Summit County Service Area #3
Board of Trustees Public Meeting

Meeting Date & Time: April 6, 2026, 4:30pm MST
Meeting Location: Service Area 3 office, 629 Parkway Drive, Park City, UT 84098
For more information or questions: (435) 500-6276

Agenda Item	Time	Presenter(s)
1. Welcome and Call Meeting to Order (motion/voting) a. Welcome b. Roll Call & Conflict of Interest Disclosure	4:30 pm	Chair
2. Administrative & Financial (motion/voting) a. Impact Fee RFP b. Silver Bullet Well RFP c. District Engineering Services RFP d. Water Storage Tank RFP e. Swift Comply Software	4:40 pm	Chair, Legal counsel
3. Adjournment	5:15 pm	Chair

To participate online:

Board of Trustees Special Board meeting
Monday, April 6 · 4:30 – 5:30pm
Time zone: America/Denver
Google Meet joining info
Video call link: https://meet.google.com/bii-ehqo-yzu
Or dial: (US) +1 636-451-9056 PIN: 404 551 072#
More phone numbers: https://tel.meet/bii-ehqo-yzu?pin=1805220789182

*Minutes and agendas available at:
https://www.summitcountyutah.gov/AgendaCenter/Search/?term=&CIDs=34,&startDate=01/01/2026&endDate=04/15/2026&dateRange=&dateSelector=
**Any motion/voting will take place in open meeting after closed session

REQUEST FOR PROPOSALS



Summit County Service Area #3

Impact Fee Study

Summit County Service Area #3

629 Parkway Drive, Suite 1

Park Service Area, UT 84098

P: (435) 500-6276

E: gm@summitcosa3ut.gov

https://www.summitcountyutah.gov/733/Service-Area-3

1. **General Information**

    1. Introduction

Summit County Service Area #3 is soliciting proposals from qualified firms for the collection and analysis of data related to the potential enactment of Impact Fees pursuant to Utah Code Annotated § 11-36a-101 et. seq. (the "Project").

Summit County Service Area #3 (SCSA3) is a special district known as a "service area." All special districts, including service areas, are independent, government entities created to carry out specific purposes.

Summit County created SCSA3 to, among other things, "own, operate and maintain water rights and culinary and irrigation water retail services". See Section 2-27-1 of the Summit County Code.

Although SCSA3 was created by Summit County, SCSA3 is a political subdivision of the State of Utah that is "separate and distinct from any other political subdivision of the state." *See* Utah Code § 17B-1-103. As such, SCSA3 is governed by its elected Board of Trustees and regulated by the State rather than Summit County.

As a government entity, SCSA3 is not a private water company nor is it an HOA.

- SCSA#3 performs road maintenance, snow removal, right-of-way management, culinary water system, water rights administration, trails, parks and drainage. We work cooperatively with Summit County to uphold their regulations and we rely upon them to provide enforcement support.

- SCSA#3 is funded through property tax, Ad Valorem tax, water rights administration fees, culinary water fees and construction fees. Seven publicly elected volunteer Board of Trustees direct the vision, policy and management of the Service Area with the assistance of a General Manager, an Office Manager, a Road and Water Operator and legal counsel.

2. **Service Area 3 Impact Fee RFP Provisions**

    1. RFP Contact

This Request for Proposals ("RFP") has been prepared and issued by Summit County Service Area #3. The Service Area's representative for this RFP is:

General Manager

(435) 500-6267
gm@summitcosa3ut.gov

2. Scope of the Contract

The selected Respondent-Respondent(s) will enter into a written agreement with Summit County Service Area #3. A binding contract between Summit County Service Area #3 and the Respondent(s) will be contingent upon the successful negotiation, preparation, and execution of a formal agreement. If a Respondent(s) wishes to propose modifications to any of the conditions outlined in this RFP, those modifications must be clearly identified in the proposal, along with reasonable alternatives.

This RFP is intended to provide sufficient information to solicit proposals from qualified Respondents but does not restrict the content of proposals or exclude the inclusion of relevant, important, or essential information. This RFP is part of a competitive procurement process designed to serve the best interests of Summit County Service Area #3 and its citizens, while also ensuring that each qualified Respondent has a fair opportunity for their services to be considered.

3. Qualifications

Respondents are required to provide a detailed discussion of their qualifications to demonstrate their capability to successfully complete the Project. Respondent(s) must include the following minimum qualifications:

1. Demonstrated and verifiable skills or experience delivering similar Projects and demonstrated resources and ability to carry out the tasks identified in this RFP;
    a. Including references that can speak to their performance and outcomes.
2. Demonstrated Respondents' understanding of the Project requirements, showcasing their grasp of the scope and objectives.
3. A summary of key personnel and Respondents' subcontractors who will be assigned to the Project, including their relevant qualifications and experience.
4. A suggested scope of services and a proposed Project schedule, outlining the approach to achieving the Project's goals within the desired timeframe.

3. **Proposal Requirements and Contents**
    a. Proposal Response Outline

Proposals must be limited to ten (10) pages and include:

1. Cover Letter: The response shall have a cover letter indicating a Respondent's willingness to enter into an agreement with the Service Area. An officer of the Respondent who has the authority to commit the Respondent to the proposed Project must sign this letter. This signature will indicate that the proposal is valid for a period of one hundred twenty (120) days from the date of submission. Responses will include the full name, legal status (corporation, state of incorporation, partnership, proprietorship, etc.), business address, email address, website address (if applicable), and phone number.

2. Executive Summary: the executive summary should provide a brief overview of the Respondent's approach, clearly highlighting any options or proposed alternatives. It should also identify any major requirements that the Respondent is unable to meet.
3. Detailed Discussion: This section should be the core of the proposal and must include a specific, outline-form response to each section of this RFP. The outline should follow the order and numbering of the sections in the RFP. Any omission of a written response to items in this RFP will be interpreted as an indication that the Respondent is unable to provide the requested service.

   The detailed discussion should cover the following:
   1. The Respondent's understanding of Project requirements.
   2. The qualifications of key personnel and subcontractors assigned to the Project.
   3. The Respondent's experience with similar Projects, including references.
   4. The suggested scope of services and Project schedule.

4. Cost Proposal: The Respondent must provide a cost proposal that allows costs to be evaluated separately from other proposal criteria. The cost proposal should include the method for determining compensation for the required services, along with a not-to-exceed cost estimate.

5. RFP Submittal Delivery

To be considered, proposals must be uploaded to Bonfire and/or emailed to:

Summit County Service Area #3
Attention: General Manager
gm@summitcosa3ut.gov

Proposals must be received no later than April 15, 2026 at 4:00 pm ("Closing Date"). The Service Area assumes no responsibility for delayed or undelivered emailed submittals. Proposals which are not emailed to the Service Area or uploaded to Bonfire by the above specified time and date will not be considered. If you do not receive an email confirming receipt, please email permit@summitcosa3ut.gov

4. **Timeline**

1. Schedule

The following schedule is the anticipated timeline of the RFP:

- RFP advertised on or before April 7, 2026
- Questions due by email on April 14, 2026 at 4:00pm.
  Answers to emailed questions will be shared with all interested parties.
- Proposals due by April 21, 2026 at 9:00am.
- Evaluation and Selection on or before April 22, 2026 at 4:00pm.
- The Project must be completed in its entirety by July 1, 2026 at 4:00pm.

2. Proposal Selection

3. Qualification/Proposal Information

The Service Area reserves the right to consider modifications to any qualifications received at any time before the award is made, if such action is in the best interest of the Service Area.

5. Scoring

Proposals will be evaluated pursuant to the following weighted decision matrix:

Criteria	**Point Value**
Respondent's understanding of and responsiveness to the Scope of Work.	Up to 25 Points
Qualifications of the Respondent and any additional staff. (Experience, past performance, and reputation.)	Up to 25 Points
Respondents demonstrated past experience with similar Projects.	Up to 20 Points
Organization and approach	Up to 20 Points
Cost (not-to-exceed and hourly rates)	Up to 10 Points
Total	**Up to 100 Points**

NOTE: In addition to addressing the specific criteria listed, each Respondent should provide a detailed response to each requirement in this RFP as indicated in Section 2.1, Proposal Response Outline.

6. Scope of Work

1. Items to be provided by the Service Area:
   - i. Service Area Ordinances related to impact fees, including the most recently approved Fee Schedule.
   - ii. Existing capital infrastructure database information of every type
   - iii. Applicable information from any of the following substantially completed master plans:
     - Parks & Trails, Storm Drainage, Roads, and information regarding other public facilities the Service Area helps fund and for which the Service Area may impose impact fees
   - iv. Any other requested requirements by Respondent if available.

2. Services to be Provided by the Respondent

i. Preparation of a comprehensive study of the SCSA3 operations and fee schedules and identify and evaluate eligible Impact Fee opportunities in accordance with Utah Code Annotated § 11-36a-101 et. seq.

ii. Prepare impact fee facilities plans to determine the public facilities required to serve development resulting from new development activity, which shall include all of the elements contained in Utah Code Annotated § 11-36a-302.

iii. Prepare an impact fee analysis for each impact fee facilities plan, which shall include all of the elements contained in Utah Code Annotated § 11-36a-304.

iv. Prepare and certify an impact fee calculation for each impact fee analysis, which shall include all of the elements contained in Utah Code Annotated § 11-36a-305 & 306.

v. Provide a plan for impact fee expenditures, which incorporate the requirements of Utah Code Annotated § 11-36a-602.

vi. Develop specific goals, objectives, and policies that will integrate the recommendations from the previous sections into a comprehensive plan of action.

vii. Conduct regular coordination meetings with Service Area staff and designated representatives to review progress and address any issues.

7. Protected Information

Confidentiality

1. All responses, inquiries, and correspondence relating to this RFP and all reports, charts, displays, schedules, exhibits, and other documentation produced by a Respondent that is submitted to the Service Area, as part of the proposal or otherwise may be considered public information under applicable law, including but not limited to the Government Records Access and Management Act, Title 63G, Chapter 2, Utah Code Annotated ("GRAMA"). The Service Area generally considers proposals and all accompanying material to be public and subject to disclosure including the subsequent contract that may be executed between the Service Area and Respondent.
2. Any material considered by a Respondent to be proprietary must be accompanied by a written claim of confidentiality and a concise written statement of reasons supporting the claim. Blanket claims that the entire RFP is confidential will be denied. The Service Area cannot guarantee that any information will be held confidential. Under Utah Code Ann. Section 63G-2-309 of GRAMA, if a Respondent makes a claim of confidentiality, the Service Area, upon receipt of a request for disclosure, will determine whether the material should be classified as public or protected, and will notify the Respondent of such determination. The Respondent is entitled under GRAMA to appeal an adverse determination. The Service Area is not obligated to notify the Respondent of a request, and will not consider a claim of confidentiality, unless the Respondent's claim of confidentiality is made in a timely basis and in accordance with GRAMA.

Additional Considerations

i. Failure to Read. Failure to read the Request for Proposals and these instructions will be at a Respondent's own risk.

ii. Cost of Developing Qualifications/Proposals. All costs related to the preparation of the qualifications/proposals and any related activities are the sole responsibility of the Respondent. The Service Area assumes no liability for any costs incurred by Respondent(s) throughout the entire selection process, including prior to selection and issuance of a contract.

iii. Discussions with Respondents. The Service Area reserves the right to enter into discussions with the Respondent (s) determined to be reasonably susceptible of being selected for award, or to enter into exclusive discussions with a Respondent whose proposal is deemed most advantageous, whichever is in the Service Area's best interest, for the purpose of negotiation. If exclusive negotiations are conducted and an agreement is not reached, the Service Area reserves the right to enter into negotiations with the next highest ranked Respondent without the need to repeat the formal solicitation process.

iv. Equal Opportunity. The Service Area will make every effort to ensure that all Respondents are treated fairly and equally throughout the entire advertisement, review, and selection process. The procedures established herein are designed to give all parties reasonable access to the same basic information. The Service Area's policy, subject to federal, State, and local procurement laws, is to provide reasonable attempts to support each Respondent's business by purchasing goods and services through local Respondents and service providers.

v. Proposal Ownership. All proposals, including attachments, supplementary materials, addenda, etc., shall become the property of the Service Area and will not be returned to each Respondent.

vi. Final Authorization. The Service Area intends to eventually contract with the Respondent (s) whose proposal is deemed most advantageous in experience, qualifications, price, and other factors considered in accordance with the weighted decision matrix described above. The Service Area does not necessarily intend to award a contract solely on the basis of any response made to this request or otherwise pay for any information solicited or obtained during the RFP process. Final authorization of an accepted bid will be provided by the Summit County Service Area #3 Service Area Council after they have had an opportunity to review the recommendations. It is expected that the winning bidder will be selected on or before April 29, 2026 at 4:00pm.

vii. Rejection of Proposals. The Service Area reserves the right to reject any or all proposals received and disqualify incomplete or late proposals. Proposals lacking required information will not be considered. Furthermore, the Service Area shall have the right to waive any informality or technicality in proposals received when in the best interest of the Service Area. No proposal shall be accepted from, or contract awarded to, any person, firm or corporation that is in arrears to the Service Area for any obligation. Respondent (s) may be required to submit satisfactory evidence that they have the necessary financial resources to perform and complete the work outlined in this RFP.

viii. Summit County Service Area #3's Best Interest. The Service Area reserves the right to take any steps deemed necessary to act in the Service Area's best interest.

ix. Proposal Term. Proposals shall be good for one hundred and twenty (120) days from the Closing Date.

x. Reservation of Rights. The Service Area reserves the right to cancel or modify the terms of this RFP and/or the Project at any time and for any reason preceding the contract award and reserves the right to accept or reject any or all proposals submitted pursuant to this request for proposals. The Service Area will provide each Respondent with written notice of any cancellation and/or modification.

PROJECT MANUAL
DRILL, CONSTRUCT, AND TEST
PROPOSED SILVER BULLET
WELL FOR
SUMMIT COUNTY SERVICE AREA
#3 PUBLIC WATER SYSTEM #22105
SUMMIT COUNTY, UTAH

Prepared for:

Summit County Service Area #3
Attn: General Manager
629 E Parkway Drive, Suite 1
Park City, UT 84098

Prepared By:

Loughlin Water Associates, LLC
Attention: William D. Loughlin,
P.G. 3100 Pinebrook Road, Suite 1100
Park City, Utah 84098
(435) 649-4005

LOUGHLIN
WATER ASSOCIATES, LLC
a Geo-Logic Company

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Proposed Silver Bullet Well
For Summit County Service Area #3
Summit County, Utah

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Drill, Construct and Test
Proposed Silver Bullet Well
Summit County Service Area #3
Summit County, Utah

DRAWINGS

Figure
No. Title (Located in Technical Specifications section of these documents)
1 Regional Map
2 Local Map
3 Preliminary Well Design

REFERENCE DRAWINGS

1. None

END OF DRAWING LIST

DOCUMENT 00100
INVITATION TO BID

PART 1 GENERAL

1.1 CONSTRUCTION CONTRACT

A. Bidders are invited to bid on Construction Contract known as:

Drill, Construct, and Test
Proposed Silver Bullet Well
For Summit County Service Area #3
Summit County, Utah

B. The location of the work site is in the Silver Creek Area, Summit County, Utah. The site location is further described in Section 1.2 and shown on Figures 1 and 2 in the Technical Specifications section of this Project Manual.

C. The work to be performed consists of furnishing and installing the equipment, facilities, services and appurtenances thereto as included in the Contract Documents. The Work generally includes, but is not limited to, the drilling, construction and testing of the proposed Silver Bullet Well.

D. The OWNER is the **Summit County Service Area #3.**

E. The ENGINEER for these Contract Documents and the Technical Specifications for the Drilling, Construction and Testing of the Proposed Silver Bullet Well is **Loughlin Water Associates, LLC.**

F. For information about the award of this Construction Contract, contact:

Loughlin Water Associates, LLC
Attn: Bill Loughlin
3100 Pinebrook Road, Suite 1100
Park City, Utah 84098
Email: bill@loughlinwater.com
Office: 435-649-4005

1.2 BID LOCATION AND OPENING

A. Bids will be received until 9:00 a.m. and opened at 9:01 a.m. on Tuesday, April 21, 2026 at the following address:

Summit County Service Area #3
Attn: General Manager
629 Parkway Drive, Suite 1
Park City, Utah 84098

B. On the outside of the envelope, the bidder shall indicate the Construction Contract title, the name and address of the Bidder, and the date and time of Bid opening and the Bidder's return mailing address.

1.3 BID SECURITY

A. Bid security in the amount of five percent (5%) of the Bid must accompany each Bid in accordance with the Instructions to Bidders. Bid Security will be returned to each unsuccessful Bidder after tabulation and award of the Construction Contract.

1.4 PRE-BID CONFERENCE

A. A pre-bid conference and site walk will be held at the proposed well site. Bidders shall meet at the Summit County Service Area #3 office (629 E Parkway Drive, Suite 1, Park City, Utah 84098) at **11:00 a.m. Tuesday, April 14, 2026**. **Attendance is mandatory.** Please preregister for the conference by sending an email to Bill Loughlin bill@loughlinwater.com and request confirmation of registration.

1.5 BASIS OF BIDS

A. Bids shall be on a unit price basis. Unsealed or segregated Bids will not be accepted.

1.6 CONTRACT TIME

A. The CONTRACTOR shall propose his estimated time to mobilize and to complete the WORK in Section 2.1 of the Bid Schedule (in Document 00410) and associated price in Section 3.1 (in Document 00410).

B. The schedule desired by the OWNER is to begin the WORK within 30 days of the Notice to Proceed. The CONTRACTOR shall substantially complete the WORK within 60 days of starting the WORK. The OWNER anticipates issuing the Notice to Proceed in May 2026.

1.7 BONDING REQUIREMENTS

A. The OWNER will require the CONTRACTOR to obtain performance and payment bonds in accordance with the Instructions to Bidders.

1.8 QUALIFICATION STATEMENT

A. In addition to the Bid submittal, the CONTRACTOR shall provide a qualification statement as outlined in the Contractor Qualification Statement section of this Project Manual.

1.9 EXAMINATION AND PROCUREMENT OF DOCUMENTS

A. A complete set of Contract Documents may be obtained after 10:00 a.m. on Tuesday, April 7, 2026, to bidders, from the ENGINEER (Bill@LoughlinWater.com) by e-mail as a pdf file.

1.10 RIGHT TO REJECT BIDS

A. The OWNER reserves the right to reject any or all bids or to waive any informality or technicality in any bid if deemed to be in the best interest of the OWNER.

1.11 VALIDITY PERIOD FOR BIDS

A. Bids shall remain valid for 45 days after the day of Bid opening. Bidders who withdraw their bid after Bid opening, but before expiration of said period, shall forfeit their bid security if Notice of Intent to Award to the successful Bidder is made by OWNER.

1.12 GOVERNING LAWS AND REGULATIONS

A. This is a federally funded project. The Bidder is required to comply with the Utah Division of Drinking Water (DDW) State Revolving Fund (SRF) conditions and requirements outlined in Exhibit A.

B. Bidders on this WORK will be subject to the applicable provisions of all federal rules, laws and regulations or orders.

C. Utah Administrative Code (UAC) Rule R655-4, Administrative Rules for Water Wells.

D. Utah Water Quality Act, 19-5-107(1).

E. Compliance with the Utah State Historic and Preservation Office (SHPO).

DOCUMENT 00200

INSTRUCTIONS TO BIDDERS

PART 1 GENERAL

1.1 DESCRIPTION OF THE WORK

A. The Work to be performed consists of furnishing and installing the equipment, facilities, services, and appurtenances thereto as included in the Contract Documents. A general description of the Work is set forth in the Invitation to Bid (Document 00100) and details of the Work are set forth in the Technical Specifications.

1.2 COPIES OF BID DOCUMENTS

A. Bidders must use complete sets of Bid Documents in preparing Bids. ENGINEER maintains a complete set on file at the address set forth in the Invitation to Bid, and bidders may review the file copy upon request during regular business hours. Bidders are solely responsible to verify whether their sets of Bid Documents are complete.

B. Bid Documents are made available to bidders only for the purpose of obtaining Bids on the Work. No license or grant for any other use is given.

C. Bidding Document copyrights shall remain with the OWNER.

1.3 PRE-BID CONFERENCE

A. If a pre-bid conference is held, the time, place and nature of the conference will be stated in the Invitation to Bid. Representatives of OWNER and ENGINEER will be present to discuss the Project. The OWNER shall not be bound by any statements, representations, conclusions, or assumptions made by any party, whether oral or written, except for written statements that are issued in an Addendum by the OWNER to all prospective bidders.

1.4 PHYSICAL CONDITIONS

A. In General: Prior to submitting a Bid, each Bidder is responsible to review all available explorations, tests and data concerning surface conditions, subsurface conditions and Underground Facilities at or contiguous to the site, or otherwise, which may affect cost, progress, performance or furnishing of the Work in accordance with the time, price and other terms and conditions of the Contract Documents.

B. Surface and Subsurface Conditions: Provisions concerning surface and subsurface conditions, if any, are set forth in Section 1 (Drilling and Well Conditions) of the Technical Specifications.

C. Underground Facilities: Information and data indicated in the Contract Documents regarding Underground Facilities at or contiguous to the site is based upon information and data furnished to OWNER and ENGINEER by owners of such Underground Facilities. The OWNER does not assume responsibility for the accuracy or completeness thereof other than as provided in the General Conditions or unless expressly provided in the Modifications to General Conditions (Document 00810).

D. Additional Explorations and Tests: If feasible as determined by OWNER, the OWNER will provide each Bidder access to the site to conduct explorations and tests as each Bidder deems necessary for submission of a Bid. Bidder shall obtain permits, fill all holes, clean up and restore the site to its former condition upon completion of such explorations. By requesting such an exploration or test, Bidder agrees to release, indemnify, defend, and save the OWNER harmless from all costs damages and liabilities of any kind whatsoever, including reasonable attorneys' fees, that may arise in connection with or as a result of the performance of such explorations or tests.

1.5 COMPENSATION AND QUANTITIES

A. In General: The bid price for any lump sum or unit price contract includes all labor, materials, and incidental work to fully complete the Work in a satisfactory manner under the terms of the Contract Documents. Bidders are responsible to inform themselves of the character of the Work to be performed.

B Lump Sum Work: If the Work is to be paid for on a lump sum basis, the lump sum will be the only sum paid.

C. Unit Price Work: If any portion of the Work is to be paid for on a unit price basis, payment will cover only work actually performed and materials actually supplied at the unit prices bid and on the terms set forth in the Contract Documents, irrespective of any quantity approximations in the Bid Documents. Any quantity approximations in the Bid Documents are stated as a basis for determining bids, and do not fix the amount of Work to be done or materials to be furnished. Stated quantities are estimates for the purpose of doing the class of work required. Actual quantities will vary. The OWNER may deviate in either direction from any indicated quantities. The Bidder shall have no claim for any variation in quantity, except to the extent permitted in the General Conditions.

1.6 EXAMINATION OF SITE AND CONTRACT DOCUMENTS

A. In General: The OWNER shall not be bound by any statements, representations, conclusions, or assumptions made by any party, whether oral or written, except for written statements that are issued in an Addendum.

B. Access: The Technical Specifications section of the Contract Documents designates the site for performance of the Work. Bidder is responsible to investigate the site and understand all access requirements. All additional off site lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by Bidder.

C. Bidder's Obligations: In addition to Bidder's other responsibilities and obligations in

connection with submitting a Bid, it is the responsibility of the Bidder before submitting a Bid, to:

1. Examine the Contract Documents thoroughly;

2. Visit the site to become familiar with local conditions that may affect cost, progress, performance or furnishing of the Work;

3. Investigate all applicable construction and labor conditions, quantities, and the character of the Work as they affect cost, progress, performance, or furnishing of the Work;

4. Consider federal, state and local Laws and Regulations that may affect cost, progress, performance or furnishing of the Work;

5. Study and carefully correlate Bidder's observations with the Contract Documents;

6. Attend any pre-bid conference, which shall be mandatory if so designated in the Invitation to Bid;

7. Review all available explorations and data concerning surface and subsurface conditions as set forth in Section 1.6 above and in the Technical Section; and

8. Identify and notify ENGINEER in writing in the manner set forth in article 2.1 below of all specific conflicts, omissions, errors, or discrepancies in the Contract Documents, or if Bidder doubts their meanings.

The failure or omission of any Bidder to take any of the foregoing actions shall not in any way relieve Bidder of its Bid, or its obligation to furnish all material, equipment, labor and services necessary to carry out the provisions of the Contract Documents and to complete the contemplated Work for the consideration set forth in its Bid. Submission of a Bid shall constitute prima facie evidence of compliance with these instructions.

D. Deviations from the Terms of the Contract Documents: OWNER will not accept any deviations whatsoever from the printed terms of the Agreement and the Contract Documents, except by Addendum or Change Order.

1.7 EFFECT OF SUBMITTING A BID

A. Bidders are responsible to carefully examine the Contract Documents, visit the site, and fully inform themselves so as to include in the Bid a sum to cover the cost of all items. Bidder’s failure or omission to receive or examine any form, instrument, addendum or other document, visit the site and become acquainted with existing conditions, or attend any pre-Bid Conference, shall in no way relieve Bidder from any obligations with respect to Bidder’s Bid or the Construction Contract.

B. By submitting a Bid, Bidder represents that Bidder has complied with all requirements of the Bid Documents; that the Bid is premised on properly performing and furnishing the Work required by the Contract Documents within the times specified; that the

Bidder is informed of the conditions to be encountered and the character, quality and quantities of the Work; and that the Bidder believes the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

C. Submission of a Bid constitutes a promise that the Bidder will enter the Contract Documents in the form presented in the Contract Documents. Bidders should carefully examine all Contract Documents, including the required Bonds and insurance to be provided by the Bidder.

1. The Performance Bond is a guarantee of faithful performance of the requirements of the Contract Documents, including all applicable warranties. The Payment Bond is a guarantee of payment of all labor, materials, or supplies used directly or indirectly in the prosecution of the Work provided in the Construction Documents.

2. The sum of the Performance Bond and the Payment Bond shall be increased or decreased during the course of the Work in the event that Contract Modifications, Change Orders or Addenda increase or decrease the total contract price. The sum of each bond shall be in an amount equal to the completed contract price at the completion of the Work.

3. OWNER does not provide any release of Performance Bonds or Payment Bonds. The bonds are in effect throughout all periods during which a suit may be brought under the provisions of applicable law.

D. By submitting a Bid, Bidder represents that the matters stated therein are true and correct.

PART 2 BIDDING PROCEDURES

2.1 INTERPRETATIONS AND ADDENDA

A. All requests for interpretation of the Contract Documents shall be made in writing and delivered to the ENGINEER no later than seven (7) calendar days prior to opening of Bids. At the ENGINEER's discretion, ENGINEER will send the written interpretation to all persons receiving a set of Bid Documents in the form of an Addendum. If the ENGINEER does not respond to a Bidder's request for interpretation the Bidder shall comply with the intent and terms of the Contract Documents.

B. No oral interpretations shall be made to any Bidder. The OWNER shall not be responsible for or bound by any statements, interpretations, explanations, representations, conclusions or assumptions made by any party, whether oral or written, except for written statements that are issued in an Addendum by the ENGINEER to all prospective bidders.

C. Each statement made in an Addendum is part of the Contract Documents at the location designated in the Addendum. A statement issued in an Addendum shall have the effect of modifying a portion of the Bid Documents when the statement in the

Addendum specifies a particular section, paragraph or text and states that it is to be so modified. Only the specified section, paragraph or text shall be so modified, and all other portions of the Bid Documents shall remain in effect.

D. Bidders shall sign to acknowledge their receipt of all Addenda issued. Bidders shall also acknowledge receipt of all Addenda in the space provided in the Bid.

E. Except to postpone the Bid opening, no Addenda shall be issued within 48 hours of the Bid opening.

2.2 EQUIPMENT AND MATERIAL OPTIONS PRIOR TO BID OPENING

A. If a Bidder or Supplier wishes to supply a product other than that identified in the Contract Documents, said Bidder or Supplier shall submit a written request for approval to the ENGINEER at least ten (10) calendar days prior to the date set for opening of bids.

B. The procedure for submission of any such product option shall be as set forth in the General Conditions. It is the sole responsibility of the Bidder or Supplier to submit complete descriptive and technical information so that ENGINEER can make a proper appraisal.

C. ENGINEER's failure to act upon such a request within five (5) days after receipt shall be deemed a denial thereof.

D. Any such approval is at the sole discretion of the ENGINEER and will be in the form of an Addendum issued to all Bidder's holding Bid Documents indicating that the additional equipment or materials are approved as equal to those specified for the Project.

E. The Construction Contract, if awarded, will be on the basis of materials and equipment specified in the Drawings and Specifications and any changes permitted in any Addenda.

2.3 BID SECURITY

A. Amount of Bid Security: If Bid Security is required, it must accompany each Bid. The total amount of the Bid on which Bid security is to be based shall be the sum of all items of the Bid constituting the maximum amount of the possible award to the Bidder.

B. Form of Bid Security: The Bid Security may be in the form of a certified check, cashier's check, cash, or Bid Bond. No other form of Bid Security will be accepted. A Bid Bond must be issued by a licensed Utah agency on behalf of a surety company licensed to do business in the State of Utah. A cashier’s check must be drawn on a bank doing business in the State of Utah and made payable to OWNER. If a cashier’s check is used in lieu of a Bid Bond, or if the Bid Bond does not specifically so provide, a certificate from an approved surety company guaranteeing execution of performance and payment bonds in the full amount of the bid must accompany the bid.

C. Purpose of Submission. By submitting a Bid Bond Bidder assures OWNER it will take all steps necessary to properly execute the Contract Documents.

D. Return of Bid Security: OWNER will return Bid securities to Bidder within 7 days after award of the Construction Contract. Bid Bonds and cashier's checks of all Bidders will be held until the Construction Contract is awarded or all bids have been rejected. The liability of OWNER in regards to the checks shall be limited only to the return of the checks.

E. Default: In the event of failure or refusal of the Bidder to enter into the Construction Contract and the delivery to the OWNER a Performance Bond, Payment Bond and any other Bonds or documents required by the Contract Documents after Notice of Intent to Award by the OWNER, the Bidder forfeits the sum of the Bid Bond or cashier's check as liquidated damages to the OWNER.

2.4 COMPLETING BID DOCUMENTS

A. The General Conditions identify forms comprising the Bid Documents. Additional copies of the forms may be obtained from the ENGINEER. The Bidder shall make no stipulations or alterations on the Bid forms. The Bidder must use all Bid Documents in preparing its bid. The Bidder must use and execute only the Bid form (Document 00400) and Bid Schedules (Document 00410) in the Contract Documents. One A complete copy of Documents 00400 and 00410 should be submitted as the Bidder's Bid.

B. The Bidder must fill in all items in the Bid form in ink or by typewriter. If applicable, furnish both the unit and total costs for each item. The total Bid price is the full price for the performance of all Work under the Contract Documents. Bidder shall initial in ink any corrections, interlineations, alterations, or erasures made by the Bidder on Bidder's entries in the Bid Documents.

C. Any work or material which is specified in the Contract Documents or which is necessary because of the nature of the Work, but which is not listed separately in the Bid Schedule shall not be measured or paid for separately. The cost of such work or material shall be considered as included in the Contract Price.

D. Bids by corporations must be executed in the corporate name by a corporate officer authorized to sign, and must be properly attested to as an official act of the corporation. At the OWNER's request, authority to sign shall be submitted.

E. Bids by partnerships or joint ventures must be executed in the partnership or joint venture name and signed by a partner or joint venture whose title and official address must be shown. If a partnership or joint venture is the low bidder, the partnership or joint venture must also submit evidence to the OWNER of the responsibility of the partnership or joint venture as a bidder in the manner directed by the ENGINEER.

F. Where the Bidder is wholly owned subsidiary of another company, the Bid must so state, and the owner or parent corporation also must agree to sign and be bound with the Bidder.

G. All names must be typed or printed under or near the signature. Signatures shall be in longhand.

H. The Bid shall contain an acknowledgment of receipt of all Addenda. The Addenda numbers must be filled in on the Bid form.

I. The Bidder's address, telephone number, and facsimile number for communications regarding the Bid must be shown on the first page of the Bid form.

J. The divisions and sections of the specifications, and the identifications of any Drawings, shall not control Bidder in dividing the Work among subcontractors or suppliers, or delineating the Work to be performed by any specific trade.

K. The base Bid and alternates shall include all Work required to be performed by the Contract Documents.

2.5 SUBCONTRACTORS

A. Bidder shall not subcontract more than 25 percent of the dollar value of the total contemplated Work (exclusive of the supply of materials and equipment to be incorporated in the Work) without OWNER's prior written approval.

2.6 SUBMISSION OF BIDS

A. Bids shall be submitted at the time and place indicated in the Invitation to Bid and should be enclosed in an opaque sealed envelope, marked with the Construction Contract name and number, the name and address of the Bidder, and the date and the opening time for Bids. If the Bid is sent through the mail or other delivery system the sealed envelope should be enclosed in a separate envelope with the notation "BID EN CLOSED" on the face of it. It is the sole responsibility of the Bidder to deliver the Bid before the scheduled time.

B. The Bidder must use all Bid Documents in preparing its bid. Bidder will make no recapitulations, stipulations, alterations, alternate submissions, or modifications in any manner to any of the Contract Documents.

C. Bidder must complete and submit:

1. The Bid form (Document 00400) that is included in these Contract Documents, which shall be in the form of a lump sum, or in the form of unit pricing pursuant to the Bid Schedule, as called for in the Bid Form.

2. The Bid Schedules (Document 00410) in the Contract Documents.

3. Utah Division of Drinking Water (DDW) State Revolving Fund (SRF) certifications (Exhibit A) in the Contract Documents which include (1) Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion Lower Tier Covered Transactions, (2) U.S. Environmental Protection Agency (EPA) Certification of Non-Segregated Facilities, and (3) Disadvantaged

Business Enterprise (DBE) Certification.

D. Alternate bids, other than those called for in the Bid form, will not be considered.

E. No oral, telegraphic, telephonic, facsimile or modified bids will be considered. **2.7**

MODIFICATION AND WITHDRAWAL OF BIDS

A. At any time prior to the opening of Bids, Bids may be modified or withdrawn if a written notice of modification or withdrawal is signed by Bidder and delivered to the place where Bids are to be submitted. Bid Security will be returned upon proper withdrawal of a Bid prior to the time for Bid opening.

B. Within 24 hours after Bids are opened, any Bidder may file written notice with OWNER that there was a substantial mistake made in the preparation of its Bid. Bidder must thereafter promptly demonstrate Bidder's mistake. The OWNER has sole discretion to determine whether to permit any modification or withdrawal or the return of any Bid Security.

C. When it appears a mistake has been made, or when the OWNER desires an assurance of any matter, the OWNER may request a Bidder to confirm the Bid in writing.

2.8 OPENING OF BIDS

A. Bids will be opened and read aloud publicly. An abstract of the amounts of the base schedule of prices and any alternate schedules will be made available for review after the Award of the Contract.

B. Any Bids received after the time specified in the Invitation to Bid will be returned unopened.

2.9 BIDS SUBJECT TO ACCEPTANCE FOR 45 DAYS

A. All bids remain subject to acceptance for 45 days after the day of the Bid opening. OWNER may, in its sole discretion, release any Bid and return the Bid security prior to that date.

PART 3 EVALUATION AND AWARD

3.1 SUBMITTALS REQUIRED FOR EVALUATION

A. After Bid opening, the Bidder, whose Bid is under consideration, must submit the following at the times specified:

1. Bidder Status Report: Document 00452. One completed form shall be submitted after the Bidder receives Notice of Intent to Award.

2. Subcontractor and Supplier Report: Document 00453. The Bidder shall submit

this report form within 24 hours of ENGINEER's request.

3.2 EVALUATION OF BIDDER'S QUALIFICATIONS

A. The Bidder's qualifications will be evaluated based upon their qualification statement. Additionally, the Bidder shall be in good standing with the Utah Division of Water Rights and not have any major infractions against their Utah Water Well Driller's License within the last 5 years. Any infractions may result in the Bidder's bid being rejected.

B. Within seven (7) calendar days of ENGINEER's request, a Bidder, whose Bid is under consideration for award shall submit to the ENGINEER the following information for the Bidder. ENGINEER may request information on Bidder's Subcontractors, Bidder's Suppliers or any other information the ENGINEER may require.

1. A current financial statement for the Work (as provided to bonding company);

2. A chronological list of "in progress" and "completed" construction work done by Bidder during the last 3 years; including project name, address, owner, contract name, and current telephone number;

3. Present construction commitments other than items listed in paragraph 2 above;

4. Proposed organizational structure such as firm ownership, project manager, progress scheduler, and superintendent for the Work of this Project;

5. Owned and rented equipment which is to be used to do the Work;

6. Investigations, arbitration, litigation or claims which are pending, threatened, settled or otherwise disposed of within the last three (3) years;

7. Evidence of ability to perform and complete the Work in a manner and within the time limit specified. As a minimum, identify specific experience on projects similar to the Work in physical size, cost, and commercial nature. If the work experiences of the project manager and superintendent designated to construct this project are different than that of the company, provide resumes of their work history. Include their actual project titles and indicate their actual responsibilities on each given project;

8. All matters consistent with federal, state and local Laws and Regulations; and 9.

Such other data as may be called by the ENGINEER.

C. If Bidder believes any information should be held confidential for business reasons, Bidder must submit a written claim of business confidentiality for that particular information and include a specific statement of the reasons supporting the claim pursuant to Utah Code Ann. § 63-2-308.

D. Untimely response or failure to provide the requested information by Bidder will release OWNER of any obligation to further consider the Bidder's Bid.

3.3 EVALUATION OF BIDS

A. OWNER reserves the right: to reject any and all Bids or any part thereof; to waive any informalities in the Bid Schedule and elsewhere; to negotiate and agree to contract terms with the successful Bidder; to disregard non-conforming, non-responsive, unbalanced or conditional Bids; and to withhold the award for any reason deemed in the best interests of the OWNER.

B. OWNER reserves the right to reject any Bid if OWNER believes that it would not be in the best interest of the Project or the OWNER. Without limitation, such rejection may be because the Bid is not responsive, or the Bidder is unqualified or of doubtful ability or the Bid or Bidder fails to meet any other pertinent standard or criteria established by OWNER.

C. If the OWNER intends to make an award to a Bidder, a Notice of Intent to Award will be issued.

D. OWNER may consider all information which OWNER believes is relevant when evaluating a Bid, including, without limitation:

1. The qualifications and experience of the Bidder and of the Subcontractors, Suppliers, and other persons and organizations proposed (whether or not the Bid otherwise complies with the prescribed requirements).

2. Such alternates, unit prices and other data, as may be requested in the Bid Form, Bid Schedule, or written requests issued prior to OWNER's Notice of Intent to Award the Construction Contract.

3. Operating costs, maintenance requirements, performance data, and guarantees of ability to provide the required materials and equipment.

4. Corporate organization and capacity for any party.

5. Ability to perform and complete the Work in the manner and within the time specified.

6. Pending litigation.

7. The amount of the Bid.

8. Proper licensing to do the Work in compliance with licensing laws of the State of Utah for contractors and subcontractors.

9. All other relevant matters, consistent with OWNER's procurement code and administrative rules, OWNER's ordinances and program policies.

F. To establish qualifications of Bidder, OWNER may request such data indicated in the Bid Documents, conduct such investigations as OWNER deems appropriate, and consider any other information (whether obtained from the Bid, the Bidder, or any

other source).

G. If the Construction Contract is to be awarded, it will be awarded to the most responsive, qualified, and responsible Bidder as determined by the OWNER. Alternates may be accepted depending upon availability of OWNER's funds and as determined by the OWNER. Accepted alternates will be considered in determining the most responsive, qualified, and responsible Bidder.

H. Bid Schedules will be evaluated as follows:

1. Discrepancies in the multiplication of quantities of Work items and unit prices will be resolved in favor of the unit prices. OWNER may correct Bid Schedule calculation errors accordingly.

2. Prices written out in words shall govern over prices written out in numbers.

3. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

4. Bids shall not contain any recapitulations of or changes in the work to be done.

I. The OWNER, in the OWNER's sole discretion, shall make determinations as to disqualification of Bidders or rejection of Bids. Such matters may include, without limitation, submission of more than one Bid by the Bidder (whether under the same or different names); evidence of collusion among Bidders; other commitments of Bidder which, in the OWNER's sole judgment, might hinder the Work; previous defaults, Bid irregularities when not waived in the best interests of the OWNER, delays or poor performance by Bidder on any project; official action against Bidder; and any other cause which, in the OWNER's sole discretion and judgment, is sufficient to justify disqualification of a Bidder or rejection of a Bid.

3.4 ADJUSTMENTS TO THE COST OF THE WORK AFTER OPENING OF BIDS

A. The Contract Price identified in the Agreement represents the cost of the work which is to be paid by the OWNER to the CONTRACTOR.

B. Adjustments to the Contract Price which are agreed to between the OWNER and the successful Bidder shall be effected by signing an Agreement Supplement.

3.5 SUBSTITUTIONS

A. The Construction Contract, if awarded, will be on the basis of materials and equipment described in the Drawings, Specifications and any Addenda.

B. After the Effective Date of the Construction Contract, the procedure for submitting an application for substitution is set forth in the General Conditions.

3.6 SUBMITTALS REQUIRED FOR AWARD OF CONTRACT

A. Performance and Payment Bonds: The OWNER's requirements as to performance and payment Bonds are as set forth in the Modifications to General Conditions (Document 00810). Specific requirements are set forth in the Performance Bond (Document 00610) and the Payment Bond (Document 00620).

1. The form of the Bonds should be carefully examined by the Bidder.

2. When the successful Bidder delivers the executed Construction Contract to OWNER, it must be accompanied by the required Performance and Payment Bonds.

B. Other Information: When a determination has been made to award the Construction Contract, Bidder is required, prior to the award or after the award, or both, to furnish such other information as the ENGINEER requests.

3.7 SIGNING OF AGREEMENT

A. Within 10 days after OWNER gives Notice of Intent to Award the Construction Contract to the successful Bidder, the Bidder shall pick up, sign and return to OWNER, the required number of copies of the Construction Contract, bonds and insurance. A minimum of two (2) originals will be signed and returned to the OWNER. One executed original will be returned to the Bidder. Bidder shall comply with all execution requirements.

B. All of Bidder’s executions and submittals must be delivered to the OWNER before OWNER will execute the Construction Contract. The Construction Contract will not be deemed awarded and shall not be binding on the OWNER until it has been approved and executed by the OWNER, and a fully executed copy is formally delivered to the CONTRACTOR. The OWNER reserves the right to rescind its Notice of Intent to Award without liability, except for the return of Bidder’s Bid Security, at any time before the Construction Contract has been fully executed by all parties and delivered to the CONTRACTOR.

C. Transfers, delegations or assignments of interests in the Contract Documents are prohibited, unless prior written authorization is received from the OWNER.

D. At the time of Bidding, and the signing of the Agreement, and at all times during the Work, Bidder shall be properly licensed to do the Work and shall be in compliance with the license laws of the State of Utah and the county where the Work is conducted. The Bidder shall also require all Subcontractors to do the same.

E. If a Bidder fails to fully and properly execute the Construction Contract and provide all submittals required therewith within ten (10) days after the date of the Notice of

Intent to Award, the OWNER may elect to rescind the Notice of Intent to Award, and the OWNER shall be entitled to the full amount of Bidder's Bid Security, not as a penalty, but in liquidation of and compensation for damages sustained. In the OWNER's sole discretion, a Notice of Intent to Award may then be provided to another bidder whose Bid is most advantageous to the OWNER, price and other factors considered.

END OF DOCUMENT

Instructions to
Bidders 00200 - 14

DOCUMENT 00400
BID

PART 1 GENERAL

1.1 BID PROPOSAL

A. After having personally and carefully examined all conditions surrounding the Work and the Contract Documents, the undersigned proposes to furnish all labor, equipment, tools and machinery and to furnish and deliver all materials not specifically mentioned as being furnished by the OWNER, which is required in and about the construction of the Construction Contract known as:

Drill, Construct and Test
Proposed Silver Bullet Well
Summit County Service Area #3
Summit County, Utah

B. The undersigned proposes to complete the Work for the price or prices listed in the Bid Schedule (Document 00410) and understands that quantities for Unit Price Work are not guaranteed.

C. The undersigned proposes to furnish bonds with the Contract, signed by a surety company satisfactory to the OWNER, in an amount equal to the Contract amount conditioned to insure compliance with all requirements of the Contract Documents.

D. The undersigned encloses a certified check, cashier's check, cash, or a Bid Bond for _____ Dollars ($ _____) which is (five (5) percent of the Bid amount) payable to the OWNER, as a guarantee of good faith, and which it is agreed will be forfeited to the OWNER as liquidated damages in the event of the failure of the undersigned to enter into a contract and furnish satisfactory bonds to the OWNER.

E. The undersigned proposes to execute the attached contract within ten (10) days after the Notice of Intention to Award, and to begin work within the period specified by the Bidder on the Bid Schedule (Document 00410).

F. If OWNER finds it necessary to further define the Work, Contract Price, Contract Time or some other portion of the Construction Contract, after Bid opening, the Bidder promises to execute an Agreement Supplement prior to or concurrent with the execution of the Agreement, if the Agreement Supplement is acceptable to the Bidder.

G. It is understood that the OWNER has the right to reject this proposal or to accept it at the prices listed in the Bid Schedule.

PART 2 EXECUTION

2.1 BIDDER

A. The Bidder is as follows

Name:

Address:

Telephone number:

Facsimile number:

Tax identification number:

B. Bidder holds Utah Well Driller's License Number _____, issued on the _____ day of _____, _____, by the Utah Division of Water Rights. License renewal date is the _____ day of _____, _____.

C. The undersigned hereby acknowledges receipt of the following Addenda.

(list Addenda numbers here)

2.2 BIDDER'S SUBSCRIPTION

A. Date: _____

B. Bidder's Signature:

C. Please print Bidder's name here:

D. Title:

END OF DOCUMENT

DOCUMENT 00410
BID SCHEDULE

PART 1 GENERAL

1.1 DOCUMENT INCLUDES

A. Price schedules.

B. Measurement and payment provisions.

1.2 CONSTRUCTION CONTRACT

A. The Construction Contract is known as:

Drill, Construct and Test
Proposed Silver Bullet Well
Summit County Service Area #3
Summit County, Utah

1.3 REFERENCES

A. Document 00700: General Conditions.

B. Document 00500: Agreement.

1.4 SCHEDULE TO BE ADDED TO THE AGREEMENT

A. This document will be added to the Agreement by reference.

PART 2 TIME TO COMPLETE

2.1 CONTRACT TIME

A. The Work will begin within _____ calendar days after the date of the Notice to Proceed issued by the OWNER.

B. The Work will be Substantially Completed within _____ calendar days after the date of the Notice to Proceed issued by the OWNER.

PART 3 PRICE SCHEDULES

3.1 BASE BID

A. The schedule on the following page constitutes the base bid:

Bid Schedule Form – Proposed Silver Bullet Well

Item No.	Description	Estimated Quantity	Unit	Unit Price	Amount
1	Mobilization and Demobilization	1	Lump Sum	$	$
2	Furnish, Install, and Remove Sound Walls	400	Linear Feet	$	$
3	Drill Minimum 18-Inch Diameter Conductor Casing Borehole	40	Linear Feet	$	$
4	Furnish Nominal 14-Inch Diameter ConductorCasing	40	Linear Feet	$	$
5	Install Minimum 14-Inch Diameter Conductor Casing	40	Linear Feet	$	$
6	Furnish and Install Well Seal for Conductor Casing	40	Linear Feet	$	$
7	Drill 12-Inch Diameter Production Borehole	750	Linear Feet	$	$
8	Geophysical Logging of Production Borehole	750	Linear Feet	$	$
9	Furnish Nominal 8-Inch Diameter Steel Production Casing	500	Linear Feet	$	$
10	Install Nominal 8-Inch Diameter Steel Production Casing	500	Linear Feet	$	$
11	Furnish Nominal 8-Inch Diameter Louvered Well Screen	240	Linear Feet	$	$
12	Install Nominal 8-Inch Diameter Louvered Well Screen	240	Linear Feet	$	$
13	Furnish and Install Gravel Pack and Bentonite Plugs	410	Linear Feet	$	$
14	Furnish and Install Well Seal for Production Casing	340	Linear Feet	$	$
15	Well Development with Drill Rig	100	Hours	$	$
16	Furnish, Install and Remove Test Pumping Equipment	1	Lump Sum	$	$
17	Transport Development Water to Offsite Location	30	5000 gallons	$	$
18	Development Pumping and Test Pumping	100	Hours	$	$
19	Obtain and Comply with all Monitoring and Reporting Requirements of a UPDES General Permit for CDHT	1	Lump Sum	$	$
20	Downhole Video Camera Inspection	750	Linear Feet	$	$
21	Disinfect Well	1	Lump	$	$

			Sum		
22	Standby Time	8	Hours	$	$
23	Rig Time/Additional Work	8	Hours	$	$
24	*OPTIONAL:* Plug and Abandon Borehole	736	Cubic Feet	$	Do Not Include in TOTAL
Total (Bid Items 1 to 23)					$

Bidder: _____ (print company name)

Bidder's Signature:_____

PART 4 PROPOSED DRILLING EQUIPMENT

4.1 INFORMATION REQUEST

A. The following information will be used in the evaluation of the bids. Bidder:

_____ 1. Drill rig: _____ 2.

Planned drilling method(s): _____ 3.

Drill pipe and drill collars: _____ 4.

Equipment/methods to collect cuttings samples: _____

_____

5. Water hauling equipment and water tanks: _____

6. Mud tanks, shale shakers, and mud conditioning equipment: _____

_____

7. Air compressors: _____

8. Ancillary equipment (backhoe, forklift, welders, generators, light plant, etc.): _____

_____

9. If allowed, will crews work on 24-hour schedule? _____

10. Number of drill crew members each shift: _____

11. Will provide an on-site supervisor ("pusher")? ___ Percent time devoted to this project: __%

12. Air-lift testing approach: _____

_____

13. Proposed Best Management Practice (BMP) to limit pollutant discharge to *de minimis quantities* during drilling, development and testing: _____

_____

Use additional sheets as necessary.

PART 5 MEASUREMENT AND PAYMENT

5.1 GENERAL

A. Units of measurement are listed above in the price schedule(s).

B. Measurement and payment procedures are provided in Section 00700.

C. CONTRACTOR will take all measurements and compute all quantities.

D. ENGINEER will verify measurement and quantities.

E. CONTRACTOR will provide all equipment, workers, and survey crews to assist ENGINEER verifying measurements.

5.2 SCOPE

A. This section provides a description of the items in the Bid Schedule of these Contract Documents. The quantities of work or material stated in unit price items of the Bid are supplied only to give an indication of the general scope of the WORK; the OWNER does not expressly or by implication agree that the actual amount of work or material will correspond therewith, and reserves the right after award to increase or decrease the quantity of any unit price item of the WORK without a change in the unit price, and shall include the right to delete any Bid item in its entirety. Payment for materials and labor will be based on actual quantities furnished, installed, used, or constructed in accordance

with the prices bid for unit price items. Lump sum items will not change to reflect actual quantities or services rendered unless those items are completely deleted from the project.

B. The OWNER may terminate WORK on the project at any point if, in the OWNER's judgment, the OWNER's best interests are not served by continuation. In such an event, the CONTRACTOR shall be paid for the value of WORK completed at that time, in accordance with the unit price and lump sum items listed on the Bid Schedule form.

5.3 MOBILIZATION AND DEMOBILIZATION (BID ITEM 1)

A. Measurement for payment for mobilization and demobilization for the project will be based on completion of the WORK as a lump sum unit. The lump sum price listed on the Bid Schedule form shall be full compensation for the moving in of rigs, pumps, equipment, materials, power, labor, fuel, tools, and water conveyance structures, and incidentals to the project area necessary to do the WORK, and moving out of all such equipment, materials, tools, and incidentals and final site cleanup upon completion of the WORK. For purposes of partial payment, the initial mobilization portion of this bid item shall be considered as 60 percent of the total lump sum.

5.4 FURNISH, INSTALL, AND REMOVE SOUND WALLS (BID ITEM 2) A.

Measurement for payment to furnish, install and remove the sound walls will be based

on the number of linear feet of sound walls actually installed in accordance with these Contract Documents.

B. Payment for furnishing, installing, and removing the sound walls shall be full compensation for rigs, machinery, equipment, fuel, labor, transportation, materials, waste and water management, and incidentals necessary to furnish, install and remove the sound walls in accordance with these Contract Documents.

C. No payment shall be made for time, materials, or labor costs incurred during remedial measures, in the event the sound walls provide unacceptable sound mitigation.

D. No payment shall be made for time, materials, or labor costs incurred during remedial measures, in the event the sound walls were improperly installed and create hazardous conditions.

5.5 DRILL CONDUCTOR CASING BOREHOLE (BID ITEM 3)

A. Measurement for payment for the drilling conductor casing borehole will be based on the actual number of vertical feet of drilling in accordance with these Contract Documents.

B. Payment for drilling the borehole shall be full compensation for rigs, equipment, fuel, bits, labor, transportation, drilling fluids, conductor casing, temporary casing, materials, waste and water management, and incidentals necessary to drill the borehole in

accordance with these Contract Documents.

C. No payment shall be made for temporary casing or drilling fluid materials used during normal drilling operations. All such costs shall be considered subsidiary to the unit prices listed on the Bid Schedule form.

D. No payment shall be made for time or expenses incurred in the recovery or replacement of tools or equipment lost during the drilling phase or any other phase of the WORK.

E. No payment shall be made for tests of borehole alignment; it shall be the responsibility of the CONTRACTOR to ensure that the hole remains within plumbness and alignment specifications.

F. No payment shall be made for time, materials, or labor costs incurred during remedial measures, in the event the well is of unacceptable plumbness and alignment.

G. No payment shall be made for time, materials, or labor costs incurred in abandoning the well in the event the well is of unacceptable plumbness and alignment following remedial measures, or if lost tools or equipment cannot be recovered from the borehole. No costs incurred for construction of the abandoned well shall be applied to construction of a new production well.

H. In the event of lost circulation conditions, the CONTRACTOR shall contact the ENGINEER for direction prior to the use of lost circulation materials. If after working 8

hours to re-establish circulation, and no additional footage is gained then additional work to regain circulation shall be at the hourly rig time rate, as listed on the Bid Schedule form, if approved in advance by the ENGINEER. Lost circulation materials and drilling fluids used in attempting to restore circulation shall be paid at invoice cost plus 15 percent for handling. Note: Lost circulation is defined as a complete loss of circulation with no return of drilling fluids to the surface and no advancement in drilling depth. No payment for footage drilled shall be made during the period for which hourly payment is made.

I. If approved in advance by the ENGINEER, the CONTRACTOR may cement the lost circulation interval, taking care not to cement beyond the lost circulation interval as directed by the ENGINEER. Payment for such cementing operations will be for the cement materials (at invoice cost plus 15 percent for handling, including commercial preparation and delivery, if applicable), rig time for placement of the cement, and to re drill the cemented interval. No payment will be made for standby time waiting for cement to arrive from a concrete vendor. Payment shall be made for waiting for the cement to cure (harden) in the borehole at the hourly standby time rate, as listed on the Bid Schedule form. No payment shall be made for footage drilled during the period used to regain drilling fluid circulation by cementing operations.

J. In the event of unstable borehole conditions, the CONTRACTOR shall contact the ENGINEER if there is no advancement of drilling depth. If after working 8 hours to advance the depth of the borehole and no additional footage is gained then additional work to advance the depth of the borehole shall be at the hourly rig time rate, as listed on the Bid Schedule form, if approved in advance by the ENGINEER. No payment for footage drilled shall be made during the period for which hourly payment is made.

K. If approved in advance by the ENGINEER, the CONTRACTOR may cement the unstable interval of the borehole, taking care not to cement beyond the unstable interval as directed by the ENGINEER. Payment for such cementing operations will be for the cement materials (at invoice cost plus 15 percent for handling, including commercial preparation and delivery, if applicable), rig time for placement of the cement, and to re drill the cemented interval. No payment will be made for standby time waiting for cement to arrive from a concrete vendor. Payment shall be made for waiting for the cement to cure (harden) in the borehole at the hourly standby time rate, as listed on the Bid Schedule form. No payment shall be made for footage drilled during the period used to regain drilling fluid circulation by cementing operations.

5.6 FURNISH CONDUCTOR CASING (BID ITEM 4)

A. Measurement for payment for furnishing conductor casing will be based on the number of linear feet of such materials actually installed in the borehole in accordance with these Contract Documents.

B. Payment for the casing shall be paid at invoice cost and constitute full compensation for taxes and transportation to the site.

5.7 INSTALL CONDUCTOR CASING (BID ITEM 5)

A. Measurement for payment for installing surface casing will be based on the number of linear feet of such materials actually installed in the borehole in accordance with these Contract Documents.

B. Payment for installing the casing shall constitute full compensation for materials, supplies, consumables, transportation, labor, fuel, equipment, waste and water management, threading, fittings, welding materials, taxes and incidentals necessary to install the casing.

C. No payment shall be made for tests of borehole alignment; it shall be the responsibility of the CONTRACTOR to ensure that the hole and casing remain within plumbness and alignment specifications.

5.8 FURNISH AND INSTALL WELL SEAL FOR CONDUCTOR CASING (BID

ITEM 6)

A. Measurement for payment for furnishing and installing the certified cement grout well seal for the conductor casing will be based on the number of cubic feet of such materials actually installed in the borehole in accordance with these Contract Documents.

B. Payment for furnishing and installing the well seal shall constitute full compensation for furnishing all tools, rigs, equipment, waste and water management, labor, materials, cement, taxes and incidentals necessary to construct the cement grout well seal at the specified location in accordance with the Contract Documents.

C. No payment shall be made for time waiting for cement to cure (harden) or bentonite to swell or set up; this time shall be included in the price bid to furnish and install the well seal.

5.9 DRILL PRODUCTION BOREHOLE (BID ITEM 7)

A. Measurement for payment for the drilling production borehole will be based on the actual number of vertical feet of drilling in accordance with these Contract Documents.

B. Payment for drilling the production borehole shall be full compensation for rigs, equipment, fuel, bits, labor, transportation, drilling fluids, temporary casing, materials, waste and water management, and incidentals necessary to drill the borehole in accordance with these Contract Documents.

C. No payment shall be made for temporary casing or drilling fluid materials used during normal drilling operations. All such costs shall be considered subsidiary to the unit prices listed on the Bid Schedule form.

D. No payment shall be made for time or expenses incurred in the recovery or replacement of tools or equipment lost during the drilling phase or any other phase of the WORK.

E. No payment shall be made for tests of borehole alignment; it shall be the responsibility of the CONTRACTOR to ensure that the hole remains within plumbness and alignment specifications.

F. No payment shall be made for time, materials, or labor costs incurred during remedial measures, in the event the well is of unacceptable plumbness and alignment.

G. No payment shall be made for time, materials, or labor costs incurred in abandoning the well in the event the well is of unacceptable plumbness and alignment following remedial measures, or if lost tools or equipment cannot be recovered from the borehole. No costs incurred for construction of the abandoned well shall be applied to construction of a new production well.

H. In the event of lost circulation conditions, the CONTRACTOR shall contact the ENGINEER for direction prior to the use of lost circulation materials. If after working 8 hours to re-establish circulation, and no additional footage is gained then additional work to regain circulation shall be at the hourly rig time rate, as listed on the Bid Schedule form, if approved in advance by the ENGINEER. Lost circulation materials and drilling fluids used in attempting to restore circulation shall be paid at invoice cost plus 15 percent for handling. Note: Lost circulation is defined as a complete loss of circulation with no return of drilling fluids to the surface and no advancement in drilling depth. No payment for footage drilled shall be made during the period for which hourly payment is made.

I. If approved in advance by the ENGINEER, the CONTRACTOR may cement the lost circulation interval, taking care not to cement beyond the lost circulation interval as directed by the ENGINEER. Payment for such cementing operations will be for the cement materials (at invoice cost plus 15 percent for handling, including commercial preparation and delivery, if applicable), rig time for placement of the cement, and to re-drill the cemented interval. No payment will be made for standby time waiting for cement to arrive from a concrete vendor. Payment shall be made for waiting for the cement to cure (harden) in the borehole at the hourly standby time rate, as listed on the Bid Schedule form. No payment shall be made for footage drilled during the period used to regain drilling fluid circulation by cementing operations.

J. In the event of unstable borehole conditions, the CONTRACTOR shall contact the ENGINEER if there is no advancement of drilling depth. If after working 8 hours to advance the depth of the borehole and no additional footage is gained then additional work to advance the depth of the borehole shall be at the hourly rig time rate, as listed on the Bid Schedule form, if approved in advance by the ENGINEER. No payment for footage drilled shall be made during the period for which hourly payment is made.

K. If approved in advance by the ENGINEER, the CONTRACTOR may cement the unstable interval of the borehole, taking care not to cement beyond the unstable interval as directed by the ENGINEER. Payment for such cementing operations will be for the cement materials (at invoice cost plus 15 percent for handling, including commercial

preparation and delivery, if applicable), rig time for placement of the cement, and to re drill the cemented interval. No payment will be made for standby time waiting for cement to arrive from a concrete vendor. Payment shall be made for waiting for the cement to cure (harden) in the borehole at the hourly standby time rate, as listed on the Bid Schedule form. No payment shall be made for footage drilled during the period used to regain drilling fluid circulation by cementing operations.

5.10 GEOPHYSICAL LOGGING OF PRODUCTION BOREHOLE (BID ITEM 8)

A. Measurement for payment for the geophysical logging of the production borehole shall be

based on a footage rate for the depth of hole logged. The footage rate listed on the Bid Schedule form shall be full compensation for the moving in and moving out of geophysical equipment, set-up, logging runs, professional services, providing copies of logs, subsistence and incidentals, and all costs for the CONTRACTOR to aid the geophysical logging, rig-time and standby time.

5.11 FURNISH PRODUCTION CASING (BID ITEM 9)

A. Measurement for payment for furnishing production casing will be based on the number of linear feet of such materials actually installed in the borehole in accordance with these Contract Documents.

B. Payment for the casing shall be paid at invoice cost and constitute full compensation for taxes and transportation to the site.

5.12 INSTALL PRODUCTION CASING (BID ITEM 10)

A. Measurement for payment for installing the production casing will be based on the number of linear feet of such materials actually installed in the borehole in accordance with these Contract Documents.

B. Payment for installing the casing shall constitute full compensation for materials, supplies, consumables, transportation, labor, fuel, equipment, waste and water management, threading, fittings, welding materials, taxes and incidentals necessary to install the casing.

C. No payment shall be made for tests of borehole alignment; it shall be the responsibility of the CONTRACTOR to ensure that the hole and casing remain within plumbness and alignment specifications.

5.13 FURNISH WELL SCREEN (BID ITEM 11)

A. Measurement for payment for furnishing the well screen will be based on the number of linear feet of such materials actually installed in the borehole in accordance with these Contract Documents.

B. Payment for the well screen shall be paid at invoice cost and constitute full compensation for taxes and transportation to the site.

C. No separate payment shall be made for placement of a well bottom cap; this item shall be included in the price bid to furnish the well screen.

5.14 INSTALL WELL SCREEN (BID ITEM 12)

A. Measurement for payment for installing the well screen will be based on the number of linear feet of such materials actually installed in the borehole in accordance with these Contract Documents.

B. Payment for installing the well screen shall constitute full compensation for materials, supplies, consumables, transportation, labor, fuel, equipment, waste and water management, threading, fittings, welding materials, taxes and incidentals necessary to install the well screen.

C. No payment shall be made for tests of borehole alignment; it shall be the responsibility of the CONTRACTOR to ensure that the hole and casing remain within plumbness and alignment specifications.

5.15 FURNISH AND INSTALL GRAVEL PACK AND BENTONITE PLUGS (BID ITEM 13)

A. Measurement for payment for furnishing and installing the gravel pack and bentonite plugs will be based on the number of cubic feet of such materials actually installed in the borehole in accordance with these Contract Documents.

B. Payment for furnishing and installing the gravel pack and bentonite plugs shall constitute full compensation for furnishing all tools, rigs, equipment, waste and water management, labor, materials, taxes and incidentals necessary to install the gravel pack and bentonite plugs at the specified location in accordance with the Contract Documents.

C. No payment shall be made for time waiting for bentonite to swell; this time shall be included in the price bid to furnish and install the gravel pack and bentonite plugs.

5.16 FURNISH AND INSTALL WELL SEAL FOR PRODUCTION CASING (BID ITEM 14)

A. Measurement for payment for furnishing and installing the certified cement grout well seal for the production casing will be based on the number of cubic feet of such materials actually installed in the borehole in accordance with these Contract Documents.

B. Payment for furnishing and installing the well seal shall constitute full compensation for furnishing all tools, rigs, equipment, waste and water management, labor, materials, cement, taxes and incidentals necessary to construct the cement grout well seal at the specified location in accordance with the Contract Documents.

C. No payment shall be made for time waiting for cement to cure (harden) or bentonite to swell or set up; this time shall be included in the price bid to furnish and install the well seal.

5.17 WELL DEVELOPMENT WITH DRILL RIG AND AIR-LIFT TESTING (BID ITEM 15)

A. Measurement for payment for well development with the drill rig will be based on the actual number of hours of development operations in accordance with these Contract Documents. Payment will be made at the unit price listed in the Bid Schedule form.

B. Measurement for payment for air-lift testing and recovery will be based on the actual number of hours of air-lift operations during testing and water level recovery measurements after air-lifting in accordance with these Contract Documents. Payment will be made at the unit price listed on the Bid Schedule form.

C. No payment shall be made for equipment acquisition, setup, or installation, or for drilling fluid break down or recovery periods required by the ENGINEER to ensure thorough well development.

D. No payment shall be made for installation of the development water conveyance structures. No payment shall be made for management of drill cuttings, drilling fluids and produced water.

5.18 FURNISH, INSTALL AND REMOVE TEST PUMPING EQUIPMENT (BID ITEM 16)

A. Measurement for payment for furnishing, installing, and removing the test pump and related equipment will be based upon completion of the entire WORK as a lump sum unit, all in accordance with the requirements of these Contract Documents.

B. Payment for furnishing, installing, and removing the test pump and equipment will be made at the lump sum price listed on the Bid Schedule form, which price shall constitute full compensation for all work, including installation and removal of cable, controls, valves, generator, air-line, orifices, temporary piping, and associated appurtenances.

C. No payment shall be made for time spent transporting or maintaining equipment. All such costs for time and maintenance materials shall be considered subsidiary to the unit price listed on the Bid Schedule form.

D. No payment shall be made for installation of water conveyance structures. No payment shall be made for management of drill cuttings, drilling fluids and produced water.

5.19 TRANSPORT DEVELOPMENT WATER TO OFFSITE LOCATION (BID ITEM

17)

A. Measurement for payment to transport water produced during development to offsite location will be based upon the number of 5,000-gallon loads of water transported, all in accordance with the requirements of these Contract Documents.

B. Payment to transport water to offsite location will be made at the unit rate per 5,000-gallon load listed on the Bid Schedule form, which price shall constitute full compensation for all work required to transport water including disposal costs, fuel, equipment, labor, temporary piping, and associated appurtenances.

C. No payment shall be made for the time spent transporting water or maintaining equipment. All such costs for time and maintenance materials shall be considered in accordance with the requirements of these Contract Documents.

5.20 DEVELOPMENT PUMPING AND TEST PUMPING (BID ITEM 18)

A. Measurement for payment for development and test pumping will be based on the actual number of hours of pumping operations in accordance with these Contract Documents. Payment will be made at the unit price listed on the Bid Schedule form.

B. No payment shall be made for standby time during the recovery periods between tests or following the tests.

C. No payment shall be made for time spent transporting or maintaining equipment. All such costs for time and maintenance materials shall be considered subsidiary to the unit price listed on the Bid Schedule form.

D. No payment shall be made for installation of water conveyance structures. No payment shall be made for management of drill cuttings, drilling fluids and produced water.

E. No payment shall be made for time, equipment, or materials used in a test aborted due to power failure or malfunction of pumping equipment.

5.21 OBTAIN AND COMPLY WITH ALL MONITORING AND REPORTING REQUIREMENTS OF A UPDES GENERAL PERMIT FOR CDHT (BID ITEM 19)

A. Measurement for payment to obtain and comply with all monitoring and reporting requirements of a Utah Pollutant Discharge Elimination System (UPDES) General Permit for Construction Dewatering Hydrostatic Testing (CDHT) to discharge to Water of the State, as required by Utah Administrative Code (UAC) R317-8-2 will be based on completion of the entire WORK as a lump sum unit, all in accordance with the requirements of these Contract Documents. Payment for furnishing, operating, and removing related equipment and supplies will be made at the lump sum price listed on the Bid Schedule form, which price shall constitute full compensation for all work.

B. No payment shall be made for time spent applying for and obtaining the necessary discharge permit. All such costs for time and labor shall be considered subsidiary to the unit price listed on the Bid Schedule form.

C. No payment shall be made for time spent fulfilling monitoring and reporting requirements for the discharge permit. All such costs for time and labor shall be considered subsidiary to the unit price listed on the Bid Schedule form.

5.22 DOWNHOLE VIDEO CAMERA INSPECTION (BID ITEM 20)

A. Measurement for payment for inspecting the well with a downhole video camera shall be based on the number of linear feet of the well logged in accordance with these Contract Documents. Payment at the linear rate listed on the Bid Schedule form shall be full compensation for the moving in and moving out of logging equipment, set-up, logging runs, professional services, providing copies of logs, subsistence and incidentals, and all costs for the CONTRACTOR to aid the video logging, rig-time and standby time.

5.23 DISINFECT WELL (BID ITEM 21)

A. Measurement for payment for disinfecting the well will be based on completion of the entire WORK as a lump sum unit, all in accordance with the requirements of these Contract Documents. Payment for furnishing, operating, and removing disinfection equipment and supplies will be made at the lump sum price listed on the Bid Schedule form, which price shall constitute full compensation for all work.

5.24 STANDBY TIME (BID ITEM 22)

A. Measurement for payment for standby time will be based on the actual number of hours required by the ENGINEER for such delays during the course of the project, and will be made at the unit price listed on the Bid Schedule form, but will not include waiting on cement to cure after cementing the casings in place, recovery periods between pumping tests, delays required for acquisition of materials, or other time that is part of the work specified herein. All standby time must be pre-approved by the ENGINEER.

5.25 RIG TIME/ADDITIONAL WORK (BID ITEM 23)

A. Payment for rig time for other miscellaneous work as directed by the ENGINEER not otherwise covered in these Contract Documents will be based on the actual number of hours of additional work done and shall be full compensation for rigs, fuel, labor, equipment, waste and water management, and materials normally associated with CONTRACTOR'S additional work activities. All additional rig time must be pre approved by the ENGINEER.

5.26 *OPTIONAL:* PLUG AND ABANDON BOREHOLE (BID ITEM 24) A. Measurement for payment for plugging and abandoning the borehole will be based on the

number of cubic feet of such materials actually installed in the borehole in accordance with these Contract Documents.

B. Payment for plugging and abandoning the borehole shall constitute full compensation for furnishing all tools, rigs, equipment, waste and water management, labor, materials, cement, taxes and incidentals necessary to properly plug and abandon the borehole in accordance with the Contract Documents.

5.27 ADDITIONAL MATERIALS

A. Payment for the cost of additional materials utilized for additional activities requested by the ENGINEER that are not covered by these specifications shall be invoice cost plus fifteen percent (15%).

END OF DOCUMENT

DOCUMENT 00452
BIDDER STATUS REPORT

PART 1 GENERAL

1.1 BIDDER

A. Name:

B. Address:

C. Telephone number:

1.2 CONSTRUCTION CONTRACT

A. The Construction Contract is known as:

Drill, Construct and Test
Proposed Silver Bullet Well
Summit County Service Area #3
Summit County, Utah

PART 2 REPORT

2.1 BIDDER STATUS REPORT

A. Bidder affirms the following information is true and correct.

1. Number of employees: _____

2. Bidder's firm is: (check the following as applicable)
   [___] Independently owned and operated.
   [___] An affiliate of*
   [___] A subsidiary of*
   [___] A division of*
   [___] A business with gross revenue in excess of $_____
   [____] A business with gross revenue below $ _____

   * Parent Company

Bidder Status
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PARENT COMPANY:

Name:

Address:

Telephone Number: _____

Facsimile Number: _____

PART 3 EXECUTION

3.1 EFFECTIVE DATE

A. Bidder executes this status report and declares it to be a supplement to the Bid and in effect as of _____, _____.

3.2 BIDDER'S SUBSCRIPTION

A. Bidder’s Signature:

B. Please print Bidder's name here:

C. Title:

END OF DOCUMENT

Bidder Status
Report 00452 - 2

DOCUMENT 00453
SUBCONTRACTOR AND SUPPLIER REPORT

PART 1 GENERAL

1.1 BIDDER

A. Name:

Address:

B. Telephone Number:

1.2 CONSTRUCTION CONTRACT

A. The Construction Contract is known as:

Drill, Construct and Test
Proposed Silver Bullet Well
Summit County Service Area #3
Summit County, Utah

PART 2 REPORT

2.1 SUBCONTRACTOR AND SUPPLIER REPORT

A. Failure of the Bidder to specify a Subcontractor for any portion of the Work constitutes an agreement by the Bidder that the Bidder is fully qualified to perform that portion, and that Bidder shall perform that portion.

B. Bidder will be fully responsible to OWNER for the acts and omissions of Subcontractors and Suppliers and of persons either directly or indirectly employed by them, as Bidder is for the acts and omissions of persons employed by Bidder directly.

C. Nothing contained in the Contract Documents shall create any contractual relationship between any Subcontractor or Supplier and the OWNER. Bidder agrees each subcontract with Bidder's Subcontractor will disclaim any third party or direct relationship between OWNER and any Subcontractor or Supplier.

D. The names and addresses of the Subcontractors and Suppliers who will work under the terms of the Contract Documents and the estimated dollar amount of each subcontract

Subcontractor and Supplier
Report 00453 - 1
(in excess of 2 percent of the Bid sum) are set forth as follows.

Table 1 - BASE BID

SUBCONTRACTORS

Name and Address	Nature and Extent of Work to be Sublet	Amount
1.		
2.		

3.		

SUPPLIERS

Name and Address	Nature and Extent of Work to be Sublet	Amount
1.		
2.		
3.		
4.		

PART 3 EXECUTION

3.1 EFFECTIVE DATE

A. Bidder executes this Subcontractor and Supplier report and declares it to be a supplement to the Bid and in effect as of _____, _____.

3.2 BIDDER'S SUBSCRIPTION

A. Bidder's signature:

B. Please print Bidder's name here:

C. Title:

END OF DOCUMENT

Subcontractor and Supplier
Report 00453 - 2

DOCUMENT 00500
AGREEMENT

PART 1 GENERAL

1.1 CONTRACTOR

A. Name:

B. Address:

C. Telephone number:

D. Facsimile number:

1.2 OWNER

A. The name of the OWNER is **Town of Genola**.

1.3 CONSTRUCTION CONTRACT

A. The Construction Contract is known as:

Drill, Construct and Test
Proposed Silver Bullet Well
Summit County Service Area #3
Summit County, Utah

1.4 ENGINEER

A. **Loughlin Water Associates, LLC** is the OWNER's representatives and agent for this Construction Contract who has the rights, authority and duties assigned to the ENGINEER in the Contract Documents.

PART 2 TIME AND MONEY CONSIDERATIONS

2.1 CONTRACT PRICE

A. The Contract Price includes the cost of the Work specified in the Contract Documents,

plus the cost of all bonds, insurance, permits, fees, and all charges, expenses or assessments of whatever kind or character.

B. The Schedules of Prices awarded from the Bid Schedule are as follows.

1. Base Bid.

2.

3.

4.

C. An Agreement Supplement [____] is, [____] is not attached to this Agreement.

D. Based upon the above awarded schedules and the Agreement Supplement (if any), the Contract Price awarded is:

dollars

and cents. ($_____).

2.2 CONTRACT TIME

A. Substantial Completion of the Work shall occur:

1. _____ calendar days after the date of the Notice to Proceed; or

2. on _____, _____ at midnight.

B. Any time specified in work sequences in the Summary of Work shall be a part of the Contract Time.

C. The OWNER anticipates that a Notice to Proceed will be given on the following date, but reserves the right to change such date:

Anticipated date of Notice to Proceed: _____

2.3 PUNCH LIST TIME

A. The Work will be complete and ready for final payment within seven days after the date CONTRACTOR receives ENGINEER's Final Inspection Punch List unless exemptions of specific items are granted by ENGINEER in writing or an exception has been specified in the Contract Documents.

B. Permitting the CONTRACTOR to continue and finish the Work or any part of the Work after the time fixed for its completion, or after the date to which the time for

completion may have been extended, whether or not a new completion date is established, shall in no way operate as a waiver on the part of the OWNER of any of OWNER's rights under this Agreement.

2.4 LIQUIDATED DAMAGES

A. Time is of the essence with this project. CONTRACTOR agrees that OWNER will

suffer damage or financial loss if the Work is not completed on time or within any time extensions allowed in accordance with Part 15 of the General Conditions. CONTRACTOR and OWNER agree that proof of the exact amount of any such damage or loss is difficult to determine. Accordingly, instead of requiring any such proof of damage or specific financial loss for late completion, CONTRACTOR agrees to pay the following sums to the OWNER as liquidated damages and not as a penalty.

1. Late Contract Time Completion: Five hundred dollars and zero cents ($ 500.00) for each day or part thereof that expires after the Contract Time until the Work is accepted as Substantially Complete as provided in the General Conditions.

2. Late Punch List Time Completion: 50% of the amount specified for Late Contract Time Completion for each day or part thereof if the Work remains incomplete after the Punch List Time. The Punch List shall be considered delivered on the date it is transmitted by facsimile, hand delivery or received by the CONTRACTOR by certified mail.

3. Interruption of Public Services: No interruption of public services shall be caused by CONTRACTOR, its agents or employees, without the ENGINEER's prior written approval. OWNER and CONTRACTOR agree that in the event OWNER suffers damages from such interruption, the amount of liquidated damages stipulated below shall not be deemed to be a limitation upon OWNER's right to recover the full amount of such damages.

   Five hundred dollars and zero cents ($ 500.00) for each day or part thereof of any utility interruption caused by the CONTRACTOR without the ENGINEER's prior written authorization.

B. Work Sequence Completion: Time is the essence of sequenced work. If a work sequence is specified, then for each day or part thereof that exceeds the specified time and until ENGINEER determines such work sequence is Substantially Complete, the CONTRACTOR agrees to pay the following sums to the OWNER as liquidated damages and not as a penalty.

1. Work Sequence 1: Not applicable.

C. Survey Monuments: No land survey monument shall be disturbed or moved until ENGINEER has been properly notified and the ENGINEER's surveyor has referenced the survey monument for resetting. The parties agree that upon such an unauthorized

disturbance it is difficult to determine the damages from such a disturbance, and the parties agree that CONTRACTOR will pay as liquidated damages the sum of $500.00 to cover such damage and expense.

D. Deduct Damages from Moneys Owed CONTRACTOR: OWNER shall be entitled to deduct and retain liquidated damages out of any money which may be due or become

due the CONTRACTOR. To the extent that the liquidated damages exceed any amounts that would otherwise be due the CONTRACTOR, the CONTRACTOR shall be liable for such amounts and shall return such excess to the OWNER.

PART 3 EXECUTION

3.1 EFFECTIVE DATE

A. OWNER and CONTRACTOR execute this Agreement and declare it in effect as of the ___ day of _____, _____.

3.2 CONTRACTOR'S SUBSCRIPTION AND ACKNOWLEDGEMENT A.

CONTRACTOR's signature:

B. Please print name here:

C. Title:

D. CONTRACTOR's Utah license number:

E. Notary Acknowledgement: In the County of ,

State of _____, on the _____ day of _____, 20___, the foregoing instrument was acknowledged before me

(person acknowledging and title or representative capacity, if any).

Notary’s signature

Residing at

My commission expires: Notary's seal

3.3 OWNER'S SUBSCRIPTION AND ATTESTATION

A. Approval as to form:

(Owner's attorney)

B. Approval as to budget:

(Owner's financial officer)

C. Owner's signature:

(Signature of Owner or Owner's designee)

Acknowledgement

State of)

) ss.

County of)

The foregoing instrument was acknowledged before me this _____ , _____

by

(person acknowledging, title and representative capacity, if any).

Notary's signature

Residing at

My commission expires: Notary's seal

END OF DOCUMENT

DOCUMENT 00610
PERFORMANCE BOND

PART 1 GENERAL

1.1 BOND

A. Number: _____.

B. Amount:

dollars ($_).

1.2 SURETY

A. Name:

B. Address:

C. Telephone number: _____.

D. Facsimile number: _____.

1.3 CONTRACTOR

A. Name:

B. Address:

C. Telephone number: _____.

D. Facsimile number: _____.

1.4 OWNER

A. **Summit County Service Area #3**

1.5 CONSTRUCTION CONTRACT

A. The Construction Contract is known as:

Drill, Construct and Test
Proposed Silver Bullet Well

1.6 DEFINED TERMS

A. Terms used in this Performance Bond which are defined in Article 1 of the General Conditions will have the meanings indicated in the General Conditions.

PART 2 COVENANTS

2.1 SURETY'S AND CONTRACTOR'S RELATIONSHIP

A. Surety as surety, and CONTRACTOR as principal, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the OWNER as obligee, for the performance of the Construction Contract, whether awarded or about to be awarded.

B. If CONTRACTOR performs the Construction Contract, the Surety and the CONTRACTOR shall have no obligation under this Bond, except to participate in conferences indicated in Article 2.3.

2.2 NOTICE

A. Notice to the Surety, the OWNER or the CONTRACTOR shall be sent by certified mail, email, or hand delivered to the address shown on this Bond agreement.

B. Notices sent as required by paragraph 2.2A shall be effective on the date on which such notice was sent.

C. Notice may be sent by email. Email notice shall be effective on the date of transmission provided that a confirmation establishing the successful transmission of the notice is sent by first-class mail, postage prepaid, along with a copy of the notice transmitted, no later than twenty-four (24) hours after the facsimile notice is transmitted.

D. If any notice requires a period of less than seven (7) days for response, the notice shall be sent by email.

E. If the time for response to any notice expires on a Saturday, Sunday or a legal holiday in the State of Utah, the time shall be extended to the next working day.

2.3 PROCEDURE TO INVOKE SURETY'S OBLIGATION

A. If the CONTRACTOR fails to perform or to comply with the terms of the Construction Contract, and such failure to perform or to comply has not been waived by the OWNER, the OWNER may notify the CONTRACTOR and the Surety, at their

addresses described above, that the OWNER is considering declaring the CONTRACTOR in default.

B. Before declaring the default, the OWNER shall request and attempt to arrange a conference with the CONTRACTOR and the Surety to be held at a time and place required by the OWNER to discuss methods of performing the Work.

C. If the CONTRACTOR does not attend the conference or agree to cure any deficiencies in the CONTRACTOR's performance of the Work to the satisfaction of the OWNER, the OWNER may declare the CONTRACTOR in default and formally terminate the CONTRACTOR's right to complete the Work. Such default shall not be declared earlier than 10 days after the CONTRACTOR and the Surety have received notice as provided in article 2.2.

D. If the Contract with the CONTRACTOR is terminated, the OWNER agrees to pay the unpaid Balance of the Contract Price to the Surety for completion of the Work in accordance with the terms of the Construction Contract or to a contractor selected by the Surety to perform the Work in accordance with the terms of the Construction Contract.

2.4 SURETY'S OPTIONS AT CONTRACTOR TERMINATION

A. Surety Completes the Work: The Surety may undertake to perform and complete the Work itself, through its agents or through independent contractors.

B. Surety Obtains Bids or Proposals: The Surety may obtain bids or negotiated proposals from qualified contractors acceptable to the OWNER for a contract for performance and completion of the Work.

1. Such bids or proposals shall be prepared by the Surety for execution by the OWNER and the completion contractor selected.

2. Surety shall secure the contract with Performance and Payment Bonds executed by a qualified surety equivalent to this Performance Bond and the payment Bond (Document 00620); and

3. Surety shall pay to the OWNER the amount of damages as described in paragraph 2.6 in excess of the balance of the Contract Price incurred by the OWNER resulting from the CONTRACTOR's default.

C. Surety to Pay OWNER: Surety may determine the amount not to exceed the amount of this bond specified in paragraph 1.1B, for which Surety believes it may be liable to pay, and tender payment therefore to the OWNER. The owner has sole discretion to accept payment. If the OWNER refuses the payment tendered, or the Surety has denied liability in whole or in part, without further notice the OWNER shall be

entitled to enforce any remedy available to the OWNER.

2.5 PROCEDURE FOR OWNER TO DECLARE SURETY IN DEFAULT A. The

OWNER may declare the Surety to be in default upon the following procedures.

1. The OWNER shall issue an additional written notice to the Surety, after declaring the CONTRACTOR in default as provided in Article 2.3, demanding that the Surety perform its obligations under this Bond.

2. Surety shall respond to the OWNER within 15 days after receipt of the OWNER's additional notice, either denying the claim or accepting liability and exercising its' options under Article 2.4.

2.6 SURETY'S OBLIGATIONS

A. After the OWNER has terminated the CONTRACTOR's right to complete the Construction Contract, and if the Surety elects to complete the Construction Contract as provided in Article 2.4, then the responsibilities of the Surety to the OWNER shall not be greater than those of the CONTRACTOR under the Construction Contract, and the responsibilities of the OWNER to the Surety shall not be greater than those of the OWNER under the Construction Contract.

B. To the limit of the amount of this Bond, but subject to commitment by the OWNER to pay all valid and proper payments made to or on behalf of the CONTRACTOR under the Construction Contract, the Surety is obligated, without duplication, for:

1. the responsibilities of the CONTRACTOR for correction of Defective Work and completion of the Construction Contract;

2. design professional and delay costs resulting from the CONTRACTOR's default, and resulting from the actions or failure to act of the Surety under article 2.4; and

3. liquidated damages which are or may become due for any reason.

2.7 UNRELATED OBLIGATIONS OF THE CONTRACTOR

A. The Surety and the OWNER shall not be liable to others for obligations of the CONTRACTOR that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or changed on account of any such unrelated obligations.

B. No right of action shall accrue on this Bond to any person or entity other than the OWNER or its heirs, executors, administrators, or successors.

2.8 SURETY WAIVES NOTICE OF ANY CHANGE

A. Surety hereby waives notice of any change, including changes of Contract Time, Contract Price and scope of Work, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

2.9 VENUE

A. Any suit or action commenced by OWNER under this Bond shall be for action in a court of competent jurisdiction in the State of Utah.

PART 3 EXECUTION

3.1 EFFECTIVE DATE

A. Surety and CONTRACTOR execute this Bond agreement and declare it to be in effect as of the _____day of _____, ____.

3.2 CONTRACTOR'S SUBSCRIPTION AND ACKNOWLEDGMENT

A. Type of organization: _____
(corporation, partnership, individual, etc.)

B. If CONTRACTOR is a corporation, attach a corporate resolution evidencing CONTRACTOR's authority to sign.

C. CONTRACTOR's signature:

D. Please print name here:

E. Title:

F. Notary Acknowledgement: In the County of _____, State of _____, on the _____ day of _____, 20 ___, the foregoing instrument was acknowledged before me

(person acknowledging and title or representative capacity, if any).

Notary’s signature

Residing at

My commission expires: Notary's seal 3.3 SURETY'S SUBSCRIPTION

AND ACKNOWLEDGMENT

A. Attach evidence of Surety's corporate authority to sign.

B. Surety's signature:

C. Please print name here:

D. Title:

E. Acknowledgment: In the County of _____,
State of _____, on the _____ day of _____, _____,
before me, the undersigned notary, personally appeared _____,
who proved to me his/her identity through documentary evidence in the form of a
_____ to be the
person whose name is signed as the authorized Surety and acknowledged to me that
this document was signed voluntarily for its stated purpose.

_____
Notary Public signature Notary Public seal

END OF DOCUMENT

DOCUMENT 00620
PAYMENT BOND

PART 1 GENERAL

1.1 BOND

A. Number: .

B. Amount:

dollars ($ _____).

1.2 SURETY

A. Name:

B. Address:

C. Telephone number:

D. Facsimile number:

1.3 CONTRACTOR

A. Name:

B. Address:

C. Telephone number: _____

D. Facsimile number: _____

1.4 OWNER

A. **Summit County Service Area #3**

1.5 CONSTRUCTION CONTRACT

A. The Construction Contract is known as:

Drill, Construct and Test
Proposed Silver Bullet Well
Summit County Service Area #3
Summit County, Utah

1.6 DEFINED TERMS

A. Terms used in this Payment Bond which are defined in article 1 of the General Conditions will have the meanings indicated in the General Conditions.

PART 2 COVENANTS

2.1 SURETY'S AND CONTRACTOR'S RELATIONSHIP

A. Surety as surety, and CONTRACTOR as principal, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the OWNER as obligee, for the performance of the Construction Contract, whether awarded or about to be awarded.

B. If CONTRACTOR performs the Construction Contract, the Surety and the CONTRACTOR shall have no obligation under this Bond.

2.2 NOTICE

A. Notice to the Surety, the OWNER or the CONTRACTOR shall be sent by certified mail, email, or hand delivered to the address shown on this Bond agreement.

B. Notices sent as required by paragraph 2.2A shall be effective on the date on which such notice was sent.

C. Notice may be sent by email. Email notice shall be effective on the date of transmission provided that a confirmation establishing the successful transmission of the notice is sent by first-class mail, postage prepaid, along with a copy of the notice transmitted, no later than twenty-four (24) hours after the facsimile notice is transmitted.

D. If any notice requires a period of less than seven (7) days for response, the notice shall be sent by email.

E. If the time for response to any notice expires on a Saturday, Sunday or a legal holiday in the State of Utah, the time shall be extended to the next working day.

2.3 CONDITIONS OF SURETY'S LIABILITY

A. With respect to the OWNER, this Bond agreement shall be null and void if the CONTRACTOR promptly takes the following actions:

1. promptly makes payment, directly or indirectly, for all sums due Claimants, and

2. defends, indemnifies and saves harmless the OWNER from all claims, demands, Liens or suits by any person or entity who furnished labor, materials or equipment for use in the performance of the Work, provided the OWNER has tendered defense of such claims, demands, liens or suits to the CONTRACTOR and the Surety.

2.4 PROCEDURE TO INVOKE SURETY'S OBLIGATION

A. Concerning Claimants who have a Direct Contract with the CONTRACTOR: The Surety shall have no obligation to Claimants under this Bond who are employed by or have a direct contract with the CONTRACTOR until Claimants have given notice to the Surety at the address shown on this Bond agreement and sent a copy, or notice thereof, to the OWNER, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

B. Concerning Claimant who does not have a Direct Contract with the CONTRACTOR: The Surety shall have no obligation to Claimant under this Bond who does not have a direct contract with the CONTRACTOR until Claimant takes the following actions.

1. The Claimant shall furnish written notice to the CONTRACTOR and send a copy, or notice thereof, to the OWNER, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials were furnished or supplied or for whom the labor was done or performed.

2. The Claimant shall have either received a rejection in whole or in part from the CONTRACTOR, or not received within 15 days of furnishing the above notice any communication from the CONTRACTOR by which the CONTRACTOR has indicated the claim will be paid directly or indirectly.

3. Not having been paid within the above 15 days, the Claimant shall have sent a written notice to the Surety at the address described on this Bond agreement and sent a copy, or notice thereof, to the OWNER stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to the CONTRACTOR.

2.5 SURETY'S OPTION TO SETTLE CLAIMS

A. When the Claimant has satisfied the conditions of article 2.4, the Surety shall promptly and at the Surety's expense take the following actions.

1. Send an answer to the Claimant, with a copy to the OWNER, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

2. Pay or arrange for payment of any undisputed amounts.

2.6 SURETY'S OBLIGATION

A. Surety's total obligations under this bond shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

2.7 USE OF FUNDS

A. Amounts owed by OWNER to CONTRACTOR under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, against the Performance Bond (Document 00610). By the CONTRACTOR furnishing and the OWNER accepting this Bond, they agree that all funds earned by the CONTRACTOR in the performance of the Work are dedicated as follows:

1. The OWNER has first priority to use the funds for the completion of the Work.

2. The CONTRACTOR and the Surety have second priority to use the funds to satisfy the obligations of the CONTRACTOR and the Surety under this Bond.

2.8 UNRELATED OBLIGATIONS OF THE CONTRACTOR

A. The Surety and the OWNER shall not be liable to Claimants or others for obligations of the CONTRACTOR that are unrelated to the Construction Contract.

B. The OWNER shall not be liable for payment of any damages, costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

2.9 SURETY WAIVES NOTICE OF ANY CHANGE

A. Surety hereby waives notice of any change to the Construction Contract including changes of Contract Time, Contract Price, and scope of Work, or to related subcontracts, purchase orders or other obligations.

2.10 VENUE

A. Any suit or action commenced by a Claimant under this Bond shall be for action in a court of competent jurisdiction in the State of Utah.

2.11 COPIES OF THIS BOND

A. Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the CONTRACTOR or OWNER shall promptly furnish a copy of this Bond or shall permit a copy to be made.

PART 3 EXECUTION

3.1 EFFECTIVE DATE

A. Surety and CONTRACTOR executed this Bond agreement and declared it to be in effect as of the _____day of _____, ____.

3.2 CONTRACTOR'S SUBSCRIPTION AND ACKNOWLEDGMENT

A. Type of organization:

(corporation, partnership, individual, etc.)

B. If CONTRACTOR is a corporation, attach a corporate resolution evidencing CONTRACTOR's authority to sign.

C. CONTRACTOR's signature:

D. Please print name here:

E. Title:

F. Notary Acknowledgement: In the County of _____, State of _____, on the _____ day of _____, 20 ___, the foregoing instrument was acknowledged before me

(person acknowledging and title or representative capacity, if any).

Notary's signature

Residing at

My commission expires: Notary's seal

3.3 SURETY'S SUBSCRIPTION AND ACKNOWLEDGMENT

A. Attach evidence of Surety's corporate authority to sign.

B. Surety's signature:

C. Please print name here:

D. Title:

E. Notary Acknowledgment: In the County of _____, State of _____, on the _____ day of _____, 20 ___, before me, the undersigned notary, personally appeared _____, who proved to me his/her identity through documentary evidence in the form of a _____-_____ to be the person whose name is signed as the authorized Surety and acknowledged to me that this document was signed voluntarily for its stated purpose.

Notary’s signature

Residing at

My commission expires: Notary's seal END OF DOCUMENT

DOCUMENT 00650
CERTIFICATE OF INSURANCE

PART 1 GENERAL

1.1 PROCEDURE

A. For filing purposes, add Certificates of Insurance to the Contract Documents following this page.

END OF DOCUMENT

Certificate of
Insurance 00650 - 1

DOCUMENT 00700
GENERAL CONDITIONS

Contents

1. Definitions
2. Additional Instructions and Detail Drawings
3. Schedules, Reports and Records
4. Drawings and Specifications
5. Shop Drawings
6. Materials, Services and Facilities
7. Inspection and Testing

8. Substitutions

9. Patents

10. Surveys, Permits, Regulations

11. Protection of Work, Property, Persons

12. Supervision by Contractor

13. Changes in the Work

14. Changes in the Contract Price

15. Time for Completion and Liquidated Damages 16.

Correction of Work

17. Subsurface Conditions

18. Suspension of Work, Termination and Delay

19. Payments to Contractor

20. Acceptance of Final Payment as Release

21. Insurance

22. Contract Security

23. Assignments

24. Indemnification

25. Separate Contracts

26. Subcontracting

27. Engineer's Authority

28. Land and Rights-of-Way

29. Guaranty

30. Arbitration

31. Taxes

1. DEFINITIONS

1.1 Wherever used in the CONTRACT DOCUMENTS, the following terms shall have the meanings indicated which shall be applicable to both the singular and plural thereof:

1.2 ADDENDA - Written or graphic instruments issued prior to the execution of the Agreement which modify or interpret the CONTRACT DOCUMENTS, DRAWINGS and SPECIFICATIONS, by additions, deletions, clarifications or corrections.

1.3 BID - The offer or proposal of the BIDDER submitted on the prescribed form setting forth the prices for the WORK to be performed.

1.4 BID DOCUMENTS – The documents defined in the Bid, together with all Addenda and supplements issued prior to the Effective Date of the Agreement.

1.5 BIDDER - Any person, firm or corporation submitting a BID for the WORK.

1.6 BONDS - Bid, Performance, and Payment Bonds and other instruments of security, furnished by the CONTRACTOR and his surety in accordance with the CONTRACT DOCUMENTS.

1.7 CHANGE ORDER - A written order to the CONTRACTOR authorizing an addition, deletion or revision in the WORK within the general scope of the CONTRACT DOCUMENTS, or authorizing an adjustment in the CONTRACT PRICE or CONTRACT TIME.

1.8 CONTRACT DOCUMENTS - The contract, including Advertisement for Bids, Information for Bidders, BID, Bid Bond, Agreement, Payment Bond, Performance Bond, NOTICE OF AWARD, NOTICE TO PROCEED, CHANGE ORDER, DRAWINGS, SPECIFICATIONS, and ADDENDA.

1.9 CONTRACT PRICE - The total monies payable to the CONTRACTOR under the terms and conditions of the CONTRACT DOCUMENTS.

1.10 CONTRACT TIME - The number of calendar days stated in the CONTRACT DOCUMENTS for the completion of the WORK.

1.11 CONTRACTOR - The person, firm or corporation with whom the OWNER has executed the Agreement.

1.12 DRAWINGS - The part of the CONTRACT DOCUMENTS which show the characteristics and scope of the WORK to be performed and which have been prepared or approved by the ENGINEER.

1.13 ENGINEER - The person, firm or corporation named as such in the CONTRACT DOCUMENTS.

1.14 FIELD ORDER - A written order effecting a change in the WORK not involving an adjustment in the CONTRACT PRICE or an extension of the CONTRACT TIME, issued by the ENGINEER to the CONTRACTOR during construction.

1.15 NOTICE OF AWARD - The written notice of the acceptance of the BID from the OWNER to the successful BIDDER.

1.16 NOTICE TO PROCEED - Written communication issued by the OWNER to the CONTRACTOR authorizing him to proceed with the WORK and establishing the date of commencement of the WORK.

1.17 OWNER - A public or quasi-public body or authority, corporation, association, partnership,

or individual for whom the WORK is to be performed.

1.18 PROJECT - The undertaking to be performed as provided in the CONTRACT DOCUMENTS.

1.19 RESIDENT PROJECT REPRESENTATIVE - The authorized representative of the OWNER who is assigned to the PROJECT site or any part thereof.

1.20 SHOP DRAWINGS - All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the CONTRACTOR, a SUBCONTRACTOR, manufacturer, SUPPLIER or distributor, which illustrate how specific portions of the WORK shall be fabricated or installed.

1.21 SPECIFICATIONS - A part of the CONTRACT DOCUMENTS consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship.

1.22 SUBCONTRACTOR - An individual, firm or corporation having a direct contract with the CONTRACTOR or with any other SUBCONTRACTOR for the performance of a part of the WORK at the site.

1.23 SUBSTANTIAL COMPLETION - That date as certified by the ENGINEER when the construction of the PROJECT or a specified part thereof is sufficiently completed, in accordance with the CONTRACT DOCUMENTS, so that the PROJECT or specified part can be utilized for the purposes for which it is intended.

1.24 SUPPLIER - Any person or organization who supplies materials or equipment for the WORK, including that fabricated to a special design, but who does not perform labor at the site.

1.25 WORK - All labor necessary to produce the construction required by the CONTRACT DOCUMENTS, and all materials and equipment incorporated or to be incorporated in the PROJECT.

1.26 WRITTEN NOTICE - Any notice to any party of the Agreement relative to any part of this Agreement in writing and considered delivered and the service thereof completed, when posted by certified or registered mail to the said party at his last given address, or delivered in person to said party or his authorized representative on the WORK.

2. <u>ADDITIONAL INSTRUCTIONS AND DETAIL DRAWINGS</u>

2.1 The CONTRACTOR may be furnished additional instructions and detail drawings, by the ENGINEER, as necessary to carry out the work required by the CONTRACT DOCUMENTS.

2.2 The additional drawings and instruction thus supplied will become a part of the CONTRACT DOCUMENTS. The CONTRACTOR shall carry out the WORK in accordance with the additional detail drawings and instructions.

3. SCHEDULES, REPORTS AND RECORDS

3.1 The CONTRACTOR shall submit to the OWNER such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data where applicable as are required by the CONTRACT DOCUMENTS for the WORK to be performed.

3.2 Prior to the first partial payment estimate the CONTRACTOR shall submit construction progress schedules showing the order in which he proposes to carry on the WORK, including dates at which he will start the various parts of the WORK, estimated date of completion of each part and, as applicable:

3.2.1 The dates at which special detail drawings will be required; and,

3.2.2 Respective dates for submission of SHOP DRAWINGS, the beginning of manufacture, the testing and the installation of materials, supplies and equipment.

3.3 The CONTRACTOR shall also submit a schedule of payments that he anticipates he will earn during the course of the WORK.

4. DRAWINGS AND SPECIFICATIONS

4.1 The intent of the DRAWINGS and SPECIFICATIONS is that the CONTRACTOR shall furnish all labor, materials, tools, equipment, and transportation necessary for the proper execution of the WORK in accordance with the CONTRACT DOCUMENTS and all incidental work necessary to complete the PROJECT in an acceptable manner, ready for use, occupancy or operation by the OWNER.

4.2 In case of conflict between the DRAWINGS and SPECIFICATIONS, the SPECIFICATIONS shall govern. Figure dimensions on DRAWINGS shall govern over scale dimensions, and detailed DRAWINGS shall govern over general DRAWINGS.

4.3 Any discrepancies found between the DRAWINGS and SPECIFICATIONS and site conditions or any inconsistencies or ambiguities in the DRAWINGS or SPECIFICATIONS shall be immediately reported to the ENGINEER, in writing, who shall promptly correct such inconsistencies or ambiguities in writing. WORK done by the CONTRACTOR after his discovery of such discrepancies, inconsistencies or ambiguities shall be done at the CONTRACTOR'S risk.

5. SHOP DRAWINGS

5.1 The CONTRACTOR shall provide SHOP DRAWINGS as may be necessary for the

prosecution of the WORK as required by the CONTRACT DOCUMENTS. The ENGINEER shall promptly review all SHOP DRAWINGS. The ENGINEER'S approval of any shop drawing shall not release the CONTRACTOR from responsibility for deviations from the CONTRACT DOCUMENTS, nor shall it relieve the CONTRACTOR from responsibility for errors or omissions in the SHOP DRAWINGS. The approval of any SHOP DRAWING which substantially deviates from the requirement of the CONTRACT DOCUMENTS shall be evidenced by a CHANGE ORDER.

5.2 When submitted for the ENGINEER'S review, SHOP DRAWINGS shall bear the CONTRACTOR'S certification that he has reviewed, checked and approved the SHOP DRAWINGS and that they are in conformance with the requirements of the CONTRACT DOCUMENTS.

5.3 Portions of the WORK requiring a SHOP DRAWING or sample submission shall not begin until the SHOP DRAWING or submission has been approved by the ENGINEER. A copy of each approved SHOP DRAWING and each approved sample shall be kept in good order by the CONTRACTOR at the site and shall be available to the ENGINEER.

6. MATERIAL, SERVICES AND FACILITIES

6.1 It is understood that, except as otherwise specifically stated in the CONTRACT DOCUMENTS, the labor, tools, equipment, water, light, power, transportation, supervision, temporary construction of any nature, and all other services and facilities of any nature whatsoever necessary to execute, complete, and deliver the WORK within the specified time shall be provided by the CONTRACTOR.

6.2 Material and equipment shall be so stored as to insure the preservation of their quality and fitness for the WORK. Stored materials and equipment to be incorporated in the WORK shall be located so as to facilitate prompt inspection.

6.3 Manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.

6.4 Material, supplies and equipment shall be in accordance with samples submitted by the CONTRACTOR and approved by the ENGINEER.

6.5 Materials, supplies or equipment to be incorporated into the WORK shall not be purchased by the CONTRACTOR or the SUBCONTRACTOR subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller.

7. INSPECTION AND TESTING

7.1 All materials and equipment used in the construction of the PROJECT shall be subject to adequate inspection and testing in accordance with generally accepted standards, as required and defined in the CONTRACT DOCUMENTS.

7.2 The OWNER shall provide all inspection and testing services not required by the CONTRACT DOCUMENTS.

7.3 The CONTRACTOR shall provide at his expense the testing and inspection services required by the CONTRACT DOCUMENTS.

7.4 If the CONTRACT DOCUMENTS, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any WORK to specifically be inspected, tested, or approved by someone other than the CONTRACTOR, the CONTRACTOR will give the ENGINEER timely notice of readiness. The CONTRACTOR will then furnish the ENGINEER the required certificates of inspection, testing or approval.

7.5 Inspections, tests or approvals by the ENGINEER or others shall not relieve the CONTRACTOR from his obligations to perform the WORK in accordance with the requirements of the CONTRACT DOCUMENTS.

7.6 The ENGINEER and his representatives will at all times have access to the WORK. In addition, authorized representatives and agents of any participating Federal or state agency shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials, and other relevant data and records. The CONTRACTOR will provide proper facilities for such access and observation of the WORK and also for any inspection, or testing thereof.

7.7 If any WORK is covered contrary to the written instructions of the ENGINEER it must, if requested by the ENGINEER, be uncovered for his observation and replaced at the CONTRACTOR'S expense.

7.8 If the ENGINEER considers it necessary or advisable that covered WORK be inspected or tested by others, the CONTRACTOR, at the ENGINEER'S request, will uncover, expose or otherwise make available for observation, inspection or testing as the ENGINEER may require, that portion of the WORK in question, furnishing all necessary labor, materials, tools, and equipment. If it is found that such Work is defective, the CONTRACTOR will bear all the expenses of such uncovering, exposure, observation, inspection and testing of satisfactory reconstruction. If, however, such WORK is not found to be defective, the CONTRACTOR will be allowed an increase in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction and an appropriate CHANGE ORDER shall be issued.

8. SUBSTITUTIONS

8.1 Whenever a material, article or piece of equipment is identified on the DRAWINGS or SPECIFICATIONS by reference to brand name or catalogue number, it shall be understood

that this is referenced for the purpose of defining the performance or other salient requirements and that other products of equal capacities, quality and function shall be considered. The CONTRACTOR may recommend the substitution of a material, article, or piece of equipment of equal substance and function for those referred to in the CONTRACT DOCUMENTS by reference to brand name or catalogue number, and if, in the opinion of the ENGINEER, such material, article, or piece of equipment is of equal substance and function to that specified, the ENGINEER may approve its substitution and use by the CONTRACTOR. Any cost differential shall be deductible from the CONTRACT PRICE and the CONTRACT DOCUMENTS shall be appropriately modified by CHANGE ORDER. The CONTRACTOR warrants that if substitutes are approved, no major changes in the function or general design of the PROJECT will result. Incidental changes or extra component parts required to accommodate the substitute will be made by the CONTRACTOR without a change in the CONTRACT PRICE or CONTRACT TIME.

9. PATENTS

9.1 The CONTRACTOR shall pay all applicable royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and save the OWNER harmless from loss on account thereof, except that the OWNER shall be responsible for any such loss when a particular process, design, or the product of a particular manufacturer or manufacturers is specified, however if the CONTRACTOR has reason to believe that the design, process or product specified is an infringement of a patent, he shall be responsible for such loss unless he promptly gives such information to the ENGINEER.

10. SURVEYS, PERMITS, REGULATIONS

10.1 The OWNER shall furnish all boundary surveys and establish all base lines for locating the principal component parts of the WORK together with a suitable number of bench marks adjacent to the WORK as shown in the CONTRACT DOCUMENTS. From the information provided by the OWNER, unless otherwise specified in the CONTRACT DOCUMENTS, the CONTRACTOR shall develop and make all detail surveys needed for construction such as slope stakes, batter boards, stakes for pile locations and other working points, lines, elevations and cut sheets.

10.2 The CONTRACTOR shall carefully preserve bench marks, reference points and stakes and, in case of damage or removal by the CONTRACTOR, his employees or sub contractors, he shall be charged with the resulting expense and shall be responsible for any mistakes that may be caused by their unnecessary loss or disturbance.

10.3 Permits and licenses of a temporary nature necessary for the prosecution of the WORK shall be secured and paid for by the CONTRACTOR unless otherwise stated in the MODIFICATIONS TO GENERAL CONDITIONS (Document 00810). Permits, licenses and easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the OWNER, unless otherwise specified. The CONTRACTOR shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the WORK as drawn and specified. If the CONTRACTOR observes that the CONTRACT DOCUMENTS are at variance

therewith, he shall promptly notify the ENGINEER in writing, and any necessary changes shall be adjusted as provided in Section 13, CHANGES IN THE WORK.

11. PROTECTION OF WORK, PROPERTY AND PERSONS

11.1 The CONTRACTOR will be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the WORK. He will take all necessary precautions for the safety of, and will provide the necessary protection to prevent damage, injury or loss to all employees on the WORK and other persons who may be affected thereby, all the WORK and all materials or equipment to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

11.2 The CONTRACTOR will comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction. He will erect and maintain, as required by the conditions and progress of the WORK, all necessary safeguards for safety and protection. He will notify owners of adjacent utilities when prosecution of the WORK may affect them. The CONTRACTOR will remedy all damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by the CONTRACTOR, any SUBCONTRACTOR or anyone directly or indirectly employed by any of them or anyone for whose acts any of them be liable, except damage or loss attributable to the fault of the CONTRACT DOCUMENTS or to the acts or omissions of the OWNER or the ENGINEER or anyone employed by either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of the CONTRACTOR. In case of failure on the part of the CONTRACTOR to restore such property, or make good such damage, or injury, the OWNER may, upon 10 days written notice proceed to repair, rebuild, or otherwise restore such property as may be deemed necessary and the cost thereof shall be deducted from any monies due or which are to become due to the CONTRACTOR under this contract.

11.3 In emergencies affecting the safety of persons or the WORK or property at the site or adjacent thereto, the CONTRACTOR, without special instruction or authorization from the ENGINEER or OWNER, shall act to prevent threatened damage, injury or loss. He will give the ENGINEER prompt WRITTEN NOTICE of any significant changes in the WORK or deviations from the CONTRACT DOCUMENTS caused thereby, and a CHANGE ORDER shall thereupon be issued covering the changes and deviations involved.

12. SUPERVISION BY CONTRACTOR

12.1 The CONTRACTOR will supervise and direct the WORK. He will be solely responsible for the means, methods, techniques, sequences and procedures of construction. The CONTRACTOR will employ and maintain on the WORK a qualified supervisor or

superintendent who shall have been designated in writing by the CONTRACTOR as the CONTRACTOR'S representative at the site. The supervisor shall have full authority to act on behalf of the CONTRACTOR and all communications given to the supervisor shall be as binding as if given to the CONTRACTOR. The supervisor shall be present on the site at all times as required to perform adequate supervision and coordination of the WORK.

13. <u>CHANGES IN THE WORK</u>

13.1 The OWNER may at any time, as the need arises, order changes within the scope of the WORK without invalidating the Agreement. If such changes increase or decrease the amount due under the CONTRACT DOCUMENTS, or in the time required for performance of the WORK, an equitable adjustment shall be authorized by CHANGE ORDER.

13.2 The ENGINEER, also, may at any time, by issuing a FIELD ORDER, make changes in the details of the WORK. The CONTRACTOR shall proceed with the performance of any changes in the WORK so ordered by the ENGINEER unless the CONTRACTOR believes that such FIELD ORDER entitles him to a change in CONTRACT PRICE or TIME, or both, in which event he shall give the ENGINEER WRITTEN NOTICE thereof within seven (7) days after the receipt of the ordered change. Thereafter the CONTRACTOR shall document the basis for the change in CONTRACT PRICE or TIME within thirty (30) days. The CONTRACTOR shall not execute such changes pending the receipt of an executed CHANGE ORDER or further instruction from the OWNER.

13.3 CLAIMS FOR EXTRA WORK. If the CONTRACTOR claims that any instruction involve extra cost under this Contract, he shall give the ENGINEER written notice thereof within forty-eight (48) hours after the receipt of such instructions, and in any event before proceeding to execute the work, except in emergency endangering life or property, and the procedure shall then be as provided for under CHANGES IN THE WORK. No such claim shall be valid unless so made.

14. <u>CHANGES IN CONTRACT PRICE</u>

14.1 The CONTRACT PRICE may be changed only by a CHANGE ORDER. The value of any WORK covered by a CHANGE ORDER or of any claim for increase or decrease in the CONTRACT PRICE shall be determined by one or more of the following methods in the order of precedence listed below:

a. Unit prices previously approved.

b. An agreed lump sum.

c. The actual cost for labor, direct overhead, materials, supplies, equipment, and other services necessary to complete the work. In addition there shall be added an amount to be agreed upon but not to exceed fifteen (15) percent of the actual cost of the WORK to cover the cost of general overhead and profit.

15. TIME OF COMPLETION AND LIQUIDATED DAMAGES

15.1 The date of beginning and the time for completion of the WORK are essential conditions of the CONTRACT DOCUMENTS and the WORK embraced shall be commenced on a date specified in the NOTICE TO PROCEED.

15.2 The CONTRACTOR will proceed with the WORK at such rate or progress to insure full completion within the CONTRACT TIME. It is expressly understood and agreed, by and

between the CONTRACTOR and the OWNER, that the CONTRACT TIME for the completion of the WORK described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the WORK.

15.3 If the CONTRACTOR shall fail to complete the WORK within the CONTRACT TIME, or extension of time granted by the OWNER, then the CONTRACTOR will pay to the OWNER the amount of liquidated damages as specified in the BID for each calendar day that the CONTRACTOR shall be in default after the time stipulated in the CONTRACT DOCUMENTS.

15.4 The CONTRACTOR shall not be charged with liquidated damages or any excess cost when the delay in completion of the WORK is due to the following, and the CONTRACTOR has promptly given WRITTEN NOTICE of such delay to the OWNER or ENGINEER.

15.4.1 To any preference, priority or allocation order duly issued by the OWNER. 15.4.2 To unforeseeable causes beyond the control and without the fault or negligence of the CONTRACTOR, including but not restricted to acts of God, or of the public enemy, acts of the OWNER, acts of another CONTRACTOR in the performance of a contract with the OWNER, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and abnormal and unforeseeable weather; and

15.4.3 To any delays of SUBCONTRACTORS occasioned by any of the causes specified in paragraphs 15.4.1 and 15.4.2 of this article.

16. CORRECTION OF WORK

16.1 The CONTRACTOR shall promptly remove from the premises all WORK rejected by the ENGINEER for failure to comply with the CONTRACT DOCUMENTS, whether incorporated in the construction or not, and the CONTRACTOR shall promptly replace and re-execute the WORK in accordance with the CONTRACT DOCUMENTS and without expense to the OWNER and shall bear the expense of making good all WORK of other CONTRACTORS destroyed or damaged by such removal or replacement.

16.2 All removal and replacement WORK shall be done at the CONTRACTOR'S expense. If the CONTRACTOR does not take action to remove such rejected WORK within ten (10) days after receipt of WRITTEN NOTICE, the OWNER may (a) Remove such work, (b) Store the material, or (c) Complete the work at the expense of the CONTRACTOR.

17. SUBSURFACE CONDITIONS

17.1 It is recognized that subsurface conditions are uncertain including the lithologies, character, stability, depths and thicknesses of formations and groundwater levels and pressures.

17.2 Prior to submitting a Bid, each Bidder is responsible to review all available explorations, tests and data concerning surface conditions and subsurface conditions at or contiguous to the site, or otherwise, which may affect cost, progress, performance or furnishing of the Work in accordance with the time, price and other terms and conditions of the Contract Documents.

17.3 It is the CONTRATOR's responsibility to become informed about the local conditions affecting this WORK. Neither the information contained in the Specification or Contract Documents, nor gleaned from the OWNER or their agents, shall act to relieve the CONTRACTOR from any responsibility set forth in understanding the drilling conditions at the site prior to submitting a Bid.

17.4 Provisions concerning surface and subsurface conditions are set forth in Section 1.6 (Examination of Site and Contract Documents) of the Instructions to Bidders and Section 1.6 (Drilling and Well Conditions) of the Technical Specifications.

18. SUSPENSION OF WORK, TERMINATION AND DELAY

18.1 The OWNER may suspend the WORK or any portion thereof for a period of not more than ninety days or such further time as agreed upon by the CONTRACTOR, by WRITTEN NOTICE to the CONTRACTOR and the ENGINEER which notice shall fix the date on which WORK shall be resumed. The CONTRACTOR will resume that WORK on the date so fixed. The CONTRACTOR will be allowed an increase in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, directly attributable to any suspension.

18.2 The ENGINEER shall have the authority to suspend the WORK wholly or in part for such a period as he may deem necessary, due to unsuitable weather or to such other conditions as are considered unfavorable for the suitable prosecution of the WORK, or for such time as he may deem necessary due to the failure on the part of the CONTRACTOR to carry out orders given, or to perform any provisions of the CONTRACT. The CONTRACTOR shall immediately comply with the written order of the ENGINEER to suspend the WORK wholly or in part. The suspended WORK shall be resumed when conditions are favorable and methods are corrected, as ordered or approved in writing by the ENGINEER. In case of suspension of WORK, the CONTRACTOR shall be responsible

for all materials and shall properly store them as necessary.

18.3 If the CONTRACTOR is adjudged as bankrupt or insolvent, or if he makes a general assignment for the benefit of his creditors, or if a trustee or receiver is appointed for the CONTRACTOR or for any of his property, or if he files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or applicable laws, or if he repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment, or if he repeatedly fails to make prompt payments to SUBCONTRACTORS or for labor, materials, or equipment, or if he disregards laws, ordinances, rules, regulations or orders of any public body having jurisdiction of the WORK, or if he disregards the authority of the ENGINEER, or if he otherwise violates any provision of the CONTRACT DOCUMENTS, then the OWNER may, without prejudice to any other right or remedy and after giving the CONTRACTOR and his surety a minimum of ten (10) days from delivery of a WRITTEN NOTICE, terminate the services of the CONTRACTOR and take possession of the PROJECT and of all materials, equipment, tools, construction equipment and machinery thereon owned by the CONTRACTOR, and finish the WORK by whatever method he may deem expedient.

In such case the CONTRACTOR shall not be entitled to receive any further payment until the WORK is finished. If the unpaid balance of the CONTRACT PRICE exceeds the direct and indirect costs of completing the PROJECT, including compensation for additional professional services, such excess shall be paid to the CONTRACTOR. If such costs exceed such unpaid balance, the CONTRACTOR will pay the difference to the OWNER. Such costs incurred by the OWNER will be determined by the ENGINEER and incorporated in a CHANGE ORDER.

18.4 Where the CONTRACTOR'S services have been terminated by the OWNER, said termination shall not affect any right of the OWNER against the CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of monies by the OWNER due the CONTRACTOR will not release the CONTRACTOR from compliance with the CONTRACT DOCUMENTS.

18.5 After ten (10) days from delivery of a WRITTEN NOTICE to the CONTRACTOR and the ENGINEER, the OWNER may, without cause and without prejudice to any other right or remedy, elect to abandon the PROJECT and terminate the CONTRACT. In such a case, the CONTRACTOR shall be paid for all WORK executed and any expense sustained plus reasonable profit.

18.6 If, through no act or fault of the CONTRACTOR, the WORK is suspended for a period of more than ninety (90) days by the OWNER or under an order of court or other public authority, or the ENGINEER fails to act on any request for payment within thirty (30) days after it is submitted, or the OWNER fails to pay the CONTRACTOR substantially the sum approved by the ENGINEER or awarded by arbitrators within thirty (30) days of its approval and presentation, then the CONTRACTOR may, after ten (10) days from delivery of a WRITTEN NOTICE to the OWNER and the ENGINEER, terminate the

CONTRACT and recover from the OWNER payment for all WORK executed and all expenses sustained.

In addition and in lieu of terminating the CONTRACT, if the ENGINEER has failed to act on a request for payment or if the OWNER has failed to make any payment as aforesaid, the CONTRACTOR may upon ten (10) days written notice to the OWNER and the ENGINEER stop the WORK until he has been paid all amounts then due, in which event and upon resumption of the WORK, CHANGE ORDERS shall be issued for adjusting the CONTRACT PRICE or extending the CONTRACT TIME or both to compensate for the costs and delays attributable to the stoppage of the WORK.

18.7 If the performance of all or any portion of the WORK is suspended, delayed, or interrupted as a result of a failure of the OWNER or ENGINEER to act within the time specified in the CONTRACT DOCUMENTS, or if no time is specified, within a reasonable time, an adjustment in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, shall be made by CHANGE ORDER to compensate the CONTRACTOR for the costs and delays necessarily caused by the failure of the OWNER or ENGINEER.

19. <u>PAYMENTS TO CONTRACTOR</u>

19.1 At least ten (10) days before each progress payment falls due (but not more often than once a month), the CONTRACTOR will submit to the ENGINEER a partial payment estimate filled out and signed by the CONTRACTOR covering the WORK performed during the period covered by the partial payment estimate and supported by such data as the ENGINEER may reasonably require. If payment is requested on the basis of materials and equipment not incorporated in the WORK but delivered and suitably stored at or near the site, the partial payment estimate shall also be accompanied by such supporting data, satisfactory to the OWNER, as will establish the OWNER'S title to the material and equipment and protect his interest therein, including applicable insurance. The ENGINEER will, within ten (10) days after receipt of each partial payment estimate, either indicate in writing his approval of payment and present the partial payment estimate to the OWNER, or return the partial payment estimate to the CONTRACTOR indicating in writing his reasons for refusing to approve payment. In the latter case, the CONTRACTOR may make the necessary corrections and resubmit the partial payment estimate. The OWNER will, within ten (10) days of presentation to him of an approved partial payment estimate, pay the CONTRACTOR a progress payment on the basis of the approved partial payment estimate. The OWNER shall retain ten (10) percent of the amount of each payment until final completion and acceptance of all work covered by the CONTRACT DOCUMENTS. The OWNER at any time, however, after fifty (50) percent of the WORK has been completed, if he finds that satisfactory progress is being made, shall reduce retainage to five (5%) percent on the current and remaining estimates. When

the WORK is substantially complete (operational or beneficial occupancy), the retained amount may be further reduced below five (5) percent to only that amount necessary to assure completion. On completion and acceptance of a part of the WORK on which the price is stated separately in the CONTRACT DOCUMENTS, payment may be made in full, including retained percentages, less authorized deductions.

19.2 The request for payment may also include an allowance for the cost of such major materials and equipment which are suitably stored either at or near the site.

19.3 Prior to SUBSTANTIAL COMPLETION, the OWNER, with the approval of the ENGINEER and with the concurrence of the CONTRACTOR, may use any completed or substantially completed portions of the WORK. Such use shall not constitute an acceptance of such portions of the WORK.

19.4 The OWNER shall have the right to enter the premises for the purpose of doing work not covered by the CONTRACT DOCUMENTS. This provision shall not be construed as relieving the CONTRACTOR of the sole responsibility for the care and protection of the WORK, or the restoration of any damaged WORK except such as may be caused by agents or employees of the OWNER.

19.5 Upon completion and acceptance of the WORK, the ENGINEER shall issue a certificate attached to the final payment request that the WORK has been accepted by him under the conditions of the CONTRACT DOCUMENTS. The entire balance found to be due the CONTRACTOR, including the retained percentages, but except such sums as may be lawfully retained by the OWNER, shall be paid to the CONTRACTOR within thirty (30) days of completion and acceptance of the WORK.

19.6 The CONTRACTOR will indemnify and save the OWNER or the OWNER'S agents harmless from all claims growing out of the lawful demands of SUBCONTRACTORS, laborers, workmen, mechanics, materials, men, and furnishers of machinery and parts thereof, equipment, tools, and all supplies, incurred in the furtherance of the performance of the WORK. The Contractor shall, upon submittal of request for final payment, include an affidavit showing satisfactory evidence that all obligations or the nature designated above have been paid, discharged, or waived. If the CONTRACTOR fails to do so the OWNER may, after having notified the CONTRACTOR, either pay unpaid bills or withhold from the CONTRACTOR'S unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the CONTRACTOR shall be resumed, in accordance with the terms of the CONTRACT DOCUMENTS, but in no event shall the provisions of this sentence be construed to impose any obligations upon the OWNER to either the CONTRACTOR, his Surety, or any third party. In paying any unpaid bills of the CONTRACTOR, any payment so made by the OWNER shall be considered as payment made under the CONTRACT DOCUMENTS by the OWNER to the CONTRACTOR and the OWNER shall not be liable to the CONTRACTOR for any such payments made in good faith.

19.7 If the OWNER fails to make payment thirty (30) days after approval by the ENGINEER, in addition to other remedies available to the CONTRACTOR, there shall be added to each such payment interest at the annual rate of 5% commencing on the first day after said

payment is due and continuing until payment is received by the CONTRACTOR.

20. ACCEPTANCE OF FINAL PAYMENT AS RELEASE

20.1 The acceptance by the CONTRACTOR of final payment shall be and shall operate as a release to the OWNER of all claims and all liability to the CONTRACTOR other than claims in stated amounts as may be specifically excepted by the CONTRACTOR for all things done or furnished in connection with this WORK and for every act and neglect of the OWNER and other relating to or arising out of this WORK. Any payment, however final or otherwise, shall not release the CONTRACTOR of his sureties from any obligations under the CONTRACT DOCUMENTS or the Performance BOND and Payment BONDS.

21. INSURANCE

21.1 Insurance requirements are specified in the MODIFICATIONS TO GENERAL CONDITIONS (Document 00810).

22. CONTRACT SECURITY

22.1 If required by the CONTRACT DOCUMENTS, the CONTRACTOR shall furnish the OWNER with a Performance Bond and a Payment Bond in penal sums equal to the amount of the CONTRACT PRICE, conditioned upon the performance by the CONTRACTOR of all undertakings, covenants, terms, conditions and agreements of the CONTRACT DOCUMENTS and upon the prompt payment by the CONTRACTOR to all persons supplying labor and materials in the prosecution of the WORK provided by the CONTRACT DOCUMENTS. Such BONDS shall be executed by the CONTRACTOR and a corporate bonding company licensed to transact such business in the state in which the

WORK is to be performed and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Treasury Department Circular Number 570. The expense of these BONDS shall be borne by the CONTRACTOR. If at any time a surety on any such BOND is declared bankrupt or loses its right to do business in the state in which the WORK is to be performed or is removed from the list of Surety Companies accepted on Federal BONDS, CONTRACTOR shall within ten (10) days after notice from the OWNER to do so, substitute an acceptable BOND or BONDS) in such form and sum and signed by such other surety or sureties as may be satisfactory to the OWNER. The premiums on such BOND shall be paid by the CONTRACTOR. No further payments shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable BOND to the OWNER.

23. ASSIGNMENTS

23.1 Neither the CONTRACTOR nor the OWNER shall sell, transfer, assign or otherwise dispose of the Contract or any portion thereof, or of his right, title or interest therein, or his obligations thereunder, without written consent of the other party.

24. INDEMNIFICATION

24.1 The CONTRACTOR will indemnify and hold harmless the OWNER and the ENGINEER and their agents and employees from and against all claims, damages, losses and expenses including attorney's fees arising out of or resulting from the performance of the WORK, provided that any such claims, damage, loss or expense is attributable to bodily injury, sickness, disease, or death, or to injury or destruction of tangible property including the loss of use resulting therefrom; and is caused in whole or in part by any negligent or willful act or omission of the CONTRACTOR and SUBCONTRACTOR, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

24.2 In any and all claims against the OWNER or the ENGINEER, or any of their agents or employees, by any employee of the CONTRACTOR, any SUBCONTRACTOR, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the CONTRACTOR or any SUBCONTRACTOR under workmen's compensation acts, disability benefit acts or other employee benefits acts.

24.3 The obligation of the CONTRACTOR under this paragraph shall not extend to the liability of the ENGINEER, his agents or employees arising out of the preparation or approval of maps, DRAWINGS, opinions, reports, surveys, CHANGE ORDERS, designs or SPECIFICATIONS.

25. <u>SEPARATE CONTRACTS</u>

25.1 The Owner reserves the right to let other contracts in connection with the PROJECT. The CONTRACTOR shall afford other CONTRACTOR'S reasonable opportunity for the introduction and storage of their materials and the execution of their WORK, and shall properly connect and coordinate his WORK with theirs. If the proper execution or results of any part of the CONTRACTOR'S WORK depends upon the WORK of any other CONTRACTOR, the CONTRACTOR shall inspect and promptly report to the

ENGINEER any defects in such WORK that render it unsuitable for such proper execution and results.

25.2 The OWNER may perform additional WORK related to the PROJECT by himself, or he may let other contracts containing provisions similar to these. The CONTRACTOR will afford the other CONTRACTORS who are parties to such CONTRACTS (or the OWNER, if he is performing the additional WORK himself), reasonable opportunity for the introduction and storage of materials and equipment and the execution of WORK, and shall properly connect and coordinate his WORK with theirs.

25.3 If the performance of additional WORK by other CONTRACTORS or the OWNER is not noted in the CONTRACT DOCUMENTS prior to the execution of the CONTRACT, written notice thereof shall be given to the CONTRACTOR prior to starting any such additional WORK. If the CONTRACTOR believes that the performance of such additional WORK by the OWNER or others involves him in additional expense or

entitles him to an extension of the CONTRACT TIME, he may make a claim therefore as provided in SECTION 14 and 15.

26. SUBCONTRACTING

26.1 The CONTRACTOR may utilize the services of specialty SUBCONTRACTORS on those parts of the WORK which, under normal contracting practices, are performed by specialty SUBCONTRACTORS.

26.2 The CONTRACTOR shall not award WORK to SUBCONTRACTOR(S) in excess of twenty five (25%) percent of the CONTRACT PRICE, without prior written approval of the OWNER.

26.3 The CONTRACTOR shall be fully responsible to the OWNER for the acts and omissions of his SUBCONTRACTORS, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.

26.4 The CONTRACTOR shall cause appropriate provisions to be inserted in all subcontracts relative to the WORK to bind SUBCONTRACTOR'S to the CONTRACTOR by the terms of the CONTRACT DOCUMENTS insofar as applicable to the WORK of SUBCONTRACTOR'S and to give the CONTRACTOR the same power as regards terminating any subcontract that the OWNER may exercise over the CONTRACTOR under any provision of the CONTRACT DOCUMENTS.

27. ENGINEER'S AUTHORITY

27.1 The ENGINEER shall act as the OWNER'S representative during the construction period. He shall decide questions which may arise as to quality and acceptability of materials furnished and WORK performed. He shall interpret the intent of the CONTRACT DOCUMENTS in a fair and unbiased manner. The ENGINEER will make visits to the site and determine if the WORK is proceeding in accordance with the CONTRACT DOCUMENTS.

27.2 The CONTRACTOR will be held strictly to the intent of the CONTRACT DOCUMENTS in regard to the quality of materials, workmanship and execution of the WORK. Inspections may be made at the factory or fabrication plant of the source of material supply.

27.3 The ENGINEER will not be responsible for the construction means, controls, techniques, sequences, procedures or construction safety.

27.4 The ENGINEER shall promptly make decisions relative to interpretation of the CONTRACT DOCUMENTS.

28. LAND AND RIGHTS-OF-WAY

28.1 Prior to issuance of NOTICE TO PROCEED, the OWNER shall obtain all land and rights of-way necessary for carrying out and for the completion of the WORK to be performed pursuant

to the CONTRACT DOCUMENTS, unless otherwise mutually agreed.

28.2 The OWNER shall provide to the CONTRACTOR information which delineates and describes the lands owned and rights-of-way acquired.

28.3 The CONTRACTOR shall provide at his own expense and without liability to the OWNER any additional land and access thereto that the CONTRACTOR may desire for temporary construction facilities, or for storage of materials.

29. GUARANTY

29.1 The CONTRACTOR shall guarantee all material and equipment furnished and WORK performed for a period of one (1) year from the date of SUBSTANTIAL COMPLETION. The CONTRACTOR warrants and guarantees for a period of one (1) year from the date of SUBSTANTIAL COMPLETION of the system that the completed system is free from all defects due to faulty materials or workmanship and the CONTRACTOR shall promptly make such repairs of any damage to other parts of the system resulting from such defects.

The OWNER will give notice of observed defects with reasonable promptness. In the event that the CONTRACTOR should fail to make such repairs, adjustments, or other WORK that may be made necessary by such defects, the OWNER may do so and charge the CONTRACTOR the cost thereby incurred. The Performance BOND shall remain in full force and effect through the guarantee period.

30. ARBITRATION

30.1 All claims, disputes and other matters in question arising out of, or relating to, the CONTRACT DOCUMENTS or the breach thereof, except for claims which have been waived by the making and acceptance of final payment as provided by Section 20, shall be decided by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association. This agreement to arbitrate shall be specifically enforceable under the prevailing arbitration law. The award rendered by the arbitrators shall be final, and judgment may be entered upon it in any court having jurisdiction thereof.

30.2 Notice of the demand for arbitration shall be filed in writing with the other party to the CONTRACT DOCUMENTS and with the American Arbitration Association, and a copy shall be filed with the ENGINEER. Demand for arbitration shall in no event be made on any claim, dispute, or other matter in question which would be barred by the applicable statute of limitations.

30.3 The CONTRACTOR will carry on the WORK and maintain the progress schedule during any arbitration proceedings, unless otherwise mutually agreed in writing.

31. TAXES

31.1 The CONTRACTOR will pay all sales, consumer, use and other similar taxes required by

the law of the place where the WORK is performed.

END OF DOCUMENT

DOCUMENT 00810
MODIFICATIONS TO GENERAL CONDITIONS
(Supplementary Conditions)

This document changes or supplements provisions specified in the General Conditions.

Modify and supplement Article 21 as follows.

1. INSURANCE

A. General: The Contractor shall carry all insurance required by Federal, State, County and local laws. The Contractor is required to carry insurance coverage sufficient to cover any injury or damage arising out of the Work and maintain such coverage during the term of this Contract.

B. All policies of insurance provided shall be issued by insurance companies qualified to do business in the State of Utah and listed on the U.S. Treasury Department's current listing of approved sureties (Department of Circular 570) (as amended), or having a general policy holder's rating of not less than "A-" in the most current available A.M. Best Co, Inc.'s, Best Insurance Report. Except in the case of worker's compensation insurance, the OWNER shall be included as an additional named insured in all insurance policies. CONTRACTOR shall furnish copies of certificates of insurance concurrent with or prior to the signing of the Agreement. The certificates shall name the OWNER as the certificate holder and as an additional insured (except in the case of workers compensation insurance). If requested, CONTRACTOR shall also furnish copies of the insurance policies secured for the Work.

C. Worker's Compensation Insurance: In addition to other required insurance, the CONTRACTOR shall obtain and maintain during the life of the Construction Contract worker's compensation insurance as required by Laws and Regulations for all of CONTRACTOR's employees employed at the site of the Work, and in case any Work is subcontracted, the CONTRACTOR shall require the Subcontractor similarly to provide worker's compensation insurance for all of the latter's employees, unless such employees are covered by protection as required by Laws and Regulations.

D. Public Liability and Property Damage Insurance: CONTRACTOR shall secure and maintain during the life of the Construction Contract and at all times thereafter when CONTRACTOR may be correcting, removing or replacing Defective Work, a comprehensive general public liability and property damage insurance policy. The policy shall protect the CONTRACTOR, the OWNER, the ENGINEER, and any Subcontractor performing work covered by the Construction Contract from claims for damages for personal injury, including accidental death, and from claims for property damage which may arise from CONTRACTOR's operations under this Construction Contract, whether such operations be by the CONTRACTOR itself or by any

Subcontractor or by anyone directly or indirectly employed by either of them. Unless specified otherwise in the Supplementary Conditions, the minimum amounts of such insurance shall be $1,000,000 for each occurrence, and $2,000,000 general aggregate

and $2,000,000 products/completed operations aggregate.

The insurance for this Project is not required to include specific insurance for environmental liabilities.

E. Automotive Public Liability Insurance: Whenever CONTRACTOR or any Subcontractor shall use and operate owned, hired, or non-owned automobiles, trucks or other vehicles on public streets and highways in complying with the terms and conditions of the Construction Contract, CONTRACTOR or each Subcontractor shall carry automobile public liability insurance with limits not less than $1,000,000.00 per occurrence.

F. Insurance Non-cancelable for 30 Days: Each policy of insurance provided pursuant to the Contract Documents shall be absolutely non-cancelable for a period of not less than 30 days after notice of cancellation and shall contain the following provision or one substantially the same as the following:

"This policy shall not be subject to cancellation, change, or reduction of coverage by the other party or parties hereto, unless notice, as defined herein, is sent to the OWNER, with a copy to the ENGINEER and the OWNER's attorney."

G. Builder's Risk: The Project involves construction which does not require the CONTRACTOR to provide builder's risk insurance.

Modify and supplement Article 22 as follows.

2. PERFORMANCE, PAYMENT AND OTHER BONDS

A. If required by the OWNER, the CONTRACTOR shall file with the OWNER a good and sufficient performance Bond and a payment Bond, each in the sum of not less than 100 percent of the Contract Price.

B. The Bonds shall be executed by the CONTRACTOR and secured by a company duly and regularly authorized to do a general surety business in the State of Utah and either (i) named in the current U.S. Treasury Department's listing of approved sureties (Department Circular 570) (as amended) with an underwriting limitation equal to or greater than the Contract Price which the Bond guarantees, or (ii) with a current "A-" rating or better in A.M. Best Co., Inc's. Best Insurance Reports, Property and Casualty Edition.

C. The Performance Bond shall guarantee the faithful performance of the Construction Contract by the CONTRACTOR and the payment Bond shall guarantee the payment

REQUEST FOR PROPOSALS

Summit County Service Area #3

District Engineering Services

Summit County Service Area #3

629 Parkway Drive, Suite 1

Park Service Area, UT 84098

P: (435) 500-6276

E: gm@summitcosa3ut.gov

https://www.summitcountyutah.gov/733/Service-Area-3

Introduction

Summit County Service Area #3 (SCSA3) is a special district known as a "service area." All special districts, including service areas, are independent, government entities created to carry out specific purposes.

Summit County created SCSA3 to, among other things, "own, operate and maintain water rights and culinary and irrigation water retail services". See Section 2-27-1 of the Summit County Code.

Although SCSA3 was created by Summit County, SCSA3 is a political subdivision of the State of Utah that is "separate and distinct from any other political subdivision of the state." *See* Utah Code § 17B-1-103. As such, SCSA3 is governed by its elected Board of Trustees and regulated by the State rather than Summit County.

As a government entity, SCSA3 is a not a private water company nor is it an HOA.

- SCSA#3 performs road maintenance, snow removal, right-of-way management, culinary water system, water rights administration, trails, parks and drainage. We work cooperatively with Summit County to uphold their regulations and we rely upon them to provide enforcement support.

- SCSA#3 is funded through property tax, Ad Valorem tax, water rights administration fees, culinary water fees and construction fees. Seven publicly elected volunteer Board of Trustees direct the vision, policy and management of the Service Area with the assistance of a General Manager, an Office Manager, a Road and Water Operator and legal counsel.

Intent and Nature of Services

The Service Area plans to retain a qualified consulting engineer to provide services as the District Engineer. Through this RFP, the Service Area is seeking proposals from qualified Engineering Firms to provide general engineering services for various construction projects, which may vary in complexity, on an as-needed, on-call basis and includes, without limitation, projects relating to roadways, water projects, drainage improvements, stream rehabilitation, etc.

The intent is to select one or more engineering firms to complete selected projects over the next five-year period as constraints allow and funding becomes available. Responses to this RFP (statements of proposal) should include details about experience, key personnel, subcontractors and reference contacts as described herein. The Service Area intends to compare and evaluate all qualifying submittals and select the most qualified firm(s) based on proposal content. This is an RFP only and should not be interpreted as a solicitation for services or as a contract for services. Submittals should be comprehensive, concise, and directly responsive to the goals and format as outlined in this RFP. The Service Area may choose at its discretion to award multiple engineering firms an ongoing contract.

DISTRICT ENGINEER FUNCTIONS

- Manages all aspects of engineering for the Service Area.
- Manage and oversee all aspects of GIS and Arc Map.

- Reviews all matters pertaining to engineering to ensure that undertakings proposed and implemented by the Service Area and others are done in a manner that protects the Service Area's interests, and are in keeping with Service Area's goals, specifications, and practices as well as with local, state, and federal laws.
- Assist in planning, coordinating, supervising, and evaluating programs, plans, services, equipment, and infrastructure.
- Evaluates the Service Area's needs and formulates short- and long-range plans to meet needs in all areas.
- Provides engineering services on capital improvement projects.
- Reviews construction plans for development for consistency with Service Area-adopted engineering specifications, Service Area policies and relevant laws, rules and regulations and ensures Board actions are implemented.
- Makes presentations to the public and the Service Area Board.
- Is available to meet with developers to oversee matters dealing with the engineering functions of the Service Area.
- Maintains engineering records and maps required to ensure accurate information is available to the Service Area and public.
- Prepare reports, investigations, studies, and evaluations as, from time to time, may be required and directed by the Service Area Board Chair or Designee.
- Advise the Service Area as to engineering and construction financing available to the Service Area and prepare and initiate applications for funding.
- On-call for the Service Area.
- Perform other engineering-related functions as directed by the Service Area Board Chair or Designee.

DEVELOPMENT REVIEW FUNCTION

- Review proposed improvements and land developments and provide recommendations as to engineering matters to ensure conformance with Service Area standards and policies.
- Establish performance, labor and material bond amounts when required and ensure the posting of such bonds with the proper time sequence of such development control.
- Provide necessary and related functions as the normal practice of a Service Area engineer.

FEDERALLY FUNDED CAPITAL PROJECTS ENGINEERING SERVICES

- Design bidding, construction review/inspection and federal aid administration services required to complete the bid requirements and subject to State and Federal regulations and law.

PROPOSAL REQUIREMENTS AND CONTENTS

Proposals submitted for this project are to follow the outline described below and must address all requested information. Any additional information that the firm wishes to include that is not specifically requested should be included in an appendix to the proposal. Firms are encouraged to keep the proposals brief and to the point, but sufficiently detailed to allow evaluation of the proposal approach.

Copies of the proposal must be submitted either (i) electronically by email to gm@summitcosa3ut.gov with the email subject "District Engineer RFP" or (ii) by hard copy received by Summit County Service Area #3, 629 Parkway Drive, #1, Park City, UT 84098.

- Preference will be given to firms with extensive water system and road engineering experience and knowledge of Summit County Service Area #3 and high elevation mountain utilities and operations. The Service Area reserves the right to withdraw this RFP at any time without prior notice and reject all proposals submitted without indicating any reasons. Any award of contract for services shall be made to the firm most qualified and responsive in the opinion of the Service Area.
- Proposals may, at the Service Area's option, be rejected if they contain any alterations, additions, conditional or alternatives, are incomplete, or contain erasures or irregularities of any kind.
- The Service Area expressly reserves the right to postpone submittal opening for its convenience.
- The selected firm must agree to indemnify and hold harmless the Service Area, its officers, agents and assigns from any liability or loss resulting from suits, claims, or actions brought against the Service Area which result directly or indirectly from the wrongful or negligent actions of the consultant or company in the performance of the contract.
- The selected firm will be required to comply with all existing State and Federal labor laws including those applicable to equal opportunity employment provisions.
- The Service Area reserves the right to negotiate unique requirements and proposed service levels using the selected proposal as a basis.
- All responses to this RFP shall become the property of the Service Area and will be retained or disposed of accordingly.
- No amendments, additions or alternates shall be accepted after the submission date and time.
- All documents, records, designs, and specifications developed by the selected firm while providing services for the Service Area shall be the property of the Service Area.
- Anything considered to be proprietary should be designated by the firm.
- Acceptance by the Service Area of any proposal submitted pursuant to this RFP shall not constitute any implied intent to enter a contract for services.
- The Service Area reserves the right to issue a written notice in the same manner as the original notice of any change in the proposal requirements or submission schedule should the Service Area determine, in its sole discretion, that such changes are necessary.
- All services provided by the firm shall be in accordance with Federal, State, County, and District standards.

SECTION 1 – OVERVIEW OF RESPONDING FIRM

Provide a narrative description of your firm and your firm's experience with the following:

- Public entities.
- Grant identification, application, success, and management.
- The firm's familiarity with the Service Area's area.
- Water projects.
- Funding entities such as State, County and Federal grant (ARPA).

- Identify any unique approaches or strengths that your firm may have related to the provision of District Engineer services.

Successful candidates shall, at a minimum:

- Have a valid Professional Engineering License from the State of Utah;
- Up-to-date general commercial liability insurance (provide policy in response);
- Have qualifying engineers who graduated from an accredited engineering school;
- Be familiar with Utah County Building codes;
- Be familiar with State of Utah codes related to drinking and wastewater;
- Be familiar with US Safe water codes;
- Have experience managing large and small water projects.
- Be familiar with the geology and geography of Summit County Service Area #3, especially as it relates to water sources, pipe trenches and other construction concerns;
- Be able and willing to communicate with SCSA#3 staff and Board, including attending and presenting at Board meetings; and
- Be able and willing to consult with SCSA#3 staff on technical matters as they may arise.

SECTION 2 – DISTRICT ENGINEER TEAM

A responsible District Engineer shall be identified and associated responsible personnel should also be identified. A project team organization diagram and a brief resume of each team member shall be included. Any sub-consultants should be listed. Full resumes may be included in an appendix.

Include client names, addresses and telephone numbers for the Service Area to check references.

SECTION 3 – CONFLICTS OF INTEREST

Firms must disclose any actual, apparent, direct or indirect, or potential conflicts of interest that may exist with respect to the firm, management, or employees of the firm or other persons relative to the services to be provided under the agreement for engineering services to be awarded pursuant to this RFP.

SECTION 4 – PROPRIETARY INFORMATION

Firms must provide a statement that nothing contained in the submitted proposal will be proprietary. All proposals shall become the property of the Service Area once submitted.

SECTION 5 – INSURANCE AND OTHER REQUIREMENTS

The Service Area will require the selected responder to maintain general liability, automobile, workers' compensation, and errors and omissions insurance. The contract will contain provisions requiring the selected firm to indemnify the Service Area and provide that the District Engineer is an independent

contractor serving at the will of the Service Area. Other required provisions will include the Service Area's right to terminate the agreement, at its sole discretion, upon the provision of notice. Other required provisions will include the Service Area's right to terminate the agreement, at its sole discretion, upon the provision of notice.

SECTION 6 – COMPENSATION

The SOQs shall be used as a basis for negotiating and finalizing compensation that is fair and reasonable in compliance with Utah Code Ann. Section 63G-6a-1505.

SECTION 7 – SIGNATURE AND ACCEPTANCE OF CONDITIONS

The proposal shall be signed by an official authorized to bind the consulting firm and shall expressly state the proposal is valid for 90 days. Additionally, this section will be a statement offering the firm's acceptance of all conditions listed in the RFP document. Any exceptions or suggested changes to the RFP of any contractual obligations, including the suggested change, the reasons therefore and the impact it may have on any considerations on the firm's behalf must be stated in the proposal. Unless specifically noted by the firm, the Service Area will assume that the proposal is in compliance with all aspects of the RFP.

PROPOSAL DEADLINES AND START DATE FOR SERVICES

- Tues, April 7, 2026 — Posting of RFP and beginning of period to accept Proposals.
- Tues, April 14, 2026 — Deadline for requests for clarification or questions
- Tues, April 21, 2026 — Deadline for Proposals at 9:00am MST
- Tues, April 21, 2026 — Opening and evaluating proposals.
- Wed, April 22, 2026 — Official award of the contract

The Board will approve the RFP at the April 21st Board Meeting. Promptly thereafter: Completion of contract negotiations and commencement of services.

PROPOSAL TERMS AND CONDITIONS

The Service Area will not pay any costs incurred by the firm in preparing or submitting the proposal. The Service Area reserves the right to modify or cancel, in part or in its entirety, this RFP. The Service Area reserves the right to reject any or all proposals, to waive defects, irregularities, or informalities, and to offer to contract with any firm in response to any RFP. This RFP does not constitute any form of offer to contract.

During the evaluation process, the District reserves the right, where it may serve the Service Area's best interest, to request additional information or clarification from proposers, or to allow corrections of errors or omissions. At the discretion of the Service Area, firms submitting proposals may be requested to make oral presentations as part of the evaluation process.

The Service Area reserves the right to retain all proposals submitted and to use any idea(s) in the proposal regardless of whether that proposal is selected. Submission of a proposal indicates acceptance by the firm of the conditions contained in the request for proposals and of the Service Area standards terms and conditions for professional services, unless clearly and specifically noted in the proposal submitted and confirmed in the contract between the Service Area and the firm selected.

RIGHT OF REFUSAL

The Service Area reserves the right to reject any and all proposals without cause. Proposals will be evaluated in their entirety. The Service Area reserves the right to negotiate specific requirements and costs using the selected proposal as a basis.

SELECTION PROCEDURES

Written proposals submitted by the deadline will be evaluated based upon qualifications, experience, ability to perform, and understanding of specific services to be provided.

In reviewing the proposals for ranking, the District will carefully weigh the following:

- The firm's approach to and understanding of the Scope of Work;
- Previous Service Area experience with the proposing firm, if any and familiarity with Summit County Service Area #3;
- Experience and expertise with GIS, Arc Map and surveying;
- The firm's experience with similar contracts and clients;
- The experience and qualifications of the proposed staff in providing similar services;
- The firm's demonstrated ability to deliver work on time and within budget;
- The extent of involvement by key personnel;
- The extent to which previous clients have found the firm's services acceptable;
- Communication skills; and
- Other qualifications/criteria as deemed appropriate.

AWARD OF CONTRACT

After taking into consideration the Service Area's staff's recommendations based on qualifications, experience, ability to perform and understanding of specific services provided. The Board shall award the contract to one or more of the top-ranked Proposers or may elect to reject all proposals. In making its decision, the Board shall determine which proposal or proposals is in the best interest of the Service Area, after considering all applicable factors.

The Board may make the awarding of a contract subject to further negotiations and modifications deemed to be in the best interest of the Service Area, and the award of contract shall be subject to the Service Area and the proposer entering into a contract acceptable to the Service Area. A separate contract will be required for each selected proposer.

Service Order

6701 Koll Center Pkwy Suite 250, Pleasanton, CA 94566

619.304.6022 - www.swiftcomply.com

Rep Name	Aimee Grove	Service Order #	AG032026-2
Email	aimee.grove@swiftcomply.com	Create Date	3/20/2026
Phone Number	562-419-6817	Valid Until	5/20/2026

Customer Information

Customer	Summit County Service Area 3	Contact	Jody Anagnos	Billing Contact	
Street Address	800 South Victoria Ave	Title	Office Manager	Email	
City, St, Zip	Ventura CA 93009	Email	aclerk@scsa3.org	Phone	
Phone	805-654-5000	Phone	435-500-6276	PO # (If any)	

Services provided by SwiftComply:

One -Time Professional Services

SKU	Description	Unit Price	Quantity	Total Price
SC-BF-PS	SwiftComply BF Professional Services - Implementation	$6,000	1	$6,000
SC-PS-DC	Implementation Discount	-$2,000	1	-$2,000
Total One-Time Service Fees				**$4,000**

Recurring Subscription Fees

SKU	Description	Unit Price	Quantity	Total Price
SC-BF-P-1	BF Annual Subscription (utility portion)	$2,500	1	$2,500
SC-BF-U-1	BF Annual Subscription (tester funded portion)	$0	1	0
Total Subscription Fees (to utility)				**$2,500**

Billing Details & Terms

Invoicing Schedule

	Billing Date	Amount(s)	Notes
Invoice 1	Contract Effective Date	$6,500	Including Professional Services and Year 1 SaaS
Invoice 2	Renewal Date	$2,500	Year 2 SaaS
Invoice 3	Renewal Date	$2,500	Year 3 SaaS

Billing Terms & Conditions

Initial Term	5 Year Contract
Payment Terms	Utility portion due 100% on Contract Effective Date (Net 30). For tester pay portion, SwiftComply to collect $15/pasing test directly from testers on submission through the SwiftComply tester portal
Annual Increase	5% increase to price per test starting in Year 3
Required Minimum Volume	Customer commits to an annual contract minimum of $2,000 for the tester portion of the subscription. If, at the end of each annual Subscription Term, actual tester pay revenue is less than the contract minimum, Customer shall be liable for the difference. Such invoice shall be payable in accordance with the terms of this Purchase Order.
Payment Method	Any discounts stated above are contingent on payment being received by ACH

Signatures	Customer		SwiftComply
Signature		Signature	
Name		Name	Aimee Grove
Title		Title	Senior Account Executive
Date		Date	

General Terms & Conditions

Taxes

The Service Fees and Billing amounts set forth above in this SwiftComply Service Order DO NOT include applicable taxes. In accordance with the laws of the applicable state, in the event that sales, use or other taxes apply to this transaction, SwiftComply shall include such taxes on applicable invoices and Customer is solely responsible for such taxes, unless documentation is provided to SwiftComply demonstrating Customer's exemption from such taxes.

Agreement

This SwiftComply Service Order shall become binding upon execution by both Parties. The signature herein affirms your commitment to pay for the Service(s) ordered in accordance with the terms set forth in this SwiftComply Service Order and also acknowledges that you have read and agree to the terms and conditions set forth in the SwiftComply Master Service Agreement. This Service Order incorporates by reference the terms of such SwiftComply Master Service Agreement, which can be found at: https://www.swiftcomply.com/service-agreement/

PROJECT MANUAL
(CONTRACT DOCUMENTS AND SPECIFICATIONS)
FOR

CULINARY WATER 2026 PROJECT
for
SUMMIT COUNTY SERVICE AREA NO.3
PUBLIC WATER SYSTEM (PWS) #22105
SUMMIT COUNTY, UTAH

Prepared for:

SCSA#3
Attn: Derek Price, Board Chair
629 E Parkway Drive, Suite 1
Park City, UT 84098

Prepared by:

Joseph N. Santos, SE/PE
Project Engineer

Rimrock Engineering & Development, LLC
801-420-4515
jsantos@re-n-d.com

SUMMIT COUNTY SERVICE AREA NO.3
CULINARY WATER 2026 PROJECT
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American Public Works Association (APWA) Manual of Standard Specifications and Manual of Standard Plans

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EXHIBIT B – GEOTECHNICAL REPORT, IGES ..... 70 PAGES

NOTICE INVITING BIDS

SUMMIT COUNTY SERVICE AREA NO.3 requests bids from experienced contractors to complete construction of a new 750K Gallon concrete storage tank, over 14,000 linear feet of culinary waterlines ranging from 6" to 10" diameter piping known as **SCSA#3 - CULINARY WATER 2026 PROJECT**. Construction work, in general, consists of providing materials and labor to construct a 750K gallon culinary water cast-in-place concrete storage tank, tank valve vault, 2,500 linear feet of access roadway, installation of culinary waterlines, PRV Station, asphalt removal and replacement. The work must be completed by **June 30, 2027**.

Sealed bids will be received at the SCSA#3 Offices, 629 E Parkway Drive, Suite1, Park City Utah, UT 84098 until DATE & TIME (TBD), 2026 at which time the proposals will be publicly opened and read aloud.

Copies of the Contract Documents, Specifications and Plans will be available online no later than DATE & TIME (TBD), 2026 as well as on the SCSA#3 website, found at http://www.scsa3.org as well as on the Bonfire Procurement Portal.

INFORMATION FOR BIDDERS

SECURING DOCUMENTS

Copies of the Contract Documents, Specifications and Plans will be available online no later than TBD, 2026 on Summit County Service Area No.3's website found at http://www.scsa3.org as well as on the Bonfire Procurement Portal.

OWNER

The OWNER is Summit County Service Area No.3 with the office location of 629 E Parkway Drive, Suite 1, Park City, UT 84098, 435-500-6260, gm@summitcosa3ut.gov. Board Chair is Derek Price.

GOVERNING LAWS AND REGULATIONS

This is a federally funded project. The Bidder is required to comply with the Utah Division of Drinking Water (DDW) State Revolving Fund (SRF) conditions and requirements outlined in Exhibit A.

Bidders on this WORK will be subject to the applicable provisions of:

- All federal rules, laws and regulations,
- Utah Department of Environmental Quality (DEQ), Division of Drinking Water (DDW), R309-500 through 550,
- Utah Water Quality Act, 19-5-107(1),
- Compliance with the Utah State Historic and Preservation Office (SHPO).

LOCATION OF WORK

The location of the work site is within the Summit County Service Area No.3 boundary, Summit County, Utah. The site locations are further detailed in the project Plans.

PRE-BID CONFERENCE

A pre-bid conference will be held at the Summit County Service Area No.3 office, (629 E Parkway Drive, Suite 1, Park City, Utah 84098) at 10:00 am, DATE (TBD), 2026. **ATTENDENCE IS MANDATORY.** A sign-up sheet will be at the conference, and it will be the Bidder's responsibility to complete the form and sign to document attendance.

PROPOSAL

Bids to receive consideration shall be made in accordance with the following instructions:

Before submitting a bid, bidders shall carefully read the Plans and Specifications, visit the site of the work, and fully inform themselves as to all existing conditions and limitations of the project. Submission of a Proposal shall be considered prima facie evidence that the bidder has made such examination and is satisfied as to the conditions to be encountered in performing the work and as to the requirements of the Plans, Specifications, and other Contract Documents.

Bids shall be properly executed upon the Proposal attached to and made part of these Contract Documents. Numbers shall be stated both in writing and in figures where required, and the signatures of all persons signing shall be in longhand. The completed forms shall be without interlineations, alterations, or erasures. In case of a difference in written words and figures in a Proposal, the amount stated in written words shall govern unless obviously in error.

A proposal may be considered irregular and may be rejected as non-responsive if:

Any of the bid prices are significantly unbalanced to the potential detriment of SCSA#3. In such cases, SCSA#3, through its representative, may require the apparent low bidder to detail in writing how the prices were determined and to justify the basis of the unit prices or lump sum amount before making a decision if the proposal is irregular.

Bids shall not contain any recapitulations of the work to be done. Alternative proposals will not be considered unless called for. No oral, telegraphic, telephonic, or modified proposals will be considered.

Bids shall be delivered to SCSA#3 on or before the day and hour set for the opening of bids in the Notice Inviting Bids as published. Bids shall be enclosed in a sealed envelope bearing the title of the work and the name of the bidder. It is the SOLE responsibility of the bidder to see that his bid is received in proper time. Any bids received after the scheduled closing time for receipt of bids will be returned to the bidder unopened.

All bids shall be made in accordance with applicable statutes of the State of Utah, APWA's Manual of Standard Specifications, APWA's Manual of Standard Plans, SCSA#3 Standards and Specifications, applicable local laws, and as specified in this Book of Specifications and project Plans.

Bidders must complete and submit:

1. The Bid Form that is included in these Contract Documents, which shall be in the form of a lump sum, or in the form of a lump sum, or in the form of a lump sum, or in the form of unit pricing pursuant to the Bid Schedule, as called for in the Bid Form.
2. The Bid Schedule in the Contract Documents.
3. U.S. Environmental Protection Agency's Certificate of Non-Segregated Facilities as found on page 1 of EXHIBIT A – SPECIAL CONDITIONS FOR UTAH DIVISION OF DRINKING WATER REVOLVING FUND (SRF).
4. CERTIFICATION REGARDING DEBARMENT, SUSPENTION, INELIGIBILITY AND VOLUNTARY EXCLUSION LOWER TIER COVERED TRANSACTIONS on page 2 and 3 of EXHIBIT A – SPECIAL CONDITIONS FOR UTAH DIVISION OF DRINKING WATER REVOLVING FUND (SRF).

BID SECURITY

Each Proposal shall be accompanied with bid bond acceptable to the Owner in an amount equal to at least 5 percent (5%) of the Proposal, payable without condition to the Owner as a guarantee that the bidder, if awarded the Contract, will promptly execute such Contract in accordance with the Proposal and in manner and form required by these Contract Documents and will furnish good and sufficient bond for the faithful performance of the same. The bid securities of the three (3) lowest bidders will be retained until the Contract is signed and satisfactory bonds furnished, or other disposition made thereof. The bid securities of all bidders except the three (3) lowest will be returned promptly after the canvass of bids.

COMPETENCY OF BIDDERS

In selecting the lowest responsible bidder, consideration will be given to the general competency of the bidder for the performance of the work covered by the bid. To this end, each bid shall be supported by a statement of the bidder's experience as of recent date on the form entitled "INFORMATION REQUIRED OF BIDDER", bound herein. No bid for the work will be accepted from a Contractor who does not hold an active Contractor's license in good standing applicable to the type of work bid upon at the time of opening bids.

No contract award will be made to a Contractor whose firm and Project Superintendent have not satisfactorily completed projects of similar type, complexity and comparable value and whose firm and Project Superintendent have not been in the contracting business for similar work for at least three (3) years. In addition, the Project Superintendent meeting this experience criterion shall be dedicated to the project. After an award of the contract, no substitution of the Project Superintendent will be allowed without the written approval by the Owner.

WITHDRAWAL OF BID

Any bidder may withdraw his bid, either personally or by telegraphic or written request, at any time prior to the scheduled closing time for receipt of bids.

CONTRACT AND BONDS

The successful bidder, simultaneously with the execution of the Contract, will be required to furnish a Payment Bond in an amount equal to one hundred percent (100%) of the Contract price and a faithful Performance Bond in an amount equal to one hundred (100%) of the Contract price. Said Bonds shall be secured from a surety company satisfactory to the Owner.

The form of Contract, which the successful bidder as Contractor will be required to execute, and the forms of Bonds which the bidder will be required to furnish are included in the Contract Documents and should be carefully examined by the bidder. The Contract and the Bonds will be executed in three original counter-parts. The Performance Bond shall extend through the warranty period as specified in the General Conditions.

All bidders are required to have payment and performance bonds underwritten by a Surety Company approved by the U.S. Department of the Treasury (Circular 570, latest edition).

INTERPRETATION OF PLANS AND DOCUMENTS

If any person contemplating submitting a bid for the proposed Contract is in doubt as to the true meaning of any part of the Plans, Specifications, or other proposed Contract Documents, or finds discrepancies in or omissions from the Plans or Specifications, a request may be submitted to SCSA#3 in writing for an interpretation or correction thereof. The person submitting the request will be responsible for its prompt delivery. Any interpretation or correction of the proposed documents will be made only by Addendum duly issued and a copy of such Addendum will be mailed or delivered to each person receiving a set of such documents. The Owner will not be responsible for any other explanations or interpretations of the proposed documents.

ADDENDA

Any Addenda issued during the time of bidding, forming a part of the documents loaned to the bidder for the preparation of his bid, shall be covered in the bid and shall be made a part of the Contract.

EXECUTION OF CONTRACT

The successful bidder shall execute and return the contract to the Owner no later than 10 days after the date of the Notice of Award.

AWARD OR REJECTION OF BIDS

Owner reserves the right to reject any and all bids or schedules of bids, to waive any and all informalities not involving price, time or changes in the work, and the right to disregard all nonconforming, nonresponsive, unbalanced or conditional bids. The Owner further reserves the right to reject the bid of any bidder if Owner believes that it would not be in the best interest of the project to make an award to that bidder, whether because the bid is not responsive or the bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by Owner. Owner may conduct such investigations, as Owner deems necessary to assist in the evaluation of any bid and to determine the responsibility, qualifications, and financial ability of the bidder to perform and furnish the work.

The award, if made, will be within 10 days after the opening of bids.

BIDDERS INTERESTED IN MORE THAN ONE BID

No person, firm, or corporation shall be allowed to make, file, or to be interested in more than one (1) bid for the same work unless alternate bids are called for.

ASSIGNMENT OF CONTRACT

No assignment by the Contractor of any contract to be entered into hereunder, or any part thereof, or of funds to be received thereunder by the Contractor, will be recognized by the Owner unless such assignment has had prior approval of the Owner and the Surety has been given due notice of such assignment in writing and has consented thereto in writing.

SPECIAL NOTICE

Bidders are required to inform themselves fully of the conditions relating to construction and labor under which the work will be or is now being performed, and the Contractor must employ, as far as possible, such methods and means in carrying out his work as will not cause any interruption or interference to any other contractor.

CONSTRUCTION SCHEDULING

Bids will be presented to the District Board for approval on TBD, 2026 at which time selection of the Contractor will be ratified. Notice of Award and Notice to Proceed will be given after this date.

TIME OF COMPLETION

The Contractor shall commence work on or before the tenth day after receiving written Notice to Proceed from the Engineer on behalf of the Owner and shall fully complete all work under this Contract by **June 30, 2027.**

The Contractor shall at all times during the continuance of the Contract prosecute the work with such force and equipment as are sufficient to complete it within the time segments specified.

NONPERFORMANCE OF WORK TASKS BY THE CONTRACTOR

If the Contractor fails, neglects, or refuses to perform work tasks necessary for the completion of the total job; to replace defective work; or to repair or resurface, in a manner that is acceptable to the Owner and Engineer, public rights-of-way disturbed by his work which are a nuisance, a hazard, or which impedes or endangers vehicular traffic and the public, the Owner may serve written notice upon the Contractor of his intention to have the work performed by others. Unless within three (3) days after the service of such notice, the Contractor has made such arrangement and scheduled the accomplishment of said work tasks to the satisfaction of the Owner and Engineer, the Owner will proceed to have the work accomplished by others and deduct the costs thereof from amounts due the Contractor.

RETENTION OF WORK COMPLETED

Owner shall retain five percent (5%) of the amount of each progress payment until the Work is fifty percent (50%) complete. Upon reaching fifty percent (50%) completion, and provided the Work is progressing satisfactorily and without substantial defects or delays, Owner shall reduce retainage on subsequent progress payments to two and one-half percent (2.5%), and shall release retainage previously withheld in excess of two and one-half percent (2.5%).

Upon Substantial Completion of the Work, Owner may, at its discretion, release a portion of the retainage, less an amount sufficient to cover incomplete or defective work.

Final retainage shall be released within forty-five (45) days after Final Completion and written acceptance of the Work by the Owner and Engineer, provided Contractor has submitted all required closeout documentation, including but not limited to lien waivers, warranties, operation and maintenance manuals, and record drawings.

PERMITS AND LICENSES

The Contractor shall procure all permits and licenses, pay all charges, fees, and taxes and give all notices necessary and incidental to the due and lawful prosecution of the work.

1. Summit County Building Permit.
2. Summit County Service Area No.3 Construction Permit (Fee to be waived).
3. Summit County Service Area No.3 Excavation/Grading/Encroachment Permit (Fee to be waived).
4. Summit County Service Area No.3 Water Meter Application and Deposit (Deposit will not be waived)

All road construction, within SCSA#3 Service Area right-of-ways shall be performed by a contractor licensed and bonded in the State of Utah. A permit shall be secured by the contractor from SCSA#3 at least 48 hours before initiating construction. SCSA#3 shall be notified by the contractor at least 3 working days before the planned construction is to commence and also before starting whenever construction is delayed for any reason. The Summit County Sheriff's Department must be notified 48 hours in advance of intended closure of any public way. The contractor shall pay all charges, fees, and taxes and give all notices necessary and incidental to the lawful prosecution of the contract. These costs shall not be paid for directly but considered incidental to other items of work.

Bidders shall have a valid contractor's license for the type of work required on this Contract.

REQUEST OF ADDITIONAL INFORMATION

Should additional information be desired prior to bid submittal, please direct all questions via email to Project Engineer, Joseph N. Santos, PE. (Joe Santos) 801-420-4515, jsantos@re-n-d.com.

Neither the Engineer nor SCSA#3 shall be held responsible for any oral instructions. Any changes to the Plans and Specifications will be in the form of an Addendum which will be furnished to all plan holders.

LIQUIDATED DAMAGES

Liquidated damages shall be one-thousand dollars ($1,000) per calendar day.

INSTRUCTIONS FOR PREPARING PROPOSAL

BID ITEMS

Payment of the bid price, as stated in the Contractor's Proposal, for the completed work shall be compensation in full for the furnishing of all overhead labor, materials, devices, equipment, and appurtenances included in the work as are necessary to complete the total work under this Contract in a good, neat, and satisfactory manner as indicated on the Plans, as described in the Specifications, and as otherwise implied or required to fulfill the objective of the work. Each item, fixture, piece of equipment, work, etc., as indicated on the Plans, or specified anywhere in these Documents, shall be completed with all necessary connections and appurtenances for the satisfactory use and operation of said item, and the total system or systems.

Any and all patents and license fees for the right to use equipment or processes included in this Contract shall be included in the bid price. The Contractor shall submit to the Engineer an itemized list of all such fees, indicating the amount of each and to whom paid.

Cost of painting, testing, and other incidental operations, profit, and overhead cost, including the cost of supervision, temporary field offices, move-in, move-out, insurance, taxes, equipment not a permanent part of the job, and other incidental items, shall be included in the bid price.

The bid shall be based upon certain manufacturer's items, for which the bidder shall indicate the designated manufacturers in the spaces if provided in the proposal.

If the bidder proposes an alternate manufacturer that has not been named in the Specifications under the item to be designated, the bidder shall, if requested, submit data to the Engineer for review after the bidding and before the Award of the Contract. The equipment proposed to be furnished by the bidder from an alternate manufacturer shall conform to the specific requirements of the bid item, and any one of the specified manufacturers' items shall serve as a standard of quality for the item.

If the equipment proposed to be furnished by the bidder from an alternate manufacturer does not and/or cannot be made, in the opinion of the Engineer, to conform to the Requirements of these Specifications, then the bidder shall furnish the equipment of a manufacturer that does meet these requirements at no extra cost to the Owner.

The Owner may require additional detailed information regarding the equipment which the bidder proposes for certain bid items. If this additional information is requested from the bidder, it must be furnished in complete detail before the Award of the Contract. The information must be in sufficient detail so that the Engineer can evaluate the bidder's Proposal on the items.

All specific requirements of the Specifications must be adhered to, and all necessary modifications shall be made in the article specified by trade name, type, or model of manufacturer's equipment to make it conform to all specific requirements of the Specifications.

In cases where an item is not listed under designated items of equipment in the Proposal, and where material or equipment is designated on the Plans or in the Specifications by a trade or manufacturer's name, it is so designated primarily to establish standards of quality, finish, appearance, and performance. It is not the intent to limit the choice of materials and equipment to the specific product designated. Requests relative to substitutions permitted under the conditions provided by this paragraph for materials or equipment specifically designated on the Plans or in the Specifications shall be made in writing, after Award of the Construction Contract, and such requests shall be accompanied by complete data on which the Engineer can make determination on the merits of the proposed substitution. The written request shall state how the product proposed for substitution compares with or differs from the designated product in composition, size, arrangement, performance, etc., and, in addition, the request shall be accompanied by documentary evidence of equality in price and delivery or evidence of difference in price and delivery. Data on price shall be in the form of certified quotations from suppliers of both the designated and proposed items. All items accepted for substitution shall be subject to all applicable provisions of the Specifications.

Bids shall not contain any recapitulations of the work to be done. Alternative proposals will not be considered unless called for. No oral, or telephonic modifications or withdrawals of Proposals will be considered.

If anyone is in doubt as to the true meaning of any part of the Plans, Specifications, or other portions of the Contract Documents, or finds discrepancies in, or omissions from the Plans or Specifications, such person may submit to the Engineer a request for an interpretation or correction thereof. The person submitting the request will be responsible for its prompt delivery. Any interpretation or correction of the Contract Documents will be made only by an Addendum duly issued and a copy of such Addendum will be mailed or delivered to each person receiving a set of such Documents. The Owner will not be responsible for any other explanation of interpretations of the Documents.

If the Proposal is made by an individual, it shall be signed and the full name and address shall be given; if it is made by a firm, it shall be signed with the co-partnership name by a member of the firm, who shall also provide a signature, and the name and address of each member shall be given; and if it is made by a corporation, the name of the corporation shall be signed by its duly authorized officer or officers.

PROPOSAL

Place:_____
Date: _____

SCSA#3
629 E Parkway Drive, Suite 1
Park City, UT 84098

In compliance with your invitation for bids and all conditions of the Contract Documents for the construction of the SCSA#3 – CULINARY WATER 2026, the undersigned _____, a corporation organized under the laws of the State of _____, a partnership consisting of _____ or individuals trading as _____of the City of _____, hereby proposes and agrees to furnish any and all materials, labor, construction equipment, services, and transportation required for performing all work for the construction described in the NOTICE INVITING BIDS and to construct the same and install the material therein for the Owner in a good and workmanlike and substantial manner acceptable to the Owner, through its Engineer, or properly authorized agents, and strictly pursuant to and in conformity with the Specifications and Plans prepared by the Engineer for the Owner, and with such modification of the same and other documents that may be made by the Owner, through its Engineer, or properly authorized agents, as provided herein, at the following lump sum and unit prices for the work described in the bid schedule.

The undersigned hereby declares that he has visited the site and has carefully examined the Contract Documents, consisting of one volume, relating to the work covered by the above bid or bids.

The Bid Security (Certified Check, Cashier's Check, or Bid Bond) attached, payable to the Owner in the sum of not less than five percent (5%) of the lump sum bid for the complete project, is to become the property of the Owner in the event the Contract and Bonds are not executed within the time set forth, as liquidated damages for the delay and additional work caused thereby.

The project shall be completed by **June 30, 2027.**

The undersigned hereby declares, as bidder, that the only persons or parties interested in this PROPOSAL as principals are those named herein; that no elected official or employee of the Owner is in any manner interested directly or indirectly in this PROPOSAL or in the profits to be derived from the Contract proposed to be taken, other than as permitted by law; that this bid is made without any connection with any other person or persons making a separate bid for the same purpose; that the bid is in all respects fair and without collusion or fraud; that the bidder has read the NOTICE INVITING BIDS and the INFORMATION FOR BIDDERS hereto attached, and agrees to all the stipulations contained therein; that he has examined the form of Contract attached hereto, and the Specifications, and he proposes and agrees that if his bid as submitted, and as more fully described in the attached sheets, be accepted, he will contract in the form so attached to furnish the items and perform work called for in accordance with the provisions of said form of Contract and the Specifications and to deliver the same within the time stipulated therein; and that he will accept in full payment, therefore, the prices named in this PROPOSAL.

The bidder further agrees that, upon receipt of written notice of the acceptance of this PROPOSAL, within 10 calendar days after the date of opening of the bids, he will execute the Contract in accordance with the PROPOSAL as accepted and furnish the required bond within 10 days from date of mailing of said notice of acceptance to him at his address as given below, or within such additional time as may be allowed by the Owner; and that upon his failure or refusal to do so within said time, then the certified or cashier's check or bid bond accompanying this bid shall be cashed or enforced and the money payable pursuant thereto shall be forfeited to and become the property of the Owner as liquidated damages for such failure or refusal; provided, that if said bidder shall execute the Contract and furnish the required bonds within the aforesaid time, his certified or cashier's check, if furnished, shall be returned to him within three days thereafter, and the bid bond, if furnished, shall become void.

BID SCHEDULE

All applicable sales taxes, State, and/or Federal, and any other special taxes, patent rights, or royalties are included in the price quoted in this Proposal. Figures are to be typewritten or clearly and legibly printed in ink. LS is equal to lump sum, LF is equal to linear feet of road, EA is equal to each, SY is equal to square-yard and SF is equal to square-feet.

ESTIMATED QUANTITIES ARE NOT GUARANTEED AND ARE FOR COMPARISON PURPOSES ONLY!

CRESCENT SITE

BID SCHEDULE

CS-1) GENERAL ITEMS

BID ITEM NUMBER	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
CS-1.1	MOBILIZATION, BONDING & PERMITTING	1	LUMP		
CS-1.2	TRAFFIC CONTROL	1	LUMP		
CS-1.3	SWPPP AND NOI	1	LUMP		
CS-1.4	PRE-CONSTRUCTION PROJECT VIDEO	1	LUMP		
				SUBTOTAL	

CS-2) EARTHWORK

BID ITEM NUMBER	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
CS-2.1	CLEARING AND GRUBBING	11,000	SQ YD		
CS-2.2	EXCAVATION	49,600	CU YD		
CS-2.3	ROCK EXCAVATION	12,400	CU YD		
CS-2.4	FILL - NATIVE	24,800	CU YD		
CS-2.5	FILL - IMPORT	12,400	SQ FT		
CS-2.6	BACKFILL - TANK AND VALVE VAULT	1	LUMP		
CS-2.7	V-BLOCK RETAINING WALL	900	EACH		
CS-2.8	6'X6' FLAT TRANSFORMER PAD	4	EACH		
				SUBTOTAL	

CS-3) ROADWORK

BID ITEM NUMBER	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
CS-3.1	UTBC 6" (MINIMUM THICKNESS)	25,000	SQ FT		
CS-3.2	ASPHALT SAWCUT	76	CU YD		
CS-3.3	ASPHALT REMOVAL	600	LIN FT		
CS-3.4	ASPHALT ROADWAY REPAIR (4" ASPHALT / 6" UTBC)	600	SQ FT		
CS-3-5	ROTOMILL ROADWAY REPAIR (5" ROTOMILL)	2,633	SQ FT		
				SUBTOTAL	$ -

CS-4) TANK & VALVE VAULT

BID ITEM NUMBER	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
CS-4.1	CONCRETE WATER TANK	1	LUMP		
CS-4.2	CONCRETE VALVE VAULT	1	LUMP		
				SUBTOTAL	

CS-5) SITE ELECTRICAL / COMMUNICATIONS					
BID ITEM NUMBER	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
CS-5.1	DUAL 4" ELECTRICAL CONDUITS	2,200	EACH		
CS-5.2	1-1/2 POWER CONDUIT (TRANSFORMER PAD TO VALVE VAULT)	50	LIN FT		
CS-5.3	1-1/2 POWER CONDUIT (VALVE VAULT TO TANK HATCH)	60	LIN FT		
				SUBTOTAL	

CS-6) CRESCENT EAST CULINARY WATER					
BID ITEM NUMBER	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
CS-6.1	10" CONNECTION INTO 10" CRESCENT WATERLINE	1	LUMP		
CS-6.2	10" WATERLINE & FITTINGS	2,200	LIN FT		
CS-6.3	10" GATE VALVE	4	LUMP		
CS-6.4	COMBINATION AIR VAC/RELEASE STATION IN 48" MANHOLE	2	LUMP		
				SUBTOTAL	

CS-7) CRESCENT WEST CULINARY WATER					
BID ITEM NUMBER	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
CS-7.1	10" TERMINATION OR CONNECTION TO WHILEAWAY WATER LINE	1	LUMP		
CS-7.2	10" WATERLINE & FITTINGS	3,200	LIN FT		
CS-7.3	10" DRAINLINE & FITTINGS	900	LIN FT		
CS-7.4	10" GATE VALVE	2	EACH		
CS-7.5	6" PUMP TO WASTE LINE & FITTINGS	600	LIN FT		
CS-7.6	6" GATE VALVE	1	EACH		
CS-7.7	COMBINATION AIR VAC/RELEASE STATION IN 48" MANHOLE	1	EACH		
CS-7.8	DUAL COMBINATION AIR VAC/RELEASE STATION IN 60" MANHOLE	1	EACH		
CS-7.9	CONCRETE DISCHARGE STRUCTURE WITH BOTH DI 90° BENDS WITH SCREEN	1	LUMP		
				SUBTOTAL	

CS-8) MISCELANEOUS ITEMS					
BID ITEM NUMBER	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
CS-8.1	RIP-RAP PAD	265	SQ FT		
CS-8.2	REPLACE FIELD FENCE - WIRE	550	LIN FT		
CS-8.3	24" WIDE SAFETY GATE (DOUBLE 12' WIDE GATES) WITH ANTI-THEFT HINGES	1	LUMP		
CS-8.4	TANK SUBSURFACE DRAIN SYSTEM	1	LUMP		
CS-8.5	ROCK TRENCH EXCAVATION	400	LIN FT		
				SUBTOTAL	

CS-9) LANDSCAPING ITEMS					
BID ITEM NUMBER	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
CS-9.1	DISTURBED AREA REVEGETATION & WEED ABATEMENT	1	LUMP		
				SUBTOTAL	

BID SCHEDULE TOTAL (FIGURES)	
BID SCHEDULE TOTAL (WRITTEN)	

WHILEAWAY WATERLINE

BID SCHEDULE

WW-1) GENERAL ITEMS

BID ITEM NUMBER	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
WW-1.1	MOBILIZATION, BONDING & PERMITTING	1	LUMP		
WW-1.2	TRAFFIC CONTROL	1	LUMP		
WW-1.3	SWPPP AND NOI	1	LUMP		
WW-1.4	PRE-CONSTRUCTION PROJECT VIDEO	1	LUMP		
				SUBTOTAL	

WW-2) ROADWORK

BID ITEM NUMBER	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
WW-2-.	ASPHALT - SAWCUT	1,260	LIN FT		
WW-2.2	ASPHALT - REMOVAL	12,800	SQ FT		
WW-2.3	ASPHALT - REPAIR/PLACEMENT	15,500	SQ FT		
WW-2.4	ROTOMILL - REPAIR/PLACEMENT	2,500	SQ FT		
				SUBTOTAL	

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WW-3) CULINARY WATER

BID ITEM NUMBER	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
WW-3-.	10" CONNECTION INTO 10" SILVER BULLET WATERLINE	1	LUMP		
WW-3.2	10" WATERLINE & FITTINGS	1,230	LIN FT		
WW-3.3	10" GATE VALVE	4	EACH		
WW-3.4	6" PUMP TO WASTE LINE	1,255	LIN FT		
WW-3.5	6" GATE VALVE	2	EACH		
WW-3.6	DUAL COMBINATION AIR VAC/RELEASE STATION IN 60" MANHOLE	2	EACH		
WW-3.7	TRENCH IMPORT BACKFILL	280	CU YD		
				SUBTOTAL	$ -

WW-4) LANDSCAPING ITEMS

BID ITEM NUMBER	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
WW-4.1	DISTURBED AREA REVEGETATION & WEED ABATEMENT	1	LUMP		
				SUBTOTAL	

BID SCHEDULE TOTAL (FIGURES)

BID SCHEDULE TOTAL (WRITTEN)

GREENFIELD WATERLINE

BID SCHEDULE

GW-1) GENERAL ITEMS

BID ITEM NUMBER	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
GW-1.1	MOBILIZATION, BONDING & PERMITTING	1	LUMP		
GW-1.2	TRAFFIC CONTROL	1	LUMP		
GW-1.3	SWPPP AND NOI	1	LUMP		
GW-1.4	PRE-CONSTRUCTION PROJECT VIDEO	1	LUMP		
				SUBTOTAL	

GW-2) ROADWORK

BID ITEM NUMBER	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
GW-2.1	UTBC 6" (MINIMUM THICKNESS)	600	SQ FT		
				SUBTOTAL	

GW-3) CULINARY WATER

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BID ITEM NUMBER	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
GW-3.1	8" CONNECTION INTO 8" GREENFIELD NORTH WATERLINE	1	LUMP		
GW-3.2	8" CONNECTION INTO 8" GREENFIELD SOUTH WATERLINE	1	LUMP		
GW-3.3	8" WATERLINE & FITTINGS	1,940	LIN FT		
GW-3.4	8" GATE VALVE	5	EACH		
GW-3.5	8" TEE WITH BLIND FLANGE	4	EACH		
GW-3.6	60' JACK & BORE WITH CASING	1	LUMP		
GW-3.7	TRENCH IMPORT BACKFILL	570	CU YD		
				SUBTOTAL	

GW-4) LANDSCAPING ITEMS

BID ITEM NUMBER	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
GW-4.1	DISTURBED AREA REVEGETATION & WEED ABATEMENT	1	LUMP		
				SUBTOTAL	

BID SCHEDULE TOTAL (FIGURES)	
BID SCHEDULE TOTAL (WRITTEN)	

BEEHIVE WATERLINE

BID SCHEDULE

BW-1) GENERAL ITEMS

BID ITEM NUMBER	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
BW-1.1	MOBILIZATION, BONDING & PERMITTING	1	LUMP		
BW-1.2	TRAFFIC CONTROL	1	LUMP		
BW-1.3	SWPPP AND NOI	1	LUMP		
BW-1.4	PRE-CONSTRUCTION PROJECT VIDEO	1	LUMP		
				SUBTOTAL	

BW-2) ROADWORK

BID ITEM NUMBER	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
BW-2.1	ASPHALT - SAWCUT	40	LIN FT		
BW-2.2	ASPHALT - REMOVAL	550	SQ FT		
BW-2.3	ASPHALT - REPAIR/PLACEMENT	550	SQ FT		
BW-2.4	ROTOMILL - REPAIR/PLACEMENT	500	SQ FT		
				SUBTOTAL	

Page 1

BW-3) CULINARY WATER

BID ITEM NUMBER	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
BW-3.1	8" CONNECTION INTO 8" SOUTHERN WHILEAWAY WATERLINE	1	LUMP		
BW-3.2	8" CONNECTION INTO 6" ECHO WATERLINE	1	LUMP		
BW-3.3	8" WATERLINE & FITTINGS	600	LIN FT		
BW-3.4	8" GATE VALVE	5	EACH		
BW-3.5	FIRE HYDRANT	1	EACH		
BW-3.6	PRESSURE REDUCING STATION	1	LUMP		
BW-3.7	TRENCH IMPORT BACKFILL	150	CU YD		
				SUBTOTAL	

BW-4) LANDSCAPING ITEMS

BID ITEM NUMBER	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
BW-4.1	DISTURBED AREA REVEGETATION & WEED ABATEMENT	1	LUMP		
				SUBTOTAL	

BID SCHEDULE TOTAL (FIGURES)	
BID SCHEDULE TOTAL (WRITTEN)	

Bidder is cautioned to read carefully the INFORMATION FOR BIDDERS Section of these Contract Documents and the INSTRUCTIONS FOR PREPARING PROPOSAL relating to what is to be furnished under each item of the PROPOSAL and to submittal of bid.

Bidder understands and agrees that the Owner reserves the right to reject any or all bids or schedules and to waive any informality in the bidding.

The bidder agrees that this bid shall be good and may not be withdrawn for a period of 90 calendar days after the scheduled closing time for receiving bids. Bidder acknowledges receipt of the following addenda:

The undersigned bidder shall acknowledge receipt of the following addenda, if any.
Addenda No(s).

Respectfully submitted,

_____

_____
Bidder

(Corporate Seal)
If bid is by corporation

By: _____
Title

_____
Witness: if bidder is an individual
Bidder's post office address:

Bidder's post office address (if applicable):

_____

_____

Name and address of all members of the firm or names and titles of all officers of the corporation

Name and Title:

Bidder's address:

_____

_____

_____

_____

_____

Bidders phone number: _____

SEAL

MEASUREMENT AND PAYMENT

GENERAL

The method of measurement and payment for the various items comprising the completed work follows: Payment for the items shall be compensation in full for the furnishing of all overhead, labor, material, tools, equipment, and appurtenances necessary to complete the work in a good, neat, and satisfactory manner as indicated on the Plans or as specified, with all connections, testing, painting, cleanup, and related work completed. Each item, fixture, piece of equipment, etc., shall be complete with all necessary connections and appurtenances for the satisfactory use and/or operation of said item. No additional payment, including work done by the contractor for his convenience, shall be made for work related to each item unless specifically noted or specified. Measurement shall be in place in the completed work with no allowance for waste.

ESTIMATED QUANTITIES ARE NOT GUARANTEED AND ARE FOR COMPARISON PURPOSES ONLY!

BID ITEMS

MOBILIZATION, BONDING & PERMITTING: ITEMS CS-1.1, WW-1.1, GW-1.1, BW-1.1

Measurement for payment for mobilization, bonding & permitting shall be a lump sum bid price. Mobilization, bonding and permitting shall include the cost of necessary bonding, permits and mobilization of equipment and personnel, and the removal of all equipment, trash, debris, etc. at the completion of the project. No more than 50% of mobilization, bonding and permitting shall be paid until work has commenced in earnest and will be made at the time of the first partial payment. A minimum of 25% of mobilization shall be retained until the contractor has removed all equipment, tools, debris, etc. from the site at the completion of the job.

TRAFFIC CONTROL: ITEMS CS-1.2, WW-1.2, GW-1.2, BW-1.2

A. Measurement for payment for TRAFFIC CONTROL shall be lump sum bid price.
B. Payment shall include all costs of traffic control for the complete project traffic control. Traffic control shall be in accordance with UDOT standards and shall include development of the plan and plan approval by SCSA#3. Payment covers all costs of furnishing, installation, and removal of all traffic control devices, including but not limited to, flag persons, cones, markers, signs, lighting, flags, and other control devices for directing traffic and maintaining safety for the duration of the project, and all other incidental work as may be required to produce the work as shown on the plans and as required by the specifications. No more than 50% of traffic control shall be paid until work has commenced in earnest and will be made at the time of the first partial payment. A minimum of 25% of mobilization shall be retained until the contractor has removed all barricades, signage, etc. from the site at the completion of the job.

SWPPP AND NOI: ITEMS CS-1.3, WW-1.3, GW-1.3, BW-1.3

A. Measured by lump sum (LUMP).
B. Payment covers the CONTRACTOR in completing all requirements, constructing and maintaining the Storm Water Pollution Prevention Plan (SWPPP) as outlined by the State of Utah DEQ. Visit httpss://deq.utah.gov for required steps for preparing and maintain the SWPPP, and to view guidelines, examples, templates, BMP specifications, etc. The CONTRACTOR will be listed as the operator. The CONTRACTOR will coordinate and attend a SWPPP specific pre-

construction meeting with Summit County Service Area No.3's Roads Manager prior to submittal of NOI to the State of Utah DEQ. Payment also covers all erosion control that is not listed as separate bid items, which includes but not limited to; construction fencing, inlet protection, silt fence or other perimeter controls. Payment will be made on a percentage basis as follows:

Percent of Original Contract Amount Earned	Percent of Amount Bid
5	40
15	20
40	20
100	20

C. No more than 40% shall be paid until work has commenced in earnest and will be made at the time of the first partial payment.
D. A minimum of 20% shall be retained until the contractor has removed -permanent material, debris, etc. from the site at the completion of the job.

PRE-CONSTRUCTION PROJECT VIDEO: ITEMS CS-1.4, WW-1.4, GW-1.4, BW-1.4

A. Measured by lump sum (LUMP).
B. Payment is for the generation, production and delivery to the District of a project wide video. The quality of the video shall be a minimum of 1080p. The video will be completed and accepted by Summit District prior to the commencement of any work including the delivery of equipment, temporary facilities and/or construction materials. Such payment will be compensation in full for the cost of equipment, time, labor, and material required. Payment will be made at the time of the first partial payment.

EXCAVATION

A. Measured by cubic-yard (CU YD).
B. Payment covers all labor, equipment, and appurtenances required to clear the site of excavated material that is not suitable to place under the trail pavement section that is not included in CLEARING & GRUBBING bid item. Payment includes all costs incidental to the excavation, handling, hauling and proper disposal.
C. Excavation completed for CONTRACTOR'S benefit or excavation error, dewatering of excavation slough or overbreak is incidental work.
D. For material ordered removed (authorized excavation), measurement of quantities for payment shall be made to the following pay limits.
    a. Upper limit of excavation is the proposed excavation limit.
    b. Lower and lateral limits are as authorized by DISTRICT.
    c. Volumes of open spaces (e.g. manholes, pipes, dipstones, inlets etc.) will not be measured in backfill calculations.
E. An adjustment to the final quantity for payment may be made if an error is discovered in the calculated quantity by either DISTRICT or the CONTRACTOR. Provide all computations and supporting documentation necessary for DISTRICT to verify the error and determine the final quantity for payment.

ROCK EXCAVATION

A. Measured by cubic-yard (CU YD).
B. Payment covers all labor, equipment, and appurtenances required to remove earthen material that cannot be excavated by conventional earthmoving equipment without drilling and blasting. Including solid ledge rock, boulders larger than ½-CY, and cemented material requiring explosive means for removal.
C. All other items are the same as ITEM for EXCAVATION.
D. Rock excavation will be measured in cubic yards in place, based on pre-excavation surveys and approved limits of rock excavation. No payment will be made for over-excavation beyond authorized lines.

ROCK TRENCH EXCAVATION

A. Measured by linear-foot of trench (LIN FT).
B. Payment covers all labor, equipment, and appurtenances required to remove earthen material that cannot be excavated by conventional earthmoving equipment without drilling and blasting. Including solid ledge rock, boulders larger than ½-CY, and cemented material requiring explosive means for removal.
C. All other items are the same as ITEM for EXCAVATION.

FILL - NATIVE (ON-SITE)

A. Measured by cubic-yard (CU YD).
B. Payment includes all costs incidental to excavation, handling, hauling, and placement of on-site granular borrow in its final position including but not limited to labor, material, and equipment to relocate and install, compact, and grade material as specified. Measurement shall be for material compacted in place in preparation for placement of base course material.
C. For material placed, measurement of quantities for payment shall be made to the following pay limits.
    a. Upper limit of excavation is the proposed subgrade elevation.
    b. Lower and lateral limits are as authorized by DISTRICT prior to placement of material.
    c. Volumes of open spaces (e.g. manholes, pipes, dipstones, inlets etc.) will not be measured in placement calculations.
D. An adjustment to the final quantity for payment may be made if an error is discovered in the calculated quantity by either DISTRICT or CONTRACTOR. Provide all computations and supporting documentation necessary for DISTRICT to verify the error and determine the final quantity for payment.

FILL - IMPORT

A. Measured by cubic-yard (CU YD).
B. Payment includes all costs incidental to purchasing, handling, hauling, and placement of A-1-a Granular borrow, in its final position including but not limited to labor, material, and equipment to provide and install, compact, and grade material as specified. Measurement shall be for material compacted in place in preparation for placement of base course material.
C. Weigh tickets will be provided to DISTRICT daily. The unit weight of import material will be determined by AASHTO T-180 Modified Proctor method.

TANK BASE MATERIAL

A. Measured by lump sum (LUMP).
B. Payment includes all costs incidental to purchasing, handling, hauling, and placement of material specified in plans and geotechnical report, in its final position including but not limited to labor, material, and equipment to provide and install, compact, and grade material as specified. Measurement shall be for material compacted in place in preparation for placement of concrete.

BACKFILL OF TANK

A. Measured by lump sum (LUMP).
B. Payment includes all costs incidental to purchasing, handling, hauling, and placement of material specified in plans and geotechnical report, in its final position including but not limited to labor, material, and equipment to provide and install, compact, and grade material as specified. Measurement shall be for material compacted in place in preparation for placement of concrete.

V-BLOCK RETAINING WALL

A. Measured by each (EACH).
B. Payment includes all costs incidental to purchasing, handling, hauling, and proper placement of V-BLOCKS specified in plans and geotechnical report, in its final position including but not limited to labor, material, and equipment to provide and install, compact, and grade material as specified. Measurement shall be for each V-BLOCK in place.

6'X6' FLAT TRANSFORMER PAD

A. Measured by each (EACH).
B. Payment includes all costs incidental to purchasing, handling, hauling, and preparation of flat earthen pad with conduits ready for connection in future electrical box.
C. Measurement shall be for each pad complete.

ASPHALT SAWCUT

A. Measured by linear feet (LIN FT).
B. Payment includes all cost incidental to saw cutting asphalt surfacing in preparation for asphalt removal. All cutting shall be full depth of existing asphalt.

ASPHALT REMOVAL

A. Measured by square foot (SQ FT).
B. Payment covers all costs incidental to removing asphalt pavement down to the underlying base course or subgrade, removal from site and proper disposal.

UNTREATED ROAD BASE COURSE (6" THICK MINIMUM)

A. Measurement shall be square foot (SQ FT).
B. Payment includes all costs incidental to the placement of untreated base course in its final position including but not limited to labor, material, and equipment to provide and install, compact, and grade base course material as specified. Measurement shall be for material compacted in place.

ASPHALT ROADWAY REPAIR (4" ASPHALT / 6" THICK MINIMUM)

A. Measurement shall be square foot (SQ FT).
B. Payment includes all costs incidental to the repair of asphalt roadway including preparation, placement of untreated base course and asphalt in its final position including but not limited to labor, material, and equipment to provide and install, compact, and grade base course material as specified. Measurement shall be for material compacted in place.

ROTOMILL ROADWAY REPAIR (5" ROTOMILL MINIMUM)

A. Measurement shall be square foot (SQ FT).
B. Payment includes all costs incidental to the repair of existing rotomill surface roadway including preparation, processing, placement of rotomill, watering, rolling, compaction of rotomill material in its final position including but not limited to labor, material, and equipment to provide and install, compact, and grade base course material as specified. Measurement shall be for material compacted in place

CONCRETE WATER TANK

A. Measurement shall be made by lump sum (LUMP).
B. Payment covers the cost of labor and materials associated with the construction of the water tank that are not identified as separate pay items in the bid schedule. Items and tasks include installation of geofabric, and drain rock, formwork, , associated pipes and penetrations, reinforcement and other incidentals (hatches, air vents, ladders, etc.) required to complete the tank as shown on the construction drawings. No measurement will be made for concrete or backfill required to fill over-excavations for footings, walls, or slabs.

CONCRETE VALVE VAULT

A. Measurement shall be made by lump sum (LUMP).
B. Payment covers the cost of labor and materials associated with the construction of the concrete valve vault that are not identified as separate pay items in the bid schedule. Items and tasks include install bedding and backfill of drain, formwork, associated pipes and penetrations, valves, pipe stands, conduits, reinforcement and other incidentals (manhole access cover, ladder, etc.) required to complete the tank valve vault as shown on the construction drawings. No measurement will be made for concrete or backfill required to fill over-excavations for footings, walls, or slabs.

TANK SUBSURFACE DRAIN SYSTEM

A. Measurement shall be made by lump sum (LUMP).
B. Payment covers the cost of labor and materials associated with the construction of the subsurface drain system and outlet including manholes and connecting to vault that are not identified as separate pay items in the bid schedule. Items and tasks include installation of geofabric, bedding and backfill of drain, and outlet.

CONDUITS (per size and type)

A. Measurement shall be linear feet (LIN FT).
B. Payment will be compensation in full for the installation of the conduit/dual conduits including the material, labor and time to locate all existing utilities, removal of excess material, removal and disposal of excess material, shoring and bracing, dewatering, bedding material, backfill material, compaction.
C. Payment shall be made upon completion and acceptance of the piping.

PIPE (per size and type)

D. Measurement shall be linear feet (LIN FT).
E. Payment will be compensation in full for the installation of the pipe including the material, labor and time to locate all existing utilities, removal of excess material, removal and disposal of excess material, shoring and bracing, dewatering, bedding material, backfill material, compaction.
F. Payment shall be made upon completion and acceptance of the piping.

CONNECT TO EXISTING PIPE (per each location)

A. Measurement shall be lump sum (LUMP).
B. Payment covers the cost of excavation, fittings, pipe, restraint, couplers, demolition and disposal, labor backfilling and all other items to make the connection as shown on the plans. Each 'connection to existing' is counted as one per connection location, not per each coupling or cut of existing pipe.
C. Valving shall be per each in their own item.

GATE VALVE (per size)

A. Measurement will be made by actual count per each installed (EACH)
B. Payment covers the cost of excavation, foundation preparation, restraint devices, valve boxes, valve, concrete collar, backfill and other miscellaneous devices, materials, or equipment required for a complete installation.

COMBINATION AIR VAC/RELEASE STATION (size and type)

A. Measurement will be made by actual count per each installed (EACH)
B. Payment will be made at the unit price bid per station. Such payment will be compensation in full for furnishing and installing the combination air release stations at the locations as shown on the plans and details, complete in place including furnishing and installing concrete manhole, interior plumbing including pipe fittings, valving, all concrete, bedding material, air vents, pipes, piping, concrete pad and all appurtenances as shown on plans.

CONCRETE DISCHARGE STRUCTURE

A. Measurement will lump sum (LUMP).
B. Payment covers the cost of excavation, bedding and backfill, potholing, formwork, reinforcement, and new manhole material including the grate, etc.; providing material, labor, and incidentals for connecting all storm drain lines to new structure; and other miscellaneous devices, materials, or equipment required for a complete installation per construction drawings.

PRV STATION

A. Measurement will be made by lump sum (LUMP).
B. Payment covers the cost of ordering, purchase, transportation, handling, excavation, valving, piping, pipe supports, drain line and outlet to adjusting/setting valving and work not identified as separate pay items in the bid schedule.

RIP-RAP PAD

A. Measurement shall be square feet (SQ FT).
B. Such payment will be compensation in full for furnishing material, placing rip-rap including drainage geotextile fabric under the riprap as well as all labor, equipment, and placement.
C. Payment shall be made upon completion and acceptance of the rip-rap pad.

DISTURBED AREA REVEGETATION & WEEK ABATEMENT

A. Measurement will be made by lump sum (LUMP).
B. Payment covers the cost of furnishing all materials and equipment, labor, and restorative methods, and top-soil necessary to repair and return to existing condition any disturbed natural landscaping during construction through hydroseeding.

BID BOND

KNOW ALL MEN BY THESE PRESENTS,

That _____ as Principal, and _____ as Surety, are held and firmly bound unto SCSA#3, hereinafter called "Owner", in the sum of

_____dollars,

(not less than 5 percent of the total amount of the bid)

for the payment of which sum will and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, said Principal has submitted a bid to said Owner to perform all work required under the bidding schedule of the Owner's Specifications entitled SCSA#3 - CULINARY WATER 2026 PROJECT.

NOW THEREFORE, if said Principal is awarded a contract by said Owner and, within the time and in the manner required under the heading "Instructions to Bidders" bound with said Specifications, enters into a written contract on the form of Agreement bound with said Specifications and furnished the required bonds, one to guarantee faithful performance and the other to guarantee payment for labor and materials, then this obligation shall be null and void, otherwise it shall remain in full force and effect. In the event suit is brought upon this bond by said Owner and judgement is recovered, said Surety shall pay all costs incurred by said Owner in such suit, including a reasonable attorney's fee to be fixed by the court.

SIGNED AND SEALED, this _____ day of _____, 20___.

_____(SEAL) _____(SEAL)
(Principal) (Surety)

By: _____ By: _____
(Signature) (Signature)

(SEAL AND NOTARIAL ACKNOWLEDGMENT OF SURETY)

INFORMATION REQUIRED OF BIDDER

SCSA#3
CULINARY WATER 2026 PROJECT

GENERAL INFORMATION

The bidder shall furnish the following information. Failure to comply with this requirement will render the Proposal informal and will cause its rejection. Additional sheets shall be attached as required.

(1) Contractor's name and address:

_____

_____

_____

(2) Contractor's telephone number: _____

(3) Contractor's license: Primary classification: _____

State License No.: _____

(4) Number of years as a contractor in construction work of this type: _____

(5) Names and titles of all officers of contractor's firm:

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

(6) Name of person who inspected site of proposed work for your firm:

Name: _____ Date of Inspection: _____

NOTE - THE FOLLOWING INFORMATION SHALL BE PROVIDED AS SEPARATE ATTACHMENTS AND SHALL BE SUBMITTED WITH BID:

(7) Individual experience resume of person who will be designated chief construction superintendent.

(8) The bidder must demonstrate the ability to perform at least seventy-five (75%) percent of the work without subcontracting. Information on the bidder's ability to staff the project, both in the field and in his office, and the bidder's ability to directly supply major construction equipment to the project shall be submitted for review with the bidder's proposal.

AGREEMENT

THIS AGREEMENT, made and entered into this __ day of_____, 20___, by and between SCSA#3, hereinafter called "Owner", and _____ hereinafter called "Contractor".

WITNESSETH, that the parties hereto do mutually agree as follows:

ARTICLE I: For and in consideration of the payments and agreements hereinafter mentioned to be made and performed by said Owner, said Contractor agrees with said Owner to perform and complete in a workmanlike manner all work required under the bidding schedule(s) of said Owner's Specifications entitled SCSA#3 – CULINARY WATER 2026 PROJECT in accordance with the Specifications and drawings therefore, to furnish at his own expense all labor, materials, equipment, tools, and services necessary therefore, except such materials, equipment, and services as may be stipulated in said Specifications to be furnished by said Owner, and to do everything required by this Agreement and said Specifications and drawings.

ARTICLE II: For furnishing all said labor, materials, equipment, tools, and services, furnishing and removing all plant, temporary structures, tools, and equipment, and doing everything required by this Agreement and the said Specifications and drawings; also for all loss and damage arising out of the nature of the work aforesaid, or from the action of the elements, or from any unforeseen difficulties which may arise during the prosecution of the work until its acceptance by said Owner, and for all risks of every description connected with the work, also for all expenses resulting from the suspension or discontinuance of work, except as in the said Specifications are expressly stipulated to be borne by said Owner; and for completing the work in accordance with the requirements of said Specifications and drawings, said Owner will pay and said Contractor shall receive, in full compensation therefor, the price(s) named in the above-mentioned proposal(s) dated _____,
Alternative _____, Schedule(s) _____.

ARTICLE III: The Owner hereby contracts with said Contractor to perform the work according to the terms of this Agreement for the above-mentioned price(s), and agrees to pay the same at the time, in the manner, and upon the conditions stipulated in the said Specifications; and the said parties for themselves, their heirs, executors, administrators, successors, and assignees, do hereby agree to the full performance of the covenants herein contained.

ARTICLE IV: The Notice Inviting Bids, Information for Bidders, Instructions to Bidders, Proposal, Performance and other bonds, Notice of Award, Notice to Proceed, Information Required of Bidder, Information for Preparing Proposal, General Conditions, Specifications, drawings, and all addenda issued by the Owner with respect to the foregoing prior to the opening of bids, are hereby incorporated in and made part of this agreement.

ARTICLE V: The parties herein each agree that should they default in any of the covenants or agreements contained herein, the defaulting party shall pay all costs and expenses, including a reasonable attorney's fee which may arise or accrue from enforcing this agreement, or in pursuing any remedy provided hereunder or by the statutes or other laws of the State of Utah, whether such costs and expenses are incurred with or without suit or before or after judgement period.

ARTICLE VI: The Owner and Contractor agree that should any dispute, which may arise between them with respect to the performance or completion of the work or the payments due from the Owner to the Contractor, all parties will use the dispute resolution procedure described below:

Mediation

The parties agree to engage in mediation as a first step toward the resolution of issues which may arise between the Owner and the Contractor which the parties are unable to resolve between themselves after discussions between the Owner, Engineer, and the Contractor. The parties agree to participate in mediation up to a period of six (6) hours for each specific topic of disagreement and to share equally the cost of such mediation. Each party may or may not be represented by counsel at the election of each party and the mediator shall be selected by the following procedure.

1. The owner shall prepare a list of five (5) proposed mediators and shall submit the proposed mediator list to the Contractor. If the Contractor finds one (1) of the five (5) nominated mediators acceptable, that mediator shall be the mediator conducting the mediation between the parties. If none of the five (5) individuals are acceptable to the Contractor, the Contractor shall prepare a list of five (5) proposed mediators to the owner. If the owner finds one (1) of the proposed mediators acceptable, that individual shall be the mediator conducting the mediation between the parties.

The parties shall cooperate in good faith to select a mediator and may engage in up to four (4) rounds of nomination of mediators to select a mediator. In the event the parties are unable to select a mediator, the parties shall proceed directly to arbitration.

Arbitration

The parties shall submit the matter to formal bidding arbitration under the Construction Industry Rules of the American Arbitration Association. The arbitration shall be conducted by a panel of three (3) arbitrators who shall be selected as provided by the Construction Industry Rules of the American Arbitration Association; the decision of the arbitrators shall be binding.

IN WITNESS WHEREOF, the parties hereto have caused this Contract to be executed the day and year first above written.

OWNER
SCSA#3

Attest: _____ By: _____
Signature Signature

_____ _____
Title Title

(Seal)

CONTRACTOR

_____

Attest: _____ By: _____
Signature Signature

_____ _____
Title Title

(Seal)

LABOR AND MATERIAL BOND

KNOW ALL MEN BY THESE PRESENTS,

That _____ as Contractor, and _____ as Surety, are held firmly bound unto SCSA#3 hereinafter called "Owner", in the sum of

_____ dollars,

for the payment of which sum will and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, said Contractor has been awarded and is about to enter into the annexed contract with said Owner to perform all work required under the bidding schedule of the Owner's Specifications entitled SCSA#3 – CULINARY WATER 2026.

NOW THEREFORE, if said Contractor, or subcontractor, fails to pay for any materials, equipment, or other supplies, or for rental of same, used in connection with the performance of work contracted to be done, or for amounts due under applicable State law for any work or labor thereon, said Surety will pay for the same in an amount not exceeding the sum specified above, and, in the event suit is brought upon this bond, a reasonable attorney's fee to be fixed by the court. This bond shall inure to the benefit of any persons, companies, or corporations entitled to file claims under applicable State law.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Title 14, Chapter 1, Utah Code Annotated 1953, as amended, and all liabilities on this bond shall be determined in accordance with said provisions to the extent as if it was copies at length herein.

PROVIDED, that any alterations in the work to be done or the materials to be furnished, or changes in the time of completion, which may be made pursuant to the terms of said contract, shall not in any way release said Contractor or said Surety thereunder, nor shall any extensions of time granted under the provisions of said contract release either said Contractor or said Surety, and notice of such alterations or extensions of the contract is hereby waived by said Surety.

SIGNED AND SEALED, this ___ day of _____, 20__.

(SEAL)	(SEAL)
_____	_____
(Contractor)	(Surety)
By: _____	By: _____
(Signature)	(Signature)

(SEAL AND NOTARIAL ACKNOWLEDGMENT OF SURETY)

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS,

That as Contractor, and

as Surety, are held firmly bound unto SCSA#3 hereinafter called "Owner", in the sum of

_____dollars, for the payment of which sum will and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, said Contractor has been awarded and is about to enter into the annexed contract with said Owner to perform all work required under the bidding schedule of the Owner's Specifications entitled SCSA#3 – CULINARY WATER 2026 PROJECT.

NOW THEREFORE, if said Contractor shall perform all the requirements of said contract required to be performed on his part, at the times and in the manner specified therein, then this obligation shall be null and void, otherwise it shall remain in force and effect.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Title 14, Chapter 1, Utah Code Annotated 1953, as amended, and all liabilities on this bond shall be determined in accordance with said provisions to the extent as if it was copies at length herein.

PROVIDED, that any alterations in the work to be done or the materials to be furnished, or changes in the time of completion, which may be made pursuant to the terms of said contract, shall not in any way release said Contractor or said Surety thereunder, nor shall any extensions of time granted under the provisions of said contract release either said Contractor or said Surety, and notice of such alterations or extensions of the contract is hereby waived by said Surety.

SIGNED AND SEALED, this ____ day of _____, 20__.

(SEAL)	(SEAL)
_____	_____
(Contractor)	(Surety)
By: _____	By: _____
(Signature)	(Signature)

(SEAL AND NOTARIAL ACKNOWLEDGMENT OF SURETY)

NOTICE OF AWARD

SCSA#3
CULINARY WATER 2026 PROJECT

TO: _____

_____

_____

PROJECT DESCRIPTION SCSA#3 - CULINARY WATER 2026 PROJECT.

SCSA#3 has considered the BID submitted to you for the above described WORK in response to its Notice Inviting Bids and Instructions to Bidders.
You are hereby notified that your BID has been accepted for items in the amount of
$ _____ (Dollars).
You are required by the Instructions to Bidders to execute the Contract and furnish the required Contractor's Performance Bond and Payment Bond and certificates of insurance within ten calendar days from the date of this Notice to you.
If you fail to execute said Contract and to furnish said bonds within ten days from the date of this Notice, said Owner will be entitled to consider all your rights arising out of the Owner's acceptance of your BID as abandoned and as a forfeiture of your Bid Bond. The Owner will be entitled to such other rights as may be granted by law.
You are required to return an acknowledged copy of NOTICE OF AWARD to the Owner.

Dated this___ day of _____, 20___.

OWNER

By: _____

Title: _____

ACCEPTANCE OF NOTICE OF AWARD

By: _____

Title: _____

Date: _____

NOTICE TO PROCEED

SCSA#3
CULINARY WATER 2026 PROJECT

TO: _____ DATE: _____

_____ PROJECT: _____

_____ _____

You are hereby notified to commence work in accordance with the Contract dated _____, 20 ___, on or before _____, 20 ___, and you are to complete the work within _____ consecutive calendar days thereafter. The date of completion is therefore _____, 20 ___.

By: _____

Title: _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE to
PROCEED is hereby acknowledged by
_____,
this the _____ day of _____ 20 ___ .

By: _____

Title: _____

CONTRACTOR'S APPLICATION FOR PAYMENT

To: _____

From: _____

_____

Project: SCSA#3 - CULINARY WATER 2026 PROJECT
Payment Request No.: _____
Period: _____through _____

1. Contract Time	_____	Calendar Days
2. Time Elapsed	_____	Calendar Days
3. Remainder	_____	Calendar Days
4. Work Completed	_____	Percent
5. Time Elapsed Percent	_____	Percent

6. Original Contract Amount		$_____
7. Approved Change Order No's	_____	$_____
8. Adjusted Contract Amount		$_____

	Previous Period	This Period
9. Total Value to Date	9a_____	9b _____
10. Total Retainage to Date	10a_____	10b_____
11. Value This Request	11a_____	11b_____
12. Retainage This Request	12a_____	12b_____
13. Reduction of Retainage	13a_____	13b_____

14. NET PAYMENT AMOUNT TO CONTRACTOR _____

We certify the above is a true statement of work done.

CONTRACTOR - _____

BY: _____

TITLE: _____

DATE: _____

ENGINEER – Rimrock Engineering and Development

BY: _____

TITLE: _____

DATE: _____

OWNER -SCSA#3

BY: _____

TITLE: _____

DATE: _____

(Instructions on Next Page)

PAYMENT REQUEST INSTRUCTIONS

ITEM

2. Elapsed Calendar Days from Date of Notice to Proceed.

3. Item 1 Minus Item 2

4. Divide Item 9b by Item 8 and Multiply by 100

5. Divide Item 2 by Item 1 and Multiply by 100

9a. Item 9b from Previous Payment Request

10a. Item 10b from Previous Payment Request

11a. Item 11b from Previous Payment Request

12a. Item 12b from Previous Payment Request

13a. Item 13b from Previous Payment Request

9b. Total Value of Work Completed to Date of this Request (Attach Payment Breakdown).

10b. 10% of Item 9b Unless Percent Reduction is Allowed by Owner.

11b. Item 9b Minus Item 9a.

12b. Item 10b Minus Item 10a.

13b. Amount Authorized by Owner.

14. Item 11b Minus Item 12b Plus Item 13b.

CHANGE ORDER

ORDER NO. _____

DATE _____

CONTRACT FOR: SCSA#3 - CULINARY WATER 2026 PROJECT

OWNER: SCSA#3

TO: _____
(Contractor)

You are hereby requested to comply with the following changes from the Contract Documents, Plans and Specifications:

Description of Changes (Supplemental Plans & Specifications Attached)	Item	Decrease Contract Price	Increase Contract Price

JUSTIFICATION: _____

The amount of the Contract Price will be (____) by the sum of: ($_____).

The Contract Price including this and previous Change Orders will be:

_____ ($_____).

This document will become a modification to the Contract and all provision will apply hereto.

Requested _____ _____
(Contractor) (Date)

Recommended _____ _____
(Engineer) (Date)

Approved _____ _____
(Owner) (Date)

AFFIDAVIT OF PAYMENT

SCSA#3

To All Whom it May Concern:

WHEREAS, the undersigned Contractor has furnished labor and materials under a contract dated for the project named SCSA#3 - CULINARY WATER 2026 PROJECT of which SCSA#3 is the Owner.

NOW, THEREFORE, this _____ day of _____, 20 ___, the undersigned Contractor hereby certifies that, except as listed below, he has paid in full or has otherwise satisfied all obligations for all materials and equipment furnished, for all work, labor, and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Contract referenced above for which the Owner or his property might in any way be held responsible.

EXCEPTIONS: (If none, write "none". If required by the Owner, the Contractor shall furnish bond satisfactory to the Owner for each Exception.)

_____

Contractor (Name of sole ownership, corporation or partnership)

Affix corporate
seal here

_____

(Signature of Authorized Representative)

Title: _____

CONSENT OF SURETY FOR FINAL PAYMENT

SCSA#3

Project Name: SCSA#3 - CULINARY WATER 2026 PROJECT

Location: SCSA#3 – Summit County, Utah

Type of Contract: Unit Price

Amount of Contract _____

In accordance with the provisions of the above-named contract between the Owner and the Contractor, the following named surety:

_____

_____

_____

on the Payment Bond of the following named Contractor:

_____

_____

_____

hereby approves of final payment to the Contractor, and further agrees that said final payment to the Contractor shall not relieve the Surety Company named herein of any of its obligations to the following named Owner (as set forth in said Surety Company's bond):

_____

_____

_____

IN WITNESS WHEREOF, the Surety Company has hereunto set its hand and seal this _____ day of _____, 20 ___.

_____

(Name of Surety Company)

_____

(Signature of Authorized Representative)

_____

(Name of Authorized Representative)

Title: _____

DIVISION 1 – GENERAL REQUIREMENTS

Section	Title
011000	Summary of Work
013300	Contractor Submittals
014000	Quality Requirements
014200	Abbreviations and Reference Standards
015000	Temporary Facilities and Controls
015050	Mobilization
015300	Protection of Existing Facilities
015600	Project Environmental Controls
016000	Materials and Equipment
016100	Product Requirements
016600	Equipment Testing and Startup
017419	Construction Waste Management and Disposal
017700	Closeout Procedures
017823	Operation and Maintenance Data
017839	Project Record Documents

DIVISION 3 – CONCRETE

Section	Title
031000	Concrete Forming
032000	Concrete Reinforcing
032900	Joints in Concrete
033000	Cast-In-Place Concrete
034100	Precast Structural Concrete
036000	Grouting Mortar

DIVISION 5 – METALS

Section	Title
055200	Miscellaneous Metalwork

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

Section	Title
079200	Sealants, Caulking and Below Grade Waterproofing

DIVISION 9 – FINISHES

Section	Title
098000	Protective Coatings
099000	Painting

DIVISION 22 – PLUMBING

Section	Title
220050	General Pipes and Fittings
220523	Valves

221030 Ductile Iron Pipe
221040 PVC Water Pipe
221066 Pipeline Testing

DIVISION 31 – EARTHWORK

Section	Title
311000	Site Clearing
312000	Earth Moving
312219	Finish Grading
312319	Dewatering
315000	Excavation Support and Protection

DIVISION 32 – EXTERIOR IMPROVEMENTS

Section	Title
320105	Restoration of Improvements

DIVISION 33 – UTILITIES

Section	Title
330112	Protecting and Relocation of Utilities
331214	Main Connections
331305	Pipeline Disinfection
331612	Hydrostatic Leakage Testing of Concrete Storage Tanks
331613	Tank Disinfection

DIVISION 1 – GENERAL REQUIREMENTS

SECTION 011000 – SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY

- Section Includes:

    1. PROJECT INFORMATION
    2. WORK COVERED BY CONTRACT DOCUMENTS
    3. ACCESS TO SITE
    4. WORK RESTRICTIONS
    5. SPECIFICATION AND DRAWING CONVENTIONS
    6. SCHEDULE
    7. UTAH OCCUPATIONAL SAFETY AND HEALTH DIVISION
    8. PERMITS & INSPECTIONS
    9. WATER DISINFECTION, SAMPLING & TESTING
    10. PUBLIC HEALTH
    11. QUALITY ASSURANCE / QUALITY CONTROL
    12. CONSTRUCTION STAKING
    13. CONSTRUCTION WATER
    14. CONSTRUCTION TRAFFIC CONTROL
    15. WARRANTY PERIOD

1.2 PROJECT INFORMATION

- Project Identification: SCSA#3 Culinary Water 2026 Project

    1. Project Location:

        a. The work area is within Summit County Service Area No. 3 boundary located within Summit County. The location is north of the intersection of I-80 and US-40 HWY.
        b. 750,000 Gallon Tank location coordinates: 40.744661°N 111.480554°W

- Owner: Summit County Service Area No.3
    1. Board Chair – Derek Price

- Engineer: Rimrock Engineering and Development, LLC
    1. Joseph N. Santos PE/SE
    2. 801-420-4515
    3. jsantos@re-n-d.com

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- The following list has been furnished for the convenience of the Contractor and shall not be considered as representing all Work required in the Contract Documents. Contractor shall not take advantage of any errors or omissions in this listing and shall report any discrepancies or questionable items to the Engineer for clarification. The Work of Project is defined by the Contract Documents

and consists of construction and installation of the following:

1. Mobilization and demobilization.

2. Crescent Site
   a. Earth work as required per drawings including access road, retaining block wall, erosion control and revegetation.
   b. Construct 750,00 Gallon Cast-in-Place Tank No.1 Structure including but not limited to concrete and reinforcing steel.
   c. Furnish and install tank supply, discharge, overflow and drain piping systems.
   d. Concrete Valve Vault with valves and piping.
   e. Concrete discharge structure.
   f. Disinfection and hydrostatic testing as required per AWWA standards.

3. Whileaway, Greenfield and Beehive Waterlines:
   a. Excavation, asphalt removal, trenching Earth work as required per drawings including erosion control and revegetation.
   b. Furnish and install all piping, fittings, backfill and surface restoration associated with waterline installation and connections.
   c. Furnish and install all valving, fittings and structures for combination air/release stations as indicated on the drawings.
   d. Furnish and install all piping, fittings, valves, pipe supports, for Beehive PRV Station as indicated on the drawings.
   e. Disinfection and hydrostatic testing as required per AWWA standards.

4. All other appurtenant items in accordance with the drawings and specifications.

1.4 ACCESS TO SITE

- Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

  1. Driveways, Walkways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

1.5 WORK RESTRICTIONS

- Work Restrictions, General: Comply with restrictions on construction operations.

  1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

- On-Site Work Hours: Limit work to normal business working hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated and/or approved by the Owner.

- Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

  1. Notify Owner not less than **three (3) business days** in advance of proposed utility

interruptions.

- Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.

    1. Notify Owner not less than **three (3) business days** in advance of proposed disruptive operations.

- Controlled Substances: Use of alcohol products on Project site is not permitted.

1.6 SPECIFICATION AND DRAWING CONVENTIONS

- Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations.

    These conventions are as follows:

    1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
    2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

- Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

- Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

    1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.

    2. Abbreviations: Materials and products are identified by abbreviations and scheduled on Drawings.

    3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

1.7 SCHEDULE

- The Contractor is required to submit a construction schedule at the pre-construction meeting.

- The Contractor is required to coordinate with Project Engineer and SCSA#3 personnel throughout construction.

1.8 UTAH OCCUPATIONAL SAFETY AND HEALTH DIVISION

- The Contractor shall be responsible to comply with applicable standards of the Utah Occupational Safety and Health Division (UOSH). The Contractor shall be responsible for identifying and adhering to all

applicable OSHA requirements related to the Work.

1.9 PERMITS & INSPECTIONS

- It is the Contractor's responsibility, at their expense, to obtain stormwater discharge permit coverage under the UPDES by submitting and maintaining a Notice of Intent (NOI) throughout construction.

- It is the Contractor's responsibility, at their expense, to obtain following:
    1. Summit County Building Permit.
    2. Summit County Service Area No.3 Construction Permit (Fee to be waived).
    3. Summit County Service Area No.3 Excavation/Grading/Encroachment Permit (Fee to be waived).
    4. Summit County Service Area No.3 Water Meter Application and Deposit (Deposit will not be waived)

- The Contractor is responsible to arrange for inspections and coordinate with the governing authorities. Contractor must submit copies of daily inspection/ construction reports to the Owner and Engineer.

- The Contractor shall perform construction materials testing at the minimum frequencies using methods described in the PROJECT MANUAL and PROJECT DRAWINGS.

1.10 WATER DISINFECTION, SAMPLING & TESTING

- The Contractor will be responsible to follow all applicable rules and regulations, especially AWWA 652-11 prior to the tank, valving and piping to be connected to the system and placed into service.

- Dispose of chlorinated water in accordance with UAC R317. Dechlorinate prior to discharge and coordinate with SCSA#3.

- The Contractor will be responsible to follow all applicable rules and regulations, especially for water sampling and testing.

1.11 PUBLIC HEALTH

- To ensure public health the Contractor shall be responsible to ensure that:
    1. Only NSF/ANSI 60 – certified chemicals are allowed.
        a. Suppliers must provide proof of certification.
        b. Certifications must be current and product specific.

    2. All potable water system components are certified to NSF/ANSI 61.

1.12 QUALITY ASSURANCE / QUALITY CONTROL

- The Owner will be responsible for the QA/QC testing at the minimum frequencies listed below and/or in the PROJECT MANUAL and PROJECT DRAWINGS:
    1. Concrete: 5 test cylinders shall be taken per 50 yards of concrete placed, or at least once per day. Air entrainment and slump shall be tested at the time cylinders are taken.
    2. Soil Compaction: Soil compaction tests shall be taken at intervals not to exceed 100 linear feet of trench backfilled. Tests shall be varied throughout the compacted lifts to provide a representative sample of compaction efforts. For roadways and surface compaction tests

shall be taken at intervals not to exceed 100 linear feet and shall be taken at both shoulders and centerline of the alignment.

- The Contractor is responsible for any/all testing needed for in-house quality control or desired documentation.
- Contractor Responsibilities: Contractor will coordinate with testing firm to perform testing and the County's and Owner/Engineer's inspection services. A minimum of 48-hour notice is required.
- Any changes or deviations from the approved construction plans and specifications must be approved prior to commencing work on the change.

1.13 CONSTRUCTION STAKING

- General. The Engineer, at the Owner's expense, will establish alignment and grade data for the construction of the improvements. The Contractor shall be responsible to request in a timely manner very specific description of what staking is desired from the Owner contracted survey crew.

- The Contractor shall be responsible to:

1. Check the location, level and plumb, of every major element as the Work progresses.

2. Notify Engineer when deviations from required lines and levels exceed allowable tolerances.

3. Prior to commencement of work, the Contractor shall make every effort to identify the survey points and make provisions to protect said points from damage or removal prior to the use of those points.

4. The Contractor shall transfer line and grade from the stakes or marks referred to above, to the work, and shall be responsible for the accuracy of the measurements from the stakes or marks to the work.

5. The Contractor shall be responsible for the protection of all control stakes established by the Engineer. The Engineer shall be reimbursed for re-establishment of stakes or bench marks that have been disturbed or destroyed for any reason and the extra cost shall be paid by Contractor.

1.14 CONSTRUCTION WATER

- The Owner will provide water for project construction through existing fire hydrants at no charge however, the Contractor will be required to complete the Hydrant Meter application and pay the deposit.

1.15 CONSTRUCTION TRAFFIC CONTROL

- The Contractor shall provide a traffic control plan (as needed) and present it at the pre-construction conference. Traffic control plan is subject to approval by SCSA#3.

1.16 WARRANTY PERIOD

- The Contractor shall warranty the construction for one-year after final acceptance. Prior to closing the warranty period, a warranty period walk through will be held with the County and Contractor and a warranty punch list will be generated. Upon the Contractor completing to SCSA#3's acceptance the project will be finalized and accepted by the SCSA#3.

END OF SECTION 011000

SECTION 013300 – CONTRACTOR SUBMITTALS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Requirements:
   1. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
   2. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action.

B. Informational Submittals: Written and graphic information and physical samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with requirements.

1.3 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Engineer and additional time for handling and reviewing submittals required by those corrections.

B. Construction Schedule: Within fourteen (14) days after the date of Notice to Proceed, the Contractor shall submit a construction schedule providing the starting and completion dates of the various stages of the Work. The Contractor shall be prepared to discuss its construction schedule at the pre-construction conference.

C. Schedule of Values or lump sum price breakdown: Within fourteen (14) days after the date of Notice to Proceed, the Contractor shall submit a schedule of values or lump sum price breakdown for progress payment purposes.

1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Engineer's Digital Data Files: Electronic copies of digital data files of the Contract Drawings will be provided by Engineer for Contractor's use in preparing submittals.

1. Engineer will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings.

    a. Engineer makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
    b. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Engineer.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

    a. Engineer and the Contractor reserve the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow fifteen (15) days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow fifteen (15) days for review of each resubmittal.

D. Paper Submittals: Place a permanent label or title block on each submittal item for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Include the following information for processing and recording action taken:

    a. Project name.
    b. Date.
    c. Name of Engineer.
    d. Name of Construction Manager.
    e. Name of Contractor.
    f. Name of subcontractor.
    g. Name of supplier.
    h. Name of manufacturer.
    i. Submittal number or other unique identifier, including revision identifier.

        1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).

j. Number and title of appropriate Specification Section.
k. Drawing number and detail references, as appropriate.
l. Location(s) where product is to be installed, as appropriate.
m. Other necessary identification.

3. Paper Copies: Unless additional copies are required for final submittal, and unless Engineer observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.

a. Submit four (4) copies of submittal to the Resident Engineer for review.

4. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Engineer will return without review submittals received from sources other than Contractor.

a. Transmittal Form for Paper Submittals: Use facsimile of sample form included in Project Manual.
b. Transmittal Form for Paper Submittals: Provide locations on form for the following information:

1) Project name.
2) Date.
3) Destination (To:).
4) Source (From:).
5) Name and address of Engineer.
6) Name of Construction Manager.
7) Name of Contractor.
8) Name of firm or entity that prepared submittal.
9) Names of subcontractor, manufacturer, and supplier.
10) Category and type of submittal.
11) Submittal purpose and description.
12) Specification Section number and title.
13) Specification paragraph number or drawing designation and generic name for each of multiple items.
14) Drawing number and detail references, as appropriate.
15) Indication of full or partial submittal.
16) Transmittal number.
17) Submittal and transmittal distribution record.
18) Remarks.
19) Signature of transmitter.

E. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.

a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point.

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Engineer.

4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Owner**,** containing the following information:

    a. Project name.
    b. Date.
    c. Name and address of Engineer.
    d. Name of Construction Manager.
    e. Name of Contractor.
    f. Name of firm or entity that prepared submittal.
    g. Names of subcontractor, manufacturer, and supplier.
    h. Category and type of submittal.
    i. Submittal purpose and description.
    j. Specification Section number and title.
    k. Specification paragraph number or drawing designation and generic name for each of multiple items.
    l. Drawing number and detail references, as appropriate.
    m. Location(s) where product is to be installed, as appropriate.
    n. Related physical samples submitted directly.
    o. Indication of full or partial submittal.
    p. Transmittal number.
    q. Submittal and transmittal distribution record.
    r. Other necessary identification.
    s. Remarks.

5. Metadata: Include the following information as keywords in the electronic submittal file metadata:

    a. Project name.
    b. Number and title of appropriate Specification Section.
    c. Manufacturer name.
    d. Product name.

F. Options: Identify options requiring selection by Engineer or Owner.

G. Deviations: Identify deviations from the Contract Documents on submittals.

H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.

3. Resubmit submittals until they are marked with approval notation from Engineer's action stamp.

I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

J. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Engineer's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements:

1. Action Submittals: Submit four (4) paper copies of each submittal unless otherwise indicated. Engineer will return three (3) copies.
2. Informational Submittals: Submit two paper copies of each submittal unless otherwise indicated. Engineer will not return copies.
3. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

    a. Provide a digital signature with digital certificate on electronically-submitted certificates and certifications where indicated.
    b. Provide a notarized statement on original paper copy certificates and certifications where indicated.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.
    h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

a. Wiring diagrams showing factory-installed wiring.
b. Printed performance curves.
c. Operational range diagrams.
d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before or concurrent with Samples.
6. Submit Product Data in the following format:

a. Four (4) paper copies of Product Data unless otherwise indicated. Engineer will return three (3) copies.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

a. Identification of products.
b. Schedules.
c. Compliance with specified standards.
d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
3. Submit Shop Drawings in the following format:

a. Two opaque (bond) copies of each submittal. Engineer will return one copy.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:

a. Generic description of Sample.
b. Product name and name of manufacturer.
c. Sample source.
d. Number and title of applicable Specification Section.

3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

a. Number of Samples: Submit two (2) full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Engineer will return submittal with options selected.

6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

a. Number of Samples: Submit two (2) sets of Samples. Engineer will retain one (1) Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.

1) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Submit product schedule in the following format:

a. Four (4) paper copies of product schedule or list unless otherwise indicated. Engineer will return three (3) copies.

F. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 014000 "Quality Requirements."

G. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 017700 "Closeout Procedures."

H. Maintenance Data: Comply with requirements specified in Section 017823 "Operation and Maintenance Data."

I. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of engineers and owners, and other information specified.

J. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

K. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

L. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

M. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

N. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

O. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

P. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

Q. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.

R. Schedule of Tests and Inspections: Comply with requirements specified in Section 014000 "Quality Requirements."

S. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

T. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

U. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

V. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads.

Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Engineer.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit three (3) paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.

B. Project Closeout and Maintenance Material Submittals: See requirements in Section 017700 "Closeout Procedures."

C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents. In the case of shop drawings, each sheet shall be so dated, signed and certified.

3.2 ENGINEER'S ACTION

A. General: Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Engineer will review each submittal, make marks to indicate corrections or revisions required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action, as follows:

1. “NO EXCEPTIONS TAKEN” or “EXCEPTIONS AS NOTED” will require no formal revision and resubmission.

2. “REVISE AND RESUBMIT” or “REJECTED” will require the Contractor to revise said submittal and shall resubmit the required number of copies of said revised submittal to the Engineer.

C. Informational Submittals: Engineer will review each submittal and will not return it, or will return it if it does not comply with requirements. Engineer will forward each submittal to appropriate party.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

F. Fabrication of an item shall commence only after the Engineer has reviewed the submittal and returned copies to the Contractor marked either “NO EXCEPTIONS TAKEN” or “EXCEPTIONS AS NOTED”. Corrections indicated on submittals shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as the basis of claims for extra work.

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
2. Requirements for Contractor to provide quality-assurance and -control services required by Engineer, Owner, Construction Manager, or authorities having jurisdiction are not limited by provisions of this Section.
3. Specific test and inspection requirements are not specified in this Section.

1.2 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Engineer or Construction Manager.

C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

1. Laboratory Mockups: Full-size physical assemblies constructed at testing facility to verify performance characteristics.

D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five (5) previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.3 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Engineer for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Engineer for a decision before proceeding.

1.4 INFORMATIONAL SUBMITTALS

A. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:

1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Engineer.

2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Engineer.

B. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

1.5 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Manufacturer's Field Reports: Prepare written information documenting tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
5. Other required items indicated in individual Specification Sections.

C. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.6 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

H. Manufacturer's Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:

a. Provide test specimens representative of proposed products and construction.
b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
c. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.

d. When testing is complete, remove test specimens, assemblies, and mockups, and laboratory mockups; do not reuse products on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Engineer, through Construction Manager, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Engineer or Construction Manager.
2. Notify Engineer and Construction Manager seven (7) days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Engineer's and Construction Manager's approval of mockups before starting work, fabrication, or construction.

a. Allow seven (7) days for initial review and each re-review of each mockup.

5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Demolish and remove mockups when directed unless otherwise indicated.

K. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Specification Sections.

1.7 QUALITY CONTROL

A. Owner Responsibilities: The Owner will be responsible for testing and inspections.

1. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.

2. Contractor Responsibilities: Ensuring that the correct testing is scheduled with the Owner selected testing and inspection form and a minimum of 24-hour notice is mandatory with 48-hour notice requested. Contractor may perform additional quality-control and be responsible for the said testing.

3. Engage a qualified testing agency to perform these quality-control services.
4. Retain first subparagraph below to assure validity of agencies' reports.
5. Notify testing agencies at least twenty-four (24) hours in advance of time when work that requires testing or inspecting will be performed with 48-hour notice being preferred.
6. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.

B. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

C. Testing Agency Responsibilities: Cooperate with Engineer, Construction Manager, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Engineer, Construction Manager, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

D. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

E. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.8 SPECIAL TESTS AND INSPECTIONS

A. The Contractor shall be responsible to be aware of all special inspections needed on this project and be responsible to schedule the inspections in a timely and professional manner with the Owner selected and engaged Special Inspector(s). The Owner will be responsible for engaging a qualified special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Contractor, as indicated in Statement of Special Inspections attached to this Section, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
2. Notifying Engineer, Construction Manager, and Owner promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Engineer, through Construction Manager, with copy to Owner and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Scheduling and Maintaining a Log: Prepare a schedule for when special tests and inspections are to occur and schedule with assigned inspecting firm in a timely and professional manner. 48-hour notice is a minimum.

B. Test and Inspection Log: A log should be maintained that will include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Engineer.
4. Identification of testing agency or special inspector conducting test or inspection.

C. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Engineer's and Construction Manager's reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 014200 – ABBREVIATIONS AND REFERENCE STANDARDS

PART 1 - GENERAL

1.1 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Engineer's action on Contractor's submittals, applications, and requests, "approved" is limited to Engineer's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Engineer. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.2 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

D. All work specified herein shall conform to or exceed the requirements of the referenced specifications, codes and standards to the extent that the provisions of such documents are not in conflict with the requirements of these Specifications.

E. References herein to "Building Code" or IBC shall mean the International Building Code of the International Conference of Building Officials (ICBO). The latest edition of the code, as of the date of award, as approved and adopted by the agency having jurisdiction, including all addenda, modifications, amendments or other lawful changes thereto, shall apply to the Work.

F. 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 for clarification and directions prior to ordering or providing any materials or labor. The Contractor shall bid the most stringent requirements.

G. 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 wherever references to "Standard Specifications" are made, the provisions therein for measurement and payment shall not apply.

H. References herein to "OSHA Regulations for Construction" shall mean Title 29, Part 1926, Construction Safety and Health Regulations, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

I. 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.

J. References in the Contract Documents to "Standard Specifications" shall mean the "Manual of Standard Specifications as Published by the American Public Works Association, Nevada Chapter" including all current supplements, addenda and revisions thereof.

1.3 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."

B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.

AA	Aluminum Association
AAMA	American Architectural Manufacturers Association
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute (Formerly: ACI International)
ACPA	American Concrete Pipe Association
AGA	American Gas Association
AGC	Associated General Contractors
AHRI	Air-Conditioning, Heating, and Refrigeration Institute (The)
AI	Asphalt Institute
AIA	American Institute of Architects (The)
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Movement and Control Association International, Inc.
ANSI	American National Standards Institute
APA	APA - The Engineered Wood Association
APA	Architectural Precast Association
API	American Petroleum Institute
APWA	American Public Works Association
ASA	Acoustical Society of America
ASAE	American Society of Agriculture Engineer
ASCE	American Society of Civil Engineers
ASCE/SEI	American Society of Civil Engineers/Structural Engineering Institute (See ASCE)
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASLE	American Society of Lubricating Engineers
ASME	American Society of Mechanical Engineers
ASQC	American Society for Quality Control
ASSE	American Society of Safety Engineers (The)
ASSE	American Society of Sanitary Engineering
ASTM	American Society for Testing and Materials International
ATIS	Alliance for Telecommunications Industry Solutions
AWPA	American Wood Protection Association
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
BIA	Brick Industry Association (The)
BOCA	BOCA (Building Officials and Code Administrators International Inc.)
CDA	Copper Development Association
CGA	Compressed Gas Association
CLFMI	Chain Link Fence Manufacturers Institute
CMA	Concrete Masonry Association
CPA	Composite Panel Association
CRSI	Concrete Reinforcing Steel Institute
DASMA	Door and Access Systems Manufacturers Association
DHI	Door and Hardware Institute
ETL	Electrical Test Laboratories
GA	Gypsum Association
GANA	Glass Association of North America
HI	Hydraulic Institute
HMMA	Hollow Metal Manufacturers Association (See NAAMM)

HPVA	Hardwood Plywood & Veneer Association
ICBO	International Conference of Building Officials (See ICC)
ICC	International Code Council
ICEA	Insulated Cable Engineers Association, Inc.
ICPA	International Cast Polymer Alliance
ICRI	International Concrete Repair Institute, Inc.
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The)
IES	Illuminating Engineering Society
IPC	Institute of Printed Circuits
IPCEA	Insulated Power Cable Engineers Association
ISA	International Society of Automation
ISO	International Organization for Standardization
LPI	Lightning Protection Institute
MBMA	Metal Building Manufacturers Association
MCA	Metal Construction Association
MHIA	Material Handling Industry of America
MPI	Master Painters Institute
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc.
NAAMM	National Association of Architectural Metal Manufacturers
NACE	NACE International (National Association of Corrosion Engineers International)
NAIMA	North American Insulation Manufacturers Association
NBS	National Bureau of Standards
NCMA	National Concrete Masonry Association
NEC	National Electrical Code
NECA	National Electrical Contractors Association
NEMA	National Electrical Manufacturers Association
NFPA	NFPA (National Fire Protection Association)
NFPA	National Forest Products Association
NFRC	National Fenestration Rating Council
NHLA	National Hardwood Lumber Association
NLGI	National Lubricating Grease Institute
NRCA	National Roofing Contractors Association
NRMCA	National Ready Mixed Concrete Association
NSF	NSF International (National Sanitation Foundation International)
NSPE	National Society of Professional Engineers
NSSGA	National Stone, Sand & Gravel Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PCI	Precast/Prestressed Concrete Institute
PDI	Plumbing & Drainage Institute
SDI	Steel Door Institute
SEI/ASCE	Structural Engineering Institute/American Society of Civil Engineers (See ASCE)
SJI	Steel Joist Institute
SMA	Screen Manufacturers Association
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
SPFA	Spray Polyurethane Foam Alliance
SPRI	Single Ply Roofing Industry
SSPC	Society for Protective Coatings
SSPC	Steel Structures Painting Council
SSPWC	Standard Specifications for Public Works Construction
SWPA	Submersible Wastewater Pump Association

UBC	Uniform Building Code (See ICC)
UL	Underwriters Laboratories Inc.
WASTEC	Waste Equipment Technology Association
WCRSI	Western Concrete Reinforcing Steel Institute
WDMA	Window & Door Manufacturers Association
WRI	Wire Reinforcement Institute, Inc.
WWPA	Western Wood Products Association

C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.

COE	Army Corps of Engineers
CPSC	Consumer Product Safety Commission
DOC	Department of Commerce
DOD	Department of Defense
DOE	Department of Energy
EPA	Environmental Protection Agency
FG	Federal Government Publications
GSA	General Services Administration
HUD	Department of Housing and Urban Development
OSHA	Occupational Safety & Health Administration
SD	Department of State
TRB	Transportation Research Board
USDA	Department of Agriculture
USDJ	Department of Justice
USPS	United States Postal Service

END OF SECTION 014200

SECTION 015050 – MOBILIZATION

PART 1 - GENERAL

1.1 GENERAL

A. Mobilization shall include the obtaining of all permits; moving onto the project site(s), temporary buildings and other construction facilities; all as required for the proper performance and completion of the Work. Mobilization shall include, but not be limited to, the following principal items:

1. Moving onto the site of all Contractors' project items and equipment required for first month operations.

2. Installing temporary construction power, wiring and lighting facilities (As required).

3. Providing all on-site Contractor communication facilities.

4. Providing on-site Contractor's sanitary facilities.

5. Arranging and setting up the Contractor's work and storage yard.

6. Posting all OSHA required notices and establishment of safety programs.

7. Have Contractor's superintendent at the jobsite full time.

8. Submittal of Construction Schedule.

1.2 PAYMENT FOR MOBILIZATION

A. Measurement for payment for mobilization, bonding & permitting shall be a lump sum bid price. Mobilization, bonding and permitting shall include the cost of necessary bonding, permits and mobilization of equipment and personnel, and the removal of all equipment, trash, debris, etc. at the completion of the project. No more than 50% of mobilization, bonding and permitting shall be paid until work has commenced in earnest and will be made at the time of the first partial payment. A minimum of 25% of mobilization shall be retained until the contractor has removed all equipment, tools, debris, etc. from the site at the completion of the job.

B. The Contractor shall include a true representation of the value of mobilization in the Schedule of Values to be submitted as specified under Paragraph 14.01, Supplementary General Conditions.

END OF SECTION 015050

SECTION 015300 – PROTECTION OF EXISTING FACILITIES

PART 1 - GENERAL

1.1 GENERAL

A. The Contractor shall protect all existing utilities, piping and improvements not designated for removal and shall restore damaged or temporarily relocated utilities, piping and improvements to a condition equal to or better than they were prior to such damage or temporary relocation.

B. The Contractor shall verify the exact locations and depths of all underground piping and utilities shown and not shown and shall make exploratory excavations of all piping and utilities that may interfere with the Work. It shall be the Contractor's responsibility to ascertain the actual location of all existing utilities, piping and other improvements that will be encountered in its construction operations and to see that such utilities or other improvements are adequately protected from damage due to such operations.

C. Maintaining in Service: All pipelines, electrical, power, telephone, communication cables, gas and water mains shall remain continuously in service during all the operations under the Contract, unless other arrangements satisfactory to the Engineer are made with the Owner. Where the proper completion of the Work requires the temporary or permanent removal and/or relocation of an existing utility or other improvements the Contractor, after necessary scheduling and approval, shall remove and, without unnecessary delay, temporarily replace or relocate such utility or improvement in a manner satisfactory to the Engineer and the owner of the facility. In all cases of such temporary removal or relocation, the Work shall be accomplished by the Contractor in a manner that will restore or replace the utility or improvement to a new condition meeting the specification requirements.

D. All repairs to a damaged utility or improvement are subject to inspection and approval by an authorized representative of the improvement owner before being concealed by backfill or other work.

1.2 RIGHTS-OF-WAY

A. The Contractor shall not do any work or enter upon the rights-of-way of any oil, gas, sewer or water pipeline; any telephone or electric transmission line; any fence; or any other structure, until notified by the Engineer that the Owner has secured authority to do so. After authority has been obtained, the Contractor shall give the governing utility proper advanced notice of its intention to begin work.

1.3 RESTORATION OF PAVEMENT

A. All paved areas not designated for replacement, cut or damaged during construction shall be replaced with similar materials and of equal thickness to match the existing adjacent undisturbed areas unless otherwise noted. All sidewalks and pavements which are subject to partial removal shall be neatly saw-cut in straight lines.

1.4 UNDERGROUND UTILITIES NOT SHOWN OR INDICATED

A. If the Contractor damages existing utilities, piping or improvements that are not shown or the location of which was not made known to the Contractor prior to excavation and the damage was not due to failure of the Contractor to exercise reasonable care the Contractor shall immediately notify the Engineer. If directed by the Engineer repairs shall be made by the Contractor under the provisions for changes and extra work contained in Articles 13, 14 and 15 of the General Conditions.

1.5 NOTIFICATION BY THE CONTRACTOR:

A. Prior to any excavation in the vicinity of any existing underground facilities, including water, sewer, storm drain, gas, petroleum products, or other pipelines; all buried electric power, communications or telecommunication cables; all traffic signal and street lighting facilities; and all roadway and state highway rights-of-way, the Contractor shall notify the respective authorities representing the owners or agencies responsible for such facilities not less than three (3) working days prior to excavation so that a representative can be present during such work if they are required to do so.

PART 2 – PRODUCTS

Not Applicable

PART 3 - EXECUTION

Not Applicable

END OF SECTION 015300

SECTION 015600 – PROJECT ENVIRONMENTAL CONTROLS

PART 1 - GENERAL

1.1 DUST ABATEMENT AND RUBBISH CONTROL

A. The Contractor shall provide under the Contract all necessary measures to prevent its operation from producing dust in amounts damaging to property or causing a nuisance to Owner's plant personnel and operations or to persons living in or occupying buildings in the vicinity. The Contractor shall be responsible for damage resulting from any dust originating from its operations. The dust abatement measurers shall be continued throughout the length of the contract.

B. During the progress of the Work the Contractor shall keep the site of the Work and other areas used by it in a neat and clean condition and free from any accumulation of rubbish. The Contractor shall dispose of all rubbish and waste materials of any nature occurring at the Work site, and shall establish regular intervals of collection and disposal of such materials and waste. The Contractor shall also keep its haul roads free from dirt, rubbish and unnecessary obstructions resulting from its operations. Disposal of all rubbish and surplus materials shall be off the site of construction in accordance with local codes and ordinances governing locations and methods of disposal and in conformance with all applicable Safety Laws and Health Standards for Construction. The Owner's dumpster shall not be used by the Contractor.

1.2 SANITATION

A. The Contractor shall provide approved fixed or portable chemical toilets wherever needed for its employees. The Contractor shall establish regular intervals of collection of all sanitary and organic wastes. All wastes and refuse from sanitary facilities provided by the Contractor or organic material wastes from any other source related to the Contractor's operations shall be disposed of in a manner satisfactory to the Engineer and in accordance with all laws and regulations pertaining thereto. The Owner's toilet facilities shall not be used by the Contractor.

1.3 CHEMICALS

A. All chemicals used during project construction or furnished for project operation, whether soil sterilant, herbicide, pesticide, disinfectant, polymer, and reactant, or of other classification, shall show approval for use by either the U. S. Environmental Protection Agency or the U. S. Department of Agriculture. Use of all such chemicals and disposal of residues shall be in strict accordance with the printed instructions of the manufacturer.

1.4 CULTURAL RESOURCES

A. The Contractor's attention is directed to the National Historic Preservation Act of 1966 (16 U.S.C. 470) and 36 CFR 800 which provides for the preservation of potential historical architectural, archeological or cultural resources (hereinafter called "cultural resources"). If

potential cultural resources are discovered during subsurface excavations at the site of construction, the following procedures shall be instituted:

1. The Contractor shall immediately notify the Engineer.
2. The Engineer will issue a Field Order directing the Contractor to cease all construction operations at the location of such potential cultural resources find.
3. Such Field Order shall be effective until such time as a qualified archeologist can be called to assess the value of these potential cultural resources and make recommendations to the State Historical Society Archeologist.

B. If the archeologist determines that the potential find is a bona fide cultural resource, at the direction of the State Historical Society Archeologist, the Contractor shall suspend work at the location of the find under the provisions for changes contained in Articles 13, 14 and 15 of the General Conditions.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

Not Applicable

END OF SECTION 015600

SECTION 016000 – MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.1 QUALITY ASSURANCE

A. To the greatest extent possible for each unit of work, the Contractor shall provide products, materials or equipment from a single source.

B. Where more than one choice is available as options for Contractor's selection of a product, material or equipment, the Contractor shall select an option which is compatible with other products, materials or equipment already selected.

1.2 PRODUCT DELIVERY, STORAGE AND HANDLING

A. The Contractor shall transport, deliver, handle and store products in accordance with supplier's written recommendations and by methods and means which will prevent damage, deterioration and loss including theft. Delivery schedules shall be coordinated to minimize long-term storage of products at the Work site and overcrowding of construction spaces. The Contractor shall provide installation coordination to ensure minimum storage times for products recognized to be flammable, hazardous, or easily damaged.

B. Products shall be delivered in a dry, undamaged condition in the supplier's unopened packaging. The Engineer and Owner reserve the right to reject all damaged products, materials and equipment. Rejected products shall be immediately removed from the site of the Work.

C. Products, materials and equipment shall be stored in accordance with the manufacturer's written instructions, with seals and labels intact and legible. Motors, electrical gear, mechanical equipment with open bearings or moving parts or any product sensitive to the environment shall be stored in weather-tight enclosures with necessary temperature and humidity ranges maintained within the manufacturer’s instructions.

D. Fabricated structural components shall be stored on supports above ground and in a manner to prevent accumulation of water and warping. Products subject to deterioration from atmospheric conditions shall be covered in a manner that will provide adequate ventilation to avoid condensation.

E. Products, materials and equipment not stored in a manner that will insure the maintaining of a new condition will be rejected by the Engineer. Such rejected products, materials and equipment shall be immediately removed from the Work site.

END OF SECTION 016000

SECTION 016100 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

1.2 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, which is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.3 ACTION SUBMITTALS

A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Engineer will notify Contractor of approval or rejection of proposed comparable product request within fifteen (15) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.

a. Form of Approval: As specified in Section 013300 "Contractor Submittals."

b. Use product specified if Engineer does not issue a decision on use of a comparable product request within time allocated.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Contractor Submittals." Show compliance with requirements.

1.4 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weather tight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.

D. Fabricated structural components shall be stored on supports above ground and in a manner to prevent accumulation of water and warping. Products subject to deterioration from atmospheric conditions shall be covered in a manner that will provide adequate ventilation to avoid condensation.

E. Products, materials and equipment not stored in a manner that will insure the maintaining of a new condition will be rejected by the Engineer. Such rejected products, materials and equipment shall be immediately removed from the Work site.

1.6 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. Refer to other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Engineer will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
3. Products:

    a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
    b. Non-restricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.

4. Manufacturers:

    a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
    b. Non-restricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.

5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

C. Visual Matching Specification: Where Specifications require "match Engineer's sample", provide a product that complies with requirements and matches Engineer's sample. Engineer's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Engineer from manufacturer's full range" or similar phrase, select a product that complies with

requirements. Engineer will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: Engineer will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Engineer may return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of engineers and owners, if requested.
5. Samples, if requested.

B. Refer to Article 6.05 of Section 700 of Contract Documents – Volume I for additional information.

PART 3 - EXECUTION

Not Applicable

END OF SECTION 016000

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Disposing of nonhazardous demolition and construction waste.

1.2 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

1.3 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan within 7 days of date established for commencement of the Work.

1.4 INFORMATIONAL SUBMITTALS

A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Include the following information:

1. Material category.
2. Generation point of waste.
3. Total quantity of waste in tons.

B. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

C. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

1.5 QUALITY ASSURANCE

A. Waste Management Conference: Conduct conference at Project site.

1.6 WASTE MANAGEMENT PLAN

A. General: Develop a waste management plan according to ASTM E 1609 and requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

B. Waste Identification: Indicate anticipated types and quantities of demolition site-clearing and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.

C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.

PART 2 - PRODUCTS

2.1 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

B. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

2.2 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.

2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Burning of waste materials is permitted only at designated areas on Owner's property, provided required permits are obtained. Provide full-time monitoring for burning materials until fires are extinguished.

C. Disposal: Remove waste materials and dispose of at designated spoil areas on Owner’s property.

D. Disposal: Remove waste materials from Owner's property and legally dispose of them.

PART 3 - EXECUTION

Not Applicable

END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.
5. Repair of the Work.

B. Related Requirements:

1. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.
2. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.2 ACTION SUBMITTALS

A. Product Data: For cleaning agents.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.3 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Field Report: For pest control inspection.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.5 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 14 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Engineer. Label with manufacturer's name and model number where applicable.

    a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Engineer’s signature for receipt of submittals.

5. Submit test/adjust/balance records.
6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 14 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
6. Advise Owner of changeover in heat and other utilities.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements, including touchup painting.

10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 14 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Engineer and Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Engineer, that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.6 FINAL COMPLETION PROCEDURES

A. Preliminary Procedures: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Engineer. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written request for final inspection to determine acceptance. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.7 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order.

2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Submit list of incomplete items in the following format:

    a. MS Excel electronic file. Engineer will return annotated copy.
    b. PDF electronic file. Engineer will return annotated copy.
    c. Three paper copies unless otherwise indicated. Engineer will return two copies.

1.8 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Engineer for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

C. Provide additional copies of each warranty to include in operation and maintenance manuals.

D. Releases from all parties who are entitled to claims against the subject project, property or improvement pursuant to the provisions of law.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Sweep concrete floors broom clean in unoccupied spaces.
i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
k. Remove labels that are not permanent.
l. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
p. Leave Project clean and ready for occupancy.

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

    a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Emergency manuals.
3. Operation manuals for systems, subsystems, and equipment.
4. Product maintenance manuals.
5. Systems and equipment maintenance manuals.

1.2 CLOSEOUT SUBMITTALS

A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Engineer will comment on whether content of operations and maintenance submittals are acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operations and maintenance manuals in the following format:

1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Engineer.

    a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
    b. Enable inserted reviewer comments on draft submittals.

2. Four (4) paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. One set will be provided to the Engineer and three sets to the Owner.

C. Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Engineer will return copy with comments.

1. Correct or revise each manual to comply with Engineer's comments. Submit copies of each corrected manual within 15 days of receipt of Engineer's comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information.

B. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

C. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Construction Manager.
7. Name and contact information for Engineer.
8. Name and contact information for Commissioning Authority.
9. Names and contact information for major consultants to the Engineer that designed the systems contained in the manuals.
10. Cross-reference to related systems in other operation and maintenance manuals.

D. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

E. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

F. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily

navigated file tree. Configure electronic manual to display bookmark panel on opening file.

G. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.

1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

    a. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, subject matter of contents. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
4. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

    a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.2 EMERGENCY MANUALS

A. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

2.3 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor is delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.

7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.4 PRODUCT MAINTENANCE MANUALS

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of operation and maintenance manuals.

F. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.

B. Related Requirements:

1. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.2 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit one (1) set(s) of marked-up record prints.

B. Record Specifications: Submit one paper copy of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit one paper copy of each submittal.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised Drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Record data as soon as possible after obtaining it.
c. Record and check the markup before enclosing concealed installations.

2. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
3. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
4. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Engineer and Construction Manager. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:

1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
3. Refer instances of uncertainty to Engineer through Construction Manager for resolution.
4. Engineer will furnish Contractor one set of digital data files of the Contract Drawings for use in recording information.

C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Identification: As follows:

    a. Project name.
    b. Date.
    c. Designation "PROJECT RECORD DRAWINGS."
    d. Name of Engineer and Construction Manager.
    e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. Note related Change Orders, record Product Data, and record Drawings where applicable.

B. Format: Submit record Specifications as paper copy.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, record Specifications, and record Drawings where applicable.

B. Format: Submit record Product Data as paper copy.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as paper copy.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Engineer's and Construction Manager's reference during normal working hours.

END OF SECTION 017839

DIVISION 3 – CONCRETE

SECTION 031000 – CONCRETE FORMING

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish all materials for concrete formwork, bracing, shoring and supports and shall design and construct all forms, bracing, shoring and falsework, all in accordance with the requirements of the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Supplemental General Conditions

B. Section 013300 - Contractor Submittals

C. Section 032000 – Concrete Reinforcing

D. Section 032900 - Joints in Concrete

E. Section 033000 - Cast-In-Place Concrete

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Codes:

The Building Code, as referenced herein, shall be the latest Uniform Building Code (UBC).

B. Government Standards:

PS 1-74 U.S. Product Standard for Concrete Forms, Class I.

C. Commercial Standards:

ACI 347R Recommended Practice for Concrete Formwork.

1.04 QUALITY ASSURANCE

A. Tolerances: The variation from established lines and grades shall not exceed 1/4-inch in ten (10) feet and there shall be no offsets or visible waviness in the finished surface. All other tolerances shall be within the "Suggested Tolerances" specified in Section 3.3 and 3.4 of ACI 347.

PART 2 - PRODUCTS

2.01 GENERAL

A. Except as otherwise expressly accepted by the Engineer, all lumber brought on the job site for use as forms, shoring or bracing shall be new material. All forms shall be smooth surface forms and shall be of the following materials:

Walls	-	Steel or plywood panel
Columns	-	Steel, plywood or fiberglass
Roof and Floor Slabs	-	Plywood
All Other Work	-	Steel panels, plywood or tongue and groove lumber

2.02 FORM AND FALSEWORK MATERIALS

A. Materials for concrete forms, formwork and falsework shall conform to the following requirements:

1. Lumber: shall be Douglas Fir or Southern Pine, construction grade or better, in conformance with U.S. Product Standard PS10.

2. Plywood for concrete formwork: shall be new, waterproof, synthetic resin bonded, exterior type Douglas Fir or Southern Pine plywood manufactured especially for concrete formwork and shall conform to the requirements for PS 1 for Concrete Forms, Class I, and shall be edge sealed.

3. Form materials: shall be metal, wood, plywood or other approved material that will not adversely affect the concrete and will facilitate placement of concrete to the shape, form, line and grade shown. Metal forms shall be an approved type that will accomplish such results. Wood forms for surfaces to be painted shall be Medium Density Overlaid plywood, MDO Ext. Grade.

B. Unless otherwise shown, exterior corners in concrete members shall be provided with 3/4-inch chamfers. Re-entrant corners in concrete members shall not have fillets unless otherwise shown.

C. Forms and falsework to support roof and floor slabs shall be designed for the total dead load, plus a live load of 40 psf (minimum).

2.03 FORM TIES

A. Form ties with integral waterstops shall be provided with a plastic cone or other suitable means for forming a conical hole to ensure that the form tie may be broken off back of the face of the concrete. The maximum diameter of removable cones for rod ties, or of other removable form-tie fasteners having a circular cross-section, shall not exceed 1-inch and all such fasteners shall be such as to leave holes of regular shape for reaming.

B. Form ties for water-retaining structures shall have integral waterstops. Removable taper ties may be used when approved by the Engineer. A preformed neoprene or polyurethane tapered plug sized to seat at the center of the wall shall be inserted in the hole left by the removal of the taper tie.

PART 3 - EXECUTION

3.01 GENERAL

A. Forms to confine the concrete and shape it to the required lines shall be used wherever necessary. The Contractor shall assume full responsibility for the adequate design of all forms. Forms which are unsafe or inadequate in any respect shall promptly be removed from the Work and replaced at the Contractor's expense. A sufficient number of forms of each kind shall be provided to permit the required rate of progress to be maintained. The design and inspection of concrete forms, falsework and shoring shall comply with applicable Local, State and Federal regulations. Plumb and string lines shall be installed before concrete placement and shall be maintained during placement. Such lines shall be used by Contractor's personnel and by the Engineer and shall be in sufficient number and properly installed. During concrete placement the Contractor shall continually monitor plumb and string line form positions and immediately correct deficiencies.

B. Concrete forms shall conform to the shape, lines and dimensions of structural components as called for on the Drawings and shall be free from surface defects and sufficiently tight to prevent leakage.

3.02 FORM DESIGN

A. All forms shall be true in every respect to the required shape and size, shall conform to the established alignment and grade and shall be of sufficient strength and rigidity to maintain their position and shape under the loads and operations incident to placing and vibrating the concrete. Suitable and effective means shall be provided on all forms for holding adjacent edges and end of panels and sections tightly together and in accurate alignment so as to prevent the formation of ridges, fins, offsets or similar surface defects in the finished concrete. Plywood, 5/8-inch and greater in thickness may be fastened directly to studding if the studs are spaced close enough to prevent visible deflection marks in the concrete. The form joints shall be tight so as to prevent the loss of water, cement and fines during the placing and vibrating of the concrete. The bottom of the wall forms that rest on concrete footings or slabs shall be provided with a gasket to prevent loss of fines and paste during placement and vibration of concrete. Adequate cleanout holes shall be provided at the bottom of each lift of forms.

3.03 CONSTRUCTION

A. Vertical Surfaces: All vertical surfaces of concrete members shall be formed.

B. Construction Joints: Concrete construction joints will not be permitted at locations other than those shown or specified, except as may be acceptable to the Engineer. Pipe stubs and anchor bolts shall be set in the forms where required.

C. Form Ties:

1. Embedded Ties: Holes left by the removal of form tie cones shall be reamed with suitable toothed reamers so as to leave the surface of the holes clean and rough before

being filled with mortar as specified for "Finish of Concrete Surfaces" in Section 03300 entitled, "Cast-In-Place Concrete". Wire ties for holding forms will not be permitted. No form-tying device or part thereof, other than metal, shall be left embedded in the concrete. Ties shall not be removed in such manner as to leave a hole extending through the interior of the concrete members. The use of snap-ties which cause spalling of the concrete form stripping or tie removal will not be permitted. If steel panel forms are used, rubber grommets shall be provided where the ties pass through the form in order to prevent loss of cement paste. Where metal rods extending through the concrete are used to support or to strengthen forms, the rods shall remain embedded and shall terminate not less than 1-inch back from the formed face or faces of the concrete.

2. Removable Ties: Where taper ties are approved for use, the larger end of the taper tie shall be on the wet side of walls in water retaining structures. After the taper tie is removed, the hole shall be thoroughly cleaned and roughened for bond. A precast neoprene or polyurethane taped plug shall be located at the wall centerline. The hole shall be completely filled with non-shrink grout for water bearing and below-grade walls. The hole shall be completely filled with non-shrink grout for above-grade walls which are dry on both sides. Exposed faces of walls shall have the outer 2-inches of the exposed face filled with a cement grout which shall match the color and texture of the surrounding wall surface.

3.04 REUSE OF FORMS

A. Forms may be reused only if in good condition and only if acceptable to the Engineer. Light sanding between uses will be required wherever necessary to obtain uniform surface texture on all exposed concrete surfaces. Exposed concrete surfaces are defined as surfaces which are permanently exposed to view.

3.05 REMOVAL OF FORMS

A. Careful procedures for the removal of forms shall be strictly followed and this work shall be done with care so as to avoid injury to the concrete. No heavy loading on green concrete will be permitted. For roof slabs and above-ground floor slabs, forms shall remain in place until test cylinders attain a minimum compressive strength of seventy-five percent (75%) of the 28-day strength specified in Section 03300 entitled, "Cast-In-Place Concrete". No forms shall be disturbed or removed under an individual panel or unit before the concrete in the adjacent panel or unit has attained seventy-five percent (75%) of the specified 28-day strength and has been in place for a minimum of seven (7) days. Forms for all vertical walls and columns shall remain in place at least forty-eight (48) hours after the concrete has been placed, except for periods of cold weather when forms shall remain in place at least seventy-two (72) hours after concrete has been placed.

3.06 MAINTENANCE OF FORMS

A. Forms shall be maintained at all times in good condition, particularly as to cleanliness, strength, rigidity, tightness and smoothness of surface. After forms have been removed from a concrete placement they shall be immediately and thoroughly cleaned and repaired and surface treated before reuse. The form surfaces shall be treated with a nonstaining mineral oil or other lubricant acceptable to the Engineer. Any excess lubricant shall be satisfactorily removed before placing the concrete. Oil shall be kept off the surfaces of steel reinforcement and other metal items to be embedded in concrete.

3.07 FALSEWORK

A. The Contractor shall be responsible for the design, engineering, construction, maintenance and safety of all falsework, including staging, walkways, forms, ladders and similar appurtenances, which shall equal or exceed the applicable requirements of the provisions of the OSHA Safety and Health Standards for Construction, and the requirements specified herein.

B. All falsework shall be designed and constructed to provide the necessary rigidity and to support the required dead load plus a minimum of 40 psf live load. Falsework for the support of a superstructure shall be designed to support the loads that would be imposed if the entire superstructure were placed at one time. Falsework shall be placed upon a solid footing, safe against undermining and protected from softening. When falsework is supported on any portion of the structure which is already constructed, the load imposed by the falsework shall be spread, distributed and braced in such a way as to avoid any possibility of damage to the structure. Falsework supported off finished floor slabs shall be set in such a way to protect the finish floor surface from being scared, chipped or gauged.

END OF SECTION 031000

SECTION 032000 – CONCRETE REINFORCING

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish, fabricate and place all concrete and masonry reinforcement steel, including all the tie wires, clips, supports, chairs, spacers and other accessories, all as shown and specified in the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Supplemental General Conditions

B. Section 013300 - Contractor Submittals

C. Section 033000 - Cast-In-Place Concrete

D. Section 031000 - Concrete Formwork

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Codes:

The Building Code, as referenced herein, shall be the latest Uniform Building Code (UBC).

B. Commercial Standards:

ACI 315	Details and Detailing of Concrete Reinforcement.
ACI 318	Building Code Requirements for Reinforced Concrete.
WRI	Manual of Standard Practice for Welded Wire Fabric.
AWS D1.4-79	Structural Welding Code - Reinforcing Steel.
ASTM A 82	Specification for Steel Wire, Plain, for (Latest Edition) Concrete Reinforcement.
ASTM A 185	Specification for Welded Steel Wire Fabric (Latest Edition) for Concrete Reinforcement.
ASTM A 615	Specification for Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
CRSI	Manual of Standard Practice (Latest Edition)
CRSI	Placing Reinforcing Bars (Latest Edition)

1.04 CONTRACTOR SUBMITTALS

A. The Contractor shall furnish to the Engineer reinforcing steel placing drawings. These drawings shall show the number, grade, size, length, mark, location and bending diagrams for all reinforcing steel and related products, together with lists of bent and straight bars in accordance with the ACI Detailing Manual (latest edition) of the American Concrete Institute and the requirements specified herein and shown on the Contract Drawings. The Engineer may or may not review the placement drawings. Any review of the placement drawings by the Engineer will be limited to general compliance with the Contract Documents and will not be returned to the Contractor. Reinforcing steel placement will be checked in the field using the design drawings. Any discrepancies, errors or omissions from the requirements of the Contract Documents shall be corrected prior to placement of concrete and at the sole expense of the Contractor.

1.05 QUALITY ASSURANCE

A. If requested by the Engineer, the Contractor shall provide a certified copy of the mill test report showing physical and chemical analysis for each heat of reinforcement steel delivered.

PART 2 - PRODUCTS

2.01 REINFORCEMENT STEEL

A. Reinforcement steel for all cast-in-place reinforced concrete construction shall conform to the following requirements:

1. Bar reinforcement shall conform to the requirements of ASTM A 615 for Grade 60 Billet Steel Reinforcement with supplementary requirement S-1, or as otherwise shown.

2. Welded wire fabric reinforcement shall conform to the requirements of ASTM A 185 and the details shown. Welded wire fabric with longitudinal wire equal to or less than 4.0 size wire shall be either furnished in flat sheets or in rolls with a core diameter or not less than 10-inches. Welded wire fabric with longitudinal wires larger than 4.0 size shall be furnished in flat sheets only.

3. Spiral reinforcement shall be cold-drawn steel wire conforming to the requirements of ASTM A 82.

B. <u>Accessories</u>:

1. The Contractor shall furnish and install all accessories including necessary chairs or bolsters, concrete blocks (dobies), tie wires, supports, spacers and other devices to position reinforcement during concrete placement.

2. Wire bar supports shall be made of plain cold-drawn steel wire with pre-molded, gray-colored, plastic tips to the legs of the support. The plastic shall have a thickness of 1/8-inch or greater at points of contact with formwork and extend upward on the wire a minimum of 1/2-inch. Wire sizes and geometric dimensions shall be made in accordance with Table II of the latest edition of CRSI Manual of Standard Practice.

3. Concrete blocks (dobies), used to support and position reinforcement steel, shall have the same or higher compressive strength as specified for the concrete in which it is located. Where the concrete blocks are used on concrete surfaces exposed to view, the color and texture of the concrete blocks shall match that required for the finished surface. Wire ties shall be embedded in concrete block bar supports.

4. The wire tie shall be 16-gauge or heavier, black annealed.

2.02 MECHANICAL COUPLERS

A. Mechanical couplers shall be provided where shown and where approved by the Engineer. The couplers shall develop a tensile strength which exceeds one hundred fifty percent (150%) of the yield strength of the reinforcement bars being spliced at each splice.

PART 3 - EXECUTION

3.01 GENERAL

A. All reinforcement steel, welded wire fabric, couplers and other appurtenances shall be fabricated and placed in accordance with the requirements of the Contract Documents, including referenced specifications, codes and standards.

3.02 FABRICATION

A. Reinforcement steel shall be accurately fabricated to the dimensions and shape shown in the Contract Documents. Fabricating details shall be prepared in accordance with ACI 315 and ACI 318, except as modified by the Drawings. Bends shall conform to bend dimensions defined as standard in accordance with details in the ACI Detailing Manual and/or CRSI Manual of Standard Practice, unless otherwise shown. Bars shall be bent cold and shall not be bent or straightened in a manner that will injure the material. All hooks shall conform to bend dimensions defined as ACI Standard Hooks.

B. The Contractor shall fabricate reinforcement bars within the tolerances shown in the ACI Detailing Manual and/or CRSI Manual of Standard Practice.

C. Reinforcing bars delivered to the field shall be tagged with durable material and marked in a legible manner with waterproof markings. Tags shall show the grade, number of pieces, size and mark or length of bars.

3.03 PLACING

A. Reinforcing steel shall be accurately positioned as shown on the Contract Documents and shall be adequately supported and wired together to prevent displacement. All reinforcement steel shall be supported or spaced off the forms by concrete or metal supports which are rigid enough to prevent any displacement or the reinforcement steel. Where concrete is to be placed on the ground, supporting concrete blocks (or dobies) shall be used, in sufficient numbers to support the bars without settlement. Concrete blocks shall not be used as spacers between mats. All concrete blocks used to space reinforcement steel off vertical formed surfaces shall be tied to the steel with wire ties which are embedded in the blocks. For reinforcement including welded wire fabric over formwork, the Contractor shall furnish concrete or metal supports with plastic covered legs for bar supports.

B. Tie wires shall be bent away from the forms in order to provide the specified concrete coverage.

C. Bars additional to those shown which may be found necessary or desirable by the Contractor for the purpose of securing reinforcement in position shall be provided by the Contractor at its own expense.

D. Placing Tolerances: Unless otherwise specified, reinforcement placing tolerances shall be within the limits specified in Section 7.5 or ACI 318, except where in conflict with the requirements of Building Code.

E. Bars may need to be moved to avoid interference with other reinforcement steel, conduits or embedded items. If bars are moved more than one bar diameter, or enough to exceed the above tolerances, the resulting arrangement of bars shall be as acceptable to the Engineer. Additional bars may be necessary to prevent cracking or provide additional reinforcement in this case and shall be provided by the Contractor at its own expense.

F. Welded wire fabric placed over the ground shall be supported on wired concrete blocks (dobies) spaced not more than three (3) feet on centers in any direction. The construction practice of placing welded wire fabric on the ground and hooking into place in the freshly placed concrete shall not be used.

3.04 SPACING OF BARS

A. The clear distance between parallel bars (except in columns and between multiple layers of bars in beams) shall be not less than the nominal diameter of the bars nor less than 1-1/3 times the maximum size of the coarse aggregate, nor less than 1-inch.

B. Where reinforcement in beams or girders is placed in two (2) or more layers, the clear distance between layers shall be not less than 1-inch.

C. In columns, the clear distance between longitudinal bars shall not be less than 1-1/2 times the bar diameter, more less than 1-1/2 times the maximum size of the coarse aggregate, more less than 1-1/2 inches.

3.05 SPLICING

A. General: Reinforcement bar splices shall only be used at locations shown, unless otherwise acceptable to the Engineer.

B. Splices of Reinforcement: The length of lap for reinforcement bars, unless otherwise shown shall be in accordance with ACI 318, Section 12.15.1 for a class C splice.

C. Laps of welded wire fabric shall be in accordance with ACI 318. Adjoining sheets shall be securely tied together with No. 14 tie wire, one tie for each two (2) running feet. Wires shall be staggered and tied in such a manner that they cannot slip.

D. Bending or Straightening: Reinforcement shall not be straightened or re-bent in a manner which will injure the material. Bars with kinks or bends not shown shall not be used. All bars shall be bent cold, unless otherwise permitted by the Engineer. No bars partially embedded in concrete shall be field-bent, except as specifically permitted by the Engineer.

3.06 CLEANING AND PROTECTION

A. Reinforcing steel delivered to the jobsite shall be suitably stored off the ground and protected from oils, mud, concrete splatter and all conditions conducive to corrosion until embedded in concrete.

B. The surfaces of all reinforcement steel and other metalwork to be in contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar and other foreign substances immediately before the concrete is placed. Where there is delay in depositing concrete, reinforcement shall be re-inspected and, if necessary, re-cleaned.

END OF SECTION 032000

SECTION 032900 – JOINTS IN CONCRETE

PART 1 - GENERAL

1.1 THE REQUIREMENT

A. The Contractor shall construct all construction joints, expansion joints and control joints in concrete at the locations shown and formed in accordance with the details shown in the drawings.

B. Waterstops shall be provided in all construction and expansion joints of hydraulic or below grade structures unless specifically noted otherwise on the drawings.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Cast-In-Place Concrete. 033000

1.3 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Federal Specifications:

TSS-S-00227E(3)	Sealing Compound, elastomeric type, multi-component (for Caulking, Sealing, Glazing Buildings and Other Structures)

B. Commercial Standards:

ASTM C 920-86	Specification for Elastomeric Joint Sealants
ASTM D 624-81	Test Method for Rubber Property - Tear Resistance
ASTM D 1752-84	Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction

1.4 CONTRACTOR SUBMITTALS

A. Waterstop: Prior to production of the waterstop material required under this Contract, the Contractor shall submit for review complete product date, including qualification samples of extruded sections of each size and shape to be used. The submittal shall also include the manufacturer's certification that the water stop material meets the physical requirements as outlined under paragraph 2.01, herein.

1.5 QUALITY ASSURANCE

A. Waterstop Inspection: Waterstop installation shall be subject to rigid inspection. No waterstop shall be cast in concrete without the Engineer's inspection. Not less than twenty-four (24) hours notice shall be provided to the Engineer for scheduling such inspections.

B. Waterstop Field Samples: Prior to use of the waterstop material in the field, a sample of a fabricated mitered cross and a tee constructed of each size or shape of material to be used shall be submitted to the Engineer for review. These samples shall be fabricated so that the material and workmanship represent in all respects the fittings to be furnished under this Contract. Field samples of fabricated fittings (crosses, tees, etc.) may be selected at random by the Engineer for testing by a laboratory at the Owner's expense. When tested, they shall have a tensile strength across the joints equal to at least 600 psi.

C. All field joints in waterstops shall be subject to rigid inspection for misalignment, bubbles, inadequate bond, porosity, cracks, offsets and other defects. All defective joints shall be replaced and all weathered, damaged or otherwise faulty material shall be removed from the site and disposed of by the Contractor at its own expense.

D. Waterstops shall be stored on site where it will not be subjected to freezing temperatures or exposed to the direct rays of the sun.

E. Construction Joint Sealant: The Contractor shall prepare adhesion and cohesion test specimens as specified herein from each shipment of material received at the jobsite. Sealant shall be stored at room temperature and shall not be stored longer than seventy-five percent (75%) of the manufacturer's stated shelf life.

F. The sealant material shall show no signs of adhesive or cohesive failure when tested in accordance with the following procedure:

1. Sealant specimen shall be prepared between two concrete blocks (1-inch by 2-inch by 3-inch). Spacing between the blocks shall be 1/2-inch. Coated spacers (2-inch by 1-1/2 inch by 1/2-inch) shall be used to ensure sealant cross-sections of 1/2-inch by 2-inches with a width of 1/2-inch.

2. Sealant shall be cast and cured according to manufacturer's recommendations except that curing period shall not exceed twenty-four (24) hours.

3. Following curing period, the gap between blocks shall be widened to 1-inch. Spacers shall be used to maintain this gap for twenty-four (24) hours prior to inspection for failure.

1.6 GUARANTEE

A. The Contractor shall provide a three (3) year written guarantee of the entire joint sealant installation against faulty and/or incompatible materials and workmanship, together with a statement that it agrees to repair or replace, to the satisfaction of the Owner, at no additional cost to the Owner, any such defective areas which become evident within said three (3) year guarantee period.

PART 2 - PRODUCTS

2.1 PVC WATERSTOPS

A. General: Waterstops shall be extruded from an elastomeric plastic compound consisting of virgin polyvinylcloride and additional plasticizers and stabilizers necessary to meet or exceed the requirements and performance criteria of these Specifications and the Corps of Engineers Specifications CRD-C572. No reclaimed scrap or reprocessed material shall be used.

B. Flatstrip, Center-Bulb and Multi-Rib Waterstops: Flatstrip, center-bulb and multi-rip waterstops shall be detailed and as manufactured by: Vinylex Corp or approved equal; provided, that at no place shall the thickness of flat strip waterstops, including the center-bulb type, be less than 3/8-inch. Prefabricated joint fittings shall be used at all intersections of the ribbed-type waterstops.

C. Physical Properties: When tested in accordance with the specified test standards, the waterstop material shall meet or exceed the following requirements:

Physical Property, Sheet Material	Value	ASTM Test Method
Tensile Strength-Min (psi)	1750	D 638
Ultimate Elongation-Min (percent)	350	D 638
Low Temp. Brittleness-Max (-35 Deg F)	Pass	D 746
Stiffness in Flexure-Min (psi)	400	D 747
Accelerated Aging (CRD-C572)		
Tensile Strength-Min (psi)	1500	D 638
Ultimate Elongation-Min (percent)	300	D 638

2.2 HYDROPHILIC WATERSTOPS

A. General: Hydrophilic waterstops may be substituted for PVC waterstops upon submittal to, and approval of the Engineer. Hydrophilic waterstops may not contain bentonite.

B. Hydrophilic waterstops shall be manufactured by: Asadi Denka Kogyo K.K. distributed by Mitsubishi International Corp; SYNKO-FLEX Products, Huston Texas; Sika Corporation Santa Fe Springs, CA; or approved equal. Hydrophilic waterstops shall be installed according to the manufactures recommendations.

C. Physical Properties: When tested in accordance with the specified test standards, the waterstop material shall meet or exceed the following requirements:

Physical Property	Value	ASTM TEST Method
Hardness	30	2240
Tensile Strength	100	D412
Elongation %	500	D412
Specific Gravity	1.18	D792

PART 3 - EXECUTION

3.1 GENERAL

A. Unless otherwise shown, waterstops of the type specified herein, shall be fully continuous for the extent of the joint. The Contractor shall take suitable precautions and means to support and protect the waterstops during the progress of the work and shall repair or replace at its own expense any waterstops damaged during the progress of the work.

B. Suitable precautions shall be taken to shade and protect the exposed waterstop from direct rays of the sun during the entire exposure and until the exposed portion of the waterstop is embedded in concrete.

C. Splices in waterstops shall be performed by heat sealing the adjacent waterstop sections in accordance with the manufacturer's printed recommendations. It is essential that the splices have a tensile strength of not less than sixty percent (60%) of the unspliced materials tensile strength and the continuity of the waterstop ribs and of its tubular center axis be maintained.

3.2 INSTALLATION OF WATERSTOP

A. All joints with waterstops involving more than two (2) ends to be jointed together and all joints which involve an angle cut, alignment change or the joining of two (2) dissimilar waterstop sections shall be prefabricated by the Contractor prior to placement in the forms, allowing not less than 24-inch long strips of waterstop material beyond the joint. Upon being inspected and approved, such prefabricated waterstop joint assemblies shall be installed in the forms and the ends of the 24-inch strips shall be butt welded to the straight run portions of waterstop in place in the forms.

B. Adequate provisions must be made to support the waterstops during the progress of the work and to ensure the proper embedment in the concrete. The symmetrical halves of the waterstops shall be equally divided between the concrete pours at the joints. The center axis of the waterstops shall be coincident with the joint openings. Maximum density and imperviousness of the concrete shall be ensured by thoroughly working it in the vicinity of all joints.

C. Adequate means shall be provided to prevent waterstops from being folded over by the concrete as it is placed. Unless otherwise shown, all waterstops shall be held in place with light wire ties on 12-inch centers which shall be passed through the edge of the waterstop and tied to the curtain of reinforcing steel. In placing concrete around horizontal waterstops, with their flat face in a horizontal plane, concrete shall be carefully worked under the waterstops so as to avoid the formation of air and rock pockets.

D. Where a bentonite waterstop is called for in the Contract Documents, it shall be installed in accordance with the manufacturer's instructions. The bentonite waterstop shall be located at the center of the joint and it shall be continuous around the entire joint. Bentonite waterstop shall not be used in joints with only one curtain of reinforcing steel. Where a bentonite waterstop is used in combination with PVC waterstop, the bentonite waterstop shall overlap the PVC waterstop for a minimum of 6-inches.

3.3 JOINT CONSTRUCTION

A. Joint Location: Construction joints, expansion joints and control joints shall be provided where shown. When not shown, construction joints shall be provided at 25-foot maximum spacing for all concrete construction, unless noted otherwise. The location of all joints shall be submitted for acceptance by the Engineer.

B. Special care shall be used in preparing concrete surfaces at joints where bonding between two (2) sections of concrete is required. Unless otherwise shown, such bonding will be required at all horizontal joints in walls and wall to slab joints. Surfaces shall be prepared by sandblasting and washing for removal of laitance or any objectional material. Joints shall be kept clean until the concrete is placed. Vertical joints shall be clean and free of concrete fins, rock pockets or any objectional material.

C. Sealant grooves shall be formed as shown on the drawings and shall be protected from damage until final application of the sealant. Care shall be taken to prevent chipping of the sealant grove during removal of forms.

END OF SECTION 032900

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

B. Related Sections:

1. Section 312000 "Earth Moving" for drainage fill under slabs-on-grade.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: Before placing any concrete, the Contractor shall submit to the Engineer, for review, the complete details of all concrete mix designs which he proposes to use including proportions and gradations of all materials for each class and type of concrete specified herein. The mix designs shall be designed by a certified testing laboratory acceptable to the Engineer. The mix design submittal shall also include test results from at least one (1) trial batch of each class and type concrete. From each trial batch six (6) 6-inch X 12-inch test cylinders shall be cast in accordance with ASTM C 31. Three (3) of these cylinders shall be compression tested in accordance with ASTM C 39 at 7-days and the other three (3) at 28-days. Test results shall include full information on each cylinder as to mix and slump in accordance with ASTM 143. Three (3) drying shrinkage specimens shall also be cast and tested in accordance with ASTM C 157 on each type of structural concrete (4,000 psi) mix design. All costs for such mix design including mix design tests shall be borne by the Contractor.

C. If fly ash concrete is proposed by the concrete supplier, the Contractor shall submit to the Engineer for review the design mix for fly ash concrete together with the design mix for Portland Cement (non-fly ash) concrete as specified in this Section. The Contractor shall furnish a Certificate of Compliance signed by the supplier identifying the type of fly ash and stating that the fly ash complies with ASTM C 618 and these specifications, together with all supporting test data including a certified chemical and physical analysis report prior to the use of the fly ash the sample represents. The supporting data shall also contain test results confirming that the fly ash in combination with the cement and water to be used meets all strength requirements and is compatible with air-entraining agents and other admixtures.

D. When a water-reducing admixture is to be used, the Contractor shall furnish mix designs for concrete both with and without the admixture.

E. Delivery Tickets: Where ready-mix concrete is used, the Contractor shall provide certified weighmaster delivery tickets at the time of delivery of each load of concrete. Each certificate shall show the total quantities, weight of cement, sand, each class of aggregate, admixtures and the amounts of water in the aggregate and added at the batching plant as well as the amount of

water allowed to be added at the site for the specific design mix. Each certificate shall also state the mix number, total yield in cubic yards, the time the batch was dispatched and when it arrived on the job.

F. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement.

G. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.

1.3 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Material certificates.

C. Material test reports.

D. Floor surface flatness and levelness measurements.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."

D. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

E. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

F. Pre-installation Conference: Conduct conference at Project site.

G. Mix design tests on component materials and for compressive strength and shrinkage of concrete shall be performed as specified herein. The mix shall not at any time be changed without approval of the Engineer, except that at all times the batching of fine aggregate shall be adjusted to compensate for the moisture content. Satisfactory means shall be provided at the

batching plant for checking the moisture content of the fine aggregate. The details of concrete mixes submitted for approval shall include information on the correction of the batching for varying moisture contents of the fine aggregate.

To avoid unnecessary or haphazard changes in consistency, the aggregate shall be obtained from a source which will ensure a uniform quality.

H. During the progress of construction, the Owner will have tests made to determine whether the concrete, as being produced, complies with the standards of quality specified herein. These tests will be made in accordance with ASTM C 31, ASTM C 39, ASTM 179 and ASTM C 157. The testing expense during construction will be borne by the Contractor. Four (5) cylinder specimens will be cast and tested for each 50-cubic yards of concrete placed, or at least once per day per structural concrete placement. One (1) test cylinder will be tested at 7-days, one (1) at 14-days, and two (2) at 28-days. The remaining cylinder will be held to verify test results if needed. Air content and concrete slump shall be tested and recorded at the time the test cylinders are taken. The costs of additional tests, including non-destructive tests and core drilling, needed to verify or investigate the quality of concrete that is questionable as to meeting the specification shall be borne by the Contractor.

I. Concrete for testing shall be supplied by the Contractor at no cost to the Owner, and the Contractor shall provide assistance to the Engineer in obtaining samples and disposal and cleanup of excess material.

J. Evaluation and Acceptance of Concrete:

1. Concrete is expected to reach a higher compressive strength than that which is indicated in Paragraph 2.05, B., as compressive strength. The strength level of the concrete will be considered satisfactory if the average strength of the two (2) 28-day specimens equals or exceeds the required strength and no individual specimen strength falls below the required strength by more than 500 psi. Where an individual strength test falls below the required strength by more than 500 psi, the Engineer shall have the right to ask for cores taken in accordance with ASTM C 42 and ACI 318, all at the Contractors expense.

2. If any concrete fails to meet these requirements, immediate corrective action shall be taken to increase the compressive strength for all subsequent batches of the type of concrete affected.

3. All concrete which fails to meet the ACI requirements and these specifications, is subject to removal and replacement at the cost of the Contractor.

K. Shrinkage Tests: Additional shrinkage tests will be made by the Engineer during construction to ensure continued compliance with these specifications.

L. Ready-mix concrete shall conform to the requirements of ASTM C 94.

M. The Engineer shall have access to and have the right to inspect all batch plants, cement mills and supply facilities providing products under these specifications. Batch plants shall have current certificates that all scales have been tested and are certified within the tolerances as set forth in the National Bureau of Standards Handbook No. 44.

N. Construction Tolerances: The Contractor shall set and maintain concrete forms and perform finishing operations so as to ensure that the completed work is within the tolerances specified herein. Surface defects and irregularities are defined as finishes and are to be distinguished from tolerances. Tolerance is the specified permissible variation from lines, grades or dimensions shown. Where tolerances are not stated in these specifications, permissible deviations will be in accordance with ACI 347.

The following construction tolerances are hereby established and apply to finished walls and slab unless otherwise shown:

Structural Component	Tolerance
Variation of the constructed linear outline from the established position in plan.	In 10-feet: 1/4-inch; In 20-feet or more: 1/2-inch.
Variation from the level or from the grades shown.	In 10-feet: 1/4-inch; In 20-feet or more: 1/2-inch.
Variation from the plumb.	In 10-feet: 1/4-inch; In 20-feet or more: 1/2-inch.
Variation in the thickness of slabs and walls.	Plus 1/4-inch; Plus 1/2-inch.
Variation in the locations and sizes of slab and wall openings.	Plus or minus 1/4-inch.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain, fabricated from as-drawn steel wire into flat sheets.

C. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.

D. Galvanized-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain, fabricated from galvanized-steel wire into flat sheets.

E. Epoxy-Coated Welded Wire Reinforcement: ASTM A 884/A 884M, Class A coated, Type 1 steel.

F. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice.

2.3 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, Type II. Supplement with the following:

   a. Fly Ash: ASTM C 618, Class F or C.
   b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
   c. Portland Cement shall contain no more than 0.60 percent total alkalies. The term "alkalies" is defined as the sum sodium oxide (Na_2O), potassium oxide (K_2O), calculated as sodium oxide (.658 K_2O). Only one (1) brand of cement shall be used for exposed concrete in any individual structure. The cement shall be suitably protected from exposure to moisture until used. Certified mill test reports for each shipment of cement to be used shall be submitted to the Engineer. Mill test reports shall include the alkali content.

B. Normal-Weight Aggregates: ASTM C 33, graded.

1. Maximum Coarse-Aggregate Size: 1-1/2 inches nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94/C 94M and potable. Water shall be clean and free from objectionable quantities of silty organic matter, alkali, salts and other impurities. The water shall be considered potable, for the purpose of this Section only, if it meets the requirements of the local governmental agencies. Agricultural water with high total dissolved solids (over 1000 mg/l TDS) shall not be used.

2.4 AGGREGATES

A. All concrete aggregates shall be obtained from pits acceptable to the Engineer, shall be non-reactive, sound, uniformly graded and free of deleterious material in excess of allowable limits specified. Combined aggregates shall be well graded from coarse to fine sizes, and be uniformly graded between screen sizes to produce a concrete that has optimum workability and consolidation characteristics. Lightweight sand for fine aggregate will not be permitted. Aggregates shall conform to ASTM C 33.

1. Coarse Aggregate: Coarse aggregate shall consist of gravel, crushed gravel or crushed stone made up of clean, hard, durable particles free from calcareous coatings, organic matter or other foreign substances. Thin or elongated pieces having a length greater than four (4) times the average thickness shall not exceed fifteen percent (15%) by weight. Deleterious substances shall not be present in excess of the following percentages by

weight, and in no case shall the total of all deleterious substances exceed one and one- half percent (1.5%):

a.	Soft Fragments	1.5%
b.	Shale	1.5%
c.	Coal and Lignite	0.25%
d.	Clay Lumps	0.25%
e.	Materials Finer than No. 200 Sieve	0.50%

f. *Except that when material finer than No. 200 sieve consists of crusher dust, the maximum amount maybe 1%.
Except as otherwise specified or approved in writing by the Engineer, coarse aggregate shall be graded as specified in ASTM C 33, size No. 57.

2. Fine Aggregate: Fine aggregate for concrete or mortar shall consist of clean, natural sand or a combination of natural and manufactured sands that are hard and durable. Deleterious substances shall not be present in excess of the following percentages by weight of contaminating substances. In no case shall the total exceed three percent (3%):

a.	Removed by Decantation (Dirt, Silt, Etc.)	3%
b.	Shale	1%
c.	Clay Lumps	1%

Fine aggregate shall not contain strong alkali or organic matter which gives a color darker than a standard color when tested in accordance with ASTM C 40. Fine aggregate shall have a fineness modulus not less than 2.50 or greater than 3.00. Except as otherwise specified, fine aggregate shall be graded from coarse to fine in accordance with the requirements of ASTM C 33.

2.5 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. All concrete shall contain five percent (5%), plus or minus one percent (1%) entrained air of evenly dispersed air bubbles at the time of placement. The air-entraining agent shall contain no chloride and conform to ASTM C 260, or U.S. Army Corps of Engineers Specifications CRD-C13. The air-entraining agent shall be added to the batch in a portion of the mixing water. The solution shall be batched by means of a mechanical batcher capable of accurate measurement. The Engineer, or Owner and his duly authorized representatives reserve the right, at any time, to sample and test the air- entraining agent or the air content of concrete received on the job by the Contractor. Air entrainment in the concrete shall be tested by ASTM C 138, ASTM C 231 or ASTM C
173. If any sample tested does not have the specified air content, a second test shall be performed. If the second test does not meet the specified air content, the concrete represented by the test shall be removed from the job.
2. Retain one or more chemical admixtures from six subparagraphs below.

3. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
4. Retarding Admixture: ASTM C 494/C 494M, Type B.
5. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
6. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
7. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
8. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

C. **ADDITIVE *ALTERNATIVE** Crystalline* Waterproofing Addmixture: Concrete waterproofing system shall be of the crystalline type that chemically controls and permanently fixes a non-soluble crystalline structure throughout the capillary voids of the concrete. The system shall cause the concrete to become sealed against the penetration of liquids from any direction, and shall protect the concrete from deterioration due to harsh environmental conditions.

1. Acceptable Manufacturers/Product:
   - Xypex Admix C-500
   - Xypex Admix C-1000
   - Xypex Admix C-2000

2.6 WATERSTOPS

A. Flexible Rubber Waterstops: CE CRD-C 513, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

B. Chemically Resistant Flexible Waterstops: Thermoplastic elastomer rubber waterstops, for embedding in concrete to prevent passage of fluids through joints; resistant to oils, solvents, and chemicals. Factory fabricate corners, intersections, and directional changes.

C. Flexible PVC Waterstops: CE CRD-C 572, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

D. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch.

E. Self-Expanding Rubber Strip Waterstops: Manufactured rectangular or trapezoidal strip, bentonite-free hydrophilic polymer modified chloroprene rubber, for adhesive bonding to concrete, 3/8 by 3/4 inch.

2.7 VAPOR RETARDERS

A. Sheet Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.

B. Sheet Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 10 mils thick.

2.8 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet. The loss of moisture, when determined in accordance with the requirements of ASTM C 156, shall not exceed 0.055 grams per square centimeter of surface.

D. Polyethylene sheet for use as concrete curing blanket shall be white and shall have a normal thickness of 6 mils.

E. Water: Potable.

F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating. Curing compound shall be Hunt Process Clear ARB as manufactured by Hunt Process Co., Santa Fe Springs, CA; Dayton Clear Resin Cure as manufactured by Dayton Superior, Miamisburg, OH; or equal. The curing compound shall contain a fugitive dye so that areas of application will be readily distinguishable.

2.9 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.

2.10 CONCRETE MIXTURES

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

B. Cementitious Materials: Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.

1. Class C Fly Ash
   a. Loss on ignition, maximum 1%
   b. SO3 content, maximum 4%
   c. Moisture content, maximum 1%
   d. R = (CaO - 5%)/(Fe2O3), maximum 4.5

2. Class F Fly Ash
   a. Loss on ignition, maximum 1%
   b. SO3 content, maximum 3%
   c. Moisture content, maximum 1%
   d. R = (CaO - 5%)/(Fe2O3), maximum 1.5

3.

C. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

D. Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4500 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.50.
3. Minimum Cement W/C per cubic yard (94 lb sacks): 6.0
4. Slump Limit: 4 inches, plus ½ inch or minus 1 inch or 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
5. Air Content: 5.0 percent, plus or minus 1 percent at point of delivery.
6. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.
7. Type of Work: Slabs on grade, footings, floor slabs, and all other concrete items not specified elsewhere.

E. Proportion site work concrete mixture as follows:

1. Minimum Compressive Strength: 3500 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.50
3. Minimum Cement W/C per cubic yard (94 lb sacks): 6.0
4. Slump Limit: 3 inches, plus or minus 1 inch or 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
5. Air Content: 6 percent, plus or minus 2 percent at point of delivery for nominal maximum aggregate size greater than 3/8 inch.
6. Air Content: 7 percent, plus or minus 2 percent at point of delivery for nominal maximum aggregate size 3/8 inch or less.
7. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.
8. Type of Work: Site work Concrete.

F. Proportion Lean concrete mixture as follows:

1. Minimum Compressive Strength: 2500 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.60
3. Minimum Cement W/C per cubic yard (94 lb sacks): 4.5
4. Slump Limit: 3 inches, plus ½ inch or minus 1 inch or 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
5. Air Content: 5.0 percent, plus or minus 1 percent at point of delivery.
6. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.
7. Type of Work: Lean Concrete.

2.11 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.12 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

2.13 TRIAL BATCH AND LABORATORY TESTS

A. Before placing any concrete, the Contractor shall submit the certified trial batch results of each class of concrete having a 28-day strength of 3,500 psi or higher, based on the preliminary concrete mixes submitted by the Contractor. All concrete shall conform to the requirements of this Section, whether the aggregate proportions are from the Contractors preliminary mix design, or whether the proportions have been adjusted during the trial batch process. The trial batch shall be prepared using the aggregates, cement and admixture proposed for the project. The trial batch materials shall be of a quantity such that the testing laboratory can obtain three (3) drying shrinkage, and six (6) compression test specimens from each batch. The costs for the trial batch tests shall be borne by the Contractor.

B. The determination of compressive strength will be made by testing 6-inch diameter by 12-inch high cylinders; made, cured and tested in accordance with ASTM C 192 and ASTM C 39. Three (3) compression test cylinders will be tested at 7-days and three (3) at 28-days. The average compressive strength for the three (3) cylinders tested at 28-days for any given trial batch shall not be less than one hundred twenty-five percent (125%) of the specified compressive strength.

C. A standard sieve analysis of the combined aggregate for each trial batch shall be performed according to the requirements for ASTM C 136. Values shall be given for percent passing each sieve.\

2.14 SHRINKAGE LIMITATION

A. Drying shrinkage specimens shall be 4-inch by 4-inch by 11-inch prisms with an effective gage length of 10-inches, fabricated, cured, dried and measured in accordance with ASTM C 157 modified as follows: Specimens shall be removed from molds at an age of 23± hours after trial batching, shall be placed immediately in water at 70 degrees F. ±3 degrees F. for at least thirty (30) minutes, and shall be measured within thirty (30) minutes thereafter to determine original length and then submerged in saturated lime water at 73 degrees F. ±3 degrees F. Measurement to determine expansion expressed as a percentage of original length shall be made at age 7-days. This length at age 7-days shall be the base length for drying shrinkage calculations ("0" days drying age). Specimens then shall be stored immediately in a humidity control room

maintained at 73 degrees F. ±3 degrees F. and fifty percent (50%) ±4 percent relative humidity for the remainder of the test. Measurements to determine shrinkage expressed as percentage of base length shall be made and reported separately for 7, 14, 21 and 28-days of drying after 7- days of moist curing.

The drying shrinkage deformation of each specimen shall be computed as the difference between the base length (at "0" days drying age) and the length after drying at each test age. the average drying shrinkage deformation of the specimens shall be computed to the nearest 0.0001-inch at each test age. If the drying shrinkage of any specimen departs from the average of that test age by more than 0.0004-inch, the results obtained from that specimen shall be disregarded. Results of the shrinkage test shall be reported to the nearest 0.001 percent of shrinkage. Compression test specimens shall be taken in each case from the same concrete used for preparing during shrinkage specimens. These tests shall be considered a part of the normal compression tests for the project. Allowable shrinkage limitations shall be specified herein.

B. The maximum concrete shrinkage for specimens cast in the laboratory from the trial batch, as measured at 21-day drying age or at 28-day drying age (specified in Paragraph 2.07), shall be 0.036 percent or 0.042 percent, respectively. The Contractor shall only use a mix design for construction that has first met the trial batch shrinkage requirements.

C. The maximum concrete shrinkage for specimens cast in the field shall not exceed the trial batch maximum shrinkage requirement by more than twenty-five percent (25%).

D. If the required shrinkage limitation is not met during construction, the Contractor shall take all necessary action, at no additional cost to the Owner, for securing the specified shrinkage requirements. These actions may include changing the source of aggregates, cement and/or admixtures; reducing water content ratio; washing or aggregate to reduce fines; increasing the number of construction joints; modifying the curing requirements; or other actions designed to minimize shrinkage or the effects of shrinkage.

2.15 GROUT

A. Grout shall be a mixture of one part Portland cement to 4-1/2 parts sand. Water content shall be such that the grout can be readily spread, yet not wet enough to cause trouble with surface water or laitance, or failure to stay in place after screeding. All grout mixes and mixing procedures shall be submitted in accordance with section 013300-Contractor Submittals, and shall be subject to review and approval by the Engineer prior to commencing the grouting operations.

B. Procedures for Grout placement shall be approved by the equipment supplier, to insure that no equipment is overstressed, as well as proper placement tolerances. Equipment Supplier shall have final say on grouting procedures and final tolerances.

PART 3 - EXECUTION

3.1 MIXING CONCRETE

A. Mixing equipment shall be subject to the Engineers approval. Mixers shall be of the stationary plant or truck mixer type. Adequate equipment and facilities shall be provided for accurate

measurement and control of all materials and for readily changing the proportions of the material. The mixing equipment shall be maintained in good working order and shall be capable of combining the aggregates, cement and water within the specified time into a thoroughly mixed and uniform mass and of discharging the mixture without segregation. Cement and aggregate shall be proportioned by weight.

B. B.The batch plant shall be capable of controlling and delivering of all material to within one percent (1%) by weight of the individual material. If bulk cement is used, it shall be weighed on a separate visible scale which will accurately register the scale load at any stage of the weighing operation from zero to full capacity.

Cement shall not come in contact with aggregate or with water until the materials are in the mixer ready for complete mixing with all mixing water. The procedure of mixing cement with sand or with sand and coarse aggregate for delivery to the jobsite for final mixing and an addition of mixing water will not be permitted. Re-tempering of concrete will not be permitted. The entire batch shall be discharged before recharging. The volume of the mixed material per batch shall not exceed the manufacturers rated capacity of the mixer.

Each mixer shall be equipped with a device for accurately measuring and indicating the quantity of water entering the concrete, and the operating mechanism shall be such that leakage will not occur when the valves are closed. Each mixer shall be equipped with a device for automatically measuring, indicating and controlling the time required for mixing. This device shall be interlocked to prevent the discharge of concrete from the mixer before the expiration of the mixing period.

Transit-mixed concrete shall be mixed and delivered in accordance with ASTM C 94. After the drum is once started, it shall be revolved continuously until it has completely discharged its batch. Water shall not be admitted to the mix until the drum has started revolving. The right is reserved to increase the required minimum number of revolutions allowed, if necessary, to obtain satisfactory mixing, and the Contractor will not be entitled to additional compensation because of such an increase or decrease.

C. Mixed concrete shall be delivered to the site of the work and discharge shall be completed within one (1) hour after the addition of the cement to the aggregates. In hot weather or under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 85 degrees F. or above, the time between the introduction of the cement to the aggregates and discharge shall not exceed forty-five (45) minutes. The use of non-agitating equipment for transporting concrete will not be permitted.

D. Truck mixers shall be equipped with counters so that the number of revolutions of the drum may be readily verified. The counter shall be of the resettable type and shall be actuated at the time of starting mixers at mixing speeds. Concrete shall be mixed in a truck mixer for not less than seventy (70) revolutions of the drum or blades at the rate of rotation designated by the manufacturer of equipment. Additional mixing, if any, shall be at the speed designated by the manufacturer of the equipment as agitating speed. All materials including mixing water shall be in the mixer drum before actuating the revolution counter for determining the number of revolution of mixing.

3.2 PREPARATION OR SURFACES FOR CONCRETING

A. Earth surfaces shall be thoroughly and uniformly wetted by sprinkling prior to the placing of any concrete. These surfaces shall be kept moist by frequent sprinkling up to the time concrete is placed thereon. The surface shall be free from standing water, mud and debris at the time of placing concrete.

B. The surfaces of all horizontal construction joints shall be cleaned of all latence, loose or defective concrete and foreign material. Such cleaning shall be accomplished by sandblasting followed by thorough washing. All pools of water shall be removed from the surface of construction joints before the new concrete is placed.

C. No concrete shall be placed until all formwork, installation of parts to be embedded, reinforcement steel and preparation off surfaces involved in the placing have been completed and accepted by the Engineer at least four (4) hours before placement of concrete. All reinforcement, anchor bolts, sleeves, inserts and similar items shall be set and secured in the forms where shown or by shop drawings and shall be acceptable to the Engineer before any concrete is placed. Accuracy of placement is the responsibility of the Contractor. All surfaces of embedded items that have become encrusted with dried grout from concrete previously placed shall be cleaned of all such grout before the surrounding or adjacent concrete is placed.

D. All form surfaces in contact with the concrete shall be thoroughly cleaned of all previous concrete, dirt and other surface contaminants prior to use. Damaged form surfaces shall not be used.

Wood form surfaces in contact with the concrete shall be coated with an approved release agent prior to form installation. The release agent shall be non-staining and non-toxic after thirty (30) days. Mill scale and other ferrous deposits shall be sandblasted or otherwise removed from the contact surface of steel forms. All steel forms shall have the contact surfaces coated with an approved release agent. The release agent shall be effective in preventing discoloration of the concrete from rust and shall be non-toxic after thirty (30) days.

E. Where concrete is to be cast against old existing concrete, the old concrete shall be thoroughly roughened to exposed, hard aggregate by sandblasting or chipping. Any additional surface preparation shall be as called for in the drawings.

F. No concrete shall be placed in any structure until all water entering the space to be filled with concrete has been properly cut off or diverted out of the forms and clear of the work. No concrete shall be deposited under water or allowed to rise on any concrete until the concrete has attained its initial set. Pumping or other necessary dewatering operations for removing ground water, if required, shall be the responsibility of the Contractor and will be subject to review by the Engineer.

G. Pipe, conduit, dowels, sleeves and other ferrous items required to be embedded in concrete construction shall be adequately positioned and supported prior to placement of concrete. There shall be a minimum of 2-inches clearance between embedded items and any of the concrete reinforcement. Securing embeddments in position by wiring or welding them to the reinforcement will not be permitted.

3.3 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Chamfer exterior corners and edges of permanently exposed concrete except where grating will be installed.

3.4 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.5 VAPOR RETARDERS

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches and seal with manufacturers recommended tape.

3.6 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.7 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when

cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

E. Waterstops: Install in construction joints and at other joints indicated according to manufacturer's written instructions.

3.8 CONCRETE PLACEMENT

A. Placement of concrete shall conform to the requirements and recommendations of ACI 301, 304 and 318, except as modified herein.

B. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

D. Cold-Weather Placement: Comply with ACI 306.1.

E. Hot-Weather Placement: Comply with ACI 301.

F. No concrete shall be placed without prior inspection of the forms, reinforcing and embedded items and approval from an authorized representative of the Engineer. The Contractor shall notify the Engineer at least twenty-four (24) hours in advance of any scheduled concrete placement and shall call for final inspections no later than four (4) hours in advance of the scheduled placement. The Contractor shall notify the Engineer at least two (2) hours in advance of setting the opposite side of wall forms so that the construction joint preparation, water stop installation and reinforcing steel inspections can be conducted. It is the Contractors responsibility to see that the forms are properly cleaned and oiled before being set, the construction joints properly prepared, reinforcing steel is securely and properly supported in the correct position and that all embedment items including electrical conduit is correctly installed before calling for inspections. The Engineer may at his option require the use of placement cords if deemed necessary.

G. Concrete which upon or before placing is found not to conform to the requirements specified herein shall be rejected and immediately removed from the work. Concrete which is not placed in accordance with these specifications, or which is of inferior quality, shall be removed and replaced at the expense of the Contractor.

H. No concrete shall be placed during rain or snow storms, unless completely covered to prevent storm water from coming in contact with it. Sufficient protective covering material shall be kept on hand at all times should rain or snow storms arise during concrete placement operations.

I. Concrete shall be deposited at or near its final position to avoid segregation caused by re- handling or flowing. Concrete shall not be deposited in large quantities in one place and worked along the forms with vibrator or other means. Concrete shall be uniformly distributed during the placing process and in no case after depositing shall any portion be displaced in the forms more than 2-feet in horizontal direction. Concrete shall be deposited in forms in horizontal layers not to exceed 24-inches in depth and shall be brought up evenly in all parts of the form. The rate of placement of concrete in forms shall not exceed 5-feet of vertical rise per hour. As the concrete is placed it shall be consolidated thoroughly and uniformly by mechanical vibration to secure a dense mass, close bond with reinforcement and other embedded items and smooth surface. The mechanical vibrator shall penetrate not only the freshly placed concrete, but also the previously placed lift to ensure the lifts become monolith. New concrete shall be placed against previously placed concrete, not away from it. When concrete is placed on a slope, placement shall begin at the lower end of the slope and progress to the upper end for the full width of the placement. Consolidation by mechanical vibration shall follow directly behind placement and the rate of placement shall never get ahead of the consolidation crew. Concrete placement shall continue without avoidable interruption, in a continuous operation until the end of the placement is reached.

J. The drop of concrete into slab or wall forms shall be vertical. Concrete shall not be dropped through reinforced steel, but deposited in forms using a hopper with a drop chute to avoid segregation and to keep mortar from coating the reinforcement steel and forms above the in- place concrete. In no case shall the free fall of concrete exceed 4-feet below the end of the hopper or chute.

K. If it takes more than 20-minutes to get back to place concrete over concrete previously placed, the depth of the layers being placed at one time shall be reduced, and/or placing equipment increased, until it is possible to return with the placing operation to previously placed concrete within 20-minutes. If concrete is to be placed over previously poured concrete and more than 20-minutes have elapsed, then a layer of grout not less than 1/2-inch thick shall be spread over the surface before placing the additional concrete.

L. The placement of concrete for slabs, beams or walkways cast monolithically with walls or columns shall not commence until the concrete in the walls or columns has been allowed to set and shrink. The time allowed for shrinkage shall be not less than one (1) hour.

M. Concrete shall be placed with the aid of approved mechanical vibrators. Vibration shall be supplemented by manual forking or spading adjacent to the forms on exposed faced in order to secure smooth dense surfaces. The concrete shall be thoroughly consolidated around reinforcement, pipes or other shapes built into the work. The vibration shall be sufficiently intense to cause the concrete to flow and settle readily into place and to visibly affect the concrete over a radius of at least 18-inches.

Sufficient vibrators shall be on hand at all times to vibrate the concrete as placed. In addition to the vibrators in actual use while concrete is being placed, the Contractor shall have on hand one (1) spare vibrator in serviceable condition. No concrete shall be placed until it has been ascertained that all vibrating equipment, including spares, is in serviceable condition.

Special care shall be taken to place the concrete solidly against the forms so as to leave no voids. Every precaution shall be taken to make all concrete solid, compact and smooth, and if for any reason the surfaces or interiors have voids or are in any way defective, such concrete

shall be repaired as directed by the Engineer. No defective work shall be patched or repaired without the prior inspection and approval of the Engineer.

N. The temperature of concrete when it is being placed shall be not more than 90 degrees F. or less than 40 degrees F. in moderate weather, and not less than 50 degrees F. in weather during which the mean daily temperature drops below 40 degrees F. Concrete ingredients shall not be heated to a temperature higher than that necessary to keep the temperature of the mixed concrete, as placed, from falling below the specified minimum temperature. If concrete is placed when the weather is such that the temperature of the concrete would exceed 90 degrees F., the Contractor shall employ effective means, such as pre-cooling of aggregates and mixing water using ice or placing at night, as necessary to maintain the temperature of the concrete, as it is placed, below 90 degrees F. The Contractor shall be entitled to no additional compensation on account of the foregoing requirements.

O. Concrete shall not be placed on a frozen subgrade or subgrade that contains frozen materials. All ice and snow shall be removed from inside forms and from reinforcing steel and embedded items. the temperature of all surfaces that the concrete will contact shall be raised above the freezing point for at least 12-hours prior to placing new concrete.

The minimum temperature of fresh concrete as mixed shall be 60 degrees F. for ambient temperature above 30 degrees F.; 65 degrees F. for ambient temperature 0 degrees F. to 30 degrees F.; and 70 degrees F. for ambient temperature below 0 degrees F. The minimum temperature of fresh concrete after placing shall be 55 degrees F. for the first 72-hours.

The use of calcium chloride shall not be permitted.

In general, the Contractor shall adhere to the recommendations as outlined in ACI Standard 306 for cold weather concreting, except as required herein.

3.9 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities. Fill tie holes and depressions and bug-holes ¼ inch or larger in width or depth with mortar.

1. Apply to concrete surfaces to be covered by backfill or coated with below grade waterproofing systems.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces in water channels, below water surface of basins, inside meter and valve vaults, inside cells of hydraulic splitter boxes and weirs.

C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one part portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.
4. Formed concrete surfaces inside buildings and machine rooms and all exposed exterior surfaces of foundations, basins, vaults, hydraulic structures and curbs.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.10 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull- floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in one direction.

1. Apply scratch finish to surfaces indicated and to receive concrete floor toppings.

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Re-straighten, cut down high spots, and fill low spots. Repeat float passes and re-straightening until surface is left with a uniform, smooth, granular texture. Surface irregularities shall not exceed ¼ inch.

1. Apply float finish to surfaces indicated and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or floor slabs to be covered with grouted tile or topping grout and slabs to be covered with built-up roofing.

D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and re-straighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces all building and machine room floors, basin floors not receiving a grout topping, channel floors, top of interior walls, top of interior curbs, steps and walkways.
2. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4 inch.

E. Trowel and Fine-Broom Finish: Apply a first trowel finish to exterior walkways, curb, gutter, sidewalk and steps, top of valve or meter vaults, electrical pull boxes and catch basins. While concrete is still plastic, slightly scarify surface with a fine broom.

1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

F. The schedule for finished unformed surfaces shall be as follows:

Unformed Concrete Surface Schedule

Area	Finish
Grade slabs and foundations to be covered with concrete or fill material.	Scratch Finish
Floor slabs to be covered with grouted tile or topping grout and slabs to be covered with built-up roofing.	Float Finish
All building and machine room floors, basin floors not receiving a grout topping, channel floors, top of interior walls, top of interior curbs, steps and walkways.	Trowel Finish
Exterior walkways, curb, gutter, sidewalk and steps, top of valve or meter vaults, electrical pull boxes and catch basins.	Fine-Broom Finish

3.11 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot- weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least

12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

    a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

D. Immediately following the first frost in the fall, the Contractor shall be prepared to protect all concrete against freezing.

3.12 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Engineer. Remove and replace concrete that cannot be repaired and patched to Engineer's approval.

3.13 FIELD QUALITY CONTROL

A. Testing and Inspecting: Refer to General Conditions and Summary of Work to determine who will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

END OF SECTION 033000

SECTION 034100 - PRECAST STRUCTURAL CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes precast structural concrete.

1.2 PRE-INSTALLATION MEETINGS

A. Pre-installation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Design Mixtures: For each precast concrete mixture.

C. Shop Drawings:

1. Include member locations, plans, elevations, dimensions, shapes and sections, openings, support conditions, and types of reinforcement, including special reinforcement.
2. Detail fabrication and installation of precast structural concrete units, including connections at member ends and to adjoining construction.

D. Delegated-Design Submittal: For precast structural concrete indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Welding certificates.

C. Material certificates.

D. Material Test Reports: For aggregates.

E. Source quality-control reports.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm that assumes responsibility for engineering precast structural concrete units to comply with performance requirements. Responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

1. Designated as a PCI-certified plant as follows:

a. Group C, Category C2 – Pre-stressed Hollowcore and Repetitively Produced Products.

B. Quality-Control Standard: For manufacturing procedures, testing requirements, and quality-control recommendations for types of units required, comply with PCI MNL 116, "Manual for Quality Control for Plants and Production of Structural Precast Concrete Products."

C. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.4/D1.4M, "Structural Welding Code - Reinforcing Steel."

1.6 COORDINATION

A. Furnish loose connection hardware and anchorage items to be embedded in or attached to other construction before starting that Work. Provide locations, setting diagrams, templates, instructions, and directions, as required, for installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design precast structural concrete units.

B. Design Standards: Comply with ACI 318 and with design recommendations in PCI MNL 120, "PCI Design Handbook - Precast and Prestressed Concrete," applicable to types of precast structural concrete units indicated.

C. Structural Performance: Precast structural concrete units and connections shall withstand design loads indicated within limits and under conditions indicated.

1. Fire-Resistance Rating: Select material and minimum thicknesses to provide indicated fire rating.

2.2 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.

C. Steel Bar Mats: ASTM A 184/A 184M, fabricated from ASTM A 615/A 615M, Grade 60, deformed bars, assembled with clips.

D. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from as-drawn steel wire into flat sheets.

E. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M or ASTM A 1064/A 1064M, flat sheet.

F. Supports: Suspend reinforcement from back of mold or use bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place according to PCI MNL 116.

2.3 PRESTRESSING TENDONS

A. Strand: ASTM A 416/A 416M, Grade 270, uncoated, seven-wire, low-relaxation strand.

1. Coat unbonded post-tensioning strand with post-tensioning coating complying with ACI 423.7 and sheath with polypropylene tendon sheathing complying with ACI 423.7. Include anchorage devices and coupler assemblies.

2.4 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150/C 150M, Type I or Type III, gray, unless otherwise indicated.

B. Supplementary Cementitious Materials:

1. Fly Ash: ASTM C 618, Class C or F, with maximum loss on ignition of 3 percent.
2. Metakaolin: ASTM C 618, Class N.
3. Silica Fume: ASTM C 1240, with optional chemical and physical requirement.
4. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

C. Normal-Weight Aggregates: Except as modified by PCI MNL 116, ASTM C 33/C 33M. Stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for Project.

D. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 116.

E. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

F. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and to not contain calcium chloride, or more than 0.15 percent chloride ions or other salts by weight of admixture.

2.5 GROUT MATERIALS

A. Sand-Cement Grout: Portland cement, ASTM C 150/C 150M, Type I, and clean, natural sand, ASTM C 144 or ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 to 3 parts sand, by volume, with minimum water required for placement and hydration. Water-soluble chloride ion content less than 0.06 percent by weight of cement when tested according to ASTM C 1218/C 1218M.

B. Nonmetallic, Nonshrink Grout: Packaged, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107/C 1107M, Grade A for drypack and Grades B and C for flowable grout and of consistency suitable for application within a 30- minute working time. Water-soluble chloride ion content less than 0.06 percent by weight of cement when tested according to ASTM C 1218/C 1218M.

C. Epoxy-Resin Grout: Two-component, mineral-filled epoxy resin; ASTM C 881/C 881M, of type, grade, and class to suit requirements.

2.6 CONCRETE MIXTURES

A. Prepare design mixtures for each type of precast concrete required.

1. Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.

B. Design mixtures may be prepared by a qualified independent testing agency or by qualified precast plant personnel at precast structural concrete fabricator's option.

C. Limit water-soluble chloride ions to maximum percentage by weight of cement permitted by ACI 318 or PCI MNL 116 when tested according to ASTM C 1218/C 1218M.

D. Normal-Weight Concrete Mixtures: Proportion by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal- weight concrete with the following properties:

1. Compressive Strength (28 Days): 5000 psi.
2. Maximum Water-Cementitious Materials Ratio: 0.45.

E. Water Absorption: Limit water absorption to 6 percent by weight or 14 percent by volume, tested according to ASTM C 642, except for boiling requirement.

F. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content complying with PCI MNL 116.

G. When included in design mixtures, add other admixtures to concrete mixtures according to manufacturer's written instructions.

H. Concrete Mix Adjustments: Concrete mix design adjustments may be proposed if characteristics of materials, Project conditions, weather, test results, or other circumstances warrant.

2.7 FABRICATION

A. Cast-in Anchors, Inserts, Plates, Angles, and Other Anchorage Hardware: Fabricate anchorage hardware with sufficient anchorage and embedment to comply with design requirements. Accurately position for attachment of loose hardware, and secure in place during precasting operations. Locate anchorage hardware where it does not affect position of main reinforcement or concrete placement.

1. Weld-headed studs and deformed bar anchors used for anchorage according to AWS D1.1/D1.1M and AWS C5.4, "Recommended Practices for Stud Welding."

B. Furnish loose hardware items including steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers, and other hardware shapes for securing precast structural concrete units to supporting and adjacent construction.

C. Cast-in reglets, slots, holes, and other accessories in precast structural concrete units as indicated on the Contract Drawings.

D. Cast-in openings larger than 10 inches in any dimension. Do not drill or cut openings or prestressing strand without Engineer’s approval.

E. Reinforcement: Comply with recommendations in PCI MNL 116 for fabricating, placing, and supporting reinforcement.

F. Reinforce precast structural concrete units to resist handling, transportation, and erection stresses and specified in-place loads.

G. Prestress tendons for precast structural concrete units by either pretensioning or post-tensioning methods. Comply with PCI MNL 116.

H. Comply with requirements in PCI MNL 116 and in this Section for measuring, mixing, transporting, and placing concrete. After concrete batching, no additional water may be added.

I. Place concrete in a continuous operation to prevent cold joints or planes of weakness from forming in precast concrete units.

J. Thoroughly consolidate placed concrete by vibration without dislocating or damaging reinforcement and built-in items, and minimize pour lines, honeycombing, or entrapped air voids on surfaces. Use equipment and procedures complying with PCI MNL 116.

K. Comply with PCI MNL 116 procedures for hot- and cold-weather concrete placement.

L. Identify pickup points of precast structural concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint or permanently mark casting date on each precast structural concrete unit on a surface that does not show in finished structure.

M. Cure concrete, according to requirements in PCI MNL 116, by moisture retention without heat or by accelerated heat curing using live steam or radiant heat and moisture. Cure units until compressive strength is high enough to ensure that stripping does not have an effect on performance or appearance of final product.

N. Discard and replace precast structural concrete units that do not comply with requirements, including structural, manufacturing tolerance, and appearance, unless repairs meet requirements in PCI MNL 116 and meet Engineer's approval.

2.8 CASTING INSULATED WALL PANELS

A. Cast, screed, and consolidate wythe supported by mold.

B. Place insulation boards abutting edges and ends of adjacent boards. Insert wythe connectors through insulation, and consolidate concrete around connectors according to connector manufacturer's written instructions.

C. Cast, screed, and consolidate top wythe to meet required finish.

2.9 FABRICATION TOLERANCES

A. Fabricate precast structural concrete units to shapes, lines, and dimensions indicated so each finished unit complies with PCI MNL 116 product dimension tolerances as well as position tolerances for cast-in items.

2.10 COMMERCIAL FINISHES

A. Commercial Grade: Remove fins and protrusions larger than 1/8 inch and fill holes larger than 1/2 inch. Rub or grind ragged edges. Faces must have true, well-defined surfaces. Air holes, water marks, and color variations are permitted. Limit form joint offsets to 3/16 inch.

B. Standard Grade: Normal plant-run finish produced in molds that impart a smooth finish to concrete. Surface holes smaller than 1/2 inch caused by air bubbles, normal color variations, form joint marks, and minor chips and spalls are permitted. Fill air holes greater than 1/4 inch in width that occur more than once per 2 sq. in.. Major or unsightly imperfections, honeycombs, or structural defects are not permitted. Limit joint offsets to 1/8 inch.

C. Grade B Finish: Fill air pockets and holes larger than 1/4 inch in diameter with sand-cement paste matching color of adjacent surfaces. Fill air holes greater than 1/8 inch in width that occur more than once per 2 sq. in.. Grind smooth form offsets or fins larger than 1/8 inch. Repair surface blemishes due to holes or dents in molds. Discoloration at form joints is permitted.

D. Grade A Finish: Repair surface blemishes and fill air holes with the exception of air holes 1/16 inch in width or smaller, and form marks where the surface deviation is less than 1/16 inch. Float apply a neat cement-paste coating to exposed surfaces. Rub dried paste coat with burlap to remove loose particles. Discoloration at form joints is permitted. Grind smooth all form joints.

E. Screed or float finish unformed surfaces. Strike off and consolidate concrete with vibrating screeds to a uniform finish. Hand screed at projections. Normal color variations, minor indentations, minor chips, and spalls are permitted. Major imperfections, honeycombing, or defects are not permitted.

F. Smooth, steel trowel finish unformed surfaces. Consolidate concrete, bring to proper level with straightedge, float, and trowel to a smooth, uniform finish.

G. Apply roughened surface finish according to ACI 318 to precast concrete units that receive concrete topping after installation.

2.11 SOURCE QUALITY CONTROL

A. Testing: Test and inspect precast structural concrete according to PCI MNL 116 requirements and ASTM C 1610/C 1610M, ASTM C 1611/C 1611M, ASTM C 1621/C 1621M, and ASTM C 1712/C 1712M.

B. Defective Units: Discard and replace precast structural concrete units that do not comply with requirements, including strength, manufacturing tolerances, and color and texture range. Chipped, spalled, or cracked units may be repaired, subject to Architect's approval.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install clips, hangers, bearing pads, and other accessories required for connecting precast structural concrete units to supporting members and backup materials.

B. Erect precast structural concrete level, plumb, and square within specified allowable tolerances. Provide temporary structural framing, shoring, and bracing as required to maintain position, stability, and alignment of units until permanent connections are complete.

1. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.
2. Remove projecting lifting devices and use plastic patch caps or sand-cement grout to fill voids within recessed lifting devices flush with surface of adjacent precast surfaces when recess is exposed.
3. For hollow-core slab voids used as electrical raceways or mechanical ducts, align voids between units and tape butt joint at end of slabs.

C. Connect precast structural concrete units in position by bolting, welding, grouting, or as otherwise indicated on Shop Drawings. Remove temporary shims, wedges, and spacers as soon as practical after connecting and grouting are completed.

D. Field cutting of precast units is not permitted without approval of Engineer.

E. Fasteners: Do not use drilled or powder-actuated fasteners for attaching accessory items to precast, prestressed concrete units.

F. Welding: Comply with applicable requirements in AWS D1.1/D1.1M and AWS D1.4/D1.4M for welding, welding electrodes, appearance, quality of welds, and methods used in correcting welding work.

G. At bolted connections, use lock washers, tack welding, or other approved means to prevent loosening of nuts after final adjustment.

H. Grouting or Dry-Packing Connections and Joints: Grout connections and joints and open spaces at keyways, connections, and joints where required or indicated on Shop Drawings. Retain flowable grout in place until hard enough to support itself. Alternatively, pack spaces with stiff dry-pack grout material, tamping until voids are completely filled.

3.2 ERECTION TOLERANCES

A. Erect precast structural concrete units level, plumb, square, and in alignment without exceeding the noncumulative erection tolerances of PCI MNL 135.

B. Minimize variations between adjacent slab members by jacking, loading, or other method recommended by fabricator and approved by Architect.

3.3 REPAIRS

A. Repair precast structural concrete units if permitted by Architect.

1. Repairs may be permitted if structural adequacy, serviceability, durability, and appearance of units have not been impaired.

B. Prepare and repair damaged galvanized coatings with galvanizing repair paint according to ASTM A 780/A 780M.

C. Remove and replace damaged precast structural concrete units that cannot be repaired or when repairs do not comply with requirements as determined by Architect.

3.4 CLEANING

A. Clean mortar, plaster, fireproofing, weld slag, and other deleterious material from concrete surfaces and adjacent materials immediately.

B. Clean exposed surfaces of precast concrete units after erection and completion of joint treatment to remove weld marks, other markings, dirt, and stains.

1. Perform cleaning procedures, if necessary, according to precast concrete fabricator's written recommendations. Protect other work from staining or damage due to cleaning operations.
2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes or damage adjacent materials.

END OF SECTION 034100

SECTION 036000 – GROUTING MORTAR

PART 1 - GENERAL

1.1 THE REQUIREMENT

A. The Contractor shall furnish, place, finish and cure the following types of grouting mortars as called for herein and as shown in the Contract Documents

1. Non-Shrink Grout: This type of grout shall be used wherever grout is shown or called for in the Contract Documents, unless another type is specifically referenced.

2. Topping Grout: This type of grout shall be used for grouting clarifier bottoms.

3. Epoxy Grout: This type of grout shall be used for anchor bolt or reinforcing steel embedment, repairs and resurfacing.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Cast-In-Place Concrete. 033000

1.3 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Specifications, codes and standards are listed under Section 033000 entitled, "Cast-In-Place Concrete", and those additional commercial standards as follows:

CRD-C 621-85	Corps of Engineers Specification for Non-Shrink Grout
ASTM C 109	Standard Test Method for Compressive (Latest Edition) Strength of Hydraulic Cement Mortars (Using 2-inch or 50-mm Cube Specimens)
ASTM C-827-87	Standard Test Method for Early Volume Change of Cementitious Mixtures

1.4 CONTRACTOR SUBMITTALS

A. Non-Shrink Grout: Submit manufacturer's technical data including compressive strength and expansion data at plastic, flowable and fluid consistencies. Also submit manufacturer's applications manual containing instructions and recommendations for mixing, handling, placement and appropriate uses for each type of non-shrink grout used in the work.

B. Topping Grout: Provide certified mix design including proportions and gradations of all materials and compressive strength test results from at least one (1) trial batch. Tests shall be performed by a certified testing laboratory. All costs for such mix design and trial batch tests shall be borne by the Contractor.

C. Epoxy Grout: Submit manufacturer's technical data including strengths and application manual of instructions for mixing, handling and placing.

1.5 QUALITY ASSURANCE

A. Mix design tests for topping grout shall be performed per the standards referenced herein.

B. During the progress of construction, the Engineer may have tests made of each type of grout used in the work to ensure compliance with the Contract Documents. These tests will be made in accordance with the standards referenced herein. The test expense during construction, except for the mix design and trial batch tests, will be borne by the Owner. The costs of additional tests including non-destructive tests and core drilling needed to verify or investigate the quality of questionable work or material shall be borne by the Contractor.

C. Grout for testing shall be supplied by the Contractor at no cost to the Owner.

D. If any grout fails to meet the requirements of these specifications, immediate corrective action shall be taken for all subsequent batches. Grout already in place which fails to meet these requirements is subject to removal and replacement with all costs borne by the Contractor.

E. Construction tolerances shall be as specified in Section 03300 entitled, "Cast-In-Place Concrete", except as modified herein and elsewhere in the Contract Documents.

PART 2 - PRODUCTS

2.1 NON-SHRINK GROUT

A. Non-shrink grout shall be a prepackaged, inorganic, non-gasliberating, non-metallic, cement-based grout requiring only the addition of water. Manufacturer's instructions shall be printed on each bag or other container in which the materials are packaged.

B. Non-shrink grouts for use as herein specified shall conform to the Corps of Engineers specifications for Non-Shrink Grout, CRD-C621-85 and to these specifications. The grout shall have a 28-day compressive strength of 6,000 psi or greater.

C. Non-shrink grouts shall be as manufactured by: Tremcrete Systems Incorporated, Woodland, California; Gifford-Hill & Company, Inc., Dallas, Texas; or approved equal.

2.2 TOPPING GROUT

A. Cement topping grout for clarifiers or channels shall be composed of one part cement, three parts sand, and the minimum amount of water necessary to obtain the desired consistency. The minimum compressive strength at 28-days shall be 4,000 psi.

B. Cement grout materials shall be as specified in Section 033000 entitled, "Cast-In-Place Concrete".

2.3 EPOXY GROUT

A. Epoxy grout shall be a pourable, non-shrink, one-hundred percent (100%) solids system. The epoxy grout system shall have three components; resin, hardener, and specially blended aggregate, all premeasured and prepackaged. The resin component shall not contain any non-reactive diluents. Resins containing butyl glycidyl ether (BGE) or other highly volatile and hazardous reactive diluents are not acceptable. Variation of component ratios is not permitted unless specifically recommended by the manufacturer. The chemical formulation of the epoxy grout shall be that recommended by the manufacturer for the particular application. Manufacturer's instructions shall be printed on each container in which the materials are packaged.

B. The mixed epoxy grout system shall have a minimum working life of 45 minutes at 75 degrees F. The epoxy grout shall develop a minimum compressive strength of 5,000 psi in 24-hours and 10,000 psi in 7-days.

2.4 CURING MATERIALS

A. Curing materials shall be as specified in Section 033000 entitled, "Cast-In-Place Concrete", for cement topping grout and as recommended by the manufacturer of non-shrink grouts.

PART 3 - EXECUTION

3.1 PLACING NON-SHRINK AND EPOXY GROUT

A. All forming, mixing, surface preparation, handling, placing and consolidated of non-shrink and epoxy grouts shall be done according to the instructions and recommendations of the manufacturer.

B. Curing shall be as specified herein.

END OF SECTION 036000

DIVISION 5 – METALS

SECTION 05520 - MISCELLANEOUS METALWORK

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish, fabricate and install miscellaneous metalwork and appurtenances, complete and in accordance with the requirements of the Contract Documents.

1.02 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. All work specified herein shall conform to or exceed the requirements of the Building Code 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 this Section.

B. Products and their delivery, handling and installation shall be in accordance with the following trade standards, codes or specifications.

C. Commercial Standards:

Aluminum Assn. AA-M32	C22A41
AISC	Specifications and Commentary
AISI	Specifications and Commentary
ASTM A 36/A36M	Specification for Structural Steel
ASTM A 48	Specification for Gray Iron Castings
ASTM A 53	Specification for Pipe, Steel, Black and Hot-Dipped Zinc-Coated, Welded and Seamless
ASTM A 123	Specification for Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed and Forged Steel Shapes, Plates, Bars and Strip
ASTM A 153	Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A 307	Specification for Carbon Steel Externally Threaded Standard Fasteners
ASTM A 563	Specification for Carbon and Alloy Steel Nuts
ASTM A 575	Specifications for Steel Bars, Carbon, Merchant Quality, M-Grades
ANSI/AWS D1.1	Structural Welding Code - Steel

NFPA 101	Life Safety Code
NAAMM	Metal Stairs Manual

1.03 CONTRACTOR SUBMITTALS

A. Shop Drawings: Shop drawings of all miscellaneous metalwork shall be submitted to the Engineer for review in accordance with Section 01300 entitled, "Contractor Submittals".

B. Welders Qualifications: Welders shall submit certified qualifications for the type of welding being performed.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Standard: All structural steel shapes, plates, bars and their products shall conform to the requirements of ASTM A 36.

B. Corrosion Protection: Unless otherwise shown, miscellaneous metalwork of fabricated steel, which will be used in a corrosive environment and/or will be submerged in water/wastewater shall be coated in accordance with Section 09900 entitled, "Painting and Coating", and shall not be galvanized prior to coating. All other miscellaneous steel metalwork shall be hot-dip galvanized after fabrication as specified herein.

C. Stainless Steel: Stainless steel metalwork shall by of Type 316 stainless steel.

2.02 STEEL PIPE HANDRAILS

A. Steel pipe handrails which may be partially or wholly submerged or which are located inside a hydraulic structure shall be entirely of Type 316 stainless steel. All other steel pipe handrails shall be standard 1-1/2 inch black steel pipe made up by welding and hot-dip galvanized after fabrication.

2.03 METAL GRATING AND FLOOR HATCHES

A. General: Metal grating and floor hatches shall be of the design, sizes and types shown. Aluminum in contact with other metal or concrete shall have the contact surface shop-painted per System 10 specified under Section 09800 entitled, "Protective Coatings".

B. Metal Grating: Metal grating shall be of aluminum or stainless steel as shown. No single piece of grating shall weigh more than 80-lbs. unless specifically detailed otherwise. Aluminum shall be 6061T6 Alloy Bearing Bars and 6063T5 Alloy Cross Bars. Stainless steel shall be Type 316. All grating shall be completely banded. Grating shall be rated at 150 lb/sq. ft.

C. Floor Hatches: Floor hatches shall be of steel or aluminum as shown. Hatches shall be double-swing and shall be furnished with two (2) stay bars designed to hold the cover in an open position and provide a railing around the opening. The hatch shall be designed to provide storage for the stay bars when the hatch is closed. The hatch shall have four (4) flush handles and a gutter or moat-type edge drain complete with drain connection. Steel

hatches shall be hot-dip galvanized after fabrication.

2.04 SEAT ANGLES AND SUPPORTS

A. Seat angles for grating shall be aluminum or stainless steel. All support angles buried, submerged or below top of hydraulic structures shall be stainless steel.

2.05 BOLTS AND ANCHORS

A. Galvanized Bolts: Except where otherwise shown or specified, all bolts, anchor bolts and nuts shall be steel, galvanized after fabrication as specified herein. Threads on galvanized bolts and nuts shall be formed with suitable taps and dies such that they retain their normal clearance after hot-dip galvanizing.

B. Steel for Bolts: Except as otherwise specified herein, steel for bolts, anchor bolts and cap screws shall be in accordance with the requirements of ASTM A 307 Grade B, or threaded parts of ASTM A 36 and shall meet the following additional requirements:

1. The nut material shall be free-cutting steel.

2. The nuts shall be capable of developing the full strength of the bolts. Threads shall be Coarse Thread Series conforming to the requirements of the American Standard for Screw Threads. All bolts and cap screws shall have hexagon heads and nuts shall be Heavy Hexagon Series.

3. The length of all bolts shall be such that after joints are made up, each bolt shall extend through the entire nut, but in no case more than 1/2-inch beyond the nut.

C. Stainless Steel Bolts: Unless otherwise shown, all bolts, anchor bolts, washers and nuts which are buried, submerged or below the top of the wall inside any hydraulic structure shall be of Type 316 stainless steel.

D. Unless otherwise shown, expanding-type anchors shall be steel expansion type. Lead caulking anchors will not be permitted. Size shall be as shown. Expansion type anchors which are to be embedded in grout may be steel. Non-embedded buried, submerged or below top of hydraulic structure anchors shall be entirely stainless steel.

2.06 POWER-DRIVEN PINS

A. Power-driven pins shall not be used unless specifically approved by the Engineer.

PART 3 - EXECUTION

3.01 FABRICATION AND INSTALLATION REQUIREMENTS

A. Fabrication and Erection: Except as otherwise shown, the fabrication and erection of structural steel shall conform to the requirements of the American Institute of Steel Construction "Manual of Steel Construction".

B. Aluminum Railings: Aluminum railing is specified in Section 05521.

C. Steel Railings: Field welding of steel pipe handrail joints will be permitted only if approved by the Engineer.

3.02 WELDING

A. Method: All welding shall be by the metal-arc method or gas-shielded arc method as described in the American Welding Society's "Welding Handbook" as supplemented by other pertinent standards of the AWS. Qualification of welders shall be in accordance with the AWS Standards governing same.

B. Quality: In assembly and during welding, the component parts shall be adequately clamped, supported and restrained to minimize distortion and for control of dimensions. Weld reinforcement shall be as specified for the AWS Code. Upon completion of welding, all weld splatter, flux, slag and burrs left by attachments shall be removed. Welds shall be repaired to produce a workmanlike appearance with uniform weld contours and dimensions. All burrs, spatter and sharp corners of material shall be ground smooth prior to coating.

3.03 GALVANIZING

A. All structural steel plates, shapes, bars and fabricated assemblies required to be galvanized shall, after the steel has been thoroughly cleaned of rust and scale, be galvanized in accordance with the requirements of ASTM A 123. Any galvanized part that becomes warped during the galvanizing operation shall be straightened. Bolts, anchor bolts, nuts and similar threaded fasteners, after being properly cleaned, shall be galvanized in accordance with the requirements of ASTM A 153. Field repairs to galvanizing shall be made using "Galvinox", "Galvo-Weld", or approved equal.

END OF SECTION 055200

DIVISION 6 – WOODS, PLASTICS, AND COMPOSITES

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

SECTION 079200 - SEALANTS, CAULKING AND BELOW GRADE WATERPROOFING

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall perform all caulking, sealing, moisture protection and appurtenant work complete and in accordance with the requirements of the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Joints In Concrete. Section 032900

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Federal Specifications:

TT-S-00230C(2)	Sealing Compound, Elastomeric Type, Single Component, (For Caulking, Sealing and Glazing in Buildings and Other Structures).
TT-S-001543A	Sealing Compound, Silicone Rubber Base, (For Caulking, Sealing and Glazing in Building and Other Structures).

B. Commercial Standards:

ASTM D 41	Specification for Asphalt Primer Used in Roofing and Waterproofing.
ASTM D 226	Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
ASTM D 312	Specification for Asphalt Used in Roofing.
ASTM D 4551	Standard for PVC Flexible Sheeting for Concealed Water Containment Membranes.

1.04 CONTRACTOR SUBMITTALS

A. Samples: The Contractor shall submit to the Engineer for review, samples, including color samples of all the caulking and sealant materials and other moisture protection materials he proposes to use. The samples shall be clearly marked with the manufacturer's name and product identification and shall be submitted along with the manufacturer's technical data and application instructions.

B. The Contractor shall submit copies of the manufacturer's technical literature, specifications, warranty and installation instructions.

PART 2 - PRODUCTS

2.01 SEALANTS AND CAULKING MATERIALS

A. All caulking and sealing materials shall conform to the following requirements:

1. Sealant for joints in concrete is specified under Section 032900, entitled "Joints in Concrete".

2. Sealant for general exterior and/or interior architectural use shall be 2-part polyurethane, gun grade, such as Products Research Corp "210"; Progress Unlimited "Iso-Flex 2000"; or equal. Sealant for interior use may be 1-part acrylic trypolymer sealant, such as Tremco's "Mono"; Dap One-Part Acrylic; or equal.

3. The sealants used with aluminum doors, windows, storefronts and frames shall be silicone sealant conforming to Federal Specifications TT-S-001543A (Class A) and TT-S-00230C(2) (Type II, Class A).

4. Filler material shall be resilient, closed-cell polyethylene foam and/or bond breakers of proper size for joint widths. It shall be compatible with sealant manufacturer's product.

5. Primers shall be as recommended in the manufacturer's printed instructions for caulking and sealants.

6. Cleaning and cleanup solvents shall be as recommended in the manufacturer's printed instructions for caulking and sealants.

7. All sealants, chemicals and materials that will be in contact, or may come into contact, with potable water shall be ANSI/NSF 60, 61 certified for use with potable water systems.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. All work under this Section and all testing, where applicable, shall be performed in accordance with manufacturer's printed recommendations, specifications and installation instructions except where more stringent requirements are shown or specified herein; and, except where project conditions require extra precautions or provisions to assure performance of the waterproofing system.

B. Authorized Installers: Caulking, sealants and moisture protection shall be complete systems and installed only by installers authorized and approved by the respective manufacturers.

C. Sub-Slab Membrane: A sub-slab membrane shall be installed under all new building floor slabs with vinyl composition tile finishes and at other locations designated in the Contract Documents.

D. Showers: Showers shall be provided with a shower pan membrane waterproofing system as specified herein for moisture protection.

3.02 SEALANT FILLED JOINTS

A. The Contractor shall be responsible for providing the on-site services of the sealant manufacturer's representative prior to sealant work to inspect the joints to be sealed and to instruct the installer in the proper use of the materials. Joints and spaces to be sealed shall be clean, dry and free of dust, loose mortar and other foreign materials. Ferrous metal surfaces shall be cleaned of all rust, mill scale and other coatings by wire brush, grinding or sandblasting. Oil and grease shall be removed by cleaning in accordance with sealant manufacturer's printed recommendations. Protective coatings shall be removed from all aluminum surfaces against which caulking or sealing compound is to be placed. Bituminous or resinous materials shall be removed from surfaces to receive caulking or sealants. Where required by the manufacturer, sides of joints of porous materials shall be primed immediately prior to caulking or sealing.

B. Sealant depth in expansion joints shall be 1/2 the width of joint, but not less than 1/8-inch deep and 1/4-inch wide nor more than 1/2-inch deep and 1-inch wide. All joints shall have a rigid filler material installed to proper depth prior to application of sealant.

C. A full bead of sealant shall be applied into the joint under sufficient pressure with the nozzle drawn across sealant to completely fill the void space and to ensure complete wetting of contact area to obtain uniform adhesion. Sealants shall be tooled immediately after exposure with caulking tool or soft bristled brush moistened with solvent. The finished sealant filled joint shall be slightly concave unless detailed otherwise.

D. After application of sealant and caulking materials, adjacent materials which have been soiled shall be cleaned and left in a neat, clean, undamaged or discolored condition. On porous surfaces, excess sealant shall be removed per sealant or caulking manufacturer's printed instructions.

END OF SECTION 079200

DIVISION 9 – FINISHES

SECTION 098000 - PROTECTIVE COATINGS

PART 1 - GENERAL

1.01 DESCRIPTION

Painting and coating shall include all materials, labor tools, equipment and services required for the furnishing and application of all painting and coatings as specified herein or as indicated on the drawings. Work shall include, but not be limited to, cleaning and preparation of surfaces, paint materials, and the application of all paint and other materials.

1.02 SCOPE OF WORK

A. Equipment and materials which require painting or coating including but not limited to:

1. System 1: Primary structural members of buildings.

2. System 2: (Hot-Dip Galvanized) Stair stringers, grating embeds, platform steel, supports, secondary members of buildings.

3. System 3: (Interior and Exterior Piping) All above ground piping including pipe supports.

4. System 4: (Concrete) Any concrete noted on the plans where coating is called for.

1.03 QUALITY ASSURANCE

A. Codes and Standards. In addition to the requirements of these specifications, the work to be performed under this section shall comply with the following codes and regulations:

1. Steel Structure Painting Council Specifications (SSPC).

2. National Association of Corrosion Engineers Standards (NACE).

3. Applicable Standards of American National Standards Institute, Inc. (ANSI).

4. Occupational Safety and Health Act regulations (OSHA).

B. Painter's Qualifications. The Contractor shall cause the work specified under this section to be performed by or under the supervision of a qualified painter. The Contractor shall be prepared to document the painter's experience, competence and ability to comply with the requirements of these specifications and to complete the work in a timely manner. The painting and coating subcontractor shall provide three references which show successful experience with the specified coating systems.

C. Standard Products. All materials, supplies and articles provided shall be the standards products of recognized, reputable manufacturers. All paints in a particular paint system shall be the products of a single manufacturer. The Contractor shall also minimize the number of paint suppliers. Do not use lead-base primers or final coats on any surface or metals.

The standard products of manufacturers other than those specified will be accepted when it is demonstrated to the satisfaction of the Engineer they are equal in composition, durability, usefulness and convenience for the purpose intended.

1.04 SUBMITTALS

A. Before any paint materials are delivered to the job site, the Contractor shall submit a complete list of all materials proposed to be furnished and applied under this section.

Two identical sets of samples of actual paint colors shall be submitted for acceptance at least three (3) months prior to painting. Samples of each color and system used shall be painted on to 8-1/2 inch by 11-inch material. The material for the samples, where possible, shall be the same material as that on which the coating will be applied in the work.

For each paint, the Contractor shall furnish the paint manufacturer's specific application instructions which shall include the following:

1. Surface preparation recommendations.
2. Type of primer, if required.
3. Maximum dry and wet mil thickness per coat.
4. Minimum and maximum curing time between coats, including atmospheric conditions for each.
5. Curing time before submergence in water.
6. Thinner to be used with each paint.
7. General ventilation requirements.
8. Atmospheric conditions during which the paint shall not be applied.
9. Allowable methods of application.
10. Maximum, allowable moisture content and minimum age of plaster, concrete and wood surfaces at time of paint application.

1.05 DELIVERY AND STORAGE

All materials shall be delivered to the job site in their original, unopened containers bearing the manufacturer's name, brand, batch number, date of manufacture, and any special directions. Only the approved material shall be stored at the job site and stored only in designated areas restricted to the storage of paint materials and related equipment. All paints shall be stored in enclosed structures and shall be protected from weather and excessive heat or cold Flammable materials shall be stored to conform to state and local safety codes. Emulsion type paints shall be protected from freezing. Materials exceeding storage life recommended by the manufacturer will be subject to rejection and, if so rejected, removed from the site.

1.06 MANUFACTURER REPRESENTATION

Require the paint manufacturer to make available a qualified technical representative to visit the job site for technical support if necessary, in order to resolve field problems attributable to or associated with the manufacturer's products furnished under this contract.

1.07 PROTECTION OF SURFACES NOT TO BE COATED

A. Protect surfaces and equipment which are not to receive coatings during surface preparation, cleaning and painting operations.

B. Remove mask, or otherwise protect hardware, lighting fixtures, switchplates, machines, surfaces, couplings, shafts, bearings, nameplates on machinery, and other surfaces not intended to be painted. Provide drop cloths to prevent paint materials from falling on or marring adjacent surfaces. Protect working parts of mechanical and electrical equipment from damage during surface preparation and painting. Mask openings in motors and equipment to prevent abrasives, paint and other materials from entering.

C. Exercise care not to damage adjacent work during sandblasting operations. Conduct spray painting under controlled conditions. Promptly repair any damage to adjacent work or adjoining property occurring from sandblasting or spray-painting operations.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Use coating materials suitable for the intended use and recommended by their manufacturer for the intended service.

B. Use quality products of nationally known manufacturers having an established good reputation in the manufacturer of quality protective coatings. Use products that have a minimum of five years of similar, satisfactory field service.

C. In any coating system, use compatible coatings and products of only one manufacturer. Coatings used for touch up shall be the same as the original materials.

D. Use materials within the manufacturer's recommended shelf life.

E. Deliver the paint materials to the job site in the manufacturer's unopened containers and prepare a list of all batch numbers for the Engineer prior to the start of work.

F. Where practicable, apply each succeeding coat of paint using a different color or shade. Where a particular finish color is specified herein, it is for bidding purposes only. Finish colors shall be as selected from the manufacturer's standard color sheets by the Engineer.

G. Where alternative products are specified, selection from among the alternatives is at the Contractor's option.

H. The Contractor may submit for consideration paint materials of manufacturers other than those specified herein. Provide satisfactory documentation from the firm manufacturing the proposed material that the material meets the specified requirements and is equivalent or better than the listed materials in the following properties:

1. Quality
2. Durability
3. Resistance to abrasion and physical damage
4. Life expectancy
5. Ability to recoat in future
6. Solids content by volume
7. Dry film thickness per coat
8. Compatibility with other coatings
9. Suitability for the intended service
10. Resistance to chemical attack
11. Temperature limitations in service and during application
12. Type and quality of recommended undercoats and topcoats
13. Ease of application
14. Ease of repairing damaged areas
15. Stability of colors

Provide tests and analyses of the proposed substitute materials required by the Engineer. If the proposed substitution requires changes in the contract work, the Contractor hall bear shall such costs involved and the costs of allied trades affected by the substitution.

2.02 SYSTEM 1 – EPOXY COATING OF FERROUS METAL

A. Areas of Application. All interior primary structural members that are not hot-dip galvanized, shall receive this protective coating. Existing primary clarifier mechanisms. Underside of the new digester lid and all ferrous metal on the inside of the digester including but not limited to pipes, side sheets, supports, and mixers.

B. Coating

1. Prime Coat: BarRust 233H Epoxy or Devoe BarRust 235 or equal – 6 mils
   Finish Coat: Devthane 379 Aliphatic Urethane semi gloss or equal – 3 mils
   Preparation shall be according to manufacturers recommendations.

2.03 SYSTEM 2 – HOT-DIP GALVANIZING

A. Area of Application: may include but is not limited to stair stringers, grating embeds, fasteners, support members, and interior structural members not epoxy coated per System 1.

B. Fabricator Preparation

1. The Fabricator shall consult with the hot dip galvanizer to insure that materials, fabrication, and prep work will prevent potential problems during the galvanizing process.

2. The Fabricator shall remove all welding slag, splatter, anti-splatter compounds and burrs prior to delivery for galvanizing. Avoid unsuitable marking paints. Consult with the galvanizer about removal of grease, oil paint and other deleterious material prior to fabrication. Remove by blast cleaning or other methods surface contaminants and coatings, which would not be removable by the normal chemical cleaning process in the galvanizing operation.

C. Hot-Dip Galvanizing

1. Pre-clean steelwork in accordance with accepted methods to produce an acceptable surface for quality hot dip galvanizing.

2. Galvanize steel members, fabrications, and assemblies after fabrication by the hot dip process in accordance with ASTM A123. Galvanize bolts, nuts and washers and iron and steel hardware components in accordance with ASTM A153.

3. Safeguard products against steel embrittlement in conformance with ASTM A143.

4. Handle all articles to be galvanized in such a manner as to avoid any mechanical damage and to minimize distortion.

5. Coating Weight: conform with paragraph 5.1 of ASTM A123, Table 1 of A767, or Table 1 of ASTM A153, as appropriate.

6. Surface Finish: Continuous, adherent, as smooth and evenly distributed as possible and free from any defect detrimental to the stated end use of the coated article.

7. Adhesion: Withstand normal handling consistent with the nature and thickness of the coating and normal use of the article.

D. Testing

1. Inspection and testing of hot dip galvanized coatings shall include visual examination and tests in accordance with ASTM A123, A767 or A153 as applicable to determine the thickness of the zinc coating on the metal surface.

2. Furnish Notarized Certificate of Compliance with ASTM Standards and Specifications herein listed. The Certificate must be signed by the galvanizer and contain a detailed description of the material processed. The Certificate shall include information as to the ASTM standard used for the coating.

E. Repair of Damaged Coating

1. The maximum area to be repaired is defined in accordance with ASTM A123 Section 4.6 current edition.

    a. The maximum area to be repaired in the field shall be determined in advance by mutual agreement between parties.

2. Repair areas damaged by welding, flame cutting or during handling, transport or erection by one of the approved methods in accordance with ASTM A780 whenever damage exceeds 3/16" in width. Minimum thickness requirements for the repair are those described in ASTM A123 section 4.6 current edition.

2.04 SYSTEM 3 – ABOVE GROUND PIPING

A. Area of application: All non-buried and non-heat traced piping, including pipe supports.

B. Surface Preparation.

1. Follow manufactures recommendations for surface preparation for each different piping material. Piping materials may consist of PVC, galvanized steel, and ductile iron.

C. Coating

1. Alkyd Primer or equal

2. First and second coats: colored Alkyd to match color system Semi-Gloss

3. Total finish thickness of 5 mils.

D. Service Colors: Potable Water Blue

2.05 SYSTEM 4A – CONCRETE

A. Area of Application. Concrete that is to be coated where noted on the plans.

B. Immersion H_2S Vapor Exposure

1. System Type: Modified Polyamine Epoxy.
2. Surface Preparation: SSPC-SP 13/NACE 6. ICRI CSP 5 Abrasive blast.

    a. Surface preparation techniques employing acid, organic solvents, extreme heat (flame), impact tools (scabblers) and scarification is prohibited. After degreasing as necessary and when concrete is dry, shot blast entire area to produce a surface profile between ICRI CSP 3 and ICRI CSP 5 (excluding ICRI CSP 4). Shot blasting equipment shall produce a 20” minimum blast path width and, in addition, each pass shall be slightly overlapped (1/4” – 1/2” overlap). New shot shall be added to shot blasting equipment prior to blasting. Shot blasting shall stop when the concrete’s surface resembles an ICRI CSP 5 profile. If contractor produces concrete surfaces with a level of coarseness greater than an ICRI CSP 5 profile, contractor shall resurface these areas at the contractor’s expense. Concrete surfaces inaccessible to shot blasting (base of walls and under secured equipment) shall be

prepared using diamond disk grinding to produce an ICRI CSP 2 profile. Resulting surfaces shall appear visually clean and contain the appropriate level of surface profile. If the resulting level of cleanliness cannot be determined, adhesion testing in accordance to ASTM D 4541 shall be conducting on the dirtiest areas of concrete. Each adhesion test shall produce cohesive failures within the concrete above 200 psi with concrete chunks attached to each pull-off coupon.

b. Contractor shall ensure that blasting material and blasted material be contained within the surface preparation area. Sand, cement, sediment laden water, and other deleterious materials shall not be allowed in effluent downstream of abrasive blast work. The Contractor shall take every precaution to ensure that downstream facilities are not injured or interrupted by abrasive blasting activities.

3. Primer: Tnemec Series 218 MortarClad or equal. DFT 1/16 in.
4. Intermediate: Tnemec Series 434 Perma-Shield H_2S or equal. DFT 125.0 Mils
5. Finish Coat: Tnemec Series 435 Perma-Glaze or equal. DFT 30.0 to 40.0 mils.
6. Total DFT: 125.0 to 165.0 mils
7. Finish Color: As selected by Owner from manufacturer's standard colors

PART 3 - EXECUTION

3.01 PREPARATION OF SURFACES

A. Inspect and provide substrate surfaces that are prepared in accordance with these specifications and the printed instructions and recommendations of the paint manufacturer whose product is applied.

B. Metal Surface Preparation (Ungalvanized)

1. The minimum abrasive blasting surface preparation is as specified in the coating system schedules. Where there is a conflict between these specifications and the coating manufacturer's recommendations for the intended service, provide the higher degree of cleaning.

2. Provide workmanship, materials and methods for metal surface preparation in conformance with the referenced current Steel Structures Painting Council (SSPC) specifications and this Section. Provide blast-cleaned surfaces that match the standard samples available from the National Association of Corrosion Engineers, NACE Standard TM-0 1-70.

3. Inspect surfaces to be coated and remove all oil, grease, welding fluxes and other surface contaminants by alkaline washing per Paragraph 2.05C prior to blast cleaning.

4. Grind all sharp edges round or chamfered and grind smooth all burrs and surface defects prior to blast cleaning.

5. Select the type and size of abrasive to produce a surface profile that meets the coating manufacturer's recommendation for the particular coating and service conditions.

6. Do not reuse the abrasive unless approved by the Engineer. For automated shop blasting Systems, maintain clean, oil-free abrasives.

7. Comply with the applicable federal, state, and local air pollution control regulations

for blast cleaning.

8. Supply compressed air for air blast cleaning at adequate pressure from well-maintained compressors equipped with oil/moisture separators which remove at least 95 percent of the contaminants.

9. Clean surfaces of all dust and residual particles of the cleaning operation by dry air blast cleaning, vacuuming or another approved method prior to painting.

10. Vacuum clean and wipe with a tack cloth enclosed areas and other areas where dust settling is a problem.

11. If newly applied coatings are damaged or defective, remove the coating by the specified blast cleaning to meet the clean surface requirements before recoating.

12. If the specified abrasive blast cleaning will damage adjacent work, the areas to be cleaned is less than 100 square feet and the coated surface will not be submerged in service, then SSPC-SP-2, hand tool cleaning or SSPC-SP-3, power tool cleaning may be used to achieve the specified surface preparation.

13. Completely remove shop-applied coatings of unknown composition before the specified coatings are applied. Examine valves, castings, ductile or cast iron pipe, fabricated pipe and equipment for the presence of shop applied temporary coatings. Completely remove temporary coatings by solvent cleaning before the abrasive blast cleaning work is started.

14. Alkaline clean shop primed equipment per Paragraph 2.05C in the field before finish coats are applied.

3.02 COATING APPLICATION

A. Apply coatings to steel substrates in accordance with "Paint Application Specification No.1", (S SPC-A- 1), Steel Structures Painting Council. Use experienced workers who are skilled in application of the coating materials.

B. Inspect cleaned surfaces and all coats prior to each succeeding coat. Schedule such inspection with the Engineer in advance.

C. Apply all coatings according to manufacturer's instructions, recommendations and these specifications. If directions differ, the most stringent requirements shall be followed.

D. Paint blast cleaned ferrous metal surfaces before any rusting or other deterioration of the surface occurs. Blast clean only those surfaces that can be coated in the same working day.

E. Each coat will be subject to inspection prior to application of the next coat.

F. For submerged and severe service conditions, brush apply coating material to edges, angles, weld seams, flanges, nuts and bolts, and other placed where insufficient fill thicknesses are likely to be present prior to the first coat. For other exposures use stripe painting for these areas.

G. Particular attention shall be paid to materials that will be joined so closely that proper

surface preparation and paint application is not possible. Such surfaces shall be painted prior to assembly on installation.

H. Apply all finish coats, including touch-up and damage repair coats in a manner which will present a uniform texture and color-matched appearance.

I. Do not apply coatings (1) in temperature conditions outside the manufacturer's recommended range, (2) in dust, smoke-laden atmosphere, (3) damp or humid weather, (4) when the temperature is less than 5 degrees F above dew point, (5) when it is expected the air temperature will drop below 40 degrees F, or less than 5 degrees F above the dew point within 8 hours after application of coating. Measure the dew point by use of a sling psychrometer in conjunction with U.S. Dept. of Commerce Weather Bureau psychometric tables.

J. Abrasive blast and prime steel piping before installation.

K. Apply the finish coat on all work after all concrete, masonry, and equipment installation is complete and the work areas are clean and dust free.

3.03 TESTING

A. Holiday Testing. Test all coated ferrous surfaces which will be submerged in water or other liquids for pinholes in the coating using an approved holiday detector. Additionally,

test any other ferrous surfaces required elsewhere in these specifications to be tested for holidays, in accordance with the provisions of this Section. Repair or recoat areas found to contain pinholes in accordance with the coating manufacturer's instructions and retest.

1. COATINGS WITH THICKNESS EXCEEDING 20 MILS. For surfaces having a total dry film coating thickness exceeding 20 mils; pulse-type holiday detector, Tinker & Rasor Model AP-W, D.E. Stearns Co., Model 14.20 or equal, adjusted to operate at the voltage required to cause a spark jump across an air gap equal to twice the specified coating thickness.

2. COATINGS WITH THICKNESS OF 20 MILS OR LESS. For surfaces having a total dry film coating thickness of 20 mils or less: Tinker & Rasor Model Ml non-destructive type holiday detector, K-D Bird Dog, or equal, operating at less than 75 volts. For thickness between 10 and 20 mils, a non-sudsing type wetting agent, Kodak Photo-Flo, or equal, shall be added to the water prior to wetting the detector sponge.

B. Testing dry film thickness. On ferrous metals, coating thickness shall be measured with a magnetic type dry film thickness gauge such as Mikrotest Model FM, Elcometer Model 11 l/lEZ, or equal. Each coat shall be checked for the correct thickness. No measurement will be made until at least 8 hours after application of the coating.

3.04 CLEANUP

Upon completion of all painting, the Contractor shall remove all surplus materials, protective coverings and accumulated rubbish and thoroughly clean all surfaces and repair any overspray or other paint-related damage.

END OF SECTION 098000

SECTION 099000 - PAINTING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included: Finishing work of this Section, as a system, includes but is not limited to the following:

1. Preparation of all surfaces

2. Performance and completion of painting and finishing of all required interior and exterior surfaces, including exposed Mechanical and Electrical Work in finished spaces, including flashing. For Mechanical and Electrical identification systems see those Divisions.

3. Finish for factory primed items is specified under individual sections for factory priming, including items specified in Division 15 and 16.

B. Related Work Described Elsewhere:

Section 033000	Cast-in-Place Concrete
Section 055000	Miscellaneous Metalwork

C. Work Not to be Finished:

1. Shop painting or priming of metal which is specified under other Sections, except for minimal spot touch-up of surfaces braded during installation.

2. Surfaces in concealed areas and inaccessible areas such as furred spaces, foundation spaces, utility tunnels, pipe spaces, and duct shafts, unless otherwise indicated.

3. Metal surfaces of anodized aluminum, stainless steel, chromium plate, polished copper, bronze, and similar finished materials, unless otherwise indicated.

4. Any moving parts of operating units; mechanical or electrical parts such as valve operators, linkages, sinkages, sensing devices, and motor shafts, unless otherwise indicated.

5. Any required labels or equipment identification, performance rating, brand name, or nomenclature plates.

6. Sheet metal work which has exterior insulation.

7. Items which have been factory finished or which are surfaces with plastic laminate.

D. Definitions:

1. The term "paint", as used herein, means all finish coating systems materials including primers, emulsions, epoxy, enamels, sealers, fillers, and other applied materials whether used as prime, intermediate, or finish coats other than special coatings or pool waterproofing which are specified elsewhere.

1.02 QUALITY ASSURANCE

A. Qualification of manufacturer: Products used in the Work of this Section shall be produced by manufacturers regularly engaged in manufacture of similar items and with a history of successful production acceptable to the Owner. Furnish source materials to Painting Inspection Agency for testing when required by Inspection Agency representative.

B. Qualifications of Workers:

1. The firm engaged for Work under this Section shall, upon request, furnish in writing, his qualifications attesting to past satisfactory experience in painting Work of not less than the scope of this Project.

2. Only qualified journeymen shall be engaged to do the painting work under this Section. Apprentices may be employed working under qualified journeymen's directions in accordance with trade regulations.

1.03 STANDARDS

A. American Society for Testing and Materials (ASTM):
D 2200-67 (1980) "Pictorial Surface Preparation Standards for Painting Steel Surfaces".

1.04 SUBMITTALS

A. Manufacturers' Data: Within 30 calendar days after award of the Contract, submit:

1. Complete materials list of all items proposed to be furnished and installed under this Section.

2. Manufacturers' specifications and other data required to demonstrate compliance with the specified requirements.

3. For information only, submit two copies of manufacturer's specifications, including analysis and application instructions for each material. Indicate by transmittal that a copy of each manufacturer's instructions has been distributed to the applicator.

4. Upon receipt of review comments, make all revisions and corrections, and resubmit if so required.

B. Samples:

1. Following the selection of colors and glosses by the Owner, submit samples for the Owner's review:

   a. Provide two samples of each color and each gloss on final substrate for each material on which the finish is specified to be applied.
   b. Except as otherwise directed by the Owner, samples shall be approximately 30 cm (12") square.
   c. If so directed by the Owner, submit samples during progress of the Work of this Section in the form of actual application of the approved materials on actual surfaces to be painted.

2. Revise and resubmit each sample as required until the Owner's approval of gloss, color, and texture is achieved.

1.05 PRODUCT HANDLING

A. Delivery of Materials: Deliver all materials to the job site in original, new, and unopened containers bearing the manufacturer's name and label showing at least the following information:

1. Name or title of the material
2. Manufacturer's stock number
3. Manufacturer's name
4. Contents by volume for major constituents
5. Thinning instructions
6. Application instructions

B. Storage of Materials: Provide proper storage to prevent damage to, and deterioration of, paint materials in accordance with manufacturer's instructions.

C. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation and to protect the Work and materials of all other trades.

D. Fire Hazard & Safety: Take all necessary precautionary measures to prevent fire hazards and spontaneous combustion.

E. Toxic Material:

1. Where toxic materials, and both toxic, acetic, and explosive solvents are used, take appropriate precautions, as a regular procedure, conforming to the manufacturer's recommendations therefore, and to the requirements of the applicable safety regulatory agencies.
2. In applying acid etch coating or solutions to metal, concrete, plaster, and toxic materials to copper, provide ventilation and take protective measures to conform to the requirements of the safety regulatory agencies.

F. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner at no additional cost.

1.06 JOB CONDITIONS

A. Surface Temperatures: Do not apply solvent-thinned paints when the temperature of surfaces to be painted and the surrounding air temperature are below 50 degrees F., unless otherwise permitted by the manufacturer's printed instructions as approved by the Owner.

B. Temporary Heat: Provide approved temporary heat for Interior Work to attain temperatures specified hereinabove for Work in this Section.

C. Lighting: Do not proceed with Work under this Section unless a lighting level of a minimum of 15 foot candles is provided on the surfaces to be painted or finished. This contractor to provide temporary lighting to attain lighting level specified.

D. Ventilation: Provide adequate continuous ventilation as required for the various specified materials used in the spaces scheduled but in no case for a time less than that recommended by the paint manufacturer for drying.

1.07 PROTECTION

A. General: Adequately protect other surfaces from paint materials and damage caused by this Work. Make good any damage caused by failure to provide suitable protection at no additional cost to the Owner.

B. Drop Cloths: Provide sufficient drop cloths, shields and protective equipment to prevent spray or dripping from fouling surfaces not being painted and, in particular, surfaces within the paint storage and preparation area.

C. Removal of Flammable Rubbish: Place cotton waste cloths and material which may constitute a fire hazard in closed metal containers and daily remove from the site.

D. Removal of Hardware & Miscellaneous Items:

1. Carefully remove electrical outlet and switch plates, mechanical diffusers, escutcheons, surface hardware, fittings, fastenings, etc. prior to starting Work under this Section.
2. Carefully store, clean and replace these items upon completion of Work in each area. Use no solvent or abrasives to clean hardware that will remove the permanent finish used on these items.

1.08 REQUIREMENTS OR REGULATORY AGENCIES

A. Codes: Observe and conform to all Federal, State and Local Fire, Safety and Ecological Laws and regulations applicable to Work in this Section.

1.09 EXTRA STOCK

A. Amount: Upon completion of the Work of this Section, deliver to the Owner an extra stock equaling 1 gallon of each color, type and gloss of paint or stain used on the Work.

B. Packaging: Tightly seal each container and clearly label with the contents and location used.

PART 2 - PRODUCTS

2.01 PAINT MATERIALS - GENERAL

A. Coating and materials other than those specified: Shall be of the standard specified, or a higher quality, top line product from an approved manufacturer.

B. Primers and undercoaters: Shall be compatible with the brand of finish paint used.

C. Mixing: All paint products shall be thoroughly mixed until homogeneous. Paints that have settled to a condition that makes them difficult to mix shall be removed from the job. Skins and other irregular particles shall be removed by straining through fine nylon. Only clean equipment and tools shall be used.

D. Thinning: All paints are ready to apply as supplied. Under certain circumstances, however, thinning may be necessary. No thinning will be approved unless the manufacturer of the paint recommends it and documents the necessity to the Owner in writing.

2.02 MIXING

A. General:

1. Furnish ready-mixed products unless otherwise specified. Follow manufacturer's directions for field-mixing of pastes and powders and for field-catalyzing components.
2. Fully grind pigments to maintain a soft paste consistency in the vehicle during storage. It is required to be dispersed readily and uniformly by paddle to a completely homogeneous mixture ready for use, to have good flowing and brushing properties, to dry or cure free of streaks or sags and to yield the desired finish specifications.
3. Store materials not in actual use in tightly covered containers.
4. Maintain containers used in storage, mixing, and application of paint in a clean condition, free from foreign materials and residue.

B. Stirring: Stir all materials before application to produce a mixture of uniform density, and as required during the application of the materials. Do not stir into the material any film which may form on the surface. Remove the film and, if necessary, strain the material before using.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

A. Inspection: Carefully inspect the installed Work of all other trades and verify that all

such Work is complete to the point where this installation may properly commence. Verify that painting may be completed in accordance with the design drawings and with the manufacturers' recommendations as approved by the Owner.

B. Discrepancies: Notify Owner in writing prior to commencing work or after the prime coat shows defects in the substrate of any defects or problems. Except as noted, starting Work under this Section implies acceptance of surfaces.

3.02 SURFACE PREPARATION

A. General: Prepare all new and existing surfaces as indicated below or, if not specified, consult Manual for surface preparation.

1. Prepare all surfaces for painting in compliance with manufacturers recommendations.
2. Remove loose, deleterious material from all surfaces by scraping and brushing. Patch minor defects, sand rough spots, and perform surface preparation work normal to the trade before applying paint. Brush all surfaces immediately prior to applying paint.
3. On existing finished surfaces to be re-painted or re-finished, remove all loose, blistered, scaled, or crazed finish to bare base material surface. Where new work joins existing work, prepare existing surfaces extending to the nearest break in the plane. Wash surfaces with TSP and water or other solution as required, rinse, and let dry.

B. Miscellaneous Steel and Iron: Put in proper condition to receive paint. Grease, rush, scale, dirt and dust are required to be removed by other trades except as otherwise noted.

1. Surfaces shop primed by others: At field welded or abraded spots, apply a phosphoric acid etch solution. Let set as recommended by acid etch manufacturer. Rinse with potable water. When thoroughly dry, immediately apply prime coat. Clean previously primed surfaces free of any remaining oil and grease.
2. Surfaces not previously shop primed: Remove rust and scale by wire brushing, sandblasting or other method. Remove dust dirt, oil, and grease using solvent wash. Apply phosphoric acid solution. Let set as recommended by acid etch manufacturer. Rinse with potable water. When thoroughly dry, immediately apply prime coat. Any defects showing in prime surface are required to be repaired by other trades. Reprime over repaired defects.

C. Structural Steel: Prepare shop primed steel as specified above for "Miscellaneous Steel and Iron".

D. Sheetmetal: Remove surface contamination and prepare surfaces in accordances with product manufacturer's instructions for priming.

E. Non-Ferrous Metal:

1. Aluminum and copper to be painted: Remove surface contamination by steam, high pressure water, or solvent washing. apply etching type primer, or, acid etch, let dry, then immediately prime paint.

2. Anodized aluminum: No work required.

F. Mechanical and Electrical Work: Prepare metal surfaces as specified for Miscellaneous steel and iron" and "Non-ferrous metals" as applicable to type of material scheduled to be painted. Remove dirt, grease and oil from canvas and cotton insulating covering.

G. Concrete and other cementitious surfaces:

1. Remove dirt, scale, powder, laitance, parting compounds, oil and grease, by light sandblasting treatment or alternate method that has been approved by the Owner. For cast-in-place work allow at least 14 days after forms have been removed by others before starting work, unless otherwise approved by Owner.
2. Remove stains caused by corroding metals by washing with sodium metasilicate solution after thoroughly wetting with potable water. Let thoroughly dry.

H. Concrete Floors: Remove contamination, dirt, dust, and foreign matter. Apply acid etch solution. Rinse with clean water. Let thoroughly dry. After surface treatment keep all traffic off surfaces until sealed.

I. Mildew removal: Scrub with approved cleaning/bleaching solution, then rinse with potable water; let dry thoroughly prior to painting.

M. Existing Painted Ferrous Metal: Sand rough edges of bare areas to featheredge at adjacent sound paint. Remove rust and loose paint to bare metal; solvent wash, then apply prime paint.

3.03 APPLICATION

A. Workmanship: The Contractor is solely responsible for uniform colors, textures and finishes of surfaces, irrespective of materials or number of coats specified.

B. General:

1. Apply paint or other finish by methods generally accepted by the trade to achieve approved finishes, except that all metal surfaces in finished spaces are required to be finished by spray-application. The application method must not adversely affect the appearance of the job or its durability. The surrounding and adjacent areas must not in any way be affected by the application methods.
2. Use materials only in accordance with the manufacturer's recommendations and apply at recommended and/or specified dry-mil thickness. Any shortage of film thickness or coats will cause remedial action as determined by the Owner. Film thickness shall be constant over V joints, edges, corners, etc. Fatty edges and unevenness will be corrected.
3. Eliminate such defects as sags, runs, color floats, etc., which are abnormal. Unsightly permanent impressions left on the surface by the applicators must be removed without defacing the surface.
4. In multiple coat work, provide each coat of paint of slightly different color than preceding coat. Sand lightly between coats to achieve required finish.
5. Do not apply finishes on surfaces not sufficiently dry and hard.

6 Tint filler to match stain when clear finishes are specified. Work filler well into grain. Before it has set work surface perpendicularly to the grain and wipe off excess.

7. Include as many additional coats as required for the work. It is the requirements of these specifications to obtain painted finishes of uniform color and textures, free from cloudy or mottled appearance on surfaces and evident thinness of coatings on surfaces; and to this end all spot-coating and undercoating shall be done to produce such results.

C. Finish Film Thickness: Apply primer, intermediate, and finish coats to not less than wet and dry film thicknesses and spreading rates for each of the various types specified.

D. Inspection: Each coat of paint shall be inspected and approved by the Owner before next coat of material is applied.

3.04 CLEANING, TOUCH-UP AND REFINISHING

A. Touch-up and Refinishing: A detailed final inspection of paint work shall be made. Runs, sags, misses, holidays, stains and other defects in the painted surfaces, including inadequate coverage and mil thickness shall be satisfactorily touched up, or refinished, or repainted as necessary to the satisfaction of the Owner.

B. Cleaning:

1. Carefully remove all spatterings, spots and blemishes caused by Work under this Section from surfaces throughout the Project. Remove in such a manner as not to damage surfaces. thoroughly clean paint and splatters from glass, mirrors, and other such surfaces. Take care not to scratch surfaces.
2. During the progress of the Work, keep the premises free from any unnecessary accumulation of tools, equipment, surplus materials and debris resulting from the Work under this Section. At the conclusion of the Work, leave the premises neat and clean and request final inspection from the Owner.

3.05 COLOR SCHEDULING

A. When not previously selected or scheduled:

1. Paint and finish colors will be selected by the Owner who will provide three different sets of color cards and schedules (minimum). These will identify where various colors and finishes are required to be applied.
2. For bidding purposes, and unless otherwise specified, refer to the finish schedules and adjacent surface paint, finish texture, and sheen for matching to following finishes.
   a. Access doors, registers, prime coated hardware, exposed conduit or piping and mechanical or electrical panels.

   b. Interior steel doors, their frames and trim. Match color of existing doors in building.

3.06 PAINT SCHEDULE

A. PAINTING AND FINISHING TITLES AND CODE NUMBERS: Provide work on Drawings, as scheduled below and as specified.

B GLOSS: To be selected by Owner.

C. SURFACES TO BE PAINTED:

Finish Code System

Alkyd Finish on Galvanized Metal:	1 coat pretreatment primer 1 coat rust-inhibitive primer 2 coats exterior alkyd
Latex Finish on Interior CMU:	1 coat Latex Primer Sealer 2 coats Interior Latex
Latex Finish on Gypsum Wallboard:	1 coat latex or alkyd primer sealer 2 coats interior latex
Alkyd Finish on Exposed Ferrous Metal:	1 coat alkyd rust-inhibitive primer (unless shop primed)
Alkyd Finish on Exposed Galvanized Metal:	1 coat pretreatment primer 1 coat galvanized primer 2 coats interior alkyd

CLEAR FLOOR SEALER for cast-in-place concrete at locations indicated: Seal all concrete floor surfaces with Sonneborn Sonoglaze per manufacturers recommendations.

END OF SECTION 099000

DIVISION 22 – PLUMBING

SECTION 220050 – GENERAL PIPES AND FITTINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 SUMMARY:

A. This section is generic in that it describes material and installation required by several other sections of this specification.

B. Types of pipes and pipe fittings specified in this section include the following:

1. Steel Piping
2. Copper Piping
3. Cast-Iron Pressure Piping
4. Cast-Iron Soil Piping
5. Plastic Piping
6. Grooved Joint Piping
7. Miscellaneous Piping Materials/Products.

C. Pipes and pipe fittings furnished as part of factory - fabricated equipment, are specified as part of equipment assembly in other Division - 22 sections.

1.3 QUALITY ASSURANCE:

A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of pipes and pipe fittings of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Installer's Qualifications:

1. Firm with at least three years history of successful experience on projects of similar nature.
2. Licensed as a firm in the contractor state of origin and in the State of Nevada.
3. Have a publicly registered bonding capacity of sufficient amount to cover this work and all other work in progress by the contractor.

4. All workmen employed on the project shall carry state licenses as journeyman or apprentice pipe fitters with additional certification for welders.

C. Welding Certification:

1. Each welder shall have passed a qualification test within the past six months.

2. The test shall be in accordance with the ASME Boiler and Pressure Vessel Code, Section IX, "Welding Qualifications", ASME Section VIII, and ANSI 313.

3. The test report shall certify that the welder is qualified to weld the material to be used at the job site.

4. The contractor shall submit three copies of each welder's qualification test report to the Project Manager for approval prior to commencing the work. No welder shall be used on the project until so certified.

1.4 SUBMITTALS:

A. Product Data: Submit manufacturer's technical product data, installation instructions, and dimensioned drawings for each type of pipe and pipe fitting. Submit piping schedule showing manufacturer, pipe or tube weight, fitting type, and joint type for each piping system.

B. Welding Certifications: Submit reports as required for piping work.

C. Brazing Certifications: Submit reports as required for piping work.

D. Maintenance Data: Submit maintenance data and parts lists for each type of mechanical fitting. Include this data, product data, and certifications in maintenance manual; in accordance with requirements of Division 1.

1.5 REFERENCES:

A. Codes and Standards:

1. Welding: Qualify welding procedures, welders and operators in accordance with ASME B31.1, or ASME B31.9, as applicable, for shop and project site welding of piping work.

2. Brazing: Certify brazing procedures, brazers, and operators in accordance with ASME Boiler and Pressure Vessel Code, Section IX, for shop and job-site brazing of piping work.

1.6 DELIVERY, STORAGE, AND HANDLING:

A. Except for concrete, corrugated metal, hub-and-spigot, clay, and similar units of pipe, provide factory-applied plastic end-caps on each length of pipe and tube. Maintain end-caps through shipping, storage and handling as required to prevent pipe-end damage and eliminate dirt and moisture from inside of pipe and tube.

B. Where possible, store pipe and tube inside and protected from weather. Where necessary to store outside, elevate above grade and enclose with durable, waterproof wrapping.

C. Protect flanges and fittings from moisture and dirt by inside storage and enclosure, or by packaging with durable, waterproof wrapping.

PART 2 - PRODUCTS

2.1 GENERAL:

A. Piping Materials: Provide pipe and tube of type, joint type, grade, size and weight (wall thickness or Class) indicated for each service. Where type, grade or class is not indicated, provide proper selection as determined by Installer for installation requirements, and comply with governing regulations and industry standards. Use United States (domestic) manufactured pipe only. Do not use foreign made pipe.

B. Pipe/Tube Fittings: Provide factory-fabricated fittings of type, materials, grade, class and pressure rating indicated for each service and pipe size. Provide sizes and types matching pipe, tube, valve or equipment connection in each case. Where not otherwise indicated, comply with governing regulations and industry standards for selections, and with pipe manufacturer's recommendations where applicable. Use domestic manufactured fittings only. Do not use foreign manufactured fittings.

2.2 STEEL PIPES AND PIPE FITTINGS:

A. Black Steel Pipe: Seamless or ERW, ASTM A 53.

B. Galvanized Steel Pipe: ASTM A 53.

C. Galvanized Seamless Steel Pipe: ASTM A 53.

D. Electric-Resistance-Welded Steel Pipe: ASTM A 135.

E. Electric-Fusion-Welded Steel Pipe: ASTM A 671, A 672, or A 691.

F. Cast-Iron Flanged Fittings: ANSI B16.1, including bolting.

G. Cast-Iron Threaded Fittings: ANSI B16.4.

H. Malleable-Iron Threaded Fittings: ANSI B16.3; plain or galvanized as indicated.

I. Unions: ANSI B16.39; 300 lb. ground joint malleable iron, hexagonal, selected by Installer for proper piping fabrication and service requirements, including style, end connections, and metal-to-metal seats (iron, bronze or brass); plain or galvanized as indicated.

J. Dielectric Unions: 175 psig WSP at 250oF. Equal to Walter Vallet Company V-line insulating coupling.

K. Threaded Pipe Plugs: ANSI B16.14.

L. Steel Flanges/Fittings: ANSI B16.5, including bolting and gasketing of the following material group, end connection and facing, except as otherwise indicated.

1. Material Group: Group 1.1.

2. End Connections: Buttwelding.

3. Facings: Raised-face.

4. Steel Pipe Flanges For Waterworks Service: AWWA C207.

M. Forged-Steel Socket-Welding and Threaded Fittings: ANSI B16.11, except MSS SP-79 for threaded reducer inserts; rated to match schedule of connected pipe.

N. Forged Branch-Connection Fittings: Except as otherwise indicated, provide type as determined by Installer to comply with installation requirements.

O. Pipe Nipples: Fabricated from same pipe as used for connected pipe; except do not use less than Schedule 80 pipe where length remaining unthreaded is less than 1-1/2", and where pipe size is less than 1-1/2", and do not thread nipples full length (no close-nipples).

2.3 COPPER TUBE AND FITTINGS:

A. Copper Tube: ASTM B 88; Type K, L (wall thickness) as indicated for each service; hard-drawn temper, except as otherwise indicated.

B. DWV Copper Tube: ASTM B 306.

C. ACR Copper Tube: ASTM B 280.

D. Cast-Copper Solder-Joint Fittings: ANSI B16.18.

E. Wrought-Copper Solder-Joint Fittings: ANSI B16.22.

F. Cast-Copper Solder-Joint Drainage Fittings: ANSI B16.23.

G. Wrought-Copper Solder-Joint Drainage Fittings: ANSI B16.29.

H. Cast-Copper Flared Tube Fittings: ANSI B16.26.

I. Bronze Pipe Flanges/Fittings: ANSI B16.24.

J. Copper-Tube Unions: Provide standard products recommended by manufacturer for use in service indicated.

2.4 CAST-IRON SOIL PIPES AND PIPE FITTINGS:

A. Hubless Cast-Iron Soil Pipe: FS WW-P-401.

B. Cast-Iron Hub-and-Spigot Soil Pipe: ASTM A 74.

C. Hubless Cast-Iron Soil Pipe Fittings: Neoprene gasket complying with ASTM C 564 and stainless steel clamp holding band.

D. Cast-Iron Hub-and-Spigot Soil Pipe Fittings: Match soil pipe units; complying with same standards (ASTM A 74).

E. Compression Gaskets: ASTM C 564.

F. Lead/Oakum Joint Materials: Provide products complying with governing regulations for use in service indicated.

2.5 PLASTIC PIPE AND PIPE FITTINGS:

A. Polyvinyl Chloride Pipe (PVC): ASTM D 1785. Schedule 80.

B. PVC Fittings:

1. Schedule 80 Socket: ASTM D 2467.

2. Schedule 80 Threaded: ASTM D 2464.

C. Polypropylene Pipe: Piping and fittings shall be manufactured to Schedule 80 iron pipe dimension, from virgin unpigmented polypropylene pipe grade material, without the addition of normal antioxidants or slip agents. The pipe shall be furnished in 10 foot lengths, cylindrical and straight, and sterile capped at time of manufacture. Pipe and fittings shall meet ASTM D2146, but without additives, and be manufactured to meet dimensional tolerances of ASTM D1785.

Fittings to have electric resistance coils.

2.6 ACID RESISTANT CAST IRON:

A. Bell and spigot type, high silicon iron alloy "Duriron" or approved equal, with chemical resistant packing and caulked lead joints.

B. POLYPROPYLENE PIPE: Orion Blueline, flame retardant, Schedule 40, with Schedule 40 fittings, heat fusion welded joints. Alternate manufacturers, GSR, Enfield. Meet material standards of ASTM-D4101, joint standards of ASTM-D2657.

2.7 DUCTILE IRON PIPE AND FITTINGS POLYETHYLENE LINED AND ENCASED:

A. Ductile iron pipe materials shall conform to the requirements of ANSI/AWWA C151/A21.51.

B. Fittings for ductile iron pipe shall conform to the requirements of ANSI/AWWA C110/A21.10 for diameters 3-inch through 48-inch. Ductile iron fittings larger than 48-inch shall conform to the above referenced standard with the necessary modifications for the larger size.

C. Polyethylene lining material shall be functional polyethylene complying with ANSI/ASTM D1248, compounded without an inert filler except 3% carbon black to resist ultraviolet rays during above ground storage of the pipe and fittings. The polyethylene shall be chemically bonded to the interior of the pipe and fittings. The polyethylene lining shall cover the inner surfaces of the pipe and fittings from the plain or beveled spigot and through the entire gasket seat in the bell. The ling shall extended on the exterior surface of the beveled spigot end to a point past the gasket seat area at a minimum thickness of 10 mils.

D. Material for the polyethylene encasement shall conform to the requirements of ANSI/AWWA C105/A21.5.

E. All elastomer gaskets used for ductile iron pipe shall be of neoprene (CR) material.

F. All buried bolts and nuts used in the assembly of ductile iron pipe and fittings shall be Cor-Ten steel bolts as manufactured by NSS Industries, or approved equal.

G. The pipe and fittings shall be of the diameter shown and shall be of pressure Class 350, except that where mechanical couplings are used and the pipe is grooved, the ductile iron pipe shall be of special thickness Class 53.

H. Ductile iron pipe and fittings shall be furnished with mechanical joints, push-on joints, flanged joints and restrained joints as required.

1. Mechanical and push-on joints shall conform to ANSI/AWWA C111/A21.11.

2. Flanged joints shall conform to ANSI/AWWA C115/A21.15.

3. Restrained joints shall be "Lok-Ring" Restrained Joint by American Ductile Iron Pipe, "TR FLEX" Restrained Joint by U.S. Pipe, "Mechanical Lock Joint" by Pacific States Cast Iron Pipe Company, or equal.

I. Polyethylene Lining:

1. All surface areas which will be exposed to liquids and gases shall be cleaned so as to remove all deleterious materials. After cleaning, the lining compound shall be applied to all surface areas so as to obtain a uniform and smooth integral lining.

2. The lining in the barrel area shall have a nominal thickness of 40 mils. and minimum thickness of 35 mils. However, the lining in the bell area may taper from a 35 mil minimum thickness at the edge of the barrel area to 10 mil minimum thickness at the edge of the gasket socket. The 10 mil. minimum lining shall also continue form inside the barrel area, around the spigot end of the pipe and along the outside of the next pipe to a point past the total gasket engagement of the next pipe section. This is a minimum requirement. The thickness of linings shall be determined by using a dry file thickness magnetic gauge.

3. Lining Material must pass the following immersion tests (35 mil. minimum dry film thickness) without disintegration, blistering of cracking:

Test	Temperature	Duration
75% H2S04	70 deg. F	45 days
10% H2S04	140 deg. F	45 days
10% H2S04	70 deg. F	45 days
30% H2S04	140 deg. F	45 days
25% H2S04	70 deg. F	45 days
5% H2S04	140 deg. F	45 days
5% H2S04	70 deg. F	45 days

4. Each piece of pipe shall be tested and shall have an absence of holidays when tested by a suitable holiday detector. In all cases the barrel area of the pipe shall be tested using a

dry conductive probe. A wet sponge test shall be used in the bell interior and exterior of the spigot.

5. The pipe manufacturer shall issue a certification that states that the pipe and lining meet the following standards and specifications:

   a. All ductile iron pipe and fittings have a polyethylene interior lining of 40 mils. in the barrel area, 10 mils. minimum in the bell area and 10 mils. minimum on the exterior of the spigot end.

   b. Each piece of pipe and each fitting have been checked for holidays utilizing a suitable testing voltage with a dry conductive probe in the barrel area and a suitable testing voltage with a wet sponge in both the bell area and the exterior of the spigot end, and not holidays were found. Holiday testing shall conform to ASTM G62-87 and NACE Standards RP-02-74 and RP0188-90 (latest revisions).

J. Exterior Coating of Pipe:

1. The exterior surfaces of ductile iron pipe which will be exposed to the atmosphere inside structures or above ground shall be thoroughly cleaned and then give a shop coat of rust-inhibitive primer conforming to the requirements of Division 09000 entitled, "Protective Coating". This exposed piping shall not be coated with the bituminous coating by the manufacturer prior to delivery

2. Buried ductile iron pipe shall be polyethylene encased per System C-9, see Division 09800.

2.8 GROOVED PIPING PRODUCTS: (Only where acceptable.)

A. General: As Installer's option, mechanical grooved pipe couplings and fittings may be used for piping systems having operating conditions not exceeding 230oF (110oC), excluding steam piping and any other service not recommended by manufacturer, in lieu of welded, flanged, or threaded methods, and may also be used as unions, seismic joints, flexible connections, expansion joints, expansion compensators, or vibration reducers.

B. Coupling Housings Description: Grooved mechanical type, which engages grooved or shouldered pipe ends, encasing an elastomeric gasket which bridges pipe ends to create seal. Cast in two or more parts, secure together during assembly with nuts and bolts. Permit degree of contraction and expansion as specified in manufacturer's latest published literature. (Victaulic style 77 or approved equal) For rigid joints (Victaulic "Zero Flex" style 07 or approved equal).

1. Coupling Housings: Malleable iron conforming to ASTM A 47.

2. Coupling Housings: Ductile iron conforming to ASTM A 536.

3. Standard: Enamel coated, options hot dip galvanized.

C. Gaskets: Mechanical grooved coupling design, pressure responsive so that internal pressure serves to increase seal's tightness, constructed of elastomers having properties as designated by ASTM D 2000.

1. Water Services: EDPM Grade E, with green color code identification.

2. Other Services: As recommended by Manufacturer.

D. Bolts and Nuts: Heat-treated carbon steel, ASTM A 183, minimum tensile 110,000 psi.

1. Exposed Locations: Tamper resistant nuts.

E. Branch Stub-Ins: Upper housing with full locating collar for rigid positioning engaging machine-cut hole in pipe, encasing elastomeric gasket conforming to pipe outside diameter around hole, and lower housing with positioning lugs, secured together during assembly with nuts and bolts.

F. Fittings: Grooved or shouldered end design to accept grooved mechanical couplings.

1. Malleable Iron: ASTM A 47.

2. Ductile Iron: ASTM A 536.

3. Fabricated Steel: ASTM A 53, Type F for 3/4" to 1-1/2"; Type E or S, Grade B for 2" to 20".

4. Steel: ASTM A 234.

G. Flanges: Conform to Class 125 cast iron and Class 150 steel bolt hole alignment.

1. Malleable Iron: ASTM A 47.

2. Ductile Iron: ASTM A 536.

H. Specialties:

1. Inline strainers.

2. Suction diffusers.

I. Grooves: Conform to the following:

1. Standard Steel: Square cut.

2. Lightweight Steel: Roll grooved.

3. Ductile Iron: Radius cut grooved, AWWA C606.

J. Manufacturer: Subject to compliance with requirements, provide grooved piping products of one of the following:

1. ITT Grinnell Corp.

2. Stockham Valves & Fittings, Inc.

3. Victaulic Co. of America.

4. Gustin-Bacon

5. Grippin.

6. Or Approved Equal.

2.9 MANUFACTURERS:

A. Manufacturer uniformity: conform with the requirements specified in Basic Mechanical Requirements, under "Product Options."

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering piping materials and specialties which may be incorporated in the work include, but are not limited to, the following:

1. Pipe Escutcheons:

a. Chicago Specialty Mfg. Co.
b. Sanitary-Dash Mfg. Co.
c. Grinnell
d. Or Approved Equal.

2. Dielectric Waterway Fittings:

a. Epco Sales, Inc.
b. Victaulic Company of America
c. Or Approved Equal.

3. Dielectric Unions:

a. Eclipse, Inc.
b. Perfection Corp.
c. Watts Regulator Co.
d. Or Approved Equal.

4. Strainers:

a. Armstrong Machine Works.
b. Hoffman Specialty ITT; Fluid Handling Div.
c. Spirax Sarco.
d. Victaulic Co. of America. (low pressure applications only)
e. Watts Regulator Co.
f. Or Approved Equal.

5. Expansion Joints:

a. Flexonics Div.; UOP, Inc.
b. Hyspan Precision Products, Inc.
c. Keflex, Inc.
d. Metraflex Co.
e. Vibration Mountings and Controls, Inc.

f. Or Approved Equal.

6. Flexible Connectors:

a. Flexonics Div.; UOP, Inc.
b. Hyspan Precision Products, Inc.
c. Keflex, Inc.
d. Metraflex Co.
e. Vibration Mountings and Controls, Inc.
f. Or Approved Equal.

2.10 PIPING SPECIALTIES:

A. Escutcheons: Chrome-plated, stamped steel, hinged, split-ring escutcheon, with set screw. Inside diameter shall closely fit pipe outside diameter, or outside of pipe insulation where pipe is insulated. Outside diameter shall completely cover the opening in floors, walls, or ceilings.

B. Unions: Malleable-iron, Class 150 for low pressure service and class 250 for high pressure service; hexagonal stock, with ball-and-socket joints, metal-to-metal bronze seating surfaces; female threaded ends.

C. Dielectric Unions: Provide dielectric unions with appropriate end connections for the pipe materials in which installed (screwed, soldered, or flanged), which effectively isolate dissimilar metals, prevent galvanic action, and stop corrosion.

D. Dielectric Waterway Fittings: electroplated steel or brass nipple, with an inert and non-corrosive, thermoplastic lining.

E. Y-Type Strainers: Provide strainers full line size of connecting piping, with ends matching piping system materials. Screens shall be Type 304 stainless steel, with 3/64" perforations at 233 per square inch.

1. Provide strainers with 125 psi working pressure rating for low pressure applications, and 250 psi pressure rating for high pressure application.

2. Threaded Ends, 2" and Smaller: Cast-iron body, screwed screen retainer with centered blowdown fitted with pipe plug.

3. Threaded Ends, 2-1/2" and Larger: Cast-iron body, bolted screen retainer with off-center blowdown fitted with pipe plug.

4. Flanged Ends, 2-1/2" and Larger: Cast-iron body, bolted screen retainer with off-center blowdown fitted with pipe plug.

5. Grooved Ends, 2-1/2" and Larger: Tee pattern, ductile-iron or malleable-iron body and access end cap, access coupling with EPDM gasket.

2.11 EXPANSION JOINTS:

A. Rubber Expansion Joints: Construct of duck and butyl rubber with full-faced integral flanges, internally reinforced with steel retaining rings. Provide steel retaining rings over entire surface of flanges, drilled to match flange bolt holes, and provide external control rods.

B. Expansion Joints for Grooved Piping: Provide expansion joints constructed of cut grooved short pipe nipples and couplings, designed by manufacturer to suit intended service. Select couplings and gasket materials to match balance of piping system.

2.12 FLEXIBLE CONNECTORS:

A. Braided Flexible Pump Connector: Stainless steel annular corrugated metal surrounded with a woven braid of high tensile stainless steel flange connection. Minimum 125 psi pressure rating, similar to Keflex KSSPC or approved equal.

B. Flexible Connector: Stainless steel annular, close pitch hose with stainless steel braid. Flanged or threaded connection, Minimum 125 psi pressure rating, similar to Keflex KFCS or approved equal.

2.13 SLEEVES:

A. Sheet-Metal Sleeves: 10 gauge, galvanized sheet metal, round tube closed with welded longitudinal joint.

B. Steel Sleeves: Schedule 40 galvanized, welded steel pipe, ASTM A53, Grade A.

2.14 MECHANICAL SLEEVE SEALS:

A. Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between pipe and sleeve, connected with bolts and pressure plates which cause rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

2.15 MISCELLANEOUS PIPING MATERIALS/PRODUCTS:

A. Welding Materials: Except as otherwise indicated, provide welding materials as determined by Installer to comply with installation requirements.

Comply with Section II, Part C, ASME Boiler and Pressure Vessel Code for welding materials.

B. Soldering Materials: Except as otherwise indicated, provide soldering materials as determined by Installer to comply with installation requirements. Use no lead bearing solders in domestic water applications.

Tin-Antimony Solder: ASTM B 32, Grade 95TA.

Silver-Lead Solder: ASTM B 32, Grade 96TS.

C. Brazing Materials: Except as otherwise indicated, provide brazing materials as determined by Installer to comply with installation requirements.

Comply with SFA-5.8, Section II, ASME Boiler and Pressure Vessel Code for brazing filler metal materials.

D. Gaskets For Flanged Joints: ANSI B16.21; full-faced for cast-iron flanges; raised-face for steel flanges, unless otherwise indicated.

E. Piping Connectors For Dissimilar Non-Pressure Pipe: Elastomeric annular ring insert, or elastomeric flexible coupling secured at each end with stainless steel clamps, sized for exact fit to pipe ends and subject to approval by plumbing code.

MANUFACTURER: Subject to compliance with requirements, provide piping connectors of the following:

1. Fernco, Inc.
2. Mission.
3. Or Approved Equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install pipes and pipe fittings in accordance with recognized industry practices which will achieve permanently- leakproof piping systems, capable of performing each indicated service without piping failure. Install each run with minimum joints and couplings, but with adequate and accessible union, flanges, etc., for disassembly and maintenance/replacement of valves and equipment. Reduce sizes (where indicated) by use of reducing fittings. Align piping accurately at connections, within 1/16" misalignment tolerance. Do not cold spring. Store filler weld materials in accordance with codes.

Comply with ANSI B31 Code for Pressure Piping.

B. Locate piping runs, except as otherwise indicated, vertically and horizontally (pitched to drain) and avoid diagonal runs wherever possible. Orient horizontal runs parallel with walls and column lines. Locate runs as shown or described by diagrams, details and notations or, if not otherwise indicated, run piping in shortest route which does not obstruct usable space or block access for servicing building and its equipment. Hold piping close to walls, overhead construction, columns and other clearance to 1/2" where furring is shown for enclosure or concealment of piping, but allow for insulation thickness, if any. Where possible, locate insulated piping for 1" clearance outside insulation. Wherever possible in finished and occupied spaces, conceal piping from view, by locating in column enclosures, in hollow wall construction or above suspended ceilings; do not encase horizontal runs in solid partitions, except as indicated. Provide high point vents, low point drains with valves and extension to drain for all piping.

C. All piping in press room, mechanical rooms, fan rooms, etc., shall be exposed. Do not conceal or imbed piping in walls, floors or other structures.

D. Make changes in direction or size with manufactured fittings. Anchor and support piping for free expansion and movement without damage to piping, equipment or to building.

E. Piping shall be arranged to maintain head room and keep passageways clear.

F. Provide unions at connections to equipment and elsewhere as required to facilitate maintenance.

G. Run full pipe size through shutoff valves, gas cocks, balancing valves, etc. Change pipe size within three pipe size diameters of final connection to equipment, coils, etc.

H. All piping shall be erected to insure proper draining. Air piping shall pitch down in the direction of flow a minimum of 1" per 40 feet. Domestic water and utility water shall slope down a minimum of 1" per 40 feet towards the drain (low point). Refrigerant suction line shall slope a minimum of 1" per 10 feet towards compressor. Soil, waste, vent, and roof drain lines shall slope in accordance with requirements of Uniform Plumbing Code.

I. Install drains at low points in mains, risers, and branch lines consisting of a tee fitting, 3/4" ball valve, and short 3/4" threaded nipple and cap.

J. Exterior Wall Penetrations: Seal pipe penetrations through exterior walls using sleeves and mechanical sleeve seals. Pipe sleeves smaller than 6" shall be steel; pipe sleeves 6" and larger shall be sheet metal.

K. Fire Barrier Penetrations: Where pipes pass through fire rated walls, partitions, ceilings, or floors, the fire rated integrity shall be maintained.

L. Use fittings for all changes in direction and all branch connections.

M. Install strainers on the supply side of each control valve, pressure reducing or regulating valve, solenoid valve, and elsewhere as indicated.

N. Install unions adjacent to each valve, and at the final connection to each piece of equipment and plumbing fixture having 2" and smaller connections, and elsewhere as indicated.

O. Install Flanges in piping 2-1/2" and larger, where indicated, adjacent to each valve, and at the final connection to each piece of equipment.

P. Install dielectric unions to connect piping materials of dissimilar metals in dry piping systems (gas, compressed air).

Q. Install dielectric fittings to connect piping materials of dissimilar metals in wet piping systems (water). Insulating fittings are not required between bronze valves and steel pipe or between copper coil headers and steel pipe.

R. Electrical Equipment Spaces: Do not run piping in or through, electrical room, transformer vaults and other electrical or electronic equipment spaces and enclosures or above electrical gear unless authorized and directed. Install drip pan under piping that must be run through electrical spaces.

3.2 EXPANSION AND CONTRACTION

A. Make all necessary provisions for expansion and contraction of piping.

B. Use grooved joint couplings, expansion compensator, offsets or loops as required to prevent undue strain.

C. At piping connection to heat exchangers provide expansion (joint) as shown on drawings.

3.3 FLEXIBLE CONNECTORS:

A. At pumps, engines and at all rotating or vibrating pieces of equipment, provide and install flexible connectors to accommodate alignment and vibration.

B. At pumps provide and install a series of three grooved joint couplings or braided flexible pump connectors.

C. At engines provide and install flexible connector.

D. Install owner furnished flex connectors for digester gas and natural gas.

3.4 PROTECTIVE COATINGS

A. All underground steel pipes shall be wrapped with Scotchwrap No. 50 tape to give not less than two complete layers on the underground piping system, or piping shall have "X-tru Coat", factory applied plastic protective covering, or pipe shall be coated and wrapped with coal tar enamel and Kraft paper, all with coated and taped joints.

3.5 PIPING SYSTEM JOINTS

A. General: Provide joints of type indicated in each piping system.

B. Threaded: Thread pipe in accordance with ANSI B2.1; cut threads full and clean using sharp dies. Ream threaded ends to remove burrs and restore full inside diameter. Apply pipe joint compound, or pipe joint tape (Teflon) where recommended by pipe/fitting manufacturer, on male threads at each joint and tighten joint to leave not more than 3 threads exposed.

C. Brazed: Braze copper tube-and-fitting joints where indicated, in accordance with ASME B31.

D. Soldered: Solder copper tube-and-fitting joints where indicated, in accordance with recognized industry practice. Cut tube ends squarely, ream to full inside diameter, and clean outside of tube ends and inside of fittings. Apply solder flux to joint areas of both tubes and fittings. Insert tube full depth into fitting, and solder in manner which will draw solder full depth and circumference of joint. Wipe excess solder from joint before it hardens.

E. Welded:

1. Weld pipe joints in accordance with ASME Code for Pressure Piping, B31.

2. Weld pipe joints in accordance with recognized industry practice and as follows:

3. Weld pipe joints only when ambient temperature is above 0oF (-18oC) where possible, with minimum pipe preheat to 50oF.

4. Bevel pipe ends at a 37.5o angle where possible, smooth rough cuts, and clean to remove slag, metal particles and dirt.

5. Use pipe clamps or tack-weld joints with 1" long welds; 4 welds for pipe sizes to 10", 8 welds for pipe sizes 12" to 20".

6. Build up welds with stringer-bead pass, followed by hot pass, followed by cover or filler pass. Eliminate valleys at center and edges of each weld. Weld by procedures which will ensure elimination of unsound or unfused metal, cracks, oxidation, blow-holes and non-metallic inclusions.

7. Do not weld-out piping system imperfections by tack-welding procedures; refabricate to comply with requirements.

8. At Installer's option, install forged branch-connection fittings wherever branch pipe is indicated; or install regular "T" fitting.

9. At Installer's option, install forged branch-connection fittings wherever branch pipe of size smaller than main pipe is indicated; or install regular "T" fitting.

F. Flanged Joints: Match flanges within piping system, and at connections with valves and equipment. Clean flange faces and install gaskets. Tighten bolts to provide uniform compression of gaskets.

G. Lead Joints: Tightly pack joint with joint packing material. Do not permit packing to enter bore of finished joint. Clean joint after packing. Fill remaining joint space with one pouring of lead to indicated minimum depth measured from face of bell. After lead has cooled, calk joint tightly by use of hammer and caulking iron.

H. Hubless Cast-Iron Joints: Comply with coupling manufacturer's installation instructions.

I. Plastic Pipe/Tube Joints: Comply with manufacturer's instructions and recommendations, and with applicable industry standards:

1. Heat Joining of Thermoplastic Pipe: ASTM D 2657.

2. Making Solvent-Cemented Joints: ASTM D 2235, and ASTM F 402.

J. Grooved Pipe Joints: Comply with fitting manufacturer's instructions for making grooves in pipe ends. Remove burrs and ream pipe ends. Assemble joints in accordance with manufacturer's instructions.

3.6 INSTALLATION OF DUCTILE IRON PIPE:

A. All pipe, fittings, etc., shall be carefully handled and protected against damage, 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 matter which will protect the pipe against injury whenever stored at the trench site. All pipe damaged prior to Substantial Completion shall be repaired or replaced by the Contractor.

B. If the contractor makes a field cut of polyethylene lined pipe, he shall comply with the recommendations of the pipe manufacturer in applying an approved field coating to the pipe end and in allowing proper drying time before pipe assembly. In all cases, as a minimum, a 10 mil. coating shall be applied to the pipe end and shall overlap the polyethylene ling by 2-inches and extend around the end of the pipe and along the outside of the pipe a minimum of 10-inches and shall also be allowed to dry before pipe assembly. In addition, the overlapped surface of the polyethylene lining shall be roughed up to produce a 3 to 5 mil. profile over the entire surface to secure proper adhesion of the field coating.

C. Repair of the damaged sections of the polyethylene lining shall be in accordance with the lining manufacturer's recommendations or as specified above so that the repaired area is equal to the undamaged lined area in all respects. All damaged lined areas and holidays shall be repaired immediately.

D. The Contractor shall inspect each pipe and fitting prior to installation to ensure that there are no damaged portions of the pipe. No pipe shall be installed where the lining or coating show defects that may be harmful as determined by the Engineer. such damaged lining or coating shall be repaired, or a new undamaged pipe shall be furnished and installed.

E. The pipe shall be installed in accordance with ANSI/AWWA C600. Before placement of the 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. As pipe laying progresses, the contractor shall keep the pipe interior free of all debris. The contractor shall completely clean the interior of the pipe of all sand, dirt, rocks and any other debris following completion of pipe laying prior to testing and disinfecting the completed pipeline.

F. Pipe shall be laid directly on the imported bedding 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 joint 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.

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, by the use of bevel adapters or by the use of additional fittings. However, in no case shall the deflection in the joint exceed the maximum deflection recommended by the pipe manufacturer.

H. The openings of all pipe and specials where the pipe and specials have been polyethylene lined in the shop shall be protected with suitable bulkheads to prevent unauthorized access by persons, animals, water or any undesirable substance. At all times, means shall be provided to prevent the pipe from floating.

I. Immediately before jointing pipe, the bell end of the pie shall be thoroughly cleaned and a clean rubber gasket lubricated with an approved vegetable-based lubricant shall be placed in the bell groove. The spigot end of the pipe shall be carefully cleaned and lubricated with a vegetable-based lubricant. The spigot end of the pipe section shall then be inserted into the bell of the previously laid joint and telescoped into its proper position. Tilting of the pipe to insert the spigot into the bell will not be permitted.

J. Buried ductile iron pipe shall be polyethylene encased in accordance with the requirements of ANSI/AWWA C105/A21.5.

3.7 CLEANING, FLUSHING, INSPECTING:

A. General: Clean exterior surfaces of installed piping systems of superfluous materials, and prepare for application of specified coatings (if any). Flush out piping systems with clean water

before proceeding with required tests. Inspect each run of each system for completion of joints, supports and accessory items.

1. Inspect pressure piping in accordance with procedures of ASME B31.

B. Disinfect water mains and water service piping in accordance with AWWA C601.

3.8 PIPING TESTS:

A. General: Provide temporary equipment for testing, including pump and gages. Test piping system before insulation is installed wherever feasible, and remove control devices before testing. Test each natural section of each piping system independently but do not use piping system valves to isolate sections where test pressure exceeds valve pressure rating. Fill each section with water or air and pressurize for indicated pressure and time.

1. Required test period is 2 hours.

2. Test long runs of Schedule 40 pipe at 150 psi, except where fittings are lower Class or pressure rating.

3. Test each piping system at 150% of operating pressure indicated, but not less than 25 psi test pressure.

4. Observe each test section for leakage at end of test period. Test fails if leakage is observed or if pressure drop exceeds 5% of test pressure.

B. Notifications: At least 10 days prior to commencement of required testing, notice shall be submitted for review. Tests shall be made prior to painting insulating or covering of any joints and shall be in accordance with ANSI Code for Pressure Piping.

C. Inspections: Services of an authorized ASME inspector shall be furnished, not an employee of Contractor, to visually inspect piping while under hydrostatic pressure. Copies of inspection shall be submitted for review. At option of contract, welds not hydrostatically tested may be x-ray tested.

D. Repair piping systems sections which fail required piping test, by disassembly and re-installation, using new materials to extent required to overcome leakage. Do not use chemicals, stop-leak compounds, mastics, or other temporary repair methods.

E. Drain test water from piping systems after testing and repair work has been completed.

F. Test pressure piping in accordance with ANSI B31.

G. Test waste, drain and vent systems in accordance with local plumbing code and these specifications. Repair failed sections by disassembly and reinstallation.

H. If test procedures in other sections differ from the above, comply with more stringent requirements.

END OF SECTION 220050

SECTION 220523 – VALVES

PART 1 - GENERAL

1.1 SCOPE:

A. Furnish and install all valves complete and in accordance to the requirements of the Contract Documents.

1.2 SUBMITTALS:

A. Product Data: Submit manufacturer's technical product data, including installation instructions for each type of valve. Include pressure drop curve or chart for each type and size of valve.

B. Shop Drawings: Submit manufacturer's assembly-type (exploded view) shop drawings for each type of valve, indicating dimensions, weights, materials, and methods of assembly of components.

C. Maintenance Data: Submit maintenance data and spare parts list for each type of valve. Include this data, product data, and shop drawings in maintenance manual; in accordance with requirements of Division 1.

1.3 QUALITY ASSURANCE:

A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of valves, of types and sizes required, whose products have been in satisfactory use in similar service.

B. Valve Types: Provide valves of same type by same manufacturer.

C. Valve Identification: Provide valves with manufacturer's name (or trademark) and pressure rating clearly marked on valve body.

D. Codes and Standards:

1. MSS Compliance: Mark valves in accordance with MSS-25 "Standard Marking System for Valves, Fittings, Flanges and Unions".
2. ANSI Compliance: For face-to-face and end-to-end dimensions of flanged- or welded-end valve bodies, comply with ANSI B16.10 "Face-to-Face and End-to-End Dimensions of Ferrous Valves".
3. For all valves: Provide EPDM gaskets on valves on air lines from the blowers.

PART 2 - PRODUCT

2.1 BRASS BALL VALVES

A. Features:

1. Adjustable packing gland
2. RPTFE seats and seals
3. Blowout proof stem
4. 200 psig water, CWP, non-shock
5. Temperature range, 50°F to 200°F

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering ball valves which may be incorporated in the work are:

1. Apollo
2. Watts
3. Or equal.

2.2 STAINLESS STEEL BALL VALVES

A. Features:

1. 316 SS Ball Construction
2. SS Body construction
3. RPTFE seat
4. Threaded
5. Full Port
6. Two piece body design
7. Solid Ball Construction
8. SS Lever and Nut
9. Blow out proof stern design
10. Nylon lever grip
11. 150 psi rated

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering ball valves which may be incorporated in the work are:

1. Apollo Valves
2. Watts
3. Or equal.

2.3 SWING CHECK VALVES

A. The rubber flapper swing check valve shall have a heavily constructed cast iron body and cover in accordance with ASTM A126 Grade B. The body shall be long pattern design (not wafer) with integrally cast-on end flanges. The flapper shall be Buna-N, or other elastomer, having an O-ring seating edge and be internally reinforced with steel.

B. Flapper to be captured between the body and the body cover in a manner to permit the flapper to flex from closed to full open position. Flapper shall be easily removed without the need to remove the valve from line. Check Valves to have full pipe size flow area. Seating surface to be on a 45 degree requiring the flapper to travel only 35 degrees from closed to full open position for minimum headloss. Valve has non-slam closure characteristics.

C. Buna-N flapper which creates an elastic spring effect to assist the flapper to close against a slight head to prevent or minimize slamming.

D. Valve designed for 175 psi differential pressure for water, sewage, oil or gas (higher pressure available). The valve shall be suitable for buried service, in which case, stainless cover bolts must be furnished.

E. When necessary to prime or backflush a clogged pump, an external backflow device can be furnished—sizes 3" and larger.

F. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering swing check valves which may be incorporated in the work are:

1. APCO
2. Flomatic
3. Or equal.

2.4 WAFER CHECK VALVES

A. Check valve shall be cast iron, seat and plug bronze.

B. The seat and plug shall be hand replaceable. The seating surfaces shall be metal to metal or resilient (Buna-N) to metal.

C. The valve plug shall have a central shaft and spring loaded. The spring must be stainless steel 316. The spring shall be helical or conical in form.

D. All materials of construction shall be certified in writing to conform to ASTM specifications as follows:

1.	Body	Cast Iron	ASTM A 126 Gr.B
2.	Seat & Plug	Bronze	ASTM 584
3.	Seat w/ Buna-N Seal	Bronze	Buna-N
4.	Spring	Stainless Steel	ASTM A313 T316
5.	Exterior Paint	Universal Primer	FDA Approved for Potable Water
6.	Or equal.		

E. Acceptable Manufacturers:

1. APCO
2. Flomatic
3. Or equal.

2.5 POTABLE / UTILITY WATER GATE VALVES

A. Description: The valves shall be suitable for an ordinary waterworks service intended to be installed in a normal position as indicated in the Plans. All valves shall be Mueller, AVK, or equal, with non-rising stem valves. CPVC valves shall be Ashai/America, or equal.

The minimum requirements for all gate valves shall, in design, material and workmanship, conform to the standards of AWWA C509 or AWWA C515 for Resilient-Sealed Gate Valves. All materials used in the manufacture of waterworks gate valves shall conform to the AWWA Standards designed for each material listed. All gate valve operating stems shall be equipped with a two (2) inch operating nut. All gate valves shall open counterclockwise.

Where static line pressure exceeds 125 psi, only 250 psi working-pressure valves shall be used.

B. Materials:

1. Manufacture and Marking: The valves shall have the name or mark of the manufacturer, year valve casting was made, size and working pressure plainly cast in raised letters on the valve body.

2. Type and Mounting: The valve bodies shall be ductile iron, mounted with approved non-corrosive metals. All wearing surfaces shall be bronze or other approved non-corrosive material. Contact surfaces shall be machined and finished in the best workmanlike manner, and all wearing surfaces shall be easily renewable.

3. Valve Seats: Resilient seats shall be applied to the gate and shall seat against a corrosion-resistant surface. The surface may be either metallic or non-metallic, applied in a manner to withstand the action of line fluids and the operation of the sealing gate under long-term service. A metallic surface shall have a corrosion resistance equivalent to or better then bronze. A non-metallic surface shall be in compliance with ANSI/AWWA C550. Resilient seats shall be bonded or mechanically attached to the gate. The method used for bonding or vulcanizing shall be proved by ASTM D429; either method A or method B. For method A, the minimum strength shall not be less than 250 psi (1,725 kPa). For method B, the peel strength shall not be less than 75 lb/in. (9.3 kg/m).

4. All exposed mechanical attaching devices and hardware used to retain the resilient seat shall be made of a corrosion-resistant material.

5. End Connections: The dimensions push-on end connections shall conform to the dimensions of the AWWA Standard C111/A21.11. The dimensions for the mechanical joint connections shall conform to the ANSI/AWWA C111/A21.11.

6. The end flanges of flanged valves shall conform in dimensions and drilling to the standard ANSI B16.1 for ductile iron flanges and flanged fittings, Class 125, unless specifically provided otherwise. The bolt holes shall straddle the vertical center line.

7. Gate Valve Stem Seals: Unless otherwise designated in the Approved Plans, all gate valves up to and including 12-inch in size shall be furnished with O-ring Stem Seals. Number, size and design shall conform to the AWWA Standards for gate valve O-Ring Stem Seals. For all valves over 12", the stem seals shall be conventional type stuffing- box with graphite packing per AWWA Standard No. C600-18.1.

8. Installation of Gate Valves: All gate valves shall be inspected upon delivery in the field to insure proper working order before installation. They shall be set and jointed to the pipe in the manner as set forth in the AWWA Standards for the type of connection ends furnished. The valves shall also be carefully inspected for injury to the outer protective coatings.

2.6 BUTTERFLY VALVES (CLASS 150B)

A. Components

1. Bodies: Valves bodies shall be constructed of ASTM-A126, Class B cast iron for flanged, mechanical joint, push-on, mechanical x flanged, and push-on x flanged valves. Flanged valves shall be fully faced and drilled in accordance with ANSI Standards B16.1, Class 125

2. Seat: Rubber body seats shall be of one piece construction, simultaneously molded and bonded into a recessed cavity in the valve body protecting the leading edge of the seat from shearing force of the line flow. Seats may not be located on the disc or be retained by segments and/or screws. For wafer style valves, the seat shall cover the entire inner surface of the valve body and extend over the outside face of the valve body to form a flange gasket.

3. Bearings: Valve bearings shall be of a self-lubricating, nonmetallic material to effectively isolate the disc-shaft assembly from the valve body. Metal-to metal thrust bearings in the flow stream are not allowed.

4. Disc: The disc shall be an on-center, lens-shaped design to afford minimal pressure drop and line turbulence. Materials of construction shall be: ASTM A126, Class B cast iron disc and a stainless steel type 316 edge with a minimum width equal to the width of disc edge. Discs shall be retained by stainless steel pin, extending through the full diameter of the shaft to withstand the specified line pressure up to valve rating and the torque required to operate the valve. Disc stops located in the flow stream are not allowed.
5. Shafts: Valve shaft shall be stainless steel type 304. At the operator end of the valve shaft, a packing gland utilizing “V” type chevron packing shall be utilized. “O” ring and “U” cup packing is not allowed.
6. Painting: All surfaces of the valve interior shall be clean, dry and free from grease before painting. The valve surfaces except for disc edge, rubber seat and finished portions shall be a minimum of 8 mils Ameron 370.

B. Operators

1. Operators and component parts: AWWA C504, unless otherwise specified in these Specifications.

2. Provide with counter-clockwise opening manual operators.

    a. Compute operation torque of each valve and operator in accordance with Appendix of AWWA Standard C504 for velocity of 16 fps and applicable pressure drop across valve.
    b. Operators: Sized for bi-directional flow and 450 ft-lb input torque.

3. Required input torque with maximum handwheel pull of:

    a. 80 lbs. for hand wheels and chain wheels, or
    b. 150 ft.-lbs. for operating nuts.

4. Hand wheels shall have a maximum diameter of 24-inches.

5. Totally enclosed, permanently lubricated and sealed gear reducers. A vent shall be provided between the valve trunnion and actuator base to prevent infiltration of fluid into the actuator.

    a. Self-locking with open and close stops provided to limit valve disc travel.
    b. Traveling nut type.
    c. Submit calculations for valve torque requirements to Engineer as part of Shop Drawing submittal package. Velocity for dynamic torque must be 16 fps.
    d. Valve operators, as manufactured by:
        i. Mueller Co.
        ii. DeZurik
        iii. or approved Equal

6. Provide butterfly valves 3 inches in diameter and larger, and butterfly valves which are not directly buried or submerged, with manual hand wheels and position indicators. Install valves with valve shaft in horizontal position unless otherwise specified.

7. Provide butterfly valves which are directly buried or submerged with 2-inch square operating nut and do not equip with position indicator unless otherwise specified.

8. Valves located in vaults: Provide adequate clearance for handwheel operation.
    a. Orientate handwheel as shown in Drawings.

C. Manufacturers

1. Butterfly valves, as manufactured by:
    a. Muller Co.
    b. Bray
    c. Ashi/America (CPVC Butterfly Valves)
    d. Or approved Equal

2.7 AIR VACUUM AND RELIEF VALVES

A. Combination Air Valves (single body, double orifice) are used to allow large volumes of air to escape or enter thru the larger diameter air / vacuum orifice when filling or draining a pipeline.

B. When the pipeline is filled and under pressure the large air / vacuum orifice shall stay closed, but the smaller diameter air release orifice shall remain operative and open to allow small pockets of accumulating air to escape automatically and independently of the large orifice. The large air / vacuum orifice shall shut off when the free acting center guided plug is raised into the orifice by the lifting force of the CONCAVE bottom float. The large orifice shut-off shall be “WITHOUT SPILLING”. The Float* shall be heavily constructed stainless steel

(hermetically sealed) having a concave bottom impact area to provide immediate resistance to flow and instant upwards movement to shut off the large orifice “WITHOUT SPILLING”. The Buna-N seat must be fastened to the valve cover without distortion for drop tight shut-off.

C. Materials

1. Body & Cover Cast Iron ASTM A126 GR.
2. Concave Float* Patented Stainless Steel ASTM A240 T304
3. Float Stem Stainless Steel ASTM A581 T303
4. Needle & Seat Buna-N
5. Plug (1”, 2”, 3”, 4”) Brass ASTM B124 (6” Size) Stainless Steel ASTM A240 T304
6. Leverage Frame Cast Iron ASTM A126 GR. B.

D. Acceptable Manufacturers

1. Apco Willamette
2. Valmatic
3. Vent-O-Mat
4. Or Equal

PART 3 - EXECUTION

3.1 INSTALLATION:

A. General: Except as otherwise indicated, comply with the following requirements:

Install valves where required for proper operation of piping and equipment, including valves in branch lines where necessary to isolate sections of piping. Locate valves so as to be accessible and so that separate support can be provided when necessary.

Install valves with stems pointed up, in vertical position where possible, but in no case with stems pointed downward from horizontal plane.

B. Insulation: Where insulation is indicated, install extended-stem valves, arranged in proper manner to receive insulation.

C. Selection of Valve Ends (Pipe Connections): Except as otherwise indicated, select and install valves with the following ends or types of pipe/tube connections.

1. Pipe Size 2" and Smaller: One of the following, at Installer's option:

   a. Threaded valves.
   b. Flanged valves.

2. Pipe Size 2-1/2" and Larger:

   a. Flanged valves.
   b. Grooved joint valves.

D. Valve System: Select and install valves with outside screw and yoke stems, except provide inside screw non-rising stem valves where headroom prevents full opening of OS&Y valves.

E. Renewable Seats: Select and install valves with renewable seats, except where otherwise indicated.

3.2 ADJUSTING AND CLEANING:

A. Valve Adjustment: After piping systems have been tested and put into service, but before final testing, adjusting, and balancing, inspect each valve for possible leaks. Adjust or replace packing to stop leaks, replace valve if leak persists.

B. Valve Identification: Tag each valve in accordance with Division-15 section "Mechanical Identification".

3.3 VALVE INSTALLATION:

A. Locate all valves in locations which will allow easy operation and facilitates maintenance.

B. Provide chain operators for any valves located more than 8 feet above finished floor. This means double acting lever handles for quarter turn valves, or chain wheels for multi-turn valves. Arrange valves and set up chain length for proper operation.

END OF SECTION 220523

SECTION 221030 – DUCTILE IRON PIPE

PART 1 - GENERAL

1.1 THE REQUIREMENT

A. The Contractor shall furnish and install all ductile iron pipe, fittings, transitions, connections and appurtenant work, complete and in accordance with the requirements of the Contract Documents.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Piping, General. Section 15050

B. Water Pipeline testing Section 02666

1.3 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Commercial Standards:

ANSI/AWWA C104/A21.4	Cement-mortar lining for Ductile Iron and Gray Iron Pipe and Fittings for Water.
ANSI/AWWA C105/A21.5	Polyethylene Encasement for Gray and Ductile Cast Iron Piping for Water and Other Liquids.
ANSI/AWWA C110/A21.10	Fittings, 3-inch through 48-inch for Water and Other Liquids, Gray Iron and Ductile Iron.
ANSI/AWWA C111/A21.11	Rubber Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings.
ANSI/AWWA C115/A21.15	Flanged Ductile Iron and Gray Iron Pipe with Threaded Flanges.
ANSI/AWWA C150/A21.50	Thickness Design of Ductile Iron Pipe.
ANSI/AWWA C153/A21.53	Mechanical Joints (MJ), Push-on joints.
ANSI/AWWA C151/A21.51	Ductile Iron Pipe, Centrifugally Cast, in Metal Molds or Sand Lined Molds for Water and Other Liquids.
ANSI/AWWA C209	Cold Applied Coatings for the Exterior of Special Sections, Connections and Fittings for Steel Water Pipelines.
ANSI/AWWA C214	Tape Coating Systems for the Exterior of Steel Water Pipelines.

ANSI/AWWA C600	Water Mains and Appurtenances, Installation of Ductile Iron.
ANSI/ASTM D 1248	Polyethylene Lining Material for Ductile Iron Pipe and Fittings.
ASTM C 150	Specification for Portland Cement.
ASTM A 746	Installation of Ductile Iron Pipe for Gravity Sewers.

1.4 CONTRACTOR SUBMITTALS

A. The Contractor shall furnish a certified affidavit of compliance for all pipe and other products or materials furnished under this Section of the Specifications and as specified in the referenced standards. Certification shall include physical and chemical properties of pipe materials and hydrostatic test reports.

B. All expenses incurred in sampling and testing for certifications shall be borne by the Contractor.

1.5 QUALITY ASSURANCE

A. Ductile iron pipe shall be manufactured with the material, have the dimensions, be within the tolerances and meet the testing requirements set forth in ASTM A746 and ANSI A21.51. Ductile iron pipe shall be manufactured in nominal 18-foot or 20-foot laying lengths and shall have the lining called for in the Contract Documents.

B. All pipe shall be subject to inspection at the place of manufacture in accordance with the provisions of the referenced standards, as supplemented by the requirements herein.

C. In addition to those tests specifically required, the Engineer may request additional samples of any material including lining and coating samples for testing by the Owner. The additional samples shall be furnished at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 GENERAL

A. Mortar lined and polyethylene encased ductile iron pipe shall conform to ANSI/AWWA C151, C104, C105, C214 and D1248, subject to the following supplemental requirements. The pipe shall be of the diameter and class shown, shall be furnished complete with rubber gaskets as indicated in the Contract Documents and all specials and fittings shall be provided as required under the Contract Documents.

B. The pipe shall be handled by use of wide slings, padded cradles or other devices acceptable to the Engineer, designed and constructed to prevent damage to the pipe lining and/or coating. The use of chains, hooks or other equipment which might injure the pipe lining and coating will not be permitted. Stockpiled pipe shall be safely and properly supported to prevent accidental rolling. The Contractor shall be fully liable for the cost of replacement or repair of pipe which is damaged.

C. Maximum pipe laying lengths shall be 20-foot with shorter lengths provided as required by the Drawings.

D. The pipe shall have a smooth dense interior surface and shall be free from fractures, defects and roughness.

2.2 MATERIALS

A. Ductile iron pipe materials shall conform to the requirements of ANSI/AWWA C151/A21.51.

C. Fittings for ductile iron pipe shall conform to the requirements of ANSI/AWWA C110/A21.10 for diameters 3-inch through 48-inch. Ductile iron fittings larger than 48- inch shall conform to the above referenced standard with the necessary modifications for the larger size.

C. Cement for mortar lining shall conform to the requirements of ANSI/AWWA C104/A21.4; provided, that cement for mortar lining shall be Type II or V. A fly ash or pozzolan shall not be used as a cement replacement.

D. Not used.

E. Material for the polyethylene encasement shall conform to the requirements of ANSI/AWWA C105/A21.5.

F. All elastomer gaskets used for ductile iron pipe shall be of neoprene material.

G. All bolts, nuts, and washers, which are buried, submerged or below the top of the wall inside any hydraulic structure used in the assembly of ductile iron pipe and fittings shall be of Type 316 Stainless Steel.

2.3 DESIGN OF PIPE

A. Ductile iron pipe shall be designed in accordance with the requirements of ANSI/AWWA C150/A21.50, as applicable and as modified in this Section. The pipe furnished shall be either mortar-lined or polyethylene-lined as called out in the Contract Documents. Buried ductile iron pipe shall be polyethylene encased.

B. The pipe shall be designed, manufactured, tested, inspected and marked according to applicable requirements previously stated and except as hereinafter modified, shall conform to ANSI/AWWA C151.

C. The pipe and fittings shall be of the diameter shown and shall be of pressure Class 350 for pipe sizes twelve inches and below and pressure Class 250 for pipe fourteen inches to twenty inches and pressure class 200 for twenty four inch pipe and pressure class 150 for thirty inch and above, except that where mechanical couplings are used and the pipe is grooved, the ductile iron pipe shall be of special thickness Class 53.

D. Ductile iron pipe and fittings shall be furnished with mechanical joints, push-on joints, flanged joints and restrained joints as required.

1. All Mechanical and push-on joints may conform to ANSI/AWWA C153/A21.53 or C110/A21.10.

2. Flanged joints shall conform to ANSI/AWWA C115/A21.15.

3. Restrained joints shall be "Lok-Ring" Restrained Joint by American Ductile Iron Pipe, "TR FLEX" Restrained Joint by U.S. Pipe, "Mechanical Lock Joint" by Pacific States Cast Iron Pipe Company, or equal.

E. For bell-and-spigot ends with rubber gaskets, the clearance between the bells and spigots shall be such that when combined with the gasket groove configuration and the gasket itself, will provide watertight joints under all operating conditions when properly installed. The Contractor shall require the pipe manufacturer to submit details complete with significant dimensions and tolerances and also to submit performance data indicating that the proposed joint has performed satisfactorily under similar conditions. In the absence of a history of field performance, the results of a test program shall be submitted.

2.4 CEMENT-MORTAR LINING

A. Except as otherwise provided herein, interior surfaces of ductile iron pipe, fittings and specials to be furnished with cement-mortar lining shall be cleaned and lined in the shop with cement-mortar lining applied centrifugally in conformity with ANSI/AWWA C104. If lining is damaged or found faulty at delivery site, the damaged or unsatisfactory portions shall be replaced with lining conforming to these Specifications.

B. The minimum lining thickness shall be as follows:

Nominal Pipe Diameter (inches)	Minimum Lining Thickness (inches)
3-12	1/8
14-24	3/16
30-54	1/4

C. For all pipe and fittings with plant-applied cement mortar linings, the Contractor shall provide a polyethylene or other suitable bulkhead on the ends of the pipe and on all special openings. All bulkheads shall be substantial enough to remain intact during shipping and storage until the pipe is installed.

2.5 EXTERIOR COATING OF PIPE

A. The exterior surfaces of ductile iron pipe which will be exposed to the atmosphere inside structures or above ground shall be thoroughly cleaned and then give a shop coat of rust-inhibitive primer conforming to the requirements of Section 09800 entitled, "Protective Coating." This exposed piping shall not be coated with the bituminous coating by the manufacturer prior to delivery.

B. Buried ductile iron pipe shall be polyethylene encased in accordance with the requirements of ANSI/AWWA C105/A21.5.

PART 3 - EXECUTION

3.1 INSTALLATION OF PIPE

A. All pipe, fittings, etc. shall be carefully handled and protected against damage, 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 in accordance with Paragraph 2.01, herein. All pipe damaged prior to Substantial Completion shall be repaired or replaced by the Contractor.

B. The Contractor shall inspect each pipe and fitting prior to installation to ensure that there are no damaged portions of the pipe. No pipe shall be installed where the lining or coating show defects that may be harmful as determined by the Engineer. Such damaged lining or coating shall be repaired, or a new undamaged pipe shall be furnished and installed.

C. The pipe shall be installed in accordance with ANSI/AWWA C600. Before placement of the 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. As pipe laying progresses, the Contractor shall keep the pipe interior free of all debris. The Contractor shall completely clean the interior of the pipe of all sand, dirt, rocks and any other debris following completion of pipe laying prior to testing and disinfecting the completed pipeline.

D. Pipe shall be laid directly on the imported bedding 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 joint 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.

E. 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, by the use of bevel adapters or by the use of additional fittings. However, in no case shall the deflection in the joint exceed the maximum deflection recommended by the pipe manufacturer.

F. No pipe shall be installed upon a foundation into which frost has penetrated or at any time that there is a danger of the formation of ice or penetration of frost at the bottom of the excavation. No pipe shall be laid unless it can be established that the trench will be backfilled before the formation of ice and frost occurs.

G. 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 prevent unauthorized access by persons, animals, water or any undesirable substance. At all times, means shall be provided to prevent the pipe from floating.

H. Immediately before jointing pipe, the bell end of the pipe shall be thoroughly cleaned and a clean rubber gasket lubricated with an approved vegetable-based lubricant shall be

placed in the bell groove. The spigot end of the pipe shall be carefully cleaned and lubricated with a vegetable-based lubricant. The spigot end of the pipe section shall then be inserted into the bell of the previously laid joint and telescoped into its proper position. Tilting of the pipe to insert the spigot into the bell will not be permitted.

I. All valves shall be handled in a manner to prevent any injury to any part of the valve. All joints shall be thoroughly cleaned and prepared prior to installation. The Contractor shall adjust all stem packing and operate each valve prior to installation to ensure proper operation. All valves shall be installed so that the valve stems are plumb and in the location shown.

END OF SECTION 221030

SECTION 221040 - PVC WATER PIPE

PART 1 – GENERAL

1.01 SCOPE

A. This specification applies to the installation of PVC plastic pressure pipe (cast iron size), together with fittings and metallic locator tape to be placed above the pipe.

PART 2 – PRODUCTS

2.01 PIPE

A. All piping shall be PVC pipe conforming to either AWWA C900 (12” diameter and below) or AWWA C905 for larger diameters. The DR for all PVC pipe shall be 18 or specified.

2.02 THRUST BLOCKING

A. Concrete used for thrust blocking shall be in accordance with the drawings and shall be furnished and installed be the Subcontractor.

2.03 METALLIC LOCATOR TAPE

A. 3” wide metallic tape.

PART 3 – EXECUTION

3.01 PIPE LAYING

A. All PVC plastic pipe installation shall proceed on a stable foundation, with joints closely and accurately fitted. Joints shall be clean and dry, and a joint lubricant as recommended by the pipe supplier shall be applied uniformly at the mating joints surfaces to facilitate easy positive joint closure.

B. Pipe shall be installed with uniform bearing under the full length of the barrel, with suitable excavations being made to receive pipe bells.

C. Select material shall be compacted around the pipe to firmly bed the pipe in position. If adjustment of position of a pipe length is required after being laid, it shall be removed and re-jointed as for a new pipe. When pipe laying is not in progress, the ends of the pipe shall be closed with a tight-fitting stopper to prevent the entrance of foreign material.

D. Service lines and laterals must be assembled so that no strain is placed on the pipe during or after backfill operations. After laying of the pipe is completed, it shall be center loaded with backfill and bedding to prevent arching and whipping under pressure. Center loading should be done carefully so that joints will be completely exposed for examination.

E. In addition to the above requirements, all pipe installation shall comply with the specific requirements of the pipe manufacturer.

3.02 PIPE BEDDING

A. All pipes shall be protected from lateral displacement and possible damage resulting from impact or unbalanced loading during backfilling operations by being adequately bedded.

B. A groove shall be excavated in the bottom of the trench to receive the bottom quadrant of the pipe. Before preparing the groove, the trench-bottom shall be filled and compacted to an elevation sufficiently above the grade of the pipe so that, when completed, the pipe will be true to line and grade. Bell holes shall be excavated so that only the barrel of the pipe receives bearing from the trench bottom.

C. Pipe bedding materials placed at any point below the midpoint of the pipe shall be deposited and compacted in layers not to exceed 10 inches in uncompacted depth. Deposition and compaction of bedding materials shall be done simultaneously and uniformly on both sides of the pipe. Compaction shall be accomplished with hand or mechanical compactors. All bedding materials shall be placed in the trench with hand tools or other approved method in such a manner that they will be scattered alongside the pipe and not dropped into the trench in compacted masses. Bedding materials shall be loose earth, free from lumps; sand or gravel, free from rocks larger than one-inch diameter; with all materials free form roots, sod, or other vegetable matter.

D. Pipe bedding shall be select imported granular material. Select bedding shall consist of placing compacted granular material on each side of and to the level of 12 inches above the top of pipe.

3.03 CUTTING, CLEANING AND INSPECTION

A. Cutting of pipe for closure pieces or for other reasons shall be done in a neat, square and workman like manner using a method which will not damage the pipe. Before installation, each pipe shall be inspected be the Subcontractor for defects. All pipe and fittings shall be cleaned and free of dirt and debris, both inside and outside, before assembly.

3.04 SEPARATION OF WATER LINES AND SEWER

A. Where water mains cross over sewer lines the water main shall be laid at such an elevation that the bottom of the water main is 18-inches or more above the top on the sewer. When these conditions cannot be met the Engineer shall be contacted for additional specifications and procedures for such crossings. Water service laterals must conform to all requirements given herein for the separation of water and sewer lines.

3.05 THRUST BLOCKING

A. Thrust blocking shall be installed at all bends, tees, hydrants, crosses, valves, plugs and any other location as specified in the drawings. Thrust blocks shall be poured against undisturbed soil, and the pipe joints must be left accessible. Bearing areas for thrust blocks shall be as shown in the drawings. Thrust blocks shall be formed neatly and plastic membrane shall be place between pipe and concrete.

3.06 METALLIC LOCATOR TAPE

A. Locating wire shall be laid along with the PVC pipe, 1 foot directly above the pipe. Care shall be taken to keep the wire in line with the pipe and to avoid and breaks in the wire. The wire shall be cad welded to all valves and fire hydrants. Along with testing of the waterline, the locating wire shall be tested for conductivity. Any breaks in the wire shall be excavated and repaired.

END OF SECTION 221040

SECTION 221050 – HIGH DENSITY POLYETHYLENE PIPE AND FITTINGS

PART 1 – GENERAL

1.1 TERMS AND CONDITIONS

A. Scope. This specification covers requirements for high-density polyethylene pipe and fittings for general purpose applications. All work shall be performed in accordance with these specifications.

B. Referenced Standards. All standard specification, i.e., Federal, ANSI, ASTM, etc., made a portion of these Specifications by reference, shall be the latest edition and revision thereof.

1.2 CONTRACTOR SUBMITTALS

A. Contractor shall submit copies of the manufacture's product specifications according to the requirements of section 013300 entitled, "Contractor Submittals".

PART 2 – PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Qualification of Manufacturers. The Manufacturer shall have manufacturing and quality control facilities capable of producing and assuring the quality of the pipe and fittings required by these Specifications. The Manufacturer's production facilities shall be open for inspection by the Customer or his Authorized Representative. Qualified Manufacturers shall be approved by the Project Engineer.

B. Materials. Materials used for the manufacture of polyethylene pipe and fittings shall be PE4710 high density polyethylene meeting cell classification 445574C per ASTM D 3350; and shall be listed in the name of the pipe and fitting Manufacturer in PPI[1] TR-4, Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Pipe and Fittings Compounds, with a standard grade HDB rating of 1600 psi at 73°F. The Manufacturer shall certify that the materials used to manufacture pipe and fittings meet these requirements.

1. Typical material properties shall be submitted to the project design engineer for analysis. These properties are to be used for engineering evaluation and are not to be misconstrued as specification minimums.

C. Interchangeability of Pipe and Fittings. Polyethylene pipe and fittings shall be supplied by the same Manufacturer. Pipe and fittings from different Manufacturers shall not be interchanged.

1. Polyethylene Pipe. Polyethylene pipe shall be manufactured in accordance with ASTM F 714, Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter, or ASTM D 3035, Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter and shall be so marked. Each production lot of pipe shall be tested for (from material or pipe) melt index, density, % carbon (from pipe), dimensions and either quick burst or ring tensile strength (equipment permitting).

2. Polyethylene Fittings & Custom Fabrications. Polyethylene fittings and custom fabrications shall be molded or fabricated by the pipe manufacturer. Butt fusion outlets shall be made to the same outside diameter, wall thickness, and tolerances as the mating pipe. All fittings and custom fabrications shall be fully rated for the same internal pressure as the mating pipe. Pressure de-rated fabricated fittings are prohibited.

    a. Molded Fittings. Molded fittings shall be manufactured in accordance with ASTM D 3261, Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing, and shall be so marked. Each production lot molded fittings shall be subjected to the tests required under ASTM D 3261.

    b. Fabricated Fittings. Fabricated fittings shall be made by heat fusion joining specially machined shapes cut from pipe, polyethylene sheet rock, or molded fittings. Fabricated fittings shall be rated for internal pressure service equivalent to the full service pressure rating of the mating pipe. Directional fittings 16" IPS and larger such as elbows, tees, crosses, etc., shall have a plain end inlet for butt fusion and flanged directional outlets. Part drawing shall be submitted for the approval of the Project Engineer.

        i. Back-up Rings & Flange Bolts. Flange adapters shall be fitted with lap joint flanges pressure rated equal to or greater than the mating pipe. The lap joint flange bore shall be chamfered or radiused to provide clearance to the flange adapter radius. Flange bolts and nuts shall be Grade 2 or higher.

D. Manufacturer's Quality Control. The pipe and fitting manufacturer shall have an established quality control program responsible for inspecting incoming and outgoing materials. Incoming polyethylene materials shall be inspected for density, melt flow rate, and contamination. The cell classification properties of the material shall be certified by the supplier, and verified by Manufacturer's Quality Control. Incoming materials shall be approved by Quality Control before processing into finished goods.

Outgoing materials shall be checked for:

- Outside diameter, wall thickness, and eccentricity as per ASTM D2122 at a frequency of at least once/hour or once/hour, whichever is less frequent.
- Out of Roundness at a frequency of at least once/hour or once/coil whichever is less frequent.
- Straightness, inside and outside surface finish, markings and end cuts shall be visually inspected as per ASTM F714 on every length of pipe.

Quality Control shall verify production checks and test for:

- Density as per ASTM D1505 at a frequency of at least once per extrusion lot.
- Melt Index as per ASTM D1238 at a frequency of at least once per extrusion lot.
- Carbon content as per ASTM D1603 at a frequency of at least once per day per extrusion line.
- Quick burst pressure (sizes thru 4-inches as per ASTM D1599 at a frequency of at least once per day per line.

- Ring Tensile Strength (sizes above 4-inches equipment permitting) as per ASTM D2290 at a frequency of a least once per day per line.
- ESCR (size permitting) as per ASTM F1248 at a frequency of at least once per extrusion lot.

X-Ray inspection shall be used to inspect molded fittings for voids, and knit line strength shall be tested. All fabricated fittings shall be inspected for joint quality and alignment.

1. Permanent Records. The Manufacturer shall maintain permanent QC and QA records.

E. Compliance Tests – Manufacturer's inspection and testing of the materials. In case of conflict with Manufacturer's certification, the Contractor, Project Engineer, or Customer my request retesting by the Manufacturer or have retests performed by an outside testing service. All retesting shall be at the requestor's expense, and shall be performed in accordance with the Specifications.

PART 3 – EXECUTION

3.1 JOINING

A. Heat Fusion Joining. Joints between plain end pipes and fittings shall be made by butt fusion, and joints between the main and saddle branch fittings shall be made using only saddle fusion procedures that are recommended by the pipe and fitting Manufacturer. The Contractor shall ensure that persons making heat fusion joints have received training in the Manufacturer's recommended procedure. The Contractor shall maintain records of trained personnel, and shall certify that training was received not more than 12 months before commencing construction. External and internal beads shall not be removed.

1. Heat Fusion Training Services. Upon request, the Manufacturer shall provide assistance in the Customer's recommended butt fusion and saddle fusion procedures to the Contractor's installation personnel, and to inspectors representing the Customer.

B. Mechanical Joining. Polyethylene pipe and fittings may be joined together or to other materials by means of flanged connections (flange adapters and back-up rings) or mechanical couplings designed for joining polyethylene pipe or for joining polyethylene pipe to another material. Mechanical couplings shall be fully pressure rated and fully thrust restrained such that when installed in accordance with manufacturer's recommendations, a longitudinal load applied to the mechanical coupling will cause the pipe to yield before the mechanical coupling disjoins. External joint restraints shall not be used in lieu of fully restrained mechanical couplings.

B. Branch Connections. Branch connections to the main shall be made with saddle fittings or tees. Polyethylene saddle fittings shall be saddle fused to the main pipe per 3.01.

3.2 INSTALLATION

A. General. The Manufacturer shall package products for shipment in a manner suitable for safe transport by commercial carrier. When delivered, a receiving inspection shall be performed, and any shipping damage shall be reported to the Manufacturer within 7 days.

Installation shall be in accordance with Manufacturer's recommendations, and this specification. All necessary precautions shall be taken to ensure a safe working environment in accordance with applicable codes and standards.

B. Large Diameter Fabricated Fittings. Fabricated directional fittings 16-inch IPS and larger shall be butt fused to the end of a pipe. The flanged directional outlet connections shall be made up in the trench.

C. Foundation & Bedding. Pipe shall be laid on grade and on a stable foundation. Unstable or mucky trench bottom soils shall be removed, and a 6-inch foundation or bedding of compacted Type 4 material shall be installed to pipe bottom grade. Excess groundwater shall be removed from the trench before laying the foundation or bedding and the pipe. A trench cut in rock or stony soil shall be excavated to 6-inches below pipe bottom grade, and brought back to grade with compacted Type 4 bedding. All ledge rock, boulders and large stones shall be removed.

D. Pipe Handling. When lifting with slings, only wide fabric choker slings capable of safely carrying the load, shall be used to lift, move, or lower pipe and fittings. Wire rope or chain shall not be used. Slings shall be of sufficient capacity for the load, and shall be inspected before use. Worn or defective equipment shall not be used.

E. Underground installation. When placing pipe underground maintain standard as outlined by ASTM D2774 and AWWA Manual of Practice M55 2006.

3.3 TESTING

A. QUALITY ASSURANCE

a. Butt Fusion Testing. On every day butt fusions are to be made, the first fusion of the day shall be a trial fusion. The trial fusion shall be allowed to cool completely, then fusion test straps shall be cut out. The test strap shall be 12-inches (min) or 30 times the wall thickness in length with the fusion in the center, and 1-inch (min) or 1.5 times the wall thickness in width. Bend the test strap until the ends of the strap touch. If the fusion fails at the joint, a new trial fusion shall be made, cooled completely and tested. Butt fusion of pipe to be installed shall not commence until a trial fusion has passed the bent strap test.

Pressure Testing. The initial pressure test can be conducted before the line is backfilled. However, it is advisable to cover the pipe at intervals or particularly at curves to hold the pipe in place during pressure test. Flanged connections may be left exposed for visual leak inspection. The main shall be tested after the final installation is completed.

Test pressure should not exceed 1.5 times the rated operating pressure of the pipe or the lowest rated component in the system. The initial pressure test shall be applied and allowed to stand without make up pressure for a sufficient time to allow for diametric expansion or pipe stretching to stabilize. This usually occurs within 2 to 3 hours. After this equilibrium period, the test section can be returned to the 1.5 times operating pressure, the pump turned off, and a final test pressure held for 2 hours.

Allowable amounts of make-up water for expansion during pressure test is shown in Chart 6, taken from PPI technical report TR 31/9-79. There shall be no visual leaks or pressure drops greater than 5 PSI during the final test period.

Under no circumstances shall the total time under test exceed 3 hours at 1 ½ times the pressure rating. If the test is not completed because of leakage, equipment failure, or other reason, the test section shall be permitted to 'relax' for 8 hours before the next testing sequence. Pneumatic pressure testing is **NOT** allowed.

END OF SECTION 221050

SECTION 221066 – PIPELINE TESTING

PART 1 - GENERAL

1.1 THE REQUIREMENT

A. The Contractor shall perform flushing and testing of all pipelines and appurtenant piping complete, including conveyance of test water from Owner-designated source to point of use and all disposal thereof, all in accordance with the requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 MATERIALS REQUIREMENTS

A. All test equipment, temporary valves, bulkheads or other water control equipment and materials shall be determined and furnished by the Contractor subject to the Engineer's review.

PART 3 - EXECUTION

3.1 GENERAL

A. The Contractor shall notify the Engineer at least 48-hours in advance of any planned testing and shall review the testing procedures with the Engineer.

B. Unless otherwise provided herein, water for testing pipelines shall be furnished by the Owner; however, the Contractor shall make all necessary provisions for conveying the water from the Owner-designated source to the points of use.

C. All pipelines shall be tested. All testing operations shall be performed in the presence of the Engineer.

D. Disposal or release of test water from pipelines, after testing shall be acceptable to the Engineer.

3.2 HYDROSTATIC TESTING OF PIPELINES

A. Prior to hydrostatic testing, all pipelines shall be flushed or blown out as appropriate. The Contractor shall test all pipelines either in sections or as a unit. The Contractor shall be responsible for 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. Care shall be taken to see that all air vents are open during filling.

B. The pipeline shall be filled at a rate 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 133% of the pipe pressure class shown or specified measured at the lowest point of the pipeline being tested. The test pressure for yard piping shall be as shown or specified on the Piping Schedule measured at the lowest point of the pipeline section being tested. All leaks shall be repaired in a manner acceptable to the Engineer.

D. All piping shall have no leakage. In the case of pipelines that fail to pass the leakage test, the Contractor shall determine the cause of the leakage, shall take corrective measures necessary to repair the leaks and shall again test the pipelines.

END OF SECTION 221066

DIVISION 31 – EARTHWORK

SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping or sealing site utilities.
7. Temporary erosion- and sedimentation-control measures.

1.2 MATERIAL OWNERSHIP

A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

B. Contractor may coordinate with adjacent property owner and place excess excavated earthen material from the Crescent Site excavation in the area designated in the plans.

C. Contractor will be responsible to document the agreement of means and method of placing material and have the Property Owner sign the agreement and provide a copy to SCSA#3 prior to placing any material outside of the construction easement.

1.3 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.

C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.

D. Do not commence site clearing operations until temporary erosion- and sedimentation- control and plant-protection measures are in place.

E. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "Earth Moving."

1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated.

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.

B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

A. General: Protect trees and plants remaining on-site.

B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Engineer.

3.4 EXISTING UTILITIES

A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.

1. Arrange with utility companies to shut off indicated utilities.

B. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. A utility interruption form, as provided by the Owner, shall be completed and returned to the Owner not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Architect's written permission.

C. Removal of underground utilities is included in earthwork sections and with applicable fire suppression, plumbing, HVAC, electrical, communications, electronic safety and security and utilities sections and Section 024116 "Structure Demolition" and Section 024119 "Selective Demolition."

3.5 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

1. Grind down stumps and remove roots, obstructions, and debris to a depth of 18 inches below exposed subgrade.
2. Use only hand methods for grubbing within protection zones.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.6 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to depth indicated on Drawings in a manner to prevent intermingling with underlying subsoil or other waste materials.

C. Stockpile topsoil away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.

3.7 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

B. Separate recyclable materials produced during site clearing from other non-recyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 311000

SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Preparing subgrades for slabs-on-grade, walks, pavements, turf, and grasses and plants.
2. Excavating and backfilling for buildings and structures.
3. Drainage course for concrete slabs-on-grade.
4. Subbase course for concrete walks, pavements.
5. Subbase course and base course for asphalt paving.
6. Excavating and backfilling for utility trenches.

1.2 DEFINITIONS

A. Backfill: Soil material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

I. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

J. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

K. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.3 QUALITY ASSURANCE

A. Contractor to notify Engineer of excavation plans a minimum of 48 hours in advance.

1.4 PROJECT CONDITIONS

A. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth moving operations.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.

F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 100 percent passing a 1-1/2- inch sieve and not more than 10 percent passing a No. 200 sieve. The gradation shall have the following gradation requirements:

1-1/2 inch Gradation

Sieve Size	Percentage Passing	Tolerance
1-1/2-inch	100	0
3/4-inch	86	±5
1/2-inch	72	±5
No. 4	48	±5
No. 16	26	±3
No. 200	8	±2

3/4 inch Gradation

Sieve Size	Percentage Passing	Tolerance
3/4-inch	100	0
1/2-inch	85	±7
No. 4	61	±6
No. 16	33	±5
No. 200	9	±2

G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

H. Bank Run Fill: Imported granular material free from rock or gravel larger than 6-inches in any dimension with less than fifteen percent (15%) passing the No. 200 sieve. Bank-run fill shall be placed in finished lifts not to exceed 8 inches and compacted to 95% of maximum dry density per ASTM D-698.

Sieve Size	Percentage Passing
3-inch	100
3/8-inch	40-50
No. 8	35-65
No. 50	10-30
No. 200	5-15

I. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve. The gradation shall have the following gradation requirements:

Sieve Size	Percentage Passing
1-1/2-inch	100
3/4-inch	90-100
3/8-inch	40-100
No. 4	5-40
No. 8	0-5

2.2 ACCESSORIES

A. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored to comply with local practice or requirements of authorities having jurisdiction.

B. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored to comply with local practice or requirements of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.

B. Protect and maintain erosion and sedimentation controls during earth moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.3 EXCAVATION FOR STRUCTURES

A. Excavations shall include the removal of all materials of whatever nature encountered including removal or relocation of all obstructions that would interfere with the proper execution of the Work. The removal of said materials shall conform to the lines and grades shown on the plans or ordered by the Engineer. The Contractor shall furnish, place and maintain all supports and shoring that may be required for safety of excavations and protection of adjacent structures and all pumping, ditching or other measures necessary for the removal or exclusion of water, including taking care of storm water, groundwater and wastewater reaching the site of the Work from any source so as to prevent damage to the Work or adjoining property. Excavations shall be sloped or otherwise supported in a safe manner in accordance with applicable State safety

requirements and the requirements of OSHA Safety and Health Standards for Construction (29CFR1926).

B. Excavations beneath structures shall be carried to the grades shown or specified. Over-excavations ordered by the Engineer that are not shown or specified and the resulting backfill will be paid for under a separate unit price bid item if such bid item has been established, otherwise payment will be made in accordance with a negotiated price. After the required excavation or over-excavation has been completed the exposed surface shall be scarified to a depth of 6-inches, brought to optimum moisture content and rolled with heavy compaction equipment to obtain ninety percent (90%) of maximum density.

C. Excavation under roadways and areas to be paved shall extend to the bottom of the aggregate base. After the required excavation has been completed the exposed surface shall be scarified brought to optimum moisture content and rolled with heavy compaction equipment to obtain ninety-five percent (95%) of maximum density.

D. The subgrade area beneath embankments shall be excavated to remove the top 8-inches of native or topsoil material. Where the subgrade is sloped the excavation shall be benched.

E. The Contractor shall keep separate and stockpile from required excavations all topsoil consisting of the top 8-inches of native material. The Contractor shall place and grade this topsoil material as the top 6-inches on areas requiring landscaping, if applicable, to the extent it remains available.

F. The Contractor shall notify the Engineer of the completion of any structural excavation and shall allow the Engineer at least 24-hours review period before the exposed foundation is scarified and compacted or is covered with any structural backfill materials.

G. The Contractor shall remove and dispose of all excess excavated material at a site selected by the Contractor and reviewed by the Engineer.

H. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

I. Excavations at Edges of Tree- and Plant-Protection Zones:

1. Excavate by hand to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.4 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.5 EXCAVATION FOR UTILITY TRENCHES

A. Unless otherwise shown or ordered, excavation for pipelines and utilities shall be open-cut trenches. The bottom of the trench shall have a minimum width equal to the outside diameter of the pipe plus 24-inches. Trenches for pipelines smaller than 8-inches shall be excavated uniformly to the grade of the bottom of the pipe. Trenches for pipelines 8 inches and larger, unless otherwise ordered by the Engineer, shall be excavated uniformly to the grade 6-inches below the grade of the outside bottom of the pipe. The over-excavation shall be replaced with material as indicated in the Geotechnical Report (Section 319000). The pipe bedding shall be compacted by mechanical means suitable to the Engineer to eighty-five percent (85%) of relative density. The trench bottom shall be uniformly graded so that each pipe section when first laid will be continually in contact with the bedding along the entire length of the pipe. Where granular backfill under footings encases an underdrain piping system or has a thickness of 18-inches or greater or where shown on the Drawings, a layer of soil stabilization fabric shall be placed under the first horizontal layer of granular backfill. Soil stabilizer fabric shall be Mirafi 500, Contech C200, or equal. The sloping or vertical side slopes shall receive a layer of Mirafi 140 NL, Contech C-45NW, or equal.

B. The maximum amount of open trench permitted in any one location shall be the length necessary to accommodate the amount of pipe installed and backfilled in a single day. The Contractor shall make every reasonable effort to backfill all trenches at the end of each day. When this is not possible, barricades with warning lights meeting OSHA requirements shall be provided, set and maintained.

C. All pipeline and utility trench excavations shall be kept reasonably free from excess water during excavation, fine grading, pipe laying, and backfilling operations. Ground water shall be lowered to the extent necessary to keep the trench free from water and the trench bottom stable when the work within the trench is in progress. The Contractor shall provide and maintain at all times during construction ample means and equipment with which to properly and promptly remove and dispose of all water entering the excavation or other parts of the Work whether the water be surface water or underground water. The Contractor shall dispose of the water from the Work site in a suitable manner without damage to adjacent property.

D. When ordered by the Engineer, whether indicated on the Drawings or not, trenches shall be over-excavated beyond the depth shown or specified. Such over-excavation shall be to the depth ordered. The trench shall then be backfilled to the grade required. When the over excavation ordered by the Engineer is 4-inches or greater below the limits shown, additional payment will be made to the Contractor for that portion of the Work which is located below said 4-inch distance. Said additional payment will be made under separate unit price bid items for over-excavation and bedding if such bid items have been established, otherwise payment will be made in accordance with a negotiated price.

E. The Contractor shall remove and dispose of all excess excavated material at a site selected by the Contractor and reviewed by the Engineer.

F. Excavate trenches to indicated gradients, lines, depths, and elevations.

G. Trenches in Tree- and Plant-Protection Zones:

1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
3. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.6 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Fill of unauthorized excavations shall be at the Contractor's expense. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Engineer.

1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Engineer.

3.7 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.8 PIPE AND UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of water, mud, frost, snow, or ice.

B. Except for drain rock materials being placed in over-excavated areas of the trench for dewatering purposes, backfill shall be placed after all water is removed from the excavation.

C. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

D. Trenches under Footings: Any piping which passes below a footing within 6 feet (measured from the bottom of the footing to the top of the pipe), shall be encased in concrete as detailed in the drawings.

E. Place and compact initial backfill of as required in the Geotechnical Report (Section 319000).

1. Backfill material shall not be dropped directly on the pipe or utility conduit.

2. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

F. Place and compact final backfill as required in the Geotechnical Report (Section 319000) to final subgrade elevation.

G. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

H. Pipe-zone and utility trench backfill material shall be spread and compacted in layers not to exceed 6-inches in thickness. Compaction shall be achieved using mechanical equipment. Flooding, ponding or jetting shall not be used for compaction unless otherwise approved by the Engineer. Pipe zone backfill material shall be manually spread around the pipe so, when compacted, the pipe zone backfill will provide uniform bearing and side support. Piping shall be protected from lateral displacement and possible damage resulting from impact or unbalanced loading during backfill operations. Trench zone backfill material shall be uniformly spread and mechanically compacted in layers not to exceed 12-inches in thickness. Moisture content shall be uniformly adjusted by wetting or drying as necessary.

I. Pipe zone including bedding compaction requirements shall be ninety-five percent (95%) of maximum density or eighty-five percent (85%) at relative density whichever is applicable.

J. Trench zone backfill using required excavated material shall be not less than eighty-five (85%) of maximum density except under paved areas, sidewalks, pipelines, utilities and structures which shall not be less than ninety-five percent (95%) of maximum density.

K. Aggregate base course materials shall be placed and compacted to not less than ninety-five percent (95%) of maximum density.

3.9 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations using satisfactory native material, or imported as required in the Geotechnical Report.

3.10 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.11 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to AASHTO T-180:

1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 92 percent.
3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.
4. For utility trenches, compact each layer of initial and final backfill soil material at 85 percent.

D. Backfill shall not be dropped directly on or against any structure. Backfill shall not be placed around or upon any structure until the concrete has attained the required strength to support the loads imposed. Backfill around water retaining structures shall not be placed until the structures have been tested for leaks and the structures are full of water while the backfill is being placed.

E. Equipment weighing more than 10,000 pounds shall not be used closer to walls than a horizontal distance equal to the depth of the fill at that time. Hand operated power compaction equipment shall be used where use of heavier equipment is impractical or restricted due to weight limitations or may cause damage to the structure.

3.12 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch.
2. Walks: Plus or minus 1 inch.
3. Pavements: Plus or minus 1/2 inch.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.13 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:

1. Shape subbase course and base course to required crown elevations and cross-slope grades.
2. Place subbase course and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
3. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to AASHTO T-180.

3.14 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

A. Place drainage course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs- on-grade as follows:

1. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
2. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to AASHTO T-180.

3.15 FIELD QUALITY CONTROL

A. Testing Agency: Refer to General Conditions and Summary of Work to determine who will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Engineer.

D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.16 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.17 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property at the Contractor’s expense.

3.18 DEWATERING

A. Prevent surface water and subsurface or ground water from flowing into trenches and excavations and from flooding project site and surrounding area.

1. The Contractor shall investigate site and submit a dewatering plan to the engineer for review

2. The existing drain system may be used for discharging ground water.

3. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well point, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

4. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rainwater and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.

END OF SECTION 312000

SECTION 312219 - FINISH GRADING

PART 1 GENERAL

1.01 WORK INCLUDED

A. Provide all labor, materials, services and equipment indicated on the Drawings and/or herein specified to complete all Finish Grading Work.

B. Finish grading shall consist of the final grading and shaping of all areas, except those areas under pavements, slabs and structures, to conform to lines, elevations and shapes as indicated on the Drawings.

C. Re-vegetation of all cleared or stripped areas disturbed by construction activities

1.02 DEFINITIONS

A. Subgrade: Subgrade shall mean surfaces upon which additional specified materials are to be placed, prepared or constructed.

B. Rough Grading: Rough grading shall mean the act that includes the spreading or placement of specified materials to the tolerances defined as final rough grade.

C. Final Rough Grade: Final rough grade shall mean the establishment of grades to a 0.15 foot plus or minus tolerance of grades required to accomplish the work described in other sections of the specifications on the drawings (i.e. landscape work, finish grading, concrete work, asphalt work, etc.)

D. Finish Grading: Finish grading shall mean the act that includes the spreading or placement of specified materials to establish the tolerances defined as final finish grade.

E. Final Finish Grade: Final finish grade shall mean the establishment of grades to a plus or minus tolerance of final grades as indicated on drawings. Tolerances are specified in applicable sections of the specifications (i.e. concrete, asphalt, finish grading, etc.).

1.04 SUBMITTALS

A. Topsoil shall be subject to inspection and approval at the source of supply or upon delivery.

1.05 QUALITY ASSURANCE

A. All spot elevations to be staked for verification and approval by the Engineer.

B. Finish grade tolerance shall be within plus or minus 0.15 foot of final grades indicated on drawings.

C. Finished grades shall conform to shapes, spot elevations and contours, as indicated on drawings, with uniform levels or slopes between finished elevations or between finished elevations and existing elevations.

D. Testing and Inspection Service: Contractor will engage a soil testing service for quality control testing during finish grading operations. All testing will be coordinated with Engineer and his inspector.

PART 2 PRODUCTS

2.01 IMPORTED FILL MATERIALS

A. As required in Section 312000 – Earth Moving

2.03 TOPSOIL

A. Topsoil shall be fertile, friable, natural loam and shall be capable of sustaining vigorous plant growth. Topsoil shall be approved native soils stripped from the site prior to excavation. It shall be free of stones, lumps, clods of hard earth, plants or their roots, sticks and other extraneous matter. The soil shall contain no noxious weeds or their seeds. It shall not be used for planting operation while in a frozen or muddy condition.

PART 3EXECUTION

3.01 GENERAL

A. Conduct work in an orderly manner and so as to not create a nuisance. Dirt shall not be permitted to accumulate on streets or sidewalks not to be washed into storm sewers.

B. Finished grades shall be established using materials as specified.

C. Finish grade tolerance shall be within plus or minus 0.15 foot of final grades indicated on drawings.

D. Finished grades shall conform to shapes, spot elevations and contours, as indicated on drawings, with uniform levels or slopes between finished elevations and existing elevations.

E. Finished grades shall be established to provide after settling, adequate drainage in a uniform way so no water pockets or ridges will be created.

3.02 FINISH GRADING

A. Fine grade all landscaped areas to a smooth, loose and uniform surface.

B. Finish grades of all landscaped areas shall be established with topsoil material, as specified, spread to a depth of two (2) inches.

C. Contractor is responsible to spread excess excavated soil material from plant pits in surrounding planting beds.

D. Finished grade of planting areas shall be one (1) inch below top of curb, walls, concrete slabs, and mow strips or redwood headers.

END OF SECTION 312219

SECTION 312319 - DEWATERING

PART 1 GENERAL

1.01 DESCRIPTION

A. Furnish and install all labor, equipment, material, and related services to dewater all applicable portions of the project.

B. Dewatering may be necessary for construction requiring deep excavations.

C. Provide all necessary dewatering during construction of the entire project.

1.02 SUBMITTALS

A. Submit dewatering plan for all applicable excavations.

1.03 SITE CONDITIONS

A. Protect the project site and adjacent property to avoid any damage caused by dewatering and pumping.

B. All dewatering discharge shall be the responsibility of the Contractor.

C. Insure that no erosion occurs and that no contamination of the adjacent low areas occurs due to dewatering.

D. Soil borings made at the site are shown on the plans and complete soil boring reports are included in this specification document. Groundwater level readings at the time of the borings are included on the logs. Borings and groundwater levels are for informational purposes only and are not to be taken as wholly representative of all conditions throughout the project site.

E. The Contractor shall furnish all power, pumps and other apparatus necessary for the rapid and proper execution of the dewatering. All costs associated with dewatering during construction shall be included in the Lump Sum bid. The risk associated with correctly determining the appropriate dewatering cost shall be borne by the Contractor. Regardless of the bid value of dewatering, the Contractor shall complete any and all dewatering work necessary to construct this project in accordance with plans and specifications. No additional compensation will be paid by the Owner.

PART 2 PRODUCTS

2.01 DEWATERING EQUIPMENT

A. The Contractor is advised to carefully view the site to determine to what extent dewatering will be necessary for construction of the various structures. The choice of dewatering equipment shall be the responsibility of the Contractor.

B. Dewatering by pumping from sump pits will be acceptable if this method is able to keep the excavation dry.

C. If pumping from sump pits is not able to maintain a dry excavation, dewatering shall be accomplished by means of well points, vacuum well points, deep wells, or a combination of these methods.

D. Contractor shall remove from the site, all sand, silt, and debris accumulated during dewatering operations.

PART 3 EXECUTION

3.01 DEWATERING

A. All dewatering shall be carried out in accordance with an approved plan. Plan must be approved by the Engineer prior to any dewatering operations.

B. All dewatering shall be done to insure no erosion or pollution results.

C. Dewatering shall be of such magnitude necessary to insure all excavations are acceptable for the construction requirements.

D. The Contractor shall insure that the dewatering is operated continuously, 24 hours per day, if necessary.

E. Upon completion of the operation, the areas shall be cleaned of all debris and equipment and shall be returned to original or better condition.

3.02 PERMITS

A. The Contractor shall obtain all permits and pay all fees required by the Department of Natural Resources and other regulatory agencies for dewatering wells or water appropriation.

END OF SECTION 312319

SECTION 315000 - EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes temporary excavation support and protection systems.

1.2 PREINSTALLATION MEETINGS

A. Pre-installation Conference: Conduct conference at Project site.

1.3 INFORMATIONAL SUBMITTALS

A. Contractor Calculations: For excavation support and protection system. Include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

B. Record Drawings: Identify locations and depths of capped utilities, abandoned-in-place support and protection systems, and other subsurface structural, electrical, or mechanical conditions.

1.4 FIELD CONDITIONS

A. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Provide, design, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting earth and hydrostatic pressures and superimposed and construction loads.

1. Design excavation support and protection system, including comprehensive engineering analysis by a qualified professional engineer.

PART 3 - EXECUTION

3.1 SOLDIER PILES AND LAGGING

A. Install steel soldier piles before starting excavation. Extend soldier piles below excavation grade level to depths adequate to prevent lateral movement. Space soldier piles at regular intervals not to exceed allowable flexural strength of wood lagging. Accurately align exposed faces of flanges to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment.

B. Install wood lagging within flanges of soldier piles as excavation proceeds. Trim excavation as required to install lagging. Fill voids behind lagging with soil, and compact.

C. Install wales horizontally at locations indicated on Drawings and secure to soldier piles.

3.2 SHEET PILING

A. Before starting excavation, install one-piece sheet piling lengths and tightly interlock vertical edges to form a continuous barrier.

B. Accurately place the piling, using templates and guide frames unless otherwise recommended in writing by the sheet piling manufacturer. Limit vertical offset of adjacent sheet piling to 60 inches. Accurately align exposed faces of sheet piling to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment.

C. Cut tops of sheet piling to uniform elevation at top of excavation.

3.3 TIEBACKS

A. Drill, install, grout, and tension tiebacks.

B. Test load-carrying capacity of each tieback and replace and retest deficient tiebacks.

1. Have test loading observed by a qualified professional engineer responsible for design of excavation support and protection system.

C. Maintain tiebacks in place until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.4 BRACING

A. Bracing: Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move brace, install new bracing before removing original brace.

1. Do not place bracing where it will be cast into or included in permanent concrete work unless otherwise approved by Engineer.
2. Install internal bracing if required to prevent spreading or distortion of braced frames.

3. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.5 FIELD QUALITY CONTROL

A. Survey-Work Benchmarks: Resurvey benchmarks regularly during installation of excavation support and protection systems, excavation progress, and for as long as excavation remains open. Maintain an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify Engineer if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

3.6 REMOVAL AND REPAIRS

A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and earth and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils and rock or damaging structures, pavements, facilities, and utilities.

1. Remove excavation support and protection systems to a minimum depth of 48 inches below overlying construction and abandon remainder.

B. Leave excavation support and protection systems permanently in place.

END OF SECTION 315000

SECTION 320105 - RESTORATION OF IMPROVEMENTS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

It shall be the responsibility of the Contractor to reconstruct any and all existing improvements along the project unless the drawings or the City Engineer specifically state otherwise. Items to be reconstructed include but are not limited to the following:

1. Relocation of mailboxes, street signs, water meters, and utility boxes as required.

2. Reconstruction of existing fences in kind, including posts, wires, concrete curb walls, rails, slats, gates, etc.

3. Relocation of existing trees, and shubbery as indicated.

4. Reconstruction of improvements damaged during the construction of the project.

1.02 PROTECTION

Ensure safe passage of persons around area of reconstruction. Conduct operations to prevent injury to adjacent buildings, structures, other facilities and improvements, and persons. Provide flaggers, barricades, warning lights, etc., as required to properly identify construction areas.

1.03 DAMAGES

Promptly repair damages caused to adjacent facilities by reconstruction operations at no cost to the owner of damaged facilities. Proper care shall be taken to retain and protect all items specifically labeled as being retained and protected.

1.04 UTILITY SERVICE DISRUPTION

The contractor shall notify and receive approval from the appropriate utility company and affected property owners ant least 24 hours in advance of all requited disruption of services.

1.05 CONSTRUCTION CONSIDERATIONS

The Contractor shall be considerate of the adjacent property owners during construction. Disruptions to services and property access ways shall be minimized. Clean-up of construction areas shall be performed daily. Storage of Contractor owned equipment shall not be allowed on private property without written permission of property owners. All construction debris shall be removed from the job site and disposed of in a safe and lawful manner.

1.06 DOCUMENTATION OF EXISTING IMPROVEMENTS

It shall be the responsibility of the Contractor to properly document the state and dimensions of existing improvements that are to be reconstructed prior to removal of that improvement. This may be done through the means of photographs, sketches, detailed drawings, or written text.

PART 2 - PRODUCTS

2.01 SALVAGEABLE ITEMS

Insofar as it is practicable, existing improvements should be salvaged and reused during reconstruction operations. It is the intent to replace in kind all existing improvements to be reconstructed.

2.02 NON-SALVAGEABLE ITEMS

When it is not practical or safe to reuse existing materials the Contractor shall supply new materials that match existing or adjacent improvements. All new material must be approved by the individual property owners and the Owner before they are used for reconstruction purposed.

PART 3 - EXECUTION

3.01 GENERAL

All items to be reconstructed shall reconstructed to match the original improvements and to the satisfaction of the affected property owners. Workmanship and quality of materials shall meet or exceed industry standards for the items being reconstructed.

3.02 TREES AND SHRUBS

Care shall be taken when removing existing trees to avoid damaging the root system. Excavate pits, beds and trenches with vertical sides and with bottom of excavation slightly raised at center to provide drainage. Set root balls on a layer of compacted planting soil mixture, plumb and in center of pit or trench with top of ball at same elevation as adjacent finished landscape grades. Backfill in layers and work each layer to settle backfill and eliminate voids and air pockets. Guy and stake trees and shrubs immediately after planting.

The Contractor shall be responsible to water and maintain trees and shrubs relocated until project close-out.

END OF SECTION 320105

DIVISION 33 - UTILITIES

SECTION 331612 – HYDROSTATIC LEAKAGE TESTING OF CONCRETE TANKS

PART 1 - GENERAL

Work under this specification includes the general requirements for concrete tank testing. The information given in this section is intended to emphasize only certain provisions of the ACI350.1R/AWWA 400 Standards and provide supplemental information. Where there is conflicting information between this section and the ACI/AWWA Standards, the ACI/AWWA Standards shall be followed.

PART 2 – PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.01 Tanks

A. Leak Test: Comply with test procedures as outlined in ACI350.1R. The following are general summary of the procedures for the leak test:

1. After construction and prior to backfill, fill tank with potable water to test for leaks.
2. Fill the tank with potable water to the overflow pipe level.
3. Allow 72 hours for concrete to absorb any water in the tank.
4. Top off the water level to overflow pipe level.
5. Let water sit in tank for 24 hours.
6. Allowable leakage shall be no more than 0.1% of the tank volume.
7. In the event of test failure, repair cracks and leakage as necessary.
8. Retest until no leaks exist.

B. Cleaning: Clean interior and exterior of water storage tanks.

END OF SECTION 330112

SECTION 331305 – PIPELINE DISINFECTION

PART 1 - GENERAL

Work under this specification includes the general requirements for flushing and disinfecting as outlined in the latest edition of AWWA Standard C651. The information given in this section is intended to emphasize only certain provisions of the AWWA Standards and provide supplemental information. Where there is conflicting information between this section and the AWWA Standards, the AWWA Standards shall be followed. Water used for flushing and disinfecting operations shall be furnished by the Owner.

PART 2 – PRODUCTS

A. Liquid Chlorine: AWWA B301 with chlorine 99.5 percent pure by volume.

B. Sodium Hypochlorite: AWWA B300 with not less than 100 grams per liter available chlorine.

C. Calcium Hypochlorite: AWWA B300 with 65 to 70 percent available chlorine by weight in granular form.

D. Powder, tablet, or gas according to manufacturer's specification.

PART 3 - EXECUTION

A. After each section of pipeline for the water supply has been laid, the valves installed, and the trenches partially backfilled, the Contractor shall subject the pipe to a hydrostatic pressure and leakage test. Refer to Section 221066 for pipeline testing requirements.

B. Disinfection (Chlorination): All culinary water lines shall be disinfected by chlorination. Chlorination shall provide a minimum of 25 ppm residual after 24-hours contact in the pipeline. This may be expected with an application of 50 ppm although some conditions may require more. Chlorine, in the form of a 1% slurry of high-test calcium hypochlorite (HTM, Perchloron, Pittchlor, etc.) shall be fed into the pipeline in such a manner as to mix with the water flowing in the pipeline. (A 1% slurry results from mixing 1-pound on the calcium hypochlorite with 7.5 gallons of water.)

The following table provides information as to the required quantity of slurry to be used per 100-feet of pipe to provided a chlorine concentration of 150 ppm:

Pipe Size (Inches)	Vol. Of 100 Ft Length (Gallon)	Required Amount of Slurry (Gallon)
4 Inches	66	0.33
6 Inches	147	0.73
8 Inches	261	1.30
10 Inches	408	2.04
12 Inches	588	3.00
14 Inches	800	4.00
16 Inches	1044	5.20
18 Inches	1321	6.60
20 Inches	1631	8.20

If the pipes and appurtenances are kept clean and dry during construction, at the Contractors option, chlorination of the water lines may be accomplished by adding a small amount of hypochlorite powder or tablets in each length of pipe as it is laid. The following table gives the amount of calcium hypochlorite (70% available chlorine) or the number of tablets to be used for each 20 foot length of pipe to give a chlorine concentration of 50 ppm.

Pipe Size (Inches)	Amount of Powder For Each 20-Feet (Tablespoons)	Number of Hypochlorite Tablets of 5-G, for ea. 20 Ft.
4 Inches	3/4	1
6 Inches	1-1/2	2
8 Inches	2-1/2	3
10 Inches	4	5
12 Inches	5-3/4	8
14 Inches	8	10
16 Inches	10-1/2	14
18 Inches	13-1/2	18
20 Inches	17	22

Upon completion of each section of the system, the pipe shall be slowly filled with water to avoid washing the chlorine to one end of the pipe. After the chlorine has been present with water for 24 hours, the Engineer will test for residual.

During the process of chlorinating the pipeline, all valves and other pipeline appurtenances shall be operated several times to provide sufficient contact with chlorinating agent. Following chlorination, the waterline shall be drained and thoroughly flushed and, if necessary, rechlorination until a satisfactory bacteriological test is obtained.

After the applicable retention period, the heavily chlorinated water shall be flushed from the main until the chlorine concentration in the water leaving the main is no longer higher than that generally prevailing in the system, or less than 1 mg/1.

The environment to which the chlorinated water is to be discharged shall be inspected and if there is any question that the chlorinated discharge will cause damage to the environment, then a reducing agent shall be applied to the water to be wasted to neutralize thoroughly the chlorine residual remaining in the water. Where necessary, federal, state, and local regulatory agencies should be contracted to determine special provisions for the disposal of heavily chlorinated water.

After final flushing and before the water main is placed in service, two water samples shall be collected by the Owner's personnel and tested for bacteriologic quality and shall show the absence of coliform organisms. In the event satisfactory bacteriological tests cannot be obtained after chlorination by these methods, re-chlorination using the slurry method will be required until satisfactory tests are obtained.

END OF SECTION 331305

SECTION 331613 – TANK DISINFECTION

PART 1 - GENERAL

Work under this specification includes the general requirements for flushing and disinfecting as outlined in the latest edition of AWWA Standard C652-11. The information given in this section is intended to emphasize only certain provisions of the AWWA Standards and provide supplemental information. Where there is conflicting information between this section and the AWWA Standards, the AWWA Standards shall be followed. Water used for flushing and disinfecting operations shall be furnished by the Owner.

PART 2 – REFERENCES

A. AWWA C652 – Disinfection of Water-Storage Facilities
B. Utah Administrative Code R309-545-19 – Drinking Water Tank Disinfection
C. Utah Administrative Code R317 – Water Quality Standards

PART 3 – PRODUCTS

All chemicals must comply with NSF/ANSI 60 certification requirements for drinking water use. Follow manufacturer's specifications.

PART 4 – SUMBITTALS

A. All chemicals must comply with NSF/ANSI 60 certification requirements for drinking water use. Follow manufacture's specifications.

B. Monitoring procedures for chlorine residual
- Product data for dechlorication chemicals
- Test reports verifying chlorine residual levels prior to discharge

PART 4 – PRODUCTS

All chemicals must comply with NSF/ANSI 60 certification requirements for drinking water use. Follow manufacture's specifications.

4.01 DISINFECTANTS

A. Liquid Chlorine: AWWA B301 with chlorine 99.5 percent pure by volume.
B. Sodium Hypochlorite: AWWA B300 with not less than 100 grams per liter available chlorine.
C. Calcium Hypochlorite: AWWA B300 with 65 to 70 percent available chlorine by weight in granular form.

4.02 CLEANING MATERIALS

A. All brushes, hoses, pumps, and spray equipment shall be free of oil, grease, or other contaminants. Material in contact with potable water shall be certified for use.

4.03 DECHLORINATION CHEMICALS

Provide chemicals suitable for neutralizing chlorine, including:

A. Sodium Thiosulfate
B. Sodium Bisulfite

C. Asorbic Acid (where applicable)

Chemicals shall be compatible with discharge requirements and safe for handling.

PART 5 – EXECUTION

5.01 FACILITY PREPARATION

A. Remove all construction debris, dirt, oil, grease, and loose coating material.
B. Flush the structure thoroughly with clean potable water prior to disinfection.

5.02 DISINFECTION METHODS

A. Spray Application
B. Fill-and-Soak
C. Combined Spray / Fill

5.03 SAMPLING & TESTING

A. Follow applicable Utah Administrative Code R309.
B. If bacteriological test proves water quality is unacceptable, repeat system treatment.

5.04 DECHLORINATION

A. Heavily chlorinated water shall be neutralized prior to proper disposal.

5.04 DISPOSAL OF CHLORINATED WATER

A. Comply with all requirements of Utah Administrative Code R317.

END OF SECTION 331310

EXHIBIT A

SPECIAL CONDITIONS
FOR UTAH DIVISION OF DRINKING WATER
STATE REVOLVING FUND (SRF)

Attachment 1
SRF Required Front-End Specifications
(This form must be completed and signed by Prime Contractor and Submitted with the bid.)

U.S. Environmental Protection Agency
Certification of Non-Segregated Facilities

(Applicable to contracts, subcontracts, and agreements with applicants who are themselves performing Federally assisted construction contracts, exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause.)

By the submission of this bid, the bidder, offeror, applicant, or subcontractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. He certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The bidder, offeror, applicant, or subcontractor agrees that a breach of this certification is a violation of the Equal Opportunity clause in this contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national original, because of habit, local custom, or otherwise. He further agrees that (except where he has obtained identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause; that we will retain such certifications in his files; and that he will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT FOR CERTIFICATION OF NON-SEGREGATED FACILITIES

A Certification of Non-segregated Facilities, as required by the May 9, 1967, order (33 F.R. 7808, May 28, 1968) on Elimination of Segregated Facilities, by the Secretary of Labor must be submitted prior to the award of the subcontract exceeding $10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

_____

Signature Date

_____

Name and Title of Signer (Please Type)

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

SRF SPECIAL CONDITIONS

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION LOWER TIER COVERED TRANSACTIONS

Instructions for Certification

1. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.

2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or had become erroneous by reason of changed circumstances.

4. The terms covered transaction, debarred, suspended, ineligible, lower tier covered transaction, participant, person, primary covered transaction, principal, proposal, and voluntarily excluded, as used in this clause, have the meaning set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

5. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is proposed for debarment under 48 CFR part 9, subpart 9.4, debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

6. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not proposed for debarment under 48 CFR part 9, subpart 9.4, debarred, suspended, ineligible, or voluntarily excluded from covered transactions, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the List of Parties Excluded from Federal Procurement and Nonprocurement Programs.

8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is proposed for debarment under 48 CFR part 9, subpart 9.4, suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

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

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction 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 this proposal.

_____

Organization Name

_____

Name and Title of Authorized Representative

_____

Signature

Date

REQUIRED SIGNS AND POSTERS

The following signs and posters required for the project include but are not limited to:

1.	Minimum Wage Poster	**https://www.dol.gov/agencies/whd/posters/flsa**
2.	Davis-Bacon Wage Poster WH-1321	**https://www.dol.gov/agencies/whd/posters/dbra**
3.	Equal Opportunity Employer Poster:	**www.dol.gov/agencies/ofccp/posters**
4.	OSHA Poster	**www.osha.gov/publications/poster**
5.	SRF Signage	See next 7 pages

EQUAL OPPORTUNITY CLAUSES

A. The Equal Opportunity Clause published at 41 CFR 60-1.4(b) is required to be included in, and is part of, all nonexempt federally assisted construction contracts and subcontracts (including this Contract). The Equal Opportunity Clause shall be considered to be a part of every contract and subcontract required by the regulations to include such a clause, whether or not it is physically incorporated in such contracts. The notices required to be posted by paragraphs (1) and (3) of the Equal Opportunity Clause shall be the "Equal Employment Opportunity is the Law" poster approved by the Office of Federal Contract Compliance Programs and available on the internet at **http://www.dol.gov/oasam/programs/osdbu/sbrefa/poster/matrix.htm.**

EQUAL OPPORTUNITY CLAUSE (41 CFR 60-1.4(b))

During the performance of this contract, the contractor agrees as follows:

(1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

(2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, or national origin.

(3) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(4) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(5) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and

accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(6) In the event of the contractor'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 contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(7) The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency the contractor may request the United States to enter into such litigation to protect the interests of the United States.

B. The Standard Federal Equal Employment Opportunity Construction Contract Specifications published at 41 CFR 60-4.3(a) are required to be included in, and are part of, all federal and federally assisted construction contracts and subcontracts (including this Contract) in excess of $10,000 to be performed in geographical areas designated by the Director pursuant to 41 CFR 60-4.6 and in construction subcontracts in excess of $10,000 necessary in whole or in part to the performance of non-construction Federal contracts and subcontracts covered under Executive Order 11246. These Specifications shall be considered to be a part of every contract and subcontract required by the regulations to include such a clause, whether or not it is physically incorporated in such contracts.

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS (EXECUTIVE ORDER 11246)

1. As used in these specifications:

    a. "Covered Area" means the geographical area described in the solicitation from which this contract resulted;

    b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;

    c. "Employer identification number" means the Federal Social Security number used on the employer's quarterly Federal Tax Return, U.S. Treasury Department Form 941.

    d. "Minority" includes:

        (i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

        (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);

        (iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands);

        (iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the contractor, or any subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area, (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each contractor or subcontractor participating in an approved Plan is individually

required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other contractors or subcontractors toward a goal in an approved Plan does not excuse any covered contractor's or subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The contractor shall implement the specific affirmative action standards provided in paragraphs (7)(a) through (p) of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the contractor should reasonably by able to achieve in each construction trade in which it has employees in the covered area. Covered Construction contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the FEDERAL REGISTER in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the contractor during the training period, and the contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

    a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the contractor's employees are assigned to work. The contractor, where possible, will assign two or more women to each construction project. The contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of

and carry out the contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

c. Maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the contractor by the union or, if referred, not employed by the contractor, this shall be documented in the file with the reason therefore, along with whatever additional actions the contractor may have taken.

d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

e. Develop on-the-job training opportunities and/or participate in training programs for the areas which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the contractor's employment needs, especially those programs funded or approved by the Department of Labor. The contractor shall provide notice of these programs to the sources compiled under (7)(b) above.

f. Disseminate the contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as superintendents, general foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained

identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the contractor's EEO policy with other contractors and subcontractors with whom the contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a contractor's workforce.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7)(a) through (p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under (7)(a) through (p) of these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the contractor. The obligation to comply, however, is the contractor's and failure of such a group to fulfill an obligation shall not be a defense for the contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the contractor has achieved its goals for women generally, the contractor may be in violation of the Executive order if a specific minority group of women is under-utilized).

10. The contractor shall not use the goals and timetables of affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

11. The contractor shall not enter into any subcontract with any person or firm debarred from government contracts pursuant to Executive Order 11246.

12. The contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in

paragraph (7) of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

PROHIBITION AGAINST
LISTED VIOLATING FACILITIES

A. REQUIREMENTS

(1) To comply with all the requirements of section 114 of the Clean Air Act, as amended (42 U.S.C. 1857, et seq., as amended by Pub. L. 92-604) and section 308 of the Clean Water Act (33 U.S.C. 1251, as amended), respectively, which relate to inspection, monitoring, entry, reports, and information, as well as other requirements specified in section 114 and section 308 of the Air Act and the Water Act, respectively, and all regulations and guidelines issued thereunder before the award of this contract.

(2) That no portion of the work required by this prime contract will be performed in a facility listed on the Environmental Protection Agency list of violating facilities on the date when this contract was awarded unless and until the EPA eliminates the name of such facility or facilities from the listing.

(3) To use his best efforts to comply with clean air and clean water standards at the facilities in which the contract is being performed.

(4) To insert the substance of the provisions of this clause, including this paragraph (4), in any nonexempt subcontract.

B. DEFINITIONS

(1) Air Act means the Clean Air Act, as amended (42 U.S.C. 1857 et seq.).

(2) Water Act means the Clean Water Act, as amended (33 U.S.C. 1251 et seq.).

(3) Clean Air Standards means any enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, or other requirements which are contained in, issued under, or otherwise adopted under the Air Act or Executive Order 11738, an applicable implementation plan as described in section 110 (d) of the Air Act (42 U.S.C. 1857c-5(d)), an approved implementation procedure or plan under section 111 (c) or section 111(d), or an approved implementation procedure under section 112(d) of the Air Act (42 U.S.C. 1857c-7(d)).

(4) Clean Water Standards means any enforceable limitation, control, condition, prohibition, standard, or other requirement which is promulgated under the Water Act or contained in a permit issued to a discharger by the Environmental Protection Agency or by a State under an approved program, as authorized by section 402 of the Water Act (33 U.S.C. 1342), or by a local government to ensure compliance with pretreatment regulations as required by section 307 of Water Act (33 U.S.C. 1317).

(5) Compliance means compliance with clean air or water standards. Compliance shall also mean compliance with a schedule or plan ordered or approved by a court of competent

jurisdiction, the Environmental Protection Agency in accordance with the requirements of the Air Act or Water Act and regulations.

(6) Facility means any building, plant, installation, structure, mine, vessel, or other floating craft, location, or site of operations, owned, leased, or supervised by a contractor or subcontractor, to be used in the performance of a contract or subcontract. Where a location or site of operations contains or includes more than one building, plant, installation, or structure, the entire location or site shall be deemed to be a facility except where the Director, Office of Federal Activities, Environmental Protection Agency, determines that independent facilities are located in one geographical area.

WILLIAMS-STEIGER OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970

A. AUTHORITY

(1) The contractor is subject to the provisions of the Williams-Steiger Occupational Safety and Health Act of 1970.

(2) These construction documents and the joint and several phases of construction hereby contemplated are to be governed, at all times, by applicable provisions of the Federal law(s), including but not limited to the latest amendment of the following:

a. Williams-Steiger Occupational Safety and Health Act of 1970, Public Law 94-596;

b. Part 1910 - Occupational Safety and Health Standards, Chapter XVII of Title 29, Code of Federal Regulations;

c. Part 1926 - Safety and Health Regulations for Construction, Chapter XVII of Title 29, Code of Federal Regulations.

B. SAFETY AND HEALTH PROGRAM REQUIREMENTS

(1) This project, its prime contractor and its subcontractors, shall at all times be governed by Chapter XVII of Title 29, Code of Federal Regulations, Part 1926 - Safety and Health Regulations for Construction (29 CFR 22801), as amended to date.

(2) To implement the program and to provide safe and healthful working conditions for all persons, general project safety meetings will be conducted at the site at least once each month during the course of construction, by the construction superintendent or his/her designated safety officer. Notice of such meeting shall be issued not less than three (3) days prior, stating the exact time, location, and agenda to be included. Attendance by the owner, architect, general foreman, shop steward(s), and trades, or their designated representatives, witnessed in writing as such, shall be mandatory.

(3) To further implement the program, each trade shall conduct a short gang meeting, not less than once a week, to review project safety requirements mandatory for all persons during the coming week. The gang foreman shall report the agenda and specific items covered to the project superintendent, who shall incorporate these items in his/her daily log or report.

(4) The prime contractor and all subcontractors shall immediately report all accidents, injuries, or health hazards to the owner and architect, or their designated representatives, in writing. This shall not obviate any mandatory reporting under the provisions of the Occupational Safety and Health Act of 1970.

(5) This program shall become a part of the contract documents and the contract between the owner and prime contractor, prime contractor and all subcontractors, as though fully written therein.

ANTI-KICKBACKS

Contractor shall comply with the Copeland "Anti-Kickback" Act (18 U.S.C. 874) as supplemented in the Department of Labor Regulations (29 CFR, Part 3). This Act provides that Contractor is prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he is otherwise entitled.

Contractor certifies and warrants that no gratuities, kickbacks and contingency fees were paid in connection with this contract, nor were any fees, commissions, gifts, or other considerations made contingent upon the award of this contract.

Contractor certifies that, to Contractor's knowledge, no state employee has any personal or beneficial interest whatsoever in the services described in this Contract.

No staff member of Contractor, compensated either partially or wholly with funds disbursed pursuant to the Contract, shall engage in any Contract or activity which would constitute a conflict of interest as related to this Contract.

DISCOVERY OF ARCHAEOLOGICAL AND OTHER HISTORICAL ITEMS

In the event of an archaeological find during any phase of construction, the following procedure will be followed:

1. Construction shall be halted, with as little disruption to the archaeological site as possible.
2. Contractor shall notify Owner who shall contact the State Historic Preservation Officer.
3. The State Historic Preservation Officer may decide to have an archaeologist inspect the site and make recommendations about the steps needed to protect the site, before construction is resumed.
4. The entire event should be handled as expediently as possible in order to hold the loss in construction time to a minimum while still protecting archaeological finds.

A similar procedure should be followed with regard to more recent historical resources. Should any artifacts, housing sites, etc., be uncovered, the same procedure should be followed as for an archaeological find.

In the event archaeological/historical data are evaluated to meet National Register criteria, the Advisory Council on Historic Preservation may be notified and asked to comment by the Utah State Revolving Fund Program.

ACCESS

Contractor and loan recipient shall insure that authorized representatives of the Utah DEQ, State Historic Preservation Office, US EPA, Comptroller General, Inspector General, and other applicable federal and state agencies and officials will have access to the project work whenever it is in preparation or progress and shall provide proper facilities for such access and inspection. Contractor shall allow these representatives to have access to any books, documents, plans, reports, papers, and other records of Contractor which are pertinent to the project for the purpose of making audit, examination, excerpts, copies and transcriptions thereof and to interview any officer or employee. Contractor shall insure that all subagreements will also afford access to such project work, sites, documents, records, and persons.

SITE EROSION AND SEDIMENT CONTROL MEASURES

Every effort shall be made by Contractor and subcontractors to prevent and correct problems associated with erosion and runoff processes which could occur during and after project construction. The efforts should be consistent with applicable local ordinances and the Nonpoint Source Pollution Control Guidance. Whenever appropriate, Contractor's efforts shall reflect the following engineering principles:

(a) When appropriate, land grading and excavating should be kept at a minimum to reduce the possibility of creating runoff and erosion problems which require extensive control measures.
(b) Whenever possible, topsoil should be removed and stockpiled before grading begins.
(c) Land exposure should be minimized in terms of area and time.
(d) Exposed areas subject to erosion should be covered as quickly as possible by means of mulching or vegetation.
(e) Natural vegetation should be retained whenever feasible.
(f) Early completion of stabilized drainage systems (temporary and permanent systems) will substantially reduce erosion potential.
(g) Roadways and parking lots should be paved or otherwise stabilized as soon as feasible.
(h) Clearing and grading should not be started until a firm construction schedule is known and can be effectively coordinated with grading and clearing activity.

UPDES CONSTRUCTION RELATED DISCHARGE PERMITS

Construction projects which will disturb one or more acres will require coverage under the State of Utah General Permit for Storm Water Discharges Associated with Large Construction Activities. Contractor is responsible for obtaining coverage under the appropriate permit and maintaining compliance until Owner accepts the Work as complete. For additional information see http://www.waterquality.utah.gov/UPDES/stormwatercon.htm.

Certain construction activities such as dewatering, flushing, testing, and disinfection require coverage under the State of Utah General Permit for Temporary Discharges or under a separate discharge permit. Contractor is responsible for obtaining any necessary coverage and maintaining compliance. For more information see **http://www.waterquality.utah.gov/UPDES/stormwatercon.htm**.

AIR QUALITY PROTECTION MEASURES

Contractor shall adhere to effective dust control procedures as required under the Utah Air Quality Standards and Regulations UAC R307. If asbestos is encountered during this project, Contractor shall follow standards for handling according to UAC R307-801. Contractor shall adhere to proper trade waste and materials disposal.

PRESERVATION OF OPEN COMPETITION AND GOVERNMENT NEUTRALITY TOWARDS GOVERNMENT CONTRACTORS' LABOR RELATIONS ON FEDERAL AND FEDERALLY FUNDED CONSTRUCTION PROJECTS

The assistance recipient agrees to comply with Executive Order 13202 (Feb. 22, 2001, 66 Federal Register 11225) of February 17, 2001, entitled "Preservation of Open Competition and Government Neutrality Towards Government Contractors' Labor Relations on Federal and Federally Funded Construction Projects," as amended by Executive Order 13208 (April 11, 2001, 66 Federal Register 18717) of April 6, 2001, entitled "Amendment to Executive Order 13202, Preservation of Open Competition and Government Neutrality Towards Government Contractors' Labor Relations on Federal and Federally Funded Construction Projects.

Amend 48 CFR Part 36.202 by adding paragraph (d) to read as follows:

(d) In accordance with Executive Order 13202, of February 17, 2001, Preservation of Open Competition and Government Neutrality Towards Government Contractors' Labor Relations on Federal and Federally Funded Construction Projects, as amended on April 6, 2001—

(1) The Government, or any construction manager acting on behalf of the Government, must not—

(i) Require or prohibit offerors, contractors, or subcontractors to enter into or adhere to agreements with one or more labor organizations (as defined in 42 U.S.C. 2000e(d)) on the same or other related construction projects; or

(ii) Otherwise discriminate against offerors, contractors, or subcontractors for becoming, refusing to become, or remaining signatories or otherwise adhering to agreements with one or more labor organizations, on the same or other related construction projects.

(2) Nothing in this paragraph prohibits offerors, contractors, or subcontractors from voluntarily entering into project labor agreements.

(3) The head of the agency may exempt a construction project from this policy if the agency head finds that, as of February 17, 2001—

(i) The agency or a construction manager acting on behalf of the Government had issued or was a party to bid specifications, project agreements, agreements with one or more labor organizations, or other controlling documents with respect to that particular project, which contained any of the requirements or prohibitions in paragraph (d)(1) of this section; and

(ii) One or more construction contracts subject to such requirements or prohibitions had been awarded.

(4) The head of the agency may exempt a particular project, contract, or subcontract from this policy upon a finding that special circumstances require an exemption in order to avert an imminent threat to public health or safety, or to serve the national security. A finding of "special circumstances" may not be based on the possibility or presence of a labor dispute concerning the use of contractors or subcontractors who are nonsignatories to, or otherwise do not adhere to, agreements with one or more labor organizations, or concerning employees on the project who are not members of or affiliated with a labor organization.

AMERICAN IRON AND STEEL REQUIREMENT

None of the funds made available by a State water pollution control revolving fund as authorized by title VI of the Federal Water Pollution Control Act (33 U.S.C. 1381 et seq.) shall be used for a project for the construction, alteration, maintenance, or repair of a public treatment works unless all of the iron and steel products used in the project are produced in the United States.

The Contractor acknowledges to and for the benefit of Loan Recipient ("Purchaser") and the Utah Division of Drinking Water (the "State") that it understands the goods and services under this Agreement are being funded with monies made available by the Clean Water State Revolving Fund (CWSRF) and/or Drinking Water State Revolving Fund (DWSRF) that have statutory requirements commonly known as "American Iron and Steel;" that requires all of the iron and steel products used in the project to be produced in the United States ("American Iron and Steel Requirement") including iron and steel products provided by the Contactor pursuant to this Agreement. The Contractor hereby represents and warrants to and for the benefit of the Purchaser and the State that:

(a) the Contractor has reviewed and understands the American Iron and Steel Requirement,
(b) all of the iron and steel products used in the project will be and/or have been produced in the United States in a manner that complies with the American Iron and Steel Requirement, unless a waiver of the requirement is approved, and
(c) the Contractor will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support a waiver of the American Iron and Steel Requirement, as may be requested by the Purchaser or the State.

Notwithstanding any other provision of this Agreement, any failure to comply with this requirement by the Contractor shall permit the Purchaser or State to recover as damages against the Contractor any loss, expense, or cost (including without limitation attorney's fees) incurred by the Purchaser or State resulting from any such failure (including without limitation any impairment or loss of funding, whether in whole or in part, from the State or any damages owed to the State by the Purchaser). While the Contractor has no direct contractual privity with the State, as a lender to the Purchaser for the funding of its project, the Purchaser and the Contractor agree that the State is a third-party beneficiary and neither this paragraph (nor any other provision of this Agreement necessary to give this paragraph force or effect) shall be amended or waived without the prior written consent of the State.

The full American Iron and Steel Guidance can be found at:
http://water.epa.gov/grants_funding/aisrequirement.cfm

AMERICAN IRON AND STEEL REQUIREMENT GUIDANCE

Covered American Iron and Steel (AIS) Products

1. **What is an iron or steel product?**
   For purposes of the DWSRF and CWSRF projects that must comply with the AIS requirement, an iron or steel product is one of the following made primarily of iron or steel that is permanently incorporated into the project:
   - Lined or unlined pipes or fittings;
   - Manhole Covers;
   - Municipal Castings (defined in more detail later in this guidance);
   - Hydrants;
   - Tanks;
   - Flanges;
   - Pipe clamps and restraints;
   - Valves;
   - Structural steel (defined in more detail later in this guidance);
   - Reinforced precast concrete; and
   - Construction materials (defined in more detail later in this guidance).

2. **What does the term 'primarily iron or steel' mean?**
   'Primarily iron or steel' places constraints on the list of products above. For one of the listed products to be considered subject to the AIS requirements, it must be made of greater than 50% iron or steel, measured by cost. The cost should be based on the material costs.

   For example, the iron portion of a fire hydrant would likely be the bonnet, body and shoe, and then the cost would include the pouring and casting to create those components. The other material costs would include non-iron and steel internal workings of the fire hydrant (i.e. stem, coupling, valve, seals, etc.). However, the assembly of the internal workings into the hydrant body would not be included in this cost calculation. If one of the listed products is not made primarily of iron or steel, United States provenance is not required. An exception to this definition is reinforced precast concrete, which is addressed later in this guidance.

3. **If a product is composed of more than 50% iron or steel, but is not listed in the above list of items, must the item be produced in the US? Alternatively, must the iron or steel in such a product be produced in the US?**
   The answer to both question is no. Only items on the above list must be produced in the US. Additionally, the iron or steel in a non-listed item can be sourced from outside the US.

4. **What is the definition of steel?**
   Steel means an alloy that includes at least 50 percent iron, between .02 and 2 percent carbon, and may include other elements. Metallic elements such as chromium, nickel, molybdenum, manganese, and silicon may be added during the melting of steel for the purpose of enhancing properties such as corrosion resistance, hardness, or strength. The

definition of steel covers carbon steel, ally steel, stainless steel, tool steel and other specialty steels.

5. **What does 'produced in the United States' mean?**
   Production in the United States of the iron or steel products used in the project requires that all manufacturing processes, including application of coatings, must take place in the United States, with the exception of metallurgical processes involving refinement of steel additives. All manufacturing processes includes processes such as melting, refining, forming, rolling, drawing, finishing, fabricating and coating. Further, if a domestic iron and steel product is taken out of the US for any part of the manufacturing process, it becomes foreign source material. However, raw materials such as iron ore, limestone and iron and steel scrap are not covered by the AIS requirement, and the material(s), if any, being applied as a coating are similarly not covered. Non-iron or steel components of an iron and steel product may come from non-US sources. For example, for products such as valves and hydrants, the individual non-iron and steel components do not have to be of domestic origin.

6. **Are the raw materials used in the production of iron or steel required to come from US sources?**
   No, raw materials, such as iron ore, limestone, scrap iron, and scrap steel, can come from non-US sources.

7. **If an above listed item is primarily made of iron or steel, but is only at the construction site temporarily, must such an item be produced in the US?**
   No. Only the above listed products made primarily of iron or steel, permanently incorporated into the project must be produced in the US. For example trench boxes or scaffolding, which are removed from the project site upon completion of the project, are not required to be made of U.S. Iron or Steel.

8. **What is the definition of 'municipal castings'?**
   Municipal castings are cast iron or steel infrastructure products that are melted and cast. They typically provide access, protection, or housing for components incorporated into utility owned drinking water, storm water, wastewater, and surface infrastructure. They are typically made of grey or ductile iron, or steel. Examples of municipal castings are:
   - Access Hatches;
   - Ballast Screen;
   - Benches (Iron or Steel);
   - Bollards;
   - Cast Bases;
   - Cast Iron Hinged Hatches, Square and Rectangular;
   - Cast Iron Riser Rings;
   - Catch Basin Inlet;
   - Cleanout/Monument Boxes;
   - Construction Covers and Frames;
   - Curb and Corner Guards;
   - Curb Openings;

- Detectable Warning Plates;
- Downspout Shoes (Boot, Inlet);
- Drainage Grates, Frames and Curb Inlets;
- Inlets;
- Junction Boxes;
- Lampposts;
- Manhole Covers, Rings and Frames, Risers;
- Meter Boxes;
- Steel Hinged Hatches, Square and Rectangular;
- Steel Riser Rings;
- Trash receptacles;
- Tree Grates;
- Tree Guards;
- Trench Grates; and
- Valve Boxes, Covers and Risers.

9. What is 'structural steel'?

Structural steel is rolled flanged shapes, having at least one dimension of their cross-section three inches or greater, which are used in the construction of bridges, buildings, ships, railroad rolling stock, and for numerous other constructional purposes. Such shapes are designated as wide-flange shapes, standard I-beams, channels, angles, tees and zees. Other shapes include H-piles, sheet piling, tie plates, cross ties, and those for other special purposes.

10. What is a 'construction material' for purposes of the AIS requirement?

Construction materials are those articles, materials, or supplies made primarily of iron and steel, that are permanently incorporated into the project, not including mechanical and/or electrical components, equipment and systems. Some of these products may overlap with what is also considered "structural steel". This includes, but is not limited to, the following products:

- wire rod,
- bar,
- angles,
- concrete reinforcing bar,
- wire,
- wire cloth,
- wire rope and cables,
- tubing,
- framing,
- joists,
- trusses,
- fasteners (i.e. nuts and bolts),
- welding rods,
- decking,
- grating,

- railings,
- stairs,
- access ramps,
- fire escapes,
- ladders,
- wall panels,
- dome structures,
- roofing,
- ductwork,
- surface drains,
- cable hanging systems,
- manhole steps,
- fencing and fence tubing,
- guardrails,
- doors,
- stationary screens

11. What is not considered a 'construction material' for purposes of the AIS requirement?

Mechanical and electrical components, equipment and systems are not considered construction materials. Mechanical equipment is typically that which has motorized parts and/or is powered by a motor. Electrical equipment is typically any machine powered by electricity and includes components that are part of the electrical distribution system.

The following examples (including their appurtenances necessary for their intended use and operation) are NOT considered construction materials:

- pumps,
- motors,
- gear reducers,
- drives (including variable frequency drives (VFDs))
- electric/pneumatic/manual accessories used to operate valves (such as electric valve actuators)
- mixers,
- gates,
- motorized screens (such as traveling screens),
- blowers/aeration equipment,
- compressors,
- meters,
- sensors,
- controls and switches,
- supervisory control and data acquisition (SCADA)
- membrane bioreactor systems,
- membrane filtrations systems,
- filters,

- clarifiers and clarifier mechanisms,
- rakes,
- grinders,
- disinfection systems,
- presses (including belt presses),
- conveyors,
- cranes,
- HVAC (excluding ductwork),
- water heaters,
- heat exchangers,
- generators,
- cabinetry and housings (such as electrical boxes/enclosures),
- lighting fixtures,
- electrical conduit,
- emergency life systems,
- metal office furniture,
- shelving,
- laboratory equipment,
- analytical instrumentation,
- dewatering equipment

12. **If the iron or steel is produced in the US, may other steps in the manufacturing process take place outside of the US, such as assembly?**
    No. Production in the US of the iron or steel used in a listed product requires that all manufacturing processes must take place in the United States, except metallurgical processes involving refinement of steel additives.

13. **What processes must occur in the US to be compliant with the AIS requirement for reinforced precast concrete?**
    While reinforced precast concrete may not be at least 50% iron or steel, in this particular case, the reinforcing rebar and wire must be produced in the US and meet the same standards as for any other iron or steel product. Additionally, the casting of the concrete product must take place in the US. The cement and other raw materials used in concrete production are not required to be of domestic origin.

    If the reinforced concrete is cast at the construction site, the reinforcing bar and wire are considered to be a construction material and mush be produced in the US.

<u>Compliance with AIS Requirements</u>

1. **How should an assistance recipient document compliance with the AIS requirement?**
    In order to ensure compliance with the AIS requirement, specific AIS contract language must be included in each contract, starting with the assistance agreement (bond, grant agreement), all the way down to the subcontractor and purchase agreements. Language

for contracts should be similar to the American Iron and Steel Requirement provision in this contract.

EPA recommends the use of a step certification process, similar to one used by the Federal Highway Administration. The step certification process is a method to ensure adherence to AIS requirements and assistance recipients can verify that products comply with the AIS requirement. The process also establishes accountability and better enables States to take enforcement actions against violators.

Step certification creates a paper trail which documents the location of the manufacturing process involved with the production of steel and iron materials. A step certification is a process under which each handler (supplier, fabricator, manufacturer, processor, etc.) of the iron and steel products certifies that their step in the process was domestically performed. Each time a step in the manufacturing process takes place, the manufacturer delivers its work along with a certification of its origin. A certification can be quite simple. Typically, it includes the name of the manufacturer, the location of the manufacturing facility where the product or process took place (not its headquarters), a description of the product or item being delivered, and a signature by a manufacturer's responsible party. A sample certification is located in this section. These certifications should be collected and maintained by the assistance recipients.

Alternatively, the final manufacturer that delivers the iron or steel product to the worksite, vendor, or contractor, may provide a certification asserting that all manufacturing processes occurred in the US. While this type of certification may be acceptable, it does not provide the same degree of assurance. Additional documentation may be needed if the certification is lacking important information. Step certification is the best practice.

2. **How will the State will ensure assistance recipients are complying with the AIS requirement?**
   In order to ensure compliance with the AIS requirement, the State must include specific AIS contract language in the assistance agreement (i.e. bond, grant agreement, etc.). The assistance recipient must include specific AIS contract language in the project's contract documents.

   The State will also conduct site visits of projects during construction and review documentation demonstrating proof of compliance which the assistance recipient has gathered.

3. **What happens if a State or EPA finds a non-compliant iron and/or steel product permanently incorporated in the project?**
   If a potentially noncompliant product is identified, the State will notify the assistance recipient of the apparent unauthorized use of the non-domestic component, including a proposed corrective action, and should be given the opportunity to reply. If unauthorized use is confirmed, the State can take one or more of the following actions:
   - request a waiver where appropriate;

- require the removal of the non-domestic item; or
- withhold payment for all or part of the project.

Only EPA can issue waivers to authorize the use of a non-domestic item. EPA may use remedies available to it under the Clean Water Act and 40 CRF part 31 grant regulations in the event of a violation of a grant term and condition.

It is recommended that the State work collaboratively with EPA to determine the appropriate corrective action, especially in cases where the State is the one who identifies the item in noncompliance or there is a disagreement with the assistance recipient.

If fraudulent activities are suspected, the Office of Inspector General (OIG) should be contacted immediately. The OIG can be reached at 1-888-546-8740 or OIG_Hotline@epa.gov. More information can be found at this website: http://www.epa.gov/oig/hotline.htm.

4. **How do international trade agreements affect the implementation of the AIS requirements?**
   The AIS provision applies in a manner consistent with United States obligations under international agreements. Typically, these obligations only apply to direct procurement by the entities that are signatories to such agreements. In general, SRF assistance recipients are not signatories to such agreements, so these agreements have no impact on this AIS provision. In the few instances where such an agreement applies to a municipality, that municipality is under the obligation to determine its applicability and requirements and document the actions taken to comply for the State.

AIS Requirement Waiver Process

The statute permits EPA to issue waivers for a case or category of cases where EPA finds (1) that applying these requirements would be inconsistent with the public interest; (2) iron and steel products are not produced in the US in sufficient and reasonably available quantities and of a satisfactory quality; or (3) inclusion of iron and steel products produced in the US will increase the cost of the overall project by more than 25 percent.

In order to implement the AIS requirements, EPA has developed an approach to allow for effective and efficient implementation of the waiver process to allow projects to proceed in a timely manner. The framework described later in this guidance will allow States to apply for waiver, on the behalf of the assistance recipients, to apply for waivers of the AIS requirement directly to EPA Headquarters. Pursuant to the Act, EPA has the responsibility to make findings as to the issuance of waivers to the AIS requirements.

- Reasonably Available Quantity means the quantity of iron or steel products is available or will be available at the time needed and place needed, and in the proper form or specification as specified in the project plans and design.
- Satisfactory Quality means the quality of iron or steel products, as specified in the project plans and designs.
- Assistance Recipient means a borrower or grantee that receives funding from a State CWSRF program.

Information Checklist for Waiver Request

The purpose of this checklist is to help ensure that all appropriate and necessary information is submitted to EPA. EPA recommends that waiver applicants review this checklist carefully and provide all appropriate information to EPA. This checklist is for informational purposes only and does not need to be included as part of a waiver application.

Items	✓	Notes
General • Waiver request includes the following information: — Description of the foreign and domestic construction materials — Unit of measure — Quantity — Price — Time of delivery or availability — Location of the construction project — Name and address of the proposed supplier — A detailed justification for the use of foreign construction materials • Waiver request was submitted according to the instructions in the memorandum • Assistance recipient made a good faith effort to solicit bids for domestic iron and steel products, as demonstrated by language in requests for proposals, contracts, and communications with the prime contractor		
Cost Waiver Requests • Waiver request includes the following information: — Comparison of overall cost of project with domestic iron and steel products to overall cost of project with foreign iron and steel products — Relevant excerpts from the bid documents used by the contractors to complete the comparison — Supporting documentation indicating that the contractor made a reasonable survey of the market, such as a description of the process for identifying suppliers and a list of contacted suppliers		
Availability Waiver Requests • Waiver request includes the following supporting documentation necessary to demonstrate the availability, quantity, and/or quality of the materials for which the waiver is requested: — Supplier information or pricing information from a reasonable number of domestic suppliers indicating availability/delivery date for construction materials — Documentation of the assistance recipient's efforts to find available domestic sources, such as a description of the process for identifying suppliers and a list of contacted suppliers. — Project schedule — Relevant excerpts from project plans, specifications, and permits indicating the required quantity and quality of construction materials • Waiver request includes a statement from the prime contractor confirming the non-availability of the domestic construction materials for which the waiver is sought • Has the State received other waiver requests for the materials described in this waiver request, for comparable projects?		

HQ Review Checklist for Waiver Request

Instructions: To be completed by EPA. Review all waiver requests using the questions in the checklist, and mark the appropriate box as Yes, No or N/A. Marks that fall inside the shaded boxes may be grounds for denying the waiver. If none of your review markings fall into a shaded box, the waiver is eligible for approval if it indicates that one or more of the following conditions applies to the domestic product for which the waiver is sought:

1. The iron and/or steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality.
2. The inclusion of iron and/or steel products produced in the United States will increase the cost of the overall project by more than 25 percent.

Review Items	Yes	No	N/A	Comments
Cost Waiver Requests • Does the waiver request include the following information? — Comparison of overall cost of project with domestic iron and steel products to overall cost of project with foreign iron and steel products				
— Relevant excerpts from the bid documents used by the contractors to complete the comparison				
— A sufficient number of bid documents or pricing information from domestic sources to constitute a reasonable survey of the market				
• Does the Total Domestic Project exceed the Total Foreign Project Cost by more than 25%?				
Availability Waiver Requests • Does the waiver request include supporting documentation sufficient to show the availability, quantity, and/or quality of the iron and/or steel product for which the waiver is requested? — Supplier information or other documentation indicating availability/delivery date for materials — Project schedule — Relevant excerpts from project plans, specifications, and permits indicating the required quantity and quality of materials • Does supporting documentation provide sufficient evidence that the contractors made a reasonable effort to locate domestic suppliers of materials, such as a description of the process for identifying suppliers and a list of contacted suppliers?				
• Based on the materials delivery/availability date indicated in the supporting documentation, will the materials be unavailable when they are needed according to the project schedule? (By item, list schedule date and domestic delivery quote date or other relevant information)				
• Is EPA aware of any other evidence indicating the non-availability of the materials for which the waiver is requested? Examples include: — Multiple waiver requests for the materials described in this waiver request, for comparable projects in the same State — Multiple waiver requests for the materials described in this waiver request, for comparable projects in other States — Correspondence with construction trade associations indicating the non-availability of the materials				
• Are the available domestic materials indicated in the bid documents of inadequate quality compared those required by the project plans, specifications, and/or permits?				

Sample Step Certification Letter

The following information is provided as a sample letter of **step** certification for AIS compliance. Documentation must be provided on company letterhead.

Date
Company Name
Company Address
City, State Zip

Subject: American Iron and Steel Certification for Project (XXXXXXXXXXX)

I, (company representative), certify that the (melting, bending, coating, galvanizing, cutting, etc.) process for (manufacturing or fabricating) the following products and/or materials shipped or provided for the subject project is in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

Item, Products and/or Materials:

1. Xxxx
2. Xxxx
3. Xxxx

Such process took place at the following location:

_____

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

Signed by company representative

Sample Certification Letter

The following information is provided as a sample letter of certification for AIS compliance. Documentation must be provided on company letterhead.

Date
Company Name
Company Address
City, State Zip

Subject: American Iron and Steel Certification for Project (XXXXXXXXXXX)

I, (company representative), certify that the following products and/or materials shipped/provided to the subject project are in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

Item, Products and/or Materials:

1. Xxxx
2. Xxxx
3. Xxxx

Such process took place at the following location:

_____

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

Signed by company representative

Instructions for Complying With Davis-Bacon Wage Requirements

a. **Wage decision:** Federal wage rates (determinations) must be obtained prior to bid solicitation. The wage determinations for the county which the project is in can be found at https://beta.sam.gov/search?index=wd. However, when the plan review is complete for the project prior to bid, the Division of Drinking Water (Division) will issue a listing of the most current prevailing wage rates. The wage determinations are required to be included in the specifications and contract documents. ***Water projects such as pipelines and storage tanks are classified as heavy construction.*** If there are other types of construction, the award recipient may submit a request to verify whether the work being performed may be classified under a different type of construction.
b. **Bid/Contract Documents**: The documents included in this packet should be included in all bid/ contract documents. These documents include: **Code of Federal Regulations - Davis-Bacon and Related Acts Provisions and Procedures, Department of Labor Certified Payroll Form, and the NOTICE TO EMPLOYEES poster.**
c. **Posting the wage decision:** The prime contractor is responsible for posting, at the jobsite: a copy of the Department of Labor poster called "Notice to Employees", and a copy of the wage decision.
d. **Payroll reports:** Certified payroll reports are required to be maintained by the recipient. The Department of Labor has a payroll report (WH-347 Form) that is included with this letter. The prime contractor should submit a weekly, certified payroll report beginning with the first week that the company works on the project and for every week afterward until the firm has completed the work. It's recommended to number the payroll reports beginning with #1 and to clearly mark the last payroll for the project "Final." The contractor should submit a consecutively-numbered, certified payroll each week; even if no work is performed on the project for one or more weeks. The weekly payrolls are called certified because each payroll is signed and contains language certifying that the information is true and correct. Thoroughly checking the weekly payroll reports also gives the award recipient the advantage to see if any discrepancies in reported hours are occurring.
    i. **Payroll retention:** The award recipient must keep a complete set of payrolls and other basic records such as time cards. For Davis-Bacon projects, records should be kept for at least 3 years after completion.
    ii. **"No Work" Payroll Reports:** If a contractor does not work on the job site for more than a week "no work" payrolls must be submitted.
    iii. **Payroll inspection**: In addition to submitting payrolls to the recipient, every contractor (and subcontractor) must make their own copy of the payrolls available for review or copying to any authorized representative from DOL.
e. **Payroll reviews and corrections:** The award recipient or another designated inspector must visit the project site and interview some of the workers concerning their employment on the project. In addition, the Division of Drinking Water (Division) may periodically review payrolls and related submissions, comparing the interview information to the payrolls, to ensure that the labor standards requirements have been met. The Division will notify the award recipient if these reviews find any discrepancies or errors. The award recipient will then be given instructions about what steps must be taken to correct any problems.

DAVIS BACON PREVAILING WAGE REQUIREMENTS

"Notwithstanding any other provision of law and in a manner consistent with other provisions in this Act, all laborers and mechanics employed by contractors and subcontractors on projects funded directly by or assisted in whole or in part by and through the Federal Government pursuant to this Act shall be paid wages at rates not less than those prevailing on projects of a character similar in the locality as determined by the Secretary of Labor in accordance with subchapter IV of chapter 31 of title 40, United States Code. With respect to the labor standards specified in this section, the Secretary of Labor shall have the authority and functions set forth in Reorganization Plan Numbered 14 of 1950 (64 Stat. 1267; 5 U.S.C. App.) and section 3145 of title 40, United States Code."

Federal Labor Standards Provisions (from 29 CFR 5.5)

(a) (1) *Minimum wages.*

(i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided,* That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH–1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(ii) (A) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(*1*) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(*2*) The classification is utilized in the area by the construction industry; and

(*3*) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii) (B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, *Provided,* That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(2) *Withholding.* The project owner (the SRF loan recipient) or the Utah SRF Program shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the project owner or the Utah SRF Program may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) *Payrolls and basic records.*

(i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii) (A) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the project owner. Project owner will provide copies to the Utah SRF Program upon request. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (*e.g.* , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH–347 is available for this purpose from the US Department of Labor/Wage and Hour Division Web site at ***http://www.dol.gov/whd/programs/dbra/wh347.htm***. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the project owner. Project owner shall provide such information, upon request, to the Utah SRF Program or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the project owner or other government agencies.

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(*1*) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(*2*) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(*3*) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH–347 shall satisfy the requirement for

submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the project owner, the Utah SRF Program, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) *Apprentices and trainees*

(i) *Apprentices.* Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the

apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) *Trainees.* Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) *Equal employment opportunity.* The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

(5) *Compliance with Copeland Act requirements.* The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

(6) *Subcontracts.* The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the project owner

and/or the Utah SRF Program may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

(7) *Contract termination: debarment.* A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

(8) *Compliance with Davis-Bacon and Related Act requirements.* All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

(9) *Disputes concerning labor standards.* Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

(10)*Certification of eligibility.*

(i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii)The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

(b) *Contract Work Hours and Safety Standards Act.* As used in this paragraph, the terms *laborers* and *mechanics* include watchmen and guards.

(1) *Overtime requirements.* No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) *Violation; liability for unpaid wages; liquidated damages.* In the event of any violation of the clause set forth in paragraph (b)(1) of this section the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (b)(1) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (b)(1) of this section.

(3) *Withholding for unpaid wages and liquidated damages.* The project owner or the Utah SRF Program shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b)(2) of this section.

(4) *Subcontracts.* The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (b)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (b)(1) through (4) of this section.

Other related requirements and information

1. Based on 29 CFR 5.6(a)(3): Owner shall make such investigations as may be necessary to assure compliance with the labor standards provisions and related statutes and regulations. Investigations shall be made with such frequency as may be necessary to assure compliance. Such investigations shall include interviews with employees, which shall be taken in confidence, and examinations of payroll data and evidence of registration and certification with respect to apprenticeship and training plans. In making such examinations, particular care shall be taken to determine the correctness of classifications and to determine whether there is a disproportionate employment of laborers and of apprentices or trainees registered in approved programs. Such investigations shall also include evidence of fringe benefit plans and payments thereunder. Complaints of alleged violations shall be given priority.

2. A brief summary of required Davis Bacon compliance checking activities by Owner:

   - Make sure the Davis-Bacon poster and the wage determination are posted at the job site in a prominent and accessible place where both can be easily seen by the workers.

- Review the weekly payrolls for compliance with the requirements.
- Interview employees to cross check the payrolls and to help ensure compliance with the requirements.

3. The regulations do not require a specific interval and number of employee interviews; however, Owner shall make the interval and number of interviews commensurate with the size and complexity of the project so as to provide a reasonable check on Contractor's compliance.

4. The regulations do not require a specific interview format. Owner can use or adapt other agencies' Davis-Bacon interview forms, such as the one provided by the US Department of Housing and Urban Development, form HUD-11, which can be found at **http://www.hud.gov/offices/olr/olrform.cfm** or Standard Form -1445 which can be found at **http://www.gsa.gov/portal/forms/download/12BF5D0E2DC4484685256CBC0062F375**.

5. Owner shall maintain the payrolls, interview records, and other compliance related records for a minimum of three years after completion of the contract and shall provide them upon request to the Utah SRF Program or to applicable federal agencies.

6. Additional compliance information and assistance is available at **http://www.dol.gov/compliance/guide/dbra.htm** and other related websites.

7. Following are the **identifier codes** used to reference the various craft unions. Examples of classifications for which their local unions commonly negotiate wage and fringe benefit rates are shown in parentheses.

   ASBE = International Association of Heat and Frost Insulators and Asbestos Workers

   BOIL = International Brotherhood of Boiler Makers, Iron Shipbuilders, Blacksmiths, Forgers and Helpers

   BRXX = International Union of Bricklayers, and Allied Craftsmen (bricklayers, cement masons, stone masons, tile, marble and terrazzo workers)

   CARP = United Brotherhood of Carpenters and Joiners of America (carpenter, millwright, piledrivermen, soft floor layers, divers)

   ELEC = International Brotherhood of Electrical Workers (electricians, communication systems installers, and other low voltage specialty workers)

   ELEV = International Union of Elevator Constructors

   ENGI = International Union of Operating Engineers (operators of various types of power equipment)

   IRON = International Association of Bridge, Structural and Ornamental Iron Workers

LABO = Laborers' International Union of North America

PAIN = International Brotherhood of Painters and Allied Trades (painters, drywall finishers, glaziers, soft floor layers)

PLAS = Operative Plasterers' and Cement Masons' International Association of the United States and Canada (cement masons, plasterers)

PLUM = United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry of the United States and Canada (plumbers, pipefitters, steamfitters, sprinkler fitters)

ROOF = United Union of Roofers, Waterproofers and Allied Workers

SHEE = Sheet Metal Workers International Association

SU.... = The "SU..." identifier is for rates derived from **su**rvey data where the union rate(s) were not determined to be prevailing for the classification(s) listed. (The data reported for such a classification and used in computing the prevailing rate may have included both union and non-union wage data.) Note that **various classifications,** for which non-union rates have been determined to be prevailing, may be listed in alphabetical order under this identifier, which the computer places into the wage determination in alphabetical order, as listed here.

TEAM = International Brotherhood of Teamsters

U.S. Department of Labor
Wage and Hour Division

PAYROLL

(For Contractor's Optional Use; See Instructions at www.dol.gov/whd/forms/wh347instr.htm)

Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number.

U.S. Wage and Hour Division

Rev. Dec. 2008

OMB No.:1235-0008
Expires: 04/30/2021

NAME OF CONTRACTOR OR SUBCONTRACTOR | ADDRESS

PAYROLL NO. | FOR WEEK ENDING | PROJECT AND LOCATION | PROJECT OR CONTRACT NO.

(1) NAME AND INDIVIDUAL IDENTIFYING NUMBER (e.g., LAST FOUR DIGITS OF SOCIAL SECURITY NUMBER) OF WORKER	(2) NO. OF WITHHOLDING EXEMPTIONS	(3) WORK CLASSIFICATION	OT. OR ST.	(4) DAY AND DATE / HOURS WORKED EACH DAY	(5) TOTAL HOURS	(6) RATE OF PAY	(7) GROSS AMOUNT EARNED	(8) DEDUCTIONS: FICA	WITH-HOLDING TAX			OTHER	TOTAL DEDUCTIONS	(9) NET WAGES PAID FOR WEEK
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While completion of Form WH-347 is optional, it is mandatory for covered contractors and subcontractors performing work on Federally financed or assisted construction contracts to respond to the information collection contained in 29 C.F.R. §§ 3.3, 5.5(a). The Copeland Act (40 U.S.C. § 3145) contractors and subcontractors performing work on Federally financed or assisted construction contracts to "furnish weekly a statement with respect to the wages paid each employee during the preceding week." U.S. Department of Labor (DOL) regulations at 29 C.F.R. § 5.5(a)(3)(ii) require contractors to submit weekly a copy of all payrolls to the Federal agency contracting for or financing the construction project, accompanied by a signed "Statement of Compliance" indicating that the payrolls are correct and complete and that each laborer or mechanic has been paid not less than the proper Davis-Bacon prevailing wage rate for the work performed. DOL and federal contracting agencies receiving this information review the information to determine that employees have received legally required wages and fringe benefits.

Public Burden Statement

We estimate that is will take an average of 55 minutes to complete this collection, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have any comments regarding these estimates or any other aspect of this collection, including suggestions for reducing this burden, send them to the Administrator, Wage and Hour Division, U.S. Department of Labor, Room S3502, 200 Constitution Avenue, N.W. Washington, D.C. 20210

(over)

Date _____

I, _____ _____
(Name of Signatory Party) (Title)

do hereby state:

(1) That I pay or supervise the payment of the persons employed by

_____ on the
(Contractor or Subcontractor)

_____; that during the payroll period commencing on the
(Building or Work)

_____ day of _____, _____, and ending the _____ day of _____, _____,

all persons employed on said project have been paid the full weekly wages earned, that no rebates have been or will be made either directly or indirectly to or on behalf of said

_____ from the full
(Contractor or Subcontractor)

weekly wages earned by any person and that no deductions have been made either directly or indirectly from the full wages earned by any person, other than permissible deductions as defined in Regulations, Part 3 (29 C.F.R. Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948, 63 Stat. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. § 3145), and described below:

(2) That any payrolls otherwise under this contract required to be submitted for the above period are correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the applicable wage rates contained in any wage determination incorporated into the contract; that the classifications set forth therein for each laborer or mechanic conform with the work he performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide apprenticeship program registered with a State apprenticeship agency recognized by the Bureau of Apprenticeship and Training, United States Department of Labor, or if no such recognized agency exists in a State, are registered with the Bureau of Apprenticeship and Training, United States Department of Labor.

(4) That:

(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

– in addition to the basic hourly wage rates paid to each laborer or mechanic listed in the above referenced payroll, payments of fringe benefits as listed in the contract have been or will be made to appropriate programs for the benefit of such employees, except as noted in section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

– Each laborer or mechanic listed in the above referenced payroll has been paid, as indicated on the payroll, an amount not less than the sum of the applicable basic hourly wage rate plus the amount of the required fringe benefits as listed in the contract, except as noted in section 4(c) below.

(c) EXCEPTIONS

EXCEPTION (CRAFT)	EXPLANATION

REMARKS:

NAME AND TITLE	SIGNATURE

THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 231 OF TITLE 31 OF THE UNITED STATES CODE.

Insert (in place of this page) the applicable Davis-Bacon Wage Determinations.
Current wage decisions for Utah can be found at: ***https://beta.sam.gov/search?index=wd.***

*Use the wage decision that applies to the type of construction. Most water projects are classified as "**heavy**." The definition of "building" is 'a sheltered enclosure with walk-in access for the purpose of housing persons, machinery, equipment or supplies.' **Treatment plants** may be "**heavy**" or "**building**" or both, depending on circumstances. Water mains constructed in conjunction with a UDOT project may be "highway." Discuss with the SRF program if necessary, especially if multiple types seem to apply. We may need to consult EPA or the US Department of Labor in some cases.*

Check the wage decision(s) before going to bid and again at least 10 days prior to contract award to make sure you are using the most current decision(s) as they get updated regularly.

"General Decision Number: UT20260079 01/02/2026

Superseded General Decision Number: UT20250079

State: Utah

Construction Type: Building

Counties: Daggett, Duchesne, Rich and Summit Counties in Utah.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Modification Number	Publication Date
0	01/02/2026

BOIL0004-001 01/01/2025

	Rates	Fringes
BOILERMAKER	$ 44.37	26.87

ELEC0354-001 06/11/2025

	Rates	Fringes
ELECTRICIAN (Low Voltage Wiring Only)	$ 31.86	1.5%+15.35
ELECTRICIAN	$ 41.23	1.3%+17.12

SFUT0669-003 01/01/2025

	Rates	Fringes
SPRINKLER FITTER (Fire Sprinklers)	$ 42.17	26.63

SHEE0312-001 07/01/2025

	Rates	Fringes
SHEET METAL WORKER (HVAC Duct Installation Only)	$ 46.79	14.89

SUUT2012-011 07/29/2014

	Rates	Fringes
BRICKLAYER	$ 23.88	0.00
CARPENTER (Acoustical Ceiling Installation Only)	$ 21.72	1.43
CARPENTER, Excludes Acoustical Ceiling Installation	$ 19.51	5.30
CEMENT MASON/CONCRETE FINISHER	$ 21.11	0.00
INSULATOR - BATT	$ 12.50	0.23
IRONWORKER, REINFORCING	$ 15.00	0.00

IRONWORKER, STRUCTURAL.....$ 17.41 6.13

LABORER: Common or General.....$ 13.98 0.00

LABORER: Mason Tender - Brick...$ 16.54 0.00

OPERATOR:
Backhoe/Excavator/Trackhoe.....$ 16.59 0.79

PLUMBER.....$ 24.00 4.62

TILE FINISHER.....$ 17.00 0.00

TILE SETTER.....$ 20.63 0.00

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

==========

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

Note: Executive Order 13658 generally applies to contracts subject to the Davis-Bacon Act that were awarded on or between January 1, 2015 and January 29, 2022, and that have not been renewed or extended on or after January 30, 2022. Executive Order 13658 does not apply to contracts subject only to the Davis-Bacon Related Acts regardless of when they were awarded. If a contract is subject to Executive Order 13658, the contractor must pay all covered workers at least $13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2025. The applicable Executive Order minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under Executive Order 13658 is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

Union Rate Identifiers

A four-letter identifier beginning with characters other than ""SU"", ""UAVG"", ?SA?, or ?SC? denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

Survey Rate Identifiers

The ""SU"" identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

?SU? wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the

discretion to update such rates under 29 CFR 1.6(c)(1).

State Adopted Rate Identifiers

The ""SA"" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

a) a survey underlying a wage determination
b) an existing published wage determination
c) an initial WHD letter setting forth a position on a wage determination matter
d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to davisbaconinfo@dol.gov or by mail to:

Branch of Wage Surveys
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail to:

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2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210.

==========

END OF GENERAL DECISION
"

"General Decision Number: UT20260011 01/02/2026

Superseded General Decision Number: UT20250011

State: Utah

Construction Type: Heavy

County: Summit County in Utah.

Including Water and Sewer line and Natural Gas Pipeline Construction

Modification Number	Publication Date
0	01/02/2026

ELEC0057-002 03/01/2025

	Rates	Fringes
LINE CONSTRUCTION		
Lineman	$ 58.83	8.35%+16.30

ENGI0003-005 07/01/2024

	Rates	Fringes
OPERATOR: Power Equipment		
(1)Mechanic-Excluding Natural Gas Pipeline Construction	$ 41.71	18.62
(2A)Blade/Grader	$ 40.32	18.62
(3) Backhoe/Excavator, Front End Loader(Over 5 cu.yds.)	$ 39.01	18.62
(4) Asphalt Paver, Bulldozer, Front End Loader(2 to 5 cu. yds.), Grade Setter, Oil Distributor, Scraper	$ 37.79	18.62
(5) Asphalt Roller, Bobcat/Skid loader, Front End Loader(Under 2 cu. yds.), Oiler	$ 36.55	18.62
(6) Screed	$ 36.55	18.62
(7) Roller(Dirt and Grade Compaction)	$ 34.25	18.62

ENGI0003-056 07/01/2013

Natural Gas Pipeline Construction Only

	Rates	Fringes
OPERATOR: Power Equipment		
Backhoe/Excavator/Trackhoe, Blade/Grader, Boom, Bulldozer, Mechanic	$ 35.68	17.57
Oiler	$ 22.03	11.88

IRON0027-001 07/01/2024

	Rates	Fringes

IRONWORKER.....$ 32.68 27.55

LABO0295-006 07/01/2014

Natural Gas Pipeline Construction Only

	Rates	Fringes
LABORER		
Common or General,		
Pipelayer	$ 20.59	8.65
Pot Tender and Sand blaster	$ 20.85	8.65

LABO0295-015 07/01/2014

	Rates	Fringes
LABORER		
(1)Flagger	$ 20.59	8.65
(3)Mason Tender (Cement/Concrete), Hand Held Saw, Jackhammer, Power Saw	$ 20.85	8.65
(5)Hand Held Drill	$ 21.65	8.65

LABO0295-038 07/01/2014

Excluding Natural Gas Pipeline & Water/Sewer Line Construction

	Rates	Fringes
LABORER (1)Common or General)	$ 20.59	8.65

TEAM0222-002 07/01/2025

NATURAL GAS PIPELINE CONSTRUCTION ONLY

ZONE 1 - Summit County (Western Half)
ZONE 2 - Summit County (Eastern Half)

	Rates	Fringes
TRUCK DRIVER		
ZONE 1:		
Group 1	$ 41.39	15.10
Group 2	$ 40.75	15.10
Group 3	$ 40.37	15.10
ZONE 2:		
Group 1	$ 46.65	15.75
Group 2	$ 46.02	15.75
Group 3	$ 41.90	15.75

Group 1: Articulated End Dump, Low Boy, Rollagon or Similar type Equipment, Truck Mechanic.

Group 2: A-Frame, Challenger(For transportation purposes), Forklift, Fuel Truck, Gin Pole, Rubber-Tired Tractor, Tandem Float (4 & 5 Axle), Track Truck/All-Track Dumper Equipment, Vacuum Truck, Winch Truck.

Group 3: Ambulance , Bus, Dump Truck (2 and 3 axle), Flatbed Truck (2 and 3 axle), Grease Truck, Hot Pass Truck (3 axle), Jeep, Pick-up, Single Axle Float (3 axle), Skid

Truck (2 and 3 axle), Station Wagon, Stringer Bead & Hot Pass (2 axle), Swamp Buggy/ Marsh Buggy, or similar type equipment, Team Driver, Water Truck (2 and 3 axle).

Premium Pay:

Add $2.25 to the above Rate for the following classifications

Group 1: Low Boy and Truck Mechanic
Group 2: Stringer Truck

SUUT2008-040 08/19/2008

	Rates	Fringes
CARPENTER, Includes Form Work	$ 14.63	0.97
CEMENT MASON/CONCRETE FINISHER	$ 17.08	3.14
ELECTRICIAN	$ 23.74	7.64
LABORER: Landscape	$ 7.25	0.00
LABORER: Pipelayer (Excluding Natural Gas Pipeline Construction)	$ 14.00	0.00
OPERATOR: Crane	$ 28.97	9.40
OPERATOR: Trackhoe (Excluding Natural Gas Pipeline and Water/Sewer Line Construction)	$ 19.98	0.00
TRUCK DRIVER (Excluding Natural Gas Pipeline Construction)	$ 14.40	3.99
WATER & SEWER LINES: Laborer, Common or General	$ 12.81	0.00
WATER & SEWER LINES: Operator-Backhoe/Excavator/Trackhoe	$ 15.57	0.00

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

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WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

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Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210.

==========

END OF GENERAL DECISION
"

EXHIBIT B

GEOTECHNICAL REPORT
IGES

Intermountain GeoEnvironmental Services, Inc.
12429 South 300 East, Suite 100, Draper, Utah, 84020
Phone (801) 748-4044 | Fax (801) 748-4045
www.igesinc.com

Geotechnical Investigation
Silver Creek Water Tank
Crescent Drive and Whileaway Road
Park City, Utah
IGES Project No. 04729-001

November 13, 2024

Prepared for

Summit County Service Area No. 3
629 East Parkway Drive, Suite 1
Park City, Utah 84098



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Geotechnical Investigation
Silver Creek Water Tank
Crescent Drive and Whileaway Road
Park City, Utah

IGES Job No. 04729-001

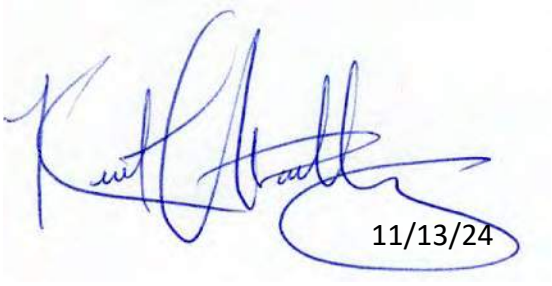
November 13, 2024

Prepared by:



Karl Christensen, E.I.T.
Staff Engineer

Reviewed by:



Kent A. Hartley, P.E.
Principal

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1.0 EXECUTIVE SUMMARY

This report presents the results of a geotechnical investigation conducted for the proposed Water Tank near Crescent Drive and Whileaway Road in Park City, Utah as shown on the *Site Map* (Figure A-1). The subject site is considered suitable for the proposed construction. A brief summary of the critical recommendations and findings are included below:

- Based on our observations the site has an approximately 9-inch-thick layer of topsoil and overburden soils, visually classified as a Sandy Lean CLAY (CL) with gravel that is underlain by Volcanic Lahar Breccia BEDROCK. In some areas the bedrock is exposed on the surface with no topsoil. For more details on the site stratigraphy see the test pit logs in Appendix A.
- Due to the presence of relatively strong bedrock, Excavation into bedrock will require larger excavators with a hoe-ram, heavy duty rippers or blasting. Spoils from the bedrock excavations may be used as structural fill if processed as recommended in this report.
- Temporary cuts in the bedrock should not be constructed steeper than 1H:10V. Permanent cuts should not be steeper than 1H:3V. Permanent fill slopes should not be steeper than 2H:1V. IGES should be on site during bedrock excavation to evaluate the competency of the exposed bedrock and substantiate the temporary and permanent cut recommendations provided in this report.
- No groundwater was encountered during our investigation.
- Shallow spread or continuous wall footings for the water tank may be constructed entirely on relatively undisturbed Lahar Breccia Bedrock or entirely on a zone of structural fill with a minimum thickness of 2 feet extending to bedrock. Footings may be proportioned utilizing a maximum net allowable bearing pressure of **4,000 psf** for dead load plus live load conditions.
- Concrete slabs-on-grade should be constructed over a minimum of 4 inches of compacted gravel overlying a zone of free-draining structural fill or bedrock. The slab may be designed with a Modulus of Subgrade Reaction of **400 psi/inch**.
- The recommended pavement section for the interior roadway is 3.5/8 (inches of asphalt/inches of road base, see Section 6.7).

NOTICE: The executive summary is not intended to replace the information presented in the report, of which the executive summary is an essential part. The executive summary should not be used separately from the report and is only provided as an overview, to summarize the primary conclusions and recommendations. The executive summary may omit a number of details, any one of which could be crucial to the proper interpretation and application of the report and implementation of the recommendations.

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2.0 INTRODUCTION

2.1 PURPOSE AND SCOPE OF WORK

This report presents the results of a geotechnical investigation completed for the proposed water tank near Crescent Drive and Whileaway Road in Park City, Utah. The purposes of this investigation were to assess the nature and engineering properties of the subsurface soils, provide recommendations for design and construction of foundations, and slabs-on-grade, as well as assess settlement, lateral earth pressures, pavement design and identify any geotechnical issues such as fill, collapsible soils, bedrock or shallow groundwater.

The scope of work completed for this study included site reconnaissance, subsurface exploration, soil sampling, laboratory testing, engineering analyses, and preparation of this report. Our services were performed in accordance with our proposal and signed authorization.

The recommendations presented in this report are subject to the limitations presented in the **Limitations** section of this report (Section 7.1).

2.2 PROJECT DESCRIPTION

The property is located west of I-80, 1.4 miles northeast of Silver Creek Junction (junction of US-40 and I 80), and north of Park City (see Figure A-1, *Vicinity Map*). Our understanding of the project is based on information provided by the client. The proposed project area is planned to include a single 750,000-gallon water tank located in the foothills adjacent to the surrounding residential developments that will be partially buried. It is expected that the project will also include a new approximately 2,200-foot long, 20’ wide access road and a 30 ft by 36 ft parking and turnaround area near the water tank. IGES understands that some of the cut sections for the tank will be up to 25 feet deep with fill sections of the same height.

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3.0 METHODS OF STUDY

3.1 FIELD INVESTIGATION

As a part of this investigation, subsurface soil conditions were assessed by completing 7 exploratory test pits to a depth of approximately 1 to 2 feet below the existing site grade using a JCB 4CX backhoe. The approximate locations of the explorations are shown on Figure A-2 (*Site Map*) in Appendix A. Exploration points were placed to provide representative coverage of the site. Each of the test pits were terminated when refusal in bedrock was reached. Photos of some of the test pits and site conditions are presented in Figures A-3 – A-6 (*Site Photos*). Logs of the subsurface conditions encountered in the explorations were recorded at the time of excavation by a member of our technical staff and are presented as Figures A-7 through A-13 in Appendix A. A *Key to Soil Symbols and Terminology* describing symbols and terms used on the test pit logs is included as Figure A-14. Rock properties were described by features such as name, color, weathering, bedding, fracturing, quality, and competency as shown in Appendix A (Figure A-15).

Soil sampling was completed to collect representative samples of the various layers observed at the site; disturbed samples were placed in plastic bags. All samples were transported to our laboratory to evaluate the engineering properties of the various earth materials observed. The soils were classified in accordance with the *Unified Soil Classification System* (USCS) by our field personnel. Classifications for the individual soil units are shown on the attached test pit logs (Figures A-7 through A-13).

3.2 LABORATORY INVESTIGATION

Geotechnical laboratory tests were conducted on selected relatively undisturbed blocks of bedrock and bulk soil samples obtained during our field investigation. The following laboratory testing program was done according to American Society for Testing and Materials (ASTM) standards:

- Water Content of Soil (ASTM D7263 and D2216)
- Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318)
- Particle-Size Distribution (ASTM D6913)
- Amount of Material in Soil Finer than the No. 200 (75mm) Sieve (ASTM D1140)
- Determination of the Point Load Strength Index of Rock (ASTM D5731)

The results of the laboratory tests are presented on the test pit logs presented in Appendix A (Figures A-7 through A-13) and the laboratory test results presented in Appendix B.

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3.3 ENGINEERING ANALYSIS

Engineering analyses were performed using soil data obtained from the laboratory test results and empirical correlations from material density, depositional characteristics and classifications. Analyses were performed using formulas, calculations and software that represent methods currently accepted by the geotechnical industry. These methods include settlement, bearing capacity, lateral earth pressures, pavement design, slope stability analysis, and trench stability. Appropriate factors of safety were applied to the results consistent with industry standards and the accepted standard of care.

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4.0 GENERALIZED SITE CONDITIONS

4.1 SURFACE CONDITIONS

The subject site is located at an elevation of approximately 6,640 feet above mean sea level. At the time of our subsurface investigation the site was vacant and undeveloped. The project area is on the south slope of a small local rise and has an approximately 9.5H:1V slope for the west side of the tank and the proposed location of the tank. There is a slightly steeper downhill slope of 3.15H:1V northeast of the tank, and a slope of 7.5H:1V southeast of the tank. The area was covered by sagebrush, grasses, weeds and other low-lying vegetation.

4.2 SUBSURFACE CONDITIONS

4.2.1 Earth Materials

Based on our observations the site has an approximately 9-inch-thick layer of topsoil, visually classified as a Sandy Lean CLAY (CL) with Gravel that is underlain by a Volcanic Lahar Breccia BEDROCK. In some areas the bedrock is exposed on the surface with no topsoil. A generalized description of each soil type encountered and the depths they can be found is presented below.

Topsoil – Sandy Lean CLAY (CL)

The topsoil was approximately 9 inches thick or less across portions of the project area and was visually classified a Sandy Lean CLAY (CL) with Gravel. This unit was described as medium stiff and dry, with low plasticity. It contained roots, cobbles, and boulders.

BEDROCK (Volcanic Lahar Breccia)

Each test pit extended into native BEDROCK with a maximum depth explored of 2 feet below the surface (maximum of 1.5 feet into weathered BEDROCK). The bedrock was described as medium hard to hard, medium gray to reddish gray, moderately fractured, minimally to moderately weathered, with small visible crystals.

The stratification lines shown on the enclosed exploratory logs represent the approximate boundary between soil types (Figures A-7 to A-13). The actual in-situ transition may be gradual. Due to the nature and depositional characteristics of the native soils, care should be taken in interpolating subsurface conditions between and beyond the exploration locations. Additional descriptions of these soil units are presented on the exploratory logs (Figures A-7 through A-13 in Appendix A).

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4.2.2 Groundwater

Groundwater was not encountered in any of the test pits completed. Seasonal fluctuations in precipitation, surface runoff from adjacent properties, or other on or offsite sources may increase moisture conditions. Groundwater conditions can be expected to rise or fall several feet seasonally depending on the time of year. Based on our field investigation, we do not anticipate that groundwater will impact the proposed construction.

4.2.3 Point Load Strength Testing

Five Point Load Strength Index tests were completed on samples of bedrock 0.5 to 2 ft in depth. Results are provided for the compressive strength of each sample. Table 4.2.3A presents a summary of the Point Load Strength Index testing completed for this project.

Table 4.2.3A
Summary of Point Load Strength Index of Rock

Location	Depth (ft)	Uniaxial Compressive Strength (psi)
TP-1	2.0	13,361
TP-4	0.5	5,257
TP-4	0.5	13,532
TP-7	1.0	4,710
TP-7	1.0	7,195

Based on the Point Load Strength Index results, the sampled bedrock is considered very strong. The complete test results are provided in Appendix B.

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5.0 GEOLOGIC CONDITIONS

5.1 GEOLOGIC SETTING

The site is located at an elevation of approximately 6,640 feet in the western part of Summit County, Utah near Silver Summit just north of Park City in the Snyderville Basin. The Snyderville Basin has terrain ranging from steep mountains cut by deep canyons in the south to broad valley bottoms in the center and low hills in the north. Pleistocene glaciation in areas at higher elevation deposited alluvium and glacial outwash by streams flowing out of the Wasatch Range. Erosion-resistant sedimentary and igneous rock form the steep mountain ridges while the gentle slopes of the low hills in the north are due to being underlain by less-resistant shale, mudstone, and siltstone (Ashland et al., 2001). The Syderville Basin is part of a larger area that represents a transition between the dissimilar Wasatch Range and Uintah Mountains.

Much of the area east of the site is dominated by the Keetley Volcanics, extrusive rocks erupted during the Oligocene Epoch in an area of considerable paleotopographic relief. As such, the rocks, consisting of rhyodacite and andesite flows, volcanic breccia, and tuffs lie unconformable over the older mostly Paleozoic and Mesozoic units. (Hintze, 1993, Stokes, 1987, and Biek, 2019). The Keetley Volcanics were intruded by various porphyries and plugs. In some drainages Quaternary-aged alluvium and colluvium overly the Keetley Units.

The site is located on the east side of the Wasatch Range. The Wasatch Mountains contain a broad depositional history of thick Precambrian and Paleozoic sediments that have been subsequently modified by various tectonic episodes that have included thrusting, folding, intrusion, and volcanic activity, as well as scouring by glacial and fluvial processes (Stokes, 1987). The uplift of the Wasatch Mountains occurred relatively recently during the Late Tertiary Period (Miocene Epoch) between 12 and 17 million years ago (Milligan, 2000). Since uplift, the Wasatch Front has seen substantial modification due to such occurrences as movement along the Wasatch Fault and associated spurs (Hintze, 1993). The site is in the Central Wasatch segment at its intersection with the Uinta Mountains trend. The central segment is the widest section of the Wasatch Range due, in large part, to great intrusions of igneous rock not found elsewhere in the range (Stokes, 1987). The site is located in an area dominated primarily by Tertiary units of the Keetley volcanics overlain in placed by alluvium (Biek, 2022).

Surface sediments on the site are mapped as Volcanic mudflow breccia of Silver Creek (Tksc), which is described as “andesitic to rhyodacitic volcanic mudflow breccia and minor interbedded lava flows and ash-flow tuff” (Biek, 2022).

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5.2 SEISMICITY AND FAULTING

There are no known active faults that pass under or immediately adjacent to the site (Hecker, 1993; Black et al, 2003). An active fault is defined as a fault displaying evidence of movement during Holocene time (eleven thousand years ago to the present). The closest mapped fault is the Salt Lake City section of the of the Wasatch Fault Zone, which is mapped approximately 16.5 miles west-southwest of the site. The Wasatch Fault Zone is mapped along the western flank of the Wasatch Mountains. The Salt Lake City section, which has an overall length of 43 km, was reportedly last active approximately 1,100 years ago and has a recurrence interval of approximately 1,300 years. Analyses of ground shaking hazard along the Wasatch Front suggest that the Wasatch fault zone is the single greatest contributor to the seismic hazard in the region.

Based on our field exploration and our understanding of the geology in this area, subsurface strata at the site consists of Volcanic Lahar Breccia bedrock, and is best represented as Site Class B (see Table 5.2A). However, lacking site-specific shear wave velocity measurements, we need to use a conservative approach, thus values for Site Class C are presented. Based on the Site Class C site coefficients, the short- and long-period *Design Spectral Response Accelerations* are presented in Table 5.2B. For geotechnical practice, the geo-mean peak ground acceleration (PGA_M)[1] is presented in Table 5.2C.

Table 5.2A
Site Class Categories

Site Class	Earth Materials	Shear Wave Velocity Range (Vs_{100}) ft/s
A	Hard Rock	>5,000
B	Rock	2,500-5,000
C	Very Dense Soil/Soft Rock	1,200-2,500
D	Stiff Soil	600-1,200
E	Soft Soil	<600
F	Special Soils Requiring Site-Specific Evaluation (e.g. liquefiable)	n/a

[1] The PGA_M is based on a uniform hazard approach and represents the probabilistic PGA with a 2% probability of exceedance in a 50-year period (2PE50) (as opposed to the risk-targeted MCE_R, which is based on a uniform risk approach).

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It should be noted that, for certain structures, particularly those with a longer fundamental natural period, a site-specific seismic hazard analysis may be required; the Structural Engineer should review ASCE-7-16 11.4.8 to assess whether Exception #2 is applicable for the proposed structures. If the simplified approach and mapped spectral accelerations as allowed by Exception #2 are not applicable to this project, IGES should be contacted regarding the completion of a site-specific seismic hazard analysis, which would necessarily include on-site shear wave velocity measurements. A summary of the Spectral Analysis is presented in Appendix C.

Table 5.2B

Spectral Accelerations for MCE, Risk-Targeted Values (Structural)

Mapped B/C Boundary S_a (g)		Site Coefficient (Site Class D*)		Design Sa (g)	
Ss	S_1	F_a	F_v	S_{DS}	S_{D1}
0.55	0.196	1.28	1.5	0.469	0.196

*default

1) T_L=8

2) Exception #2 taken, see ASCE-7-16 11.4.8-2, a site-specific ground-motion hazard analysis may be required for some structures

Table 5.2C

Spectral Accelerations for MCE, Geo-Mean Values (Geotechnical)

Mapped B/C Boundary PGA (g)	Site Coefficient F_{PGA} (Site Class D*)	PGA_M (g)
0.24	1.2	0.289

*default

5.3 GEOLOGIC HAZARDS

Geologic hazards and conditions can be defined as naturally occurring geologic conditions or processes that could present a danger to human life and property or result in impacts to conventional construction procedures. These hazards and conditions must be considered before development of the site. There are several hazards and conditions in addition to seismicity and faulting that if present at a site, should be considered in the design of critical and essential facilities. The hazards considered for this site include liquefaction and rockfall.

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5.3.1 Liquefaction

Certain areas within the Intermountain region possess a potential for liquefaction during seismic events. Liquefaction is a phenomenon whereby loose, saturated, granular soil deposits lose a significant portion of their shear strength due to excess pore water pressure buildup resulting from dynamic loading, such as that caused by an earthquake. Among other effects, liquefaction can result in densification of such deposits causing settlement of overlying layers after an earthquake as excess pore water pressures are dissipated. The primary factors affecting liquefaction potential of a soil deposit are: (1) level and duration of seismic ground motions; (2) soil type and consistency; and (3) depth to groundwater.

Referring to the Liquefaction Special Study Areas, Wasatch Front and Nearby Areas, Utah published by the Utah Geological Survey, the site is located within an area currently designated as "very low" for liquefaction potential. The site is not considered liquefiable based on our field observations and laboratory testing below which very strong bedrock was encountered.

5.3.2 Rockfall

Rockfall is a type of mass-wasting process that involves rocks and small rock masses becoming loose or dislodged and moving downslope. Rockfall can involve rocks falling, rolling, and bouncing. Rockfall is based on several factors, including geology, topography, and climate. Sources typically include boulders on steep slopes and bedrock outcrops.

Based on our observations, there are no significant outcrops or other source areas for rockfall.

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6.0 ENGINEERING ANALYSIS

6.1 SLOPE STABILITY

IGES completed slope stability analyses for the final fill slope conditions and the temporary cut-slope during construction. Two sections were evaluated for the permanent fill slopes and temporary cut conditions; along a North to South (A-A') axis and West to East (B-B') axis. The final and temporary slope analyses were based on plan drawings provided by Rimrock Engineering & Development and are illustrated on Plate D-1 in Appendix D.

6.2 GLOBAL STABILITY

The global stability of the proposed final fill slopes and temporary cut slope was modeled using SLIDE, a computer application incorporating (among others) Spencer's Method of analysis. Calculations for stability were developed by searching for the minimum factor of safety for a failure. Analysis was performed for both temporary construction cuts and permanent fill slope conditions. For temporary construction cut conditions we considered a factor of safety of 1.3 or greater as acceptable. Only static conditions were assessed for the temporary cut conditions, seismic conditions were not considered. For the permanent slope condition, we considered a factor of safety of 1.5 or greater as acceptable for the static condition and 1.0 or greater for the seismic (pseudo-static) condition.

6.2.1 Soil Strength Parameters

We anticipate the excavated site bedrock soils will be used as backfill around the tank or a granular import material will be used. IGES has assumed conservative values of 34 degrees and 50 psf cohesion for the strength parameters of the granular crushed bedrock or imported material (Af/Qh).

Refusal on the volcanic lahar breccia (Tkb) bedrock was encountered in every test pit excavated at this site at a shallow depth. Based on observations of the bedrock observed in the test pits and considering the prominence of bedrock ridges within at the project site that are indicative of stronger, more resistant materials to weathering, IGES used RocLab 1.033 software to estimate strength values for the Tkb bedrock The rock mechanic parameters selected for the RocLab inputs used lower-end (lower strength/competency) values for the lahar breccia to conservatively estimate the strength of the bedrock, which is likely to be stronger with increasing depth. The RocLab assessment output is provided at the end of Appendix D and a summary of the RocLab input values used in the assessment follows:

- Intact Uniaxial Compressive Strength: 678 ksf (minimum of the lab point load testing)
- GSI: 40 (geologic strength index; visual observation)

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- Mi Value: 19 (intact rock parameter) (this value is the low-end value for breccia per RocLab)
- D: 0.7 (disturbance factor)

6.2.2 Seismic Parameters

Pseudo-static (seismic screening) analysis of the final planned slope conditions was performed in general conformance with Blake et al. (2002), ASCE 7-16 and AASHTO LRFD for Bridge Design Specifications. The design seismic event was taken as the ground motion with a 2 percent probability of exceedance in 50 years (2PE50). Based on information provided from the ASCE-7-16 Seismic Hazard Tool, the geometric mean Peak Ground Acceleration (PGA_M) associated with a 2PE50 event is estimated to be 0.289g. Half of the PGA_M, (0.145g), was taken as the horizontal seismic coefficient (k_h) and used in the pseudo-static seismic screening analysis.

6.2.3 Slope Stability Results

The results of the slope stability analyses for the final fill slope Sections A-A' and B-B' are summarized in Table 6.2.3.

Table 6.2.3
Results of Final Planned Fill Slope Stability Analyses

Section	Static Factor of Safety	Pseudo-Static Factor of Safety
Tank North to South (A-A')	2.52	1.69
Tank West to East (B-B')	2.57	1.72

The results of the analyses indicate the existing conditions meet the minimum required factor-of-safety of 1.5 for static conditions and 1.0 for the seismic (pseudo-static) case. The slope stability summary output for both sections is presented in Appendix D.

6.2.4 Temporary Cut-Slopes

Temporary cut-slopes are expected to be created during construction of the water tank. The cut will be mostly in the bedrock material with a small amount of soil overburden. The cut-slopes will be approximately 25- to 30-feet in maximum height. Based on our assessment, the cut-slopes in the overburden soils should be cut at 1H:1V (horizontal to Vertical) and cuts into the bedrock can be safely constructed at a 1H:10V batter. Alternatively, the slopes can be cut vertical for up to 10 feet then a 1-foot bench placed before starting the next vertical cut. Using this configuration, the following temporary static cut-slope stability factors provided in Table 6.2.4:

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Table 6.2.4
Results of Temporary Cut-Slope 1H:10V Stability Analyses

Section	Static Factor of Safety
A-A' (1H:10V Cut)	3.08
B-B' (1H:10V Cut)	3.32

During construction of the cut-slopes, it is critical that an IGES geologist be on-site to evaluate the conditions of the bedrock as the cut progresses. If any adverse bedding or fracture planes are identified, remediation measures will have to be taken. These remediation measures may consist of flattening the slope, removing the dangerous blocks of bedrock, or other methods to create a safe working environment. IGES anticipates machine and hand scaling of the cut slopes as excavation occurs to remove any loose material left over from the cutting, chipping, ripping or blasting. The exposed cut-slope should be inspected by an experienced and competent person daily to assess the condition of the cut-slope and identify any compromised or dangerous areas. Areas identified as a safety concern will need to be stabilized to protect workers at the bottom of the excavation.

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7.0 ENGINEERING CONCLUSIONS AND RECOMMENDATIONS

7.1 GENERAL CONCLUSIONS

Based on the subsurface conditions encountered at the site, the subject site is suitable for the proposed development provided that the recommendations presented in this report are incorporated into the design and construction of the project. The site is comprised primarily of mostly intact and massive volcanic lahar breccia (Tkb) bedrock within 0 to 2 feet of the surface. Excavating into this material will be difficult, requiring heavy duty ripping equipment, hoe-rams and blasting.

Footings should be placed entirely on bedrock, or entirely on 2 feet of structural fill, fill/bedrock transition zones are not recommended. The client should closely follow the moisture protection and surface drainage recommendations presented in Section 6.8 of this report to minimize the potential for water to infiltrate into underlying soils.

IGES understands that a roadway will also be constructed into the water tank site with cut and fill sections. IGES recommends that the recommendations provided below for placement of structural fill onto native slopes should be followed. Temporary cut-slope recommendations should also be closely followed.

The following sub-sections present our recommendations for general site grading, design of foundations, slabs-on-grade, lateral earth pressures, pavement design, and moisture protection.

7.2 GENERAL SITE PREPARATION

Areas that will receive structural fill, concrete foundations, concrete flatwork, or pavement should be grubbed to a depth of approximately 8 inches (or to native bedrock) to remove the majority of the topsoil containing organic matter and fine roots. An IGES representative should observe the site preparation and grading operations to assess whether the recommendations presented in this report have been complied with.

7.2.1 Excavations

Where fills tie into native slopes the native slope should be benched to receive the fill. Temporary cut slopes during construction should be completed as recommended in this report for stability.

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7.2.2 Excavatability

Excavation into bedrock will require larger excavators with a hoe-ram, heavy duty rippers or blasting. Blasting will likely be more cost effective in areas where deeper cuts are planned in the largely unaltered bedrock; however, blasting often creates more fractures and fragments in the exposed cut faces thus requiring more scaling of the exposed slope or slope protection in the form of netting.

7.2.3 Excavation Stability

The contractor is responsible for site safety, including all temporary slopes and trenches excavated at the site and design of any required temporary shoring. The contractor is responsible for providing the "competent person" required by OSHA standards to evaluate soil conditions.

Based on Occupational Safety and Health (OSHA) guidelines for excavation safety, trenches with vertical walls up to 5 feet in depth may be occupied. Where very moist soil conditions or groundwater is encountered, or when the trench is deeper than 5 feet, we recommend a trench-shield or shoring be used to protect workers in the trench. Trenches cut into stable bedrock may be cut vertically up to a depth of 10 feet, but should be assessed for stability by a qualified geologist/engineer prior to entry; deeper trenches should be excavated with a minimum 2-foot-wide bench for every 10 feet of vertical trench excavation. The native overburden soil above the bedrock, if any, should be sloped at 1H:1V.

Additional recommendations for temporary and permanent open cut slopes in bedrock are provided in Section 7.3 of this report.

7.2.4 Structural Fill and Compaction

All fill placed for the support of structures, flatwork or pavements, should consist of structural fill. Structural fill may consist of the spoils from the excavation or an IGES-approved imported material. All structural fill should be free of vegetation and debris and contain no rocks larger than 4 inches in nominal size (6 inches in greatest dimension). Topsoil may not be used as structural fill; this material must be kept segregated from other soils intended to be used as structural fill.

All structural fill should be placed in maximum 6-inch loose lifts if compacted by small hand-operated compaction equipment, maximum 8-inch loose lifts if compacted by light- to medium-duty rollers, and maximum 12-inch loose lifts if compacted by heavy duty compaction equipment that is capable of efficiently compacting the entire thickness of the lift. These values are *maximums*; the Contractor should be aware that thinner lifts

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may be necessary to achieve the required compaction criteria. We recommend that all structural fill be compacted on a horizontal plane, unless otherwise approved by IGES. Structural fill placed beneath footings and pavements should be compacted to at least 95 percent of the maximum dry density (MDD) as determined by ASTM D-1557. The moisture content should be at or slightly above the OMC for all structural fill – compacting dry of optimum is discouraged. Any imported fill materials or spoils from bedrock should be approved by IGES prior to importing. Also, prior to placing any fill, the excavations should be observed by IGES to confirm that unsuitable materials have been removed. In addition, proper grading should precede placement of fill, as described in the General Site Preparation and Grading subsection of this report.

All utility trenches backfilled below pavement sections, curb and gutter and concrete flatwork, should be backfilled with structural fill compacted to at least 95 percent of the MDD as determined by a modified Proctor (ASTM D-1557). All other trenches, including landscape areas, should be backfilled and compacted to a minimum of 95 percent of the MDD (ASTM D-1557).

If the contractor desires to use the excavated bedrock as structural fill, it should be crushed and screened with a grizzly to remove particles greater than 4 inches in nominal diameter. In areas where the excavated bedrock is used for structural fill, it is anticipated that conventional density testing will not be applicable, therefore IGES recommends that a minimum number of passes with compaction equipment be determined and that full time observations are completed to assist in documenting that the minimum standard is met. IGES also recommends that an experienced geologist or engineer observe the excavated bedrock that is planned to be used as structural fill to assess the expansion potential.

Specifications from governing authorities having their own precedence for backfill and compaction should be followed where applicable.

7.2.5 Retaining Walls

The soils data provided in this report should be used for retaining wall or rockery design. Careful judgement should be used when selecting soil strengths, location and depth relative to the wall placement should be reviewed prior to selection. Retaining wall design should be completed under a separate design package that contains construction drawings and specifications for each specific wall. The design package should include elevation (profile) drawings, stationing, section drawings and construction specifications for the particular wall type and planned accessories such as fencing or drainage swales. Drawings should be completed so that accurate construction layout can be provided.

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7.2.6 Permanent Fill Slope Recommendations

The following generalized recommendations are for engineered slopes (fill slopes). Recommendations for grading of engineered slopes are intended to minimize the potential for future surficial failures, in addition to more deep-seated failures and create a surface that can sustain vegetation. For the purposes of this report, surficial failure includes excessive erosion, soil creep, sloughing, slumping, mass wasting, rockfall, and similar relatively shallow failures.

We recommend that permanent engineered fill slopes be constructed no steeper than 2H:1V; however, steeper slopes may be allowed provided geosynthetic reinforcement is incorporated into the slope design. The maximum vertical height of a fill slope should be no greater than 20 feet before placing a horizontal bench. Horizontal benches should have a minimum width of 5 feet.

7.2.7 General Specifications

Fill slopes taller than 10 feet should be constructed with a keyway. In general, the keyway back cut should be constructed no steeper than 0.5H:1V gradient. Flatter back cuts will reduce the potential for back cut failures. Front cuts should be cut at a maximum 0.5H:1V slope gradient unless field conditions indicate a flatter gradient should be used to provide adequate stability.

7.2.8 Keyway Sizing

As a minimum, keyways should be excavated 2 feet below toe grade for slopes up to 20 feet, and 3 feet below toe grade for slopes up to 50 feet; deeper keyway excavations may be necessary, depending on the height of the slope and prevailing geologic conditions. Keyway widths should be ½ the height of the slope but need not be wider than 15 feet (see Figure E-1 in Appendix E for a graphic illustration). The width of a keyway is measured horizontally from the toe of slope (top of front cut) to the toe of the back cut (heel), with a 2 percent drop to the heel. The depth of a keyway is measured from the toe of the fill slope to the bottom of the keyway.

7.2.9 Benching

Where fills are to be placed, the ground should be stepped or benched (see Figure E-1 for a graphic illustration). At a minimum, benches should be constructed every four (4) vertical feet. Benches shall be excavated a minimum lateral depth of four (4) feet into competent material or as otherwise recommended by IGES. However, the *lowest* bench should be excavated a minimum lateral depth of 10 feet into competent material (this measurement may include the key width). Drains should be placed on every other bench

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and daylighted to the side of the fill section to reduce the potential for the fill section to become saturated.

7.2.10 Slope Protection

Slope planting and other measures should be provided immediately following construction. Turf reinforcement mats and/or straw-coconut blankets with straw waddles should be considered to limit the amount of erosion on unvegetated slopes until landscaping and other permanent erosion protection measures are fully in place and rooted.

Over-wetting the soils prior to, during, or after construction may result in softening and pumping, causing equipment mobility problems and difficulty in achieving compaction. Every effort should be taken to ensure positive drainage away from the water tank and access road to reduce the potential for water to migrate around the tank or below pavements.

To aid in maintaining surficial slope stability, we recommend that a water interceptor swale be constructed at the top of all engineered slopes (cut slopes, fill slopes). This swale should be designed to intercept all uphill slope drainage and divert the drainage around the slopes. The drainage should be controlled as it travels around the slopes and should be daylighted to the side of the slope or to a suitable drainage structure.

7.3 TEMPORARY AND PERMANENT CUTS AND FILLS

It is understood that the proposed water tank and access road may require deep excavations with both temporary and permanent sideslopes. Conceptual drawings show that the water tank will be founded in a deep cut ranging from approximately 5 to 30 feet below grade and the roadway will be in a cut ranging from 0 to 15 feet below grade. The proposed soil cuts will require specific attention during the construction phase when the side slopes are temporarily much steeper than the final grades.

7.3.1 Temporary Cut Slopes

Temporary excavations side slopes for the water tank site and access road should be no steeper than 1H:10V (Horizontal to Vertical) in the Lahar Breccia Bedrock. The small amount of overburden located above the bedrock should be sloped at 1H:1V. This can be accomplished by sloping the cut at approximately 1H:10V or cutting the slopes vertical in 10-foot sections and then constructing a minimum 1-foot bench in-between.

7.3.2 Permanent Cut Slopes

For permanent slopes into the native Breccia bedrock, we recommend the slope be constructed at a maximum of 1H:3V. The Breccia bedrock will weather over time and

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some maintenance will be required to remove the raveled material at the base of the cut. For permanent cut slopes we recommend the cuts be in maximum 10-foot vertical sections with a 3-foot bench in between to catch any raveling material. A geotechnical engineer/engineering geologist should be present to evaluate conditions and provide recommendations as the excavation proceeds. If saturated conditions are encountered, or if adverse bedding, jointing, or fractures are identified during the excavation, slopes will likely require flattening, scaling or shoring to maintain stability. Any overburden soil should be removed from above the cut or sloped at 2H:1V and vegetated.

We further recommend that a safety zone of approximately 8 feet be provided around the outside diameter of the tank to allow a fall zone for loose materials that may fall into the excavation. Additionally, netting or fencing, may be placed on the slope to protect workers from rock fall hazards. The contractor is ultimately responsible for site safety and pertinent OSHA requirements should be met to provide a safe work environment. If site specific conditions arise that require engineering analysis in accordance with OSHA regulations, IGES can respond and provide recommendations as needed. Qualified personnel should inspect all excavations frequently to evaluate stability.

7.4 FOUNDATIONS

Based on our field observations and our analysis, we recommend that the footings for the proposed water tank, including all interior and exterior footings be established entirely on bedrock, or entirely on a minimum of 2 feet of structural fill extending to bedrock. It is not recommended that footings be placed partially on bedrock and partially on structural fill due to differential settlement concerns.

Prior to placement of structural fill or construction of foundations, any loose soil in the excavation should be removed.

Shallow spread or continuous wall footings constructed on undisturbed bedrock or compacted structural fill as described previously may be proportioned utilizing a maximum net allowable bearing pressure of **4,000 pounds per square foot (psf)**. The net allowable bearing value presented above is for dead load plus live load conditions; a one-third increase may be used for transient loads such as wind or seismic.

All foundations exposed to the full effects of frost should be established at a minimum depth of 42 inches below the lowest adjacent final grade. Interior footings, not subjected to the full effects of frost, may be established at higher elevations, however, a minimum depth of embedment of 12 inches is recommended for confinement purposes. The

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minimum recommended footing width is 24 inches for continuous wall footings and 36 inches for isolated spread footings.

7.5 SETTLEMENT

Static settlement of properly designed and constructed conventional foundations, founded as described above, are anticipated to be on the order of 1 inch or less. Differential settlement is expected to be half of the total settlement over a distance of 30-feet.

7.6 EARTH PRESSURES AND LATERAL RESISTANCE

Lateral forces imposed upon conventional foundations due to wind or seismic forces may be resisted by the development of passive earth pressures and friction between the base of the footing and the supporting soils. In determining the frictional resistance, a coefficient of friction of 0.44 should be used for concrete in contact with native soils.

In general, foundations that are fixed at the top should be designed using at-rest lateral earth pressures. However, according to the IBC foundation walls for buried or partially buried structures may also be designed for active pressures if no more than 8 feet of the wall extends below grade and laterally supported by flexible diaphragms.

Ultimate lateral earth pressures from backfill acting against conventional footings may be computed from lateral pressure coefficients or equivalent fluid densities. Based on an estimated internal angle of friction of 34-degrees and a soil unit weight of 130 pcf, the ultimate lateral earth pressures for native fine-grained soils acting against buried structures may be computed from the lateral pressure coefficients or equivalent fluid densities presented in Table 6.7A:

Table 6.7A
Recommended Lateral Earth Pressure Coefficients

Condition	Lateral Pressure Coefficient	Equivalent Fluid Density (pounds per cubic foot)
Active*	0.28	37
At-rest**	0.44	57
Passive*	3.54	455

* Based on Coulomb's equation

** Based on Jaky

These values should be used with an appropriate factor of safety against overturning and sliding. A value of 1.5 is typically used. Additionally, if passive resistance is used in conjunction with frictional resistance, the passive resistance should be reduced by ½.

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The coefficients and densities presented in the tables above for static and dynamic conditions assume a vertical wall face, flat back slope and no buildup of hydrostatic pressures. The force of the water should be added to the presented values if hydrostatic pressures are anticipated. Proper grading and other drainage recommendations provided previously in this report will help to reduce the potential for buildup of hydrostatic pressures if implemented.

Clayey soils drain poorly and may swell upon wetting, thereby greatly increasing lateral pressures acting on earth retaining structures; therefore, clayey soils with a potential for swelling should not be used as retaining wall backfill.

7.7 CONCRETE SLAB-ON-GRADE CONSTRUCTION

To minimize settlement and cracking of slabs, and to aid in drainage beneath the concrete floor slabs, all concrete slabs should be founded on a minimum 4-inch layer of clean gravel overlying properly prepared subgrade, see Section 6.2.1. The 4-inch layer of gravel should consist of free-draining gravel with no more than 5 percent passing the No. 200 mesh sieve that should be vibrated in place for densification. If undocumented fill soils or topsoil are encountered below areas of slab-on-grade construction, the subgrade should be over-excavated to a minimum depth of 12 inches and replaced with structural fill as defined in Section 7.2.4.

All concrete slabs should be designed to minimize cracking as a result of shrinkage. Consideration should be given to reinforcing the slab with a welded wire fabric, re-bar, or fiber mesh. Slab reinforcement should be designed by the structural engineer; however, as a minimum, slab reinforcement should consist of 4''×4'' (W2.9×W2.9) welded wire mesh within the middle third of the slab. We recommend that concrete be tested to assess whether the slump and/or air content are in compliance with the plans and specifications. We recommend that concrete be placed in general accordance with the requirements of the American Concrete Institute (ACI). A Modulus of Subgrade Reaction of **400 psi/inch** may be used for design.

Our experience indicates that use of reinforcement in slabs and foundations can generally reduce the potential for cracking resulting from drying and shrinkage. However, some cracking can be expected as the concrete cures. Minor cracking is considered normal; however, it is often aggravated by a high water/cement ratio, high concrete temperature at the time of placement, small nominal aggregate size, and rapid moisture loss due to hot, dry, and/or windy weather conditions during placement and curing. Cracking due to temperature and moisture fluctuations can also be expected. The use of low slump

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concrete can reduce the potential for shrinkage cracking; saw cuts in the concrete at strategic locations can help to control and reduce undesirable shrinkage cracks.

7.8 PAVEMENT

Based upon the earth materials observed during our field work and the laboratory testing completed, a conservative CBR value of 15 was assumed in engineering the pavement section for the site. Anticipated traffic volumes were not available at the time this report was prepared; thus, based on past experience with similar commercial projects, IGES has estimated an equivalent single axle load (ESAL) of 100,000 over a 30-year design life. Based on these estimates and our analysis, IGES has designed a flexible pavement section utilizing AASHTO design methodology; the pavement section design recommendation is summarized in Table 6.9A.

Table 6.9A
Flexible (Asphalt) Pavement Section

Asphalt (in.)	Road Base (in.)
3.5	8

If undocumented fill soils or topsoil are encountered below the proposed roadways, they should be removed and replaced with structural fill as defined in Section 7.2.4.

Asphalt has been assumed to be a high stability plant mix, road base material should meet APWA gradation requirements and be composed of crushed stone with a minimum CBR of 70. Asphalt should be compacted to a minimum density of 96% of the Marshall value; base course and all structural fill placed below pavement sections should be compacted to at least 95% of the MDD as determined by ASTM D-1557.

It is our experience that pavement in areas where vehicles frequently turn around, stop, backup, load and unload, including the entrance and exit areas and dumpster areas often experience more distress. If the owner wishes to prolong the life of the pavement in these areas, consideration should be given to using a Portland cement concrete (rigid) pavement in these areas. For the rigid pavement section design, IGES has assumed a flexural strength of the concrete at 28 days of at least 600 psi, road base with a minimum CBR value of 70 and a load transfer coefficient of 2.7 for doweled joints with edge support. Concrete should consist of a low slump, low water cement ratio mix, with a minimum 28-day compressive strength of 4,000 psi. The base course should be compacted to at least 95% of the MDD as determined by ASTM D-1557 place in maximum 6-inch lifts. Table 6.9B presents our recommendation for a rigid pavement section

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Table 6.9B
Rigid (Concrete) Pavement Section

Concrete (in.)	Road Base (in.)
5	8

IGES also recommends that the contractor review and become familiar with the minimum recommendations and guidelines contained in Park City's Public Works minimum guidelines before bidding and constructing.

7.9 MOISTURE PROTECTION AND SURFACE DRAINAGE

As part of good construction practices, moisture should not be allowed to infiltrate into the soils in the vicinity of the foundations. Excessive moisture can increase the risk of wetting-induced settlement of both structural fill and native subgrade. As such, design strategies to minimize ponding and infiltration near the structure should be implemented as follows:

1. The ground surface within 10 feet of the foundations should be sloped to drain away from structure with a minimum fall of 6 inches (5%). If 10 feet cannot be achieved, then the ground surface should be sloped to the property line or as far as practical and a conveyance feature used to carry the water to the front or rear of the property.
2. All pressurized irrigation lines and valves should be placed a minimum of 5 feet from foundation walls and must be placed outside the limits of the foundation backfill.
3. It is recommended that Desert landscaping or xeriscaping be utilized within five feet of foundation walls. Examples of low-water landscape planning is available on the following website: http://localscapes.com.

7.10 PRELIMINARY SOIL CORROSION POTENTIAL

We anticipate the concrete tank will be placed on a layer of gravel for a leveling course and drainage and the backfill for the tank and any trenches will likely consist of import or crushed excavated bedrock material; therefore, we recommend that soluble sulfate, resistivity, and pH testing be completed on the selected backfill material to assess the risk of corrosion of steel and sulfate attack on the concrete in direct contact with the fill materials.

7.11 CONSTRUCTION CONSIDERATIONS

Based on the findings of this study, IGES has provided the following recommendations to be considered as part of construction of this project.

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It is possible that construction will take place during winter months when freezing overnight takes place frequently and day time temperatures may not exceed freezing for a prolonged period of time. It is best if earthwork, primarily placement and compaction of structural fill, not take place during the winter months when regular freezing temperatures can be expected. However, if construction is desired during the winter months, IGES recommends that free draining gravel be used in place of structural fill; alternatively, a granular soil with a relatively low fines content can be used for structural fill. If structural fill is placed and compacted during the winter months when freezing temperatures are present or anticipated, it should be covered with either a sacrificial layer of fill that can be placed to protect compacted fill from freezing and then removed prior to placing additional fill when the temperature is above freezing or covered with insulated blankets.

Due to the presence of relatively strong bedrock, excavations completed for construction of the water tank will require larger excavators with a hoe-ram, heavy duty rippers or blasting. Spoils from the bedrock excavations may be used as structural fill if processed as recommended in Section 6.2.4 of this report; testing should be completed to see that it meets the recommendations presented herein.

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8.0 CLOSURE

8.1 LIMITATIONS

The concept of risk is a significant consideration of geotechnical analyses. The analytical means and methods used in performing geotechnical analyses and development of resulting recommendations do not constitute an exact science. Analytical tools used by geotechnical engineers are based on limited data, empirical correlations, engineering judgment and experience. As such the solutions and resulting recommendations presented in this report cannot be considered risk-free and constitute IGES's best professional opinions and recommendations based on the available data and other design information available at the time they were developed. IGES has developed the preceding analyses, recommendations and designs, at a minimum, in accordance with generally accepted professional geotechnical engineering practices and care being exercised in the project area at the time our services were performed. No warrantees, guarantees or other representations are made.

The information contained in this report is based on limited field testing and understanding of the project. The subsurface data used in the preparation of this report were obtained largely from the explorations made for this project. It is very likely that variations in the soil, rock, and groundwater conditions exist between and beyond the points explored. The nature and extent of the variations may not be evident until construction occurs and additional explorations are completed. If any conditions are encountered at this site that are different from those described in this report, IGES must be immediately notified so that we may make any necessary revisions to recommendations contained in this report. In addition, if the scope of the proposed construction or grading changes from those described in this report, our firm must also be notified.

This report was prepared for our client's exclusive use on the project identified in the foregoing. Use of the data, recommendations or design information contained herein for any other project or development of the site not as specifically described in this report is at the user's sole risk and without the approval of IGES, Inc. It is the client's responsibility to see that all parties to the project including the designer, contractor, subcontractors, etc. are made aware of this report in its entirety. The use of information contained in this report for bidding purposes should be done at the contractor's option and risk.

8.2 ADDITIONAL SERVICES

We recommend that IGES be retained to review the final design plans, grading plans and specifications to assess whether our engineering recommendations have been properly incorporated in the project plans and specifications. We also recommend that IGES be

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retained to evaluate construction performance and other geotechnical aspects of the project as construction initiates and progresses through its completion.

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APPENDIX A



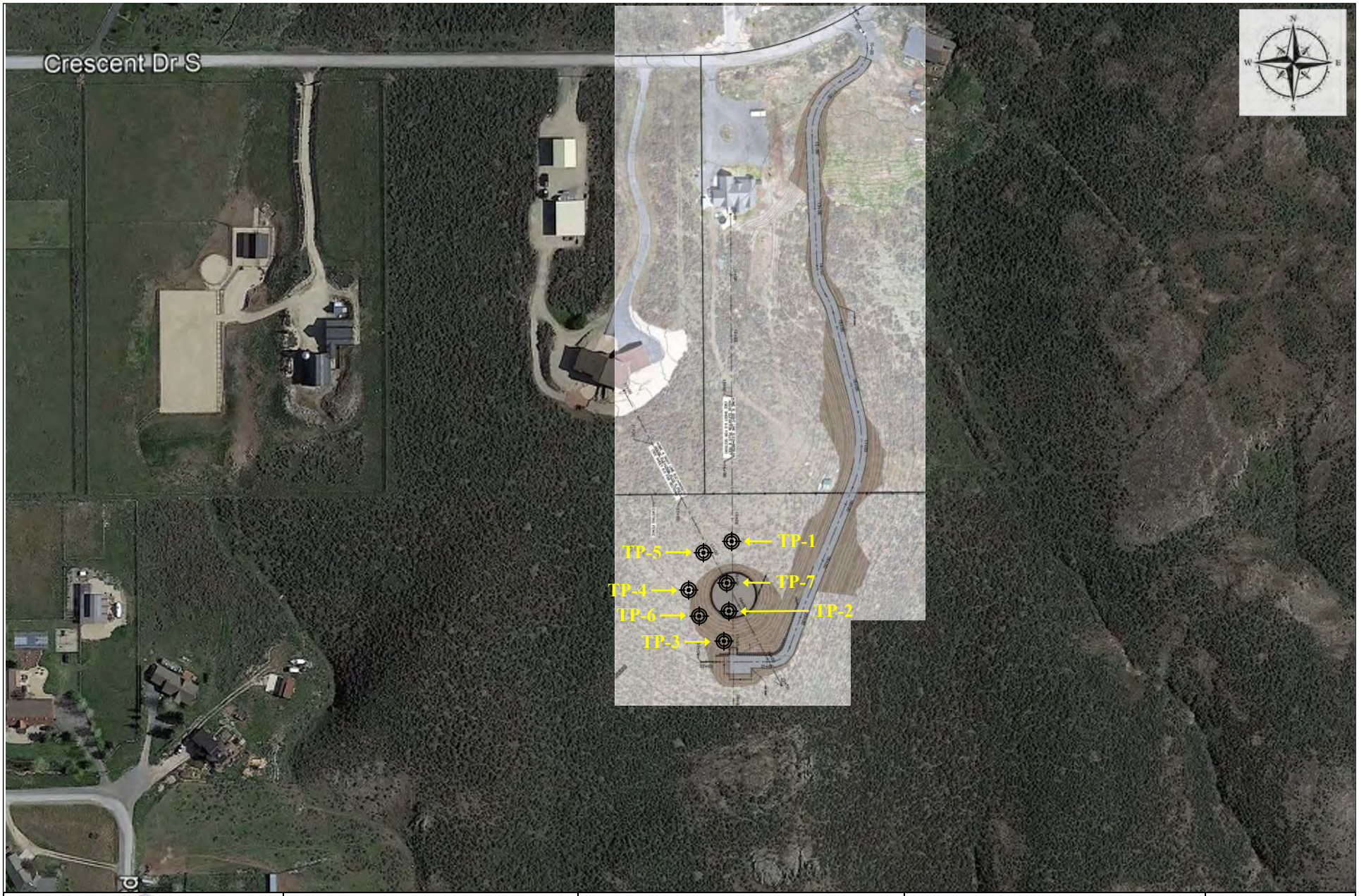
Geotechnical Investigation
Silver Creek Water Tank GTI
Summit County Service Area No. 3
Park City, Utah

VICINITY MAP

Project Number: 04729-001

Source: USGS 100K Topo 1 Quadrangle 2024

FIGURE
A-1



IGES EST. 1998	Geotechnical Investigation Silver Creek Water Tank GTI Summit County Service Area No. 3 Park City, Utah	SITE MAP Project Number: 04729-001 Source: Google Earth Imagery October 2022 and Rimrock Engineering & Development Review Set 8/5/2024	**Test Pit Location** 0 50 100 200 Feet	FIGURE A-2





IGES EST. 1998	Geotechnical Investigation Summit County Services Area No. 3 Silver Creek Water Tank Park City, Utah	SITE PHOTOS June 27, 2024 Project Number: 04729-001	FIGURE A-3





IGES EST. 1998	Geotechnical Investigation Summit County Services Area No. 3 Silver Creek Water Tank Park City, Utah	SITE PHOTOS June 27, 2024 Project Number: 04729-001	FIGURE A-4





IGES EST. 1998	Geotechnical Investigation Summit County Services Area No. 3 Silver Creek Water Tank Park City, Utah	SITE PHOTOS June 27, 2024 Project Number: 04729-001	FIGURE A-5





IGES EST. 1998	Geotechnical Investigation Summit County Services Area No. 3 Silver Creek Water Tank Park City, Utah	SITE PHOTOS June 27, 2024 Project Number: 04729-001	FIGURE A-6

Silver Creek Water Tank GTI

Summit County Service Area No. 3

Crescent Dr and Whileaway Rd Park City, UT

TP-1

Date Started:	06/07/2024	Project Number:	04729-001	Remarks:	-
Date Completed:	06/07/2024	Equipment:	JCB 4CX		
Logged By:	Dylan B	Tooling:	Backhoe		
Operator:	Todd	Excavation Size:	-		
Contractor:	Skyline Excavation	Depth:	2'		
Coordinates:	40.774484, -111.480113	Water Encounter:	N/A	▼ Delayed Water Level:	N/A
		Cave-in Atd:	N/A	Delayed Water Observation Date:	N/A

Depth (ft)	Sample Graphic	Graphic Log	USCS	Visual Classification and Remarks	Lab: % Gravel	% Sand	% Fines	Dry Density (PCF)	Moisture Content (%)	Liquid Limit	Plasticity Index
			CL	**TOPSOIL Sandy LEAN CLAY with gravel** - medium stiff, dry, low plasticity, roots, boulders							
				0.8							
				BEDROCK Volcanic Lahar BRECCIA - medium hard to hard, medium gray to reddish gray, small crystals, moderately fractured, minimal to moderately weathered							
				2.0							
				Refusal in bedrock							

▽

Graphics Legend

CL

Bulk - Bulk Sample

Volcanic Lahar breccia

FIGURE

A-7

Silver Creek Water Tank GTI

Summit County Service Area No. 3

Crescent Dr and Whileaway Rd Park City, UT

TP-2

Date Started:	06/07/2024	Project Number:	04729-001	Remarks:	-
Date Completed:	06/07/2024	Equipment:	JCB 4CX		
Logged By:	Dylan B	Tooling:	Backhoe		
Operator:	Todd	Excavation Size:	-		
Contractor:	Skyline Excavation	Depth:	1.5'		
Coordinates:	40.744509, -111.480130	Water Encounter:	N/A	▼ Delayed Water Level:	N.E.
		Cave-in Atd:	N/A	Delayed Water Observation Date:	N.E.

Depth (ft)	Sample Graphic	Graphic Log	USCS	Visual Classification and Remarks	Lab: % Gravel	% Sand	% Fines	Dry Density (PCF)	Moisture Content (%)	Liquid Limit	Plasticity Index
			CL	**TOPSOIL Sandy LEAN CLAY with gravel** - medium stiff, dry, low plasticity, roots, boulders							
0.8				**BEDROCK Volcanic Lahar BRECCIA** - medium hard to hard, medium gray to grayish orange, small crystals, moderately fractured, minimal to moderately weathered	78.4	16.4	5.2		7.7		
1.5				Refusal in bedrock							

Graphics Legend

CL

Bulk - Bulk Sample

Volcanic Lahar breccia

FIGURE

A-8

Silver Creek Water Tank GTI

Summit County Service Area No. 3

Crescent Dr and Whileaway Rd Park City, UT

TP-3

Date Started:	06/07/2024	Project Number:	04729-001	Remarks:	-
Date Completed:	06/07/2024	Equipment:	JCB 4CX		
Logged By:	Dylan B	Tooling:	Backhoe		
Operator:	Todd	Excavation Size:	-		
Contractor:	Skyline Excavation	Depth:	1.5'		
Coordinates:	40.744381, -111.480171	Water Encounter:	N/A	▼ Delayed Water Level:	N/A
		Cave-in Atd:	N/A	Delayed Water Observation Date:	N/A

Depth (ft)	Sample Graphic	Graphic Log	USCS	Visual Classification and Remarks	Lab: % Gravel	% Sand	% Fines	Dry Density (PCF)	Moisture Content (%)	Liquid Limit	Plasticity Index
			CL	**TOPSOIL Sandy LEAN CLAY with gravel** - medium stiff, dry, low plasticity, roots, boulders							
0.8				**BEDROCK Volcanic Lahar BRECCIA** - medium hard to hard, medium gray to reddish gray, small crystals, moderately fractured, minimal to moderately weathered	12.1	52.5	35.4			28	5
1.5				Refusal in bedrock							

Graphics Legend

CL

Bulk - Bulk Sample

Volcanic Lahar breccia

FIGURE

A-9

Silver Creek Water Tank GTI

Summit County Service Area No. 3

Crescent Dr and Whileaway Rd Park City, UT

TP-4

Date Started:	06/07/2024	Project Number:	04729-001	Remarks:	-
Date Completed:	06/07/2024	Equipment:	JCB 4CX		
Logged By:	Dylan B	Tooling:	Backhoe		
Operator:	Todd	Excavation Size:	-		
Contractor:	Skyline Excavation	Depth:	1'		
Coordinates:	40.744606, -111.480455	Water Encounter:	N/A	Delayed Water Level:	N/A
		Cave-in Atd:	N/A	Delayed Water Observation Date:	N/A

Depth (ft)	Sample Graphic	Graphic Log	USCS	Visual Classification and Remarks	Lab: % Gravel	% Sand	% Fines	Dry Density (PCF)	Moisture Content (%)	Liquid Limit	Plasticity Index
			CL	**TOPSOIL Sandy LEAN CLAY with gravel** - medium stiff, dry, low plasticity, roots, boulders 0.2 **BEDROCK Volcanic Lahar BRECCIA** - medium hard to hard, medium gray to reddish gray, small crystals, moderately fractured, minimal to moderately weathered 1.0							
				Refusal in bedrock							

Graphics Legend

CL

Volcanic Lahar breccia

Bulk - Bulk Sample

FIGURE

A-10

Silver Creek Water Tank GTI

Summit County Service Area No. 3

Crescent Dr and Whileaway Rd Park City, UT

TP-5

Date Started:	06/07/2024	Project Number:	04729-001	Remarks:	-
Date Completed:	06/07/2024	Equipment:	JCB 4CX		
Logged By:	Dylan B	Tooling:	Backhoe		
Operator:	Todd	Excavation Size:	-		
Contractor:	Skyline Excavation	Depth:	1.5'		
Coordinates:	40.744793, -111.480343	Water Encounter:	N/A	Delayed Water Level:	N/A
		Cave-in Atd:	N/A	Delayed Water Observation Date:	N/A

Depth (ft)	Sample Graphic	Graphic Log	USCS	Visual Classification and Remarks	Lab: % Gravel	% Sand	% Fines	Dry Density (PCF)	Moisture Content (%)	Liquid Limit	Plasticity Index
			CL	**TOPSOIL Sandy LEAN CLAY with gravel** - medium stiff, dry, low plasticity, roots, boulders							
				0.5							
				BEDROCK Volcanic Lahar BRECCIA - medium hard to hard, medium gray to reddish gray, small crystals, moderately fractured, minimal to moderately weathered			22.7		10		
				2.0							
				Refusal in bedrock							

Graphics Legend

CL

Bulk - Bulk Sample

Volcanic Lahar Breccia

FIGURE

A-11

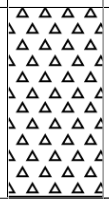
Silver Creek Water Tank GTI

Summit County Service Area No. 3

Crescent Dr and Whileaway Rd Park City, UT

TP-6

Date Started:	06/07/2024	Project Number:	04729-001	Remarks:	
Date Completed:	06/07/2024	Equipment:	JCB 4CX	-	
Logged By:	Dylan B	Tooling:	Backhoe		
Operator:	Todd	Excavation Size:	-		
Contractor:	Skyline Excavation	Depth:	1'		
Coordinates:	40.744793, -111.480343	Water Encounter:	N/A	▼ Delayed Water Level:	N/A
		Cave-in Atd:	N/A	Delayed Water Observation Date:	N/A

Depth (ft)	Sample Graphic	Graphic Log	USCS	Visual Classification and Remarks	Lab: % Gravel	% Sand	% Fines	Dry Density (PCF)	Moisture Content (%)	Liquid Limit	Plasticity Index
				**BEDROCK Volcanic Lahar BRECCIA** - medium hard to hard, medium gray to reddish gray, small crystals, moderately fractured, minimal to moderately weathered							
				1.0 Refusal in bedrock							

Graphics Legend

 Volcanic Lahar breccia

FIGURE

A-12

Silver Creek Water Tank GTI

Summit County Service Area No. 3

Crescent Dr and Whileaway Rd Park City, UT

TP-7

Date Started:	06/07/2024	Project Number:	04729-001	Remarks:	-
Date Completed:	06/07/2024	Equipment:	JCB 4CX		
Logged By:	Dylan B	Tooling:	Backhoe		
Operator:	Todd	Excavation Size:	-		
Contractor:	Skyline Excavation	Depth:	1.5'		
Coordinates:	40.744641, -111.480146	Water Encounter:	N/A	Delayed Water Level:	N/A
		Cave-in Atd:	N/A	Delayed Water Observation Date:	N/A

Depth (ft)	Sample Graphic	Graphic Log	USCS	Visual Classification and Remarks	Lab: % Gravel	% Sand	% Fines	Dry Density (PCF)	Moisture Content (%)	Liquid Limit	Plasticity Index
			CL	**TOPSOIL Sandy LEAN CLAY with gravel** - medium stiff, dry, low plasticity, roots, boulders							
0.4				**BEDROCK Volcanic Lahar BRECCIA** - medium hard to hard, medium gray to reddish gray, small crystals, moderately fractured, minimal to moderately weathered							
1.5				Refusal in bedrock							

Graphics Legend

CL

Bulk - Bulk Sample

Volcanic Lahar breccia

FIGURE

A-13

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			USCS SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve)	GRAVELS (More than half coarse fraction is larger than the #4 sieve)	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		GRAVELS WITH OVER 12% FINES	GM	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS (More than half coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH OVER 12% FINES	SM	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
			SC	CLAYEY SANDS SAND-GRAVEL-CLAY MIXTURES
FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid limit less than 50)		ML	INORGANIC SILTS & VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (Liquid limit greater than 50)		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

LOG KEY SYMBOLS

- BORING SAMPLE LOCATION
- TEST-PIT SAMPLE LOCATION
- WATER LEVEL (level after completion)
- WATER LEVEL (level where first encountered)

CEMENTATION

DESCRIPTION	DESCRIPTION
WEAKELY	CRUMBLES OR BREAKS WITH HANDLING OR SLIGHT FINGER PRESSURE
MODERATELY	CRUMBLES OR BREAKS WITH CONSIDERABLE FINGER PRESSURE
STRONGLY	WILL NOT CRUMBLE OR BREAK WITH FINGER PRESSURE

OTHER TESTS KEY

C	CONSOLIDATION	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	DS	DIRECT SHEAR
UC	UNCONFINED COMPRESSION	T	TRIAXIAL
S	SOLUBILITY	R	RESISTIVITY
O	ORGANIC CONTENT	RV	R-VALUE
CBR	CALIFORNIA BEARING RATIO	SU	SOLUBLE SULFATES
COMP	MOISTURE/DENSITY RELATIONSHIP	PM	PERMEABILITY
CI	CALIFORNIA IMPACT	-200	% FINER THAN #200
COL	COLLAPSE POTENTIAL	Gs	SPECIFIC GRAVITY
SS	SHRINK SWELL	SL	SWELL LOAD

MODIFIERS

DESCRIPTION	%
TRACE	<5
SOME	5 - 12
WITH	>12

MOISTURE CONTENT

DESCRIPTION	FIELD TEST
DRY	ABSENCE OF MOISTURE, DUSTY, DRY TO THE TOUCH
MOIST	DAMP BUT NO VISIBLE WATER
WET	VISIBLE FREE WATER, USUALLY SOIL BELOW WATER TABLE

STRATIFICATION

DESCRIPTION	THICKNESS
SEAM	1/16-1/2"
LAYER	1/2-12"

DESCRIPTION	THICKNESS
OCCASIONAL	ONE OR LESS PER FOOT OF THICKNESS
FREQUENT	MORE THAN ONE PER FOOT OF THICKNESS

GENERAL NOTES

1. Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual.
2. No warranty is provided as to the continuity of soil conditions between individual sample locations.
3. Logs represent general soil conditions observed at the point of exploration on the date indicated.
4. In general, Unified Soil Classification designations presented on the logs were evaluated by visual methods only. Therefore, actual designations (based on laboratory tests) may vary.

APPARENT / RELATIVE DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPT (blows/ft)	MODIFIED CA. SAMPLER (blows/ft)	CALIFORNIA SAMPLER (blows/ft)	RELATIVE DENSITY (%)	FIELD TEST
VERY LOOSE	<4	<4	<5	0 - 15	EASILY PENETRATED WITH 1/2-INCH REINFORCING ROD PUSHED BY HAND
LOOSE	4 - 10	5 - 12	5 - 15	15 - 35	DIFFICULT TO PENETRATE WITH 1/2-INCH REINFORCING ROD PUSHED BY HAND
MEDIUM DENSE	10 - 30	12 - 35	15 - 40	35 - 65	EASILY PENETRATED A FOOT WITH 1/2-INCH REINFORCING ROD DRIVEN WITH 5-LB HAMMER
DENSE	30 - 50	35 - 60	40 - 70	65 - 85	DIFFICULT TO PENETRATE 12" WITH 1/2-INCH REINFORCING ROD DRIVEN WITH 5-LB HAMMER
VERY DENSE	>50	>60	>70	85 - 100	PENETRATED ONLY FEW INCHES WITH 1/2-INCH REINFORCING ROD DRIVEN WITH 5-LB HAMMER

CONSISTENCY - FINE-GRAINED SOIL		TORVANE	POCKET PENETROMETER	FIELD TEST
CONSISTENCY	SPT (blows/ft)	UNTRAINED SHEAR STRENGTH (tsf)	UNCONFINED COMPRESSIVE STRENGTH (tsf)	
VERY SOFT	<2	<0.125	<0.25	EASILY PENETRATED SEVERAL INCHES BY THUMB. EXUDES BETWEEN THUMB AND FINGERS WHEN SQUEEZED BY HAND.
SOFT	2 - 4	0.125 - 0.25	0.25 - 0.5	EASILY PENETRATED ONE INCH BY THUMB. MOLDED BY LIGHT FINGER PRESSURE.
MEDIUM STIFF	4 - 8	0.25 - 0.5	0.5 - 1.0	PENETRATED OVER 1/2 INCH BY THUMB WITH MODERATE EFFORT. MOLDED BY STRONG FINGER PRESSURE.
STIFF	8 - 15	0.5 - 1.0	1.0 - 2.0	INDENTED ABOUT 1/2 INCH BY THUMB BUT PENETRATED ONLY WITH GREAT EFFORT.
VERY STIFF	15 - 30	1.0 - 2.0	2.0 - 4.0	READILY INDENTED BY THUMBNAIL.
HARD	>30	>2.0	>4.0	INDENTED WITH DIFFICULTY BY THUMBNAIL.

IGES EST. 1998

Geotechnical Investigation
Summit County Services Area No. 3
Silver Creek Water Tank
Park City, Utah

KEY TO SOIL SYMBOLS AND TERMINOLOGY
Project Number: 04729-001

FIGURE
A-14

ROCK CLASSIFICATION COMPONENTS
1. Rock name (or classification)
2. Color
3. Weathering
4. Fracturing
5. Competency
6. Additional comments

FRACTURING	
Spacing	**Description**
>6ft	Very Widely
2-6 ft	Widely
8-24 in	Moderately
2 1/2-8 in	Closely
3/4-2 1/2 in	Very Closely

ROCK QUALITY DESIGNATION	
RQD (%)	**Rock Quality**
90-100	Excellent
75-90	Good
50-75	Fair
25-50	Poor
0-25	Very Poor

WEATHERING	
Weathering	**Field Test**
Fresh	No visible sign of decomposition or discoloration. Rings under hammer impact.
Slightly Weathered	Slight discoloration inwards from open fractures, otherwise similar to Fresh.
Moderately Weathered	Discoloration throughout. Weaker minerals such as feldspar are decomposed. Strength somewhat less than fresh rock but cores cannot be broken by hand or scraped with a knife. Texture preserved.
Highly Weathered	Most minerals somewhat decomposed. Specimens can be broken by hand with effort or shaved with a knife. Core stones present in rock mass. Texture becoming indistinct but fabric preserved.
Completely Weathered	Minerals decomposed to soil but fabric and structure preserved. Specimens easily crumble or penetrated.

BEDDING OF SEDIMENTARY ROCKS		
SPLITTING PROPERTY	**THICKNESS**	**STRATIFICATION**
Massive	>4.0 ft	Very thick bedded
Blocky	2.0-4.0 ft	Thick-bedded
Slabby	2 1/2-24 in	Thin-bedded
Flaggy	1/2-2 1/2 in	Very thin-bedded
Shaly or Platy	1/8-1/2 in	Laminated
Papery	<1/8	Thinly Laminated

COMPETENCY			
Class	**Strength**	**Field Test**	**Approximate Unconfined Compressive Strength**
I	Extremely Strong	Many blows with geologic hammer required to break intact specimen.	>2000 psi
II	Very Strong	Hand-held specimen breaks with pick end of hammer under more than one blow.	2000-1000 psi
III	Strong	Cannot by scraped or peeled with knife, hand-held specimen can be broken with single moderate blow with pick end of hammer	1000-500 psi
IV	Moderately Strong	Can just be scraped or peeled with knife. Indentations 1-3 mm show in specimen with moderate blow with pick end of hammer.	500-250 psi
V	Weak	Material crumbles under moderate blow with pick end of hammer and can be peeled with a knife, but is hard to hand-trim for triaxial test specimen.	250-10 psi
VI	Friable	Material crumbles in hand.	N/A

APPENDIX B

Water Content and Unit Weight of Soil

(In General Accordance with ASTM D7263 Method B and D2216)

© IGES 2006, 2024

Project: Svc Area #3 Water Tank
No: 04729-001
Location: Park City, UT
Date: 7/9/2024
By: LM

Sample Info.	Boring No.	TP-2							
	Sample								
	Depth	1.0'							
	Split	Yes							
	Split sieve	No.4							
Total sample (g)		1027.68							
Moist coarse fraction (g)		805.51							
Moist split fraction (g)		222.17							
	Sample height, *H* (in)								
	Sample diameter, *D* (in)								
	Mass rings + wet soil (g)								
	Mass rings/tare (g)								
	Total unit wt., γ (pcf)								
Coarse Fraction	Wet soil + tare (g)	1134.59							
	Dry soil + tare (g)	1077.21							
	Tare (g)	326.27							
	Water content (%)	7.6							
Split Fraction	Wet soil + tare (g)	358.51							
	Dry soil + tare (g)	343.83							
	Tare (g)	154.00							
	Water content (%)	7.7							
Water content, ω (%)		**7.7**							
Dry unit weight, γ_d (pcf)									

Entered by:_____
Reviewed:_____

Liquid Limit, Plastic Limit, and Plasticity Index of Soils

(ASTM D4318)

© IGES 2004, 2024

Project: Svc Area #3 Water Tank
No: 04729-001
Location: Park City, UT
Date: 7/10/2024
By: BRR
Grooving tool type: Plastic
Liquid limit device: Mechanical
Rolling method: Hand

Boring No.: TP-3
Sample:
Depth: 0.5'
Description: Brown silt

Preparation method: Air Dry
Liquid limit test method: Multipoint
Screened over No.40: Yes
Larger particles removed: Dry sieved

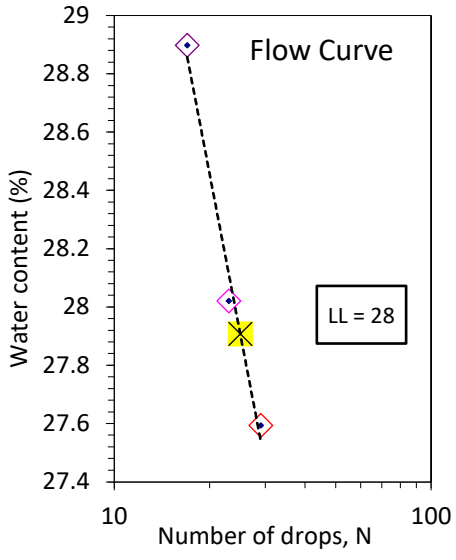
Plastic Limit

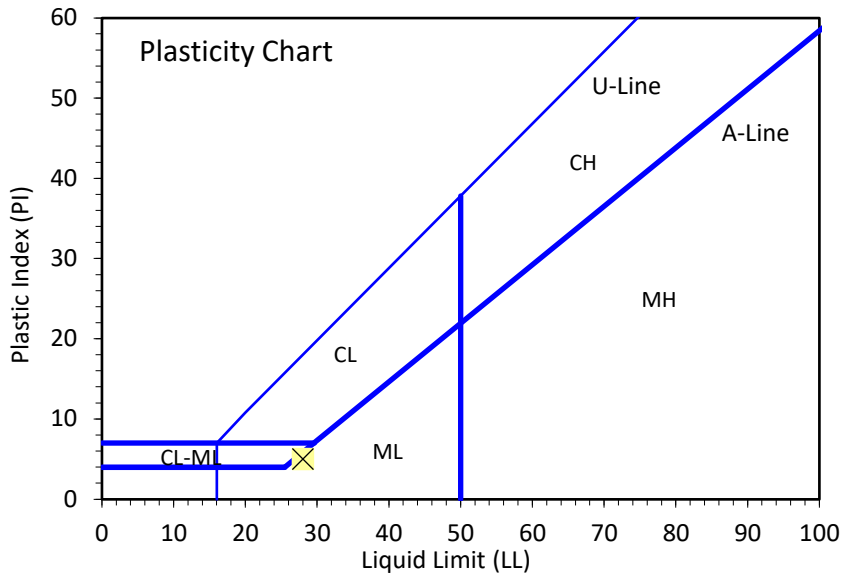
Determination No	1	2				
Wet Soil + Tare (g)	14.39	14.37				
Dry Soil + Tare (g)	13.03	13.02				
Water Loss (g)	1.36	1.35				
Tare (g)	7.08	7.06				
Dry Soil (g)	5.95	5.96				
Water Content, w (%)	22.86	22.65				

Liquid Limit

Determination No	1	2	3			
Number of Drops, N	29	23	17			
Wet Soil + Tare (g)	12.81	12.02	13.25			
Dry Soil + Tare (g)	11.56	10.93	11.86			
Water Loss (g)	1.25	1.09	1.39			
Tare (g)	7.03	7.04	7.05			
Dry Soil (g)	4.53	3.89	4.81			
Water Content, w (%)	27.59	28.02	28.90			
One-Point LL (%)	28	28				

Liquid Limit, LL (%)	**28**
Plastic Limit, PL (%)	**23**
Plasticity Index, PI (%)	**5**





Entered by:_____
Reviewed:_____

Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis

(ASTM D6913)

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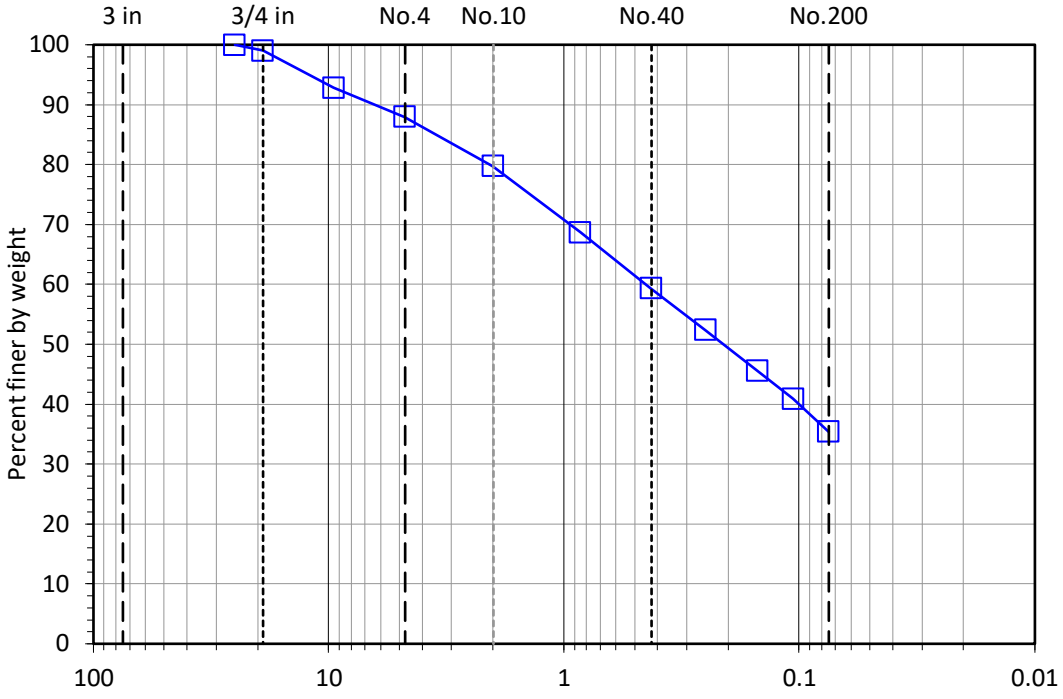
Project: Svc Area #3 Water Tank
No: 04729-001
Location: Park City, Ut
Date: 7/5/2024
By: SE

Boring No.: TP-3
Sample:
Depth: 0.5'
Description: Brown silty sand

Split:	Yes	
Split sieve:	3/8"	
	Moist	Dry
Total sample wt. (g):	1057.51	1038.22
+3/8" Coarse fraction (g):	75.26	74.80
-3/8" Split fraction (g):	292.14	286.54
Split fraction:	0.928	

Water content data	C.F.(+3/8")	S.F.(-3/8")
Moist soil + tare (g):	297.73	414.75
Dry soil + tare (g):	297.27	409.15
Tare (g):	222.47	122.61
Water content (%):	0.6	2.0

Sieve	Accum. Wt. Ret. (g)	Grain Size (mm)	Percent Finer	
6"	-	150	-	
4"	-	100	-	
3"	-	75	-	
1.5"	-	37.5	-	
1"	-	25	100.0	
3/4"	10.31	19	99.0	
3/8"	74.80	9.5	92.8	←Split
No.4	15.03	4.75	87.9	
No.10	40.36	2	79.7	
No.20	74.55	0.85	68.7	
No.40	103.33	0.425	59.3	
No.60	124.81	0.25	52.4	
No.100	145.88	0.15	45.6	
No.140	160.25	0.106	40.9	
No.200	177.24	0.075	35.4	



Gravel (%): 12.1
Sand (%): 52.5
Fines (%): 35.4

Comments:
These results are in nonconformance with Method D6913 because the minimum dry mass was not met.

Entered by:_____
Reviewed:_____

Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis

(ASTM D6913)

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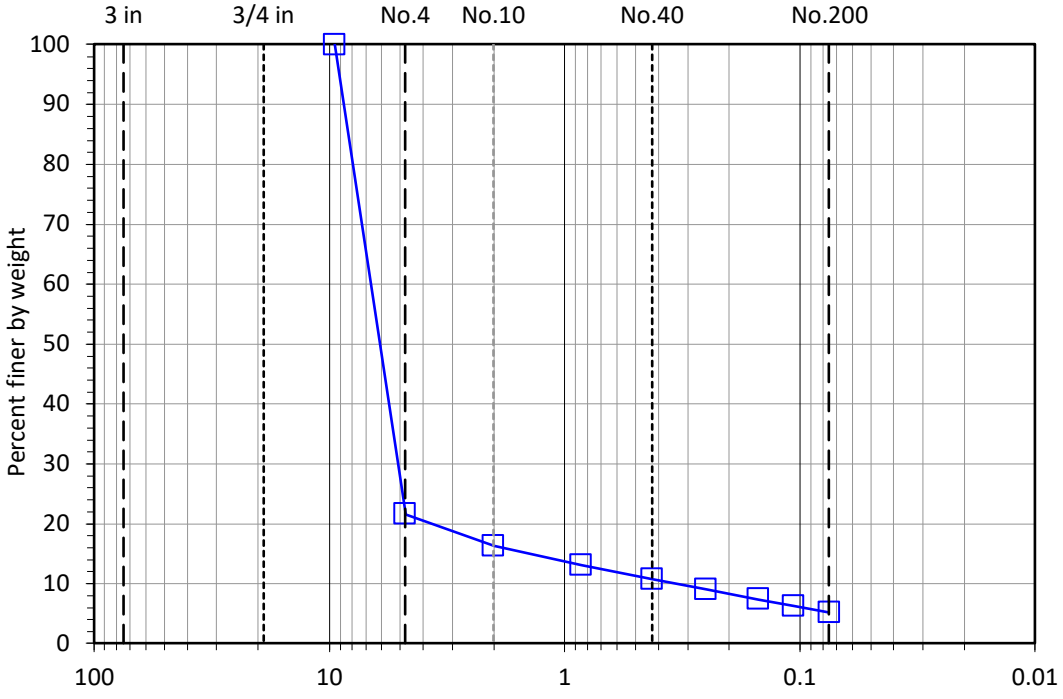
Project: Svc Area #3 Water Tank
No: 04729-001
Location: Park City, Ut
Date: 7/5/2024
By: SE

Boring No.: TP-2
Sample:
Depth: 1.0'
Description: Brown gravel with clay and sand

Split:	Yes	
Split sieve:	No.4	
	Moist	Dry
Total sample wt. (g):	1027.68	954.55
+No.4 Coarse fraction (g):	805.51	748.33
-No.4 Split fraction (g):	204.51	189.83
Split fraction:	0.216	

Water content data	C.F.(+No.4)	S.F.(-No.4)
Moist soil + tare (g):	1134.59	358.51
Dry soil + tare (g):	1077.21	343.83
Tare (g):	326.27	154.00
Water content (%):	7.6	7.7

Sieve	Accum. Wt. Ret. (g)	Grain Size (mm)	Percent Finer	
6"	-	150	-	
4"	-	100	-	
3"	-	75	-	
1.5"	-	37.5	-	
1"	-	25	-	
3/4"	-	19	-	
3/8"	-	9.5	100.0	
No.4	748.33	4.75	21.6	←Split
No.10	46.72	2	16.3	
No.20	74.62	0.85	13.1	
No.40	95.54	0.425	10.7	
No.60	110.51	0.25	9.0	
No.100	124.90	0.15	7.4	
No.140	134.52	0.106	6.3	
No.200	144.28	0.075	5.2	



Gravel (%): 78.4
Sand (%): 16.4
Fines (%): 5.2

Comments:
These results are in nonconformance with Method D6913 because the minimum dry mass was not met.

Entered by:_____
Reviewed:_____

Amount of Material in Soil Finer than the No. 200 (75mm) Sieve

(ASTM D1140)

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Project: Svc Area #3 Water Tank
No: 04729-001
Location: Park City, UT
Date: 7/5/2024
By: SE

Sample Info.	Boring No.	TP-5								
	Sample									
	Depth	0.5'								
	Split	Yes								
	Split Sieve*	3/8"								
	Method	B								
Specimen soak time (min)		240								
Moist total sample wt. (g)		2445.33								
Moist coarse fraction (g)		826.79								
Moist split fraction + tare (g)		390.92								
Split fraction tare (g)		128.09								
Dry split fraction (g)		238.91								
Dry retained No. 200 + tare (g)		285.11								
Wash tare (g)		128.09								
No. 200 Dry wt. retained (g)		157.02								
Split sieve* Dry wt. retained (g)		749.11								
Dry total sample wt. (g)		2220.35								
Coarse Fraction	Moist soil + tare (g)	1154.61								
	Dry soil + tare (g)	1076.93								
	Tare (g)	327.82								
	Water content (%)	10.37								
Split Fraction	Moist soil + tare (g)	390.92								
	Dry soil + tare (g)	367.00								
	Tare (g)	128.09								
	Water content (%)	10.01								
Percent passing split sieve* (%)		**66.3**								
Percent passing No. 200 sieve (%)		**22.7**								

Comments: These results are in nonconformance with Method D1140 because the minimum dry mass was not met.

Entered by:_____

Reviewed:_____

Determination of the Point Load Strength Index of Rock

(ASTM D5731)

© IGES 2005, 2024

Project: **Svc Area #3 Water Tank**
No: **04729-001**
Location: Park City Utah
Date: 7/11/2024
By: PW
Test Device: Humboldt H-1342
Test Frame: GEOTAC Sigma-1 10K

Boring No.	TP-1	TP-4	TP-4	TP-7	TP-7	
Sample:	1	1	2	1	2	
Depth:	2.0'	0.5'	0.5'	1.0'	1.0'	
Sample type	Block	Block	Block	Block	Block	
Core test type						
Distance between platen points, D (in.)	1.534	2.002	1.198	1.882	1.395	
D (mm)	38.964	50.851	30.429	47.803	35.433	
Smallest specimen width, W (in.)	2.029	1.975	1.959	2.750	2.289	
W (mm)	51.5	50.2	49.8	69.9	58.1	
Equivalent core area, D_e^2 (mm^2)	2556.7	3247.9	1927.8	4251.4	2623.0	
Failure load, P (lbf)	2276	1019	2001	1236	1241	
P (N)	10124	4533	8901	5498	5520	
Point load strength index, I_s (MPa)	3.96	1.40	4.62	1.29	2.10	
Size correction factor, F	1.005	1.061	0.943	1.127	1.011	
PLSI 50mm equivalent, $I_{s(50)}$ (MPa)	3.98	1.48	4.35	1.46	2.13	
Site specific correlation, C	23.1	24.5	21.4	22.3	23.3	
Uniaxial compressive strength, δ_{uc} (MPa)	92.12	36.25	93.30	32.48	49.61	
Uniaxial compressive strength, δ_{uc} (psi)	**13361**	**5257**	**13532**	**4710**	**7195**	

Entered by:_____

Reviewed:_____

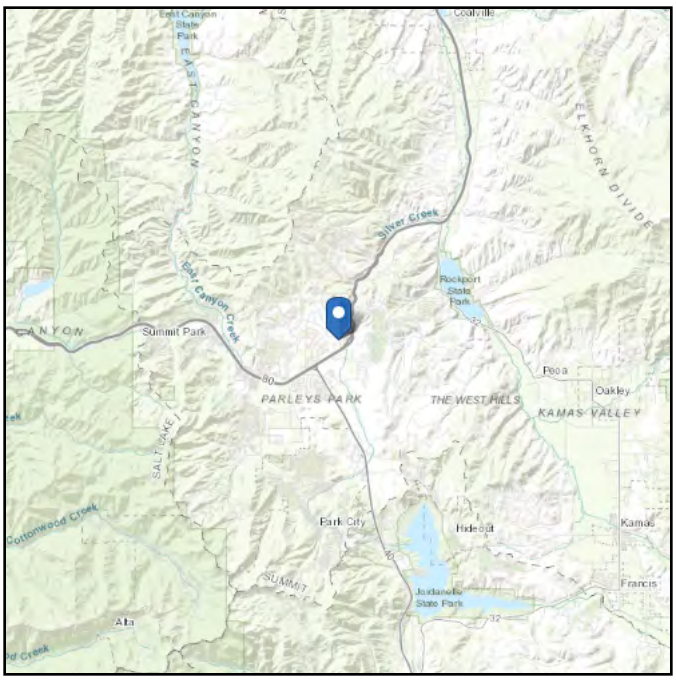
APPENDIX C

ASCE Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-16	**Latitude:**	40.74488
Risk Category:	II	**Longitude:**	-111.48118
Soil Class:	C - Very Dense Soil and Soft Rock	**Elevation:**	6633.67465363913 ft (NAVD 88)





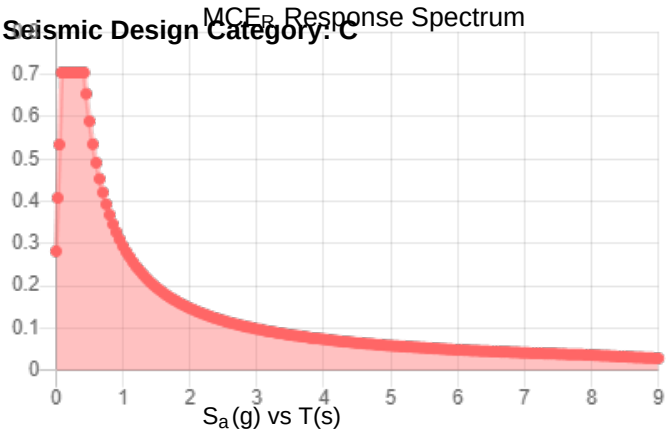
Seismic

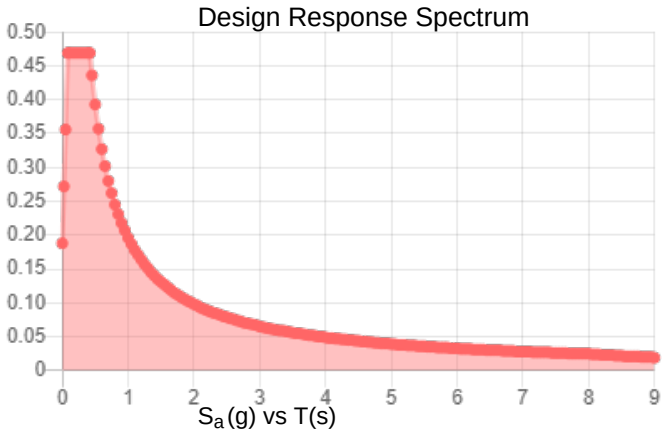
Site Soil Class: C - Very Dense Soil and Soft Rock

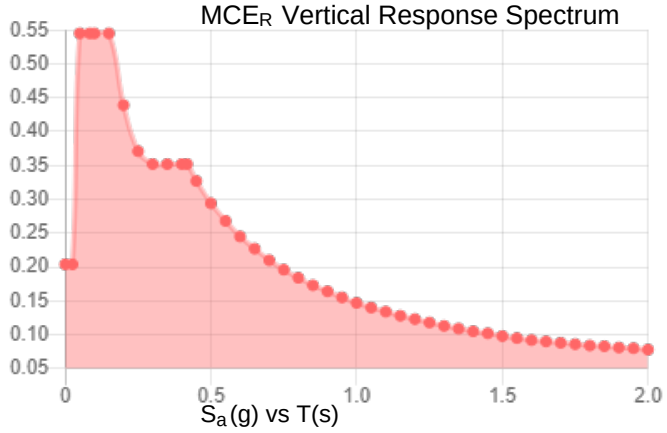
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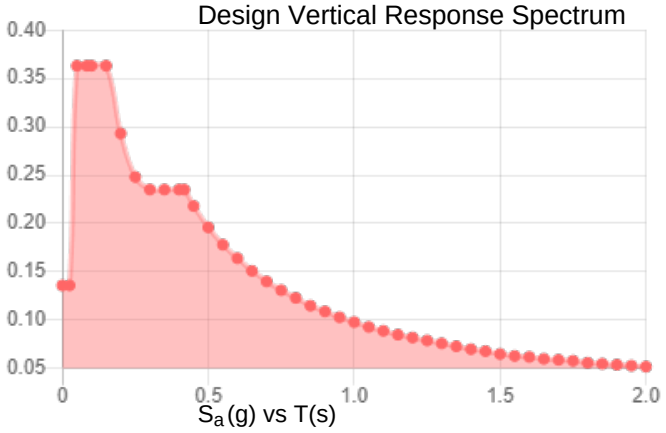
S_S :	0.55	S_{D1} :	0.196
S_1 :	0.196	T_L :	8
F_a :	1.28	PGA :	0.24
F_v :	1.5	PGA_M :	0.289
S_{MS} :	0.704	F_{PGA} :	1.2
S_{M1} :	0.294	I_e :	1
S_{DS} :	0.469	C_v :	0.967

Seismic Design Category: C









Data Accessed: **Wed Aug 28 2024**

Date Source:

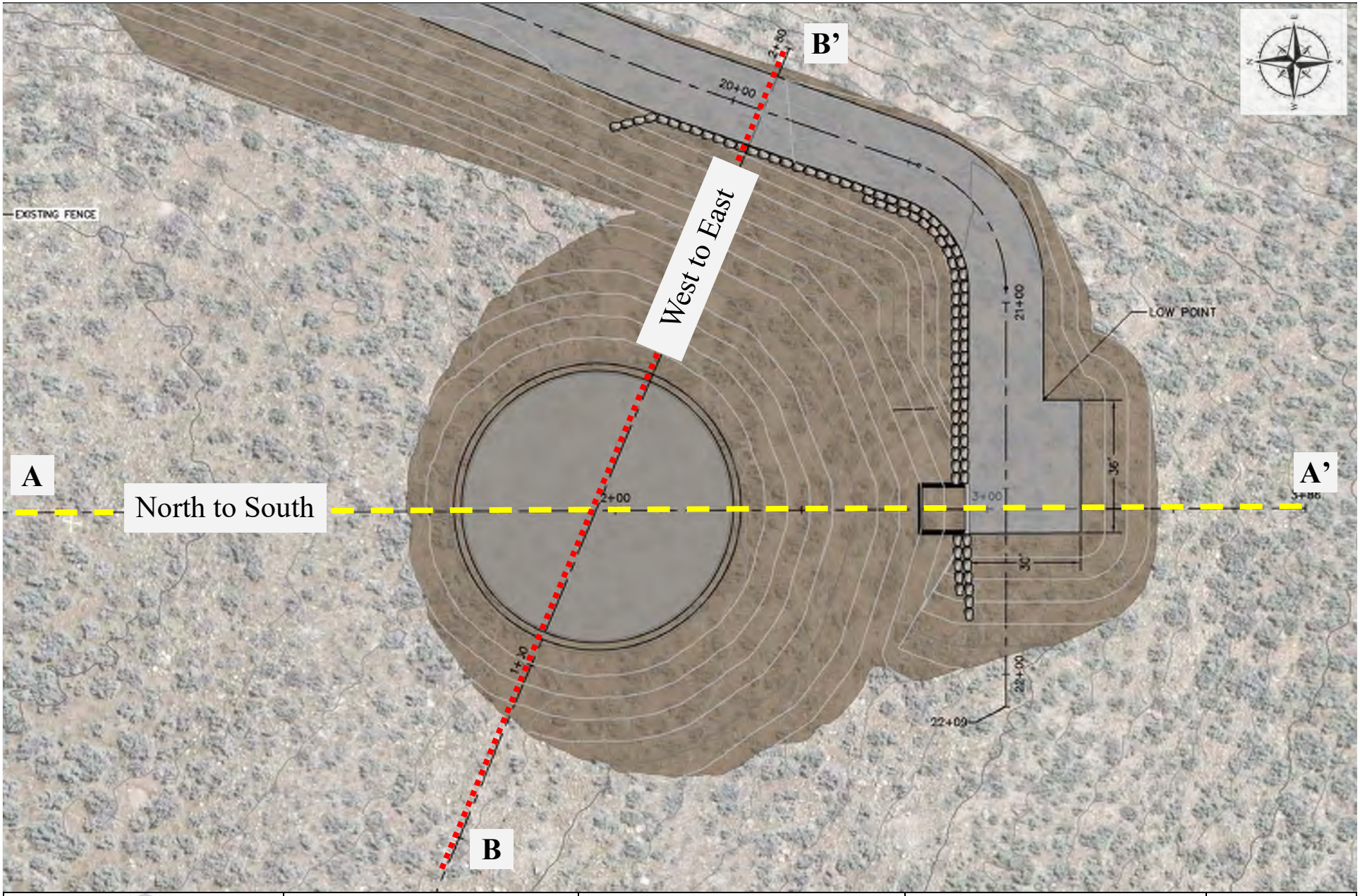
USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

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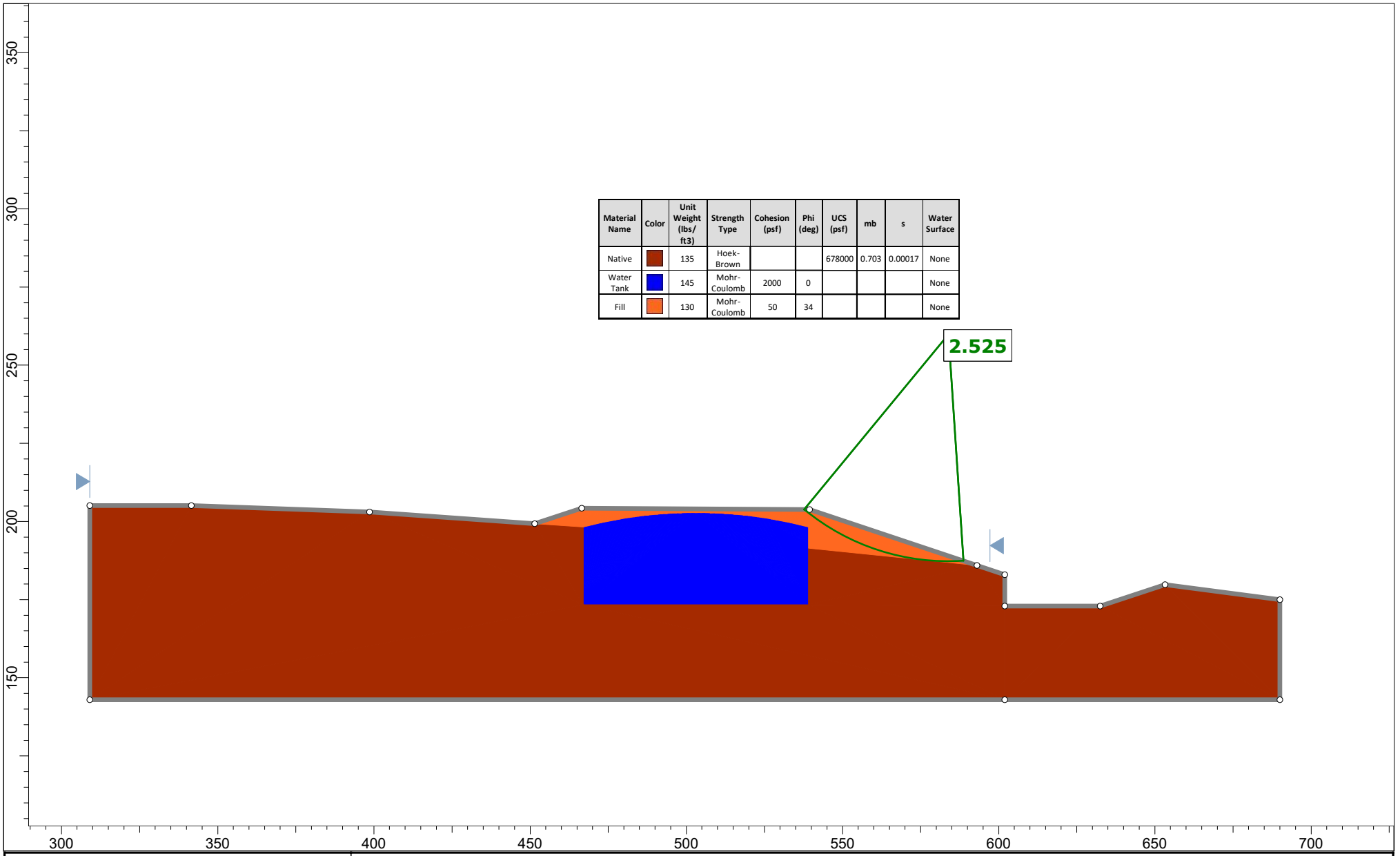
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APPENDIX D



IGES EST. 1998	Geotechnical Investigation Silver Creek Water Tank GTI Summit County Service Area No. 3 Park City, Utah	Slope Stability Sections Project Number: 04729-001 Source: Rimrock Engineering & Development Review Set 8/5/2024	0 10 20 40 Feet **SCALE**	FIGURE D-1

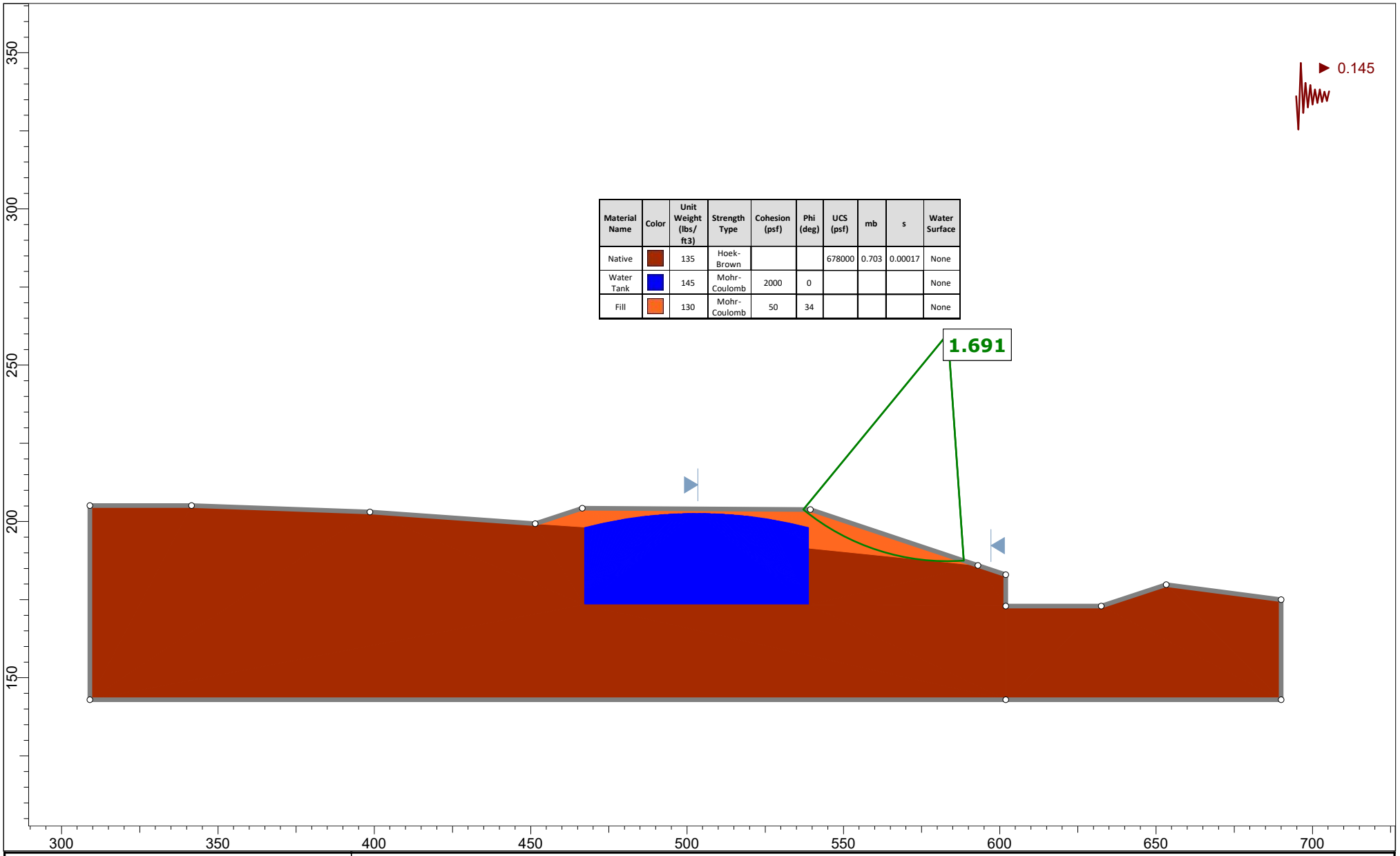
Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	UCS (psf)	mb	s	Water Surface
Native		135	Hoek-Brown			678000	0.703	0.00017	None
Water Tank		145	Mohr-Coulomb	2000	0				None
Fill		130	Mohr-Coulomb	50	34				None



rocscience

SLIDEINTERPRET 9.018

Project	SLIDE - Summit County Service Area No. 3		
Group	Profile A-A' North to South	*Scenario*	Static
Drawn By		*Company*	
Date	9/5/2024	*File Name*	Slide Analysis - Silver Creek Water Tank.slmd



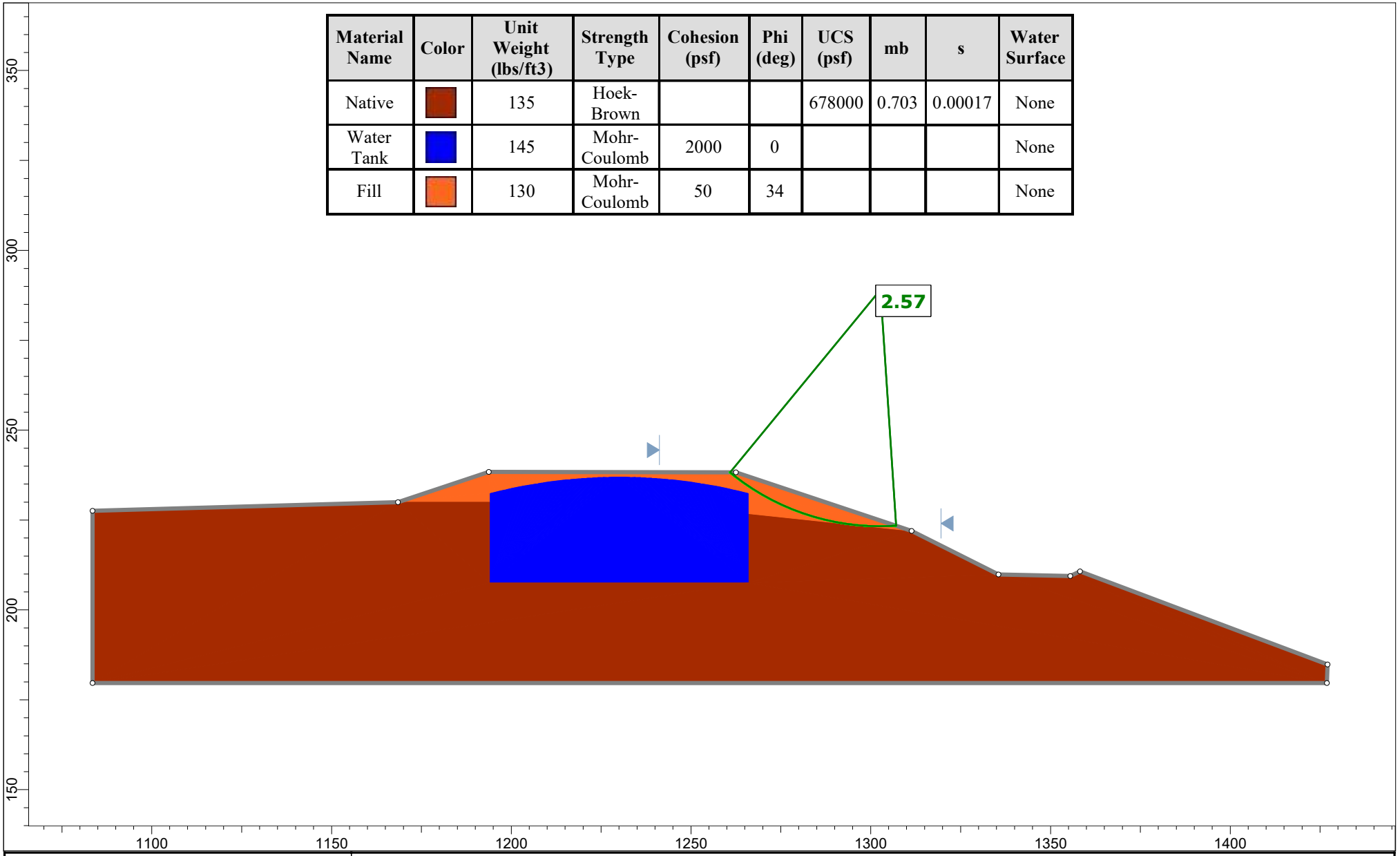
Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	UCS (psf)	mb	s	Water Surface
Native		135	Hoek-Brown			678000	0.703	0.00017	None
Water Tank		145	Mohr-Coulomb	2000	0				None
Fill		130	Mohr-Coulomb	50	34				None

rocscience

SLIDEINTERPRET 9.018

Project	SLIDE - Summit County Service Area No. 3		
Group	Profile A-A' North to South	*Scenario*	Seismic
Drawn By		*Company*	
Date	9/5/2024	*File Name*	Slide Analysis - Silver Creek Water Tank.slmd

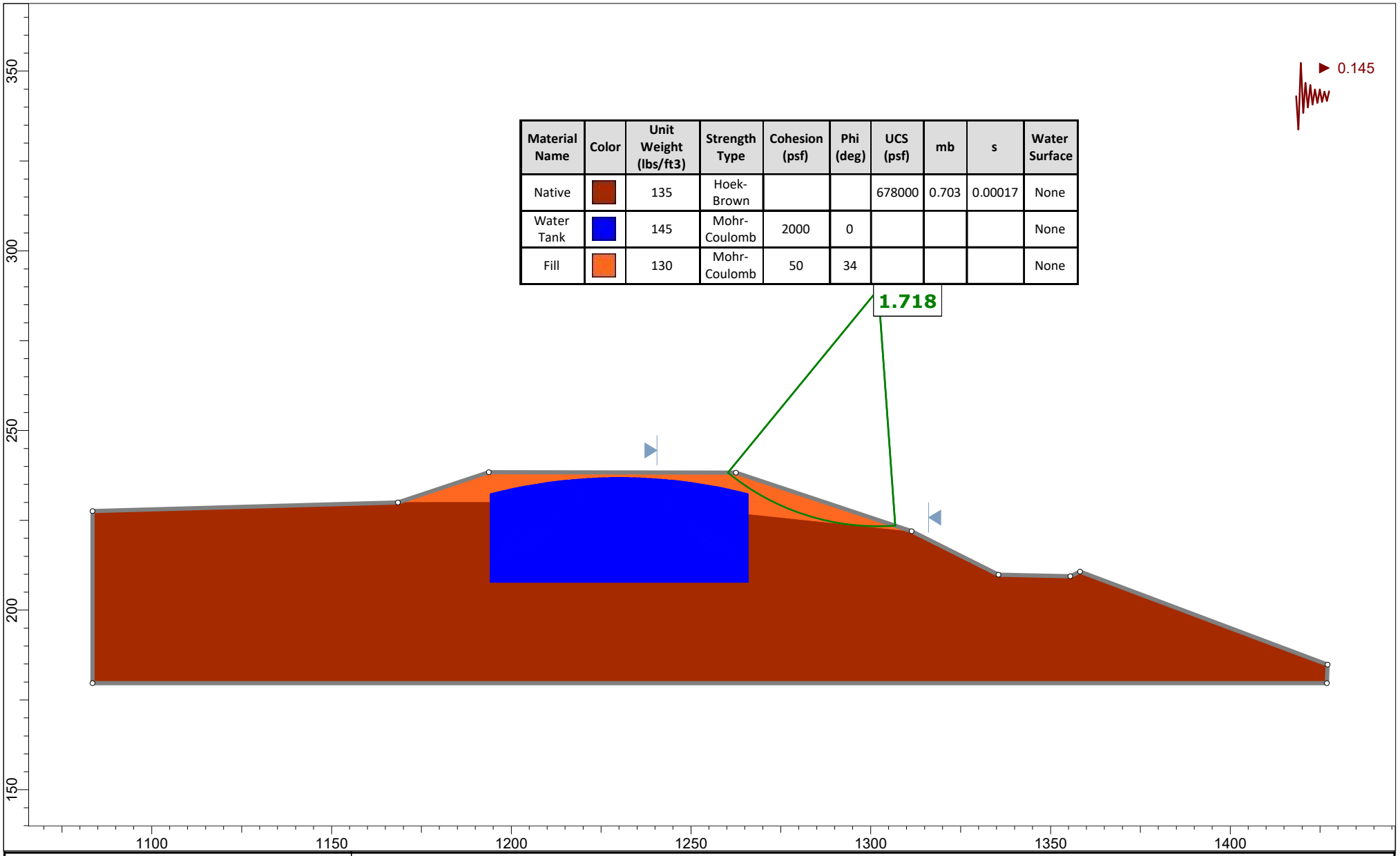
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	UCS (psf)	mb	s	Water Surface
Native		135	Hoek-Brown			678000	0.703	0.00017	None
Water Tank		145	Mohr-Coulomb	2000	0				None
Fill		130	Mohr-Coulomb	50	34				None



rocscience

SLIDEINTERPRET 9.018

Project	SLIDE - Summit County Service Area No. 3		
Group	Profile B-B' West to East	Scenario	Static
Drawn By		Company	
Date	9/5/2024	File Name	Slide Analysis - Silver Creek Water Tank.slmd



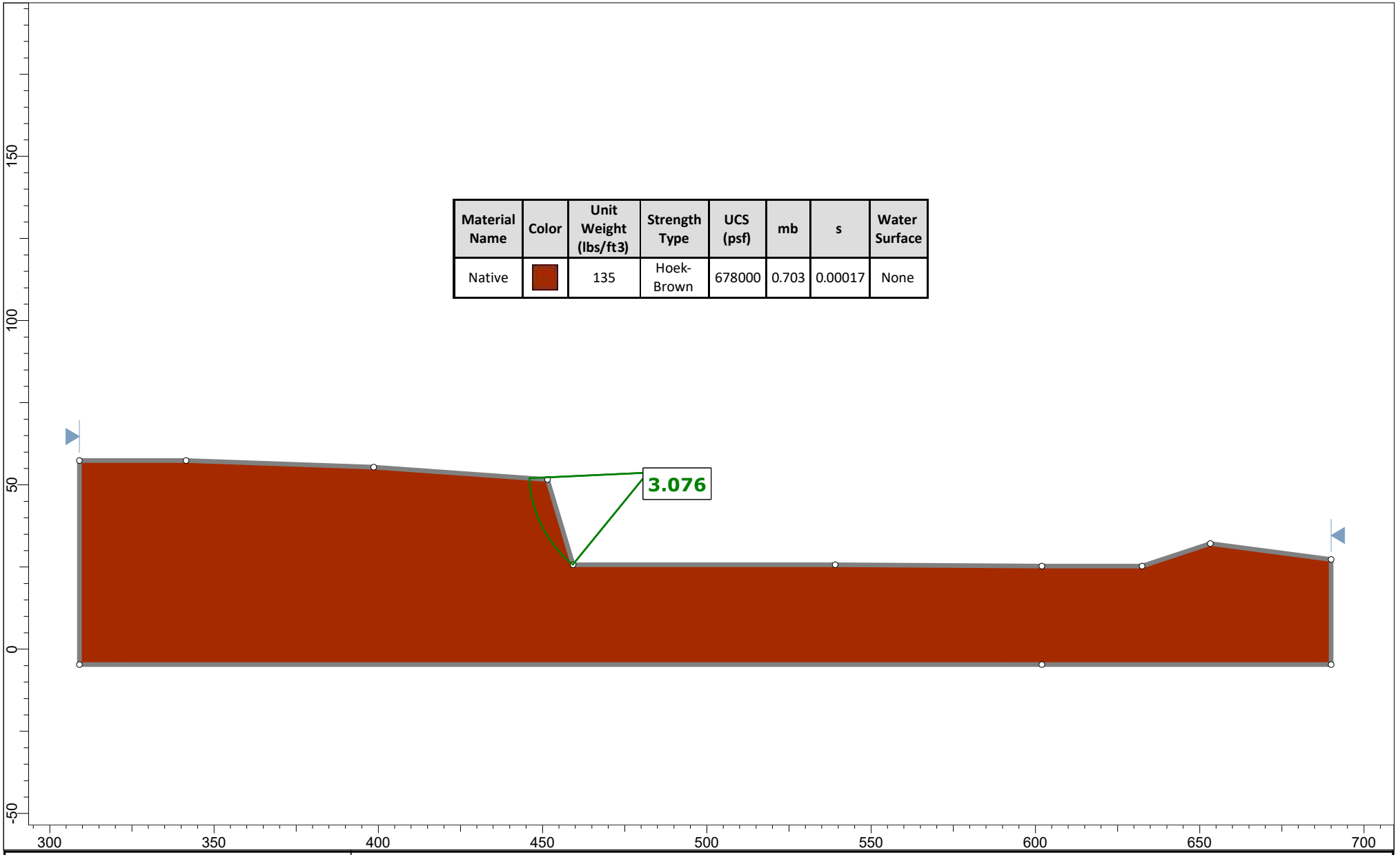
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	UCS (psf)	mb	s	Water Surface
Native		135	Hoek-Brown			678000	0.703	0.00017	None
Water Tank		145	Mohr-Coulomb	2000	0				None
Fill		130	Mohr-Coulomb	50	34				None

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SLIDEINTERPRET 9.018

Project	SLIDE - Summit County Service Area No. 3		
Group	Profile B-B' West to East	*Scenario*	Seismic
Drawn By		*Company*	
Date	9/5/2024	*File Name*	Slide Analysis - Silver Creek Water Tank.slmd

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	UCS (psf)	mb	s	Water Surface
Native		135	Hoek-Brown	678000	0.703	0.00017	None



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SLIDEINTERPRET 9.018

Project	SLIDE - Summit County Service Area No. 3		
Group	Profile A-A' North to South - No Tank	Scenario	Static
Drawn By		Company	
Date	9/5/2024	File Name	Slide Analysis - Silver Creek Water Tank.slmd

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	UCS (psf)	mb	s	Water Surface
Native		135	Hoek-Brown	678000	0.703	0.00017	None



150
100
50
0
-50
1100
1150
1200
1250
1300
1350
1400
1450

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SLIDEINTERPRET 9.018

Project	SLIDE - Summit County Service Area No. 3		
Group	Profile B-B' West to East - No Tank	Scenario	Static
Drawn By		Company	
Date	9/5/2024	File Name	Slide Analysis - Silver Creek Water Tank.slmd

Rock Mechanical Properties **Silver Creek Water Tank (Volcanic Lahar Breccia)**

Hoek-Brown Classification Parameters

σ_{ci}	678	ksf	Intact Uniaxial Compressive Strength
GSI	40		Geological Strength Index
m_i	19		Intact Rock Material Constant
D	0.7		Disturbance Factor
E_i	271,200	ksf	Intact Modulus
MR	400		Modulus Ratio

Hoek-Brown Criterion

m_b	**0.703**
s	**1.67E-04**
a	**0.511**

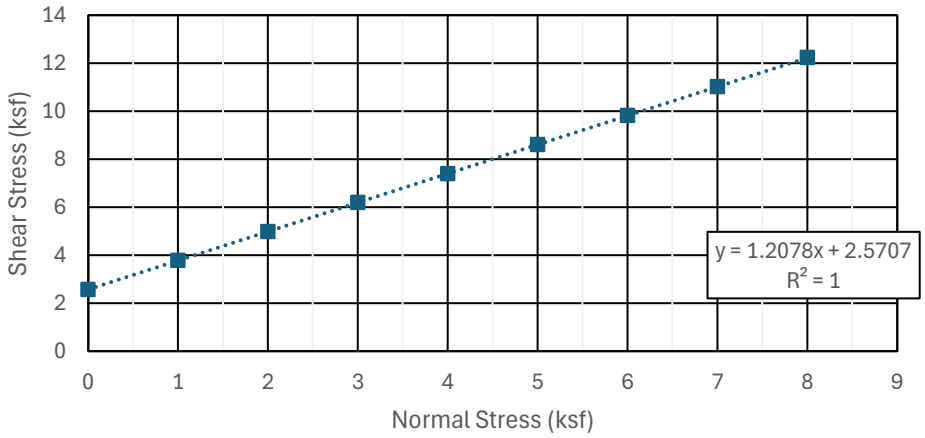
$$\sigma_1' = \sigma_3' + \sigma_{ci}\left(m_b\frac{\sigma_3'}{\sigma_{ci}} + s\right)^a$$

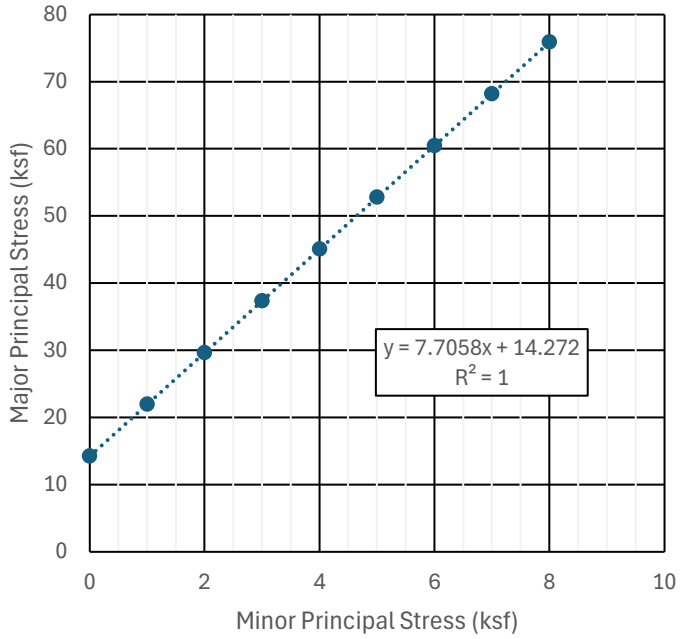
$$\phi' = \sin^{-1}\left[\frac{6am_b(s+m_b\sigma_{3n}')^{a-1}}{2(1+a)(2+a)+6am_b(s+m_b\sigma_{3n}')^{a-1}}\right]$$

$$c' = \frac{\sigma_{ci}\left[(1+2a)s+(1-a)m_b\sigma_{3n}'\right](s+m_b\sigma_{3n}')^{a-1}}{(1+a)(2+a)\sqrt{1+\left(6am_b(s+m_b\sigma_{3n}')^{a-1}\right)/\left((1+a)(2+a)\right)}}$$

Mohr-Coulomb Parameters (Best Fit)

σ'_{cm}	72.04	ksf	Rock Mass Strength
γ	0.135	kcf	Unit Weight of Intact Rock
H	50	ft	Height of the Slope
σ'_{3max}	6.0142	ksf	Upper limit of confining stress on slopes
σ'_{3max}	6.0142	ksf	Upper limit of confining stress used in calculations
σ'_{3n}	0.0089		$\sigma'_{3max} / \sigma_{ci}$
ϕ'	**50.38**	**degrees**	
c'	**2.571**	**ksf**	





Analysis of Rock Strength using RocLab

Hoek-Brown Classification

intact uniaxial compressive strength = 678 ksf
GSI = 40 mi = 19 Disturbance factor = 0.7

Hoek-Brown Criterion

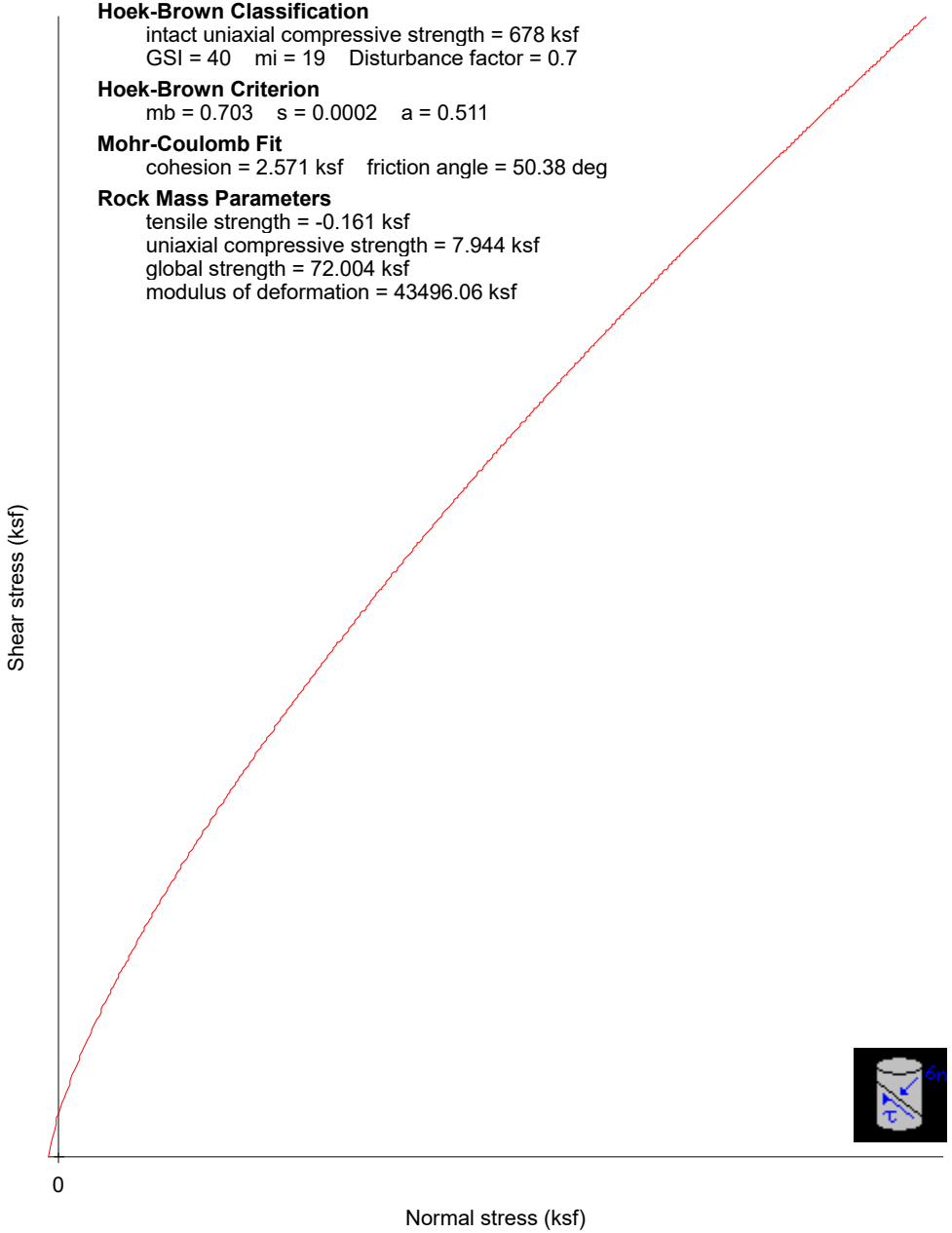
mb = 0.703 s = 0.0002 a = 0.511

Mohr-Coulomb Fit

cohesion = 2.571 ksf friction angle = 50.38 deg

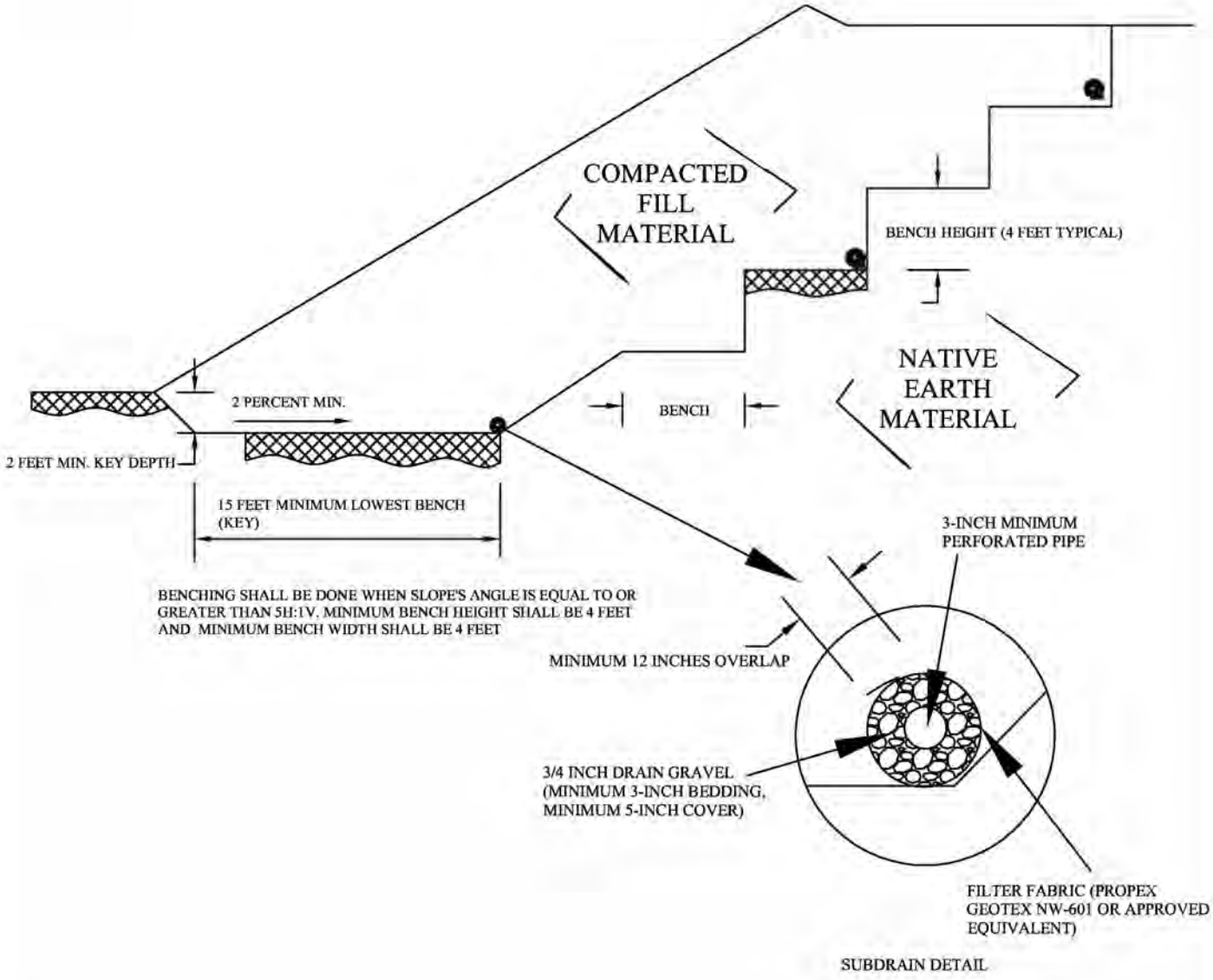
Rock Mass Parameters

tensile strength = -0.161 ksf
uniaxial compressive strength = 7.944 ksf
global strength = 72.004 ksf
modulus of deformation = 43496.06 ksf



APPENDIX E

KEYING AND BENCHING DETAIL



IGES EST. 1998	Geotechnical Investigation Summit County Services Area No. 3 Silver Creek Water Tank Park City, Utah	KEYING AND BENCHING Project Number: 04729-001	FIGURE E-1

Backflow Implementation

Statement of Work

Project Objectives: Implementation of SwiftComply's backflow solution, including training and configuration of the backflow software

Scope of Work

Data Migration

- **Data Configuration & Migration**
  - *Locations, Assemblies, Contacts*
    - SwiftComply will migrate active Assembly, Contact, and Location records, including:
      - Support for up to three (3) migrated custom fields per data element. including Locations, Assemblies, Contacts
      - Outside of custom fields, the remainder of customer data must match SwiftComply's standard data structure
        - Standard data structure can be found here: Standard Fields
  - *Tester Information*
    - SwiftComply will provide a Tester Registration Site for the customer to gather their tester data.
      - Testers will be required to manually register on this site.
- **Data Migration Integrity Check**
  - SwiftComply will provide up to one (1) hour of pre-migration data review sessions to ensure data tables are normalized or can be linked via a unique ID value
  - If data is not normalized, any data normalization that cannot be automated will be the responsibility of the customer, or require additional scope via a change order
  - A data validation report will be provided highlighting any unnormalized data that would be customer responsibility for cleanup or duplicate resolution prior to initial test data load
- **Data Cleanup**
  - SwiftComply will provide data cleanup services based on the following criteria:
    - Deduplication that falls within the following automated logic
    - Standard capitalization
    - Merge records provided a shared, unique ID value exists
    - Data is provided within one single flat-file data source per data element
  - Any required data cleanup that does not match the above criteria will be the responsibility of the customer, or require additional scope via a change order
- **Data Validation and User Acceptance Testing (UAT)**
  - SwiftComply will provide the following services related to data validation and user acceptance testing:
    - One (1) hour of data mapping sessions to assist in mapping legacy data to SwiftComply product fields
    - One (1) test data load based on customer-approved data mapping
    - One (1) revision to the customer-approved data mapping with up to two (2) subsequent reloads into the UAT environment
    - One (1) final production data load
    - Temporary access to a UAT environment
      - Access to the temporary UAT environment cannot exceed up to a four (4) week timeframe
    - A data testing checklist to guide users through the data validation process
    - Up to three (3) hours total of guided UAT sessions, typically weekly, to assist the customer in validating data
- **Customer Responsibility**
  - During the User Acceptance Testing (UAT) phase, the customer will be responsible for the following data validation activities:
    - Providing copies of data sources in flat file or Excel format, organized to one file per data element
    - Completion of the data validation worksheet
    - Any required data cleanup or data normalization

- The UAT phase of the project should be completed within twenty (20) business days from initial data load
    - Any required data cleanup or normalization not completed by the customer within the UAT time period can be manually completed by the customer directly in the application, but shall not influence any go-live or project timeline planning
    - Additional resources or services may be required to extend the duration of the UAT phase, if needed

Product Configuration

- **Core Setup**
    - SwiftComply will provide the following services:
        - Configuration of up to three (3) custom fields for each data table or report, including:
            - Locations
            - Assemblies
            - Contacts
            - Service Provider
            - Test Entry Screen
            - Test Report PDF
            - Survey Entry Screen
            - Survey Report PDF
            - Standard data entry screens and structure for reference:
                - Test Form Entry Screen
                - Test Form Output
                - Survey Entry Screen
                - Survey Entry Output
        - Configuration of a custom compliance period
        - Configuration of auto-accept rules
- **Communication Template Configuration**
    - SwiftComply will provide the following services:
        - Configuration of up to three (3) Standard Notice Workflows, such as:
            - First - 30 days before
            - Second - 1 day after
            - Third - 30 days after
            - Any additional Compliance Notice configuration will be the responsibility of the customer
                - Training on Compliance Notice configuration will be part of user training and onboarding
        - For Compliance Notice configuration, only standard Notice Merge Fields are supported

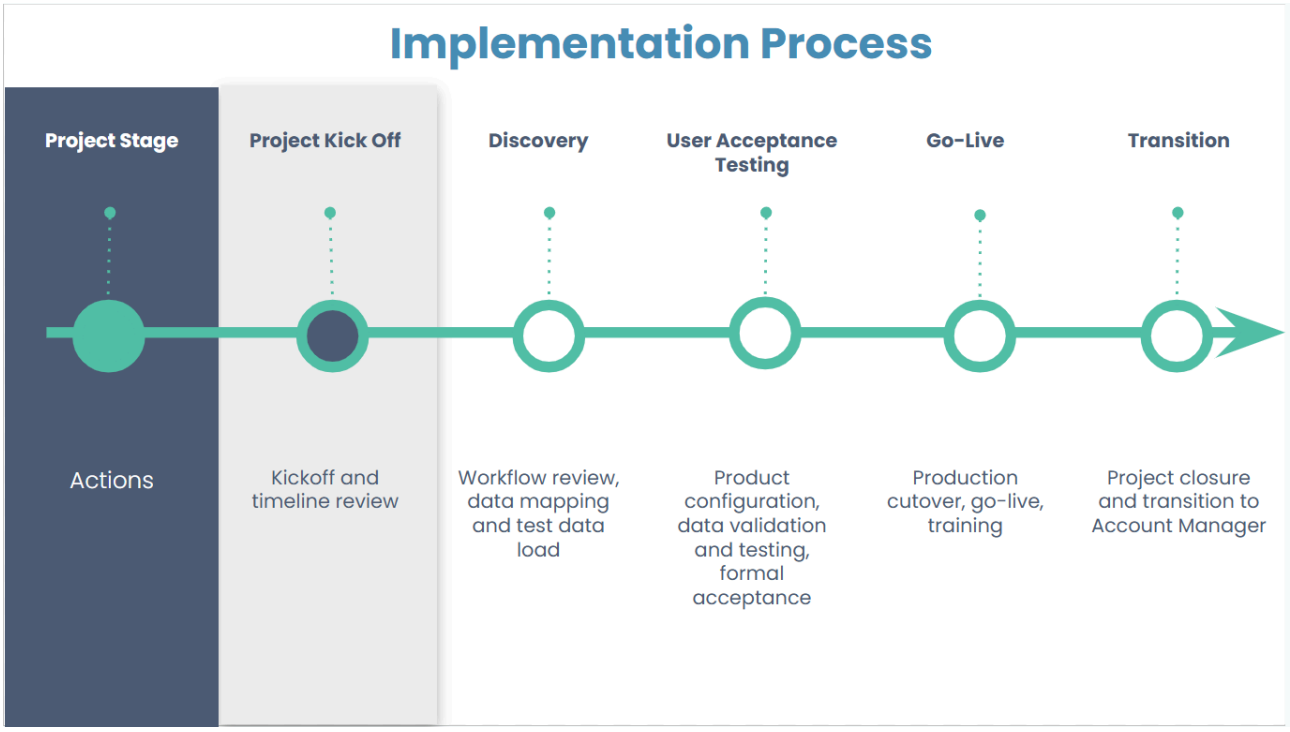
Project Management

- SwiftComply will provide the following project management services:
    - A project kickoff call to review scope, timeline, goals, roles and responsibilities
    - Weekly status meetings and project updates
    - A project closure and transition call to conclude formal delivery and transition to the ongoing account team

User Onboarding

- **Onboarding, Training, and Ongoing Support**
  - Upon formal acceptance exiting user acceptance testing, SwiftComply will migrate all relevant data and configurations to a production instance to support go-live and user onboarding
  - SwiftComply will provide the following services:
    - Up to four (4) one hour sessions for onboarding, training, and go-live support. Sessions can include:
      - Communications training
      - Tester Invite process and templates
        - The customer will be responsible for notification and communication with their actual testers.
      - Testing Report best practices
      - General product Q&A and refresher training
    - Access to Knowledge Base documentation and the SwiftComply Training Academy
  - Onboarding services must be rendered and accepted by the customer within a 45 day time period from the production cutover date

Implementation Process



Project Duration

- Implementation duration is generally around 4-6 weeks, dependent on customer availability and data readiness.

Roles	Key Responsibilities
SwiftComply Delivery Manager	• Oversees day-to-day project tasks, activities and schedule • Serves as the customer's primary point of contact throughout the duration of the project • Provides guidance, recommendations, and best practices • Builds and executes training and onboarding plan for the project
SwiftComply Delivery Engineer	• Provides guidance on data cleanup and manages configuration and migration into Testing and Production SwiftComply environments
SwiftComply Project Sponsor	• Serves as primary point of contact for project escalations and resolution • Provides leadership, guidance, and direction on overall project
Customer Technical Support	• Primary point of contact to retrieve data files of the existing program, including an initial and final data export • Assists with any required data cleanup as necessary
Customer Backflow Project Manager	• Primary point of contact for data testing, validation, and configuration of the backflow migration project • Serves as SwiftComply's primary point of contact throughout the duration of the project • Assists with any required data cleanup as necessary
Customer Project Sponsor	• Serves as primary point of contact for project escalations and resolution • Provides leadership, guidance, and direction on overall project

Change Orders

The following procedures will be used to handle any requested amendment or change to the above services that has a cost impact.

- "Change Order" will be used to communicate a change between the Parties. Each Change Order will describe the proposed change in written communication, including additional deliverables, cost impact, schedule impact, shared to all relevant parties.
- Change Orders are not binding unless and until they are signed by authorized signatories of both Parties.
    - For the avoidance of doubt, if a Change Order has a financial impact, then it must be associated with a signed Order.
- Any product functionality seen or discussed during product demonstrations that are not explicitly referenced above are excluded from the statement of work and may require additional scoping, if required.