot be reasonably avoided, UDOT will

identify the extent of the conflict, encroachment, or interference and propose a solution. In the event of a relocation of US Facilities, the location to which such facilities are to be relocated must be acceptable to the United States and Jordan Valley.

c. The United States, Jordan Valley, and UDOT have determined locations of encroachment on Land Interests of the United States and US Facilities which are shown in attached Exhibit B – Bangerter Interchanges Protect-in-Place.

6. DUTIES TO BE INCORPORATED INTO DESIGN-BUILD CONTRACT

a. UDOT's Responsibilities

i. UDOT may inspect Work items as they pertain to its Highway Project, and UDOT shall be responsible for construction, relocation, or modification of US Facilities.

ii. UDOT will remove certain longitudinal third-party utilities outside of the Land Interests of the United States upon completion of the 5400 South interchange Project Work as shown in Exhibit C – BOR Easement - Utility Relocation.

iii. If Work is required on US Facilities, UDOT shall be responsible to identify the conflicts, encroachments, or interference, provide Jordan Valley with Highway Project design plans as early as possible, and schedule and meet with Jordan Valley to review the details of design, construction, estimates of cost, and scheduling for Work at specific locations within the Highway Project.

iv. UDOT shall advise Jordan Valley of the approximate time required for completion of Work and shall diligently pursue its Work so that completion can be accomplished according to the pre-determined time schedule as negotiated by UDOT and Jordan Valley.

v. UDOT shall provide to Jordan Valley for final approval any design documents addressing any conflict, encroachment, or interference with Land Interests of the United States and US Facilities.

1. Design Preparation and Review Time: Jordan Valley requires up to one (1) week for design review after UDOT submits a relocation request and design documents.
2. Address review documents to JT Cracroft, Property Manager, Jordan Valley.
3. UDOT shall provide facility design documents incorporating Jordan Valley's specifications and drawings, which may be obtained from JT Cracroft.

vi. UDOT shall provide all of the supervision, labor, tools, equipment, and materials for the Work. Jordan Valley shall approve, in advance, Work on Land Interests of the United States and US Facilities. Work by UDOT may include purchasing and hauling materials; cutting asphalt; trenching, equipment installation; backfilling; compacting; clean-up; and completing US Facilities to meet the requirements of this Project Agreement. UDOT shall perform the Highway Project in stages, including facility tie-in and putting US Facilities into service, to minimize disruption to the public and to the United States and its contractors.

vii. Specifications: The specification which is of the higher standard between those of UDOT and Jordan Valley will control where duplication occurs. UDOT will provide to Jordan Valley as-constructed plans in AutoCAD and PDF format upon completion of the Work.

viii. Water Service Disruption: Jordan Valley and the Metropolitan Water District rely upon the operation of JA-2 and JA-3, among other facilities, to provide water service to their respective customers. Uncoordinated or prolonged disruption to the operation of any facility may cause Jordan Valley and the Metropolitan Water District to incur additional expense, including but not limited to the purchase of replacement water, the loss of revenues from water sales, purchase payments made on take-or-pay water contracts although Jordan Valley or the Metropolitan Water District cannot take or use the contract water, additional pumping costs, additional treatment costs, and damages paid by Jordan Valley and the Metropolitan Water District for breach of contract with customers for failure to provide them water. Therefore, United States facilities may be taken out of service by UDOT only pursuant to the following schedule notwithstanding any other provision of this Agreement to the contrary:

Facility*	Maximum time facility may be out of service*	Time period when service disruption is permitted	Minimum prior notice to Jordan Valley to request a service disruption
JA-2	15 days	Nov. 1 thru Nov. 30	30 days
JA-3	20 days	Dec. 1 thru following Jan. 15 Sole exception: Dec. 1, 2017 thru Jan. 31, 2018	30 days

*Note: JA-2 and JA-3 cannot be taken out of service at the same time.

UDOT shall reimburse Jordan Valley and the Metropolitan Water District for their actual respective damages for UDOT's breach of the terms of this subparagraph 6(a)(viii).

ix. Construction Inspection: UDOT shall not bury or conceal any portion of the Work that has not been inspected and accepted by Jordan Valley.

x. Cost Allocations: UDOT shall pay the cost of relocation of US Facilities located on Land Interests of the United States in compliance with 23 C.F.R. §645, subpart A. UDOT is 100% responsible for traffic control and surveying.

xi. Inspection of the Work by Jordan Valley shall not relieve UDOT from the obligation to perform all Work in compliance with Jordan Valley's specifications and any other obligations under this Project Agreement.

xii. UDOT shall accomplish the Work on US Facilities in accordance with the plans and specifications approved by Jordan Valley. Any changes or additions to the plans and specifications shall be approved in writing by Jordan Valley.

b. United States and Jordan Valley Responsibilities

i. The United States and Jordan Valley agree to the allocation of responsibilities, and commitments regarding UDOT specified in this Project Agreement. In case of a discrepancy or conflict between the information contained in this Project Agreement and any subsequently executed agreements, the subsequently executed agreements shall govern.

ii. The United States will allow certain third-party utilities to remain longitudinally within the Land Interests of the United States during the Highway Project as shown in Exhibit C – BOR Easement - Utility Relocation. Such third-party utilities must be relocated outside of the Land Interests of the United States upon completion of the 5400 South interchange.

iii. Jordan Valley will perform the necessary design reviews prior to the start of Work.

iv. The United States and Jordan Valley will inspect UDOT's Design-Builder's Work, and will provide UDOT's Project Representative and the Design-Builder's Project Representative with information covering any problems or concerns the United States and Jordan Valley may have with acceptance of the facilities. The failure of either the United States or Jordan Valley to find a deficiency during inspection of the Work does not relieve UDOT or its Design-Builder from performing Work that complies with the plans and specifications.

v. The United States or Jordan Valley shall notify UDOT's Project Representative of any deficiencies in the Work on US Facilities. UDOT's Project Representative will respond to the concerns within 24 hours of notification.

vi. In the event the United States or Jordan Valley discovers any deficiencies in the Work, including any failure to comply with plans and specifications as required above, Jordan Valley shall make recommendations to UDOT's Project Representative to stop the Work or correct the deficiencies. Jordan Valley and UDOT will immediately thereafter meet to determine a plan to bring the Work into compliance. Any such plans to cure shall be approved by Jordan Valley. Jordan Valley may notify UDOT to stop the Work immediately upon discovery of safety deficiencies during Work in progress.

7. NOTIFICATION BEFORE BEGINNING CONSTRUCTION WORK: The required notification periods as indicated in this section are for the commencing of any Work provided for by Supplemental Agreements to allow sufficient time for Jordan Valley to schedule an inspection during the Work.

   a. Jordan Valley maintains an 8:00 a.m. to 5:00 p.m., Monday through Friday work week, not including observed holidays. All Work schedule notifications shall be given during the identified time period to JT Cracroft, Property Manager, Jordan Valley.
   b. Jordan Valley requires a minimum of 3 working days' notification prior to beginning weekend and/or night Work.
   c. Jordan Valley requires a minimum of 2 working days' notification to schedule an inspection request.
   d. Jordan Valley requires a minimum of 14 calendar days' notification prior to beginning Work on or affecting existing US Facilities (including limitations to access to US Facilities).
   e. Jordan Valley requires a minimum of 30 calendar days' notification before Work is started on any betterments in order to schedule full-time inspection personnel.

8. TRAFFIC CONTROL AND SURVEYING: UDOT will provide all coordination, traffic control per UDOT standards and Manual on Uniform Traffic Control Devices (MUTCD), and required surveying (line and grade), and will verify the proposed location of relocated US Facilities prior to them being placed in their final position. UDOT will coordinate with Jordan Valley for survey staking. The United States and Jordan Valley shall not be responsible for the costs of any coordination, traffic control, or surveying.

9. FORCE MAJEURE: If, as a result of force majeure, either UDOT, Jordan Valley, or the United States is wholly or partially unable to meet its respective obligations under this Project Agreement other than for payment of monies due, the non-performing party shall give the other parties reasonable notice of such situation, describing it in reasonable

detail. Thereupon, the party giving the notice shall be released from its obligations under this Project Agreement to the extent that the force majeure prevents performance of obligations during the continuance of the force majeure. The party having the force majeure shall attempt to cure and mitigate the force majeure as quickly as possible, but if rectification is not possible, the parties shall negotiate an acceptable solution. The term "force majeure" means any cause or condition which is not reasonably within the control of the party claiming the suspension.

10. ACCEPTANCE OF THE WORK: The United States and Jordan Valley, as applicable, agree that upon completion and final inspection of construction, to accept, own (in the case of the United States), and maintain the relocated facilities covered herein at no further cost to UDOT and will notify UDOT of the acceptance.

11. COVENANT AGAINST CONTINGENT FEES: UDOT warrants that no person or agency has been employed or retained to solicit or secure this Project Agreement upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established agencies maintained by UDOT for the purpose of securing business. For breach or violation of this warranty, the United States and Jordan Valley shall have the right to annul this Project Agreement without liability or in their discretion to require UDOT to pay the full amount of such commission, percentage, brokerage, or contingent fee.

12. HAZARDOUS MATERIALS: UDOT shall comply with all applicable Federal, State, and local laws and regulations, and United States policies and directives and standards, existing or hereafter enacted or promulgated, concerning any hazardous material that will be used, produced, transported, stored, or disposed of on or in Federal lands, waters or facilities. Additional requirements related to specific impacts to US Facilities may be identified in Supplemental Agreements to this Project Agreement.

13. CONTACTS:
    a. Jordan Valley Water Conservancy District: Jordan Aqueduct Reaches 2 & 3
       JT Cracroft; Property Manager; 8215 South 1300 West, West Jordan, UT 84088; 801-565-4300; jtc@jvwcd.org
    b. United States Representative: Jordan Aqueduct Reaches 2 & 3
       i. Kieth Marvin; Lands Group; 302 East 1860 South, Provo, UT 84606; 801-379-1193; kmarvin@usbr.gov
       ii. Alan Christensen, PE; Civil Engineer; 302 East 1860 South, Provo, UT 84606; 801-379-1098; achristensen@usbr.gov
    c. UDOT Project Representative:

Alana Spendlove; Region 2 Utility and Railroad Leader; 2010 South 2760 West, SLC, UT 84104; 801-887-3462; aspendlove@utah.gov

d. Metropolitan Water District of Salt Lake & Sandy:

Wayne Winsor; Engineering and Maintenance Manager; 3430 East Danish Road, Cottonwood Heights, UT, 84093; 801-942-9631; winsor@mwdsls.org

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be executed the day and year first written above.

UNITED STATES OF AMERICA

Approved: Regional Solicitor's Office

By: Kib Jacobson
Brent Rhees acting for
Regional Director
Date: 9/8/16

ACKNOWLEDGMENT OF THE UNITED STATES

State of Utah)

) ss.

County of Salt Lake)

On this 8th day of September, 2016, personally appeared before me Kib Jacobson acting, known to me to be the Regional Director of the Upper Colorado Region, Bureau of Reclamation, United States Department of Interior, the signer of the above instrument, who duly acknowledged to me that he executed the same on behalf of the United States of America pursuant to authority delegated to him.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year first above written.

(NOTARY SEAL) Notary Public BETTY J. REED Commission #664009 My Commission Expires February 25, 2017 State of Utah

Betty J. Reed
Notary Public

S-0154(12)11
4 Interchanges on Bangerter Highway
CID 71939 PIN 12566

UTAH DEPARTMENT OF
TRANSPORTATION

By: _____
Bryan Adams
Region Two Director
Date: 8/26/16

ACKNOWLEDGMENT OF UTAH DEPARTMENT OF TRANSPORTATION (UDOT)

State of UT)

) ss.

County of Salt Lake)

On this 26 day of August, 2016, personally appeared before me Bryan Adams, known to me to be the Region 2 Director of UDOT, the signer of the above instrument, who duly acknowledged to me that he executed the same on behalf of UDOT pursuant to authority delegated to him/her.

(NOTARY SEAL) Notary Public

Michael Deryl Davis
Notary Public - State of Utah
Commission #688722
Expires 5/02/2020

9-8-16
CONTRACT ADMINISTRATOR
COMPTROLLERS OFFICE

S-0154(12)11
4 Interchanges on Bangerter Highway
CID 71939 PIN 12566

JORDAN VALLEY WATER
CONSERVANCY DISTRICT

By: Gary Swensen
Title: Chair Board of Trustees
Date: August 30, 2016

ACKNOWLEDGMENT OF JORDAN VALLEY WATER CONSERVANCY DISTRICT
(Jordan Valley)

State of UT)

) ss.

County of Salt Lake)

On this 30th day of August, 2016, personally appeared before me Gary Swensen, known to me to be the Chair of the Board of Trustees of Jordan Valley Water Conservancy District, the signer of the above instrument, who duly acknowledged to me that he executed the same on behalf of Jordan Valley Water Conservancy District pursuant to authority delegated to him/her.

(NOTARY SEAL)

Beverly M Parry
Notary Public

BEVERLY M PARRY
NOTARY PUBLIC - STATE OF UTAH
COMMISSION# 681765
COMM. EXP. 02-20-2019

CONCUR:

METROPOLITAN WATER DISTRICT OF SALT LAKE & SANDY

By: [illegible]
Title: General Manager

EXHIBIT A

Memorandum of Agreement 05-LM-40-02720 September 26, 2005

Contract No. 05-LM-40-02720

MEMORANDUM OF AGREEMENT

Between

THE UNITED STATES OF AMERICA,
DEPARTMENT OF THE INTERIOR,
BUREAU OF RECLAMATION

And

THE UTAH DEPARTMENT OF TRANSPORTATION

REGARDING USE OF RECLAMATION LANDS FOR HIGHWAY PROJECTS

THIS Memorandum of Agreement (Agreement), dated this 26th day of September, 2005, in pursuance of the Act of June 17, 1902 (32 Stat. 388), and acts amendatory thereof or supplementary thereto, particularly Section 10 of the Reclamation Project Act of 1939 (53 Stat. 1196; Act of August 18, 1950; 64 Stat. 463; 43 U.S. C. § 387), between THE UNITED STATES OF AMERICA, and its assigns, hereinafter referred to as the United States, acting through the BUREAU OF RECLAMATION, hereinafter referred to as Reclamation, and the UTAH DEPARTMENT OF TRANSPORTATION, hereinafter referred to as UDOT;

WHEREAS, Reclamation, an agency of the United States Government, has constructed and continues to own large projects for the storage and delivery of water; and

WHEREAS, Reclamation, has contracted with various water user organizations to operate and maintain its project facilities; and

WHEREAS, as a result, the United States holds real property interests (fee title and easements) in real property located throughout the State of Utah which it acquired through Reclamation in connection with Reclamation's projects, and which continue to be administered by Reclamation for authorized project purposes; and

WHEREAS, UDOT, a department of the Utah State Government, constructed and continues to construct, operate, maintain, reconstruct, and rehabilitate highways throughout the State of Utah for the purpose of providing public transportation; and

WHEREAS, as a result, UDOT frequently needs to obtain easements over United States' lands administered by Reclamation for various highway construction projects; and

WHEREAS, Reclamation recognizes that UDOT's highway projects serve a public need and have public support, and such easements, if granted by the United States, would be used by UDOT for public benefit; and

WHEREAS, as a result of UDOT's highway projects, Reclamation frequently receives benefit of improved access to United States' lands and facilities which Reclamation administers; and

WHEREAS, as a result of UDOT's highway projects, Reclamation frequently receives benefit from enhanced safety on highways which are used by Reclamation, its employees and contractors, and the general public for access to United States' lands and facilities, as well as from diminished potential for claims of liability resulting from public use of said lands and facilities.

WHEREAS, as a result of UDOT's highway projects, the general public benefits from improved access and safety; and

WHEREAS, UDOT recognizes and agrees that it will be required to comply with environmental laws, including the National Environmental Policy Act, for each of its highway projects, and that it must obtain approval of said compliance by each and every required agency; and

WHEREAS, Reclamation and UDOT wish to cooperate for the best public good to facilitate each agency's respective missions; and

WHEREAS, Reclamation, acting pursuant to 43 CFR 429.6(c) has authority to waive all or part of administrative costs which may be incurred in issuing easements, as follows:

> *All* [administrative] *fees and costs may be waived or reduced at the discretion of the Regional Director, when . . . (3) the holder provides without charges, or at a reduced charge, a valuable service to the public or to the programs of the Department of the Interior.*

WHEREAS, Reclamation, acting pursuant to 43 CFR 429.4 has authority to waive all or part of fair market value compensation for issuing said easements, as follows:

> *Rights of use requested by other Federal or other governmental agencies will be granted with fair market value reimbursement unless a reasonable opportunity exists for the exchange of rights-of use privileges, and there exists an interagency agreement providing for such exchange.*

WHEREAS, Reclamation, acting pursuant to 43 CFR 429.4 has authority to waive all or part of fair market value compensation for issuing said easements, as follows:

Rights of use requested by nonprofit organizations or nonprofit corporations may be provided with no charge being made for the value of these rights-of-use when it is determined that the use will not interfere with the authorized current or planned use of the land by Reclamation.

NOW THEREFORE, whenever UDOT desires the United States to grant an easement for a UDOT highway project across United States lands administered by Reclamation, UDOT and Reclamation agree to follow the following general procedures:

1. UDOT shall submit all request(s) for grants of easement to Reclamation following the format attached as, Exhibit "A".

2. UDOT shall provide Reclamation with an environmental compliance document covering each request. Reclamation shall review and, if appropriate, approve said environmental compliance document prior to granting any easements to UDOT.

3. Reclamation shall waive reimbursement from UDOT for both administrative costs and compensation for fair market value for the granting easements to UDOT as long as UDOT's highway project meets requirements for such a waiver.

4. UDOT and Reclamation, upon mutual agreement, may enter into a temporary contract to allow UDOT to occupy and use areas it requires immediately, prior to the execution of a final contract and grant of easement.

5. Reclamation may alter the format of said easements prior to approval and signing of final contracts and grants of easement, but the legal descriptions and nature of use (perpetual easement) shall be the responsibility of UDOT and shall remain substantially the same.

6. Both parties agree to complete and execute all final contracts and grants of easement in a timely manner.

7. UDOT will obtain concurrence of any water user organization having contractual responsibility for operation and maintenance of the Reclamation project which is affected by UDOT's highway project on all temporary or final contracts.

8. UDOT agrees to conduct all activities within the any easement to be granted to UDOT by the United States in strict accordance with the Protective Criteria contained in Exhibit B attached hereto and by this reference made a part hereof.

9. UDOT shall not remove, relocate, damage, or destroy any facility or structure of the United States without first having entered into a separate contract with the United States covering such issues as design and specifications, funding, construction, and future operation and maintenance of said facility or structure.

10. UDOT shall notify the affected water user organization by telephone Five (5) days in advance of its intent to commence any construction operations.

11. UDOT agrees to reduce impact to soil, vegetation, wildlife and visual resources within the easement area by limiting the amount of surface disturbance.

12. All United States land areas (except portions presently covered by asphalt surfacing) where soils and surface materials are disturbed through actions incident to construction, operation, and maintenance shall be restored by the UDOT to their natural state insofar as practicable by water barring, scarifying, leveling, reseeding, or other practices as prescribed by the United States and to its satisfaction.

13. Unless authorized in writing by the United States, travel by UDOT, its agents or assigns is limited to the area covered by the easements and existing public roads.

14. Disturbance of any improvements encountered during construction, maintenance, and operation of the easements shall be kept to an absolute minimum. UDOT shall immediately restore any damaged improvements at least to their former state. Functional use of these improvements must be maintained at all times.

15. During construction, operation, and maintenance, UDOT shall be particularly alert to take all reasonable and necessary precautions to protect and preserve historic or prehistoric ruins and artifacts on or adjacent to the easements. Should sites, ruins, or artifacts be discovered during these operations, UDOT will immediately suspend work involving the area in question, and advise the United States of suspected values. UDOT shall promptly have the area inspected to determine significance of values and consult with the United States on appropriate actions to follow (recovery, etc., and resumption of work). Cost of any recovery work shall be borne by the UDOT. UDOT shall provide the United States with a copy of any cultural resources survey reports concerning sites located on the temporary easement and shall develop a mitigation plan acceptable to the State Historic Preservation Officer (SHPO) for those significant sites subject to an adverse impact. All objects of antiquity recovered from public lands are the property of the United States and shall be turned over to Reclamation. UDOT is responsible for obtaining required SHPO clearance for any additional survey and report completed.

16. Within sixty (60) days after conclusion of construction operations, all construction materials and related litter and debris, including vegetative cover accumulated through land clearing, shall be disposed of by UDOT in an appropriate manner (State of Utah approved sanitary landfill).

17. UDOT shall designate a representative for field operations who shall be the sole representative of UDOT and UDOT's contractors in dealings with the United States, and shall provide their name, address, and telephone number to the United States and the the Association prior to commencement of construction.

18. UDOT shall comply with existing County, State, and Federal laws concerning the protection and preservation of game, and non-game wildlife species.

19. UDOT shall comply with all State and Federal regulations and laws pertaining to water quality, public health and public safety.

20. UDOT shall be responsible for prevention and suppression of all uncontrolled fires that are caused by UDOT, its agents or assigns.

21. Subject to applicable Federal and State law, UDOT agrees to indemnify and hold harmless the United States against any and all loss or damage and from any liability on account of personal injury, property damage, or claims for personal injury or death arising from its occupancy or use of United States lands or any other rights covered under any temporary or final contract and grant of easement.

22. It is acknowledged and agreed by the parties hereto that, prior to start of construction by UDOT, the United States will have inspected the land area covered by the easements and found it to be free from contamination by hazardous materials of any kind. Removal and clean-up of future contamination, including broken asphalt, resulting from UDOT's use of the easements shall be the sole responsibility of UDOT. Removal and clean-up of any such future contamination, including broken or damaged asphalt, shall be at UDOT's sole expense and shall be accomplished in compliance with all applicable Federal and State laws and regulations.

23. UDOT agrees that in all operations conducted within the easements, it shall comply with applicable State and Federal laws and regulation concerning the use of poisonous substances, including insecticides, herbicides, fungicides, rodenticides, and other similar substances. Prior to the use of such substances on or near the easements, UDOT shall obtain from the United States, approval of a written plan of such use. The plan shall state the type and quantity of material to be used, the pest to be controlled, the method of application, or such other information as may be required. All use of such substances on or near the easements shall be in accordance with the approved plan. If the use of a poison is prohibited by the Environmental Protection Agency (EPA), it shall not be used. If use of a poison is limited by the EPA, it shall be used only in accordance with that limitation.

24. Any proposed additional or subsequent uses by UDOT or others of lands or facilities not covered by the easements must be authorized in advance, in writing by the United States. Additional construction, relocation, or use of the easements that is not in accordance with temporary or final contracts shall not be initiated without prior written approval of the United States and the affected water user organization. Copies of this and other applicable contracts shall be available to construction, operation, and maintenance personnel, as well as personnel of the United States and the Association, during operations.

25. If UDOT violates the terms and conditions of this or any temporary or final contract, the United States shall provide written notice to UDOT describing the violation. Following receipt of said written notice, UDOT shall have 45 days in which to correct said violation. In the event that UDOT fails to correct said violation to the satisfaction of the United States within that time period, title to the easements shall revert to the United States, following written notice by the United States to UDOT.

26. UDOT warrants that no person or selling agency has been employed or retained to solicit or secure this Agreement upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by UDOT for the purpose of securing business. For breach or violation of this warranty, the United States shall have the right to annul this Contract and grant without liability.

27. No Member of or Delegate to Congress or Resident Commissioner shall be admitted to any share or part of this Agreement or to any benefit that may arise herefrom, but this restriction shall not be construed to extend to this instrument if made with a corporation or company for its general benefit.

28. The provisions of this Agreement shall run in favor of and bind the assigns of the United States and the successors and assigns of UDOT.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be executed the day and year first written above.

UNITED STATES OF AMERICA

By _____
Regional Director
Upper Colorado Region
Bureau of Reclamation
Department of the Interior

Approved:

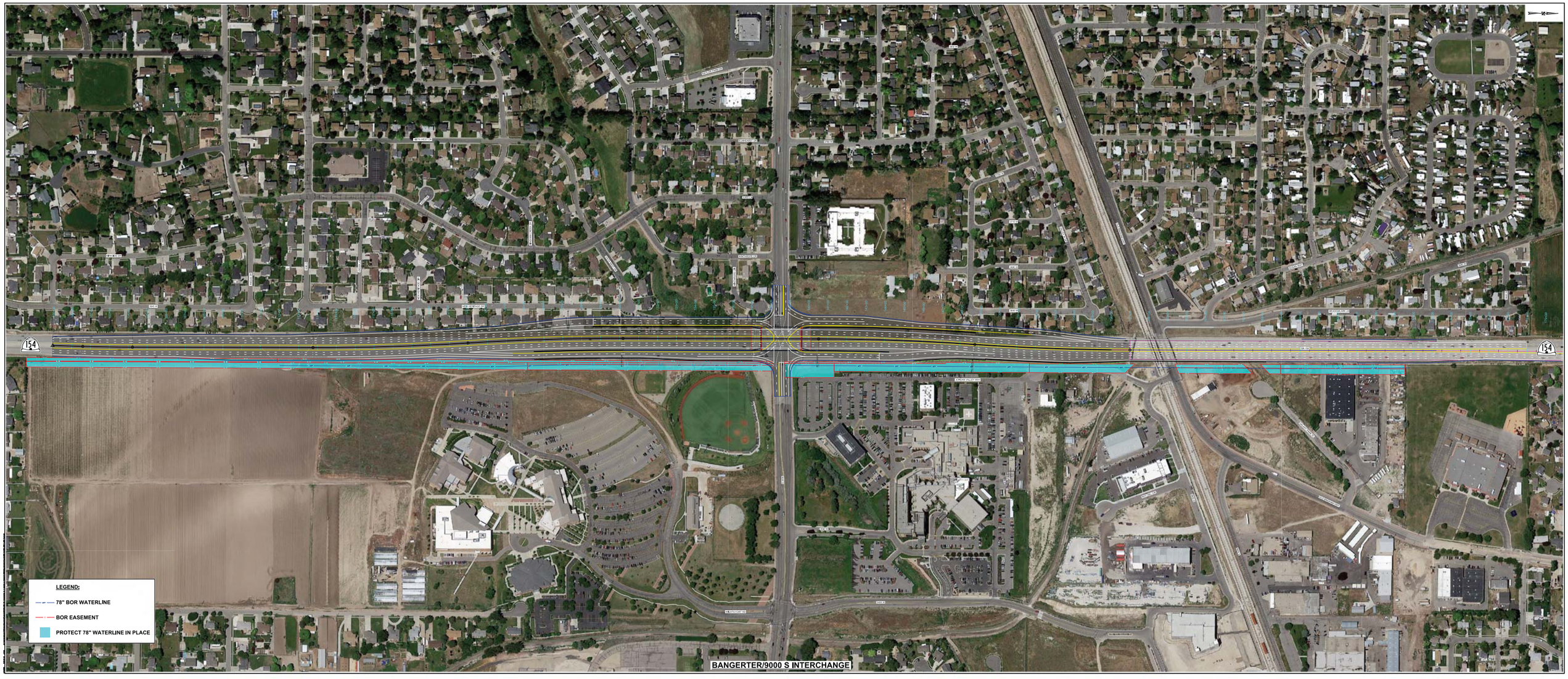
_____
Office of the Regional Solicitor

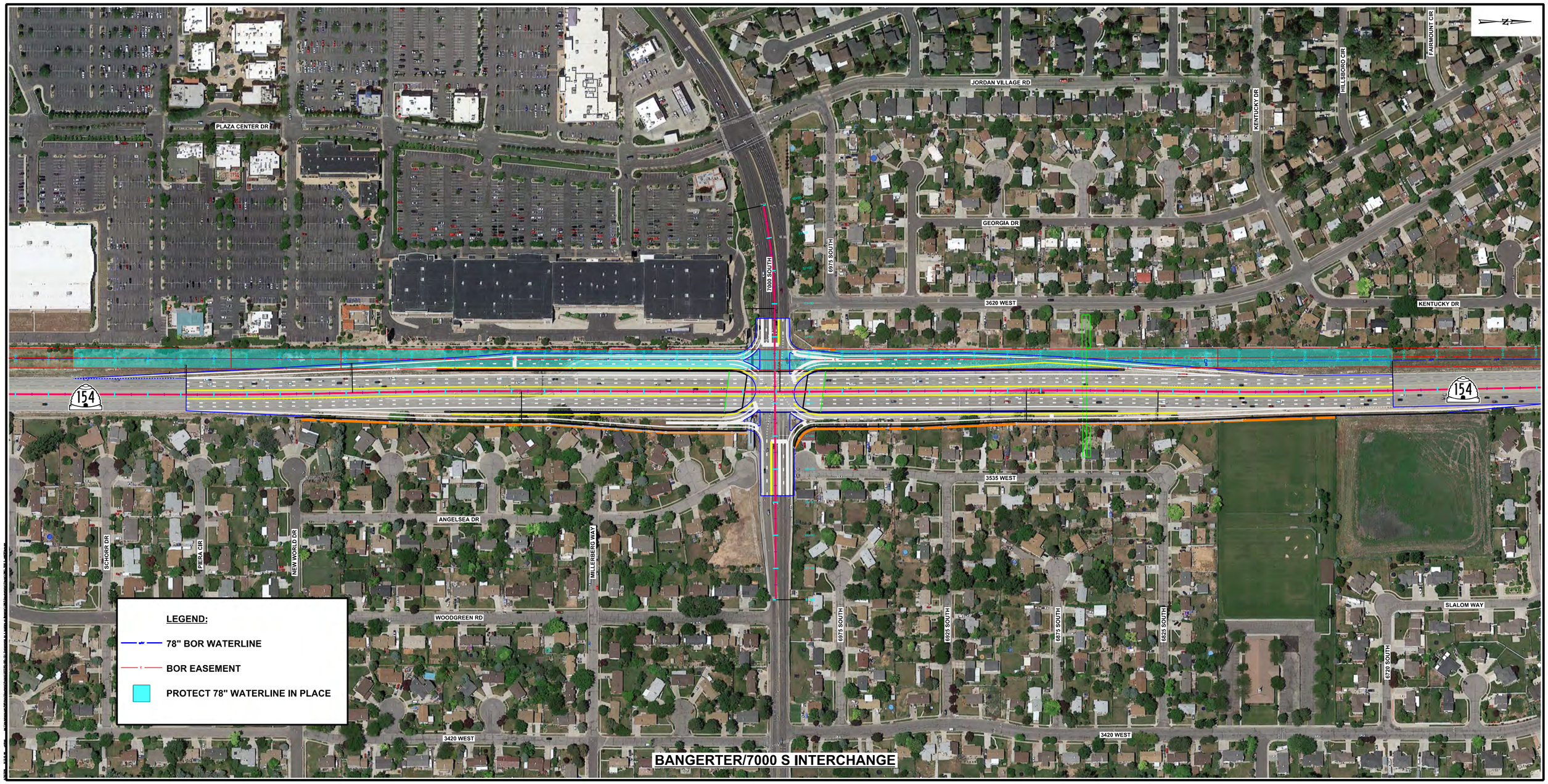
UTAH DEPARTMENT OF
TRANSPORTATION

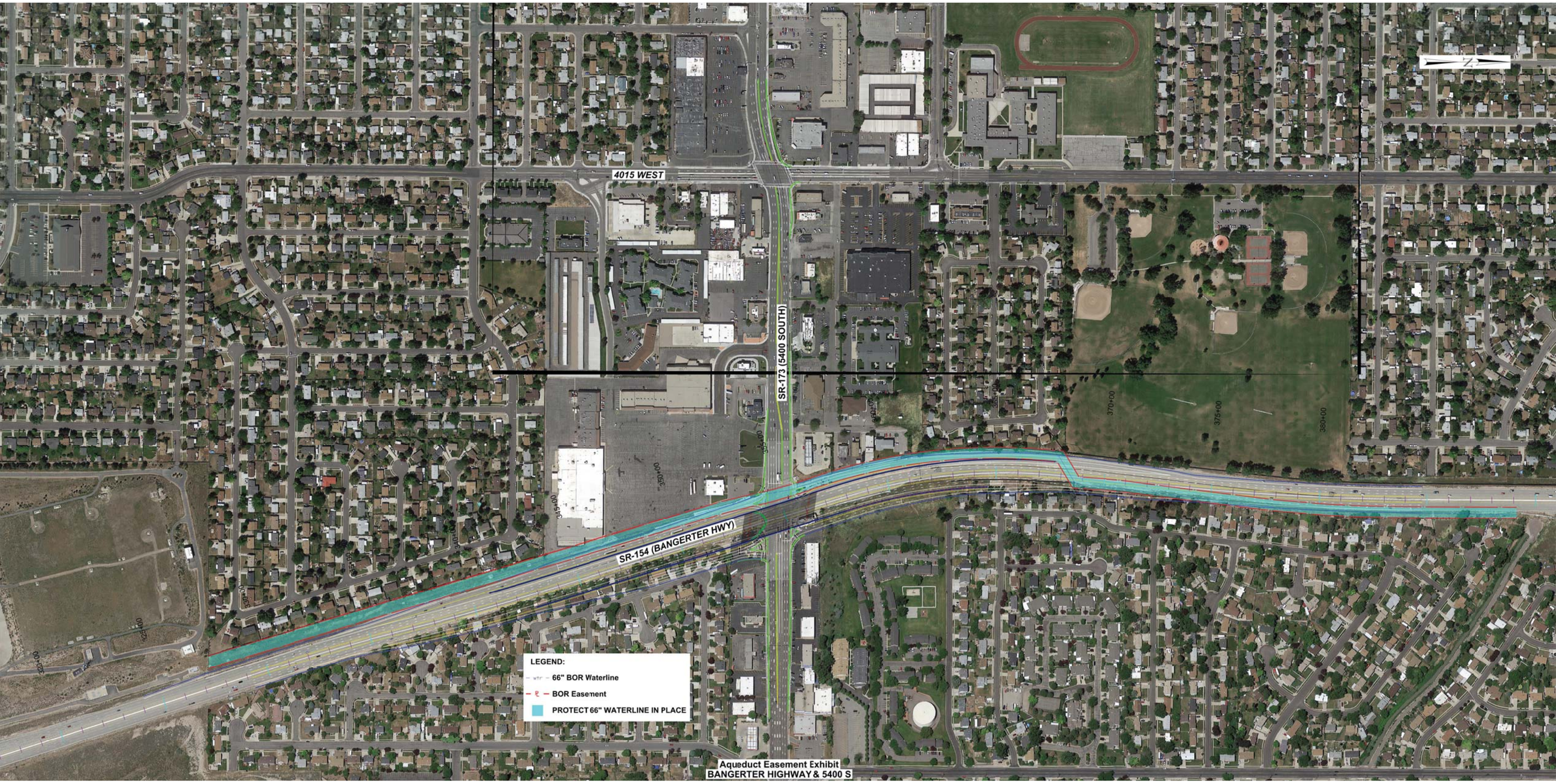
_____
for Lyle McMillan
Director of Right of Way

EXHIBIT B

Bangerter Interchanges Protect-in-Place


LEGEND:
78" BOR WATERLINE
BOR EASEMENT
PROTECT 78" WATERLINE IN PLACE
BANGERTER/9000 S INTERCHANGE
154
154

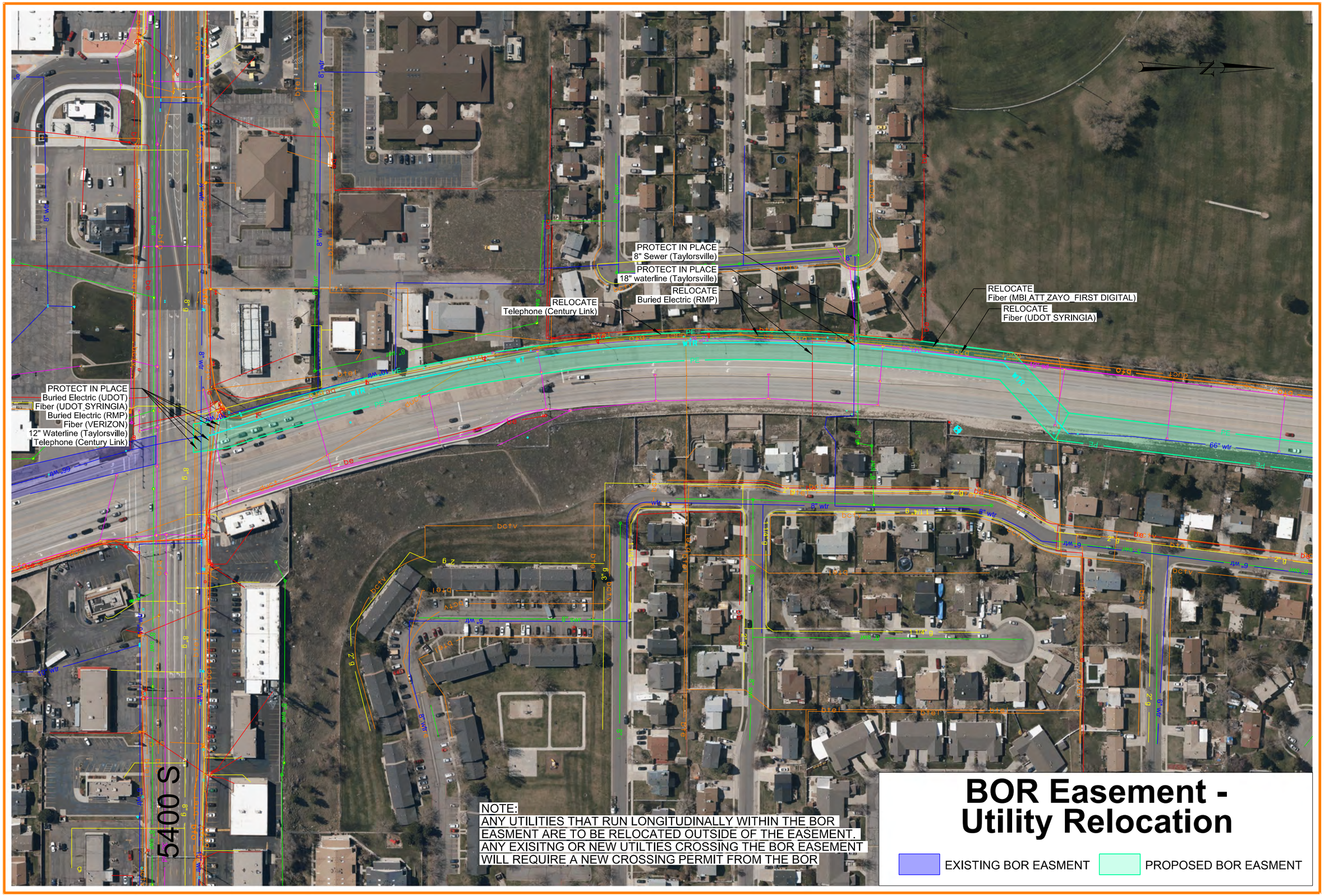

PLAZA CENTER DR
JORDAN VILLAGE RD
KENTUCKY DR
HILLSBORO CIR
FAIRMOUNT CIR
GEORGIA DR
7000 SOUTH
6975 SOUTH
3620 WEST
KENTUCKY DR
154
154
3535 WEST
ANGELSEA DR
SCHORR DR
PIERA CIR
NEW WORLD DR
MILLERBERG WAY
WOODGREEN RD
6975 SOUTH
6925 SOUTH
6875 SOUTH
6825 SOUTH
SLALOM WAY
6725 SOUTH
3420 WEST
3420 WEST
LEGEND:
78" BOR WATERLINE
BOR EASEMENT
PROTECT 78" WATERLINE IN PLACE
BANGERTER/7000 S INTERCHANGE



Aqueduct Easement Exhibit
BANGERTER HIGHWAY & 5400 S

EXHIBIT C

BOR Easement - Utility Relocation


PROTECT IN PLACE
8" Sewer (Taylorsville)
PROTECT IN PLACE
18" waterline (Taylorsville)
RELOCATE
Buried Electric (RMP)
RELOCATE
Telephone (Century Link)
RELOCATE
Fiber (MBI ATT ZAYO_FIRST DIGITAL)
RELOCATE
Fiber (UDOT SYRINGIA)
PROTECT IN PLACE
Buried Electric (UDOT)
Fiber (UDOT SYRINGIA)
Buried Electric (RMP)
Fiber (VERIZON)
12" Waterline (Taylorsville)
Telephone (Century Link)
5400 S
NOTE:
ANY UTILITIES THAT RUN LONGITUDINALLY WITHIN THE BOR EASMENT ARE TO BE RELOCATED OUTSIDE OF THE EASEMENT.
ANY EXISITNG OR NEW UTILTIES CROSSING THE BOR EASEMENT WILL REQUIRE A NEW CROSSING PERMIT FROM THE BOR
BOR Easement -
Utility Relocation
EXISTING BOR EASMENT
PROPOSED BOR EASMENT

WELBY JACOB WATER USERS COMPANY
MASTER UTILITY AGREEMENT

THIS MASTER UTILITY AGREEMENT, made and entered into this _____day of_____, 20_____, by and between the **Utah Department of Transportation**, ("UDOT"), and **Welby Jacob Water Users Company**, a Utah Non-Profit Corporation, Registered Corporation of the State of Utah, ("Company") each as ("Party") and jointly as ("Parties").

RECITALS

WHEREAS, UDOT is preparing to request proposals for and award a design-build contract for the highway project identified as Project Number S-0154(12)11, 4 Interchanges on Bangerter Highway in Salt Lake County, Utah, ("Project"); and

WHEREAS, UDOT's design-build contractor ("Design-Builder") will complete the design and administer construction of the Project; and

WHEREAS, UDOT has identified Company facilities within the limits of the Project which may necessitate the relocation, protection, or adjustment of the facilities, ("Utility Work"); and

WHEREAS, the Company desires for the Design-Builder to design and construct the Company's Utility Work necessitated by the Project; and

WHEREAS, the Company will perform the necessary review and approval for the design and construction of its Utility Work to accommodate the Project; and

WHEREAS, for the purpose of expediting any required Utility Work and reimbursement the Parties are entering into this Project Master Utility Agreement with the understanding that future supplemental agreements to this Agreement will be entered into covering Utility Work to be accomplished by the Company and UDOT at specific Project locations.

THIS AGREEMENT is made to set out the terms and conditions where under the Utility Work shall be performed.

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AGREEMENT

NOW THEREFORE, the Parties agree as follows:

1. **CONTACT INFORMATION**

UDOT's Project Representative is Alana Spendlove, UDOT Project Utility and Railroad Leader, telephone number (801) 887-3462, and e-mail aspendlove@utah.gov.

UDOT's Resident Engineer for 9000 South and 11400 South interchanges is Ken Talbot, telephone number (801) 360-8750, and e-mail kentalbot@utah.gov, or their designated representative, as assigned.

UDOT's Field Representative contact person will be identified in subsequent supplemental agreements.

Company's contact person is Darryl Lehmitz, telephone number (801) 718-3327, and e-mail darryllehmitz@yahoo.com.

After awarding the Project, UDOT will provide the Company with the Design-Builder contact information, hereinafter referred to as "Design-Builder Project Representative".

2. **AUTHORIZATION FOR DESIGN WORK**

In order to facilitate coordination and obtain technical information about the Company's facilities and requirements for inclusion in this Agreement and the request for proposals, UDOT gave the Company authorization for preliminary design engineering on August 9, 2016.

3. **SUBSURFACE UTILITY ENGINEERING**

UDOT has performed Subsurface Utility Engineering (SUE) within the limits of the Project. Additional SUE work to determine the precise location of underground facilities at specific, critical locations on the Project will be reviewed with the Company

4. **PROJECT COORDINATION**

Company and UDOT agree to have the Design-Builder include in the Project, items of Utility Work for the Company's facilities.

During the development of the Project design, the Company and UDOT, along with its Design-Builder, shall consult as necessary in an effort to determine if conflicts with the Company's facilities can be avoided. If Utility Work is required, UDOT will be responsible to propose and provide a location for the facilities. UDOT will provide the Company with Project design plans as early as possible, and will schedule and meet with the Company to review the design, construction, estimates of cost, and scheduling for the Company's Utility Work at specific locations on the Project to ensure maximum lead time for advance order of materials and work force scheduling.

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UDOT shall advise the Company of the approximate time required for completion of the Utility Work and shall diligently pursue its Utility Work so that completion can be accomplished according to the pre-determined time schedule negotiated by the Company and UDOT in the supplemental agreement issued hereto for a specific Project location. UDOT shall immediately notify the Company by phone call or email, of its discovery of any occurrence or unforeseen circumstances that would prevent the Company from completing its Utility Work according to the time schedule provided. In addition, UDOT shall describe the circumstances in writing within 24-hours of the discovery to the Company.

5. COMPANY REQUIREMENTS

UDOT will comply with the following Company Utility Work requirements:

a. Adhere to Company Encroachment Requirements to construct within or crossing Company right-of-way marked Exhibit "A" that is incorporated by reference.
b. Maintain full functionality of irrigation systems from April 1 through October 15 each calendar year, unless otherwise approved by the Company owner in writing.
c. Coordinate with the Company for water user scheduling as needed for Project Utility Work scheduling.
d. The Company will require a 2 week review and approval period for proposed designs, estimate review, and internal approvals after design plans and estimates are delivered to the Company.
   i. Include Company's engineer in all engineer review, preparation of agreements, and construction activities and notifications:
      Franson Civil Engineers
      Attn: Vince Hogge
      1276 South 820 East, Suite 100 American Fork, UT 84003
      Telephone: (801) 756-0309 and email: vhogge@fransoncivil.com
e. See Supplemental Agreement section below for time limitations and Weir/Turnout requirements.

6. UDOT TO DESIGN AND CONSTRUCT THE UTILITY WORK

UDOT shall perform the necessary design work, cost estimating, field and office engineering, furnish all materials, and perform the Utility Work necessitated by the Project.

UDOT will design the Utility Work in accordance with Company's standards regularly followed by the Company in its own work and not considered a betterment. In the event of a conflict between UDOT and Company standards, the higher standard will be applied. Refer to City standards at http://www.fransoncivil.com/images/pdfs/WJWUC%20Standard%20Drawings%2003_2013.pdf that is incorporated by reference.

UDOT will secure permits required for Utility Work for Company's facilities. Obtain a copy of the Company's Encroachment Application www.fransoncivil.com/WJWUC that is incorporated by reference.

UDOT will supply as-constructed plans for the Utility Work it performs, in AutoCAD format**,** upon completion of any required Utility Work.

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7. **COMPANY TO PERORM INSPECTION OF THE UTILITY WORK**

The Company will perform inspection of the Utility Work for the Company's facilities that will be performed by UDOT. UDOT will accomplish the Utility Work on the Company's facilities in accordance with the plans and specifications approved by the Company. Changes or additions to the plans and specifications shall be approved by the Company and UDOT through a supplemental agreement.

8. **STANDARD SPECIFICATIONS AND REGULATIONS**

UDOT, while engaged in the preliminary design and Utility Work of its facilities, shall comply with UDOT's 2012 Standard Specifications for Road and Bridge Construction and Utah Administrative Code R930-7.

9. **RIGHT-OF-WAY**

Any easements or replacement right-of-way required in conjunction with the Utility Work of Company's facilities will be acquired by UDOT in accordance with the requirements of Utah Administrative Code R930-8-7.

10. **MAINTENANCE OF TRAFFIC (MOT), TRAFFIC CONTROL, CLEAR/GRUB, AND SURVEYING**

UDOT will provide MOT and traffic control for Utility Work at no cost to the Company.

UDOT will provide, at no cost to the Company, clearing and grubbing for the Utility Work as required by the Company and in accordance with UDOT's Standard Specifications.

Surveying and staking of roadway facilities will be provided by UDOT in accordance with UDOT's Standard Specifications. The cost of the surveying and staking will be at UDOT's expense and the Company will have no obligation for the cost of surveying. Any of UDOT's survey control stakes or bench markers, which are removed or damaged by the Company, shall be reestablished by UDOT at Company's expense.

11. **BETTERMENT WORK**

If the Company desires to include betterment work in the Project at any specific location, UDOT may agree to the betterment work providing the difference in costs between the functionally equivalent required Utility Work and the Company's desired betterment work, that is not required by the Project, shall be at the sole cost of the Company and the betterment work can reasonably be accommodated without delaying UDOT's Project. The betterment work will be addressed by a separate supplemental agreement between UDOT and the Company.

Once a Design-Builder has been selected by UDOT, any betterment work request will be negotiated directly with the Design-Builder. However, it is at UDOT's sole discretion to approve the betterment work.

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12. **SUPPLEMENTAL AGREEMENTS**

UDOT and the Company shall enter into individual supplemental agreements to cover Utility Work at specific Project locations. Each supplemental agreement will include a description and location of the Utility Work to be performed, design drawings showing the original and proposed locations of the Company's facilities, Utility Work schedules, cost estimates from all Parties, participation shares for UDOT and the Company, any proposed betterment work, and any necessary right-of-way documents. The estimates do not account for increases due to unknown and unforeseen hardships in accomplishing the Utility Work. A copy of the format of the proposed supplemental agreement is marked Exhibit "B" that is incorporated by reference.

The Company will require a 2 week review and approval period for any final supplemental agreement submitted to the Company by UDOT.

Include Application for Weir/Turnout with the Supplemental Agreement where applicable.

Supplemental Agreements are valid for 6 months from the execution date, with a 12 month completion limitation for Work on Company facilities. Additional fees may apply if these Supplemental Agreement schedules are not met.

In the event there are changes in the scope of the Utility Work, extra Utility Work, or changes in the planned Utility Work covered by a supplemental agreement, a modification to the supplemental agreement approved in writing by the Parties is required prior to the start of Utility Work on the changes or additions.

13. **UDOT AUTHORIZATION TO PROCEED WITH UTILITY WORK**

UDOT shall not perform any Utility Work until the supplemental agreement for the Utility Work is signed by the Company and received by UDOT. UDOT will review and approve the supplemental agreement and will issue an authorization to proceed to the Company for each specific Utility Work location.

14. **UDOT TO NOTIFY THE COMPANY BEFORE BEGINNING UTILITY WORK**

UDOT will notify the Company at least 2 business days in advance of beginning any Utility Work covered by any supplemental agreements hereto, to allow the Company time to schedule an inspector to be present during the Utility Work. Subsequent notification of when and where Utility Work will be performed will be given on a day-to-day basis. Should UDOT fail to give advance notification and Utility Work is performed without the presence of a Company inspector, UDOT will, at no cost to the Company, facilitate inspection of the Utility Work including, if necessary, uncovering the Utility Work.

15. **CITY TO NOTIFY UDOT**

City's personnel shall notify UDOT's Resident Engineer upon arriving and leaving the Project site for verification of inspecting Utility Work. City's personnel will comply with all applicable OSHA and Project safety requirements while within the Project limits.

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16. **INSPECTION**

The Company shall provide on-call engineering support by the Company's engineer or appropriate representative for design review, schedule coordination, or to correct or clarify issues during the Utility Work, and to perform the necessary inspection for the Company's Utility Work installed by UDOT.

a. The Company engineer and/or inspector shall work with and through UDOT's Project Representative and shall give no orders directly to UDOT's Design-Builder unless authorized in writing to do so. UDOT will accomplish the Utility Work covered herein on Company's facilities in accordance with the plans and specifications provided and/or approved by the Company, including changes or additions to the plans and specifications, which are approved by the Parties hereto.
b. The Company shall immediately notify UDOT's Project Representative and the Design-Builder Project Representative of any deficiencies in the Utility Work on the Company's facilities. The Company shall follow up with written detail to UDOT's Project Representative and the Design-Builder Project Representative of its findings within 24-hours of making its initial notification.
c. UDOT will respond to the Company's concerns within 24-hours of written notification.
d. The Company, through its inspection of the Utility Work, will provide UDOT's Project Representative with information covering any problems or concerns the Company may have with acceptance of the facilities upon completion of the Utility Work.
e. Any periodic plan and specification review or construction inspection performed by UDOT arising out of the performance of the Company's Utility Work does not relieve the Company of its duty in the performance of the Utility Work or to ensure compliance with acceptable standards.

17. **DAILY RECORDKEEPING**

UDOT's Resident Engineer will keep daily records of the inspection performed by the Company. Daily inspection records will be in duplicate on a form to be prepared by the Company or UDOT. The type of form to be used shall be preapproved by UDOT's Contracts, Compliance and Certification Manager. The inspection records shall be signed by UDOT's Field Representative, and the Company or its authorized representatives. Copies of the inspection records shall be retained by the parties to this Agreement.

18. **REIMBURSEMENT FOR COMPANY'S UTILITY WORK**

In accordance with Utah Code §72-6-116(3)(a)(ii), UDOT will reimburse the Company 50% of the cost of Utility Work of its facilities on state highways and the Company shall pay the remainder of the cost of the Utility Work. UDOT will reimburse the Company 100% of the cost of Utility Work of its facilities located on a public utility easement, on a Company-owned private easement or fee property. The Company shall provide UDOT with a copy of the public utility easement or subdivision plat, private easement or fee title. The Utility Work and reimbursement for Company's facilities required by the Project will be in conformance with the requirements of Utah Administrative Code R930-8.

The Company shall submit itemized bills covering its actual costs incurred for performing the Utility Work covered by supplemental agreements to UDOT's Contracts and Compliance Specialist:

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UDOT Contracts and Compliance Specialist
4501 South 2700 West
Construction Office, Box 148220
Salt Lake City, Utah 84114-8220

Itemized bills shall bear the Project and supplemental agreement numbers, supporting sheets, and a complete billing statement of all actual costs incurred, following the order of the items in the detailed estimates contained in the supplemental agreement, and be submitted to UDOT within 60 days following completion of the Utility Work by the Company on the Project. Otherwise, previous payments to the Company may be considered final, except as agreed to between the Parties in advance. UDOT will reimburse the Company within 60 days after receipt of the billings, but only for those items complying fully with the provisions of Utah Administrative Code R930-8. Failure on the part of the Company to submit final billings within 6 months of the completion of the Utility Work will result in UDOT's disallowance of that portion of Utility Work reimbursement.

If the Company owes a balance to UDOT, the Company will reimburse UDOT within 60 days after receipt of billing from UDOT.

19. **SALVAGE CREDIT**

In accordance with 23 C.F.R. §645.117 all materials from Company's existing facilities which are recovered by UDOT while performing the Utility Work and not reused on this Project shall become the property of the Design-Builder unless otherwise agreed to in advance by the Parties hereto.

In accordance with 23 C.F.R. §645.117, all materials from the existing facilities, which are recovered in suitable condition for reuse by the Company and not reused on the Project, shall be credited to the cost of the Project at current stock prices. If the materials are not suitable for reuse, they shall be credited at such other prices as agreed upon between the Company and UDOT following inspection of the recovered material.

20. **PROJECT DESIGN CHANGES**

If UDOT changes the Project design after the Company has completed its design review; or if the Company has completed its portion of the Utility Work of its facilities based on previously approved design plans; the cost of the second design review and/or Utility Work is to be paid in full by UDOT. UDOT will make adjustments for any additional time that may be required for the Company to perform Utility Work on its facilities when required.

21. **COMPANY'S COSTS DIFFER BY MORE THAN 10%**

If the Company's actual costs incurred for its force account work differs more than 10% plus or minus per line item from the amount contained in the supplemental agreements, the Company is required to submit a letter of explanation with its billings indicating how and why the difference in costs occurred.

22. **RIGHT TO AUDIT**

UDOT and FHWA shall have the right to audit all cost records and accounts of the Company pertaining to this Project in accordance with the auditing procedure of the Federal Highway Administration

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and 23 C.F.R. §645, subpart A. Should this audit disclose that the Company has been underpaid, UDOT will reimburse the Company within 60 days upon submission of additional billing to cover the underpayment. Should this audit disclose that the Company has been overpaid, the Company will reimburse UDOT within 60 days of notification of audit findings in the amount of the overpayment. For the purpose of audit the Company is required to keep and maintain its records of Utility Work covered herein for a minimum of 3 years after final payment is received by the Company from UDOT.

The Company shall have the right to review UDOT's cost documentation for the Utility Work performed on behalf of the Company.

23. **ACCEPTANCE**

UDOT will provide notification to the Company for acceptance of the Utility Work upon completion of the final inspection. Company will have 60 days to respond in writing to UDOT with any additional comments in regards to the Utility Work. In the event that UDOT does not receive a written response within 60 days, UDOT will designate the Utility Work accepted by the Company. Upon acceptance of the Utility Work, the Company will accept, own and maintain its facilities. To the extent it may lawfully do so, Company further agrees to relieve UDOT from any responsibility or liability that may result for its new facilities or the operation thereof.

24. **ACCESS & MAINTENANCE**

Access for maintenance and servicing of Company's facilities located on the Project right-of-way will be allowed only by permit issued by UDOT. Company will obtain the permit and abide by conditions thereof for policing and other controls in conformance with Utah Administrative Code R930-7.

25. **MISCELLANEOUS**

a. Each Party agrees to undertake and perform all further acts that are reasonably necessary to carry out the intent and purpose of this Agreement at the request of the other Party.

b. This Agreement in no way creates any type of agency relationship, joint venture, or partnership between UDOT and Company.

c. The failure of either Party to insist upon strict compliance of any of the terms and conditions, or failure or delay by either Party to exercise any rights or remedies provided in this Agreement, or by law, will not release either Party from any obligations arising under this Agreement.

d. This Agreement shall be deemed to be made under and shall be governed by the laws of the State of Utah in all respects. Each person signing this Agreement warrants that the person has full legal capacity, power, and authority to execute this Agreement for and on behalf of the respective Party and to bind such Party. This Agreement may be executed in one or more counterparts, each of which shall be an original, with the same effect as if the signatures were made upon the same instrument. This Agreement may be delivered by facsimile or electronic mail.

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IN WITNESS WHEREOF, the Parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first above written.

Welby Jacob Water Users Company

_____

Title: _____

Date: _____

Recommended For Approval:

_____

Title: Utility and Railroad Leader

Date: _____

Utah Department of Transportation

_____

Title: Project Director

Date: _____

Approved as to Form

_____

Title: Assistant Attorney General

Date: _____

UDOT Comptroller Office Contract Administrator

_____

Title:

Date: _____

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Encroachment Requirements
for Encroachment Authorization
to Construct Within or Cross Canal Right-of-Way

1. Application fees are listed below. For initial submittal, the fee below will begin the review process.

Application Type	Application Fee	Possible Refund
Bridge or Box Culvert	$8,400	$2,00
Canal Parkway	$7,300	$1,00
Excavation of Canal	$7,300	$1,00
Large Bore (over 24 inches in diameter)	$6,500	$500
New Weir & Turnout	$6,500	None
Small Boring or Directional Drilling	$4,000	$500
Overhead Crossing	$4,000	$2,00
Use of Existing Conduit	$1,500	$500

Application fees will be used by WJWUC for purposes of administration, coordination, engineer review, preparation of agreements, review during construction, legal guidance, and any other expenses it incurs related to this application.

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BANGERTER

Project No. S-0154(12)11, Salt Lake County
4 Interchanges on Bangerter Highway
CITY OF WEST JORDAN
25915 Charge ID No. 71939 PIN 12566

CITY OF WEST JORDAN
MASTER UTILITY AGREEMENT

THIS MASTER UTILITY AGREEMENT, made and entered into this 12 day of Sept, 2016, by and between the **Utah Department of Transportation**, ("UDOT"), and the **City of West Jordan**, a Municipal Corporation of the State of Utah, ("City") each as ("Party") and jointly as ("Parties").

RECITALS

WHEREAS, UDOT is preparing to request proposals for and award a design-build contract for the highway project identified as Project No. S-0154(12)11, 4 Interchanges on Bangerter Highway in Salt Lake County, Utah, ("Project"); and

WHEREAS, the design-build contractor will complete the design and administer construction of the Project ("Design-Builder"); and

WHEREAS, UDOT has identified City facilities within the limits of the Project which may necessitate the relocation, protection, or adjustment of the facilities, ("Utility Work"); and

WHEREAS, the City desires for the Design-Builder to design and perform the Utility Work on the City's facilities necessitated by the Project; and

WHEREAS, the City will perform the necessary design review and inspection to accommodate the Project; and

WHEREAS, for the purpose of expediting any required Utility Work and reimbursement, the Parties are entering into this Project Master Utility Agreement with the understanding that future supplemental agreements to this Agreement will be entered into covering the Utility Work to be accomplished by UDOT at specific Project locations.

THIS AGREEMENT is made to set out the terms and conditions where under the Utility Work shall be performed.

AGREEMENT

NOW THEREFORE, the Parties agree as follows:

1. PROJECT RESPONSIBLE FOR COST

In accordance with Utah Code § 72-6-116(3)(a)(ii), UDOT is responsible for 100% of the cost of the Utility Work of City's facilities for those costs that comply with Utah Administrative Code R930-8.

2. CONTACT INFORMATION

UDOT's Project Representative is Alana Spendlove, UDOT Project Utility and Railroad Leader, telephone number (801) 887-3462, and e-mail aspendlove@utah.gov.

UDOT's Resident Engineer for 5400 South and 7000 South interchanges is Bryan Chamberlain, telephone number (801) 887-3405, and e-mail bchamberlain@utah.gov, or their designated representative, as assigned.

UDOT's Resident Engineer for 9000 South and 11400 South interchanges is Ken Talbot, telephone number (801) 360-8750, and e-mail kentalbot@utah.gov, or their designated representative, as assigned.

UDOT's Field Representative contact person will be identified in subsequent supplemental agreements.

City's contact person is David Murphy, telephone number (801) 569-5074, and e-mail davidm@wjordan.com.

After awarding the Project, UDOT will provide the City with the Design Builder contact information, hereinafter referred to as "Design-Builder Project Representative".

3. AUTHORIZATION FOR DESIGN WORK

In order to facilitate coordination and obtain technical information about the City's facilities and requirements for inclusion in this Agreement and the Request for Proposals, UDOT gave the City authorization for preliminary design engineering on April 26, 2016.

4. SUBSURFACE UTILITY ENGINEERING

UDOT has performed Subsurface Utility Engineering (SUE) within the limits of the Project. Additional SUE work to determine the precise location of underground facilities at specific, critical locations on the Project will be reviewed with the City.

5. PROJECT COORDINATION

The City requested that UDOT include items of Utility Work for relocating and adjusting City's facilities in the Project.

During the development of the Project design, the City and UDOT, along with its Design-Builder, shall consult as necessary in an effort to determine if conflicts with the City's facilities can be avoided. If Utility Work for the City's facilities is required by the Project, UDOT will be responsible to identify the conflicts and to design and construct the Utility Work of the City's facilities. The City will perform the necessary design reviews prior to the start of Utility Work. UDOT's Project Representative will be responsible for coordinating with other utility companies as it relates to City's facilities.

6. CITY REQUIREMENTS

UDOT will comply with the following City Utility Work requirements:

a. The City will require 14-day advance shut down notification for all water and sewer connections. A copy of the City's Water System Disruption of Service Approval Process is marked Exhibit "A" that is incorporated by reference.
   i. Notifications shall include, but are not limited to the following:
      1. Scope and schedule of work.
      2. City water, storm drain, and sewer system activities.
      3. City 16-inch water feed connection activities as it relates to the BOR Jordan Aqueduct Reach 2 & 3.
      4. Lateral connections to homes, businesses, and service retirements at all property takes and/or incidental work activities.
   ii. Allow 14-days for review and approval from the City.

b. UDOT will supply as-constructed plans, in AutoCAD version 16 format specified by the City, upon completion of any required Utility Work including betterment work.

c. Coordinate Project Work and Maintenance of Traffic activities/requirements for City's independent project for its 2017 Master Plan Sewer Improvements crossing Bangerter Highway at 3200 West.
   i. City shall request a permit from UDOT prior to beginning its 2017 Master Plan Sewer Improvement work.

d. Approval of plans in an executed Storm Drain Agreement(s) prior to contributing temporary and permanent Project storm drain into City system.

7. UDOT TO DESIGN AND CONSTRUCT CITY'S UTILITY WORK

UDOT will schedule and meet with the City to review the design and scheduling of the Utility Work for the City's facilities at specific locations on the Project to ensure maximum lead time for advance order of materials and work force scheduling.

a. UDOT will design the Utility Work in accordance with City's standards regularly followed by the City in its own work and not considered a betterment. In the event of a conflict between UDOT and City standards, the higher standard will be applied.

i. A copy of the City's standards can be found at http://www.wjordan.com/Engineering.aspx?pgID=3.7.1 that is incorporated by reference.

b. UDOT will secure permits required for Utility Work of City's facilities.

i. A copy of the City's Encroachment Permit is marked Exhibit "B" that is incorporated by reference.

ii. A copy of the City's Demolition Permit is marked Exhibit "C" that is incorporated by reference.

8. RIGHT-OF-WAY

Any easements or replacement right-of-way required in conjunction with the Utility Work of City's facilities will be acquired by UDOT in accordance with the requirements of Utah Administrative Code R930-8.

9. BETTERMENT WORK

City Betterment Work is described in attached Exhibit "D" that is incorporated by reference.

City Aesthetics and Landscaping Betterment Work is described in attached Exhibit "E" that is incorporated by reference.

If the City desires to include additional betterment work in the Project at any specific location UDOT may agree to the betterment providing the difference in costs between the functionally equivalent required Utility Work and the City's desired betterment work that is not required by the Project shall be at the sole cost of the City and the betterment work can be accommodated without delaying UDOT's Project. The betterment work will be addressed by separate supplemental agreement between UDOT and the City.

Once a Design-Builder has been selected by UDOT, any betterment work request will be negotiated directly with the Design-Builder. However, it is at UDOT's sole discretion to approve the betterment work.

10. SUPPLEMENTAL AGREEMENTS

UDOT and the City shall enter into supplemental agreements to cover Utility Work at specific Project locations. As part of the supplemental agreement, UDOT will provide design plans and Utility Work schedules for review and approval by the City prior to start of the Utility Work. A copy of the format of the proposed supplemental agreement is marked EXHIBIT "F" that is incorporated by reference.

The City will require a 2 week review and approval period for any final supplemental agreement submitted to the City by UDOT. The City does not require council review for supplemental agreement approval.

In the event there are changes in the scope of the Utility Work, extra Utility Work, or changes in the planned Utility Work covered by a supplemental agreement, a modification to the supplemental

agreement approved in writing by the Parties is required prior to the start of Utility Work on the changes or additions.

11. UDOT TO NOTIFY CITY BEFORE BEGINNING UTILITY WORK

UDOT will notify the City at least 2 business days in advance of beginning any Utility Work covered by any supplemental agreements hereto, to allow the City time to schedule an inspector to be present during the Utility Work. Subsequent notification of when and where Utility Work will be performed will be given on a day-to-day basis.

12. CITY TO NOTIFY UDOT

City's personnel shall notify UDOT's Field Representative upon arriving and leaving the Project site for verification of inspecting Utility Work. City's personnel will comply with all applicable OSHA and Project safety requirements while within the Project limits.

13. INSPECTION

The City shall provide on-call engineering support by City's engineer or appropriate representative for design review, schedule coordination, or to correct or clarify issues during Utility Work, and to perform the necessary inspection on the City's facilities installed by UDOT.

a. The City's engineer and/or inspector shall work with and through UDOT's Project Representative and shall give no orders directly to UDOT's Design-Builder unless authorized in writing to do so. UDOT will accomplish the Utility Work covered herein on City's facilities in accordance with the plans and specifications provided and/or approved by the City, including changes or additions to the plans and specifications, which are approved by the Parties hereto.
b. The City shall immediately notify UDOT's Project Representative and the Design-Builder Project Representative of any deficiencies in the Utility Work on the City's facilities. The City shall follow up with written detail to UDOT's Project Representative and the Design-Builder Project Representative of its findings within 24-hours of making its initial notification.
c. UDOT will respond to City's concerns within 24-hours of written notification.
d. The City, through its inspection of the Utility Work, will provide UDOT's Project Representative with information covering any problems or concerns the City may have with acceptance of the facilities upon completion of the Utility Work.
e. Any periodic plan and specification review or construction inspection performed by UDOT arising out of the performance of the Utility Work does not relieve the City of its duty in the performance of the Utility Work or to ensure compliance with acceptable standards.

14. DAILY RECORDKEEPING

UDOT's Resident Engineer will keep daily records of the inspection performed by the City. Daily inspection records will be in duplicate on a form to be prepared by the City or UDOT. The type of form to be used shall be preapproved by UDOT's Contracts, Compliance and Certification Manager. The inspection records shall be signed by UDOT's Field Representative, and the City or its authorized representatives. Copies of the inspection records shall be retained by the parties to this Agreement.

15. REIMBURSEMENT

UDOT will not reimburse the City for costs incurred by City personnel for design review, observation, inspection, and operation of valves performed as part of their regularly assigned duties. Should it become necessary for the City to procure outside services to perform design review, observation, or inspection to accommodate UDOT's Utility Work and Project schedule, the City shall notify UDOT. Upon concurrence by UDOT, a supplemental agreement for the cost of the services will be executed at which time the City may procure outside services through appropriate solicitation.

16. SUBMITTAL OF ITEMIZED BILLS

The City shall submit itemized bills covering the actual costs incurred for outside services to perform design review, oversight, and inspection work covered by supplemental agreements to UDOT's Contracts and Compliance Specialist:

UDOT Contracts and Compliance Specialist
4501 South 2700 West
Construction Office, Box 148220
Salt Lake City, Utah 84114-8220

Itemized bills shall bear the Project and supplemental agreement numbers, supporting sheets, and a complete billing statement of all actual costs incurred, following the order of the items in the detailed estimates contained in the supplemental agreement and be submitted to UDOT within 60 days following completion of outside services by the City on the Project. Otherwise, previous payments to the City may be considered final, except as agreed to between the Parties in advance.

UDOT will reimburse the City within 60 days after receipt of the billings, but only for items complying fully with the provisions of Utah Administrative Code R930-8. Failure on the part of the City to submit final billings within 6 months of the completion of outside services will result in UDOT's disallowance of that portion of outside services performed by the City.

17. SALVAGED MATERIALS

All materials from City's existing facilities which are recovered by UDOT while performing the Utility Work and not reused on this Project shall become the property of the Design-Builder unless otherwise agreed to in advance by the Parties hereto.

18. RIGHT TO AUDIT

UDOT and the Federal Highway Administration shall have the right to audit all cost records and accounts of the City pertaining to this Project in accordance with the auditing procedure of the Federal Highway Administration and 23 C.F.R. § 645, subpart A. Should this audit disclose that the City has been underpaid, the City will be reimbursed by UDOT within 60 days upon submission of additional billing to cover the underpayment. Should this audit disclose that the City has been overpaid, the City will reimburse UDOT within 60 days of notification of audit findings in the amount of the overpayment. For purpose of audit the City is required to keep and maintain its records of outsides services covered herein for a minimum of 3 years after final payment is received by the City from UDOT.

19. ACCEPTANCE AND MAINTENANCE

Upon completion of the Utility Work of City facilities by UDOT, the City will accept, own, and maintain its own facilities. The City shall be the sole owner of the facilities upon completion of the Project unless otherwise agreed to by the Parties. To the extent it may lawfully do so, City further agrees to relieve UDOT from any responsibility or liability that may result from its new facilities or the operation thereof.

20. ACCESS

It is understood that access for maintenance and servicing of City's facilities located on the right-of-way of the Project will be allowed only by permit issued by UDOT to the City, and that the City will obtain the permit and abide by conditions thereof for policing and other controls in conformance with Utah Administrative Code R930-7.

21. INDEMNIFICATION

UDOT and the City are both governmental entities subject to the Governmental Immunity Act. Each Party agrees to indemnify, defend, and save harmless the other from and against all claims, suits and costs, including attorneys' fees for injury or damage of any kind, arising out of its negligent acts, errors or omissions of its officers, agents, contractors or employees in the performance of this Agreement, and from and against all claims, suits, and costs, including attorneys' fees for injury or damage of any kind. Nothing in this paragraph is intended to create additional rights to third parties or to waive any of the provisions of the Governmental Immunity Act. The obligation to indemnify is limited to the dollar amounts set forth in the Governmental Immunity Act, provided the Act applies to the action or omission giving rise to the protections in this paragraph. The indemnification in this paragraph shall survive the expiration or termination of this Agreement.

22. MISCELLANEOUS

a. Each Party agrees to undertake and perform all further acts that are reasonably necessary to carry out the intent and purpose of this Agreement at the request of the other Party.

b. This Agreement in no way creates any type of agency relationship, joint venture, or partnership between UDOT and City.

c. The failure of either Party to insist upon strict compliance of any of the terms and conditions, or failure or delay by either Party to exercise any rights or remedies provided in this Agreement, or by law, will not release either Party from any obligations arising under this Agreement.

d. This Agreement shall be deemed to be made under and shall be governed by the laws of the State of Utah in all respects. Each person signing this Agreement warrants that the person has full legal capacity, power and authority to execute this Agreement for and on behalf of the respective Party and to bind such Party. This Agreement may be executed in one or more counterparts, each of which shall be an original, with the same effect as if the signatures were made upon the same instrument. This Agreement may be delivered by facsimile or electronic mail.

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IN WITNESS WHEREOF, the parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first above written.

CITY OF WEST JORDAN Seal STATE OF UTAH

ATTEST: **The City of West Jordan**

Title: City Clerk Melanie Briggs **Title:** Mayor Kim V. Rolfe

Date: 8/24/16 **Date:** 8/24/16

(IMPRESS SEAL)

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Recommended For Approval:

Title: Utility and Railroad Leader

Date: 9/12/16

Utah Department of Transportation

Title: Project Director

Date: Sept 12, 2016

Approved as to Form

Title: Assistant Attorney General

Date: 09/19/2016

Comptroller Office

Title: Contract Administrator

Date: 9-21-16

EXHIBIT A

Department of Public Works

STANDARD OPERATIONAL GUIDELINE

Subject: **Water System, Disruption of Service Approval Process**		SOG No.: **WS002**
Origin Date: May 1, 2010	Revison Date: April 4, 2011	Page(s): 5

1. INTRODUCTION

A. Purpose: To allow for the planning, proper coordination, notifications and approvals required for a safe and timely disruption of water service to City water customers in cases of planned construction, due to either City capital improvement projects or private development projects. Planning for such disruptions must begin during the design phase of the project, and continue through construction and project acceptance phases of the work.

B. Scope: Affects Engineering, Construction Inspections, Water, and Streets divisions of the Public Works Department. Also affect City Capital Improvement Projects and private development projects.

C. Definitions:

D. Precautions/Safety: Trench safety and planning for safe evacuation of staff from areas where pipelines may be under construction.

E. Responsibility: The City's Project Engineer has primary responsibility for this work. Others such as the City's Water Division also have key roles in the work, and the City's or Developer's Contractor has a key role to play in the safe and timely completion of the work.

F. Equipment:

G. Notifications: The Director of Public Works is to be notified at least 24-hours in advance of the actual shut-down by email.

2. PROCEDURE

Water disruptions or outages which are a result of planned construction projects are required to be coordinated from the inception of the project through construction. This means that all of the Department divisions indicated above, will need to be continually coordinated with during all phases of the project. The paragraphs below indicate the various phases of the project, which divisions and positions are involved, and how these activities are to be carried out. Extreme carefulness must be observed in planning and carrying out these activities as

they can significantly affect City water customers and others.

A. Design Proces: As part of the design process, the City's Project Engineer and Consultant are to keep all affected parties involved and informed. This is critical to the success, safe, and timely completion of the construction and water service disruption/outage.

1) Adequate System Information: This process assumes reasonable amounts of adequate water system information is available. Existing drawings must be researched, and potholing will be required to fully answer any questions the Project Engineer and Consultant may have. Reasonable amounts of funds spent on potholing are worth the money and this area of project investiation should not be short-changed. It is understood that full information is not possible in many instances, but efforts need to be made to have as much information available if reasonably possible.
2) Existing As-built Drawings: Use existing as-bulit drawings to begin with and improve on them through additional coordination with Field Staff and through potholing. The GIS/Technical Support Division of the Department is responsible for managing the as-builts drawings with assistance for all of the other divisions in the Department.
3) Roadway Intersection Drawings: Use the existing Roadway Intersection Drawings which show all valves, water lines, other utilities, improve these as needed, and then include them in the Released for Construction Drawings. Ensure the drawings are as correct as possible before bidding. If the Project Engineer does not feel comfortable with the accuracy of these drawings, they should be noted as 'schemtic drawings' with indications that locations, sizes, etc. are for general information only and are not to be relied on.
4) Planning/research of Needs and Impacts (Preliminary): All Engineering, Inspection, O&M, and Consultant staff is to participate in this planning work for water outages. The following need to be included:
   - Identify options for providing water service.
   - Field Research of Water System: Water Division is to Identify existing valves, mark, and exercises them to make sure they operate properly.
   - Impacted Customers – Staff is to identify the water customers of the City who will be impacted by any disruption or outage of the Water System.
   - Night outage(s) – If night outages are required, coordinate with the SLVHD for work to be done between the hours of 10 p.m. and 7 a.m. O&M staff will also need to be coordinated with for actual water valve closures and only O&M staff is to open/close these valves.
5) Identification of Possible Water Outages: Project Engineer/Consultant identifies possible/required shut-downs as part of the design process. These are to be noted in the project Contract Documents and conditions indicated for water outages.
6) Engineering Inspector Review of Contract Documents: The Engineering Inspector is to review the 'Released for Construction Drawings', and coordinate with the Project Engineer and remainder of the Project Team on how to address outage(s).
   - Determine proposal for how the work might be done. Suggest or require process to contactor as part of Contract Documents.

EXHIBIT A

7) Constructability Review Meeting: As part of the design process, a meeting or set of meetings as needed, with the design staff, project engineer, O&M staff, and inspection staff to identify potential outages. The Engineer, O&M staff, and Inspector are to then begin working through how to plan for these outages and the impacts of those outages.
7) PW O&M Review of Drawings – Engineering staff are to make sure O&M staff has reviewed the preliminary documents (30-50% review) and their comments have been incorporated into the final documents (80-90%), prior to putting the Documents out for bid.

B. Preconstruction/Construction Meeting Coordination: As part of the process, a mandatory preconstruction/construction meeting is to be held where water distruptions/outages are discussed. City staff is to express their concerns and present the information they have prepared and require the Contractor to develop a written water disruption/outage plan.

1) Scheduling: Schedule the meeting through Outlook at least 2 weeks in advance of the meeting.

2) Persons to Attend: The Project Engineer, Consultant, Engineering Inspector, Water Division staff and Contractor must be invited and must attend. If the Contractor's Superintendent does not show up at the meeting, the meeting is to be cancelled and rescheduled.
3) Communications: Establish City and Contractor chain of command and which persons are the point-to-point contacts on the City's, and the Contractor's sides of the work.
4) Agenda Item: Water service disruptions/outages are to be identified and discussed as part of meeting agenda. The Engineering Inspection Supervisor is responsible for this meeting and this item.
5) Contractor's Proposal and Schedule: The Contractor is to take all of the available information available and propose methods/processes/timelines for distruption/outages. Contractor is to prepare and submit a Contract Schedule for the work to the Project Inspector.
6) Approval Process: Once the Contractor has submitted a proposed plan and schedule for the disruption/outage, City staff is to meet and go over the Plan to make sure it meets all of their requirements. Corrections need to be submitted back to the Contractor in writing and a new Plan prepared. The Plan is not approved until the Water Division, Engineering Inspection, Engineering, and Contractor, signs off on the Plan.

C. Request for Water Disruption/Outage: The Contractor is to make a written request for any water disruption or outage he feels is necessary, as part of the project. The following applies to this process:

1) Request is made by the Contractor to Engineering Inspector and must include:
   - Request indicates answers to the questions of 'what, when, where, why'.
   - The request must be made in writing. A letter or email will suffice as long as it contains the correct information.

EXHIBIT A

- The Water Division requires a minimum of 72-hours notice to begin customer notification of outage and implementation of the City's portion of the Plan in the Field.

2) Engineering Inspector begins coordination with Water Division through the Water Superintendent. The Water Superintendent will coordinate with his staff including the Water Operations Supervisor.
3) Notification of Utilities Manager and Public Works Director: Both the Utilities Operations Manager and the Public Works Director are to be kept up-to-date on planning and approval processes and especially as the project moves closer to the actual water service disruption/outage.

D. Planning/Research of Needs and Impacts: The purpose of this section is to take the Plan submitted by the Contractor and make sure that it will actually work. City staff is the most familiar with the Water System, and will have the final approval on whether the Plan is approved. The following steps need to be considered in doing this phase of the work.

1) Engineering inspector schedules meeting with Water Division staff/Contractor to coordinate outage.
2) Staff brings all information developed as part of the desgin process and proposals from the Contractor.
3) Project Team develops reviews the proposed plan and develops an actual written water outage plan and prepares a scope of work, or step by step plan, of what is going to be done. This will include detail such as which pipe will be cut first, which one second, which valves will we closed, how muc h time will it take, etc. Make sure everyone involved in the outage: contractor, contractor's on-site superintendent, workers, City project engineer, city inspector, and O&M staff all have copies and understand the order of the work. Deviations must be coordinated with everyone (Refer to KHP, Mid-Jordan Light Rail, Redwood PNR Waterline Tie-in plan. Includes "Overview", "Safety", "Quality", "Compliance", "Survey", and "Discussion Items").
4) Plan for Contingencies – Look at all drawings, identify the scope of work (work to be done), and identify contingency plans if things should go wrong. For instance, if we cut this pipe, do we understand how to close off all flow to the pipe and have we tried it out before hand.
5) Additional Potholing – If the Contractor feels that additional potholing is required, work out a solution for doing so and pay him, if additional compensation is warranted.
6) Obtain all Permits: Make sure all appropriate permits have been obtained as part of the planning process. This may include:
   - SLVHD Permit - for night work
   - UDOT Permit
   - City of West Jordan Encroachment Permit
   - Others as needed

E. Pre-activity Meeting/Actual Water Disruption/Outage: Just prior to the actual beginning of the outage, and work preliminary to the outage, a pre-activity meeting is to be held to discuss in detail the work to be done as part of the water disruption/outage. The following need to be discussed:

EXHIBIT A

1) Communications - Reaffirm City and Contractor's organizations, who are in charge, and who are the point-to-point contacts on the Contractor's side and who on the City's side. Make sure everyone has the correct phone numbers.
2) Implement final water outage plan – Needs to include priority of construction: which lines to cut first, second, etc. Plan needs to include a flushing plan and safety plan.
3) Contingency Plan(s) - Implement plan(s) for contingencies as required.
4) Schedule – execute work within appropriate time windows.
5) Permits: Make sure all the permits have been obtained.
6) Approval form: *(Do you want an approval form where everyone signs off on the outage, basically a permit?) (1st comment – No – cover page of plan/excavation permit is the form.)*
7) Inspections and Testing: Inspections and sampling are to be accomplished per City and AWWA standards.
8) Documentation of Work: The Engineering Inspector is responsible for taking pictures of the work with excavation open, take measurements and survey of critical points to document what is in the intersection, or other location, for future reference.
9) Questions regarding Unknown Pipelines/Conduits/Strucctures: If there are questions about what pipelines, conduits do, identify them prior to closing the excavation.
10) As-built Drawings: The Contractor is responsible for ensuring as-built drawings are prepared and meet the Engineering Inspector's requirements, and are turned over to the Inspector as the end of the project. The Engineering Inspector is responsible for collecting all as-built information from the Contractor and transferring them to the Project Engineer. The Project Engineer will work with the GIS Division is making the changes to the City's as-built drawings to keep them up-to-date.

F. Post-activity Meeting: Once the work is complete, all City and Contractor are to meet to go over the actual outage. Go over what went right and wrong and improve the process
   1) Process for as-builty drawings – City Engineer/Supervising Inspector need to look at the requirements for as-builting drawings and make sure they are complied with.

3. REFERENCE DOCUMENTS

A City of West Jordan, Water Design & Construction Standards.
B City of West Jordan, Encroachment Ordinance and Permit.

Approved by:

Wendell T. Rigby, P.E.
Director of Public Works

Date 4/4/2011

EXHIBIT B

City of West Jordan Public Works
Engineering Department
8000 South Redwood Road
West Jordan, Utah 84088
801-569-5070

Public Right-of-Way Encroachment Permit Application and Agreement

Company Name:	**Permit No.:**
License No.:	**Date Issued:**
Applicant Name:	**Cost of Permit:**
Title:	**Check No.:**
Address:	**Receipt No.:**
City, State, Zip:	**Work No.:**
Contractor Performing Work:	**Cell No.:**
Nature of Work: Telephone • Electrical • CATV • Gas • Water • Stormdrain • Wastewater • Secondary Water • Other:	**Email:**

FAILURE OF THE PERMITTEE TO FOLLOW THE PROVISIONS OF THIS PERMIT SHALL RESULT IN THE RETRACTION OF THE PERMIT BY THE CITY AND LOSS OF PRIVILEGESTO WORK WITHIN THE CITY 'S RIGHT-OF-WAY.

1. Standards/ Location of Work
The above indicated applicant is hereby granted subject to Title 8, Chapter 8 of the City's Municipal Code, the City's Policies and Design Criteria Manuals, the Construction Specifications Manual, Standard Drawings Manual, State Occupational Safety and Health Laws, Manual on Uniform Traffic Control Devices (MUTCD), Instructions to Flaggers, the approved plans, and any special limitations set herein, permission for the purpose of:

_____within the right of way limits in the

following locations _____

2. Prior to Work
Prior to Work being performed in the public right-of-way, the Permittee will make proper provisions for protecting the public's safety and property. This permit is a binding agreement between the Permittee and the City and shall be only for the location listed on this permit.

3. Permit Fee
The City of West Jordan Encroachment Permit Fee shall apply, for an excavation in public right-of-way, as listed on the Current Uniform Schedule of Fees and Services Charges:

_____ feet long, _____ feet wide, and _____feet deep.

4. Beginning and Ending of Work
The work permitted herewith shall commence on _____ and shall be diligently prosecuted to completion. The work shall be completed and all disturbed surface or objects restored on or before _____. In the event work is commenced under this permit and the permittee fails or refuses to complete the work, the City of West Jordan may, at its election, fill in or otherwise correct any existing deficiencies at the expense of the permittee and subject to immediate payment by the permittee.

5. Performance Bond and Insurance
The Permittee shall supply to the City a Performance Bond for a period of three (3) years after completion of the work to guarantee satisfactory performance. Amount of the bond shall be determined by the encroachment department upon review of this application. The bond shall be in the name of the Permittee.

Insurance
The Permittee shall provide to the City copies of workers compensation insurance and liability insurance that names the City its elected officials, appointed officials, employees, volunteers, and agents as additionally insured (This verbiage must be a part of your Lability Insurance under Special Items.. The Permittee shall be responsible for any liability or personal injury involved through neglect. The Permit Holder agrees to indemnify the City, its elected officials, appointed officials, employees, volunteers, and agents against all claims, demand s, costs, damages, attorney fees or other expenses of any kind by such neglect

EXHIBIT B

6. Notice of Work to Begin
Before work permitted herewith is commenced, the permittee shall call in on the inspection line (801) 569-5051 before 3:00 p.m. Commencement of said work is understood to indicate that the permittee will comply with all instruction and regulations of the City of West Jordan (as listed) with respect to performance of said work and that she/he will properly control and warn the public of said work to prevent accident. The Permittee shall inform all emergency services, school districts, UDOT and UTA two (2) working days in advance of any approved road closures or detours.

7. Restoration of Right-of-Way
This permit is issued with the understanding that the Permittee will restore the right-of-way to its original or better condition. Such restoration shall take place within two (2) working days from the time of completion of the Work. If the Permittee fails to meet this obligation within the time indicated herein, the City may make all the necessary restorations at the Permittee's expense.

8. Limits of Work Area
Permittee shall not perform any work on City of West Jordan right-of-way beyond those areas of operation stipulated on this permit. This permit in no way allows the Permittee access to private properties; the individual property owners must grant access.

9. Suspension of Work
If permittee fails to comply with City of West Jordan regulations, specifications or instructions pertinent to this permit, the City Engineer or his duly authorized representative, may by verbal order, suspend the work until the violation is corrected. If permittee fails or refuses to comply promptly, the City Engineer or his authorized representative may issue a written order stopping all or any part of the work. When satisfactory corrective action is taken, an order permitting resumption of work may be issued.

10. Permit Period/Extensions
This permit is valid forty-five (45) days from issue date. The City may grant an extension of time with a written request from the Permittee to the Engineering Department. Such request must be submitted five (5) working days before the expiration date of the permit.

11. On-Site Permit Requirements
A copy of the City's current trench detail, approved plan of the Work, approved traffic control plan, a signed copy of this Permit, and a copy of the City's Public Improvement Standards, Specifications, and Plans shall be on the work site at all times. The City shall be granted access to these papers at all times.

12. Temporary Asphalt Patching
Asphalt patching to roads between October 15 and March 1 will be considered temporary only and must be replaced after March 1 following APWA standards.

Special Limitations:

- Traffic Control Plans, signs and channelizing devices shall conform to MUTCD Standards as a minimum. Traffic Control Plan to be approved by City's Traffic Engineer.
- Contact the inspection line at (801) 569-5051 48-hours prior to the time of lane or shoulder closure, with route, location and duration. Call again when the job is complete.
- This Agreement and/or permit are for City of West Jordan approval only. You are responsible to obtain clearances from UDOT, UTA, railroads, private property owners and other local jurisdictions that you are working with.
- Call for Blue Stakes and check for other utilities in the area prior to excavation.
- Saw cut and tack coat joints. Replace asphalt to the existing depth plus 1-inch, with a minimum of 4-inches, or as directed by City Engineer.
- Untreated Base Course with 97-percent compaction for the full depth of the trench with 6-inch lifts.
- Licensee is responsible for repairing and/or restoring any portion of the roadway damaged during construction.
- Licensee must restore shoulder of highway to its original or better condition to include reseeding, replacing sidewalk, fencing, pipe, culverts or signs removed or damaged during construction.
- Striping is to be replaced with the same material within 48-hours of completion of the permit. The materials must maintain City of West Jordan standard specifications for 6-months.
- No storage of backfill material or pipe will be allowed within the ASHTO Clear Zone. Excavations to be backfilled daily if possible.
- If excavation is within 350-feet of an intersection, permittee is required to contact the City Traffic Engineer for requirements.
- Permittee will comply with all applicable environmental laws.

EXHIBIT B

- All borings shall show an approved cross section showing all other existing utilities, and clearances from such.
- Steel drum vehicles or steel tracked vehicles or equipment shall use minimum ¾ inch plywood over railroad concrete pavement to protect the concrete while crossing the railroad track area.
- For concrete paved roadways, the permittee is responsible for all panels that have 2-inch holes bored into the panel. If these panels fail in the future due to the bores, the Permittee will be required to replace the affected panels.

Accepted By:
My carrying out the activities allowed by this permit is conclusive evidence that I have accepted all provisions, limitations, and restrictions of the permit and attachments, understand and agree to all penalties for failing to comply with them and understand my ability to review a sample permit and applicable attachments at the City Engineer's office.

Permit Applicant:

Name	Title	Date

Attach the following documents: **All documents and fees must be paid before an Encroachment Permit will be issued.**

- ☐ Bond ($10,000 for one cut / $ 25,000 for multiple cuts)
- ☐ Current copy of Liability Insurance (See #5 for verbiage)
- ☐ Traffic Control Plan
- ☐ Site Plan
- ☐ Fees Paid

Processed and Approved By:

Name	Title	Date
Name	Title	Date

Inspections

Beginning of Work: Phone call received:	Inspection Completed By/Date:
Intermediate Work: Phone call received:	Inspection Completed By/Date:
Intermediate Work: Phone call received:	Inspection Completed By/Date:
Completion of Work: Phone call received:	Inspection Completed By/Date:

Final Inspection and Release

Inspector Approval		Administrative Approval to Release	
Signature	Date	Signature	Date

EXHIBIT C

City of West Jordan
Building & Safety
8000 South Redwood Road
West Jordan, UT 84088
(801) 569-5050
Fax (801) 569-5099

BUILDING DEMOLITION(S)

A Building Permit and fee are required for each building demolition. The fee for a building demolition permit is $126.25 per building.

Follow these steps to expedite your demolition permit:

1. Fill out a building permit application, with the address, type of structure to be demolished, and contractor(s) information.
2. Submit approval letter from the State Division of Air Quality 801-536-4053. Jobs having Asbestos requires an inspection by a Utah Certified Asbestos Inspector prior to disturbing suspected asbestos. 801-536-4451.
3. Submit approval letter from the Salt Lake Valley Health Department. Ph. 801-313-6626, 788 E Woodoak Lane, Murray.
4. Notify and request disconnection from the following utilities and **provide a signature from the West Jordan Engineering department for water and sewer disconnection.**
5. If contractor/company disturbs or removes painted or coated surfaces greater than 6 sq ft in a room on the interior or 20 sq ft on the exterior of target housing or child-occupied facilities built before 1978, the company may be subject to the ***new lead based paint and/or renovation, repair and painting rule.*** 801-536-4018

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a. Rocky Mountain Power - ph. 888-221-7070
b. Questar Gas – ph. 800-323-5517
c. **West Jordan Water & Sewer Engineering Department Ph. 801-831-7172**

_____
Signature (W.J. Representative) Print Name

d. Phone, Cable, and any other service to the building.

The above items must be submitted to this office before a permit will be issued.

CITY OF WEST JORDAN BETTERMENTS

The City has requested the following Betterment Work be included with the Project Work:

7000 Betterment Work

City has provided concept layouts for proposed Betterment Work as shown and described below. Final Betterment Work plans will be memorialized through a separate supplemental agreement between UDOT and the City.

1. Upgrade existing 12-inch sewer to 24-inch sewer from sta. 1+00 to sta. 5+25 +/-.
2. Install new 24-inch secondary water pipeline casing from sta. 1+00 to sta. 6+05 +/.

9000 South Betterments

City has requested Betterment Work as listed below. Final Betterment Work plans will be memorialized through a separate supplemental agreement between UDOT and the City. City shall be responsible for permitting costs associated with Betterment Work.

1. Upgrade existing 12-inch sewer to 24-inch from Winthrope Circle to approximately 3450 West.

2. Water upgrades:
   a. Replace existing 10-inch waterline with new 12-inch DIP waterline or equivalent from Winthrope Circle to hospital connection.
   b. Replace 12-inch waterline with new 12-inch DIP waterline or equivalent from old PRV location to hospital connection.
   c. Place new 16-inch waterline in same approximate alignment as the existing 16-inch water to replace Zone 1 pipe and connect to Zone 2 transmission with 16 inch pipe. Length of pipe installation shall be based on pressure class.

3. PRV upgrades:
   a. Combine two existing PRV's vaults in 9000 South into one vault. It is anticipated that the exiting PRV vault located in 9000 South, within the south park-strip, will be a Project Work conflict resulting in Utility Work at UDOT's cost. City requests the existing PRV within 9000 South, within roadway, be placed into the PRV vault being relocated as Project Utility Work. The Utility Work to abandon the 9000 South PRV, within roadway, and to combine the two PRV vaults is pro-rated Betterment Work. Costs of the Betterment shall include, design, right-of-way, materials, and construction exceeding the Project Work conflict requirements.

CITY OF WEST JORDAN AESTHETIC AND LANDSCAPE BETTERMENTS

The City has requested the following Betterment Work be included with the Project Work:

UDOT will include the following Aesthetics and Landscaping Betterment Work items into the Project Work. UDOT will supplement up to $100,000.00 towards each City intersection at 7000 and 9000 South for Aesthetics and Landscaping Betterment Work. UDOT and the City shall enter into supplemental agreements to cover Aesthetics and Landscaping Betterment Work described below. City will be responsible for paying the actual costs greater than $100,000.00 associated with the Aesthetics and Landscaping Betterment Work items, based on UDOT's actual quantities placed.

Description of Aesthetics and Landscaping Betterment Work:

Element	Desired City Betterment
Parapets:	1. Add the City of West Jordan logo to one or two visible locations on each bridge at 7000 and 9000 South.
Lighting and Traffic Signal Poles:	1. Matching all City affected streetlights to new LED standards, both arterial and local streetlights. Lights must match Section 16500 and current manufacturer specifications. 2. Traffic Signal Poles shall be black powder coated as minimum standard.
Landscaping Remnant Parcels:	1. Sod, trees, plants, and sprinkler systems installed according to City Parks' standards, which will be maintained by the City.

CITY OF WEST JORDAN
SUPPLEMENTAL AGREEMENT NO. ___

Supplement to UDOT Finance No. _____

THIS SUPPLEMENTAL AGREEMENT, made and entered into this _____ day of _____, 20____, **Utah Department of Transportation**, ("UDOT"), and **City of West Jordan** a Municipal Corporation of the State of Utah, ("City") each as ("Party") and jointly as ("Parties").

The parties hereto entered in to a Master Utility Agreement (MUA) dated _____, UDOT Finance No. _____. All the terms of the Master Utility Agreement remain in full force and effect unless otherwise specified herein.

The Parties agree as follows:

1. UDOT will perform the following described Utility Work in accordance with the terms and conditions of the MUA:

   a. Description of Utility Work to be performed, including proposed location, described in Exhibit "A" that is incorporated by reference: (Plan Sheets Attached)

   b. The City requirements as shown in the MUA – City Requirements, are modified as follows:
      i.

   c. Anticipated duration of Utility Work:

   d. Total estimated cost of City's (100% reimbursable) outside services: (Detailed Estimate Attached)

2. UDOT will notify the City's Project Representative, David Murphy, telephone number (801 569-5074, email davidm@wjordan.com at least 48 hours in advance of beginning the Utility Work covered herein, or in accordance with the specific terms of the MUA, as applicable.

IN WITNESS WHEREOF, the Parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first written above.

ATTEST:

City of West Jordan

_____ _____

Title: _____ **Title:** _____

Date: _____ **Date:** _____

(Impress Seal)

. . . . . .

RECOMMENDED FOR APPROVAL:

UTAH DEPARTMENT OF TRANSPORTATION

_____ _____

Title: Utility and Railroad Leader **Title:** Project Director

Date: _____ **Date:** _____

_____
UDOT Comptroller Office
Contract Administrator

. . . . . .

CITY OF WEST JORDAN
AMENDMENT No. 1 TO MASTER UTILITY AGREEMENT
FINANCE NUMBER 178263

THIS MASTER UTILITY AGREEMENT AMENDMENT No. 1, made and entered into this _____day of_____, 20_____, by and between the **Utah Department of Transportation**, ("UDOT"), and the **City of West Jordan**, a Municipal Corporation of the State of Utah, ("City") each as ("Party") and jointly as ("Parties").

RECITALS

WHEREAS, UDOT is preparing to request proposals for and award a design-build contract for the highway project identified as Project No. S-0154(12)11, 4 Interchanges on Bangerter Highway in Salt Lake County, Utah, ("Project"); and

WHEREAS, the Parties hereto entered in to a Master Utility Agreement, finance number 178263, dated the 12 day of September, 2016. All the terms of the Master Utility Agreement remain in full force and effect unless otherwise specified herein.

The parties hereto agree amend the Master Utility Agreement as follows:

1. Replace paragraph 3 of Section 9, Betterment Work with the following:

   If the City desires to include Betterment Work in the Project at any specific location UDOT may agree to the Betterment Work providing the difference in costs between the functionally equivalent required Utility Work and the City's desired Betterment Work that is not required by the Project shall be at the sole cost of the City and the Betterment Work can be accommodated without delaying UDOT's Project. The Betterment Work will be addressed by separate supplemental agreement between UDOT and the City. UDOT shall adhere to requirements in Sections 6 and 7 and requirements identified in Exhibits D and E.

2. Replace Exhibit "D" with new Exhibit "D" that is incorporate by reference.

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IN WITNESS WHEREOF, the Parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first written above.

ATTEST:

City of West Jordan

_____ _____

Title: _____ **Title:** _____

Date: _____ **Date:** _____

(Impress Seal)

. . . . . .

RECOMMENDED FOR APPROVAL:

UTAH DEPARTMENT OF TRANSPORTATION

_____ _____

Title: Utility and Railroad Leader **Title:** Project Director

Date: _____ **Date:** _____

_____
UDOT Comptroller Office
Contract Administrator

. . . . . .

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EXHIBIT D
CITY OF WEST JORDAN BETTERMENTS
7000 South and 9000 South

7000 Betterment Work

City, through its consultant, has provided concept layouts for proposed Betterment Work as shown and described below.

1. **7000 South 24-in Sewer Betterment**: Upsize existing 12-in diameter sewer to 24-in diameter sewer. Betterment Work shall include, but not limited to, piping, manholes, collars, trenching and/or boring, casing, as shown in concept drawings marked Exhibit "D-1" that is incorporated by reference.
    a. Design the Betterment Work using the Project Manual marked Exhibit "D-1".

2. **7000 South 24-in Steel Casing Betterment**: Work includes, but not limited to, installation of new 24-in steel casing for secondary waterline. See Exhibit "D-1".
    a. Location of Betterment Work is between approximate Sta: 1+00 to Sta: 6+05 within 7000 South. UDOT shall work with the City to define final Betterment Work limits.
    b. Betterment Work requirements:
        i. 24-in Steel Casing
        ii. ASTM A53 Grade B with a minimum yield stress of 42 KSI
        iii. ½-inch wall thickness
        iv. Pump and fill casing with sand, capping each end. Carrier pipe will be installed by others.

9000 South Betterments

City has requested Betterment Work as follows:

1. **9000 South 24-in Sewer Betterment:** Upsize existing 12-in diameter sewer to 24-in diameter sewer. Work shall include but not limited to piping, manholes, collars, trenching and/or boring, casing, road repair, pumping, service laterals, backfill, bedding, dumping, and material disposal.
    a. Work will be performed from Sta, 606+90 to Sta. 614+00 within 9000 South roadway.

2. City shall install sewer from Sta. 614+00 to Sta. 620+00 for sewer system functionality prior to the Betterment Work. In the event the City is unable to install improvements, UDOT will not be obligated to perform the Betterment Work and will be entitled to reimbursement of all Betterment Work Project costs. See Exhibit "D-2" that is incorporated by reference.

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3. **9000 South Waterline Replacement Betterments:** UDOT shall design and construct 3 waterline replacements
    a. Work shall include, but not limited to piping, pipe wrap, valves, fittings, service laterals, collars, backfill, bedding, and waterline commissioning.
    b. City requires all waterline replacement pipe be Ductile-Iron CL-52 350psi rated except as noted.
    c. UDOT shall work with City to define final Betterment limits.
    d. Waterline replacements Betterment Work scope and location:

        i. 9000 South 10-in Waterline Replacement Betterment (upsize to 16-in)–
        1. Replace existing 10-in waterline with new 16-in waterline.
        2. Work will be performed from Withrope Circle to existing hospital connection (Sta 608+00 to 614+00). City concept drawings are shown in Exhibit "D-3" that is incorporated by reference.

        ii. 9000 South 12-in Waterline Replacement Betterment –
        1. Replace existing 12-in waterline with new 12-in waterline.
        2. Work will be performed from existing City PRV vault to existing hospital connection (Sta. 608+00 to 614+00). See concept drawings shown in Exhibit "D-3."

        iii. **9000 South 16-in Waterline Extension Betterment –**
        1. Extend existing 16-in waterline with new 16-in waterline.
        2. Replacement shall follow current 16-in alignment.
        3. Work shall be performed from Sta. 609+00 to Sta. 612+25. See concept drawings shown in Exhibit "D-3."

        iv. **9000 South 18-in Waterline Crossing Betterment:** Install 18-in waterline across 9000 South.

        1. Install Ductile-Iron CL- 50 250psi rated.
        2. Install 18-in cap/plugs on each pipe end.
        3. Work will be performed at Sta 611+90as shown in Exhibit "D-3."

4. **9000 South West Jordan Central PRV Vault Betterment –**

    UDOT shall design and construct a central PRV Vault. Work shall include, but not limited to, two (2) separate PRV valves and one (1) flow control valve, piping, isolation valves, meters, gauges, couplings, pipe supports, fittings, vaults, electrical systems and cabinets, power source, vault, hatches, manholes, ladders, ventilation systems, sumps pumps, lifting equipment, backfill, trenching, bedding, existing system connections and water system commissioning.

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a. CLA-VAL pressure reducing and flow control valves as follows:
    i. Pressure Zone 3 reduced to 3B; existing pipe size is 12-inch.
        1. Size: 10-in CLA- Val 90-01 (City to identify Pilot System Specifications) with Low-Flow By-Pass.
        2. Flow: Min 700 gpm – Max 4000 gpm.
        3. Downstream Pressure Setting: 70 psi.
        4. Upstream Pressure Range: Min 65 psi – Max 122 psi.
    ii. Pressure Zone 3 reduced to Zone 2 existing pipe size 10-inch:
        1. Size: 8-in CLA- Val 90-01 (City to identify Pilot System Specifications) with Low-Flow By-Pass
        2. Flow: 300 gpm – 1100 gpm
        3. Downstream Pressure Setting: 53 psi
        4. Upstream Pressure Range: Min 95 psi – Max 122 psi
    iii. Flow Control Valve at 9000 South 3200 West:
        1. Size: 16-in CLA- Val 40-25 (City to identify Pilot System Specifications) with Low-Flow By-Pass
        2. Flow: Min 300 gpm – Max 1600 gpm
        3. Pressure Elevation Head (ft) 4729

b. UDOT shall work the City to determine final location of City's Central PRV Vault.
c. UDOT shall have final acceptance authority of City's PRV Betterment Work design that impacts UDOT right-of-way.
d. City shall provide design, construction and equipment for PRV communication SCADA system.
    i. City shall apply for a Project permit, defining scope, schedule and the City's installation contractor's contact information and insurances prior to entering the Project limits to install the PRV communication SCADA system.
e. UDOT shall assist and provide information to City to receive Utah Division of Drinking Water approval.
    i. City is responsible to obtain necessary approval from DEQ and Division of Drinking Water.

See concept drawings shown in Exhibit "D-4" that is incorporated by reference.

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EXHIBIT D-1

CITY OF WEST JORDAN, UTAH

PROJECT MANUAL FOR

CITY OF WEST JORDAN
7000 SOUTH AND BANGERTER HIGHWAY
UTILITY BETTERMENTS

SEPTEMBER 2016

DRAFT

CITY OF WEST JORDAN
8000 S. Redwood Road
West Jordan, UT 84088

EXHIBIT D-1

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Applicable APWA 2012 Sections

APWA SECTION 33 08 00; Commissioning Of Water Utilities
APWA SECTION 33 11 00; Water Distribution and Transmission
APWA SECTION 33 31 00; Sanitary Sewage Systems

PART II - APPENDICES

APPENDIX A
City of West Jordan 7000 South and Bangerter Highway Utility Betterments Drawings and Details

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EXHIBIT D-1

SECTION 01 42 19
REFERENCE STANDARDS

1.01 GENERAL

A. Titles of Sections and Paragraphs: Captions accompanying specification sections and paragraphs are for convenience of reference only, and do not form a part of the Specifications.

B. Applicable Publications: Whenever in these specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is specified, only the latest specifications, standards, or requirements of the respective issuing agencies which have been published as of the date that the Work is advertised for bids, shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth herein or shown on the drawings shall be waived because of any provision of, or omission from, said standards or requirements.

C. Specialists, Assignments: In certain instances, specifications test requires (or implies) that specific work is to be assigned to specialists or expert entities, who must be engaged for the performance of that work. Such assignments shall be recognized as special requirements over which the Contractor has no choice or option. These requirements shall not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the Work; also they are not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of work is recognized as "expert" for the indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of the entire set of contract requirements remains with the Contractor.

1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the general provisions of other portions of the specifications, all work specified herein shall conform to or exceed the requirements of all applicable codes and the applicable requirements of the following documents to the extent that the provisions of such documents are not in conflict with the requirements of these Specifications nor the applicable codes.

B. References herein to codes shall mean the following listed codes, as adopted by City of West Jordan, including all addenda, modifications, amendments, or other lawful changes thereto:

1. 2012 Manual of Standard Specifications, American Public Works Associations (APWA) Utah Chapter
2. UDOT 2012 Standard and Supplemental Specifications For Road and Bridge Construction and Drawings
3. UDOT Minimum Sampling and Testing Requirements
4. 2012 International Building Code
5. 2015 International Residential Code
6. 2009 International Mechanical Code
7. 2009 International Plumbing Code
8. 2015 International Fire Code
9. National Electric Code, 2014 Edition, as Published by the National Fire Protection Association

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(NFPA)

C. In case of conflict between codes, reference standards, drawings and the other Contract Documents, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the Engineer or Architect for clarification and directions prior to ordering or providing any materials or labor. The Contractor shall bid the most stringent requirements.

D. Applicable Standard Specifications: The contractor shall construct the Work specified herein in accordance with the requirements of the Contract Documents and the referenced portions of those referenced codes, standards, and specifications listed herein; except, that whenever references to "Standard Specifications" are made, the provisions therein for measurement and payment shall not apply.

E. References in the Contract Documents to "Standard Specifications" shall mean the 2012 Manual of Standard Specifications, American Public Works Associations (APWA) Utah Chapter including all current supplements, addenda, and revisions thereof; and UDOT 2012 Standard and Supplemental Specifications For Road and Bridge Construction including all current supplements, addenda, and revisions thereof.

F. Applicable Standard Drawings: References herein to "Standard Drawings" shall mean the Standard Drawings of the City of West Jordan which drawings are hereby incorporated in and made a part of these Contract Documents; and UDOT 2012 Standard and Supplemental Drawings For Road and Bridge Construction.

G. References herein to "OSHA Standards" shall mean Title 29, Part 1910, Occupational Safety and Health Standards, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

*** END OF SECTION ***

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EXHIBIT D-1

SECTION 26 42 10

CORROSION MONITORING

PART 1 GENERAL

1.01 WORK INCLUDED

A. This section covers the work necessary to furnish and install pipe joint bonds to form an electrically continuous pipeline, insulating joints, electrical isolation, and test stations, complete.

1.02 DEFINITIONS

A. Ferrous Metal Pipe: Any pipe made of steel or iron, or pipe containing steel or iron as a principal structural material, except reinforced concrete pipe.

B. Foreign Owned: Any buried pipe or cable not specifically owned or operated by the Owner.

C. Lead, Lead Wire, Joint Bonds, Pipe Connecting Wires, Cable: Insulated copper conductor; the same as wire.

D. Electrically Continuous Pipeline: A pipeline which has a linear electrical resistance equal to or less than the sum of the resistance of the pipe plus the maximum allowable bond resistance for each joint as specified in this section.

E. Electrical Isolation: The condition of being electrically isolated from other metallic structures (including, but not limited to, piping, reinforcement, casings, etc.) and the environment as defined in NACE Standard RP0169.

1.03 SUBMITTALS

A. Shop Drawings: Catalog cuts and other information for products proposed for use.

B. Quality Assurance Submittals:

1. Manufacturers' Certificates of Compliance.
2. Field Test Reports.

PART 2 PRODUCTS

2.01 GENERAL

A. Like items of materials provided hereunder shall be the product of one manufacturer in order to achieve standardization for appearance, maintenance, and replacement.

B. Materials and workmanship as specified in this section shall be installed concurrently with pipe installation. Coordinate all work specified herein with related sections.

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C. The use of a manufacturer's name and model or catalog number is for establishing only the standard of quality and general configuration desired. Products of other manufacturers will be considered.

2.02 JOINT BONDS

A. Ductile or Cast Iron Pipe:

1. No. 2 AWG, stranded copper wire, HMWPE insulation, maximum 18-inches long, with formed copper sleeves on each end.
2. Welding of bond to pipe shall be with the thermite weld mold recommended by the bond manufacturer for the specified pipe diameter and wire size.

B. Flexible Coupling, Flanged Coupling Adapter, and Other Non-standard Joints:

1. Ductile Iron Pipe: No. 2 AWG wires, 24 inches long, HMWPE insulation, with two 12-inch long THHN insulated No. 12 AWG wire pigtails, as manufactured by Erico Products Inc. (Cadweld), Cleveland, OH.
2. Steel Pipe:
   a. Solid copper strap, 1-1/4-inch wide by 1/16-inch thick, equivalent to 1/0 AWG wire, with five punched holes for thermite welding to the coupling and pipe. Strap bond shall be fabricated for the length of the coupling with sufficient additional length for 1 inch of joint movement.
   b. Weld bonds to pipe with the thermite weld mold recommended by the bond manufacturer.
   c. Strap bond shall be as manufactured by Erico Products, Continental Industries, or approved equal.

C. Insulated Flexible Coupling Joints:

1. Ductile Iron Pipe: No. 8 AWG HMWPE wire, 18-inch long, with one 12-inch long THHN insulated No. 12 AWG wire pigtail.
2. Steel Pipe:
   a. Solid copper strap, 1-1/4-inch wide by 1/16-inch thick, equivalent to 1/0 AWG wire, with four punched holes for thermite welding to the coupling and pipe. Strap bond shall be fabricated for the length of the coupling with sufficient additional length for 1 inch of joint movement.
   b. Weld bonds to pipe with the thermite weld mold recommended by the bond manufacturer.
   c. Strap bond shall be as manufactured by Erico Products, Continental Industries, or approved equal.

2.03 TEST STATION WIRES

A. General: Conform to applicable requirements of NEMA WC 3-80, WC 5-73, and WC 7-88.

B. Wire: Single-conductor, No. 12 AWG or No. 8 AWG stranded copper with 600-volt TW, THWN, or THHN insulation.

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C. Insulation Color:

1.	Pipeline Test Wires:	White
2.	Insulated Joints:	Green and White as shown on Drawings.
3.	Foreign Metallic Pipelines:	Blue (Water) and Red (Gas)
4.	Permanent Reference Cell:	Yellow

2.04 TEST STATION

A. Flush Mounted:

1. Test Box: Concrete body cast with a cast iron ring, with a minimum weight of 55 pounds and minimum dimensions of 8-inch inside diameter and 12 inches long. Furnish extensions as required to penetrate concrete surfaces by 4 inches minimum. Furnish with a 12-pound cast iron lid with the letters "TS" or words "Test Station" cast into the lid.
2. Manufacturer and Products: Brooks; Models 1RT or equal.

B. Flush Mount Test Station Terminal Board:

1. Test boards for terminating pipeline test leads and other test leads inside test boxes: 5-inch by 8-inch by 1/4 inch thick micarta or glass-fiberglass.
2. Furnish terminal block with five stainless steel studs, washers, and lock washers.
3. Shop fabricated as shown on the Drawings with engrave labels on terminal board.

C. Post Mounted (Wood Post):

1. Test Box: Cast aluminum suitable for threaded mounting to a 2-inch or larger rigid galvanized conduit.
2. Terminal Block: Plastic or glass-reinforced laminate, 1/4-inch thick with seven (7) terminals. Terminal heads shall have special heads to keep them from turning or shall be easily accessible from both sides of the terminal block without requiring its removal. Terminal studs, washers, and nuts shall be stainless steel.
3. Mounting Post: 4-inch by 4-inch by 6-foot long AWPB LP-22 preservative-treated wood post.
4. Mounting Hardware: Conduit, straps, and hardware for mounting test station to the post as specified under CONDUIT, LOCKNUTS, AND STRAPS.
5. Manufacturer and Product: Testox 800 series test stations for Type T, C, F and I test stations as manufactured by Gerome Manufacturing.

2.05 PERMANENT REFERENCE ELECTRODES

A. Prepackaged Copper-Copper Sulfate Reference Electrodes:

1. Material: High impact ABS, ceramic with Moisture Retention Membrane.
2. Dimensions: 1.5” by 10.5” or 1” by 8”.
3. Wire: Minimum 14 AWG stranded copper wire with yellow, 600-volt TW, THWN, or THHN insulation. The wire shall be attached to the electrode and insulated with the manufacturer's standard connection. Connection shall be stronger than the wire.

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4. Packaging: Furnish electrode packaged in a plastic or heavy paper bag of sufficient thickness to protect the electrode, backfill, and cloth bag during normal shipping and handling.
5. Manufacturers:
   a. Borin Manufacturing, Stelth Series
   b. MC Miller, IonX Permanent Reference Electrode

2.06 CONDUIT, LOCKNUTS, AND STRAPS

A. Conduit shall be rigid galvanized steel. Locknuts, two-hole straps, and other miscellaneous hardware shall be galvanized steel.

2.07 THERMITE WELD MATERIALS

A. General:

1. Thermite weld materials consist of wire sleeves, welders, and weld cartridges according to the weld manufacturer's recommendations for each wire size and pipe or fitting size and material.
2. Welding materials and equipment shall be the product of a single manufacturer. Interchanging materials of different manufacturers is not acceptable.

B. Molds: Graphite. Ceramic "One-Shot" molds not acceptable.

C. Adapter Sleeves:

1. For No. 12 AWG and No. 2 AWG wires.
2. Prefabricated factory sleeve joint bonds or bond wires with formed sleeves made in the field are acceptable. Attach field-formed joint bonds sleeves with the appropriate size and type of hammer die furnished by the thermite weld manufacturer.
3. Extend wire conductor 1/8 inch beyond the end of the adapter sleeve.

D. Cartridges:

1. Steel: 32 grams, maximum.
2. Cast and Ductile Iron: 45 grams, maximum, XF-19 Alloy

E. Welders and Cartridges: For attaching copper wire to pipe material:

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Pipe Material	Weld Type	Cartridge Size, Max.
No. 4 AWG Wire & Smaller		
Steel	HA, VS, HC	25 gm
Ductile or Cast Iron	HB, VH, HE	32 gm
Wire Joint Bonds		
Steel	FS	32 gm
Ductile or Cast Iron	FC	45 gm

F. Welding Materials Manufacturers:

1. Erico Products Inc. (Cadweld), Cleveland, OH.
2. Continental Industries, Inc. (Thermo-Weld), Tulsa, OK.

2.08 COATING REPAIR MATERIAL FOR PIPE AND FITTINGS

A. General:

1. Complete coating repairs in accordance with recommendations of the pipe or fitting manufacturer.
2. Coat thermite weld connections to ductile iron pipe with fast cure epoxy or thermite weld cap.

B. Thermite Weld Caps: Prefabricated weld cap with coating and primer, if required, such as Handy Cap IP as manufactured by Royston Laboratories, Inc.

C. Epoxy Coating:

1. 100 percent solids, fast curing epoxy suitable for submerged or buried conditions.
2. Acceptable products and manufacturers or equal:
   a. Aquata-poxy, American Chemical Corp., East Lake, OH.
   b. Protal 7125 (low temperature) or Protal 7300, Denso North American, Houston, TX.
   c. TC 7010, Tapecoat, Evanston, IL.

2.09 ANCILLARY MATERIALS

A. Wire Connectors: One-piece, tin-plated crimp-on ring tongue connector as manufactured by Burndy Co. or Thomas and Betts.

B. Compression Connectors:

1. For in-line, tap, and multi-splice, furnish "C" taps made of conductive wrought copper, sized to fit the wires being spliced.

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2. Provide crimp tool and dies as recommended by the manufacturer for the wire and connector size.
3. Manufacturer and Product: Burndy; Type YC, or equal.

C. Electrical Tape:
1. Linerless rubber high-voltage splicing tape and vinyl electrical tape suitable for moist and wet environments.
2. Use Scotch 130 C and Scotch 88 as manufactured by 3M Products.

D. Silver Brazing Alloy: Fifteen percent silver content, 1185 degrees F to 1300 degrees F melting range, ASTM B 260.

2.10 INSULATING JOINTS

A. General: Insulating joints shall be dielectric unions, flanges, or couplings. The complete assembly shall have an ANSI rating equal to or higher than that of the joint and pipeline. All materials shall be resistant for the intended exposure, operating temperatures, and products in the pipeline.

B. Insulating Flange Joints:

1. Complete assembly shall have an ANSI rating of 150 pounds, minimum, or equal to or higher than that of the joint and pipeline.
2. Gasket materials shall be resistant to intended chemical exposure, operating temperatures, and pressures in the pipeline.
3. Gaskets: Full-face Type E with O-ring seal.
4. Insulating Sleeves: Full-length fiberglass reinforced epoxy (NEMA G-10 grade).
5. Insulating Washers: Fiberglass reinforced epoxy (NEMA G-10 grade).]
6. Steel Washers: Plated, hot-rolled steel, 1/8-inch thick.
7. Manufacturers:
   a. Pacific Seal, Inc., Burbank, CA.
   b. Central Plastics Co., Shawnee, OK.

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PART 3 EXECUTION

3.01 GENERAL

A. All materials and equipment associated with joint bonding, test stations, insulating joints, and corrosion monitoring sensors as shown on the Drawings and specified herein shall be furnished and installed by the Contractor. Any changes in design or method of installation of an item as specified shall be reviewed by the Engineer.

B. The Contractor shall coordinate the installation of the specified items with the General Contractor or other subcontractors on the project such that installation of the items herein specified can be completed concurrently with pipeline installation. Items not installed before backfilling of the pipe shall be installed at the Contractor's sole expense.

C. Whenever the requirements of the Specifications or Drawings exceed those of the codes or manufacturer's instructions, the requirements of the Specifications or Drawings shall

prevail. Where a larger size or better grade of material or a higher standard of workmanship is required, the most stringent requirement shall apply.

3.02 PIPE JOINT BONDING

A. To form an electrically continuous pipeline and associated appurtenances, the joints of all buried steel and iron pipe, including vault and manhole piping and all fittings, and including all restrained joints and follower rings, shall be electrically bonded, except joints specified to be threaded, welded, or insulated.

B. Mechanical pipe connections are not considered to provide electrical continuity. All metallic components associated with appurtenances and fittings, including follower rings and retainer glands shall be electrically bonded to the piping system.

C. Install two (2) joint bond wires at ductile iron pipe joint that requires bonding.

D. Electrical connection of all wires to pipe and fittings shall be by the thermite weld process.

E. Each bonded joint shall be tested as specified under ELECTRICAL CONTINUITY TESTING, this section.

3.03 TEST STATION INSTALLATION

A. Location
1. Location of test stations shall be as shown on the Drawings. CONTRACTOR shall determine the location of the test stations based on actual site conditions and as approved by the ENGINEER.
2. Test stations types shall be generally located as follows, unless otherwise specified or shown on the Drawings:
   a. Install Type T test stations or other type test stations as required or at 1,200-foot intervals, but shall not exceed 1,500 feet.
   b. Install a Type F test station where any metallic pipe crosses a foreign-owned metallic pipeline under cathodic protection.
   c. Install a Type C test station at each end of cased crossings, including irrigation canals, rivers, railroad, or interstate highway, unless otherwise indicated on the Drawings.
   d. Install a Type I test station at all insulated joints.
3. Locate post-mounted test stations directly over the pipe and, where possible, at protected locations such as fences, manholes, power poles, or edges of cultivated land.
4. Locate flush mounted test stations directly over the pipeline, except in areas of heavy traffic conditions. When heavy traffic conditions exist, offset the test stations to the side of the street.

B. Style:
1. Test station style shall be either flush or post mounted as shown on the Drawings and as follows:
2. Post mount style test stations shall be wood, plastic, steel, or condulet style as shown on the Drawings.

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a. Wood, plastic, or steel post style test stations shall be used for Type C, F, or I test stations or any other test station type which has four or more wires and for type T test stations where self support is required.
b. Condulet post style test station shall be used for Type T test stations where support is available in the form of fence posts, pipe marker posts, or aboveground manholes.

3. Flush mount style test stations shall be used for all type test stations in traffic, landscaped, or areas where aesthetic requirements restrict use of aboveground facilities.

C. Installation:
1. Post mounted test station:
a. Height shall be 30 to 36-inches above finish grade.
b. In areas with livestock, test station height shall be between 12 and 18-inches.
2. Flush Mounted Test Stations
a. Place in concrete pad or sidewalk with cast iron cover as shown on Drawings.
b. Place concrete box on top of 3-inch base of compacted sand.
c. In unimproved areas provide blue "Carsonite" utility marker with yellow reflector on each side 1 foot from test box or as directed by the ENGINEER.

D. Test Wires:
1. Wires shall be attached to the pipe as specified under WIRE CONNECTIONS, this section.
2. Wires to foreign-owned pipelines shall be connected to the pipe by the CONTRACTOR unless the foreign pipeline owner has indicated otherwise in writing. The CONTRACTOR shall coordinate this work with the owner of the foreign pipeline.
3. Wires shall be buried a minimum of 30 inches below finished grade. Wires shall be direct buried except when station is required to be offset to the side of a road. Offset wires shall be installed in PVC coated rigid steel conduit from the centerline of the pipeline to the back of curb or test station, whichever is least.
4. Provide 12-inch diameter loop in wires at the pipeline connection, at each end of rigid conduit when required, and below post mounted test stations to prevent wires from being stressed or broken.
5. Maintain sufficient slack in flush mount test wires to permit extension of terminal block 18-inches from station.
6. Make wire connections to test station terminals with crimp-on ring tongue terminals, except where solid wire is specified.

3.04 REFERENCE ELECTRODE INSTALLATION

A. Remove plastic or paper wrapper and place reference electrode within the pipeline trench excavation 6 inches below the centerline of the pipe in a vertical position or as required by manufacturer.

B. Install reference cell as required by manufacturer at the locations indicated on the Drawings.

1. Do not use lead wire in lowering reference cell.
2. Backfill hole with select native material in 6-inch layers and hand tamp each layer around anode.

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3. Use only native soil for backfill; do not use sand.
4. Exercise care not to strike reference cell or lead wire with tamper.

C. Terminate reference electrode wire in test station.

3.05 WIRE CONNECTIONS

A. Thermite Weld:

1. Use thermite weld method for electrical connection of copper wire to steel, ductile, and cast iron surfaces. Observe proper safety precautions, welding procedures, thermite weld material selection, and surface preparation recommended by the welder manufacturer. Assure that the pipe or fitting wall thickness is of sufficient thickness that the thermite weld process will not damage the integrity of the pipe or fitting wall or protective lining.
2. After the weld connection has cooled, remove slag, visually inspect, and physically test wire connection by tapping with a hammer; remove and replace any defective connections.
3. On pipe and fittings with dielectric linings, make the weld connection on the shop tab provided or on a thick metal section to minimize damage to the lining and coating. After the weld is made, coat the weld with coating repair material.
4. Coat all welds and exposed wire or copper on each connection as specified, this section. If the lining is damaged by the welding, repair in accordance with the lining applicator's recommendations.

3.06 WIRE INSULATION REPAIR

A. Splicing of wire will not be permitted except where specifically shown on the drawings and approved by the Engineer.

B. Splices or damage to the wire insulation shall be required by spirally wrapping with two coats of high-voltage rubber splicing tap and two layers of vinyl electrical tape.

C. Make wire splices with suitable sized compression connectors or mechanically secure and solder with rosin cored 50/50 solder.

3.07 INSULATED JOINTS

A. Install insulated joints to electrically isolate the pipeline as shown on the Drawings.

B. Align and install insulating joints according to the manufacturer's recommendations to avoid damaging insulating materials.

C. After assembly of insulated flanges, prepare cement-mortar surface in accordance with paint manufacturer's instructions and apply a 20-mil minimum thickness of EPA potable water approved, 100 percent solids water or air curing epoxy coating to the interior of the pipeline. Apply coating for a minimum of two pipe diameter lengths from the insulating flange in both directions. Apply and cure coating in accordance with the manufacturer's recommendations. Do not apply coating where it will interfere with operation of pipeline valves or other pipeline assemblies.

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D. Install a Type I test station at each insulated joint.

E. The CONTRACTOR shall test each insulated joint for electrical insulation as specified this section. Defective insulating joints shall be repaired by the CONTRACTOR at his sole expense. All damaged or defective insulation parts shall be replaced.

3.08 TESTS AND INSPECTIONS

A. Electrical Continuity Testing:

1. General
   a. Furnish all necessary equipment and materials and make all electrical connections to the pipe as required to test continuity of bonded joints.
   b. Conduct a continuity test on all buried joints that are required to be bonded. Test the electrical continuity of joint bonds after the bonds are installed but before backfilling of the pipe.
   c. The Contractor shall test completed joint bonds for electrical continuity using digital low resistance ohmmeter or by the Calculated Resistance Test Method at the Contractor's option. The equipment and test procedures for the two methods are described herein.

2. Digital Low Resistance Ohmmeter Method:

   a. Required Equipment and Materials:
      (1) One Biddle Model 247001 digital low resistance ohmmeter.
      (2) One set of duplex helical current and potential handspikes, Biddle Model No. 241001, cable length as required.
   b. Test Procedure: Measure the resistance of joint bonds with the low resistance ohmmeter in accordance with the manufacturer's written instructions. Use the helical handspikes to contact the pipe on each side of the joint, without touching the thermite weld or the bond. The contact area shall be cleaned to bright metal by filing or grinding and without any surface rusting or oxidation. Record the measured joint bond resistance on the test form described herein. Repair any damaged pipe coating in accordance with WIRE CONNECTIONS, this section.

3. Calculated Resistance Method:

   a. Required Equipment and Materials:
      (1) One dc ammeter (meter or clamp-on) with full-scale reading of 100 amperes and a minimum resolution of 1 ampere or a 100-ampere shunt with a voltmeter as specified herein.
      (2) One high-resistance electronic voltmeter with a dc low range of 200 millivolts full scale to a dc high range of 20 volts full scale and capable of a minimum resolution of 1 millivolt (two voltmeters are required if a shunt is used).
      (3) One knife switch, safety switch, or time controlled relay suitable for test current.
      (4) Two electrical probes for the voltmeter.
         (a) Insulated wire suitable for carrying the test current, length as required.

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(b) One dc power supply with a steady capacity of 50 amperes minimum; storage batteries are not an acceptable power supply.

b. Test Procedure:

(1) Current wire connections shall be either tightly clamped or thermite welded to the pipe at the Contractor's option. Wire size shall be determined by the Contractor and shall be sized for the test current, and shall not exceed 1,000 feet in length.

(2) Apply a minimum direct current of 50 amperes.

(3) Measure the voltage drop across each joint with a voltmeter by contacting the pipe on each side of the joint. Voltmeter connections to the bond wire or thermite welds will not be acceptable.

(4) Measure the current applied to the test span and the voltage drop across the joint simultaneously.

(5) Record the measured voltage drop and current for each joint of the test form described herein and calculate the bond resistance in accordance with the following formula:

$$R = \frac{E}{I}$$

Where:

R = Resistance of the joint bond.
E = Measured voltage drop across the joint, in volts.
I = Test current applied to the pipe test span, in amperes.

4. Joint Bond Acceptance:

a. Joint bond resistance shall be less than or equal to the maximum allowable bond resistance values shown in Table 1.

Table 1

Joint Type	Max. Allowable Resistance (Ohms)		
	One bond/Joint	**Two Bonds/Joint**	**Three Bonds/Joint**
No. 2 AWG wire Bonds	0.000325	0.000162	0.000081
Flexible Coupling	0.000425	0.000212	0.000115

b. The Contractor shall replace any joint bond that exceeds the allowable resistance. Replacement joint bonds shall be retested for compliance with the specified bond resistance.

c. Any defective joint bond discovered during energizing and testing shall be located, excavated, repaired, and backfilled by the Contractor.

5. Test Records: Records shall be made of each bonded pipeline during the test and submitted to the Engineer. These records shall include:

a. Description and location of the pipeline tested.

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b. Starting location and direction of test.
c. Date of test.
d. Joint type.
e. Test current and voltage drop across each joint and calculated bond resistance (Calculated Resistance Method only).
f. Measured joint bond resistance (Digital Low Resistance Ohmmeter method only).

B. Final Electrical Continuity Test:

1. After the pipeline construction is completed and test stations have been installed, the Engineer shall test the completed pipeline for electrical continuity using the four-wire lineal pipe resistance test method.
2. Test will be conducted with a minimum test current of 10 amperes using a portable rectifier or dc welder.
3. An electrically continuous pipeline will be defined as a pipe or section of pipe that has a linear electrical resistance equal to or less than the sum of the lineal resistance of the pipe plus the maximum allowable joint bond resistance for each joint within the test section as specified this section.
4. Each discontinuous section of pipe shall be retested after all continuity repairs are completed to demonstrate that the pipeline is electrically continuous.

C. Electrical Discontinuity Location:

1. If electrically discontinuous sections of pipe are detected during final continuity testing, the Contractor to locate and repair electrically discontinuous joint bonds.
2. Location of discontinuous joints bonds may be performed using a test method determined by the Contractor. Regardless of test method used to locate discontinuous joints, final acceptance of discontinuous sections shall be determined by the lineal pipe resistance method.
3. After all discontinuous joints are repaired, the repaired section shall have a resistance less than or equal to the calculated allowable lineal pipe resistance as determined by the initial final continuity testing.
4. Existing joint bonds damaged during excavation of the pipe for repairs or temporary wire connection shall be repaired by the Contractor.
5. Existing test stations shall be protected from damage. When damage occurs CONTRACTOR shall complete repairs while the excavation is open. Undisclosed test station damage that requires repairs to be made after backfilling the excavation will be repaired at the Contractor sole expense.

D. Insulated Joint Testing:

1. Test each insulating joint after assembly with a GAS Electronics Model 601 insulator tester or equivalent instrument in accordance with the manufacturer's written instructions. Conduct test before burial and coating of buried insulating flanges.
2. Contractor to replace damaged or defective insulation parts identified during testing.
3. Electrical Isolation is defined as a condition of being electrically isolated from other metallic structures (including, but not limited to, other piping, concrete reinforcement, casings, and other structures not intended to be cathodically protected) and the environment as defined in NACE Recommended Practice RP0169-83.

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4. Engineer shall conduct additional insulating joint tests as required to ensure that insulating flanges are not electrically shorted by other equipment or incidental contact with concrete reinforcement or other equipment during energizing and testing.

END OF SECTION

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EXHIBIT D-1

SECTION 33 05 05

DUCTILE IRON PIPE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Ductile iron pipe, couplings, fittings, and joint materials.

1.02 REFERENCES

A. American Water Works Association (AWWA)

1. C104 Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
2. C105 Polyethylene Encasement for Ductile-Iron Pipe
3. C110 Ductile-Iron and Gray Iron Fittings, 3 In. Through 48 In., for Water and Other Liquids.
4. C111 Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings.
5. C115 Flanged Ductile-Iron and Gray Iron Pipe with Threaded Flanges.
6. C150 Standard for the Thickness Design of Ductile-Iron Pipe.
7. C151 Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids.
8. C600 Installation of Ductile-Iron Water Mains and Their Appurtenances.

1.03 SUBMITTALS

A. Product Data: Manufacturer's catalog data for pipe, and pipe joints.

B. Quality Control

1. Certificates from manufacturer evidencing compliance with AWWA standards listed herein for pipe, pipe joints, valves, valve boxes, and hydrants.
2. Certification by nationally recognized, independent organization that components, materials, and treatment chemicals in contact with potable water conform to ANSI/NSF Standard 60 or 61, as applicable.

PART 2 PRODUCTS

2.01 CEMENT-LINED DUCTILE IRON PIPE

A. Pipe:

1. Design: AWWA C150.
2. Manufacture: AWWA C151.
3. Minimum thickness:
   a. Buried: 24-inch Pressure Class 250.
   b. Exposed, flanged: Class 53.

B. Fittings:

1. Buried: Mechanical, push-on joints, or TR Flex Restrained Joint.
   a. AWWA C153.
   b. AWWA C110; rated working pressure, 250 psi.
2. Exposed: Flanged joints.
   a. AWWA C110; rated working pressure, 250 psi.

C. Joints:

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1. Buried: Mechanical, push-on, or TR Flex Restrained Joint Pipe, AWWA C111.
2. Exposed: Flanged, AWWA C111.
3. Gasket: Styrene butadiene rubber.
4. Fitting joints: Type similar to that used for pipe; AWWA C110, C111, C115, or C153.
5. Restrained joints:
    a. Use pipe manufacturer's standard restrained joints or Series 1700 restraint harness, EBAA Iron Sales, Inc., or approved equal rated at specified test pressure for buried piping lengths shown on Drawings.
    b. Fittings: Series 1100 bell restraints, EBAA Iron Sales, Inc., or approved equal rated at specified test pressure for buried piping lengths shown on Drawings.
    c. Restrained joint pipe and fittings (McWane TR Flex or approved equal) may be used in lieu of mechanical restraint harness.

D. Standard cement lining for pipe and fittings; AWWA C104.

1. Thickness: Standard thickness.
2. Seal coat: Asphaltic material.

E. Include gaskets, glands, bolts, and nuts required for complete installation.

F. Mark each length of pipe with manufacturer's name and class.

G. Exterior coating for pipe and fittings: Asphaltic coating; AWWA C151.

H. Polyethylene encasement:

1. Linear, low-density with 8-mil thickness or high-density, cross-laminated with 4-mil thickness, tube-type, polyethylene film; AWWA C105.
2. Color: Purple.
3. All fittings shall be completely coated with Chevron FM Grease and shall be completely encased with 8 mil, Class C polyethylene in those areas designated by the ENGINEER, conforming to AWWA C105. All seams in the polyethylene encasement shall be taped with Polycan #900 Adhesive Tape to completely seal the seam.

I. Buried Mechanical Joints:

1. Grease and 8-mil vinyl wrap plastic cover.
2. Color: Purple.

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2.02 UNDERGROUND WARNING TAPES

A. Type: Purple; 6" wide, polyethylene by 5 mil thickness with no less than a 50 gauge solid aluminum foil core, for ease of locating buried pipe. Printed wording shall read "Caution - Water Line Buried Below."

B. Bury approximately 12" directly above water main.

C. Location: Entire length of water main except for canal crossings. Warning tape shall be as manufactured by Magnatec or approved equal.

2.03 DUCTILE IRON PIPE JOINTS

A. Ductile iron pipe shall be furnished with mechanical joints, push on, flanged joints, or TR Flex Restrained Joint as required and shall conform to the "American National Standard for Rubber-Gasket Joints for Cast Iron and Ductile Iron Pressure Pipe and Fittings" (ANSI A21.11 AWWA C111) and the "American National Standard for Flanged Cast Iron and Ductile Iron Pipe with Threaded Flanges" (ANSI A21.15 AWWA C115).

2.04 MECHANICAL-TYPE COUPLINGS

A. Mechanical-type couplings shall be designed for a water working pressure not less than the design pressure of the pipe on which they are to be installed. Restraints shall be provided as required.

2.05 SLEEVE-TYPE COUPLINGS

A. Sleeve-type couplings shall be provided where shown. Couplings shall be of ductile iron, without pipe stop, and shall be of sizes to fit the pipe and fittings shown. Couplings shall be the CLOW F-1014 or approved equal. Where sleeves are utilized proper anchoring shall be provided.

2.06 GASKETS AND BOLTS

A. Except as otherwise provided, gaskets for flanged joints shall be 1/8-inch thick rubber fabric. Wherever blind flanges are shown, the gaskets shall consist of 1/8-inch thick cloth-inserted rubber sheet which shall cover the entire inside surface of the blind flange and shall be cemented to the surface of the blind flange. All buried fittings using steel bolts shall be coated with no-oxide wax and wrapped with polyethylene or as otherwise approved by the ENGINEER.

2.07 CEMENT MORTAR LINING

A. Ductile iron pipe and fittings shall be lined with cement mortar in accordance with the requirements of the "American National Standard for Cement Mortar Lining for Cast Iron and Ductile Iron Pipe and Fittings for Water" (ANSI A21.4 AWWA C104) except that the lining thickness shall be not less than 1/8 of an inch.

2.08 THRUST RESTRAINTS

A. All fittings shall have proper thrust restraints as noted for the type of installation required. Restraints shall be tie-rods, Megalug or approved equal, or Engineer approved anchoring devices.

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PART 3 EXECUTION

3.01 INSTALLATION

A. Store, handle, join, lay, and otherwise install in accordance with pipe manufacturer's recommendations.

B. Trench excavation and backfill: Conform to requirements of UDOT 2012 Standard and Supplemental Specifications For Road and Bridge Construction.

C. Minimum earth cover: 4'.

D. Clean pipe interior of foreign material before lowering into trench; keep clean at all times by securely closing open ends of pipe and fittings.

E. Lay pipe in dry soil conditions.

F. Handle pipe and accessories in manner to ensure delivery to trench in sound, undamaged condition; take particular care not to injure pipe coating or cement lining.

G. Cut pipe in neat and workmanlike manner without damage to pipe.

H. Carefully protect joint material from injury while handling and storing pipe; keep weight off joint material on spigot; use no pipe with joints deformed, gouged, or otherwise impaired.

I. Pipe which is damaged or unsound will be rejected; before installation of ductile iron pipe, tap with light hammer to detect cracks.

J. Use suitable fittings where grade or alignment requires offsets greater than manufacturer's recommended joint deflections. Do not exceed 50% of manufacturer's recommended joint deflection.

K. Plug or cap and block pipe ends or fittings left for future connections. The pipe shall be plugged at the end of each work day or period of suspension.

L. Uncover existing mains, to which connections are to be made, a sufficient time ahead of pipe laying operations to determine fittings required.

M. Make connections between existing and new water mains with specials and fittings to suit actual conditions.

N. Install polyethylene encasement of ductile iron pipe in accordance with AWWA C105.

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3.02 PRELIMINARY CLEANING AND FLUSHING

A. CONTRACTOR shall flush the pipeline as the work progresses by a means in accordance with good practice to insure that sand, rocks, or other foreign material are not left in any of the pipeline. If possible the flushing shall be made with an open pipe end.

3.03 TESTS FOR WATER MAINS

A. Test piping after installation in accordance with AWWA Specification C600.

B. Test piping with relatively clean water, free from organic debris and sand or silt.

C. Pressure test for water main:

1. Pressure test: 200 psi at lowest point in test section.
2. Duration of pressure test: 2 hours.
3. Flush out main before test to remove air; insert taps if necessary to blow off trapped air.
4. Maximum allowable pressure variation during test period: 5 psi.

D. Leakage test for water main:

1. Conduct concurrently with pressure test.
2. Measure water supplied to maintain test pressure within 5 psi of test pressure by pumping from calibrated container.
3. Maximum allowable leakage (L) in gallons per hour:

$$L = \frac{SD \sqrt{P}}{133{,}200}$$

S = length of pipe tested in feet
D = nominal pipe diameter in inches
P = average test pressure, psig

4. When testing against closed metal seated gate valves, an additional leakage of 0.0078 gallons per hour per inch of nominal valve size shall be allowed.

E. Provide test pumps, test plugs, pipe, calibrated container, and gages, and make required piping connections.

F. Carefully examine visible joints during the time pressure is on pipe.

G. Refit piping as needed to minimize or eliminate leakage.

H. Locate and repair or replace defective pipe or fittings until leakage is within specified allowance.

I. A satisfactory shutdown is one which allows the work to be accomplished (i.e. pipe installation) using drainage pumps to dewater if needed.

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J. Furnish labor, material and equipment associated with construction dewatering at no additional cost to Owner.

K. In the case of pipelines that fail to pass the leakage test, CONTRACTOR shall determine the cause of the excessive leakage, shall take corrective measures necessary to repair the leaks, and shall again test the pipelines, all at no additional cost to OWNER.

L. The ENGINEER shall be notified at least 48 hours before the pipeline is to be tested so that he may be present during the test.

END OF SECTION

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EXHIBIT D-1

SECTION 33 08 00
COMMISSIONING OF WATER UTILITIES

This specification changes a portion of APWA Standard Specification Section 33 08 00. All other provisions of the Section remain in full force and effect.

Delete articles 3.3.B, 3.8.G in Part 3.

END OF SECTION

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EXHIBIT D-1

SECTION 33 11 00
WATER DISTRIBUTION AND TRANSMISSION

This specification changes a portion of APWA Standard Specification Section 33 11 00. All other provisions of the Section remain in full force and effect.

change the following articles in part 1.

1.5 SITE CONDITIONS

D. The Contractor is to coordinate water shutdowns with City Water Department. Water valves shall only be operated by City personnel.

change the following articles in part 2.

2.3 CONCRETE

A. Refer to UDOT Standard Specification Section 03055 Portland Cement Concrete and UDOT Supplemental Specification 03055M Portland Cement Concrete.

2.6 TAPPING SADDLES

A. As specified in West Jordan Standard Drawing CW-105.

2.7 SERVICE CONNECTION

A. As specified in West Jordan Standard Drawing CW-105.

2.8 ACCESSORIES

A. Service Pipe: Provide pipe as specified in the most current edition of the City of West Jordan Water Policies, Design and Criteria Manual. See Standard Drawings CW-105 and CW-120 for more information.
B. Service Valves and Fittings: As specified in Standard Drawing CW-105 and CW-120.
C. Meter Settings: As specified in Standard Drawing CW-120.
D. Corporation Stops and Angle Valves: As specified in Standard Drawing CW-105.
E. Bypasses: Not allowed on any service installation without approval of the Engineer.

change the following articles in part 3.

3.8 INSTALLATION – SERVICE LINES

A. Replace Existing Service Line:
   1. Follow AWWA C800, Utah public drinking water regulations and Utah plumbing code requirements.
   2. When replacing water service lines, replace lines copper lines with Type K copper pipe, and non-copper pipe with polyethylene IPS 200 PSI SIDR-7 “Blue NSF approved unless otherwise stated on the plans.

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3.12 **BACKFILLING**

B. Trenches:
   1. Pipe zone backfill: Refer to detail drawings.
   2. Trench backfill: Refer to detail drawings.

Delete article 3.13 in Part 3.

END OF SECTION

DRAFT

EXHIBIT D-1

SECTION 33 31 00
SANITARY SEWERAGE SYSTEMS

This specification changes a portion of APWA Standard Specification Section 33 31 00. All other provisions of the Section remain in full force and effect.

Replace the following articles to Part 2.

2.2 MORTAR, GROUT AND CONCRETE

A. Portland cement mortar, stiff mortar composed of one part portland cement to two parts sand.
B. Non-shrink grout, use non-shrink grout according to ASTM C 1107.
C. Concrete:
    1. Cast-in-place: 4,000 psi, UDOT Standard Specification Section 03055 Portland Cement Concrete and UDOT Supplemental Specification Section 03055M Portland Cement Concrete.
    2. Precast concrete: 5,000 psi, UDOT Standard Specification Section 03055 Portland Cement Concrete and UDOT Supplemental Specification Section 03055M Portland Cement Concrete.

2.3 MANHOLES

D. Frame and Cover: Scoriated, asphalt coated, heavy duty, ductile iron UDOT Standard Specification Section 02635, with flat top and appropriate utility lettering. Shape, size and lifting device as necessary.

E. Pipe Connectors:
    2. Cast in Place or Connections to Existing Fixture with Plastic Pipe: Use rubber adapter gasket for precast sections. Grout, use non-shrink grout according to ASTM C 1107 for cast in place sections.

Replace the following articles to Part 3.

3.1 PREPARATION

B. Hand trim excavations to required elevations. Backfill over excavations and compact, UDOT Standard Specification Section 02056 Embankment, Borrow, and Backfill; and UDOT Supplemental Specification Section 02056M Embankment, Borrow, and Backfill.

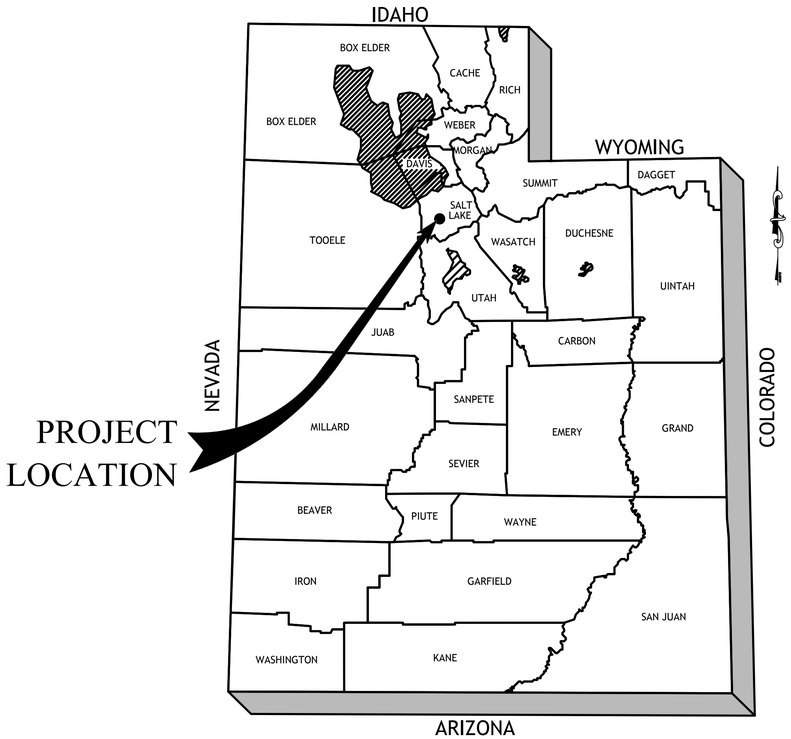
END OF SECTION

DRAFT

EXHIBIT D-1

7000 SOUTH AND BANGERTER HIGHWAY UTILITY BETTERMENTS

ISSUED FOR REVIEW



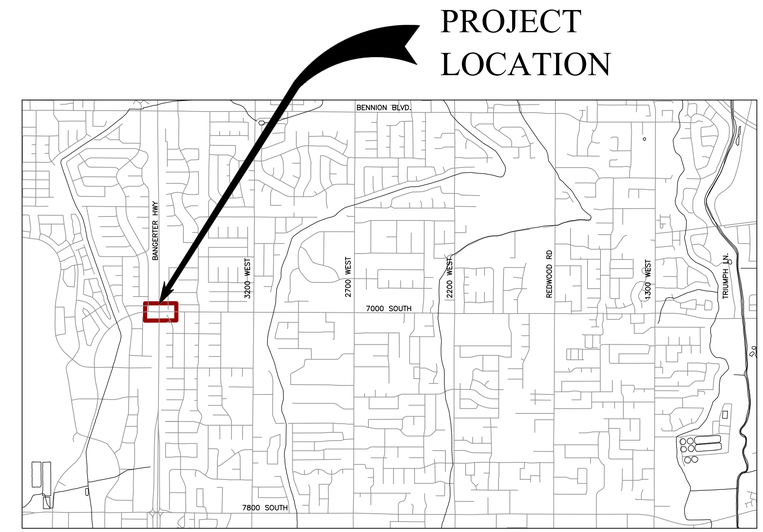
LOCATION MAP

N.T.S

WEST JORDAN

UTAH

DRAFT



VICINITY MAP

N.T.S

INDEX OF DRAWINGS

SHEET NO.	DWG. NO.	DESCRIPTION
1	G-001	PROJECT LOCATION AND SHEET INDEX
2	G-002	LEGEND
3	G-003	GENERAL NOTES
4	C-100	PLAN AND PROFILE - SANITARY SEWER SHEET 1
5	C-200	PLAN AND PROFILE - SECONDARY WATER SHEET 1
6	C-201	PLAN AND PROFILE - SECONDARY WATER SHEET 2
7	C-610	SANITARY SEWER DETAIL SHEET 1
8	C-611	SANITARY SEWER DETAIL SHEET 2
9	C-620	SECONDARY WATER DETAIL SHEET 1
10	C-621	SECONDARY WATER DETAIL SHEET 2

NO.	REVISIONS	DSGN	CHKD	APVD	DATE
B	ISSUED FOR RFP	AKF	GST	DWJ	09/08/16
A	ISSUED FOR REVIEW	AKF	GST	DWJ	07/07/16

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7000 SOUTH UTILITY BETTERMENTS

PROJECT LOCATION AND SHEET INDEX

DESIGNED AKF/JDU
DRAWN IL
CHECKED GST
APPROVED GST
APPROVED DWJ
DATE 7/5/16

SCALE: AS SHOWN

NO. G-001 REV. B

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CADD D3-R4

EXHIBIT D-1

SYMBOL LEGEND

DESCRIPTION	EXIST.	PROP.
SANITARY SEWER		
SANITARY SEWER MANHOLE	S	S
STORM SEWER MANHOLE	D	D
STORM DRAIN		
CATCH BASIN		
DROP INLET		
STORM DRAIN	SD	SD
COMMUNICATION		
TELE. PEDESTAL	T	T
TV PEDESTAL	TV	TV
CABLE TV	CATV	CATV
DOMESTIC WATER		
FIRE HYDRANT		
WATER MANHOLE		WM
WATER METER		
WATER VALVE	WV	WV
ELECTRIC		
ELEC. MANHOLE	E	E
JUNCTION BOX	J	J
ELEC. TRANS.	E	E
GUY WIRE		
LIGHT POLE	LP	LP
POWER POLE	PP	PP
SIGNALS		
SIGNAL CONTROLLER		
SIGNAL POLE		SP
MANHOLES		
MANHOLE		
NATURAL GAS		
GAS VALVE	G	G
GAS MANHOLE	G	G
SITE		
SIGN		

DESCRIPTION	EXIST.	PROP.
SURVEY		
CAP		
CTRL PT		

LINE LEGEND

DESCRIPTION	EXIST.	PROP.
STORM DRAIN	X"SD	X"SD X"SD
MIDVALE STORM DRAIN	MSD	MSD MSD
UDOT STORM DRAIN	UDOTSD	UDOTSD
SANITARY SEWER	X"SS	X"SS
MIDVALE SANITARY SEWER	MSS	MSS
WATER	X"W	X"W X"W
IRRIGATION	X"IRR	X"IRR
NATURAL GAS	X"GAS	X"GAS
HIGH PRESSURE NATURAL GAS	HP"GAS	HP"GAS
OVERHEAD POWER	OHP	OHP
UNDERGROUND POWER	UGP	UGP
POWER	P	P
TELEPHONE	T	T
FIBER OPTIC	FO	FO
CABLE TELEVISION	CTV	CTV
FENCE	X	X
MAJOR CONTOUR		
MINOR CONTOUR		
PROPERTY LINE	P/L	P/L
RIGHT OF WAY	R/W	R/W
SECTION LINES	SEC	SEC
QUARTER SECTION LINES	¼ SEC	¼ SEC
CURB AND GUTTER		
ROAD CENTERLINE		

ABBREVIATIONS

ABBREV.	TERM
A	GRADE CHANGE
ALUM	ALUMINUM
ASSY	ASSEMBLY
∠	ANGLE
@	AT (MEASUREMENTS)
BC	BEGINNING OF CURVE
BFS	BEGIN FULL SUPER
BLDG	BUILDING
B.M.	BENCH MARK
BNC	BEGIN NORMAL CROWN
BNS	BEGIN NORMAL SHOULDER
BOA	BEGINNING OF ALIGNMENT
BP	ALIGNMENT BEGINNING
BREAK	GRADE BREAK
BSC	BITUMINOUS SURFACE COURSE
BSW	BACK OF SIDEWALK
BVC	BEGIN VERTICAL CURVE
BVCE	BVC ELEVATION
BVCS	BVC STATION
BVP	PROFILE START
B.W.	BOTH WAYS
C	CHANNEL (STRUCTURAL)
CJ	CONTROL JOINT
℄	CENTER LINE
CLR	CLEARANCE
CMP	CORRUGATED METAL PIPE
CO	CLEANOUT
CONC	CONCRETE
CONT	CONTINUOUS
CPLG	COUPLING
CS	CURVE-SPIRAL INTERSECT
CS_LRB	COMPOUND SPIRAL LARGE RADIUS AT BEGINNING
CS_LRE	COMPOUND SPIRAL LARGE RADIUS AT END
CS_SRB	COMPOUND SPIRAL SMALL RADIUS AT BEGINNING
CS_SRE	COMPOUND SPIRAL SMALL RADIUS AT END
CTR	CENTER
CU FT	CUBIC FEET
CU YD	CUBIC YARD
DEG OR °	DEGREE
DET	DETAIL
DIA OR Ø	DIAMETER
D.I.P.	DUCTILE IRON PIPE

ABBREVIATIONS

ABBREV.	TERM
DIST	DISTRIBUTION
DWG	DRAWING
EA	EACH
EC	END OF CURVE
EFS	END FULL SUPER
ELB	ELBOW
ELEV OR EL.	ELEVATION
ENC	END NORMAL CROWN
ENS	END NORMAL SHOULDER
EOA	END OF ALIGNMENT
EP	ALIGNMENT END
EVP	PROFILE END
E.W.	EACH WAY
EXIST	EXISTING
EVC	END VERTICAL CURVE
EVCE	EVC ELEVATION
EVCS	EVC STATION
FF	FINISH FLOOR
FG	FINISH GRADE
FH	FIRE HYDRANT
FL	FLOW LINE
FLG	FLANGE
FT OR '	FEET
FTG	FOOTING
GALV	GALVANIZED
GB	GRADE BREAK
GV	GATE VALVE
HORIZ	HORIZONTAL
HP	HIGH POINT
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IN. OR "	INCH
INV.	INVERT
K	CURVE COEFFICIENT
L	LEFT
LB	LINE BEGINNING
LB OR #	POUND
LC	LEVEL CROWN
LE	LINE END
LF	LINEAL FEET
LN	LINEAL
LP	LOW POINT
LSM	LOW SHOULDER MATCH
MAN	MANUAL
MAX	MAXIMUM
MIN	MINIMUM
NO. OR #	NUMBER

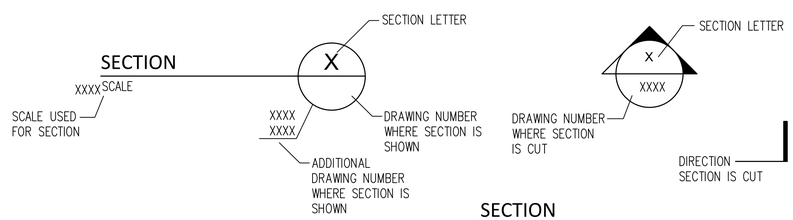
ABBREVIATIONS

ABBREV.	TERM
OVERALL HP	OVERALL HIGH POINT
OVERALL LP	OVERALL LOW POINT
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PE	POLYETHYLENE
PI	TANGENT-TANGENT INTERSECT
PL OR ℄	PLATE OR PROPERTY LINE
PRC	POINT OF REVERSE CURVATURE
PT	END OF CURVE
PVC	POLYVINYL-CHLORIDE
PVI	POINT OF VERTICAL INTERSECTION
R	RADIUS OR RIGHT
R&R	REMOVE & REPLACE
RC	REVERSE CROWN
REM	REMOVE
REQ'D	REQUIRED
REV	REVISION
R/W	RIGHT-OF-WAY
S	SLOPE
SBO	SHOULDER BREAKOVER
SC	SPIRAL-CURVE INTERSECT
SPI	REVERSE SPIRAL INTERSECT
SPEC	SPECIFICATION
SS_LRB	SIMPLE SPIRAL LARGE RADIUS AT BEGINNING
SS_LRE	SIMPLE SPIRAL LARGE RADIUS AT END
SS_SRB	SIMPLE SPIRAL SMALL RADIUS AT BEGINNING
SS_SRE	SIMPLE SPIRAL SMALL RADIUS AT END
ST	SPIRAL-TANGENT INTERSECT
STA	STATION
STD	STANDARD
STL	STEEL
ST STL	STAINLESS STEEL
SS	SPIRAL-SPIRAL INTERSECT
TBC	TOP BACK OF CURB

ABBREVIATIONS

ABBREV.	TERM
TFC	TOP FACE OF CONCRETE
TOB	TOP OF BEAM
TOC	TOP OF CONCRETE
TOF	TOP OF FOOTING
TOP	TOP OF PIPE
TOW	TOP OF WALL
TS	TANGENT-SPIRAL INTERSECT
TYP	TYPICAL
UDOT	UTAH DEPARTMENT OF TRANSPORTATION
VCC	VERTICAL COMPOUND CURVE
VCCE	VCC ELEVATION
VCCS	VCC STATION
VRC	VERTICAL REVERSE CURVE
VRCE	VRC ELEVATION
VRCS	VRC STATION
W/	WITH
W/O	WITHOUT
W/REQ'D	WHERE REQUIRED

VIEW MARKERS



SECTION

DRAFT

NO.	REVISIONS	DSGN	CHKD	APVD	DATE
B	ISSUED FOR RFP	AKF	GST	DWJ	09/08/16
A	ISSUED FOR REVIEW	AKF	GST	DWJ	07/07/16

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LEGEND SHEET

DESIGNED AKF/JDU
DRAWN IL
CHECKED GST
APPROVED GST
APPROVED DWJ
DATE 7/5/16

SCALE: AS SHOWN
NO. G-002
REV. B

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CADD D3-R4

EXHIBIT D-1

GENERAL NOTES

1. SYMBOLS FOR STRUCTURES, PIPE, ETC. USED FOR IDENTIFICATION ARE SHOWN IN LEGENDS AND SHALL BE FOLLOWED THROUGHOUT THE PLANS WHERE APPLICABLE. NOT ALL COMPONENTS FOUND IN SAID LEGENDS ARE NECESSARILY USED IN THE PROJECT.

2. THE SIZE OF THE ORIGINAL PLOTTED DRAWINGS ARE 22"X34". THEREFORE CARE SHOULD BE TAKEN TO REVIEW AND VERIFY THE SCALE BAR TO ADEQUATELY DETERMINE THE SCALE OF THE REDUCED REPRODUCTIONS.

3. KNOWN SEWER MAINS, WATER MAINS, GAS MAINS, STORM DRAINS, IRRIGATION LINES, TELEPHONE CONDUITS, ELECTRIC CABLES AND OTHER UNDERGROUND STRUCTURES ARE SHOWN ON THE DRAWING ONLY TO THE EXTENT SUCH INFORMATION HAS BEEN MADE AVAILABLE TO OR DISCOVERED BY THE ENGINEER. IT IS EXPECTED THAT THERE MAY BE DISCREPANCIES AND OMISSIONS IN THE LOCATION AND QUANTITIES OF THE UTILITIES AND STRUCTURES SHOWN. THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR BUT IS NOT GUARANTEED TO BE EITHER CORRECT OR COMPLETE, AND ALL RESPONSIBILITY FOR THE ACCURACY AND COMPLETENESS THEREOF IS EXPRESSLY DISCLAIMED. THE CONTRACTOR SHALL MAKE SUCH INVESTIGATION, AS HE THINKS NECESSARY TO VERIFY ITS CORRECTNESS AND COMPLETENESS. THE CONTRACTOR SHALL, AHEAD OF THE EXCAVATOR, LOCATE UNDERGROUND UTILITIES AND STRUCTURES SO THAT THEY WILL NOT BE ACCIDENTALLY CUT OR DAMAGED BY HIS CONSTRUCTION OPERATION, AND SO THAT THE GRADE OF THE PIPE CAN BE ADJUSTED.

4. NOTIFY "BLUESTAKES" AT 1(800) 662-4111 PRIOR TO ANY EXCAVATION. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES SHOWN IN THE DRAWINGS ARE APPROXIMATE. DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BY POTHOLING IN ADVANCE OF TRENCHING OPERATIONS. NOTIFY THE OWNER'S AUTHORIZED REPRESENTATIVE OF ANY POTHOLED UTILITIES IN CONFLICT WITH PROPOSED CONSTRUCTION IN ADVANCE OF CONSTRUCTION OPERATIONS.

5. CONTRACTOR WILL BE RESPONSIBLE FOR CORRECTING ANY SETTLEMENT OF OR DAMAGE TO EXISTING UTILITIES.

6. CONTRACTOR WILL BE RESPONSIBLE FOR ANY DAMAGE TO AND REPAIR OF ADJACENT SURFACE IMPROVEMENTS OR FACILITIES DURING CONSTRUCTION.

7. CONTRACTOR IS RESPONSIBLE TO FURNISH ALL MATERIALS NECESSARY TO COMPLETE THE PROJECT.

8. DEFLECTION OF PIPE SHALL BE KEPT UNDER 50% OF THE PIPE MANUFACTURE'S ALLOWABLE DEFLECTION.

9. EXCAVATION LIMITS SHOWN ARE FOR GRAPHICAL REPRESENTATION ONLY AND DO NOT REPRESENT ACTUAL EXCAVATION LIMITS OR SAFE TRENCH CONDITIONS REQUIRED TO COMPLETE THE WORK. CONTRACTOR IS SOLELY RESPONSIBLE FOR CONFORMANCE WITH LOCAL AND FEDERAL CODES GOVERNING SHORING AND BRACING OF EXCAVATIONS AND TRENCHES. CONTRACTOR IS RESPONSIBLE FOR THE SAFETY AND PROTECTION OF PERSONNEL AND WORKERS.

10. ONLY CITY OF WEST JORDAN INFRASTRUCTURE MAINTENANCE AND OPERATIONS DEPARTMENT PERSONNEL ARE TO OPERATE CULINARY WATER SYSTEM VALVES.

11. LAY PIPE TO UNIFORM GRADE BETWEEN INDICATED ELEVATION POINTS ALONG HORIZONTAL ALIGNMENT AS DEFINED IN THESE DRAWINGS. CONTRACTOR SHALL NOT DEVIATE FROM PROPOSED ALIGNMENT WITHOUT A WRITTEN APPROVAL BY THE CONSTRUCTION MANAGER.

12. ALL LENGTHS OF SANITARY SEWER ARE MEASURED INSIDE FACE TO INSIDE FACE.

DRAFT

NO.	REVISIONS	DSGN	CHKD	APVD	DATE
B	ISSUED FOR RFP	AKF	GST	DWJ	09/08/16
A	ISSUED FOR REVIEW	AKF	GST	DWJ	07/07/16

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CITY OF WEST JORDAN
7000 SOUTH UTILITY BETTERMENTS

GENERAL NOTES

DESIGNED AKF/JDU
DRAWN IL
CHECKED GST
APPROVED GST
APPROVED DWJ
DATE 7/5/16

SCALE: AS SHOWN
NO. G-003
REV. B

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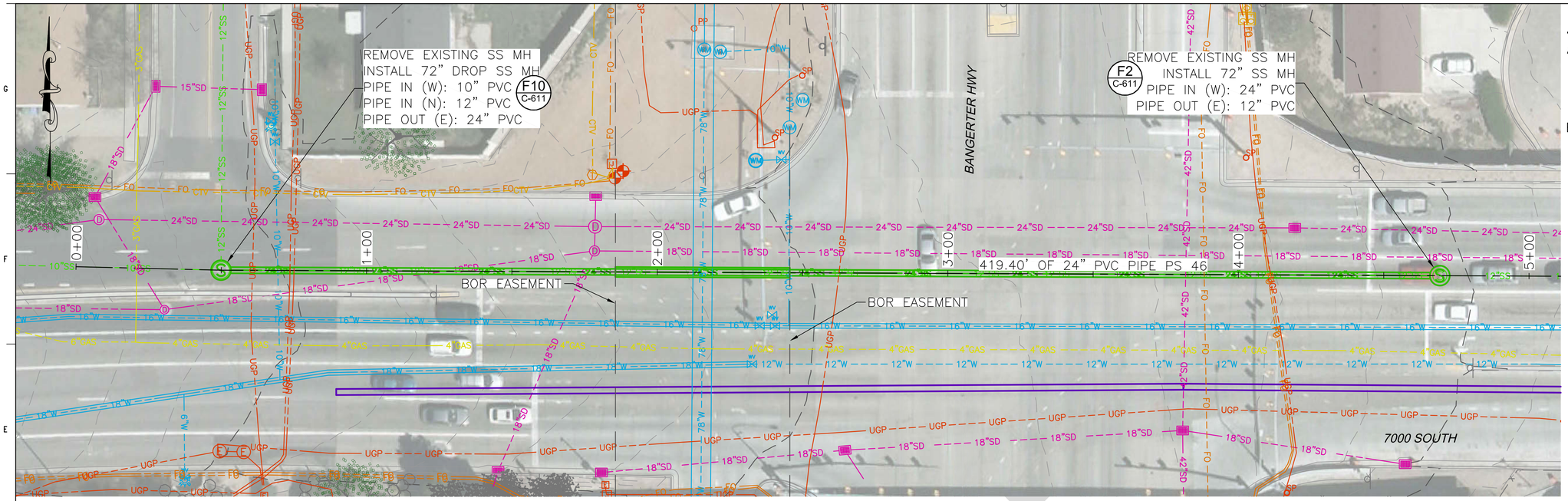
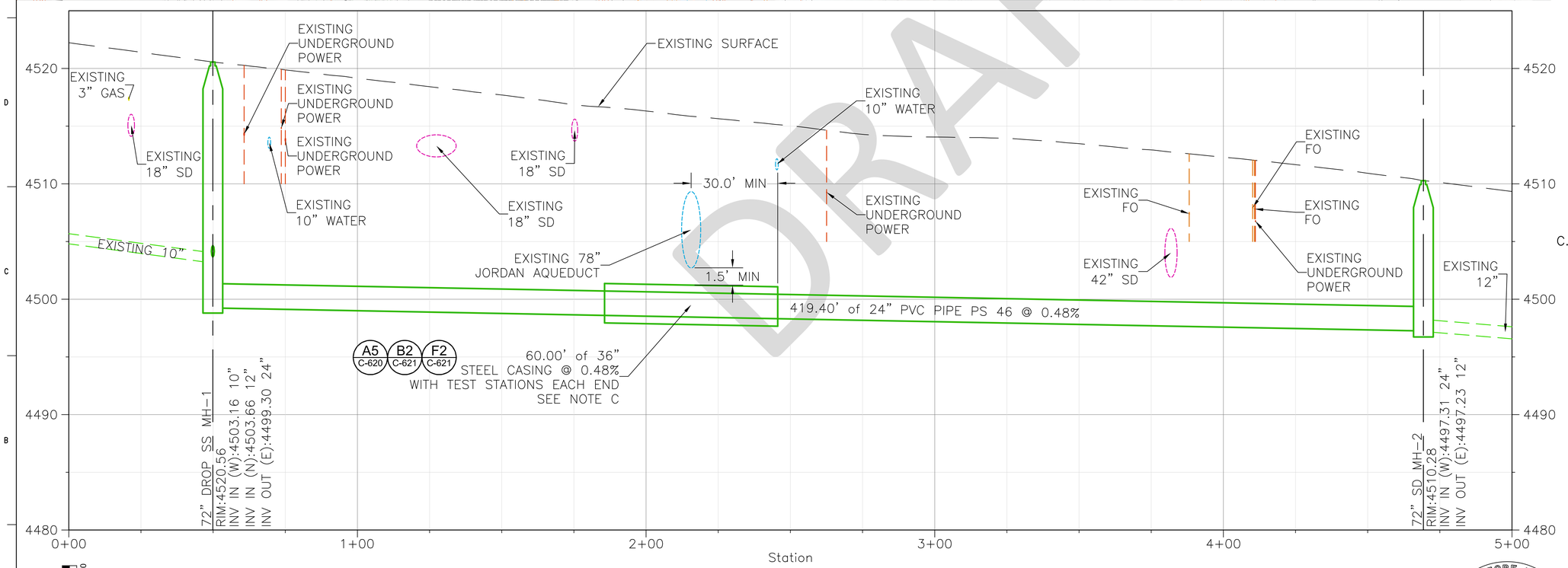
CADD D3-R4

EXHIBIT D-1





DRAFT

SCALE: 1" =5'

SCALE: 1" = 20'
ON 22x34 SHEET

NOTES:

A. ESTIMATED MAXIMUM SANITARY SEWER FLOW WITHIN THE EXISTING 12" SEWER PIPE AT BANGERTER HIGHWAY AND 7000 SOUTH IS 0.55 CFS. CONTRACTOR TO FIELD VERIFY.

B. FLOW CONTROL:
   a. CONTRACTOR SHALL PROVIDE BYPASS OF FLOW OF SEWAGE AROUND SECTIONS OF PIPE TO BE INSTALLED AND OR REMOVED.
   b. CONTRACTOR SHALL PROVIDE MEANS AND EQUIPMENT FOR FLOW CONTROL OR PUMPING DURING CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGES TO PROPERTY DUE TO SEWER BACKUP WHILE CONTROLLING SEWAGE FLOW.
   c. CONTRACTOR SHALL FURNISH PUMPING EQUIPMENT, CONDUITS, ETC. UNDER NO CIRCUMSTANCES SHALL BYPASSING OF UNTREATED WASTEWATER TO STORM DRAINAGE FACILITY OR SURFACE WATER COURSE BE ALLOWED.
   d. SEWER FLOW CONTROL OPERATIONS SHALL NOT CAUSE FLOODING OR DAMAGE TO PUBLIC OR PRIVATE PROPERTY. SEWAGE FLOW DIVERTED SHALL BE DISCHARGED BACK INTO SANITARY SEWER SYSTEM.
   e. CONTRACTOR SHALL PROVIDE BYPASS PUMPING PLAN FOR FLOW DIVERSION TO CITY OF WEST JORDAN FOR REVIEW PRIOR TO CONSTRUCTION OF SANITARY SEWER IMPROVEMENTS. INDICATE SEQUENCE OF DIVERSION OPERATIONS, TEMPORARY PLUGS, SILENCED BYPASS PUMPING SYSTEMS, TEMPORARY VEHICLE AND PEDESTRIAN BYPASS, AND SITE REINSTATEMENT AFTER DIVERSION.
   f. CONTRACTOR SHALL PROVIDE FOR BYPASSING PIPE FLOWS AND LATERAL FLOWS. STANDBY PUMPING CAPACITY FOR 125 PERCENT FLOW IS REQUIRED AT ALL TIMES.

C. PROVIDE TEST STATIONS AT EACH END OF SEWER CASING AS PER DETAIL F2 ON SHEET C-621. DESIGN BUILD CONTRACTOR TO FIELD LOCATE TEST STATION AND VERIFY WITH CITY OF WEST JORDAN.

NO.	REVISIONS	DSGN	CHKD	APVD	DATE
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PLAN AND PROFILE
SANITARY SEWER SHEET 1

DESIGNED	AKF
DRAWN	AKF
CHECKED	GST
APPROVED	GST
APPROVED	DWJ
DATE	6/16/16

SCALE: AS SHOWN
NO. C-100
REV. B

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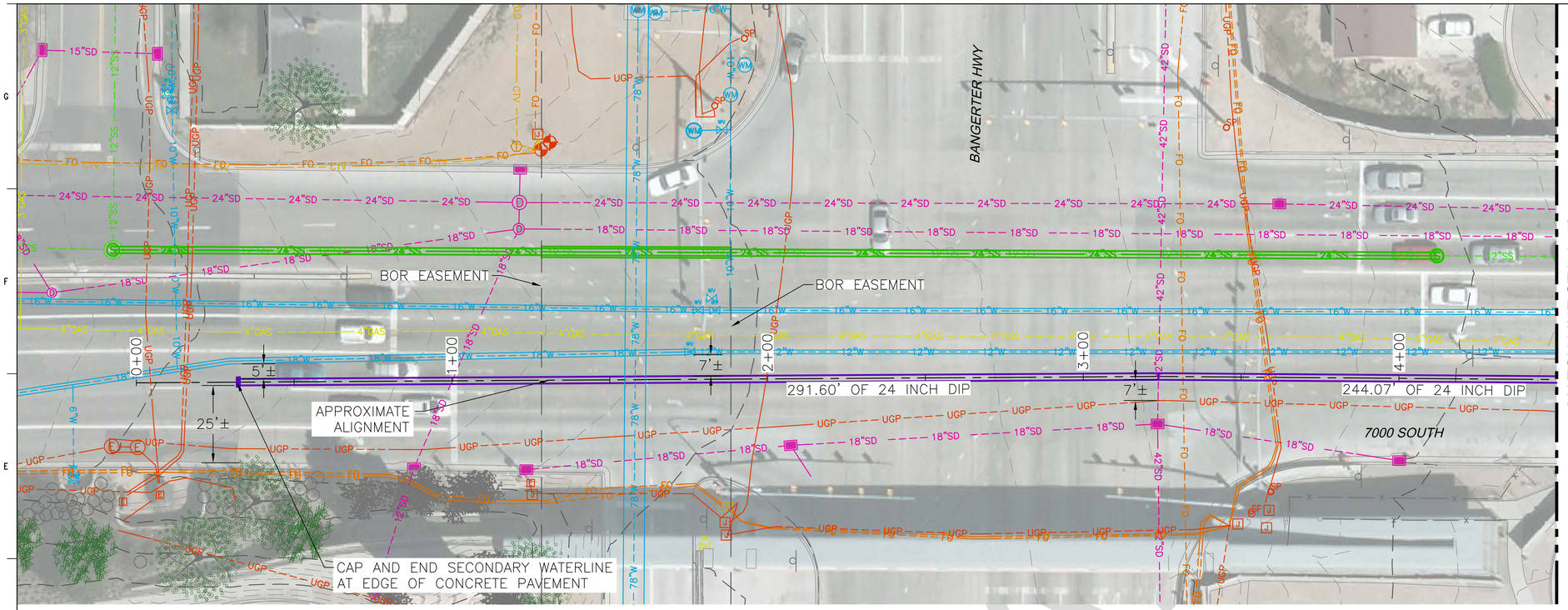
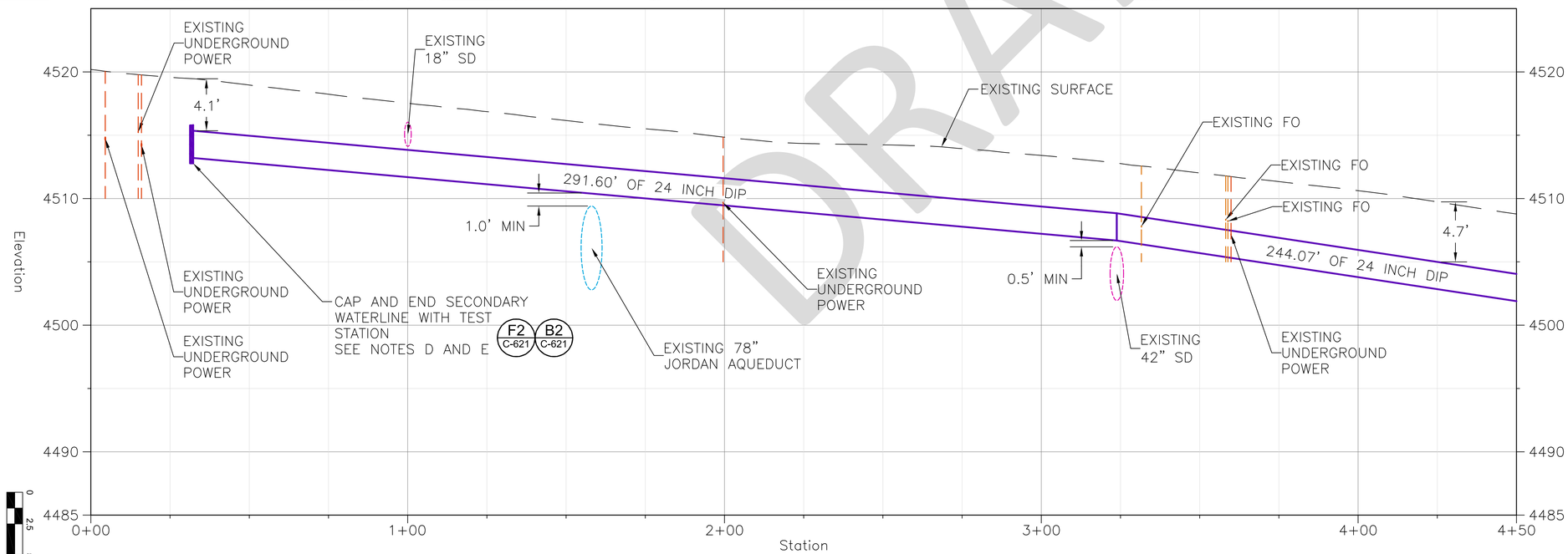
CADD D3-R4

EXHIBIT D-1





SCALE: 1"=5'

SCALE: 1" = 20'
ON 22x34 SHEET

NOTES:

A. SECONDARY WATER PIPE SHALL BE DUCTILE IRON PIPE PC250. REFER TO SPECIFICATION SECTION 33 05 05.
B. ALL FITTING, VALVES AND APPURTENANCES SHALL BE MECHANICALLY RESTRAINED AS PER DETAIL F8 ON SHEET C-620. RESTRAINED JOINT PIPE (MCWANE TR FLEX OR APPROVED EQUAL) MAY BE USED IN LIEU OF MECHANICAL RESTRAINTS (E.G. MEGA-LUGS).
C. PROVIDE JOINT BONDS AT ALL JOINTS AS PER DETAIL F10 ON SHEET C-621.
D. PROVIDE TEST STATIONS AT EACH END OF SECONDARY WATER LINE AS PER DETAIL F2 ON SHEET C-621. DESIGN BUILD CONTRACTOR TO FIELD LOCATE TEST STATION AND VERIFY WITH CITY OF WEST JORDAN.
E. DESIGN BUILD CONTRACTOR SHALL CONDUCT HYDROSTATIC PRESSURE TESTING OF 24" SECONDARY WATERLINE AFTER CONCRETE PAVEMENT IS INSTALLED. PROVIDE 2" GALVANIZED PIPING AND APPURTENANCES NECESSARY TO FACILITATE HYDROSTATIC PRESSURE TESTING THAT TERMINATE OUTSIDE THE ROADWAY. 2" GALVANIZED PIPING AND APPURTENANCES SHALL BE REMOVED AND TERMINATED WITH CAP 2' BELOW GRADE OUTSIDE ROADWAY AND ABANDONED WITHIN THE ROADWAY.

DRAFT

NO.	REVISIONS	DSGN	CHKD	APVD	DATE
B	ISSUED FOR RFP	AKF	GST	DWJ	09/08/16
A	ISSUED FOR REVIEW	AKF	GST	DWJ	07/07/16

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CITY OF WEST JORDAN
7000 SOUTH UTILITY BETTERMENTS

PLAN AND PROFILE
SECONDARY WATER SHEET 1

DESIGNED AKF
DRAWN AKF
CHECKED GST
APPROVED GST
APPROVED DWJ
DATE 7/5/16

SCALE: AS SHOWN
NO. C-200
REV. B

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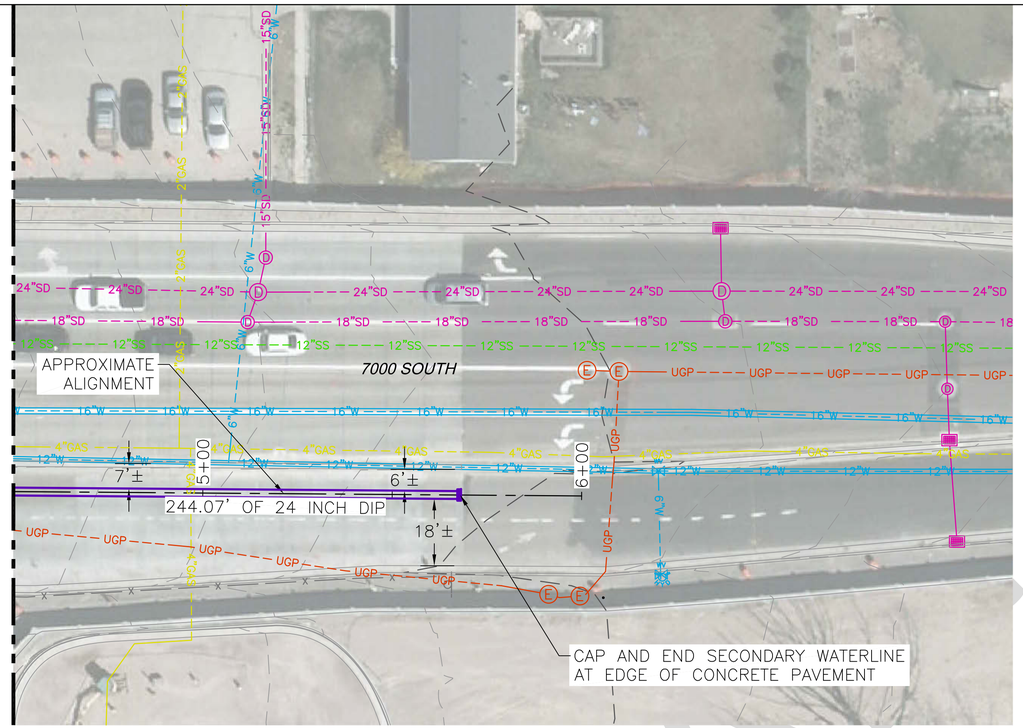
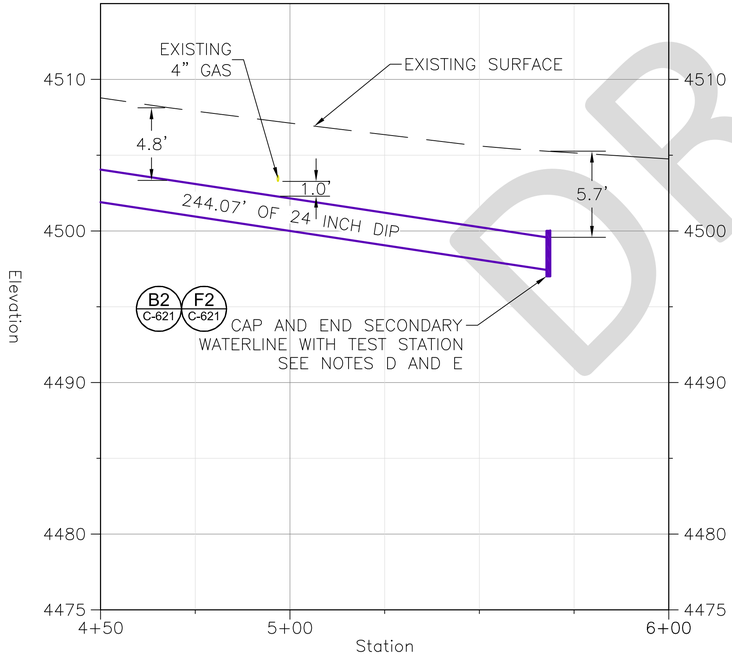
CADD D3-R4

EXHIBIT D-1

MATCH LINE STA 4+50
SEE SHEET C-200





NOTES:

A. SECONDARY WATER PIPE SHALL BE DUCTILE IRON PIPE PC250. REFER TO SPECIFICATION SECTION 33 05 05.

B. ALL FITTING, VALVES AND APPURTENANCES SHALL BE MECHANICALLY RESTRAINED AS PER DETAIL F8 ON SHEET C–620. RESTRAINED JOINT PIPE (MCWANE TR FLEX OR APPROVED EQUAL) MAY BE USED IN LIEU OF MECHANICAL RESTRAINTS (E.G. MEGA–LUGS).

C. PROVIDE JOINT BONDS AT ALL JOINTS AS PER DETAIL F10 ON SHEET C–621.

D. PROVIDE TEST STATIONS AT EACH END OF SECONDARY WATER LINE AS PER DETAIL F2 ON SHEET C–621. DESIGN BUILD CONTRACTOR TO FIELD LOCATE TEST STATION AND VERIFY WITH CITY OF WEST JORDAN.

E. DESIGN BUILD CONTRACTOR SHALL CONDUCT HYDROSTATIC PRESSURE TESTING OF 24" SECONDARY WATERLINE AFTER CONCRETE PAVEMENT IS INSTALLED. PROVIDE 2" GALVANIZED PIPING AND APPURTENANCES NECESSARY TO FACILITATE HYDROSTATIC PRESSURE TESTING THAT TERMINATE OUTSIDE THE ROADWAY. 2" GALVANIZED PIPING AND APPURTENANCES SHALL BE REMOVED AND TERMINATED WITH CAP 2' BELOW GRADE OUTSIDE ROADWAY AND ABANDONED WITHIN THE ROADWAY.

DRAFT

SCALE: 1" =5'

SCALE: 1" = 20'
ON 22x34 SHEET

NO.	REVISIONS	DSGN	CHKD	APVD	DATE
B	ISSUED FOR FRP	AKF	GST	DWJ	09/08/16
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CITY OF WEST JORDAN
7000 SOUTH UTILITY BETTERMENTS

PLAN AND PROFILE
SECONDARY WATER SHEET 2

DESIGNED	AKF
DRAWN	AKF
CHECKED	GST
APPROVED	GST
APPROVED	DWJ
DATE	7/5/16

SCALE: AS SHOWN
NO. C–201
REV. B

CALL BEFORE YOU DIG! IT'S THE LAW BLUE STAKES 1-800-662-4111

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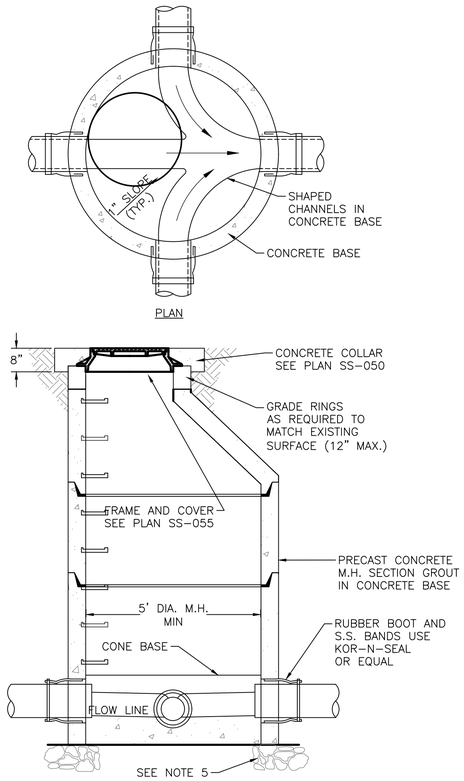
S:\25931 – 7000 South Utility Design\25931.05 – Secondary Water Transmission Pipeline\11–CAD\C–200.dwg
CADD D3–R4

EXHIBIT D-1

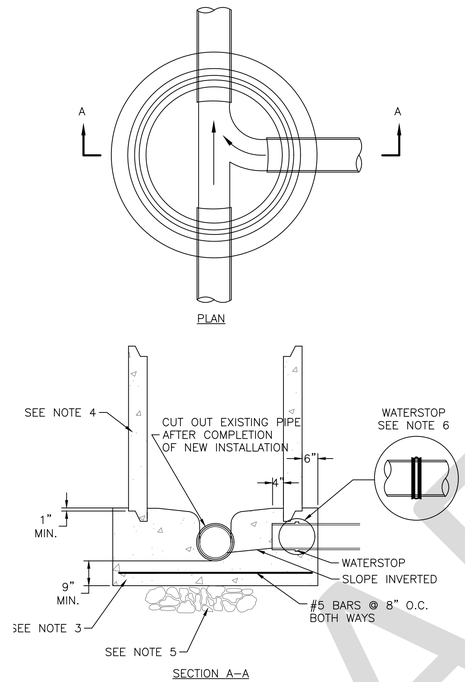


NOTES:

1. SELECT FILL: USE OF UNTREATED BASE COURSE AS PER UDOT STANDARD SPECIFICATION 02721 UNTREATED BASE COURSE (UTBC).
2. BACKFILL: INSTALL AND COMPACT ALL BACKFILL MATERIAL PER UDOT STANDARD SPECIFICATION 02056 EMBANKMENT, BORROW, AND BACKFILL: AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 02056M EMBANKMENT, BORROW, AND BACKFILL.
3. CONCRETE: CLASS 4,000 PER CAST IN PLACE APPLICATIONS AND 5,000 PSI FOR PRECAST APPLICATIONS. APPLY A SEALING/CURING COMPOUND UDOT STANDARD SPECIFICATION 03390 CONCRETE CURING AND UDOT SUPPLEMENTAL SPECIFICATION 03390 CONCRETE CURING.
4. REDUCING RISER: WHEN A DEPTH OF MANHOLE FROM PIPE INVERT TO FINISH GRADE EXCEEDS 6'-7", USE A REDUCING RISER SECTION.
5. FOUNDATION: FOUNDATION TO REST ON 6" OF FREE DRAINING GRANULAR BACKFILL AS PER UDOT STANDARD SPECIFICATION 02056 EMBANKMENT, BORROW, AND BACKFILL: AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 02056M EMBANKMENT, BORROW, AND BACKFILL.
6. JOINTS: PLACE FLEXIBLE GASKET TYPE SEALANT IN MANHOLE JOINTS.
7. BASE OF MANHOLE: POUR IN ONE CONTINUOUS OPERATION.
8. FINISH: PROVIDE SMOOTH AND NEAT FINISHES ON THE INTERIOR OF CONES, SHAFTS, AND RINGS. IMPERFECT MOLDING OR HONEYCOMBS WILL NOT BE ACCEPTED.

F/2 JUNCTION MANHOLE

NTS CITY OF WEST JORDAN STD. PLAN SS-035 REVISED

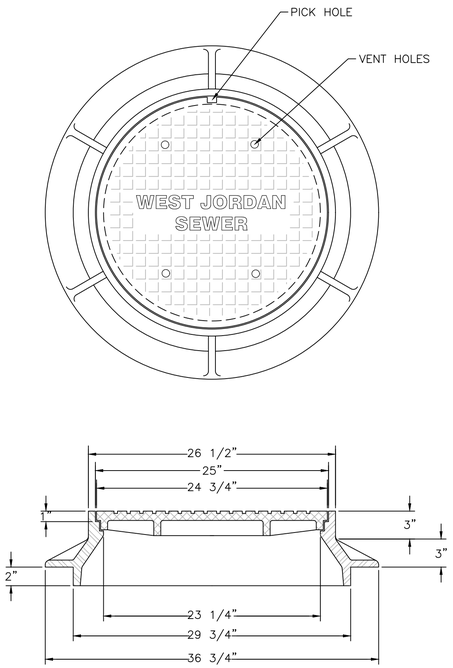


NOTES:

1. SELECT FILL: USE OF UNTREATED BASE COURSE AS PER UDOT STANDARD SPECIFICATION 02721 UNTREATED BASE COURSE (UTBC).
2. BACKFILL: INSTALL AND COMPACT ALL BACKFILL MATERIAL PER UDOT STANDARD SPECIFICATION 02056 EMBANKMENT, BORROW, AND BACKFILL: AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 02056M EMBANKMENT, BORROW, AND BACKFILL.
3. CONCRETE: CLASS 4,000 PER CAST IN PLACE APPLICATIONS AND 5,000 PSI FOR PRECAST APPLICATIONS. APPLY A SEALING/CURING COMPOUND UDOT STANDARD SPECIFICATION 03390 CONCRETE CURING AND UDOT SUPPLEMENTAL SPECIFICATION 03390 CONCRETE CURING.
4. REDUCING RISER: WHEN A DEPTH OF MANHOLE FROM PIPE INVERT TO FINISH GRADE EXCEEDS 6'-7", USE A REDUCING RISER SECTION.
5. FOUNDATION: FOUNDATION TO REST ON 6" OF FREE DRAINING GRANULAR BACKFILL AS PER UDOT STANDARD SPECIFICATION 02056 EMBANKMENT, BORROW, AND BACKFILL: AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 02056M EMBANKMENT, BORROW, AND BACKFILL.
6. WATERSTOP: SHALL BE 1/2" 300 SERIES NONMAGNETIC STAINLESS STEEL CONFORMING TO ASTM A167 AND RUBBER GASKET MEETING ASTM C-443.
7. JOINTS: PLACE FLEXIBLE GASKET TYPE SEALANT IN MANHOLE JOINTS.
8. BASE OF MANHOLE:
   A. THIS MANHOLE BASE IS TO BE USED FOR A CONNECTION TO AN EXISTING LINE OR AS AN ALTERNATE TO A PRECAST MANHOLE BASE.
   B. INVERT SHALL BE SMOOTH AND "U' SHAPED AND MATCH THE SPRING LINE OF THE PIPE.
   C. THE FIRST PRECAST MANHOLE SECTION SHALL BE CAST INTO THE BASE. THE REMAINDER OF THE MANHOLE CONSTRUCTION SHALL CONFORM TO PLAN SS-030.

F/6 CAST IN PLACE MANHOLE BASE

NTS CITY OF WEST JORDAN STD. PLAN SS-040 (REVISED)

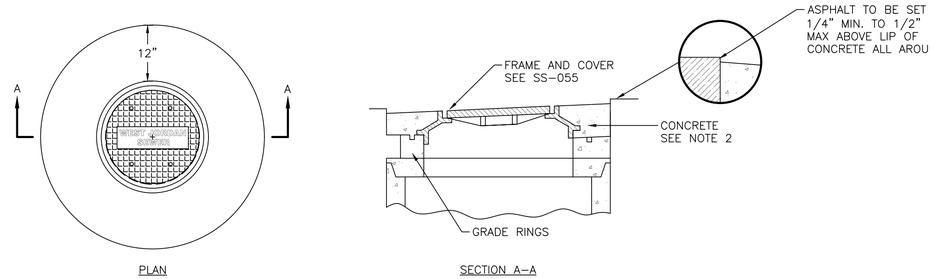


NOTES:

1. CASTINGS: GRAY IRON CLASS 30 MINIMUM PER ASTM A48.
2. COATING: EXCEPT MACHINED SURFACES, COAT ALL METAL PARTS WITH ASPHALTUM PAINT.
3. INSCRIPTIONS: CAST THE WORDS "WEST JORDAN" AND "SEWER" ON THE COVER FLUSH WITH THE SURFACE FINISH.
4. HEAT NUMBER: PLACE FOUNDRY AND HEAT NUMBER ON THE INSIDE OF THE FRAME AND ON THE BOTTOM OF THE COVER.
5. FIT: GIVE THE FRAME AND COVER A MACHINE FINISH SO THE COVER WILL NOT ROCK.
6. LOCKING: PROVIDE COVERS FOR MANHOLES LOCATED IN EASEMENTS, RIGHTS OF WAY, ALLEYS PARKING LOTS, AND ALL OTHER PLACES EXCEPT PAVED STREETS, WITH ALLEN SOCKET SET SCREW LOCKING DEVICES. DRILL AND TAP TWO HOLES TO A DEPTH OF 1 INCH AT 90 DEGREES TO PRY AND INSTALL 3/4" X 3/4" INCH ALLEN SOCKET SET SCREWS.
7. MANHOLE STRUCTURES: SEE PLAN SS-030, SS-035, SS-045, SS-060, SS-065.
8. VENTILATION: STANDARD IS FOR VENTED MANHOLE EXCEPT AS NEEDED FOR PROBLEMS.

F/9 FRAME AND COVER

NTS CITY OF WEST JORDAN STD. PLAN SS-055



NOTES:

1. ADJUST TO GRADE: ADJUST INCIDENTAL STRUCTURE TO GRADE PER APWA SECTION 33 05 14
2. BACKFILL: INSTALL AND COMPACT ALL BACKFILL MATERIAL PER UDOT STANDARD SPECIFICATION 02056 EMBANKMENT, BORROW, AND BACKFILL: AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 02056M EMBANKMENT, BORROW, AND BACKFILL.
3. JOINTS: PROVIDE A NEAT STRAIGHT JOINT BETWEEN EXISTING AND NEW ASPHALT CONCRETE SURFACES. PROVIDE CONCENTRIC CIRCLE OR STRAIGHT EDGE CUT. CLEAN EDGES OF ALL DIRT, OIL AND LOOSE DEBRIS.

B/4 CONCRETE COVER COLLAR

NTS CITY OF WEST JORDAN STD. PLAN SS-050

NO.	REVISIONS	DSGN	CHKD	APVD	DATE
B	ISSUED FOR RFP	AKF	GST	DWJ	09/08/16
A	ISSUED FOR REVIEW	AKF	GST	DWJ	07/07/16

Stanley Consultants INC.
383 West Vine Street, Suite 400, Murray, Utah 84123
www.stanleyconsultants.com

PRELIMINARY NOT FOR CONSTRUCTION

CITY OF WEST JORDAN
7000 SOUTH UTILITY BETTERMENTS

SANITARY SEWER
DETAIL SHEET 1

DESIGNED	AKF
DRAWN	IL
CHECKED	GST
APPROVED	GST
APPROVED	DWJ
DATE	7/5/16

SCALE: AS SHOWN

NO. C-610 REV. B

DRAFT

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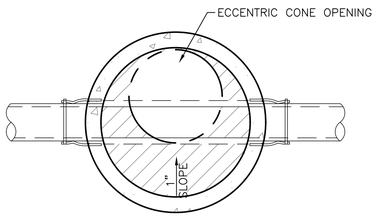
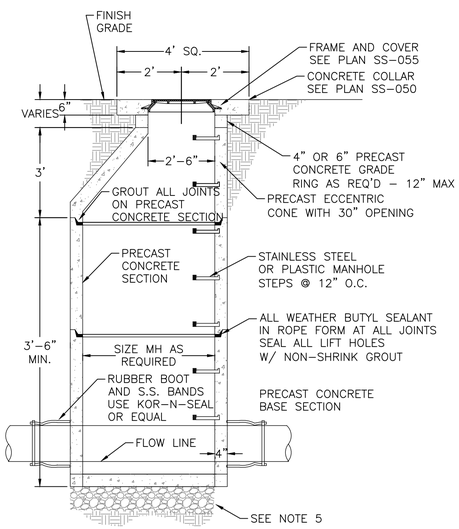
S:\25931 - 7000 South Utility Design\25931.05 - Secondary Water Transmission Pipeline\11-CAD\C-601 through C-623.dwg
CADD D3-R4

EXHIBIT D-1

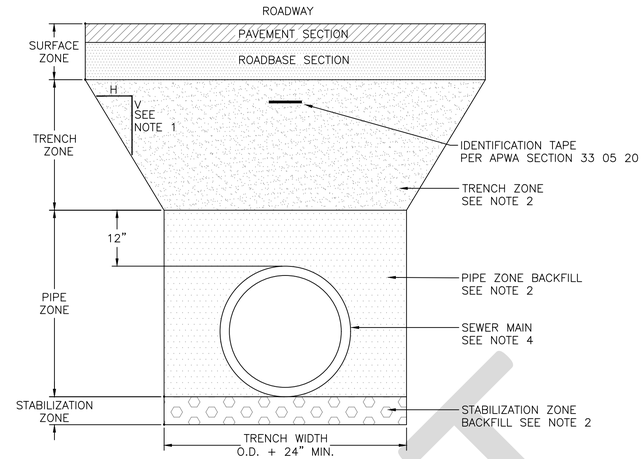




NOTES:

1. SELECT FILL: USE OF UNTREATED BASE COURSE AS PER UDOT STANDARD SPECIFICATION 02721 UNTREATED BASE COURSE (UTBC).
2. BACKFILL: INSTALL AND COMPACT ALL BACKFILL MATERIAL PER UDOT STANDARD SPECIFICATION 02056 EMBANKMENT, BORROW, AND BACKFILL: AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 02056M EMBANKMENT, BORROW, AND BACKFILL.
3. CONCRETE: CLASS 4,000 PER UDOT STANDARD SPECIFICATION 03055 PORTLAND CEMENT CONCRETE AND UDOT. SUPPLEMENTAL SPECIFICATION SECTION 03055M PORTLAND CEMENT CONCRETE CAST IN PLACE APPLICATIONS AND 5,000 PSI FOR PRECAST APPLICATIONS. APPLY A SEALING/CURING COMPOUND UDOT STANDARD SPECIFICATION 03390 CONCRETE CURING AND UDOT SUPPLEMENTAL SPECIFICATION 03390 CONCRETE CURING.
4. REDUCING RISER: WHEN A DEPTH OF MANHOLE FROM PIPE INVERT TO FINISH GRADE EXCEEDS 6'-7", USE A REDUCING RISER SECTION.
5. FOUNDATION: FOUNDATION TO REST ON 6" OF FREE DRAINING GRANULAR BACKFILL AS PER UDOT STANDARD SPECIFICATION 02056 EMBANKMENT, BORROW, AND BACKFILL: AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 02056M EMBANKMENT, BORROW, AND BACKFILL.
6. JOINTS: PLACE FLEXIBLE GASKET TYPE SEALANT IN MANHOLE JOINTS.
7. BASE OF MANHOLE: POUR IN ONE CONTINUOUS OPERATION.
8. FINISH: PROVIDE SMOOTH AND NEAT FINISHES ON THE INTERIOR OF CONES, SHAFTS, AND RINGS. IMPERFECT MOLDING OR HONEYCOMBS WILL NOT BE ACCEPTED.

F/2 IN-LINE MANHOLE
NTS CITY OF WEST JORDAN STD. PLAN SS-030 (REVISED)



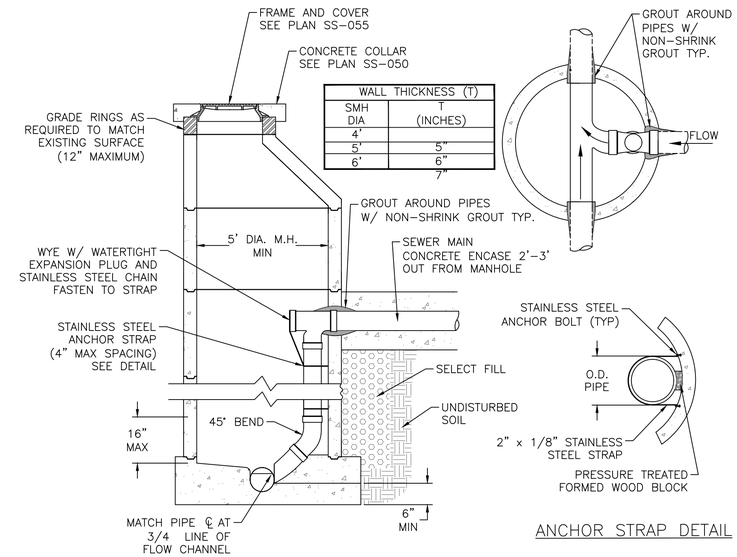
NOTES:

1. EXCAVATION: TRENCH EXCAVATION AND SIDE SLOPES SHALL BE PROVIDED IN ACCORDANCE WITH OSHA AND UOSH SAFETY STANDARDS AND WITH UDOT STANDARD SPECIFICATION SECTION 02317 STRUCTURAL EXCAVATION AND UDOT SUPPLEMENTAL SPECIFICATION 02317M STRUCTURAL EXCAVATION AND ALL STATE AND FEDERAL LAWS FOR TRENCH SAFETY.
2. BACKFILL: BACKFILL OPERATIONS SHALL COMPLY WITH UDOT STANDARD SPECIFICATION SECTION 02056 EMBANKMENT, BORROW, AND BACKFILL; AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 02056M EMBANKMENT, BORROW, AND BACKFILL WITH MATERIAL SELECTION AS FOLLOWS:

	UNIMPROVED AREAS	PAVEMENT AREAS
STABILIZATION ZONE	2" MINUS SEWER ROCK	GRANULAR BACKFILL BORROW
PIPE ZONE	UNTREATED BASE COURSE GRADE 3/4"	UNTREATED BASE COURSE GRADE 3/4"
TRENCH ZONE	GRANULAR BACKFILL BORROW	GRANULAR BACKFILL BORROW
SURFACE ZONE	NATIVE TOP SOIL REPLACE VEGETATION TO PRECONSTRUCTION CONDITION	UDOT ROAD SECTION

3. COMPACTION: COMPACTION OF BACKFILL MATERIALS SHALL COMPLY WITH UDOT STANDARD SPECIFICATION SECTION 02056 EMBANKMENT, BORROW, AND BACKFILL; AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 02056M EMBANKMENT, BORROW. SUBMISSION OF QUALITY ASSURANCE COMPACTION TEST RESULT DATA MAY BE REQUIRED BY ENGINEER AT ANY TIME. CONTRACTOR IS TO PROVIDE RESULTS OF TEST IMMEDIATELY UPON REQUEST.
4. INSTALLATION OF PIPE: INSTALL PIPE PER APWA SECTION 33 31 00 "SANITARY SEWERAGE SYSTEMS". INSTALL PIPE ON STABLE FOUNDATION WITH UNIFORM BEARING.
5. PAVEMENT RESTORATION: DO NOT INSTALL PAVEMENT OR ROADBASE SELECTION UNTIL TRENCH COMPACTION IS ACCEPTED BY ENGINEER.

F/6 SANITARY SEWER TRENCH DETAIL
NTS CITY OF WEST JORDAN STD. PLAN SS-020 (REVISED)



WALL THICKNESS (T)	
SMH DIA	T (INCHES)
4'	
5'	5"
6'	6"
7'	7"

NOTES:

1. SELECT FILL: USE CLASS A UNTREATED BASE COURSE GRADE 1 OR GRADE 3/4 PER UDOT STANDARD SPECIFICATION 02721. USE OF SEWER ROCK OR RECYCLED AGGREGATE REQUIRES ENGINEER'S WRITTEN APPROVAL.
2. BACKFILL: INSTALL AND COMPACT ALL BACKFILL MATERIAL PER UDOT STANDARD SPECIFICATION 02056
3. CONCRETE: CLASS 4,000 PER UDOT STANDARD SPECIFICATION 03055 PORTLAND CEMENT CONCRETE AND UDOT. SUPPLEMENTAL SPECIFICATION SECTION 03055M PORTLAND CEMENT CONCRETE CAST IN PLACE APPLICATIONS AND 5,000 PSI FOR PRECAST APPLICATIONS. APPLY A SEALING/CURING COMPOUND UDOT STANDARD SPECIFICATION 03390 CONCRETE CURING AND UDOT SUPPLEMENTAL SPECIFICATION 03390 CONCRETE CURING.
4. FOUNDATION: FOUNDATION TO REST ON 6" OF FREE DRAINING GRANULAR BACKFILL AS PER UDOT STANDARD SPECIFICATION 02056 EMBANKMENT, BORROW, AND BACKFILL: AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 02056M EMBANKMENT, BORROW, AND BACKFILL.
5. JOINTS: PLACE FLEXIBLE GASKET TYPE SEALANT IN MANHOLE JOINTS.
6. FINISH: PROVIDE SMOOTH AND NEAT FINISHES ON THE INTERIOR OF CONES, SHAFTS, AND RINGS. IMPERFECT MOLDING OR HONEYCOMBS WILL NOT BE ACCEPTED.

F/10 DROP MANHOLE
NTS CITY OF WEST JORDAN STD. PLAN SS-045 (REVISED)

DRAFT

NO.	REVISIONS	DSGN	CHKD	APVD	DATE
B	ISSUED FOR RFP	AKF	GST	DWJ	09/08/16
A	ISSUED FOR REVIEW	AKF	GST	DWJ	07/07/16

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PRELIMINARY NOT FOR CONSTRUCTION

CITY OF WEST JORDAN
7000 SOUTH UTILITY BETTERMENTS

SANITARY SEWER
DETAIL SHEET 2

DESIGNED AKF
DRAWN IL
CHECKED GST
APPROVED GST
APPROVED DWJ
DATE 7/5/16

SCALE: AS SHOWN
NO. C-611
REV. B

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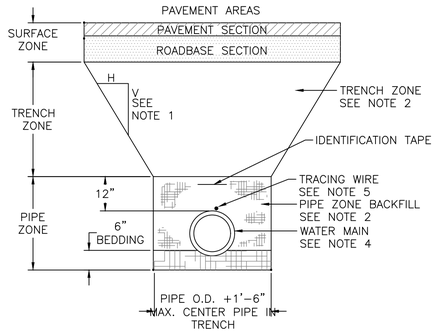
S:\25931 - 7000 South Utility Design\25931.05 - Secondary Water Transmission Pipeline\11-CAD\C-601 through C-623.dwg
CADD D3-R4

EXHIBIT D-1



NOTES:

1. EXCAVATION: TRENCH EXCAVATION AND SIDE SLOPES SHALL BE IN ACCORDANCE WITH OSHA AND UOSH SAFETY STANDARDS AND WITH UDOT STANDARD SPECIFICATION SECTION 02317 STRUCTURAL EXCAVATION AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 02317M STRUCTURAL EXCAVATION AND ALL STATE AND FEDERAL LAWS FOR TRENCH SAFETY.
2. BACKFILL: BACKFILL OPERATIONS SHALL COMPLY WITH UDOT STANDARD SPECIFICATION SECTION 02056 EMBANKMENT, BORROW, AND BACKFILL; AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 02056M EMBANKMENT, BORROW, AND BACKFILL WITH MATERIAL SELECTION AS FOLLOWS:

	UNIMPROVED AREAS	PAVEMNET AREAS
BEDDING	SAND	SAND
PIPE ZONE	SAND	SAND
TRENCH ZONE	GRANULAR BACKFILL BORROW. SAND NATIVE (FREE OF ROCK OVER 2")	GRANULAR BACKFILL BARROW
SURFACE ZONE	NATIVE TOP SOIL	UDOT ROAD SECTION

SEWER ROCK, PEA GRAVEL, RECYCLE AGGREGATE NOT ALLOWED AS BACKFILL

3. COMPACTION: COMPACTION OF BACKFILL MATERIALS SHALL COMPLY WITH UDOT STANDARD SPECIFICATION SECTION 02056 EMBANKMENT, BORROW, AND BACKFILL; AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 02056M EMBANKMENT, BORROW, AND BACKFILL AND THE FOLLOWING:

	UNIMPROVED AREAS	PAVEMNET AREAS
PIPE ZONE	PER PIPE MANUFACTURE RECOMMENDATION	PER PIPE MANUFACTURE RECOMMENDATION
TRENCH ZONE	92% OF ASTM D 698	95% OF ASTM D 1557
SURFACE ZONE	80% OF ASTM D 698	UTDOT ROAD SECTION

WATER SETTLING OR "JETTING" OF TRENCHES BACKFILL NOT ALLOWED

4. INSTALLATION OF PIPE: INSTALL PIPE PER SPECIFICATION SECTION 33 11 00 WATER DISTRIBUTION AND TRANSMISSION (CITY SPECIFICATION) AND APWA SPECIFICATION SECTION 33 11 00 WATER DISTRIBUTION AND TRANSMISSION. INSTALL PIPE ON STABLE FOUNDATION WITH UNIFORM BEARING. SHAPE TRENCH BY HAND TO FIT BOTTOM QUADRANT OF PIPE ALLOWING SPACE FOR PIPE BELLS.
5. TRACING WIRE: ALL PIPES SHALL HAVE 12 GA. INSULATED TRACING WIRE INSTALLED W/THE PIPE.
6. DEWATERING: CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING THE TRENCHES FREE FROM SURFACE AND GROUNDWATER.

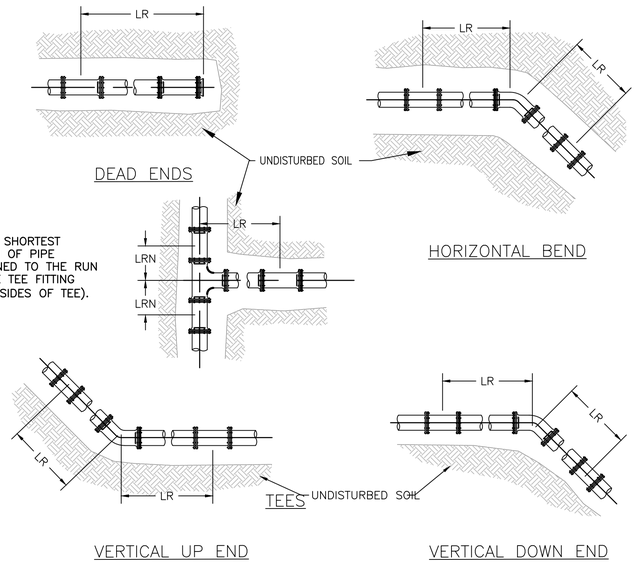
F/2 SECONDARY WATER PIPE TRENCH
NTS — CITY OF WEST JORDAN STD. PLAN CW-035 (REVISED)

RESTRAINED LENGTHS, LR, FOR DUCTILE IRON PIPE

NOMINAL PIPE SIZE INCHES	HORIZONTAL BENDS			TEES		VERTICAL OFFSETS						DEAD ENDS
						90° BEND FITTINGS		45° BEND FITTINGS		22-1/2° BEND FITTINGS		
	90°	45°	22-1/2°	LRN=0'	LRN=10'	DOWN BEND	UP BEND	DOWN BEND	UP BEND	DOWN BEND	UP BEND	
	18	7	4	30	8	31	18	13	7	6	3	31
46	25	10	5	43	20	44	25	18	10	9	5	44
8	32	13	6	56	34	58	32	24	13	11	6	58
10	38	16	8	68	45	69	38	29	16	14	8	69
12	45	19	9	80	57	81	45	34	19	16	9	81
14	51	21	10	91	68	92	51	38	21	18	10	92
16	57	24	11	103	79	104	57	43	24	21	11	104
18	62	26	12	113	90	115	62	48	26	23	12	115
20	68	28	14	125	100	126	68	52	28	25	14	126
24	79	33	16	145	121	147	79	61	33	29	16	147

RESTRAINED LENGTHS, LR, FOR DUCTILE IRON PIPE WITH POLYETHYLENE WRAP

NOMINAL PIPE SIZE INCHES	HORIZONTAL BENDS			TEES		VERTICAL OFFSETS						DEAD ENDS
						90° BEND FITTINGS		45° BEND FITTINGS		22-1/2° BEND FITTINGS		
	90°	45°	22-1/2°	LRN=0'	LRN=10'	DOWN BEND	UP BEND	DOWN BEND	UP BEND	DOWN BEND	UP BEND	
	26	11	5	69	18	72	26	30	11	14	5	72
46	36	15	7	99	47	102	36	42	15	20	7	102
8	47	19	9	130	78	133	47	55	19	26	9	133
10	56	23	11	157	103	159	6	66	23	32	11	159
12	65	27	13	185	131	187	65	77	27	37	13	187
14	74	31	15	211	156	214	74	89	31	42	15	214
16	82	34	16	238	183	241	82	100	34	48	16	241
18	90	37	18	263	207	266	90	110	38	53	18	266
20	98	41	20	289	233	292	98	121	41	58	20	292
24	113	47	22	337	280	340	113	141	47	68	22	340



NOTES:

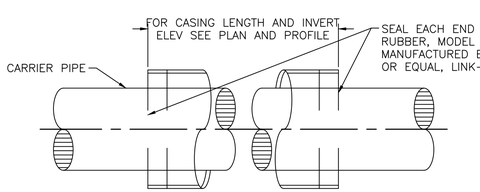
1. ALL JOINTS WITHIN THE SPECIFIED LENGTH LR MUST BE RESTRAINED. ALL LENGTHS ARE GIVEN IN FEET.
2. THE MAXIMUM TEST PRESSURE SHALL NOT EXCEED 200 PSI.
3. THE MINIMUM DEPTH OF BURY SHALL BE 3' TO TOP OF PIPE.
4. RESTRAINED LENGTHS MAY BE REDUCED WHEN SUPPORTED BY ENGINEERING CALCULATIONS.

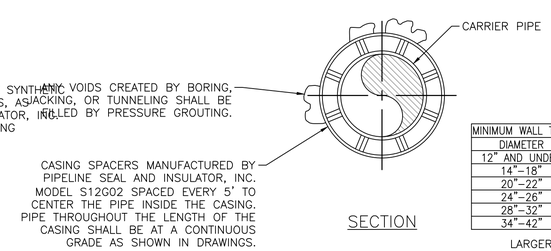
F/8 JOINT RESTRAINT – DUCTILE IRON
NTS — CITY OF WEST JORDAN STD. PLAN CW-90&95

DRAFT

NOTES:

1. CASING PIPES SHALL BE REQUIRED AS INDICATED ON THE DRAWINGS AND/OR WHERE REQUIRED BY THE DISTRICT INSPECTOR OR ENGINEER.
2. SEE PLANS FOR CASING SIZE
3. CARRIER PIPE SHALL BE TESTED BEFORE SEALING THE ENDS OF THE CASING.
4. SPACERS SHALL BE SECURELY ATTACHED TO CARRIER PIPE PER MANUFACTURER'S REQUIREMENTS.
5. CASING PIPE SHALL BE WELDED STEEL, ASTM A53, GRADE B OR APPROVED EQUIVALENT.
6. ALL CARRIER PIPE JOINTS WITHIN CASING TO BE MECHANICALLY RESTRAINED. THRUST LOCK BOLTLESS RESTRAINED JOINT OR APPROVED EQUAL.





MINIMUM WALL THICKNESS OF CASINGS	
DIAMETER	WALL THICKNESS
12" AND UNDER	0.188"
14"-18"	0.312"
20"-22"	0.375"
24"-26"	0.438"
28"-32"	0.500"
34"-42"	0.562"

LARGER CASINGS AS DIRECTED BY THE CITY ENGINEER.

A/5 STEEL CASING
NTS — CITY OF WEST JORDAN STD. PLAN SS-100 (REVISED)

NO.	REVISIONS	DSGN	CHKD	APVD	DATE
B	ISSUED FOR RFP	AKF	GST	DWJ	09/08/16
A	ISSUED FOR REVIEW	AKF	GST	DWJ	07/07/16

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PRELIMINARY NOT FOR CONSTRUCTION

CITY OF WEST JORDAN
7000 SOUTH UTILITY BETTERMENTS

SECONDARY WATER
DETAIL SHEET 1

DESIGNED AKF
DRAWN IL
CHECKED GST
APPROVED GST
APPROVED DWJ
DATE 7/5/16

SCALE: AS SHOWN
NO. C-620
REV. B

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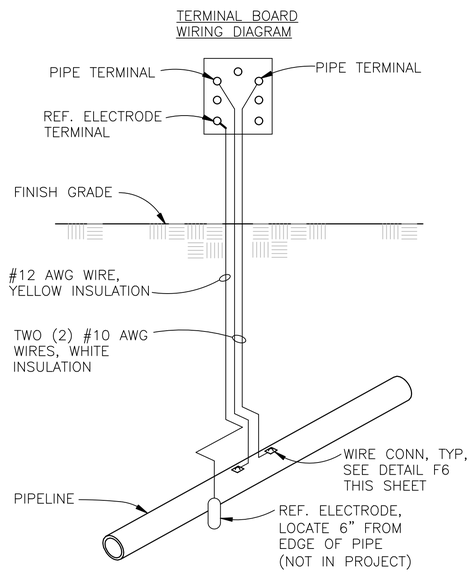
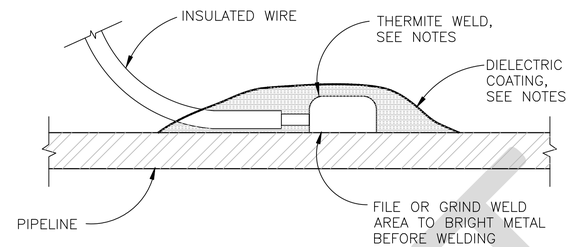
S:\25931 – 7000 South Utility Design\25931.05 – Secondary Water Transmission Pipeline\11-CAD\C-601 through C-623.dwg
CADD D3-R4

EXHIBIT D-1

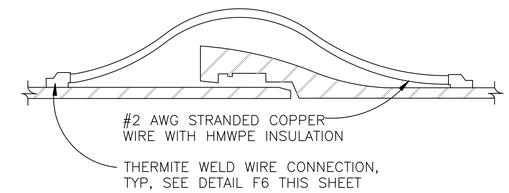


F/2 TYPE T TEST STATION
NTS



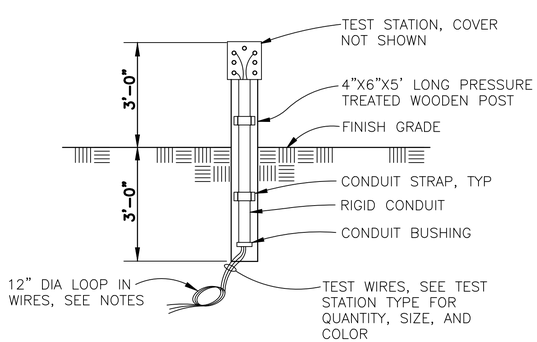
NOTES:
1. MAINTAIN SEPARATION BETWEEN MULTIPLE TEST WIRE CONNECTIONS OF ONE PIPE DIA OR 24", WHICHEVER IS LESS.
2. COPPER SLEEVE REQUIRED FOR #2 AWG JOINT BONDS OR FOR #12 AWG OR SMALLER TEST WIRES.
3. THERMITE WELDER AND CARTRIDGE SIZE VARIES ACCORDING TO PIPE SIZE AND PIPE MATERIAL, CONSULT WELDER MANUFACTURER FOR RECOMMENDED WELDER AND CARTRIDGE
4. COAT COMPLETED CONNECTIONS WITH DENSO PROTAL 7200 EPOXY.

F/6 STEEL AND DUCTILE IRON PIPE WIRE CONNECTION
NTS



NOTES:
1. PUSH ON DUCTILE IRON BOND SHOWN, SIMILAR FOR DUCTILE MECHANICAL AND RESTRAINED JOINTS, AND STEEL CARNEGIE JOINTS.
2. INSTALL 2 BOND WIRES AT EACH PIPE JOINT, UNLESS SPECIFIED OTHERWISE.
3. COAT THERMITE WELDS WITH DENSO PROTAL 7200 EPOXY.

F/10 DUCTILE IRON JOINT BOND
NTS



NOTES:
1. TEST STATION TO BE ALUMINUM BODY AND LID WITH THREADED CONNECTION FOR CONDUIT.
2. QUANTITY OF TERMINALS AND WIRING CONNECTIONS VARIES, SEE APPLICABLE TEST STATION DETAILS FOR TYPE OF TEST STATION
3. PROVIDE WIRE LOOP AT BASE OF POST MOUNTED TEST STATION TO MINIMIZE SETTLEMENT STRESSES ON WIRE
4. PROVIDE 3"X3" IDENTIFICATION PLATE TO EACH POST ON THE OPPOSITE SIDE OF TEST STATION. SECONDARY WATER IDENTIFICATION PLATE SHALL READ "CITY OF WEST JORDAN 24" DIP SECONDARY WATER LINE". SANITARY SEWER CASING IDENTIFICATION PLATE SHALL READ "CITY OF WEST JORDAN SANITARY SEWER 36" STEEL CASING".

B/2 POST MOUNTED, WOOD POST
NTS

DRAFT

NO.	REVISIONS	DSGN	CHKD	APVD	DATE
B	ISSUED FOR RFP	AKF	GST	DWJ	09/08/16
A	ISSUED FOR REVIEW	AKF	GST	DWJ	07/07/16

Stanley Consultants INC.
383 West Vine Street, Suite 400, Murray, Utah 84123
www.stanleyconsultants.com

PRELIMINARY
NOT FOR
CONSTRUCTION

CITY OF WEST JORDAN
7000 SOUTH UTILITY BETTERMENTS

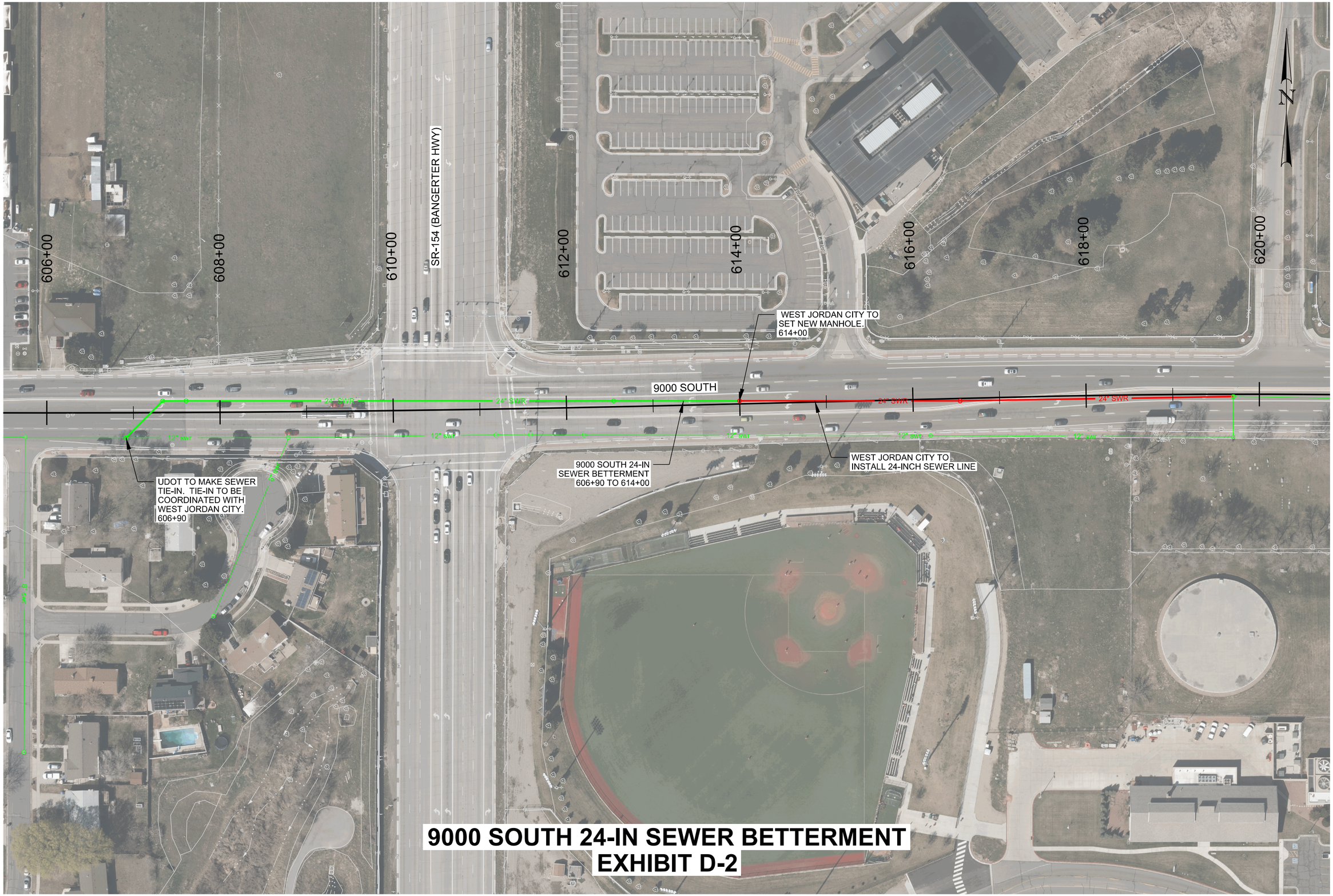
SECONDARY WATER
DETAIL SHEET 2

DESIGNED AKF
DRAWN IL
CHECKED GST
APPROVED GST
APPROVED DWJ
DATE 7/5/16

SCALE: AS SHOWN
NO. C-621
REV. B

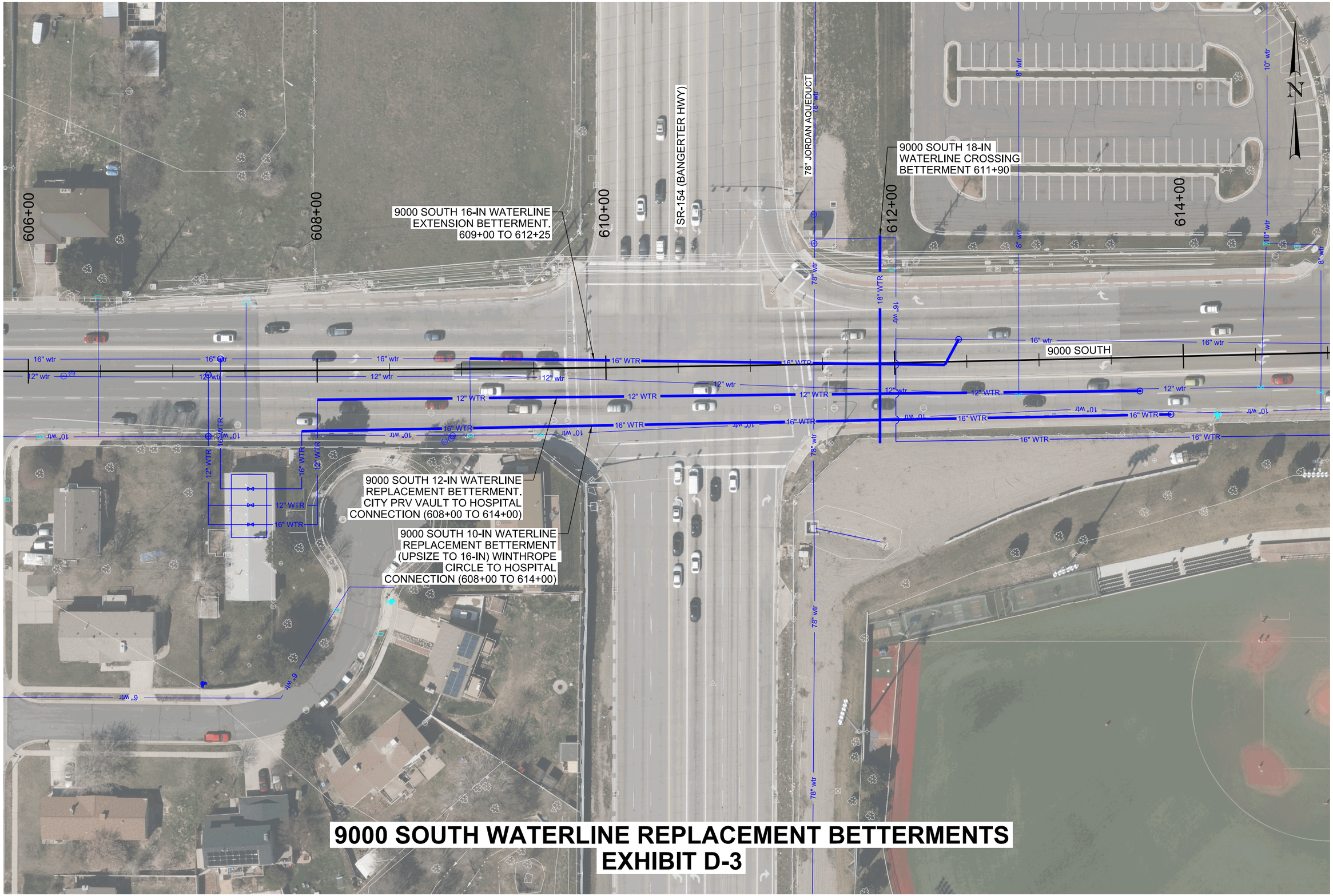
© STANLEY CONSULTANTS

S:\25931 – 7000 South Utility Design\25931.05 – Secondary Water Transmission Pipeline\11-CAD\C-601 through C-623.dwg
CADD D3-R4



9000 SOUTH 24-IN SEWER BETTERMENT
EXHIBIT D-2

9/26/2016 4:30:58 PM pw:\\pw.horrocks.com\PWPrimary\Documents\Projects\2016\PG-858-1604 Bangerter 4 Interchanges PM\12566\Documentation\Figures\9000 South\12566_9000SWR-01.dgn



9000 SOUTH WATERLINE REPLACEMENT BETTERMENTS
EXHIBIT D-3

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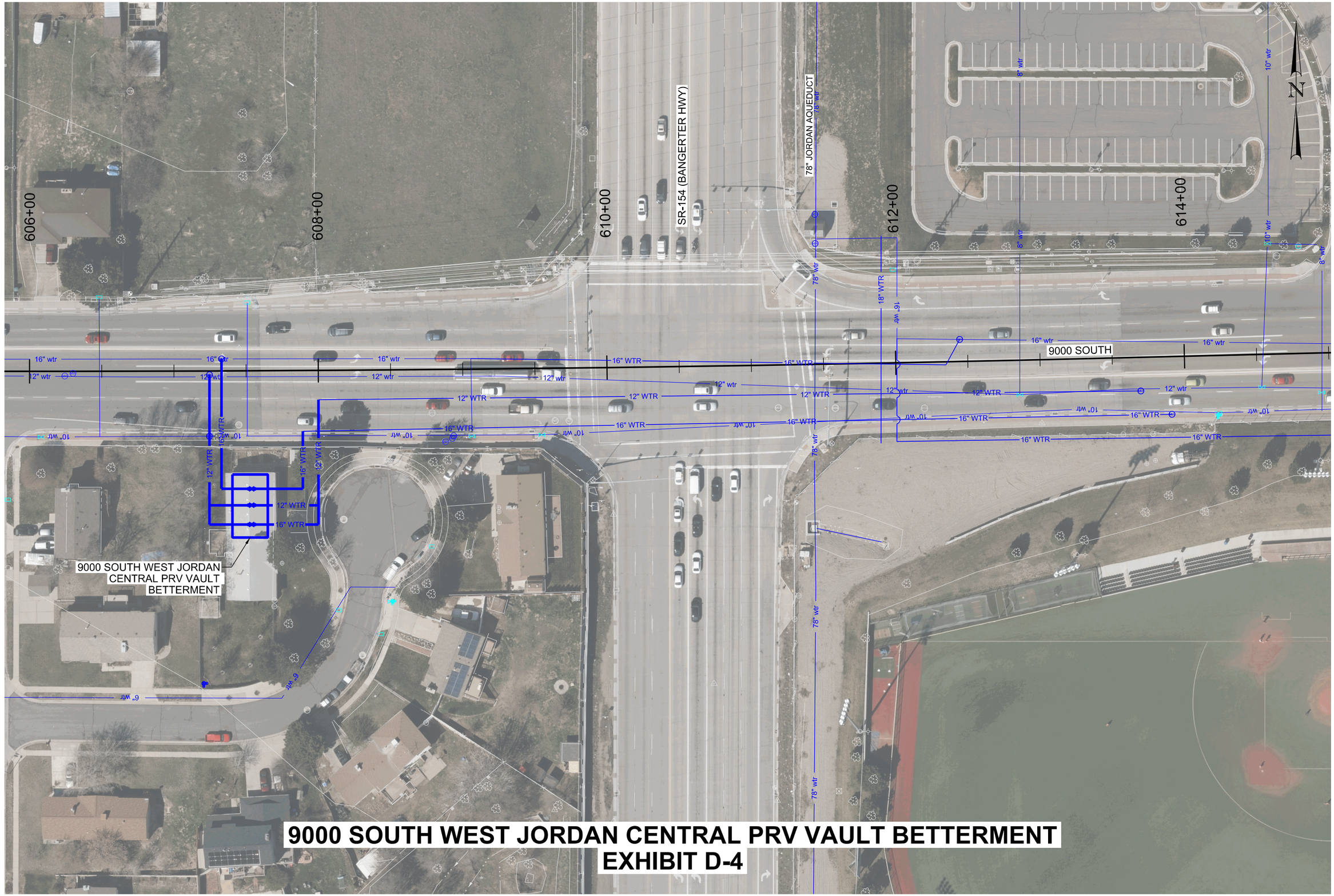

9000 SOUTH WEST JORDAN CENTRAL PRV VAULT BETTERMENT
EXHIBIT D-4

9/27/2016 10:48:51 AM pw:\\pw.hdrinc.com:PWPrimary\Documents\Projects\2016\PG-858-1604 Bangerter 4 Interchanges PM\12566\Documentation\Figures\9000 South\12566_90WTR03.dgn

ZAYO GROUP, LLC
MASTER UTILITY AGREEMENT

THIS MASTER UTILITY AGREEMENT, made and entered into this 12 day of Sept, 2016, by and between the **Utah Department of Transportation**, ("UDOT") and **Zayo Group, LLC**, a Company of the State of Colorado, ("Company") (each as "Party" and jointly as "Parties").

RECITALS

WHEREAS, UDOT is preparing to request proposals for and award a design-build contract for the highway project identified as Project Number S-0154(12)11, 4 Interchanges on Bangerter Highway in Salt Lake County, Utah, ("Project"); and

WHEREAS, UDOT's design-build contractor ("Design-Builder") will complete the design and administer construction of the Project; and

WHEREAS, UDOT has identified Company facilities within the limits of the Project which may necessitate the relocation, protection, or adjustment of the facilities, ("Utility Work"); and

WHEREAS, the Company desires for the Design-Builder to design and construct the Company's Utility Work except cable/pedestal procurement, pulling, and splicing necessitated by the Project; and

WHEREAS, the Company will perform the necessary review and approval for the design and construction of its Utility Work, provide cable/pedestal procurement, pulling, splicing, and construction inspection to accommodate the Project; and

WHEREAS, for the purpose of expediting any required Utility Work and reimbursement the Parties are entering into this Project Master Utility Agreement with the understanding that future supplemental agreements to this Agreement will be entered into covering Utility Work to be accomplished by the Company and UDOT at specific Project locations.

THIS AGREEMENT is made to set out the terms and conditions where under the Utility Work shall be performed.

AGREEMENT

NOW THEREFORE, the Parties agree as follows:

1. CONTACT INFORMATION

UDOT's Project Representative is Alana Spendlove, UDOT Project Utility and Railroad Leader, telephone number (801) 887-3462, and e-mail aspendlove@utah.gov.

UDOT's Resident Engineer for 5400 South and 7000 South interchanges is Bryan Chamberlain, telephone number (801) 887-3405, and e-mail bchamberlain@utah.gov, or their designated representative, as assigned.

UDOT's Resident Engineer for 9000 South and 11400 South interchanges is Ken Talbot, telephone number (801) 360-8750, and e-mail kentalbot@utah.gov, or their designated representative, as assigned.

UDOT's Field Representative contact person will be identified in subsequent supplemental agreements.

Company's contact person is Michael Sullivan, telephone number (602) 354-9486 and e-mail michael.sullivan@zayo.com.

After awarding the Project, UDOT will provide the Company with the Design-Builder contact information, hereinafter referred to as "Design-Builder Project Representative".

2. AUTHORIZATION FOR DESIGN WORK

In order to facilitate coordination and obtain technical information about the Company's facilities and requirements for inclusion in this Agreement and the request for proposals, UDOT gave the Company authorization for preliminary design engineering on April 26, 2016.

3. SUBSURFACE UTILITY ENGINEERING

UDOT has performed Subsurface Utility Engineering (SUE) within the limits of the Project. Additional SUE work to determine the precise location of underground facilities at specific, critical locations on the Project will be reviewed with the Company

4. PROJECT COORDINATION

Company and UDOT agree to have the Design-Builder include in the Project, items of Utility Work for the Company's facilities.

During the development of the Project design, the Company and UDOT, along with its Design-Builder, shall consult as necessary in an effort to determine if conflicts with the Company's facilities can be avoided. If Utility Work is required, UDOT will be responsible to propose and provide a location for the facilities. UDOT will provide the Company with Project design plans as early as possible, and will schedule and meet with the Company to review the design, construction, estimates of cost, and scheduling for the Company's Utility Work at specific locations

on the Project to ensure maximum lead time for advance order of materials and work force scheduling.

The Company shall advise UDOT's Project Representative of the approximate time required for completion of the Utility Work and shall diligently pursue its Utility Work so that completion can be accomplished according to the pre-determined time schedule negotiated by the Company and UDOT in the supplemental agreement issued hereto for a specific Project location. The Company shall immediately notify UDOT's Project Representative by phone call or email, of its discovery of any occurrence or unforeseen circumstances that would prevent the Company from completing its Utility Work according to the time schedule provided. In addition, the Company shall describe the circumstances in writing within 24-hours of the discovery to UDOT's Project Representative.

5. COMPANY REQUIREMENTS

UDOT will comply with the following Company Utility Work requirements:

1. Company splicing hours are from 12:00 p.m. to 5:00 a.m.
2. Provide minimum 12 inch separation of conduit from power in joint trench.
3. Include #14 gauge tracer wires in all conduits.
4. The Company will require a 2 week review and approval period for proposed designs, estimate review, and internal approvals after design plans and estimates are delivered to the Company.

6. UDOT TO DESIGN AND CONSTRUCT A PORTION OF UTILITY WORK

UDOT shall perform the necessary design work, cost estimating, field and office engineering, furnish all materials except cables and pedestals, and perform the Utility Work except pulling and splicing, necessitated by the Project.

UDOT will design the Utility Work in accordance with Company's standards regularly followed by the Company in its own work and not considered a betterment. In the event of a conflict between UDOT and Company standards, the higher standard will be applied.

UDOT will secure permits required for Utility Work for Company's facilities.

UDOT will supply as-constructed plans for the Utility Work it performs, in PDF format, upon completion of any required Utility Work. 20160113 DS

7. COMPANY TO PERORM INSPECTION AND CONSTRUCT A PORTION OF THE UTILITY WORK

The Company will perform inspection of the Utility Work for the Company's facilities that will be performed by UDOT. UDOT will accomplish the Utility Work on the Company's facilities in accordance with the plans and specifications approved by the Company. Changes or additions to the plans and specifications shall be approved by the Company and UDOT through a supplemental agreement.

The Company will provide all cables, pedestals, pulling, and splicing necessary to accommodate the Utility Work of its facilities on the Project. The Company requires 2 weeks' notice to schedule splicing and fiber pulls and will determine the splicing window based on the circuit.

8. STANDARD SPECIFICATIONS AND REGULATIONS

The Company, while engaged in the preliminary design and Utility Work of its facilities, shall comply with UDOT's 2012 Standard Specifications for Road and Bridge Construction and Utah Administrative Code R930-7.

9. UNDERBUILT AND FACILITY REMOVAL REQUIREMENTS

The Company is responsible to see to the removal of all Company-owned underbuilt facilities from utility poles that will be relocated or removed due to the Project.

10. RIGHT-OF-WAY

Any easements or replacement right-of-way required in conjunction with the Utility Work of Company's facilities will be acquired by UDOT in accordance with the requirements of Utah Administrative Code R930-8-7.

11. MAINTENANCE OF TRAFFIC (MOT), TRAFFIC CONTROL, CLEAR/GRUB, AND SURVEYING

UDOT will provide MOT and traffic control for Utility Work at no cost to the Company. The Company is responsible to coordinate Utility Work schedules and traffic control needs with UDOT to facilitate the Project schedule and minimize impacts to the public. Except in the case of emergencies, Company's Utility Work on the Project will be scheduled in compliance with the requirements of the Limitation of Operations contained in UDOT's Design-Builder contract with respect to lane closures, peak hour Utility Work restrictions, holiday and special event limitations, etc.

UDOT will provide, at no cost to the Company, clearing and grubbing for the Utility Work as required by the Company and in accordance with UDOT's Standard Specifications.

Surveying and staking of roadway facilities as required by the Company will be provided by UDOT in accordance with UDOT's Standard Specifications. The cost of the surveying and staking will be at UDOT's expense and the Company will have no obligation for the cost of surveying. Any of UDOT's survey control stakes or bench markers, which are removed or damaged by the Company, shall be reestablished by UDOT at Company's expense.

12. BETTERMENT WORK

If the Company desires to include betterment work in the Project at any specific location, UDOT may agree to the betterment work providing the difference in costs between the functionally equivalent required Utility Work and the Company's desired betterment work, that is not required by the Project, shall be at the sole cost of the Company and the betterment work can reasonably

be accommodated without delaying UDOT's Project. The betterment work will be addressed by a separate supplemental agreement between UDOT and the Company.

Once a Design-Builder has been selected by UDOT, any betterment work request will be negotiated directly with the Design-Builder. However, it is at UDOT's sole discretion to approve the betterment work.

13. SUPPLEMENTAL AGREEMENTS

UDOT and the Company shall enter into individual supplemental agreements to cover Utility Work at specific Project locations. Each supplemental agreement will include a description and location of the Utility Work to be performed, design drawings showing the original and proposed locations of the Company's facilities, Utility Work schedules, cost estimates from all Parties, participation shares for UDOT and the Company, any proposed betterment work, and any necessary right-of-way documents. The estimates do not account for increases due to unknown and unforeseen hardships in accomplishing the Utility Work. A copy of the format of the proposed supplemental agreement is marked Exhibit "A" that is incorporated by reference.

The Company will require a 2 week review and approval period for any final supplemental agreement submitted to the Company by UDOT.

In the event there are changes in the scope of the Utility Work, extra Utility Work, or changes in the planned Utility Work covered by a supplemental agreement, a modification to the supplemental agreement approved in writing by the Parties is required prior to the start of Utility Work on the changes or additions.

14. UDOT AUTHORIZATION TO PROCEED WITH UTILITY WORK

The Company shall not perform any Utility Work until the supplemental agreement for the Utility Work is signed by the Company and received by UDOT. UDOT will review and approve the supplemental agreement and will issue an authorization to proceed to the Company for each specific Utility Work location.

15. UDOT TO NOTIFY THE COMPANY BEFORE BEGINNING UTILITY WORK

UDOT will notify the Company at least 2 business days in advance of beginning any Utility Work covered by any supplemental agreements hereto, to allow the Company time to schedule an inspector to be present during the Utility Work. Subsequent notification of when and where Utility Work will be performed will be given on a day-to-day basis. Should UDOT fail to give advance notification and Utility Work is performed without the presence of a Company inspector, UDOT will, at no cost to the Company, facilitate inspection of the Utility Work including, if necessary, uncovering the Utility Work.

16. COMPANY TO NOTIFY UDOT AND THE DESIGN-BUILDER BEFORE BEGINNING UTILITY WORK

The Company will notify UDOT's Project Representative as well as the Design-Builder Project Representative at least 2 business days in advance of beginning any Utility Work covered by any supplemental agreements hereto. The Company will give subsequent notifications of when

and where the Company will be performing Utility Work to UDOT's Field Representative and the Design-Builder Project Representative on a day-to-day basis. Such subsequent notifications can be informal. Failure on the part of the Company to give proper notification to UDOT's Field Representative and the Design-Builder Project Representative will be cited to the Company and that portion of the Company's Utility Work performed while not under the surveillance of the UDOT Field Representative may be deducted from the reimbursement at UDOT's discretion for.

17. INSPECTION

The Company shall provide on-call engineering support by the Company's engineer or appropriate representative for design review, schedule coordination, or to correct or clarify issues during the Utility Work, and to perform the necessary inspection for the Company's Utility Work installed by UDOT.

a. The Company engineer and/or inspector shall work with and through UDOT's Project Representative and shall give no orders directly to UDOT's Design-Builder unless authorized in writing to do so. UDOT will accomplish the Utility Work covered herein on Company's facilities in accordance with the plans and specifications provided and/or approved by the Company, including changes or additions to the plans and specifications, which are approved by the Parties hereto.
b. The Company shall immediately notify UDOT's Project Representative and the Design-Builder Project Representative of any deficiencies in the Utility Work on the Company's facilities. The Company shall follow up with written detail to UDOT's Project Representative and the Design-Builder Project Representative of its findings within 24-hours of making its initial notification.
c. UDOT will respond to the Company's concerns within 24-hours of written notification.
d. The Company, through its inspection of the Utility Work, will provide UDOT's Project Representative with information covering any problems or concerns the Company may have with acceptance of the facilities upon completion of the Utility Work.
e. Any periodic plan and specification review or construction inspection performed by UDOT arising out of the performance of the Company's Utility Work does not relieve the Company of its duty in the performance of the Utility Work or to ensure compliance with acceptable standards.

18. DAILY RECORDKEEPING

The Company will keep daily records of the inspection and Utility Work performed by the Company forces. Daily records will be in duplicate on a form to be prepared by the Company or UDOT. The type of form to be used shall be preapproved by UDOT's Contracts, Compliance, and Certification Manager. The daily records shall be signed by UDOT's Field Representative and the Company or its authorized representatives.

19. REIMBURSEMENT FOR COMPANY'S UTILITY WORK

In accordance with Utah Code §72-6-116(3)(a)(ii), UDOT will reimburse the Company 50% of the cost of Utility Work of its facilities on state highways and the Company shall pay the remainder of the cost of the Utility Work. UDOT will reimburse the Company 100% of the cost of Utility Work of its facilities located on a public utility easement, on a Company-owned private easement or fee property. The Company shall provide UDOT with a copy of the public utility

easement or subdivision plat, private easement or fee title. The Utility Work and reimbursement for Company's facilities required by the Project will be in conformance with the requirements of Utah Administrative Code R930-8.

The Company shall submit itemized bills covering its actual costs incurred for performing the Utility Work covered by supplemental agreements to UDOT's Contracts and Compliance Specialist:

UDOT Contracts and Compliance Specialist
Utah Department of Transportation
PO Box 141510
SLC UT 84114-1510

Itemized bills shall bear the Project and supplemental agreement numbers, supporting sheets, and a complete billing statement of all actual costs incurred, following the order of the items in the detailed estimates contained in the supplemental agreement, and be submitted to UDOT within 60 days following completion of the Utility Work by the Company on the Project. Otherwise, previous payments to the Company may be considered final, except as agreed to between the Parties in advance. UDOT will reimburse the Company within 60 days after receipt of the billings, but only for those items complying fully with the provisions of Utah Administrative Code R930-8. Failure on the part of the Company to submit final billings within 6 months of the completion of the Utility Work will result in UDOT's disallowance of that portion of Utility Work reimbursement.

If the Company owes a balance to UDOT, the Company will reimburse UDOT within 60 days after receipt of billing from UDOT.

20. SALVAGE CREDIT

In accordance with 23 C.F.R. §645.117 all materials from Company's existing facilities which are recovered by UDOT while performing the Utility Work and not reused on this Project shall become the property of the Design-Builder unless otherwise agreed to in advance by the Parties hereto.

In accordance with 23 C.F.R. §645.117, all materials from the existing facilities, which are recovered in suitable condition for reuse by the Company and not reused on the Project, shall be credited to the cost of the Project at current stock prices. If the materials are not suitable for reuse, they shall be credited at such other prices as agreed upon between the Company and UDOT following inspection of the recovered material.

21. PROJECT DESIGN CHANGES

If UDOT changes the Project design after the Company has completed its design review; or if the Company has completed its portion of the Utility Work of its facilities based on previously approved design plans; the cost of the second design review and/or Utility Work is to be paid in full by UDOT. UDOT will make adjustments for any additional time that may be required for the Company to perform Utility Work on its facilities when required.

22. **COMPANY'S COSTS DIFFER BY MORE THAN 10%**

If the Company's actual costs incurred for its force account work differs more than 10% plus or minus per line item from the amount contained in the supplemental agreements, the Company is required to submit a letter of explanation with its billings indicating how and why the difference in costs occurred.

23. **RIGHT TO AUDIT**

UDOT and FHWA shall have the right to audit all cost records and accounts of the Company pertaining to this Project in accordance with the auditing procedure of the Federal Highway Administration and 23 C.F.R. §645, subpart A. Should this audit disclose that the Company has been underpaid, UDOT will reimburse the Company within 60 days upon submission of additional billing to cover the underpayment. Should this audit disclose that the Company has been overpaid, the Company will reimburse UDOT within 60 days of notification of audit findings in the amount of the overpayment. For the purpose of audit the Company is required to keep and maintain its records of Utility Work covered herein for a minimum of 3 years after final payment is received by the Company from UDOT.

The Company shall have the right to review UDOT's cost documentation for the Utility Work performed on behalf of the Company.

24. **ACCEPTANCE**

UDOT will provide notification to the Company for acceptance of the Utility Work upon completion of the final inspection. Company will have 60 days to respond in writing to UDOT with any additional comments in regards to the Utility Work. In the event that UDOT does not receive a written response within 60 days, UDOT will designate the Utility Work accepted by the Company. Upon acceptance of the Utility Work, the Company will accept, own and maintain its facilities. To the extent it may lawfully do so, Company further agrees to relieve UDOT from any responsibility or liability that may result for its new facilities or the operation thereof.

25. **ACCESS & MAINTENANCE**

Access for maintenance and servicing of Company's facilities located on the Project right-of-way will be allowed only by permit issued by UDOT. Company will obtain the permit and abide by conditions thereof for policing and other controls in conformance with Utah Administrative Code R930-7.

26. **MISCELLANEOUS**

a. Each Party agrees to undertake and perform all further acts that are reasonably necessary to carry out the intent and purpose of this Agreement at the request of the other Party.
b. This Agreement in no way creates any type of agency relationship, joint venture, or partnership between UDOT and Company.
c. The failure of either Party to insist upon strict compliance of any of the terms and conditions, or failure or delay by either Party to exercise any rights or remedies

provided in this Agreement, or by law, will not release either Party from any obligations arising under this Agreement.

d. This Agreement shall be deemed to be made under and shall be governed by the laws of the State of Utah in all respects. Each person signing this Agreement warrants that the person has full legal capacity, power, and authority to execute this Agreement for and on behalf of the respective Party and to bind such Party. This Agreement may be executed in one or more counterparts, each of which shall be an original, with the same effect as if the signatures were made upon the same instrument. This Agreement may be delivered by facsimile or electronic mail.

****

IN WITNESS WHEREOF, the Parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first above written.

Zayo Group, LLC

Title: General Counsel

Date: 8/30/2016

Recommended For Approval:

Title: Utility and Railroad Leader

Date: 9/12/16

Utah Department of Transportation

Title: Project Director

Date: Sept 12, 2016

Approved as to Form

Title: Assistant Attorney General

Date: 09/19/2016

UDOT Comptroller Office Contract Administrator

Title:

Date: 9-21-16

ZAYO GROUP, LLC
SUPPLEMENTAL AGREEMENT NO. ___

Supplement to UDOT Finance No. _____

THIS SUPPLEMENTAL AGREEMENT, made and entered into this _____ day of _____, 20____, **Utah Department of Transportation**, ("UDOT"), and **Zayo Group, LLC**, a Company in the State of Colorado, ("Company") each as ("Party") and jointly as ("Parties").

The Parties hereto entered in to a Master Utility Agreement (MUA) dated _____, UDOT Finance No. _____. All the terms of the MUA remain in full force and effect unless otherwise specified herein.

The Parties agree as follows:

1. UDOT and Company will perform the following described Utility Work in accordance with the terms and conditions of the MUA:

   a. Description of Utility Work to be performed, including proposed location, described in Exhibit "A" that is incorporated by reference: (Plan Sheets Attached)

   b. The Company requirements as shown in the MUA – Company Requirements, are modified as follows:

   c. Anticipated duration of Utility Work as shown on Exhibit "B" that is incorporated by reference:

   d. Betterments included:

TOTAL ESTIMATED COST OF SUPPLEMENTAL AGREEMENT _____	**$0.00**
TOTAL ESTIMATED COST OF COMPANY PERFORMED UTILITY WORK	$0.00
TOTAL ESTIMATED COST OF UDOT PERFORMED UTILITY WORK	$0.00
COMBINED TOTAL ESTIMATED COST OF UTILITY WORK	**$0.00**
TOTAL ESTIMATED AMOUNT OF COMPANY PARTICIPATION @ 50%	$0.00
TOTAL ESTIMATED AMOUNT OF UDOT PARTICIPATION @ 50%	$0.00

2. UDOT will notify the Company's contact person, Michael Sullivan, telephone number (602) 354-9486 and e-mail michael.sullivan@zayo.com at least 48 hours in advance of beginning the Utility Work covered herein, or in accordance with the specific terms of the MUA, as applicable.

IN WITNESS WHEREOF, the Parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first written above.

Zayo Group, LLC

_____

Title: _____

Date: _____

. . . . . .

Recommended For Approval:

_____

Title: Utility and Railroad Leader

Date: _____

Utah Department of Transportation

_____

Title: Project Director

Date: _____

UDOT Comptroller Office Contract Administrator

_____

Title:

Date: _____

REQUEST FOR PROPOSALS

UTAH DEPARTMENT OF TRANSPORTATION

4 Interchanges on Bangerter HWY (SR-154)

Project No. S-0154(12)11

Salt Lake County

CONTRACT DOCUMENTS

PART 7:

CONTRACT DRAWINGS

Addendum 5 - October 27, 2016

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10. ATMS Details
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12. Off Ramp Grading for Future Lane Detail
13. Pedestrian Bridge Location at 7000 South
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REQUEST FOR PROPOSALS

UTAH DEPARTMENT OF TRANSPORTATION

4 Interchanges on Bangerter HWY (SR-154)

Project No. S-0154(12)11

Salt Lake County

CONTRACT DOCUMENTS

PART 8:

ENGINEERING DATA

Addendum 4 - October 20, 2016

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4. SUE Test Hole Mapbook – Revised
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PART 8 DOCUMENTATION NOT INCLUDED IN MAIN PDF DOCUMENT; INCLUDED AS SEPARATE DOCUMENTS/ELECTRONIC FILE

REQUEST FOR PROPOSALS

UTAH DEPARTMENT OF TRANSPORTATION

4 Interchanges on Bangerter HWY (SR-154)

Project No. S-0154(12)11

Salt Lake County

CONTRACT DOCUMENTS

PART 9:

WARRANTY PROVISIONS

Final Issued September 15, 2016

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9—WARRANTY PROVISIONS

9A. GENERAL

Warrant the Work for the duration of the Warranty Period in accordance with the requirements of this Part 9 and Part 2 (General Provisions). Remove, replace, or correct Work at no cost to the Department when an element of Work does not meet Contract requirements.

Warranty Period. Except as specified otherwise within the Contract provisions, warrant the Work for two years after the date of Final Acceptance.

9B. STANDARDS

Not used

9C. REQUIREMENTS

9C-1 Geotechnical—Maximum Permissible Settlements

Warrant the maximum permissible settlements during the designated Warranty Periods as follows.

A. **Pavements**: As measured by a string line and/or from the as-designed roadway grade.

1. Transverse direction: 0.2 inch differential per 12-foot lane width
2. Longitudinal direction:
   a. Structure approaches: 0.5 inch differential per 25 feet
   b. All other locations: 0.3 inch differential per 50 feet
3. Total post-construction settlement: 1 inch

B. **Foundations Supporting Bridges**:

1. Total settlement: 1.0 inch, and maintain minimum structure height clearances
2. Differential settlement:
   a. Transverse across substructure unit(s): 0.2 inch per 12-foot width
   b. Longitudinal between adjacent foundation supports: 0.75 inch per 100 feet

C. Structure Approach Slabs

1. Longitudinal direction (parallel to roadway alignment): 1 inch differential per 25 feet
2. Transverse direction: 0.2 inch per 12-foor lane width

D. **Deep Foundations Supporting Walls**:

1. Total settlement: 1 inch
2. Differential settlement: 0.5 inch per 30 feet

E. **Mechanically Stabilized Earth (MSE) Walls**: The following maximum movements (all measured at the wall face) will be applied for the wall Warranty Period. The parenthetical entries are examples of the maximum allowable movements, typically

for the minimum length of measurement;

1. Differential Settlement (measured at wall face):
   a. Single-stage walls: 0.3% (1.8 inches per 50 lineal feet of wall)
   b. Two-stage walls, first stage (wire facing): 1.5% (3.6 inches per 20 feet of wall)
   c. Two-stage walls, second stage (panels): 0.15% (0.9 inch per 50 feet of wall)
2. Horizontal Alignment: 0.25% (0.9 inch per 30 lineal feet of wall)
3. Vertical Alignment: 0.25% (0.3 inch per 10-foot vertical segment of wall)
4. Overall Plumbness: 0.2% (0.45 inch for 20 foot height of wall)

9C-2 Pavement—Rigid and Flexible

A. Warrant that, during the Warranty Period, both the allowable level and extent of severity for the various distress types identified do not exceed those trigger values identified in Table 9C-1 (Distress Trigger Values for Rigid Pavements) and Table 9C-2 (Distress Trigger Values for Flexible Pavements) for the two pavement types. If any of these values is exceeded, take the recommended corrective action to bring these parameters within the limits.

TABLE 9C-1
DISTRESS TRIGGER VALUES FOR RIGID PAVEMENTS

Distress Type	***Allowable Severity***		***Corrective Action ****
	Level	***Extent***	
Cracking:			
Corner Break	Low Severity: Crack not spalled for more than 10% of the length of crack; no measurable faulting; and corner piece not broken into two or more pieces	Low Extent: 2 corner breaks per lane-mile	Repair full depth.
Durability "D" Cracking	Crescent-shaped hairline cracking, with no loose or missing pieces	Not allowed	Replace total slab.
Longitudinal Cracking	Low Severity: Crack widths <1/8", no spalling, and no measurable faulting; or well-sealed and with a width that cannot be determined	Low Extent: 4 slabs per lane-mile	If cracking exceeds low severity, replace full depth of slab. If two or more cracks per panel, replace full slab.
Transverse Cracking	Low Severity: Crack widths <1/8", no spalling, and no measurable faulting; or well-sealed and with a width that cannot be determined.	Low Extent: 4 slabs per lane-mile	Replace according to UDOT Standard Drawings, Section 450. If two or more cracks per panel, replace full slab.
Joint Deficiencies:			
Joint Seal Damage—Transverse	Low Severity: Transverse joint sealant damage, as described by the Strategic Highway Research Program (SHRP): extrusion, hardening, adhesive failure, cohesive failure, or complete loss of sealant	Low Extent: 10% of joint length per lane-mile	Reseal joint.

TABLE 9C-1
DISTRESS TRIGGER VALUES FOR RIGID PAVEMENTS

Distress Type	***Allowable Severity***		***Corrective Action ****
	Level	***Extent***	
Joint Seal Damage—Longitudinal	Low Severity: Longitudinal joint sealant damage, as described by SHRP: joint sealant damage, extrusion, hardening, adhesive failure, cohesive failure, or complete loss of sealant.	Low Extent: 10% of joint length per lane-mile	Reseal joint.
Spalling—Longitudinal Joint	Low Severity: Spalls <3" wide (measured to center of joint) with loss of material; or spalls with no loss of material and no patching.	Low Extent: <5% of joint length per lane-mile	If severity is low, fill void with hot-pour sealant. If low severity is exceeded, repair to full depth.
Spalling—Transverse Joint	Low Severity: Spalls <3" wide (measured to center of joint), with loss of material; or spalls with no loss of material and no patching.	Low Extent: <5% of joint length per lane-mile or 25% of a joint.	If severity is low, fill void with hot-pour sealant. If low severity is exceeded, repair to full depth.
Surface Defects:			
Surface Crazing	(Not applicable)	Low Extent: <1% of surface area per lane-mile	Apply UDOT Standard Penetrating Seal.
Scaling	Deterioration of upper concrete surface	Low Extent: <1% of surface area per lane-mile	Apply UDOT Standard Penetrating Seal.
Map Cracking	Cracks that extend only into the upper surface of slab, compromising structural capacity	Not allowed	Replace total slab.
Polished Aggregate Damage	Surface mortar and texturing worn away	Low Extent: Skid resistance value <45 at end of 2 years	Abrade or grind surface to exceed established skid resistance values.
Popouts	Small pieces of pavement >1 inch in diameter broken loose from surface	More than 3 per square yard ($yd^{2)}$	Remove and replace with flexible repair material.
Miscellaneous Distress:			
Blowups	Not applicable; however, severity levels can be defined by ride quality and safety.	Low Severity: Within established ride quality and skid-resistance criteria, and a visual inspection	Within 24 hours, Department will perform temporary repair; within six months, Design-Builder must repair to full depth.
Faulting of Transverse Joints and Cracks	None allowed		If faulting of transverse joints occurs, replace the full depth of the slab.
Lane-to-Shoulder or Lane-to-Lane Dropoff; Lane-to-Shoulder or Lane-to-Lane Ramp Separation	Allowable: Maximum = ¼ inch; Mean width < ¼ inch.	2% of joint length per lane-mile	Retrofit No. 5 tie bars @ 3-foot centers; grind and overlay.

TABLE 9C-1
DISTRESS TRIGGER VALUES FOR RIGID PAVEMENTS

Distress Type	***Allowable Severity***		***Corrective Action ****
	Level	***Extent***	
Differential Settlement at approach slab/pavement interface	Allowable: Maximum = ½ inch	At any location	Slab-jack or remove and replace pavement panel
Patch/Patch Deterioration	None allowed		Replace to full depth.
Water Bleeding and Pumping	Seeping or ejection of water from beneath the pavement through cracks	Not allowed	Underseal slab and seal joint.
** All corrective action(s) apply to full width of paving pass for full length of distress, except as noted otherwise.*			

TABLE 9C-2
DISTRESS TRIGGER VALUES FOR FLEXIBLE PAVEMENTS

Distress Type	***Allowable Severity***		***Corrective Action ****
	Level	***Extent***	
Cracking:			
Fatigue Cracking	Low Severity: An area of cracks with no cracks or only a few connecting cracks; cracks not spalled or sealed; pumping not evident	Low Extent: <5% of the wheelpath, defined as a 3-foot-wide pass centered 3 feet off the lane line each side per lane-mile	Repair to full depth and replace with similar section; in this case, "full depth" is the depth of the pavement section (including base courses).
Block Cracking	Low Severity: Cracks with mean width ≤¼"; or sealed cracks with sealant material in good condition and with a width that cannot be determined	Low Extent: <5% of surface area per lane-mile	Seal cracks and overlay.
Edge Cracking	Low Severity: Cracks with no breakup or loss of material	Low Extent: <10% of pavement edge per lane-mile	Seal crack.
Longitudinal Cracking	Low Severity: Cracks with mean width ≤¼"; sealed cracks with sealant material in good condition and with a width that cannot be determined	Low Extent: <10% of pavement edge per lane-mile	Reseal crack and overlay.
Transverse Cracking	Low Severity: An unsealed crack with mean width ≤¼"; or sealed cracks with sealant material in good condition and with a width that cannot be determined.	Low Extent: <100 cracks per lane-mile; no 3 cracks (no cracks??) within 50-foot stretch	Seal or reseal crack or joint and overlay.
Patching and Potholes:			
Patch/Patch Deterioration	None allowed		Repair to full depth.
Potholes	None allowed		Repair to full depth.
Surface Deformation:			
Rutting	<1/8 inch deep	Low Extent: <5% of traveled surface per lane-mile	Rotomill and overlay; determine cause (e.g., OGSC or full depth) and replace to that depth.
Shoving	<1/8 inch deep	Low Extent: <5% of traveled surface per lane-mile	Repair to full depth or Rotomill and overlay; determine cause (e.g., OGSC or full depth) and replace to that depth.
Surface Defects:			
Bleeding	Low Severity: An area of pavement surface discolored (relative to the remainder of the pavement) by excess asphalt	Low Extent: 2% of surface area per lane-mile	Surface-treat with plant mix friction course.

TABLE 9C-2
DISTRESS TRIGGER VALUES FOR FLEXIBLE PAVEMENTS

Distress Type	***Allowable Severity***		***Corrective Action ****
	Level	***Extent***	
Polished Aggregate	Reduction in surface friction.	Low Extent: 2% of surface area per lane-mile	Surface-treat with plant mix friction course.
Raveling	Low Severity: Aggregate or binder beginning to wear away, but no significant progression yet; some loss of fine aggregate.	Low Extent: <2% of surface area per lane-mile.	Surface-treat with plant mix surface treatment.
Miscellaneous Distress:			
Lane-to-Shoulder Dropoff	Allowable: Maximum ¼"; and Mean width, <¼".	Low Extent: 5% of joint length per lane-mile	Restore shoulder elevation.
Water Bleeding and Pumping	Seeping or ejection of water from beneath the pavement through cracks	Not allowed	Seal or reseal.
Differential Settlement at approach slab/pavement interface	Allowable: Maximum = ½ inch	At any location	Slab-jack or remove and replace pavement
**** All corrective action(s) apply to full width of paving pass for full length of distress, except where noted otherwise.***			

9C-3 Lamps and Luminaires

Warrant all luminaires for 10 years.

9C-4 Pedestrian Bridge

Warrant the pedestrian bridge against defects in material and workmanship.

9C-5 Drainage

A. Warrant the quality and function of drainage features constructed under this contract for the duration of the Warranty Period.

B. Warrant the quality and function of irrigation facilities constructed under this Contract for the duration of the Warranty Period.

9D. SUBMITTALS

Provide submittals to the Department in accordance with Table 9D-1.

TABLE 9D-1
DESIGN-BUILDER SUBMITTALS FOR WARRANTIES

Submittal	***For Approval***	***Schedule***
Warranty Bond and Letter of Credit for Pavement Markings	No	Prior to Placing

REQUEST FOR PROPOSALS

UTAH DEPARTMENT OF TRANSPORTATION

4 Interchanges on Bangerter HWY (SR-154)

Project No. S-0154(12)11

Salt Lake County

REFERENCE DOCUMENTS

(RD)

Addendum 5 - October 27, 2016

TABLE OF CONTENTS

1. Aerial Images

2. Preliminary Engineering Concept (PEC) Base Build – Revised Sheets

3. PEC Build Alternative – 4015 West Reconstruction

4. Electronic Files

a) Structures Location .dgn
b) 5400 South
    1. 4015 West - Build Alternative
c) 7000 South
d) 9000 South
e) 11400 South
f) Drainage Basin .dgns

5. Environmental Documentation

a) Final State Environmental Study (SES) Bangerter Hwy & 5400 South
b) Final SES Bangerter Hwy & 7000 South
c) Final SES Bangerter Hwy & 9000 South
d) Final SES Bangerter Hwy & 11400 South
e) USBOR Aqueduct Environmental Assessment (EA) Draft
f) Section 404 Permit 9000 South

6. Municipal & County Standards

a) Salt Lake County Standards
b) South Jordan City Standards
c) South Valley Sewer District Standards
d) Taylorsville City Standards
e) Taylorsville Bennion Improvement District Standards
f) West Jordan City Standards

7. USBOR Aqueduct Relocation Plans

8. Drainage Basin Maps and Supporting Information

a) Drainage Basin Maps
b) South Jordan City Bangerter Hwy. and 9000 South Supporting Drainage and Utilities Information
c) South Jordan City Bangerter Hwy. and 11400 South Supporting Drainage Information

9. As-Builts

a) Bangerter Hwy (SR-154) at 6200, 7000 & 7800 South DB
b) Bangerter Hwy (SR-154) at 4700 & 5400 South (SR-173) Flex Lanes CFI
c) 5400 South (SR-173) from Bangerter Hwy (SR-154) to 4800 West
d) 7000 South & WVH Pedestrian Bridge
e) Original Bangerter

1. SR-154 WVH 4100 South to 5400 South

f) USBOR Aqueduct As-Builts
g) Pedestrian Structure As-Builts

10. Moved to Part 6

11. Draft Aesthetics Plan

a) Bangerter Highway Aesthetics Treatment
b) Aesthetics Land Form

12. Right-of-Way Plans

13. Utility General Estimated Costs

a) Estimated Costs for AT&T
b) Estimated Costs for First Digital and Questar
c) Estimated Costs for Syringa

14. Miscellaneous Agreements

a) MOA UDOT and SJ Marketplace
b) SLCC RIRO Letter
c) UTA-UDOT Partnering Agreement June 2015

15. Not Used – Moved to Part 8 (Engineering Data)

16. Traffic Models

a) 5400 South
b) 7000 South
c) 9000 South
d) 11400 South

17. Splice Details

a) First Digital Splicing
b) AT&T Box Splice Maps
c) AT&T Sheets 64-103

18. West Jordan City Council Presentation 9/7/16 – 7000 South Closure Request

19. Bureau of Reclamation Stamped Drawings

20. Turning Templates

a) 5400 South
b) 7000 South - Revised
c) 9000 South - Revised
d) 11400 South - Revised

21. 2015 Traffic Models

a) 5400 South
b) 7000 South
c) 9000 South
d) 11400 South
e) Bangerter Corridor

22. Drainage Report SR-154 Bangerter Highway 9000 South to 12600 South

23. Aqueduct Protection and Monitoring Draft Special Provisions – Moved to Part 5

REFERENCE DOCUMENTATION NOT INCLUDED IN MAIN PDF DOCUMENT; INCLUDED AS SEPARATE DOCUMENTS/ELECTRONIC FILES.