

UTAH COUNTY
PUBLIC WORKS DEPARTMENT
2855 South State Street
Provo, Utah 84606
(801) 851-8600

INVITATION TO BID

For

**Utah County
6400 South Bridge Replacement
ITB # 2024-14**

CLOSING DATE
FOR RECEIPT OF BIDS: Tuesday, November 26, 2024

TIME: 2:30 p.m. (Mountain Time)
Bids will be opened at 2:45 p.m.

PLACE: Office of the Utah County Purchasing Manager
100 East Center Street
Room 3600
Provo, Utah 84606

NOTE: The Contractor is responsible for reading the contents of this bid, including but not limited to, the Scope of Work, General Requirements, Specifications, the Drawings, and Agreement. The Contractor is also responsible to visit the work sites before presenting a bid.



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1. INVITATION TO BID

1.1 INTENT

Through this Invitation to Bid (ITB), Utah County intends to select a qualified contractor to replace the existing bridge structure located in unincorporated Utah County where 6400 South crosses the Benjamin Slough in the Lake Shore area with a pre-cast 6' x 24' box culvert with headwalls, wing walls, and parapets and complete all detailed items as outlined in the specifications, specifications measurement and payments, and "6400 South Bridge Replacement 100% design" plans, herein referred to as (the Drawings), and all other general requirements included in or referenced in this ITB.

The Contractor shall furnish all labor, materials, transportation, tools, equipment, supplies, disposal fees, and other costs required to complete the work in accordance with the terms hereof.

Pursuant to this ITB an agreement will be executed, a sample copy of which is attached as Exhibit C. **The County will not entertain changes to its Standard Terms and Conditions.**

1.2 PROCEDURE

The procedure for response to this ITB, evaluation of bids, and selection of a Contractor is as follows:

- A. Interested entities will prepare and submit their bids prior to the specified Closing Date for Receipt of Bids.
- B. Utah County and/or its representatives will evaluate all submitted bids to determine acceptance or rejection of the bids.
- C. The selected bidder(s) will be required to sign an agreement, a sample of which is included as Exhibit C.

1.3 RULES OF PROCUREMENT

- A. This procurement shall conform to and is governed by The Utah County Division of Purchasing, Procurement Rules and Regulations.
- B. For this procurement, all bids must be submitted in the bid format outlined herein.
- C. All prospective bidders must meet the required criteria as of the date of submission.
- D. Respondents must provide all information requested in the Contractor Information Form.
- E. Utah County has established certain requirements with respect to bids to be submitted by respondents. The use of "shall", "must", or "will", in this ITB indicates a requirement or condition from which a material deviation will not be approved by Utah County.

1.4 BID ORGANIZATION

- A. Each respondent must submit its bid through the U3P website using the State's new Bonfire account. The bid must be submitted by Tuesday, **November 26, 2024 at 2:30pm.**

LATE BIDS WILL NOT BE ACCEPTED EXCEPT AS SET FORTH IN THE UTAH COUNTY PROCUREMENT POLICY.

- B. Please submit with the bid the documents listed below. Before a contract can be awarded, the selected contractor must provide all the documents listed below.
1. Completed Contractor's Cost Proposal (Attachment A).
 2. Completed Contractor Information Form (Exhibit A).
 3. Completed Certificate of Non-Collusion (Exhibit B).
 4. A copy of the bidder's current local business license.
 5. A copy of the bidder's current Contractor License issued by the Utah Department of Commerce, Division of Occupational and Professional Licensing.
 6. Proof of required insurance.
 7. Documentation from the County Treasurer of the bidder's county showing that bidder is current on its personal property taxes.

1.5 PROPRIETARY INFORMATION

The Contractor shall mark proprietary information contained in the bid which is not to be disclosed to the public or used for purposes other than the evaluation of the bids. Pricing and service elements of the successful bid will not be considered proprietary.

1.6 QUESTIONS AND CLARIFICATIONS

- A. All questions regarding this ITB must be submitted through the Utah Procurement Place (U3P) web site or to the Utah County Purchasing Manager, Robert Baxter, at RobertB@utahcounty.gov. The deadline for submission of questions is two business days prior to the closing date.
- B. Bidders are urged and expected to inspect the site where services are to be performed and to satisfy themselves as to all general and local conditions that may affect the cost of performance of the Agreement, to the extent such information is reasonably obtainable. In no event will a failure to inspect the site constitute grounds for withdrawal of a bid after opening, or for a claim after award of the agreement.

1.7 ACCEPTANCE OF BID

- A. Utah County reserves the right to reject any or all bids or waive minor irregularities when to do so would be in the best interests of Utah County. Minor irregularities are those which will not have a significant adverse effect on overall competition or performance levels.

responding party for any costs or expenses incurred in connection with this ITB, or such party's response.

1.8 DISQUALIFICATION OF BID

The occurrence of any of the following may result in disqualification of a bid:

- A. Failure to respond within the established timetable.
- B. Failure to completely answer all questions presented in the ITB.
- C. Use of any other type of form or format other than those indicated in the ITB.
- D. Failure to provide requested documentation at the time of bid submission.
- E. Illegible responses.
- F. If the bidder adds any provisions reserving the right to accept or reject an award, or to enter into an agreement pursuant to an award, or any other unauthorized conditions, limitations or provisions.
- G. If the bidder is unable to evidence a satisfactory record of integrity.
- H. If the bidder is not qualified legally to contract.
- I. If the bid at the opening does not contain a signed bid, and a signed certificate of non-collusion.
- J. Utah County reserves the right to reject any or all bids.

1.9 DISPOSITION OF BIDS

All bids (and the information contained therein) shall become the property of Utah County. No bid shall be returned to the respondent regardless of the outcome of the selection process.

1.10 INTERPRETATION OF ITB

The invalidity of any portion of this ITB shall not prevent the remainder from being carried into effect. Whenever the context of any provision shall require it, the singular number shall be held to include the plural number, and vice versa, and the use of any gender shall include all genders. The paragraph and section headings in this ITB are for convenience only and do not constitute a part of the provisions hereof.

1.11 REQUIRED EXPERIENCE

- A. The Contractor must have a minimum of three (3) years' experience in the work specified herein. Proof of experience must be submitted with each bid.
- B. The Contractor shall provide a list of at least three (3) projects similar to Utah County's as set forth herein, including contracting agency and contact information for each.
- C. The Contractor shall be the general contractor for the project and is required to have a current local business license from the jurisdiction in which their business is located. A copy of the bidder's current local business license must be submitted with the bid.

1.12 EVALUATION CRITERIA

All bids will be evaluated by authorized representatives of Utah County for compliance with the terms and conditions contained in this ITB, and the resulting agreement awarded to the lowest responsive and responsible bidder. Utah County reserves the right to award to more than one Contractor if it is in the best interest of the County.

1.13 GENERAL

- A. Utah County will award a contract in reliance upon the information contained in bids submitted in response to the ITB. Utah County will be legally bound only when and if there is a signed agreement entered into between Utah County and the awarded bidder(s).
- B. It is vitally important that any person who signs a bid or agreement on behalf of a respondent certifies that he or she has the authority to so act. The bidder who has its bid accepted may be required to answer further questions and provide further clarification of its bid and responses.
- C. Receiving this ITB or responding to it does not entitle any entity to participate in services or transactions resulting from or arising in connection with this ITB. Utah County shall have no liability to any person or entity under or in connection with this ITB, unless and until Utah County and such person have executed and entered into an agreement pursuant to the terms of this ITB.
- D. By responding to this ITB each responding party acknowledges that neither Utah County nor any of its representatives is making or has made any representation or warranty, either express or implied, as to the accuracy or completeness of any portion of the information contained in this ITB. The responding party further agrees that neither Utah County nor any of its representatives shall have any liability to the responding party or any of its representatives as a result of this ITB process or the use of the information contained in this ITB. Only the terms and conditions contained in an agreement when, as, and if executed, and subject to such limitations and restrictions as may be specified therein, may be relied upon by the respondent in any manner as having any legal effect whatsoever.

1.14 BONDS

- A. Before this contract is awarded by Utah County, the Contractor shall furnish to Utah County the following bonds:
 - 1. A performance bond satisfactory to County in an amount equal to 100% of the price specified in the contract, to assure the faithful performance of the contract, for the protection of Utah County, to be held until final acceptance by Utah County of all aspects of this project; and
 - 2. A payment bond satisfactory to the County in an amount equal to 100% of the price specified in the contract, for the protection of each person supplying labor, service, equipment, or material for the performance of the work provided for in the contract.
- B. Each bond shall be:

1. Binding upon the award of the contract.
 2. Executed by a surety company or companies duly authorized to do business in the State of Utah, or, in the form or cash or other certified funds.
 3. Payable to Utah County, A Body Corporate and Politic.
 4. Filed with the Utah County Public Works Department in a timely manner following the Closing date for Receipt of Bids.
 5. Increased if the contract price is increased by change order or otherwise subsequent to entering into the contract.
- C. Utah County will hold the Payment Bond for 90 days subsequent to the completion of the project.

GENERAL REQUIREMENTS

Alteration of Plans or Character of Work

The County Commission, after recommendation by the County Public Works Director, reserves the right to make at any time during the progress of the work, such increases or decreases in quantities and such alterations in the details of construction, and the elimination of one or more items as may be found necessary or desirable. Such alterations shall not be considered as a waiver of, nor release of, the surety. The Contractor agrees to accept the work as altered the same as if it had been a part of the original Agreement. The Contractor shall proceed with the work alterations when ordered in writing. **Financial increases to this Agreement must be approved in writing by the County Commission before additional work is authorized and constructed.**

Brand Name

The use of brand names in the Specifications is for the purpose of designating the standard of quality, performance, and characteristics desired. Equivalent brand substitutions for products must be approved by Utah County.

Change Orders

Utah County may at any time, without notice to any sureties, by written order designated or indicated to be a change order, make changes to the work within the general scope of the contract, and to the contract amount and/or contract deadlines.

The overhead, profit, and commission fees included in any change order bid shall not exceed the maximum percentages of the net cost of the bid as shown in the following table:

	Overhead & Profit	Commission
To prime Contractor on work performed by subcontractors	0%	10%
To prime Contractor or subcontractor for that portion of work performed with their respective forces	10%	0%

Only the Contractor or subcontractor who actually performs or furnishes the work may charge for overhead or profit regardless of the number of tiers of subcontractors, that is, the markup on work subcontracted by a subcontractor will be limited to one charge of 10% for overhead and profit and one charge of 10% for the prime Contractor's commission.

Overhead and profit includes but is not limited to:

- A. Estimating.
- B. Field supervision above foreman level superintendents, assistant superintendents, general foremen, engineers, accountants, timekeepers, office manager, and other staff.
- C. Office supplies.
- D. Drinking water.
- E. Temporary heat, light, and power.
- F. Field toilets.
- G. Small tools.
- H. Other costs of materials and/or equipment associated with performance of the contract.

On bids covering both increases and decreases in the contract amount, the overhead and profit shall be computed on the net change only.

Each change order shall be signed by the Contractor, the County Public Works Director, and the County Commission, and payment and performance bonds shall be increased by the Contractor to reflect any increase to the contract amount before the Contractor will be authorized to proceed with the work specified therein.

Failure of Contractor and the County to agree on an adjustment of contract amount or contract deadlines shall not excuse Contractor from proceeding with prosecution and performance of work. Contractors, subcontractors, and suppliers shall handle all disputes in a manner which will permit work to proceed on schedule while the matter in dispute is being resolved.

The County shall have the right, within its sole discretion, to require Contractor to commence performance of changes to work based on County requirements prior to the submission of a cost bid by the Contractor to the County, or approval of the cost bid by the County. In such case, Contractor shall proceed with the work so changed upon receipt of a Construction Change Directive from the County, and thereafter submit to the County as soon as possible any cost bid required.

Completion Date

The completion date for the 6400 South Bridge Replacement is on or before May 16, 2025, regardless of weather conditions and other related problems. If the Contractor fails to complete the work on or prior to the completion date, or by extension of time granted by the County in writing, then the Contractor may forfeit his or her 5% payment retainer and shall in addition be liable for all additional costs and damages incurred by Utah County as a result of the failure of completion.

If abnormal weather conditions or other natural events totally beyond the control of the Contractor require, in the judgment of the County, an extension of the completion date, written authorization must be given by the County for such specific extension.

Liquidated Damages

It is agreed by the parties to this Agreement that in case all the work called for in accordance with this Agreement is not completed before or upon the Completion Dates set forth in this Agreement, damage will be sustained by Utah County, and that it is and will be impracticable to determine the actual damage which Utah County will sustain in the event of and by reason of such delay. It is therefore agreed that the Contractor will pay to Utah County **\$1860.00 per day** for each calendar day between the Completion Date required herein for any specific roadway and the date of final acceptance thereof by Utah County, as liquidated damages and not as penalty. It is further agreed that the amounts stipulated are reasonable estimates of the damages that would be sustained by Utah County and the Contractor agrees to pay such liquidated damages as herein provided. In case the liquidated damages are not paid, the Contractor agrees that Utah County may deduct the amount thereof from any money due to or that may become due to the Contractor by progress payments or otherwise in accordance with the terms of this Agreement, or if said amount is not sufficient, recover the total amount.

The Contractor will not be assessed with liquidated damages during any delay in the completion of the work caused by acts of God, acts of criminals, acts of Utah County, acts of the public utilities, fire, floods, epidemics, quarantine restrictions, labor strikes that delay the critical sequence of the work, and unusually severe weather or delays of subcontractors due to such causes, provided that Utah County is notified in writing of the causes of such delay.

Cooperation

Utah County intends to encourage cooperation with the Owner, Engineers, Supplier, Contractor and its subcontractors. The objectives are effective and efficient agreement performance, intended to achieve completion within budget, on schedule, and in accordance with the Drawings and Specifications.

Alternative Dispute Resolution (ADR) methodologies will be encouraged in place of the more formal dispute resolution procedures. ADR in this context is intended to be a voluntary, non-binding procedure available for use by the parties to this Agreement to resolve any dispute that may arise during performance.

Delivery/Shipping

The Contractor/Supplier shall be responsible for all delivery, shipping, transportation, and handling charges and shall include these costs in the bid schedule. Delivery and Shipping costs will not be paid as a separate line item

Extra Work

If extra work, as defined in the Utah County Standard Terms and Conditions, is authorized by the Utah County Commission in writing, payment for authorized extra work will be made by either of the following methods, as determined by the County:

1. Reimbursement for all direct and substantiated costs of labor, materials, supplies and equipment use, plus 10% to cover all indirect costs, overhead and profit; or
2. A lump sum, agreed to prior to beginning the extra work, to cover all of the items authorized in writing by the County.

Inspection

Testing or work to determine contract compliance shall be performed by the Contractor. Such testing shall comply with American Public Works Association (APWA) standards for all applicable materials and placement of those materials. Copies of test results must be provided to, and approved by, the County Project Manager prior to final acceptance of project.

Final acceptance and inspection of completed work shall be performed by the County Project Manager.

Insurance

The insurance required by the Utah County Standard Terms and Conditions shall name "Utah County, 100 East Center, Provo, Utah 84606" as a Certificate Holder.

The Contractor shall file all required certificates of insurance with the Utah County Public Works Department in a timely manner following the Closing Date for Receipt of Bids and prior to commencing any work.

Keys

If it becomes necessary for the County to issue the Contractor a key to County locks, final payment to the Contractor will be held until the key has been returned and documented. It is illegal to duplicate County keys.

Legal

The Contractor shall be responsible to provide all legal support for the project including but not limited to the preparation of contracts with subcontractors.

License

The Contractor shall have a current "Business License", issued by the county or city in which the Contractor's business is located, and shall provide proof of such license prior to the commencement of said work.

The Contractor shall be a licensed "General Contractor" through the State of Utah, Utah Division of Occupational and Professional Licensing, to perform construction work in this State. The Contractor shall provide proof of such license prior to the commencement of said work.

Payment

Payment shall be required in the manner prescribed in the Utah County Standard Terms and Conditions. All bills must be signed and dated by both the Contractor and the County Project Manager before the payment process can commence. Each bill shall itemize the work performed and shall show progress of the work that can be verified. Actual payment will be based upon inspection by the County Project Manager who will certify that the work has been performed in a workmanlike manner. **In accordance with Utah Code §13-8-5, Utah County may retain five percent (5%) of all payments to the Contractor or such other sums as authorized thereby until the end of the project.** Final payment of any sums retained will be paid thirty (30) days after request after approval of work by final inspection.

The County Project Manager will decide all questions which may arise as to the quality, quantity, and acceptability of materials furnished and work performed, and as to the rate of progress of work. He will also decide all questions which may arise as to the acceptable fulfillment of the Agreement on the part of the Contractor.

Payments may be withheld from the Contractor by the County in order to protect or offset the County from loss due to:

- A. Defective work not remedied.
- B. Liens or claims filed or reasonable evidence of probable filing.
- C. The Contractor's failure to promptly pay subcontractors for labor and/or materials accepted by the Contractor.
- D. The County's reasonable doubt that the project can be completed for the unpaid balance of the contract price.
- E. Damage to another contractor.
- F. Failure to maintain scheduled progress.
- G. Any other failure of the Contractor which results in liability for the County.

Safety Requirements

In order to protect the life and health of employees and the general public in the performance of this Agreement, the Contractor shall comply with the general safety orders covering Utah industries, issued by the Industrial Commission of Utah and Occupational Safety and Health Act of 1970. Nothing in the Agreement shall relieve the Contractor of responsibility assigned in the Specifications, State Industrial Commission's requirements, or state and local laws and ordinances.

The Contractor agrees to hold Utah County and the County's Engineer free and harmless from any and all damages/claims that may occur during the construction operations of this Agreement. The Contractor shall assume sole liability for any injuries or damages caused to a third party as a result of fulfillment of this Agreement and construction operations.

The County Public Works Director or the County Project Manager will have the authority by written order to suspend work wholly or in part due to the failure of the Contractor to correct conditions unsafe for the workmen or general public; for failure to carry out provisions of the Agreement; for failure to carry out orders; for such periods as he may deem necessary due to

unsuitable weather, for conditions considered unsuitable for the progress of the work, or for any other condition or reason deemed to be in the public interest. Written orders shall state the reason for suspension.

Sales Tax

The Contractor shall be responsible for including in their bid schedule, not as a separate line, any sales tax charges for products, materials, or other items that the Contractor will be purchasing. The Contractor will not be allowed to use the County's sales tax exemption number to purchase products, materials or other items that the Contractor will be installing as part of the agreement on the County's behalf.

Supervision of Work

The County Public Works Director shall have full supervisory powers in determining the extent of the construction on the project. Compensation shall be based upon logbooks maintained by the County Project Manager as a percentage of work completed and payment terms described under General Requirements. All decisions concerning the extent and acceptability of the work and the quality of all materials shall rest solely with the County Public Works Director.

Surveying

The Contractor shall be responsible for all construction staking.

The Contractor will be responsible for furnishing, maintaining, or restoring all survey monuments and reference marks within the project site. Contact the County Surveyor to obtain permits for section corners and monuments before any work begins.

Utilities

Care shall be taken to preserve and protect existing overhead and underground utilities, pole lines, signs, pipelines, and improvements from injury or damage during construction operations. The Contractor shall assume full responsibility for reimbursing the owners of the utilities for any damage to their properties, utilities, or improvements, or interference with their service caused through Contractor's operations at no additional cost to the County. **The Contractor shall contact "Blue Stakes of Utah,"** and individual utility owners as necessary, to have all underground utilities located on the work site in accordance with Utah law.

The Contractor shall be responsible to protect in place all utilities shown or not shown on this plan.

The Contractor shall be responsible for providing all water, power, sanitary facilities, and telephone services as required for the Contractor's use during construction.

STATEMENT OF APPLICABLE STANDARDS

All work performed by the Contractor shall meet or exceed all applicable specifications listed in the publications American Public Works Association – Manual of Standard Specifications and Manual of Standard Plans, 2017 edition, published by the Utah Chapter of the American Public Works Association, hereinafter referred to as “APWA Standard Specifications and Standard Plans.” All work performed by the Contractor shall also comply in every respect with the specifications and plans referred to as “6400 South Bridge Replacement 100% design” (the Drawings), which are attached hereto and incorporated herein by this reference. Where conflicts arise, the most stringent code will apply.

Where the plans or specifications describe portions of the work in general terms but not complete detail, it is understood that only the best general practice is to prevail and that only materials and workmanship of the first quality are to be used.

It is intended that these plans and specifications require all labor and materials necessary and proper for the work contemplated and that the work be completed in accordance with their true intent and purpose. The Contractor shall notify the County Project Manager immediately regarding any discrepancies or ambiguities which may exist in the plans or specifications. The County Project Manager’s interpretation thereof shall be conclusive.

ATTACHMENT A
CONTRACTOR'S BID SCHEDULE

Company Name: _____
 Address: _____
 City, State, Zip: _____
 Phone: _____

B.1. BID PRICE:

Each Bidder shall complete the line-item cost summary below. The specified "Total Cost" shall become the bidder's "Total Bid Price" for completion of this project.

6400 South Bridge Replacement

Item	APWA	DESCRIPTION	Unit	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT
A-1	01 71 13	Mobilization & Demobilization	Lump	1		
A-2	01 55 26	Traffic Control	Lump	1		
A-3	01 57 00	Construction Erosion Control / SWPP	Lump	1		
A-4	01 71 23	Construction Survey	Lump	1		
A-5	31 11 00	Site Clearing	Lump	1		
A-6		Quantity Control / Test	Lump	1		
A-7		Site Restoration	Lump	1		
A-8	02 41 13	Remove Existing Sign	Each	4		
A-9		Remove Existing Guardrail	Feet	81		
A-10		Remove Existing Bridge Structure	Lump	1		
A-11	02 41 13	Remove Existing Fence	Feet	115		
A-12	02 41 14	Remove Asphalt Pavement	Sq Ft	6337		
A-13		Construct Public Assess Point	Each	4		
A-14		Channel Dredging	Cu Yd	117		
A-15		Culvert Construction Bypass and Dewatering	Lump	1		
A-16		6'x24' Box Culvert	Feet	71		
A-17		Wingwalls & Headwalls w/Parapet (one side)	Each	2		
A-18		Concrete Apron and Cut Off Wall	Lump	1		
A-19	31 23 16	Roadway Excavation (Plan Quantity)	Cu Yd	716		
A-20	32 05 10	Roadway Embankment (Plan Quantity)	Cu Yd	928		
A-21	31 23 23	Structural Fill (Plan Quantity)	Cu Yd	342		
A-22	31 05 19	Soil Stabilization	Cu Yd	140		
A-23	32 11 23	Untreated Base Course (Plan Quantity)	Cu Yd	171		
A-24	32 12 16.13	Hot Mix Asphalt	Ton	180		
A-25	31 37 00	12 Inch Rip-Rap	Sq Ft	831		
A-26		Field Fence	Feet	88		
A-27		Mammal Ledge	Cu Yd	26		
					TOTAL COST:	

NOTE: The quantities specified herein are only estimates used for bid evaluation purposes. Actual payment will be based upon inspection records kept by the County, and the actual work completed, approved, and accepted by the County.

B.2 CERTIFICATION

I hereby certify that I have read, understand, and agree to all sections, Exhibits, Addenda, and Attachments of this Invitation to Bid for 6400 South Bridge Replacement. I further certify that the information submitted by me/my company in response to this Invitation, including the pricing and other information, is true and accurate.

I understand that Utah County has the right to reject any or all bids, to waive minor irregularities when to do so would be in the best interests of Utah County, and to negotiate a price for the proposed services as determined to be in the best interest of Utah County.

Signature

Title

Name (please print)

Date

ATTACHMENT B

SPECIFICATIONS

SECTION 01 11 00 SUMMARY OF WORK

PART 1 GENERAL

The Contractor shall carefully read all notes and specifications. The Contractor shall be satisfied as to the true meaning and intention and shall be responsible for complying with each.

1.1 GENERAL NOTES

Manufacturing and delivery times are a critical part of the project schedule and will be a consideration in awarding of the project.

1.2 APWA STANDARDS SPECIFICATIONS

- A. All work performed by the Contractor shall meet or exceed all applicable specifications listed in the publications American Public Works Association – Manual of Standard Specifications and Manual of Standard Plans, 2017 edition, published by the Utah Chapter of the American Public Works Association, hereinafter referred to as “APWA Standard Specifications and Standard Plans.” All work performed by the Contractor shall also comply in every respect with the specifications and plans “6400 South Bridge Replacement” (the drawings), which are attached hereto and incorporated herein by this reference. Where conflicts arise, the most stringent code will apply.
- B. Where the plans or specifications describe portions of the work in general terms but not complete detail, it is understood that only the best general practice is to prevail and that only materials and workmanship of the first quality are to be used.
- C. It is intended that these plans and specifications require all labor and materials necessary and proper for the work contemplated and that the work be completed in accordance with their true intent and purpose. The contractor shall notify the project manager immediately regarding any discrepancies or ambiguities which may exist in the plans or specifications. The project manager's interpretation thereof shall be conclusive.

1.3 SAFETY

The Contractor shall comply with all applicable requirements of the Utah Labor Commission and the Occupational Safety and Health Act of 1970. Nothing in this Agreement shall relieve the Contractor of responsibility assigned herein, in Utah Labor Commission's requirements, or in Federal, state, and local laws and ordinances.

1.4 UTILITIES

- A. Care shall be taken to preserve and protect existing overhead and underground utilities, pole lines, signs, pipelines, and improvements from injury or damage during construction operations. The Contractor shall assume full responsibility for reimbursing the owners of the utilities for any damage to their properties, utilities, or improvements, or interference with their service caused through Contractor's operations at no additional cost to the County. The Contractor shall contact “Blue Stakes of Utah,” and individual utility owners as necessary, to have all underground utilities located on the work site in accordance with Utah law.
- B. The Contractor shall be responsible to protect in place all utilities shown or not shown on

this plan.

- C. The Contractor shall be responsible to provide all water, power, sanitary facilities and telephone services as required for the contractors use during construction.

1.5 PERMITS

The contractor must obtain all the necessary permits and agreements and pay all applicable fees prior to any construction activities. Contact Utah County Public Works, UDOT, and other applicable agencies for permits and inspections required for any work conducted within Utah County's public right-of-way and utility easements.

1.6 CONSTRUCTION STAKING

- A. The contractor shall be responsible for all construction staking.
- B. The contractor will be responsible for furnishing, maintaining, or restoring all survey monuments and reference marks within the project site. Contact the county surveyor to obtain permit for section corners and monuments before any work begins.

1.7 DUST CONTROL

Dust control shall be provided at all times, at the Contractor's expense, to minimize any dust nuisance and shall be in accordance with APWA specification 01 57 00. The contractor is responsible for any costs for the use of city water.

1.8 TESTING

The Contractor is responsible for providing soil, base aggregate and hot mix asphalt compaction testing. A certified technician must be onsite at all times during fill operations. Copies of soil compaction test results must be provided to, and approved by, the Project Manager prior to placement of base aggregate. Copies of base aggregate compaction test results must be provided to, and approved by, the Project Manager prior to placement of hot mix asphalt. Copies of hot mix asphalt compaction test results must be provided to and approved by the Project Manager prior to final acceptance of project.

1.9 OTHER

- A. The Contractor shall be held responsible for any field changes made without prior written authorization from the owner, project manager, and/or any regulatory agency.
- B. The Contractor shall attend all preconstruction and construction conferences and weekly meetings.
- C. The contractor agrees to:
 - 1. Be responsible to remove and dispose of all trash, scrap and unused material at their own expense in a timely manner.
 - 2. Be responsible to maintain the site in a neat, safe and orderly manner at all times.
 - 3. Be responsible for their own safety, traffic control, permits, retesting and re-inspections at their own expense.
 - 4. Unless otherwise noted all excess soils and materials shall become the property of the contractor and shall be lawfully disposed of offsite at the Contractor's expense.
 - 5. Immediately remove any construction debris or mud tracked onto existing roadways.
 - 6. Repair any excavation or pavement failures caused by his construction.

SECTION 01 65 00
PRODUCT DELIVERY AND HANDLING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Basic requirements for product delivery and handling on site.

1.2 DELIVERY

- A. Arrange for delivery of products in accordance with progress schedule to facilitate instruction before installation.
- B. Coordinate deliveries to avoid conflict with work, conditions at site, and:
 - 1. Work of separate contractors, or OWNER.
 - 2. Limitations of storage space.
 - 3. OWNER's use of premises.
- C. Deliver products in undamaged condition in original containers or packaging, with identifying labels for handling, storing, unpacking, protecting and installing intact and legible.
- D. Partial deliveries of component parts of equipment shall be clearly marked to identify the equipment, to permit easy accumulation of parts, and to facilitate assembly.
- E. Immediately upon delivery, inspect shipment to determine:
 - 1. Product complies with requirements of Contract Document
 - 2. Reviewed submittals.
 - 3. Quantities are correct.
 - 4. Containers and packages are intact, labels are legible.
 - 5. Products are properly protected and undamaged.

1.3 PRODUCT HANDLING

- A. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction space.
- B. Coordinate delivery with installation time to ensure minimum holding time for items that are hazardous, easily damaged, or sensitive to deterioration, theft and other losses.
- C. Handle products to prevent bending or over-stressing.
- D. Lift heavy components at designated lifting points.
- E. Discard damaged products.

1.4 ACCESS

- A. Identify access to CONTRACTOR's work and office area by use of signs so agents, delivery trucks, and other parties desiring contact with CONTRACTOR may do so.
- B. In security zones, prevent unauthorized personnel from proceeding outside of CONTRACTOR's work and office areas.

END OF SECTION

PRECAST CONCRETE BOX AND THREE-SIDED CULVERT STRUCTURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Material and procedures for fabricating and installing single cell precast concrete box culverts, multi-cell precast concrete box culverts, precast conventionally reinforced concrete three-sided culvert structures, and ancillary appurtenances such as cutoff walls, aprons, footings, floor slabs, headwalls and wing walls.

1.2 REFERENCES

- A. AASHTO LRFD Bridge Design Specifications
- B. ASTM C150: Standard Specification for Portland Cement
- C. ASTM C877: External Sealing Bands for Concrete Pipe, Manholes, and Precast Box Sections
- D. ASTM C990: Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
- E. ASTM C1504: Manufacture of Precast Reinforced Concrete Three-Sided Structures for Culverts and Storm Drains
- F. ASTM C1577: Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers Designed According to AASHTO LRFD.
- G. OSHA

1.3 SUBMITTALS

- A. Detailed plans including culvert sizes and wall widths, line layout, joint details and lifting devices.
- B. Structural calculations for the precast element. ASTM C1577 steel areas may be used for box culverts without providing supporting calculations. For special designs, for sizes and loads other than those shown in Table 1 of ASTM C1577, engineering calculations will be required. Eriksson Culvert software design calculations may be submitted for approval of steel areas for box culverts.
- C. For Three Sided Structures, design the structure in compliance with AASHTO LRFD Bridge Design Specifications, Section 12. Computer aided design calculations may be submitted. Design for HL-93 live loading.
- D. Provide the seal of a Professional Engineer (PE) licensed in the appropriate state on drawings and supporting engineering calculations.
- E. Allow the Engineer up to seven calendar days to review and approve working drawings and supporting engineering calculations.
- F. Foundation material gradation (for over excavation replacement), bedding material gradation or leveling course gradation will be submitted for the Engineers approval.

PART 2 PRODUCTS

2.1 CONCRETE

- A. Provide strength and size of the culvert or structure.
- B. Use ASTM C150, ASTM C1157, or ASTM C595 cement unless otherwise specified.
- C. Meet the concrete performance requirements per the appropriate manufacturing specification, either ASTM C1577 or ASTM C1504.

2.2 REINFORCING

- A. Use steel bars or steel welded wire.

2.3 JOINTS

- A. Use tongue and groove joints with a bituminous mastic joint sealant that meets the requirements of ASTM C990.
- B. Use a mastic joint sealant with a minimum cross-sectional area of 1 to 1½ square inches.
- C. Joint wrap is not required. Use ASTM C877 if joint wrap is specified.
- D. Mortar grout is not required.

2.4 LIFTING DEVICES

- A. Provide the number and type of lifting devices required to support the vertical and horizontal forces
 - 1. Use at least four lifting devices for box culvert and three-sided structures.
 - 2. Use a minimum safety factor of 4:1 for lifting inserts used in handling and erection of precast concrete box culverts and three-sided structures.
 - 3. Attach to lifting inserts according to manufactures recommendations.
 - 4. Use a maximum diameter of 3 inches when lifting holes are used. Locate holes to avoid interference with the reinforcing steel.

2.5 MANUFACTURE

- A. Precast Concrete Box Culverts:
 - 1. Meet the requirements in ASTM C1577.
 - 2. Special designs for sizes and loads other than those shown in Table 1 of ASTM C1577 require approval by the Project Manager.
 - 3. Prepare special designs according to AASHTO LRFD Bridge Design Specifications, Section 12.
- B. Precast Concrete Three-Sided Structures:
 - 1. Meet the requirements in ASTM C1504 with the following exceptions:
 - a. Design the structure in compliance with AASHTO LRFD Bridge Design Specifications, Section 12.
 - b. Design for HL-93 live loading.

2.6 QUALITY ASSURANCE

- A. Manufacture of pre-cast concrete box and three-sided culvert section must be completed in a plant where the quality assurance program has been certified by either the American Concrete Pipe Association (for box culverts) or the National Precast Concrete Association (for three sided structures).
- B. Permanently mark each precast unit with date of casting and supplier identification.
- C. Prevent cracking or damage during shipping, handling and storage of precast units.
- D. Replace or repair, cracked or damaged precast units at no additional cost to the Owner.

2.7 CONNECTION TO CAST-IN-PLACE CONCRETE

- A. Project the reinforcing steel at least 12 inches out of the precast box section and square off the concrete face where precast box sections join cast-in-place concrete.

END OF SECTION

**SPECIFICATIONS
MEASUREMENT & PAYMENT**

A-1	MOBILIZATION & DEMOBILIZATION (LUMP)	APWA 01 71 13
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- A. Measurement shall be made for the job completed.
- B. Payment includes all cost of mobilization, installation of all temporary facilities and bringing all necessary construction equipment to the site. Also includes any and all temporary facilities including but is not limited to water, power, fencing (permanent or temporary), fence removal as required, solid waste disposal, sanitation facilities, and any other temporary facilities or utilities, etc., and any and all permits required, and all other items not covered in other bid items. Mobilization cost for subcontracted work shall be considered to be included in the contract lump sum price bid by the Contractor.

A-2	TRAFFIC CONTROL (LUMP)	APWA 01 55 26
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- A. Measurement shall be made for the job completed.
- B. Payment includes all cost of creating a traffic control plan acceptable to Utah County, Public Works Department for vehicular, bicycle and pedestrian protection from work zone, and certified traffic control technician.
- C. Materials shall conform to Section 01 55 26 and to the "Manual on Uniform Traffic Control Devices" (MUTCD).

A-3	CONSTRUCTION EROSION CONTROL / SWPP (LUMP)	APWA 01 57 00
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- A. Measurement shall be made for the job completed.
- B. Payment includes all cost associated with preparation and implementation of storm water pollution prevention plan (SWPPP) acceptable to OWNER's Inspector throughout the project and obtaining the Utah Pollutant Discharge Elimination (UPDES) Storm Water General permit. This includes, but is not limited to, inlet barriers, check dams, silt fence, fiber rolls, street sweeping, etc.
- C. This item also includes dust control measures during the project such as brine (mag) treatments, watering, mill tailings, etc.

A-4	CONSTRUCTION SURVEY (LUMP)	APWA 01 71 23
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- A. Measurement shall be made for the job completed.
- B. Payment includes all cost for labor, materials, stakes, hubs, equipment and incidentals to provide construction survey, layout, and as-constructed information.
- C. Use a survey crew measured by the hour and approved if extra survey work is directed. The County makes no additional payment for travel time to and from the project.
- D. Directed survey work is paid for in the accepted quantities if needed and approved at a standard negotiated rate.

A-5 SITE CLEARING (LUMP)**APWA 31 11 00**

- A. Measurement shall be made for the job completed.
- B. Payment includes all cost for labor, products, tools, equipment, transportation, services, disposal cost, and incidentals; vegetation, small tree removal including branches, trunk, foliage, stump, and root system to at least 2 ft below the finished ground level, and within limits of construction (less than 20 inch circumference measured at a point 2 feet above the existing ground), shrub removal, planting removal, irrigation removal, and miscellaneous items less than 10 feet square.

A-6 QUANTITY CONTROL / TESTING (LUMP)

- A. Measurement shall be made for the job completed.
- B. Payment for this item shall be considered compensation in full for all subcontractors, labor, materials and equipment necessary to verify and ensure the quality of the installed project including in part proctor, gradation, CBR values. Includes bacteriological and pressure testing. Includes compaction testing of the; trenches, buried structures, untreated base course and granular borrow. Includes asphalt density, asphalt core samples of the asphalt and other testing required in the APWA 2017 Standard Specifications, and in accordance with the design drawings, and where not covered under separate items.

A-7 SITE RESTORATION (LUMP)

- A. Measurement shall be made for the job completed.
- B. Payment includes covers cost of protecting, watering, and/or maintaining any landscaping within the County right of way or within private property (sod, shrubs, flowers, etc.) where existing irrigation systems are impacted by the work throughout construction to avoid damage. Replace in kind any dead or damaged landscape resulting from failure to protect, water, or otherwise maintain it at no additional cost to the Owner.

A-8 REMOVE EXISTING SIGN (EACH)**APWA 02 41 13**

- A. Measurement will be made by each.
- B. Payment includes all cost to remove and salvage existing sign panel and post undamaged, and to remove post foundations. Cost includes all labor, equipment, backfill, compaction, and incidental items to remove and salvage sign to OWNER. Contractor is to coordinate with the OWNER for signs that are to be salvaged to the OWNER.

A-9 REMOVE EXISTING GUARDRAIL (FEET)

- A. Measurement will be made by linear feet of guardrail removed.
- B. Payment includes all cost to remove and dispose of existing guardrail. Cost includes all labor, equipment, backfill, compaction, and incidental items to remove guardrail.

A-10 REMOVE EXISTING BRIDGE STRUTURE (LUMP)

- A. Measurement shall be made for the job completed.
- B. Payment includes all cost to remove and dispose of existing bridge structure. Cost

includes all labor, equipment, backfill, compaction, and incidental items to remove bridge structures.

A-11 REMOVE EXISTING FENCE (FEET)

APWA 02 41 13

- A. Measurement will be made for linear feet of fence removed.
- B. Payment includes all cost to remove and dispose of existing fence. Cost includes all labor, equipment, and incidental items to remove a chain link fence, including backfill and compaction of any voids.

A-12 REMOVE ASPHALT PAVEMENT (SQ FT)

APWA 02 41 14

- A. Measurement will be made by square foot of asphalt removed.
- B. Payment includes all cost to remove and dispose of existing asphalt as shown on the plans. No price adjustment will be made for thickness.
- C. Asphalt is to be sawcut to full depth. Sawcut will be considered incidental to this item.

A-13 CONSTRUCT PUBLIC ACCESS POINT (EACH)

- A. Measurement will be made by each.
- B. Payment includes all cost of labor, equipment, and materials to install a public access point consistent with existing conditions.

A-14 CHANNEL DREDGING (CU YD)

- A. Measurement will be made by the cubic yard plan quantity in place. No adjustment to quantities if staked quantities differ by 5 percent or less.
- B. Payment includes cost to remove material below existing ground to proposed flow line in Benjamin Slough, and to haul and dispose of excavated material from the work site to a location chosen by Contractor. Excavation at the entrance and outfall of the culvert is also included in this pay item.
- C. Excavated material can NOT be used as embankment material.
- D. Excavation done for Contractor's benefit or excavation error, dewatering of excavation, slough, or over excavation is incidental work.
- E. Contractor to complete topography surveys to determine material quantities at pre-disturbance, post clearing and grubbing, and at subgrade, and correlate quantities with the Owner before payment approval.

A-15 CONSTRUCT CULVERT BYPASS AND DEWATERING (LUMP)

- A. Measurement shall be made for the job completed.
- B. Payment includes all cost of labor, equipment, and materials to constructing, maintaining, and removing a temporary culvert bypass and stream barrier with the temporary easement.
- C. Temporary bypass and creek barrier plans must be submitted for approval.
- D. Bid price covers cost of supplying, excavation, removal and disposal of unsuitable materials, installing, and compacting bedding, foundation material, dewatering, imported bedding, imported haunch material, and initial and final backfill material, per APWA. Payment is to the bottom of the roadway cross section in areas of

complete roadway reconstruction and to the top of proposed grade in other locations.

A-16 6'X24' BOX CULVERT (FEET)

- A. Measurement will be made by linear feet of box culvert installed.
- B. Payment includes all costs of purchasing, delivery, and installing a precast reinforced concrete box culvert, fitting and joint material that complies with AASHTO LRFD Bridge Design Specification and designed for HL-93 live loading. Payment also includes providing structural calculations for the precast element.

A-17 WING WALLS AND HEADWALLS WITH PARAPETS (ONE SIDE) (EACH)

- A. Measurement will be made by per set of wingwalls or headwalls with parapet installed on one side of the culvert.
- B. Payment includes all costs of purchasing, delivery, and installing a precast headwalls and wing walls with parapets that complies with AASHTO LRFD Bridge Design Specification. Payment also includes providing structural calculations for the precast element.

A-18 CONCRETE APRON & CUTOFF WALL (LUMP)

- A. Measurement shall be made for the job completed.
- B. Payment includes all cost of labor, equipment, and materials to constructing concrete apron and 24-inch cutoff wall as soon on plans.

A-19 ROADWAY EXCAVATION (PLAN QUANTITY) (CU YD) APWA 31 23 16

- A. Measurement will be made by the cubic yard plan quantity in place. No adjustment to quantities if staked quantities differ by 5 percent or less.
- B. Bid price covers cost to remove material below existing asphalt to the proposed compact subgrade and to haul and dispose of excavated material from the work site to a location chosen by Contractor. Excavation for the proposed culvert is included from in this bid item. Dredging is excluded from the bid item and is included in the Channel Dredging pay item.
- C. Excavated material can NOT be used as embankment material.
- D. Excavation done for Contractor's benefit or excavation error, dewatering of excavation, slough, or over excavation is incidental work.
- E. Contractor to complete topography surveys to determine material quantities at pre-disturbance, post clearing and grubbing, and at subgrade, and correlate quantities with the Owner before payment approval.

A-20 ROADWAY EMBANKMENT (PLAN QUANTITY (CU YD) APWA 32 05 10

- A. Measurement will be made by the cubic yard plan quantity in place. No adjustment to quantities if staked quantities differ by 5 percent or less.
- B. Bid price covers cost to place and compact embankment material in areas identified in the plans or directed by Project Manager.
- C. Excavated material can NOT be used as embankment material.
- D. Contractor to complete topography surveys to determine material quantities at pre-

disturbance, post clearing and grubbing, and at subgrade, and correlate quantities with the Owner before payment approval.

A-21 STRUCTURAL FILL (PLAN QUANTITY) (CU YD) APWA 31 23 23

- A. Measurement by the cubic yard plan quantity in place, as shown on the plans. Payment will not be made for locations not directed by Project Manager.
- B. Bid price covers cost to place and compact structure fill material in areas identified in the plans or directed by Project Manager.

A-22 SOIL STABILIZATION

- A. Measurement will be made by the cubic yard plan quantity as need as directed by the inspector on site
- B. Payment cover cost to remove and stabilize soft soil when encountered at the site. Soft spot stabilization requires placing TenCate Mirafi HP570, a woven geotextile, or approved equivalent over the subgrade; seams should be overlapped a minimum of 24 inches or as recommended by the manufacturer. The woven geotextile should be placed to cover the entire excavated bottom and covered with a minimum of 24 inches of crushed angular ¾- to 4-inch diameter rock.

A-23 UNTREATED BASE COURSE (PLAN QUANTITY) (CU YD) APWA 32 11 23

- A. Measurement by the cubic yard plan quantity in place, as shown on the plans, measured by area of roadway multiplied by depth. Payment will not be made for locations not directed by Project Manager.
- B. Bid price covers cost to place and compact untreated base course material in areas identified in the plans or directed by Project Manager. Includes proof rolling before placement of pavement.

A-24 HOT MIX ASPHALT (TON) APWA 32 12 16.13

- A. Measurement shall be per ton of HMA placed for the depth shown on the plans and documented by weight tickets.
- B. Bid price covers cost of equipment, labor, and material to place asphalt pavement. This includes, but is not limited to, aggregates, asphalt binder, hydrated lime, prime coat, tack coat, and other additives, etc.

A-25 12 INCH RIP-RAP (SQ FT) APWA 31 37 00

- A. Measurement will be made by the square feet as shown on plans.
- B. Bid price covers cost of equipment, labor, and material to install D50 = 12" Rip-rap as shown on the plans.

A-26 CONSTRUCT NEW FENCE

- A. Measurement will be made by linear feet of fence installed.
- B. Bid price covers cost of work and material to install fence. Cost includes, but is not limited to, all labor, foundations, bases, posts, disposal of unused material, and incidental items to install chain link fence.

A-27 CONCRETE APRON & CUTOFF WALL (LUMP)

- A. Measurement by the cubic yard plan quantity in place, as shown on the plans.
- B. Payment includes all cost of labor, equipment, and materials to construct a 2' wide cast-in-place mammal ledge as shown on plans.

ATTACHMENT C

100% PLANS & DRAWINGS

ATTACHMENT D

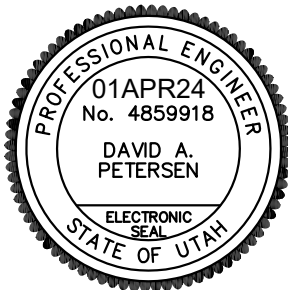
GEOTECHNICAL REPORT

**Geotechnical Investigation
Benjamin Slough Culvert Replacement
5999 – 5805 West 6400 South
Spanish Fork, Utah**

IGES Project No. 00511-032

April 1, 2024

Prepared by:



David A. Petersen, P.E.
Associate

Reviewed by



A handwritten signature in blue ink, appearing to read "Kent A. Hartley".

Kent A. Hartley, P.E.
Principal

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1.0 EXECUTIVE SUMMARY

This report presents the results of a geotechnical investigation completed for the proposed box culvert to be located at approximately 5900 West where the Benjamin Slough crosses 6400 South in Benjamin, Utah. Based on the subsurface conditions encountered across the property, the site is considered suitable for the proposed construction using standard construction practices provided that the recommendations presented in this report are incorporated into the design and construction of the project. A brief summary of the critical recommendations and findings are included below:

- Undocumented fill soils were observed in each of the borings to a depth of 3 – 3.5 feet below existing grade. Native soils were observed below the undocumented fill soils and consisted primarily of fine-grained soils; a layer of gravel was observed at a depth of approximately 8 – 9 feet. The fine-grained soils consisted of Fat CLAY (CH), Lean CLAY (CL) and SILT (ML).
- Groundwater was encountered at a depth of approximately 3 feet in each of the borings.
- Native soils are considered severely corrosive to steel with a low potential for sulfate attack on concrete.
- IGES observed moderately compressible soils at the site to a depth of approximately 26.5 feet below the existing grade, or through the maximum depth explored.
- Excavations with vertical walls up to 5 feet in depth may be occupied; however, based on the presence of relatively soft soils and the presence of ground water, these soils may need to be benched back and dewatered. Sloping of the excavation sides at 1.5H:1V (34 degrees) in *Type C* soils may be used in areas where the native soils are comprised of soft to very soft native fine-grained soils that were encountered in our borings.
- Shallow conventional continuous wall footings constructed as described above may be proportioned utilizing a maximum net bearing resistance of **1,400 pounds per square foot (psf)** for *Service Limit State* conditions.

Recommendations for general site grading, design of conventional foundations, moisture protection and soil corrosivity as well as other aspects of construction are included in this report.

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.

2.0 INTRODUCTION

2.1 PURPOSE AND SCOPE OF WORK

This report presents the results of a geotechnical investigation for the proposed box culvert structure to be constructed at approximately 5900 West where the Benjamin Slough crosses 6400 South in Benjamin, Utah. The purposes of this investigation were to assess the engineering properties of the subsurface soils at the site, provide detailed information on the soil profile encountered in the borings and provide graphical logs with soil classifications and results of the laboratory testing as well as recommendations for structural fill, lateral earth pressure coefficients, foundations, and estimated settlement.

The scope of work completed for this study included a site reconnaissance, subsurface exploration, soil sampling, laboratory testing, engineering analyses and preparation of this report. The subsurface exploration included seven borings located across the site.

The recommendations contained in this report are subject to the limitations presented in the **Closure and Limitations** section of this report (Section 6.0).

2.2 PROJECT DESCRIPTION

The approximate location is shown on the *Site Vicinity Map*, see Figure A-1. Our understanding of the project is based on conversations with the client. It is our understanding that the box culvert will consist of a box culvert with an opening of approximately 5 feet by 20 feet that will be constructed at the location the slough crosses below 6400 South; it is possible that the box culvert may be a precast concrete structure. It is our understanding that the footings will be established on subgrade soils at a depth of approximately 6 feet below existing site grade.

3.0 METHODS OF STUDY

3.1 FIELD INVESTIGATION

As a part of this investigation, subsurface soil conditions were explored by advancing two borings on February 12, 2024, using a track mounted Geoprobe hollow stem auger rig; approximate locations of the explorations are shown on Figure A-2 (*Site Map*). Photos of the site and of select borings are included in Figure A-3 (*Site Photos*) in Appendix A. Graphic logs of the subsurface conditions, as encountered at the time of our excavations, have been presented as Figures A-4 through A-5 in Appendix A. A *Key to Soil Symbols and Terminology* used on the test pit logs is included as Figure A-6.

Samples were collected at 2½-foot intervals to 10 feet and 5-foot intervals at depths greater than 10 feet using a standard split spoon (SPT) sampler and California (MC) sampler. Relatively undisturbed samples were collected with the California sampler to be evaluated for collapse and strength testing. Borings were then backfilled with soils from the auger cuttings. All samples were transported to our laboratory to evaluate the engineering properties of the various earth materials observed. The soils were classified in general accordance with the *Unified Soil Classification System (USCS)*.

3.2 LABORATORY TESTING

Geotechnical laboratory tests were conducted on selected relatively undisturbed and bulk soil samples obtained during our field investigation. The laboratory testing program was designed to evaluate the engineering characteristics of onsite earth materials. Laboratory tests conducted during this investigation include:

- In Situ Moisture Content and Density (ASTM D7263/D2216)
- Atterberg Limits (ASTM D4318)
- Percent Passing the No. 200 (ASTM D1140)
- One-Dimensional Consolidation Properties of Soils (ASTM D2435)
- Unconfined Compressive Strength of Cohesive Soils (ASTM D2166)
- Unconsolidated-Undrained Triaxial Compression (ASTM D2850)
- Corrosion Testing-sulfate and chloride concentrations, pH and resistivity (ASTM D4972, D4327, D4327, C1580 and EPA 300.0)

Results of the laboratory testing are included with this report in Appendix B. Index test results have also been incorporated into the boring logs (see Figures A-4 through A-5).

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 soil classification. Analyses were performed using formulas, calculations and software that represent methods currently accepted by the geotechnical industry. These methods include settlement, conventional footings, and lateral earth pressures. Appropriate factors of safety were applied to the results, consistent with industry standards and the accepted standard of care.

4.0 FINDINGS

4.1 SURFACE CONDITIONS

The 6400 South Street was paved with asphalt at the time of our site investigation. Water was present in Benjamin Slough at the time of our drilling and appeared to be approximately 3 feet below existing grade. The banks of the slough are vegetated with native grasses and weeds.

4.2 SUBSURFACE CONDITIONS

4.2.1 Earth Materials

Based on the observations made while logging the borings, the site is underlain by native younger alluvium. The earth materials observed as a part of our subsurface exploration are described in the following paragraphs:

Undocumented Fill Soils

Undocumented fill soils consisting primarily of Poorly Graded GRAVEL with sand were observed to a depth of 3.5 feet in Boring B-1 and 3 feet in B-2. Undocumented fill soils consisting of SILT with gravel (ML) were observed in B-2 at a depth of approximately 1 – 3 feet. The undocumented fill soils were in general loose, light brown and very moist to wet.

Younger Alluvial Deposits

Based on geologic mapping the surficial native soils at the site are mapped as Younger Alluvial Deposits (Qaly). These soils were observed below the undocumented fill soils and logged as fine-grained clayey and silty soils observed throughout the maximum depth explored of approximately 26.5 feet. Approximately 12 inches of native silty soils were observed below the undocumented soils in B-1 that were soft, wet and light brown. Fat CLAY (CH) soils were observed in B-1 between a depth of 5 and 23 feet that were soft to very soft, wet, light grey; an approximately 12-inch thick layer of Silty GRAVEL (GM) was observed in B-1 at 7.5 feet. Lean CLAY (CL) was observed in the lowermost 3.5 feet of B-1 that was medium stiff, wet, red brown, gray, brown and olive. Approximately 2 feet of native silty soils were observed below the undocumented soils in B-2 that were very soft, wet and brown. Lean CLAY with sand (CL) was observed in B-2 at a depth of 5 – 9 feet that was very soft, wet and brown. An approximately 12-inch thick layer of Silty GRAVEL (GM) was observed in B-2 at 9 feet. Alternating layers of Silty CLAY (CL-ML), SILT (ML), and Lean CLAY were observed between 10 feet and 26.5 feet in B-2 that were very soft to medium stiff, wet, brown, gray, and reddish brown in color. Refer to boring logs in Appendix A for

more detailed information on the soil profile observed in the explorations (Figures A-4 through A-5).

4.2.2 Groundwater

Groundwater was encountered in each of the borings completed as part of this investigation at a depth of approximately 3 feet below existing site grade. Seasonal fluctuations in precipitation, surface runoff from adjacent properties, or other on or offsite sources such as irrigation or other utilities may increase moisture conditions or raise the groundwater elevation several feet.

4.2.3 Strength of Earth Materials

IGES completed an Unconfined Compression Strength test (ASTM D2166) on a sample of SILT (ML) from Boring B-1 at a depth of 20 feet; the shear stress at failure was measured at 118psf.

IGES completed an Unconsolidated-Undrained Triaxial Compression Test (ASTM D2850) on a sample of SILT (ML) from Boring B-2 at a depth of 15 feet; the shear stress at failure was measured at 1,134psf.

4.2.4 Compressible Soils

Four one-dimensional consolidations tests were completed on various samples obtained for this investigation. Calculated pre-consolidation pressures ranged between approximately 1,300 and 7,000 psf. A summary of the consolidation tests are presented in Table 4.2.4A. The results of the one-dimensional consolidation tests are provided in Appendix B.

**Table 4.2.4A
Summary of Consolidation Test Results**

Location	Depth	Cc	Cr	Pre-Consolidation Pressure (psf)	Comments
B-1	8	0.15	0.022	1,300	Fat CLAY (CH)
B-1	20	0.29	0.04	1,700	Fat CLAY (CH)
B-2	15	0.09	0.009	7,000	SILT (ML)
B-2	25	0.20	0.04	5,400	Lean CLAY (CL)

4.2.5 Chemical Testing

Chemical testing was completed as a part of this investigation on a representative sample of the native soil located 2.5 feet below existing grade from B-1. The test results indicated that the sample tested has a minimum resistivity of 1,682 OHM-cm, soluble chloride

content of 130 ppm, soluble sulfate content of less than 50 ppm and a pH of approximately 8.4.

4.3 GENERAL GEOLOGIC CONDITIONS

4.3.1 Local Geology

The site is located at an elevation of approximately 4,500 feet in the southern portion of Utah Valley. Utah Valley represents a deep, sediment-filled structural basin of Cenozoic age flanked by uplifted blocks; the Wasatch Range on the east, and the Lake and East Tintic Mountains to the west (Hintze, 1980). The Wasatch Range is the easternmost expression of pronounced Basin and Range extension in north-central Utah. The Basin and Range province is comprised of north-south trending fault-block mountain ranges and intervening sediment filled structural basins formed by extensional faulting. These structural basins represent deep, sediment-filled valleys of Cenozoic age (Hintze, 1980; Hintze, 1993). 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, the development of the numerous canyons that empty into the current Salt Lake Valley and Utah Valley and their associated alluvial fans, erosion and deposition from Lake Bonneville, and localized mass-movement events (Hintze, 1993). The Wasatch Range is located along the eastern edge of Utah Valley and marks the easternmost expression of pronounced Basin and Range extension in north-central Utah. The boundary between the Basin and Range province and the Middle Rocky Mountain physiographic province, to the east, is the Wasatch fault zone. Also present west of the site is West Mountain, a stand-alone mountain that is not part of any range. Like the Wasatch Mountains, West Mountain is primarily Paleozoic sedimentary units (Clark, 2009).

The near-surface geology of the Utah Valley is dominated by sediments, which were deposited within the last 30,000 years by Lake Bonneville (Hintze, 1993). Sediments toward the center of the valley are predominately deep-water deposits of clay, silt, and fine sand. However, these deep-water deposits are in places covered by a thin post-Bonneville alluvial cover. The area where the site is located is at the base of West Mountain next to a low-lying area containing fine-grained sediments that were deposited in deeper, calm water as well as more granular sediments that were deposited in shallow water as the lake receded. A large series of alluvial-fan deposits cover the lake sediments

in many places. The lacustrine sediments near the mountain front, where the site is located, consist mostly of gravel and sand (Solomon and Biek, 2009, Clark, 2009).

Surface sediments at the site are mapped as Younger alluvial deposits (Qaly). Qaly is described as “Moderately sorted sand, silt, clay, and local pebble gravel deposited in stream channels and flood plains” (Clark, 2009).

4.3.2 Seismicity

Following the criteria outlined in the 2021 International Building Code (IBC, 2021), spectral response at the site was evaluated for the risk-targeted *Maximum Considered Earthquake* (MCE_R), which represents the spectral response accelerations in the direction of maximum horizontal response represented by a 5% damped acceleration response spectrum that is expected to achieve a 1% probability of structural collapse within a 50-year period. The MCE_R spectral accelerations were determined based on the location of the site using the *ASCE-7 Hazard Tool*; this software incorporates seismic hazard maps depicting probabilistic ground motions and spectral response data developed for the United States by the U. S. Geological Survey. These maps have been incorporated into the *International Building Code* (IBC) (International Code Council, 2021).

To account for site effects, site coefficients that vary with the magnitude of spectral acceleration and *Site Class* are used. Site Class is a parameter that accounts for site amplification effects of soft soils and is based on the average shear wave velocity of the upper 100 feet (30 meters, V_{s30}); site classifications are identified in Table 4.3.2A.

Based on our field exploration and our understanding of the geology in this area, the site is underlain by young alluvium deposits that would likely be best represented as Site Class D. However, since site-specific shear wave velocity measurements were not obtained, IGES recommends a Site Class D Default classification (stiff soil). Based on the default Site Class D site coefficients, the short- and long-period *Design Spectral Response Accelerations* are presented in Table 4.3.2B. For geotechnical practice, the geo-mean peak ground acceleration (PGA_M)¹ is presented in Table 4.3.2C.

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).

Table 4.3.2A
Site Class Categories

Site Class	Earth Materials	Shear Wave Velocity Range (V_{s30}) 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

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.

Table 4.3.2B

Spectral Accelerations for MCE, Risk-Targeted Values (Structural)

Mapped B/C Boundary S_a (g)		Site Coefficient (Site Class D*)		Design S_a (g)	
S_s	S_1	F_a	F_v	S_{DS}	S_{D1}
1.333	0.486	1.20	1.814	1.067	0.588

* default Site Class D (stiff soil site conditions)

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 4.3.2C

Spectral Accelerations for MCE, Geo-Mean Values (Geotechnical)

Mapped B/C Boundary PGA (g)	Site Coefficient F_{PGA} (Site Class D*)	PGA_M (g)
0.596	1.2	0.715

* default Site Class D (stiff soil site conditions)

4.3.3 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 site is located approximately 2 miles south of the Utah Lake Faults and Folds (ULFF), the closest mapped fault. The ULFF consists of several northeast to northwest trending faults and folds located beneath Utah Lake and are reported to have been active in the past 15 ka (Black et al., 2003). However, since the ULFF is at the bottom of a large lake these faults are poorly understood – as such, the USGS does not include ULFF in their fault database for seismic hazard analysis. The site is also located approximately 3.75 miles northwest of the Nephi segment of the Wasatch Fault Zone (WFZ), which is mapped along the western flank of the Wasatch Mountains. The Nephi section has a length of 42.5 kilometers and was last active about 1,200 years ago. The site is also located 9.33 miles northwest of a splay of the Provo segment of the Wasatch Fault Zone (WFZ), which is mapped along the western flank of the Wasatch Mountains. The splay in question is mapped to the west of the main trace of the WFZ. The main trace of the fault is approximately 9.5 miles southeast of the site. The Provo segment was reportedly last active less than 1,000 years ago and is reported to have a recurrence interval of approximately 1,700 years. Analysis of the ground shaking hazard along the Wasatch Front suggests that the Wasatch Fault Zone is the single greatest contributor to the seismic hazard in the region.

4.4 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 a 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 primary geologic hazard considered for this site is liquefaction and flooding.

4.4.1 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-Potential Map for a part of Utah County, Utah* published by the Utah Geological Survey, the site is located within an area currently designated as "high" for liquefaction potential. The upper 25 feet are not considered liquefiable based on our field observations and laboratory testing. Deeper deposits may be more susceptible, but a full liquefaction study was not part of the scope of work and is beyond the standard of care for the project.

4.4.2 Flood-Hazard

Based on the proximity of Benjamin Slough, it is our opinion that there is a potential for flooding. IGES recommends that the historical flows in this drainage and the potential for greater flows in the future to flow through this drainage be taken into consideration when considering depth of embedment, scour, etc.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 GENERAL CONCLUSIONS

Based on the subsurface conditions encountered at the site, it is our judgment that the subject site is suitable for construction of the proposed box culvert structure provided that the recommendations presented in this report are incorporated into the design and construction of the project. IGES observed soils that are moderately compressible at the site. Due to the presence of very soft soils at the proposed footing elevation, it is anticipated that these soils will need to be stabilized prior to constructing the box culvert.

We recommend IGES be on site at key points during construction to document whether the recommendations presented in this report have been implemented.

The following sub-sections present our recommendations for general site grading, design of foundations, lateral earth pressures, moisture protection and preliminary soil corrosion.

5.2 EARTHWORK

Prior to the placement of foundations, general site grading is recommended to provide proper support for foundations and concrete forming. Site grading is also recommended to provide proper drainage and moisture control for the proposed improvements.

5.2.1 General Site Preparation

Within the areas to be graded (below proposed structures, fill sections, or concrete form work), any existing surface vegetation, debris, asphalt, collapsible soils or undocumented fill should be removed as recommended herein. Any existing utilities should be re-routed or protected in-place before completing nearby excavations. Soft and/or loose areas of soil should be stabilized as recommended in Section 5.2.5. An IGES representative should observe the site preparation and grading operations to assess whether the recommendations presented in this report have been complied with.

5.2.2 Excavations

Undocumented fill, soft, porous, or otherwise unsuitable soils beneath foundations or concrete form work may need to be over-excavated and replaced with structural fill. If over-excavation is required, the excavations should extend a minimum of ½-foot laterally for every foot of depth of over-excavation. Structural fill recommendations are presented in this report (Section 5.2.4). Excavations extended deeper than 3 feet in depth will likely need to be dewatered. Dewatering can typically be accomplished by placing a trash pump in the lower part of an excavation and discharged into an area where it will flow away

from the excavation. Due to the presence of water in Benjamin Slough, a temporary cofferdam may need to be constructed to keep the area devoid of water to facilitate construction/placement of the box culvert or the flow of water will have to be temporarily diverted.

5.2.3 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. Soil types are expected to consist of *Type C* soils (low unconfined compressive strength) in the top 10 feet.

Based on Occupational Safety and Health (OSHA) guidelines for excavation safety, excavations and trenches with vertical walls up to 5 feet in depth may be occupied; however, based on the presence of relatively soft soils and the presence of ground water, these soils may need to be benched back and dewatered. Sloping of the excavation sides at 1.5H:1V (34 degrees) should be used where the native soils are comprised of soft to very soft native fine-grained soils.

5.2.4 Structural Fill and Compaction

All fill placed for the support of structures, flatwork or pavements, should consist of structural fill. Due to the saturated and fine-grained nature of the existing soils, IGES recommends that any structural fill needed for the site be imported. 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) with a minimum fines content of 30 percent. 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-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 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. All structural fill placed beneath footings and pavements should be compacted to at least 97 percent of the maximum dry density (MDD) as determined by ASTM D-1557.

If imported material is desired to be used as structural fill, it should be approved by IGES prior to being imported. The moisture content of imported structural fill should be within

2 percent of the OMC— compacting dry of the OMC is discouraged; the moisture content should be equal to or greater than the OMC if native fine-grained soils are used. Prior to placing any structural fill, the excavations should be observed by IGES to confirm that unsuitable materials have been removed, such as pinholes and loose soil. 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 ASTM D-1557. All other trenches, including landscape areas, should be backfilled and compacted to a minimum of 90 percent of the MDD (ASTM D-1557).

Backfill adjacent to the box culvert structure should consist of granular material. This material should be placed in 8-inch loose lifts or thinner and compacted to 95 percent of the MDD and within 2 percent of the OMC as determined by ASTM D1557. Failure to properly moisture-condition and compact foundation wall backfill may result in settlements of up to several inches.

Specifications from governing authorities having their own precedence for backfill and compaction should be followed where applicable.

5.2.5 Soft Soil Stabilization

Soft soils will be encountered at the site based on our field investigation. These soils may cause equipment mobility problems and may make it difficult to place and properly compact structural fill overlying these soft soils or to construct the footings and/or box culvert. If encountered, we recommend stabilizing these soils prior to placing structural fill or constructing footings and/or the box culvert.

Stabilization can be accomplished by placing a woven geotextile over the soft subgrade; seams should be overlapped a minimum of 24 inches or as recommended by the manufacturer. The geotextile should be covered with a minimum of 24 inches of crushed, angular $\frac{3}{4}$ - to 4-inch diameter rock. Structural fill (Section 5.2.4) may then be placed and compacted as recommended in this report. The woven geotextile should consist of TenCate Mirafi HP570 or an approved equivalent. The geotextile should be placed to cover the entire excavation bottom.

Alternatively, stabilization of soft or pumping subgrade can be accomplished using a clean, coarse angular material worked into the soft subgrade. We recommend the material be greater than 3 inches in nominal diameter, but less than 6 inches. The

stabilization material should be worked (pushed) into the soft subgrade soils until a relatively firm and unyielding surface is established. Once a relatively firm and unyielding surface is achieved, the area may be brought to final design grade using structural fill. Other earth materials not meeting aforementioned criteria may also be suitable; however, such material should be evaluated on a case-by-case basis and should be approved by IGES prior to use. The area should be wheel-rolled with heavy equipment to evaluate whether a firm working surface has been achieved and that soft/pumping soils have been “bridged” to the greatest extent reasonably possible based on existing subsurface conditions. An IGES representative should be present during this evaluation.

The area of stabilization should extend a minimum of 3 feet beyond the footprint of the structure.

5.3 FOUNDATIONS

Due to the saturated, very soft, fine-grained soils, it is anticipated that the subgrade will need to be stabilized as recommended in Section 5.2.5 of this report prior to beginning construction/placement of the box culvert. IGES should observe the excavation before footings are constructed. The footings should be established entirely on granular structural fill extending to the zone of stabilization.

Service limit state bearing resistance values were based on limiting total settlement to a maximum of 1-inch and differential settlement to a maximum of ½ inch over 30 feet horizontally. Strength limit state design for bearing resistance was determined using the Meyerhof’s modifications to Terzaghi’s original bearing capacity formula along with a resistance factor of 0.5 as specified in Table 10.5.5.2.2-1 of AASHTO LRFD bridge design specifications, 9th Edition. Extreme limit state bearing resistance was determined using the same procedure as above with a resistance factor of 1.0. Net bearing resistance values are shown below in Table 5.3A.

Table 5.3A
Net Bearing Resistance Values

Service Limit State (psf)	Strength Limit State (psf)	Extreme Limit State (psf)
1,400	1,800	3,500

Strength parameters for the bearing soils were assigned based on laboratory test data, field data, and field observations. All bearing resistances were calculated using a total stress analysis.

If required, all fill beneath the foundations should consist of structural fill and should be placed and compacted in accordance with our recommendations presented in Section 5.2.4 of this report.

All foundations exposed to the full effects of frost should be established at a minimum depth of 30 inches below the lowest adjacent final grade.

5.4 SETTLEMENT

The service limit state bearing resistance was limited to minimize settlement of foundation elements to less than 1 inch with differential settlements limited to ½-inch over 30 feet. The settlement of the box culvert and overburden were calculated based on the consolidation data obtained from the laboratory testing and using Terzaghi’s One Dimensional Consolidation Theory.

5.5 EARTH PRESSURES AND LATERAL RESISTANCE

Lateral forces imposed on the box culvert may be resisted by the development of passive earth pressures and friction between the bottom of the culvert and the supporting soils. In determining the frictional resistance, a coefficient of friction of 0.40 can be used for footings bearing on granular structural fill.

Based on an estimated internal angle of friction of 32 degrees for imported granular soils backfilled and compacted around buried structural elements, the ultimate lateral earth pressures may be computed from the lateral pressure coefficients or equivalent fluid densities presented in Table 5.5A:

Table 5.5A
Recommended Lateral Earth Pressure Coefficients

Condition	Lateral Pressure Coefficient	Equivalent Fluid Density (pounds per cubic foot)
Active*	0.31	40
At-rest**	0.47	60
Passive*	3.3	400

* Based on Coulomb’s equation

** Based on Jaky

These values should be used with an appropriate factor of safety against overturning and sliding; a factor of safety of 1.5 is typically used. Additionally, if passive resistance is calculated in conjunction with frictional resistance, the passive resistance should be reduced by ½.

The coefficients and densities presented in the table above assume no buildup of hydrostatic pressures, a vertical wall face and flat back slope. 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.

5.6 PRELIMINARY SOIL CORROSION POTENTIAL

Chemical testing was completed as a part of this investigation on a representative sample of the near-surface soils; the test results are presented in Appendix B. Based on the test results; the following recommendations are made:

- Site soils are expected to exhibit *severe corrosivity* with respect to steel in direct contact with site soils. If failure of steel exposed to the native fine-grained soil could have detrimental consequences, IGES recommends the client consult with a corrosion engineer to provide further recommendations. The corrosivity potential will be different for imported or native granular soil which should be evaluated if used.
- Site soils are expected to exhibit *low potential* for sulfate attack with respect to concrete in direct contact with site soils. Conventional Type I/II Portland cement may be used for all concrete in contact with site soils.

6.0 CLOSURE

6.1 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 warranties, 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.

6.2 ADDITIONAL SERVICES

We recommend that IGES be retained to review the final design plans, grading plans and specifications to determine if our engineering recommendations have been properly incorporated in the project development documents. We also recommend that IGES be retained to evaluate, construction performance and other geotechnical aspects of the projects as construction initiates and progresses through its completion.

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APPENDIX A



GTI Benjamin Slough Culvert Replacement

5999-5805 W 6400 S St, Spanish Fork, UT 84660, USA

B-1

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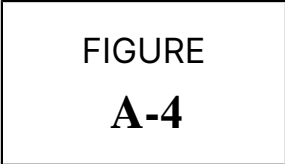
Drilling Co.: Direct Push	Project No.: 00511-032	Remarks:
Driller: Connor	Date Drilled: 02/12/24	
Logged By: Karl C	Boring Depth: 26.5'	
Equipment: Geoprobe 7822DT	Boring Elevation: N/A	
Hammer Type: Auto	Coordinates: 40.11418, -111.79329	
Drilling Method: Auger	Water Level At Time Of Drilling: 3' Cave-in At Time Of Drilling: N/A	Delayed Water Level: Not... Delayed Water Observation Date: N/A

Depth (ft)	Sample Graphic	% Recovery	Graphic Log	USCS	Visual Classification and Remarks	Samples		Lab				
						Blow Counts	Uncorrected N-Value	Moisture Content (%)	Dry Density (PCF)	% Fines	Atterberg Limits (LL-PL-P)	Liquid Limit Plastic Limit Moisture Content
33		33			Undocumented Fill; Poorly Graded GRAVEL with sand Very moist, light brown, Roots, Organics	6-4-2	6	8.1				
56		56				1-1-2	3	14.4	36.8			
5		67		ML	Native; SILT - soft, wet, light brown	x-x-1	1	47.5		52-27-25		
		67		CH	FAT CLAY - very soft to soft, wet, dark brown	x-x-2	2	47.5	72.7	87.6		
		67		GM	Silty GRAVEL - 1' of trace gravels	x-x-x	0					
10		100			FAT CLAY - soft to very soft, wet, light gray, black streaks (dessication)	x-x-x	0					
15		100		CH		x-2-4	6	38.2	89.1	86		
20		100				x-x-x	0	34.1	84.0			
		100						44.0	69.6		55-23-32	
23.0												
25		100		CL	Lean CLAY - medium stiff, wet, reddish brown, with gray, brown, and olive	2-2-3	5					
26.5												

End of boring at 26.5'

Graphics Legend

- At Time of Drilling (ATD)
- Undocumented Fill
- ML
- CH
- GM
- CL
- SPT - Standard Penetration Test
- Modified CA - Modified California Sampler





GTI Benjamin Slough Culvert Replacement

5999-5805 W 6400 S St, Spanish Fork, UT 84660, USA

B-2

Page 1 of 1

Drilling Co.: Direct Push	Project No.: 00511-032	Remarks:
Driller: Connor	Date Drilled: 02/12/24	
Logged By: Karl C	Boring Depth: 26.5'	
Equipment: Geoprobe 7822DT	Boring Elevation: N/A	
Hammer Type: Auto	Coordinates: 40.11427, -111.79305	
Drilling Method: Auger	Water Level At Time Of Drilling: 3' Cave-in At Time Of Drilling: N/A	Delayed Water Level: Not... Delayed Water Observation Date: N/A

Depth (ft)	Sample Graphic	% Recovery	Graphic Log	USCS	Visual Classification and Remarks	Samples		Lab				
						Blow Counts	Uncorrected N-Value	Moisture Content (%)	Dry Density (PCF)	% Fines	Atterberg Limits (LL-PL-P)	Liquid Limit Plastic Limit Moisture Content
0.5				ML	Undocumented Fill; Poorly Graded GRAVEL with silt	3-3-3	6	19.5				
3.0				ML	Undocumented Fill; SILT with gravel							
4.0				ML	Native; SILT - very soft, wet, brown	x-1-x	1					
5.0				ML	SILT with gravel - wet, brown							
5.5				CL	Lean CLAY with sand - very soft, wet, brown	2-x-x	0					
9.0		100		CL	Layering with organic deposits (shells)	1-x-x	0	42.1	72.9	42-21-21		
10.0				GM	Silty GRAVEL - wet, brownish gray, with organics							
12.0				CL-ML	Silty CLAY - very soft, wet, brownish gray	x-x-x	0					
18.0				ML	SILT - medium stiff, wet, gray, with organics	2-4-5	9	30.8	91.9	92.2	26-24-2	
23.0		100		CL	Lean CLAY - very soft, wet, gray, trace black streaks (desiccation)	x-x-x	0					
26.5		100		CL	Lean CLAY - medium stiff, moist, reddish brown	2-4-4	8	30.7	92.7			

Bottom of Boring at 26.5 feet

Graphics Legend

- At Time of Drilling (ATD)
- Undocumented Fill
- ML
- CL
- GM
- CL-ML
- SPT - Standard Penetration Test
- Modified CA - Modified California Sampler

FIGURE
A-5

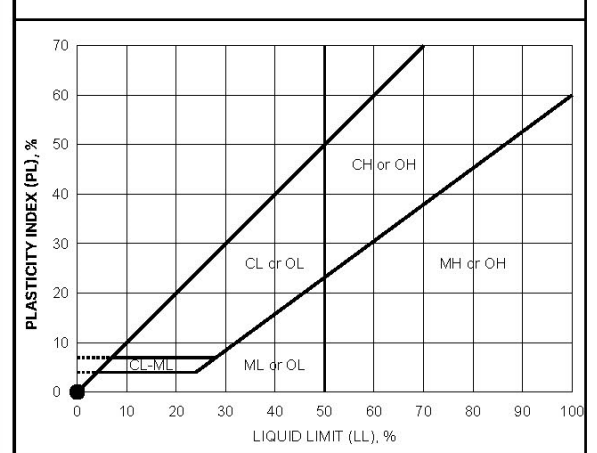
SOIL CLASSIFICATION CHART PER ASTM D 2488

PRIMARY DIVISIONS			SECONDARY DIVISIONS		
			GROUP SYMBOL	GROUP NAME	
COARSE-GRAINED SOILS more than 50% retained on No. 200 sieve	GRAVEL more than 50% of coarse fraction retained on No. 4 sieve	CLEAN GRAVEL less than 5% fines	GW	well-graded GRAVEL	
			GP	poorly-graded GRAVEL	
		GRAVEL with DUAL CLASSIFICATIONS 5% to 12% fines	GW-GM	well-graded GRAVEL with silt	
			GP-GM	poorly-graded GRAVEL with silt	
			GW-GC	well-graded GRAVEL with clay	
			GP-GC	poorly-graded GRAVEL with clay	
		GRAVEL with FINES more than 12% fines	GM	silty GRAVEL	
			GC	clayley GRAVEL	
			GC-GM	silty, clayley GRAVEL	
	SAND 50% or more of coarse fraction retained on No. 4 sieve	CLEAN SAND less than 5% fines	SW	well-graded SAND	
			SP	poorly-graded SAND	
		SAND with DUAL CLASSIFICATIONS 5% to 12% fines	SW-SM	well-graded SAND with silt	
			SP-SM	poorly-graded SAND with silt	
			SW-SC	well-graded SAND with clay	
			SP-SC	poorly-graded SAND with clay	
		SAND with FINES more than 12% fines	SM	silty SAND	
			SC	clayley SAND	
			SC-SM	silty, clayley SAND	
FINE-GRAINED SOILS 50% or more passes No. 200 sieve	SILT and CLAY liquid limit less than 50%	INORGANIC	CL	lean CLAY	
			ML	SILT	
			CL-ML	silty CLAY	
	SILT and CLAY liquid limit 50% or more	INORGANIC	ORGANIC	OL (PI > 4)	organic CLAY
				OL (PI < 4)	organic CLAY
				CH	fat CLAY
	SILT and CLAY liquid limit 50% or more	INORGANIC	ORGANIC	MH	elastic SILT
				OH (plots on or above 'A'-line)	organic CLAY
				OH (plots below 'A'-line)	organic SILT
	Highly Organic Soils		PT	Peat	

GRAIN SIZE

DESCRIPTION	SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders	> 12"	> 12"	Larger than basketball-sized
Cobbles	3 - 12"	3 - 12"	Fist-sized to basketball-sized
Gravel	Coarse	3/4 - 3"	Thumb-sized to fist-sized
	Fine	#4 - 3/4"	Pea-sized to thumb-sized
Sand	Coarse	#10 - #4	Rock-salt-sized to pea-sized
	Medium	#40 - #10	Sugar-sized to rock-salt-sized
	Fine	#200 - #40	Flour-sized to sugar-sized
Fines	Passing #200	< 0.0029"	Flour-sized and smaller

PLASTICITY CHART



APPARENT DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPOOLING CABLE OR CATHEAD		AUTOMATIC TRIP HAMMER	
	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)
Very Loose	≤ 4	≤ 8	≤ 3	≤ 5
Loose	5 - 10	9 - 21	4 - 7	6 - 14
Medium Dense	11 - 30	22 - 63	8 - 20	15 - 42
Dense	31 - 50	64 - 105	21 - 33	43 - 70
Very Dense	> 50	> 105	> 33	> 70

CONSISTENCY - FINE-GRAINED SOIL

CONSISTENCY	SPOOLING CABLE OR CATHEAD		AUTOMATIC TRIP HAMMER	
	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)
Very Soft	< 2	< 3	< 1	< 2
Soft	2 - 4	3 - 5	1 - 3	2 - 3
Firm	5 - 8	6 - 10	4 - 5	4 - 6
Stiff	9 - 15	11 - 20	6 - 10	7 - 13
Very Stiff	16 - 30	21 - 39	11 - 20	14 - 26
Hard	> 30	> 39	> 20	> 26



Geotechnical Investigation
Benjamin Slough Culvert Replacement
5999 - 5805 West 6400 South
South Jordan, Utah

**Key to Soil Symbols
and Terminology**

Project Number - 00511-032

Figure

A-6

APPENDIX B

Water Content and Unit Weight of Soil

(In General Accordance with ASTM D7263 Method B and D2216)



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Project: Benjamin Slough Culvert

No: 00511-032

Location: Benjamin, Utah

Date: 2/14/2024

By: KC

Sample Info.	Boring No.	B-1	B-2						
	Sample	1	11						
	Depth	0.0'	0.0'						
	Split	Yes	Yes						
	Split sieve	3/8"	3/8"						
Total sample (g)		169.22	430.71						
Moist coarse fraction (g)		73.28	91.78						
Moist split fraction (g)		95.94	338.93						
	Sample height, H (in)								
	Sample diameter, D (in)								
	Mass rings + wet soil (g)								
	Mass rings/tare (g)								
	Moist unit wt., γ_m (pcf)								
Coarse Fraction	Wet soil + tare (g)	258.30	214.86						
	Dry soil + tare (g)	257.22	212.10						
	Tare (g)	185.02	123.08						
	Water content (%)	1.5	3.1						
Split Fraction	Wet soil + tare (g)	223.29	455.75						
	Dry soil + tare (g)	211.81	389.41						
	Tare (g)	127.88	122.44						
	Water content (%)	13.7	24.8						
Water Content, w (%)		8.1	19.5						
Dry Unit Wt., γ_d (pcf)									

Entered by: _____

Reviewed: _____

Liquid Limit, Plastic Limit, and Plasticity Index of Soils
(ASTM D4318)



Project: Benjamin Slough Culvert
No: 00511-032
Location: Benjamin, Utah
Date: 2/15/2024
By: BRR

Boring No.: B-1
Sample: 3
Depth: 5.0'
Description: Dark brown fat clay

Grooving tool type: Plastic
Liquid limit device: Mechanical
Rolling method: Hand

Preparation method: Wet
Liquid limit test method: Multipoint
Screened over No.40: Yes
Larger particles removed: Wet sieved

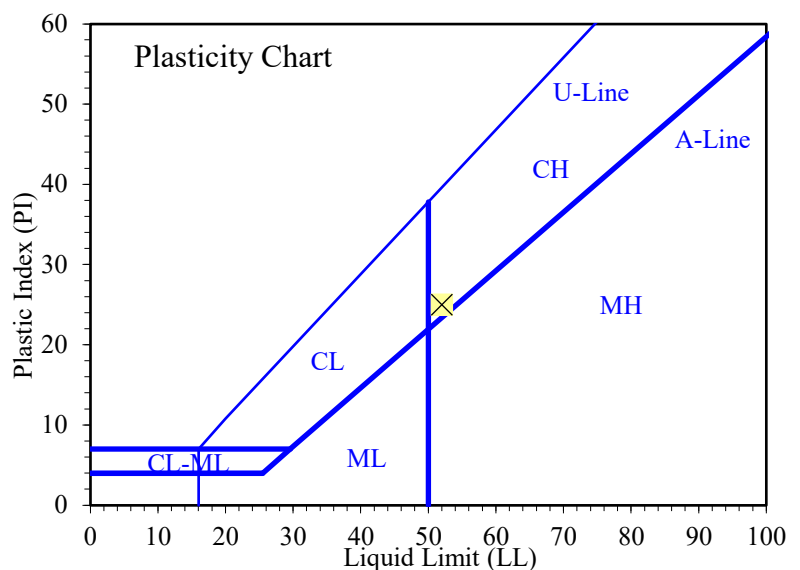
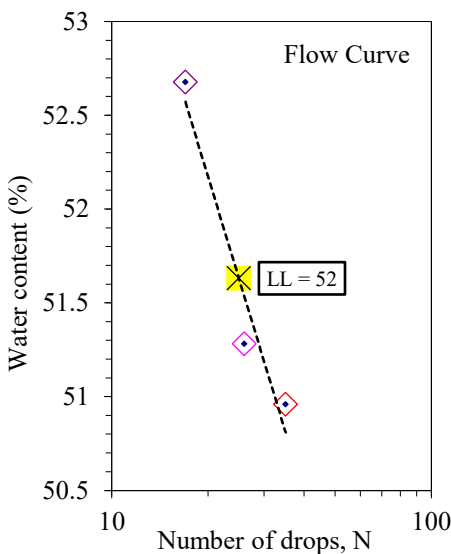
Plastic Limit

Determination No	1	2				
Wet Soil + Tare (g)	13.61	14.47				
Dry Soil + Tare (g)	12.23	12.92				
Water Loss (g)	1.38	1.55				
Tare (g)	7.02	7.11				
Dry Soil (g)	5.21	5.81				
Water Content, w (%)	26.49	26.68				

Liquid Limit

Determination No	1	2	3			
Number of Drops, N	35	26	17			
Wet Soil + Tare (g)	14.15	13.40	14.52			
Dry Soil + Tare (g)	11.76	11.40	12.06			
Water Loss (g)	2.39	2.00	2.46			
Tare (g)	7.07	7.50	7.39			
Dry Soil (g)	4.69	3.90	4.67			
Water Content, w (%)	50.96	51.28	52.68			
One-Point LL (%)		52				

Liquid Limit, LL (%)	52
Plastic Limit, PL (%)	27
Plasticity Index, PI (%)	25



Entered by: _____
 Reviewed: _____

Liquid Limit, Plastic Limit, and Plasticity Index of Soils
(ASTM D4318)



Project: Benjamin Slough Culvert
No: 00511-032
Location: Benjamin, Utah
Date: 2/15/2024
By: BRR
Grooving tool type: Plastic
Liquid limit device: Mechanical
Rolling method: Hand

Boring No.: B-1
Sample: 9
Depth: 20.5'
Description: Brown fat clay

Preparation method: Wet
Liquid limit test method: Multipoint
Screened over No.40: Yes
Larger particles removed: Wet sieved

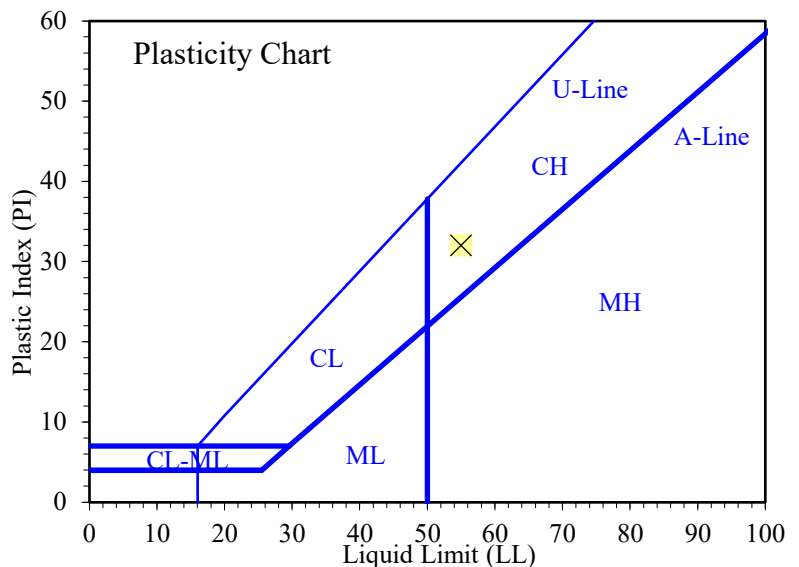
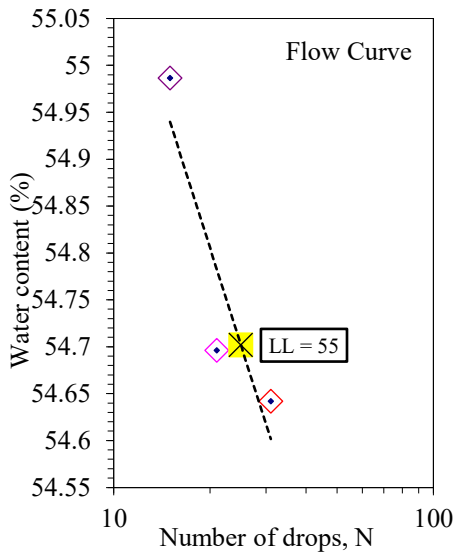
Plastic Limit

Determination No	1	2				
Wet Soil + Tare (g)	14.64	13.46				
Dry Soil + Tare (g)	13.23	12.29				
Water Loss (g)	1.41	1.17				
Tare (g)	7.05	7.06				
Dry Soil (g)	6.18	5.23				
Water Content, w (%)	22.82	22.37				

Liquid Limit

Determination No	1	2	3			
Number of Drops, N	31	21	15			
Wet Soil + Tare (g)	13.37	13.10	12.79			
Dry Soil + Tare (g)	11.31	11.12	10.75			
Water Loss (g)	2.06	1.98	2.04			
Tare (g)	7.54	7.50	7.04			
Dry Soil (g)	3.77	3.62	3.71			
Water Content, w (%)	54.64	54.70	54.99			
One-Point LL (%)		54				

Liquid Limit, LL (%)	55
Plastic Limit, PL (%)	23
Plasticity Index, PI (%)	32



Entered by: _____
 Reviewed: _____

Liquid Limit, Plastic Limit, and Plasticity Index of Soils
(ASTM D4318)



Project: Benjamin Slough Culvert
No: 00511-032
Location: Benjamin, Utah
Date: 2/15/2024
By: BRR
Grooving tool type: Plastic
Liquid limit device: Mechanical
Rolling method: Hand

Boring No.: B-2
Sample: 12
Depth: 7.5'
Description: Brown lean clay

Preparation method: Wet
Liquid limit test method: Multipoint
Screened over No.40: Yes
Larger particles removed: Wet sieved

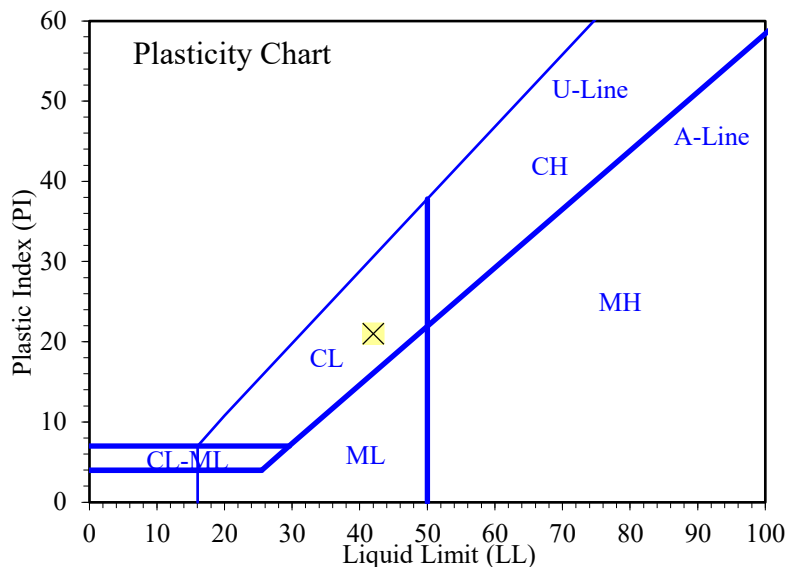
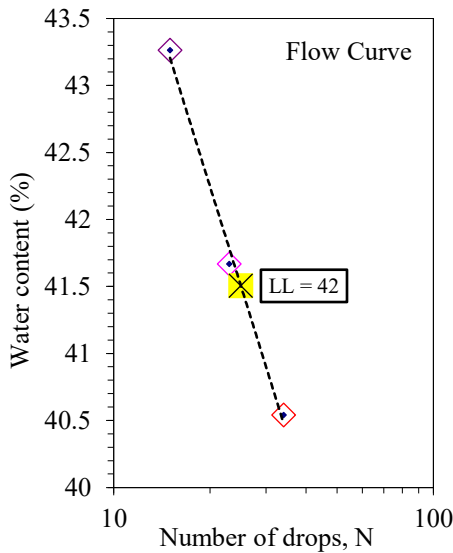
Plastic Limit

Determination No	1	2				
Wet Soil + Tare (g)	14.88	13.93				
Dry Soil + Tare (g)	13.52	12.76				
Water Loss (g)	1.36	1.17				
Tare (g)	7.08	7.11				
Dry Soil (g)	6.44	5.65				
Water Content, w (%)	21.12	20.71				

Liquid Limit

Determination No	1	2	3			
Number of Drops, N	34	23	15			
Wet Soil + Tare (g)	14.69	14.65	14.64			
Dry Soil + Tare (g)	12.59	12.50	12.36			
Water Loss (g)	2.10	2.15	2.28			
Tare (g)	7.41	7.34	7.09			
Dry Soil (g)	5.18	5.16	5.27			
Water Content, w (%)	40.54	41.67	43.26			
One-Point LL (%)		41				

Liquid Limit, LL (%)	42
Plastic Limit, PL (%)	21
Plasticity Index, PI (%)	21



Entered by: _____
 Reviewed: _____

Liquid Limit, Plastic Limit, and Plasticity Index of Soils
(ASTM D4318)



Project: Benjamin Slough Culvert
No: 00511-032
Location: Benjamin, Utah
Date: 2/15/2024
By: BRR
Grooving tool type: Plastic
Liquid limit device: Mechanical
Rolling method: Hand

Boring No.: B-2
Sample: 14
Depth: 15.5'
Description: Grey silt
Preparation method: Wet
Liquid limit test method: Multipoint
Screened over No.40: Yes
Larger particles removed: Wet sieved

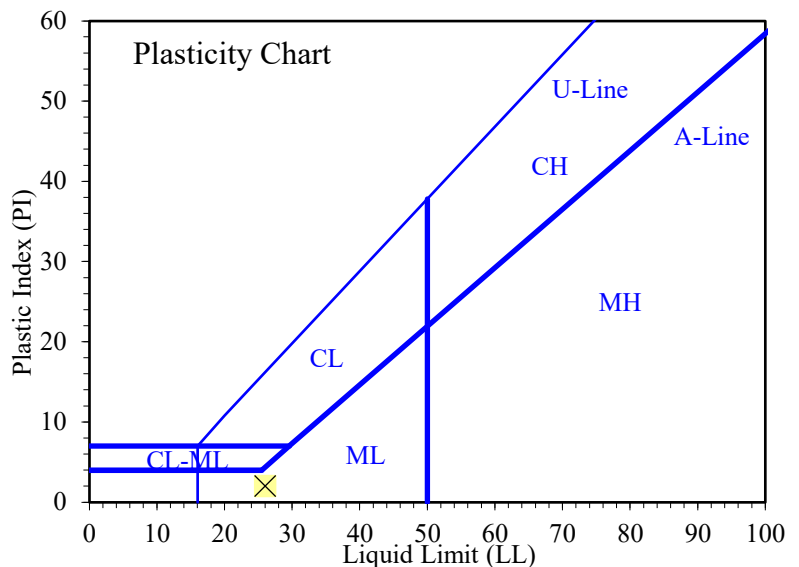
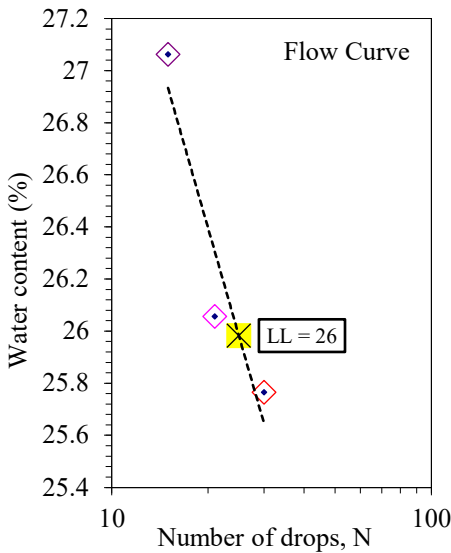
Plastic Limit

Determination No	1	2			
Wet Soil + Tare (g)	13.17	13.81			
Dry Soil + Tare (g)	11.98	12.48			
Water Loss (g)	1.19	1.33			
Tare (g)	7.09	7.06			
Dry Soil (g)	4.89	5.42			
Water Content, w (%)	24.34	24.54			

Liquid Limit

Determination No	1	2	3		
Number of Drops, N	30	21	15		
Wet Soil + Tare (g)	11.98	14.27	15.23		
Dry Soil + Tare (g)	10.97	12.79	13.59		
Water Loss (g)	1.01	1.48	1.64		
Tare (g)	7.05	7.11	7.53		
Dry Soil (g)	3.92	5.68	6.06		
Water Content, w (%)	25.77	26.06	27.06		
One-Point LL (%)	26	26			

Liquid Limit, LL (%)	26
Plastic Limit, PL (%)	24
Plasticity Index, PI (%)	2



Entered by: _____
 Reviewed: _____

Amount of Material in Soil Finer than the No. 200 (75µm) Sieve

(ASTM D1140)



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Project: Benjamin Slough Culvert

No: 00511-032

Location: Benjamin, Utah

Date: 2/16/2024

By: SE/CJ/KC

Sample Info.	Boring No.	B-1	B-1	B-1	B-2	B-2			
	Sample	2	5	7	12	14			
	Depth	2.5'	8.0'	15.0'	7.5'	15.5'			
	Split	Yes	No	Yes	No	No			
	Split Sieve*	No.10		3/8"					
	Method	B	B	B	B	B			
Specimen soak time (min)		290	200	200	190	210			
Moist total sample wt. (g)		408.93	260.49	847.65	247.85	194.92			
Moist coarse fraction (g)		146.72		2.33					
Moist split fraction + tare (g)		290.13		371.48					
Split fraction tare (g)		120.10		117.32					
Dry split fraction (g)		148.68		183.89					
Dry retained No. 200 + tare (g)		181.33	163.31	142.52	175.53	164.98			
Wash tare (g)		120.10	141.45	117.32	128.31	153.30			
No. 200 Dry wt. retained (g)		61.23	21.86	25.20	47.22	11.68			
Split sieve* Dry wt. retained (g)		136.70		2.16					
Dry total sample wt. (g)		365.99	176.66	613.77	174.40	149.07			
Coarse Fraction	Moist soil + tare (g)	273.10		181.52					
	Dry soil + tare (g)	263.08		181.35					
	Tare (g)	126.38		179.19					
	Water content (%)	7.33		7.87					
Split Fraction	Moist soil + tare (g)	290.13	401.94	371.48	376.16	348.22			
	Dry soil + tare (g)	268.78	318.11	301.21	302.71	302.37			
	Tare (g)	120.10	141.45	117.32	128.31	153.30			
	Water content (%)	14.36	47.45	38.21	42.12	30.76			
Percent passing split sieve* (%)		62.6		99.6					
Percent passing No. 200 sieve (%)		36.8	87.6	86.0	72.9	92.2			

Comments:

These results are in nonconformance with Method D1140 because the minimum dry mass was not met.

These results are in nonconformance with Method D1140 because the minimum dry mass was not met.

Entered by: _____

Reviewed: _____

One-Dimensional Consolidation Properties of Soils

(ASTM D2435)



Project: Benjamin Slough Culvert

No: 00511-032

Location: Benjamin, Utah

Date: 2/19/2024

By: CJ

Boring No.: B-1

Sample: 5

Depth: 8.0'

Sample Description: Grey clay

Engineering Classification: Not requested

Sample type: Undisturbed-trimmed from thin-wall

Test method: A
 Inundation stress (psf), timing: 100 Beginning
 Specific gravity, G_s : 2.70 Assumed

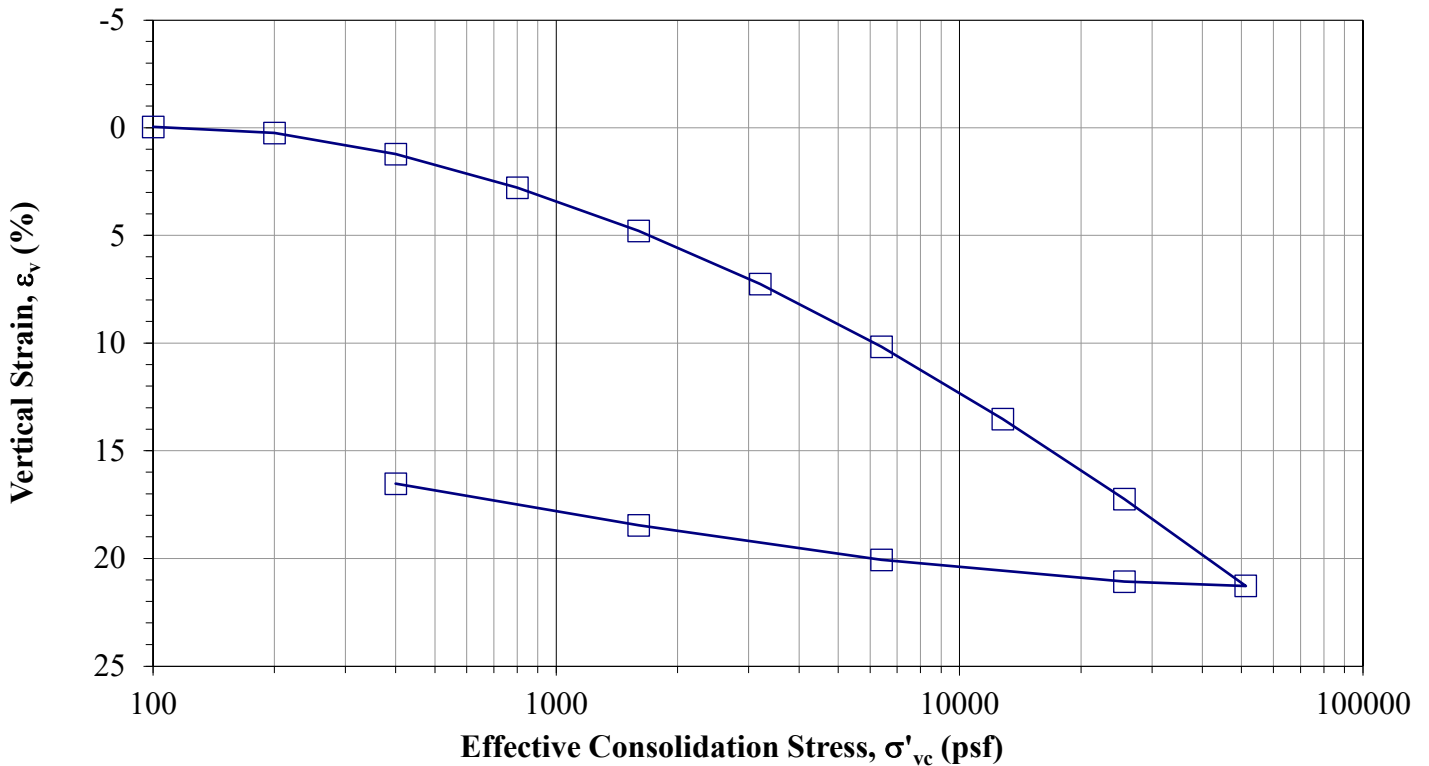
Water type used for inundation Tap

	Initial (o)	Final (f)
Sample height, H (in.)	0.924	0.771
Sample diameter, D (in.)	2.415	2.415
Wt. rings + wet soil (g)	164.73	153.11
Wt. rings/tare (g)	45.58	45.58
Moist unit wt., γ_m (pcf)	107.2	115.94
Wet soil + tare (g)	380.94	237.41
Dry soil + tare (g)	303.87	210.48
Tare (g)	141.45	129.04
Water content, w (%)	47.5	33.1
Dry unit wt., γ_d (pcf)	72.7	87.1
Saturation	0.97	0.96

Stress (psf)	Dial (in.)	1-D ϵ_v (%)	H_c (in.)	e
Seating	0.0000	0.00	0.9240	1.3175
100	-0.0004	-0.04	0.9244	1.3185
200	0.0023	0.24	0.9217	1.3118
400	0.0113	1.22	0.9127	1.2892
800	0.0257	2.78	0.8983	1.2531
1600	0.0442	4.78	0.8798	1.2066
3200	0.0671	7.26	0.8569	1.1492
6400	0.0940	10.17	0.8300	1.0818
12800	0.1249	13.52	0.7991	1.0041
25600	0.1593	17.24	0.7647	0.9180
51200	0.1965	21.27	0.7275	0.8245
25600	0.1947	21.07	0.7293	0.8291
6400	0.1854	20.07	0.7386	0.8524
1600	0.1706	18.46	0.7535	0.8897
400	0.1527	16.52	0.7713	0.9346

*Note: C_v , C_e , C_r , and σ_p' to be determined

by Geotechnical Engineer.



Comments: Test specimen swelled upon inundation and at 100 psf load step.

Entered: _____

Reviewed: _____

One-Dimensional Consolidation Properties of Soils

(ASTM D2435)



Project: Benjamin Slough Culvert

No: 00511-032

Location: Benjamin, Utah

Date: 2/19/2024

By: CJ

Boring No.: B-1

Sample: 9

Depth: 20.5'

Sample Description: Brown clay

Engineering Classification: Not requested

Sample type: Undisturbed-trimmed from thin-wall

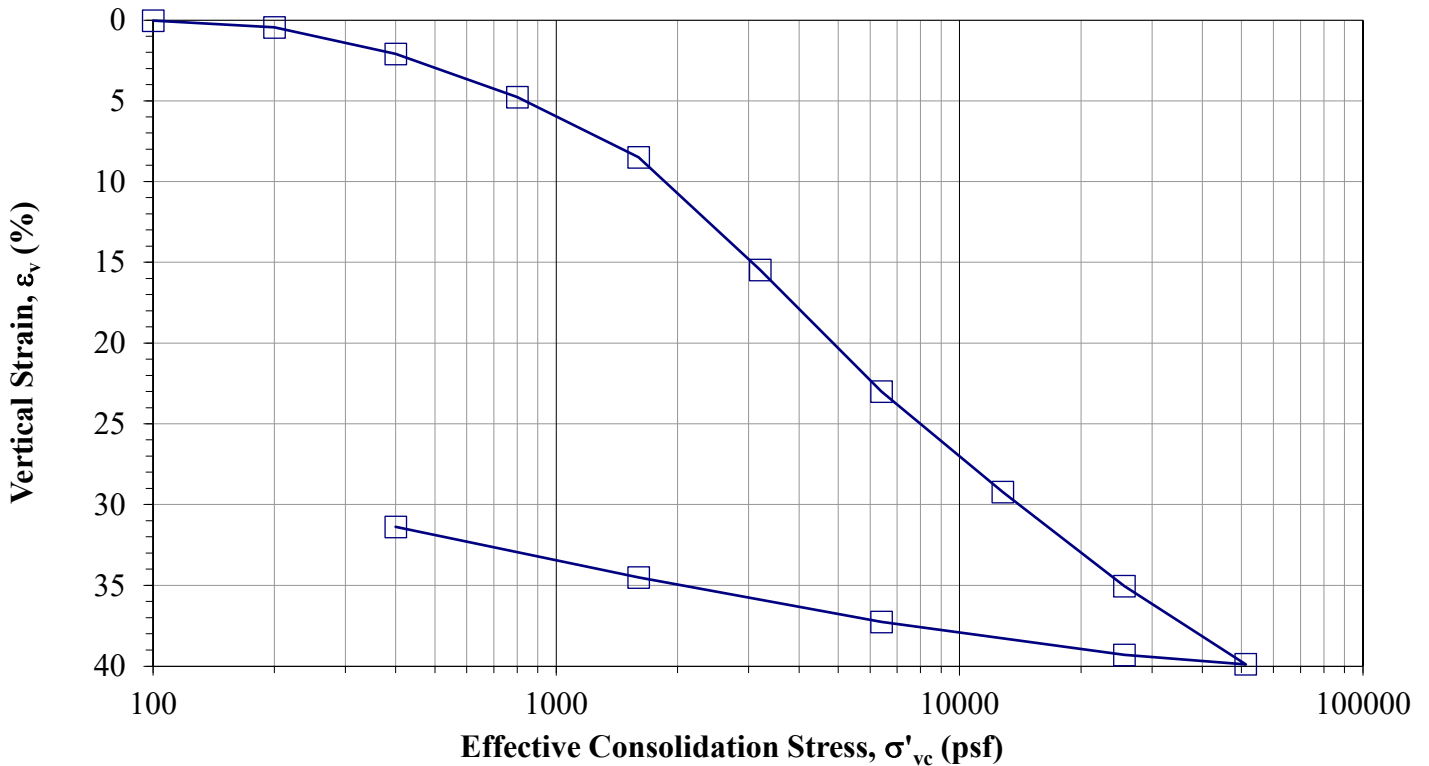
Test method: A
 Inundation stress (psf), timing: 100 Beginning
 Specific gravity, G_s : 2.70 Assumed

Water type used for inundation Tap

	Initial (o)	Final (f)
Sample height, H (in.)	0.922	0.633
Sample diameter, D (in.)	2.414	2.414
Wt. rings + wet soil (g)	153.53	146.74
Wt. rings/tare (g)	42.52	42.52
Moist unit wt., γ_m (pcf)	100.2	137.11
Wet soil + tare (g)	300.37	212.95
Dry soil + tare (g)	254.62	189.80
Tare (g)	150.72	124.08
Water content, w (%)	44.0	35.2
Dry unit wt., γ_d (pcf)	69.6	101.4
Saturation	0.84	1.00

Stress (psf)	Dial (in.)	1-D ϵ_v (%)	H_c (in.)	e
Seating	0.0000	0.00	0.9220	1.4225
100	0.0003	0.04	0.9217	1.4216
200	0.0042	0.45	0.9178	1.4115
400	0.0193	2.10	0.9027	1.3717
800	0.0440	4.77	0.8780	1.3068
1600	0.0784	8.50	0.8437	1.2166
3200	0.1426	15.47	0.7794	1.0478
6400	0.2120	22.99	0.7100	0.8655
12800	0.2695	29.23	0.6525	0.7144
25600	0.3231	35.04	0.5989	0.5736
51200	0.3677	39.88	0.5543	0.4564
25600	0.3624	39.31	0.5596	0.4703
6400	0.3435	37.26	0.5785	0.5200
1600	0.3181	34.50	0.6039	0.5867
400	0.2893	31.38	0.6327	0.6624

*Note: C_v , C_e , C_r , and σ'_p to be determined by Geotechnical Engineer.



Entered: _____

Reviewed: _____

One-Dimensional Consolidation Properties of Soils

(ASTM D2435)



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Project: Benjamin Slough Culvert

No: 00511-032

Location: Benjamin, Utah

Date: 2/16/2024

By: PW

Boring No.: B-2

Sample: 14

Depth: 15.5'

Sample Description: Grey silt

Engineering Classification: Not requested

Sample type: Undisturbed-trimmed from thin-wall

Test method: **A**
 Inundation stress (psf), timing: **100 Beginning**
 Specific gravity, G_s : **2.70 Assumed**

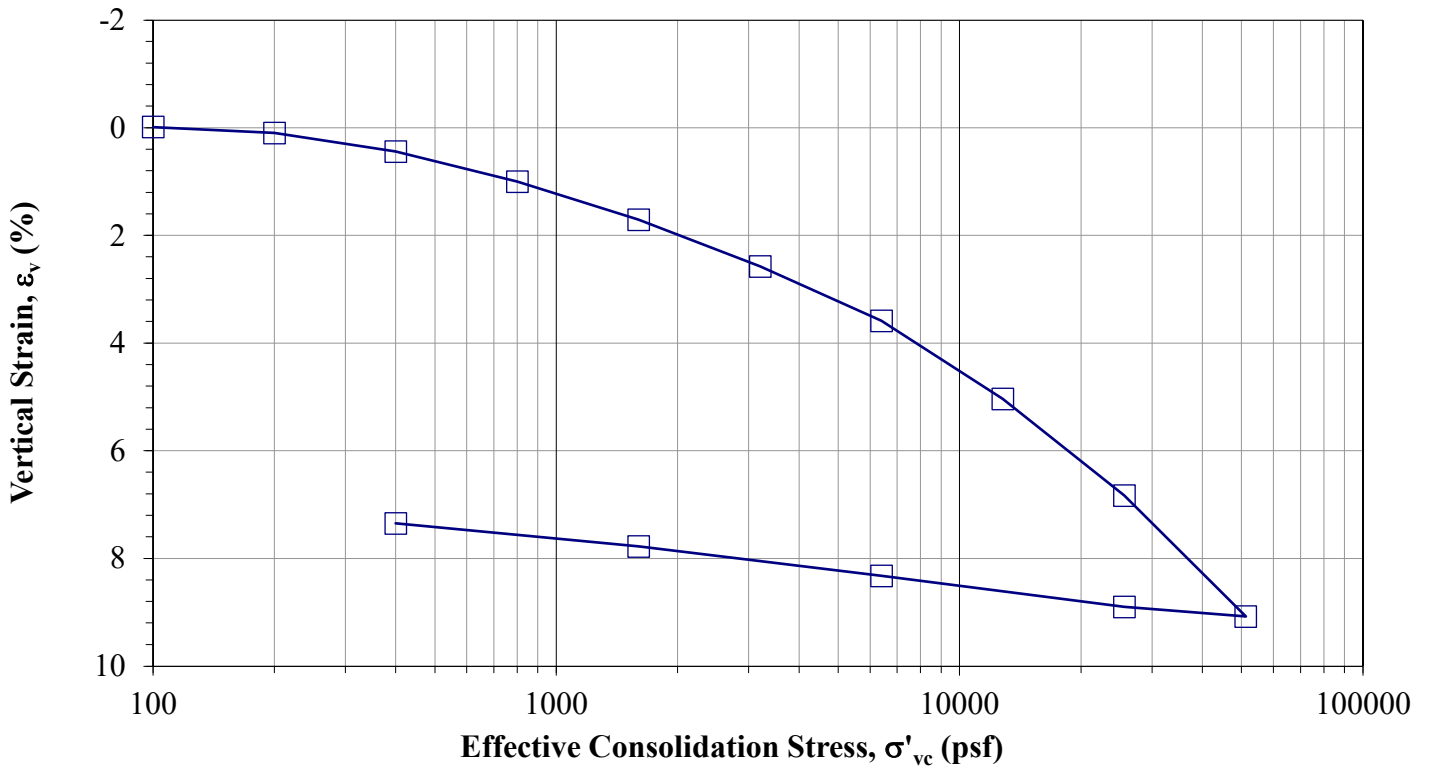
Stress (psf)	Dial (in.)	1-D ϵ_v (%)	H_c (in.)	e
Seating	0.0000	0.00	0.9290	0.8347
100	-0.0001	-0.02	0.9291	0.8350
200	0.0009	0.10	0.9281	0.8329
400	0.0041	0.44	0.9249	0.8267
800	0.0093	1.00	0.9197	0.8164
1600	0.0159	1.71	0.9131	0.8034
3200	0.0239	2.57	0.9051	0.7875
6400	0.0333	3.59	0.8957	0.7689
12800	0.0468	5.04	0.8822	0.7423
25600	0.0635	6.83	0.8656	0.7094
51200	0.0843	9.08	0.8447	0.6682
25600	0.0827	8.90	0.8463	0.6715
6400	0.0773	8.32	0.8517	0.6821
1600	0.0722	7.78	0.8568	0.6921
400	0.0683	7.35	0.8607	0.6999

Water type used for inundation **Tap**

	Initial (o)	Final (f)
Sample height, H (in.)	0.929	0.861
Sample diameter, D (in.)	2.413	2.413
Wt. rings + wet soil (g)	179.74	174.92
Wt. rings/tare (g)	45.78	45.78
Moist unit wt., γ_m (pcf)	120.1	124.98
Wet soil + tare (g)	348.22	174.92
Dry soil + tare (g)	302.37	170.45
Tare (g)	153.30	153.30
Water content, w (%)	30.8	26.1
Dry unit wt., γ_d (pcf)	91.9	99.2
Saturation	0.99	1.00

*Note: C_v , C_c , C_r , and σ'_p to be determined

by Geotechnical Engineer.



Entered: _____

Reviewed: _____

One-Dimensional Consolidation Properties of Soils

(ASTM D2435)



Project: Benjamin Slough Culvert

No: 00511-032

Location: Benjamin, Utah

Date: 2/16/2024

By: PW

Boring No.: B-2

Sample: 17

Depth: 25.5'

Sample Description: Brown clay

Engineering Classification: Not requested

Sample type: Undisturbed-trimmed from thin-wall

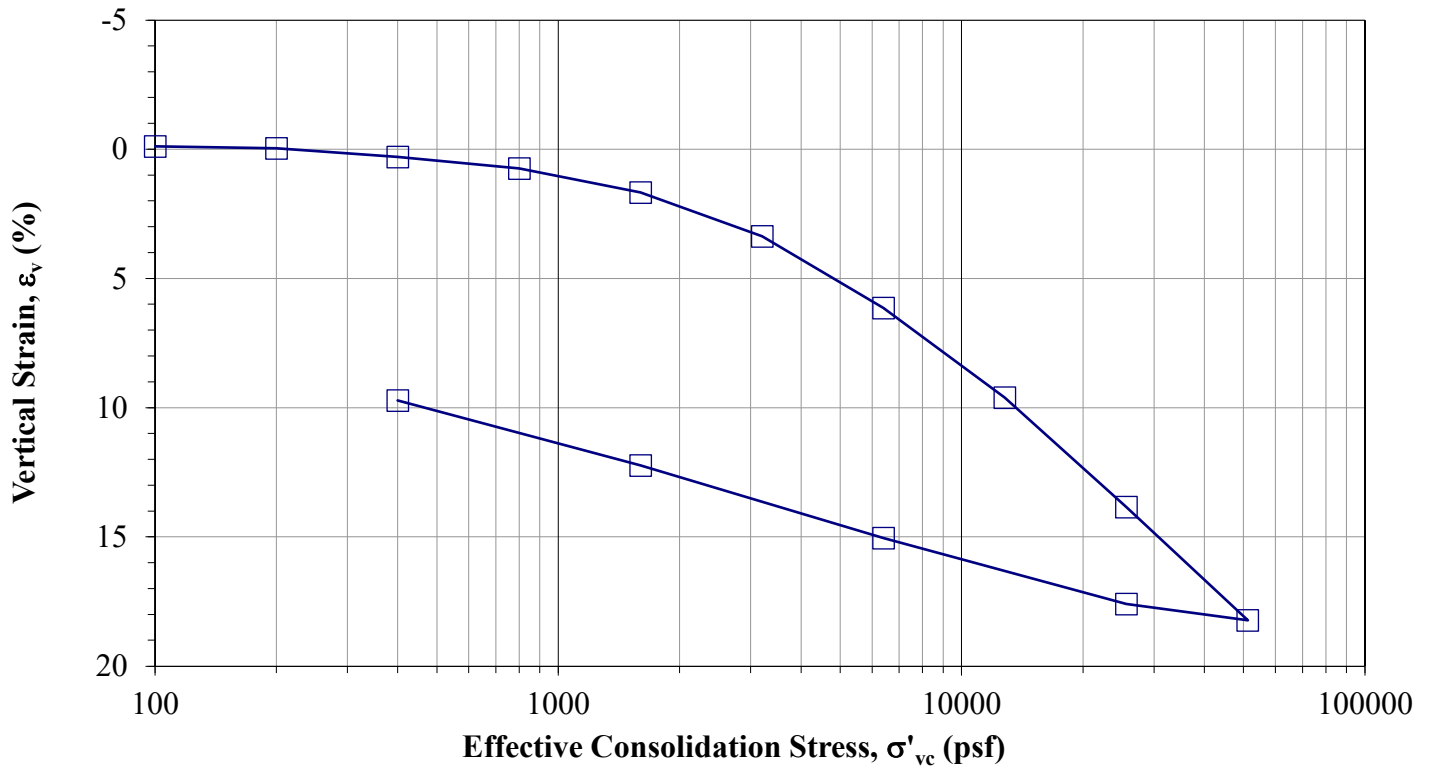
Test method: A
 Inundation stress (psf), timing: 100 Beginning
 Specific gravity, G_s : 2.70 Assumed

Stress (psf)	Dial (in.)	1-D ϵ_v (%)	H_c (in.)	e
Seating	0.0000	0.00	0.9200	0.8177
100	-0.0010	-0.11	0.9210	0.8198
200	-0.0003	-0.04	0.9203	0.8184
400	0.0027	0.30	0.9173	0.8124
800	0.0068	0.74	0.9132	0.8042
1600	0.0154	1.68	0.9046	0.7872
3200	0.0310	3.36	0.8890	0.7566
6400	0.0565	6.14	0.8635	0.7062
12800	0.0884	9.61	0.8316	0.6431
25600	0.1274	13.85	0.7926	0.5660
51200	0.1677	18.23	0.7523	0.4864
25600	0.1619	17.60	0.7581	0.4979
6400	0.1384	15.04	0.7816	0.5444
1600	0.1125	12.23	0.8075	0.5954
400	0.0894	9.72	0.8306	0.6411

Water type used for inundation Tap

	Initial (o)	Final (f)
Sample height, H (in.)	0.920	0.831
Sample diameter, D (in.)	2.412	2.412
Wt. rings + wet soil (g)	176.23	173.80
Wt. rings/tare (g)	42.48	42.48
Moist unit wt., γ_m (pcf)	121.2	131.81
Wet soil + tare (g)	286.57	252.64
Dry soil + tare (g)	247.41	224.39
Tare (g)	119.92	124.70
Water content, w (%)	30.7	28.3
Dry unit wt., γ_d (pcf)	92.7	102.7
Saturation	1.00	1.00

*Note: C_v , C_c , C_r , and σ'_p to be determined by Geotechnical Engineer.



Comments: Test specimen swelled upon inundation and at 100, 200 and 400 psf load steps.

Entered: _____
 Reviewed: _____

Unconfined Compressive Strength of Cohesive Soils
(ASTM D2166)

Project: Benjamin Slough Culvert
No: 00511-032
 Location: Benjamin, Utah
 Date: 2/15/2024
 By: CJ

Boring No.: B-1
Sample: 8
Depth: 20.0'
 Sample Description: Grey clay
 Sample type: Undisturbed

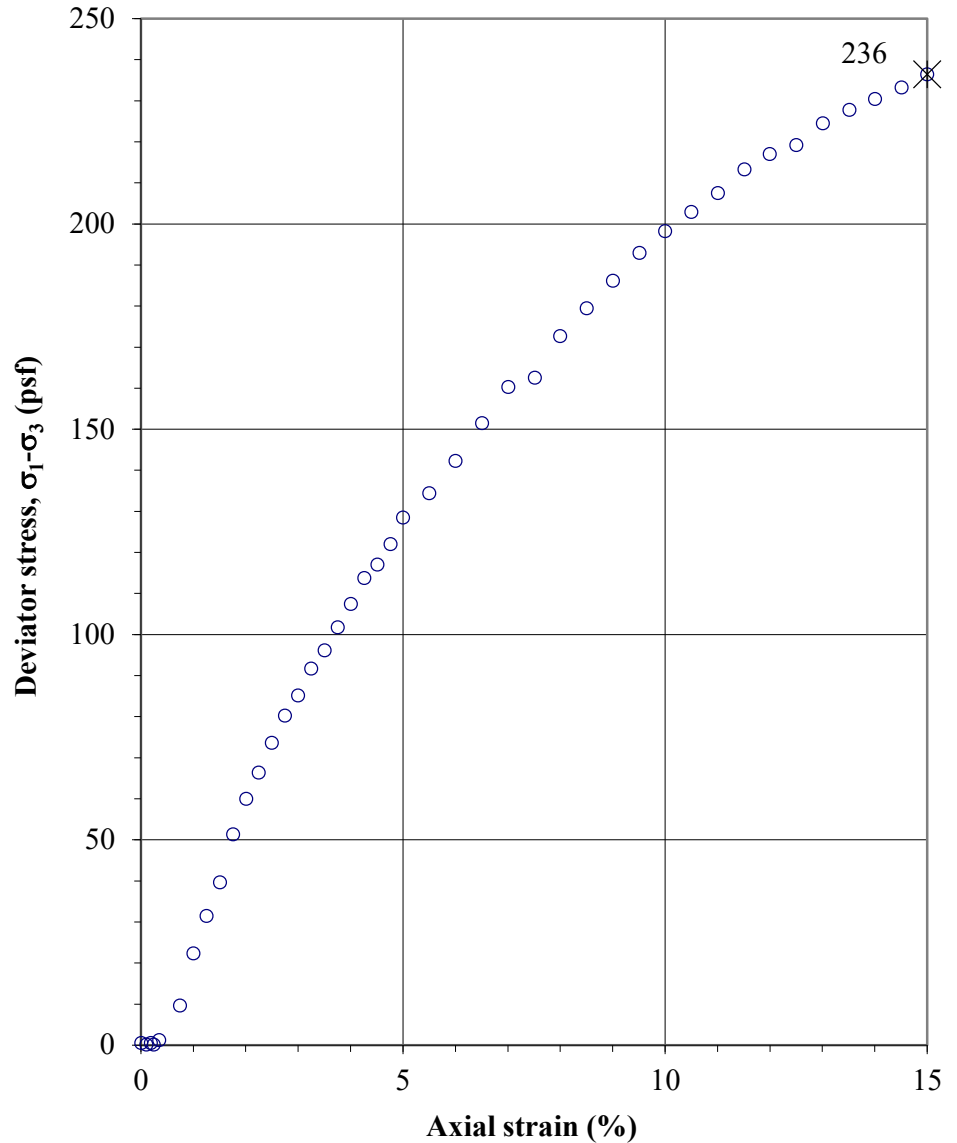
Specific gravity, G _s	2.70
Sample height, H (in.)	5.585
Sample diameter, D (in.)	2.407
Sample volume, V (ft ³)	0.0147
Wt. rings + wet soil (g)	991.73
Wt. rings/tare (g)	240.62
Moist soil, W _s (g)	751.11
Moist unit wt., γ _m (pcf)	112.6
Dry unit wt., γ _d (pcf)	84.0
Saturation (%)	91.1
Void ratio, e	1.01

Assumed



Wet soil + tare (g)	243.39
Dry soil + tare (g)	230.72
Tare (g)	193.58
Water content, w (%)	34.1
Strain rate (%/min)	2.0
Strain at failure, ε _f (%)	15.00
Deviator stress at failure, (σ ₁ -σ ₃) _f (psf)	236
Shear stress at failure, q _f = (σ ₁ -σ ₃) _f /2 (psf)	118

Axial Strain (%)	σ _d (psf)	Q (psf)
0.00	0.4	0.2
0.04	-1.8	-0.9
0.10	0.1	0.0
0.13	-0.6	-0.3
0.19	0.5	0.2
0.24	0.1	0.0
0.29	-1.0	-0.5
0.31	-1.6	-0.8
0.35	1.2	0.6
0.40	-2.2	-1.1
0.45	-1.7	-0.9
0.51	-1.5	-0.8
0.74	9.6	4.8
0.99	22.3	11.2
1.25	31.4	15.7
1.50	39.6	19.8
1.76	51.3	25.7
2.01	59.9	30.0
2.24	66.4	33.2
2.49	73.6	36.8
2.74	80.2	40.1
3.00	85.1	42.6
3.25	91.7	45.8
3.50	96.2	48.1
3.75	101.7	50.8
4.00	107.4	53.7
4.26	113.8	56.9
4.51	117.0	58.5
4.76	122.0	61.0
5.00	128.4	64.2
5.50	134.4	67.2
6.00	142.3	71.1
6.50	151.4	75.7
7.01	160.2	80.1
7.51	162.5	81.3
8.00	172.7	86.3
8.50	179.4	89.7
9.00	186.1	93.1
9.51	192.9	96.4
9.99	198.3	99.1
10.50	202.9	101.5
11.01	207.5	103.7
11.51	213.2	106.6
12.00	217.0	108.5
12.50	219.2	109.6
13.01	224.5	112.2
13.51	227.7	113.9
14.00	230.4	115.2
14.51	233.2	116.6
15.00	236.4	118.2



Entered by: _____

Reviewed: _____

Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils
(ASTM D2850)

Project: Benjamin Slough Culvert
No: 00511-032
 Location: Benjamin, Utah
 Date: 2/14/2024
 By: RH

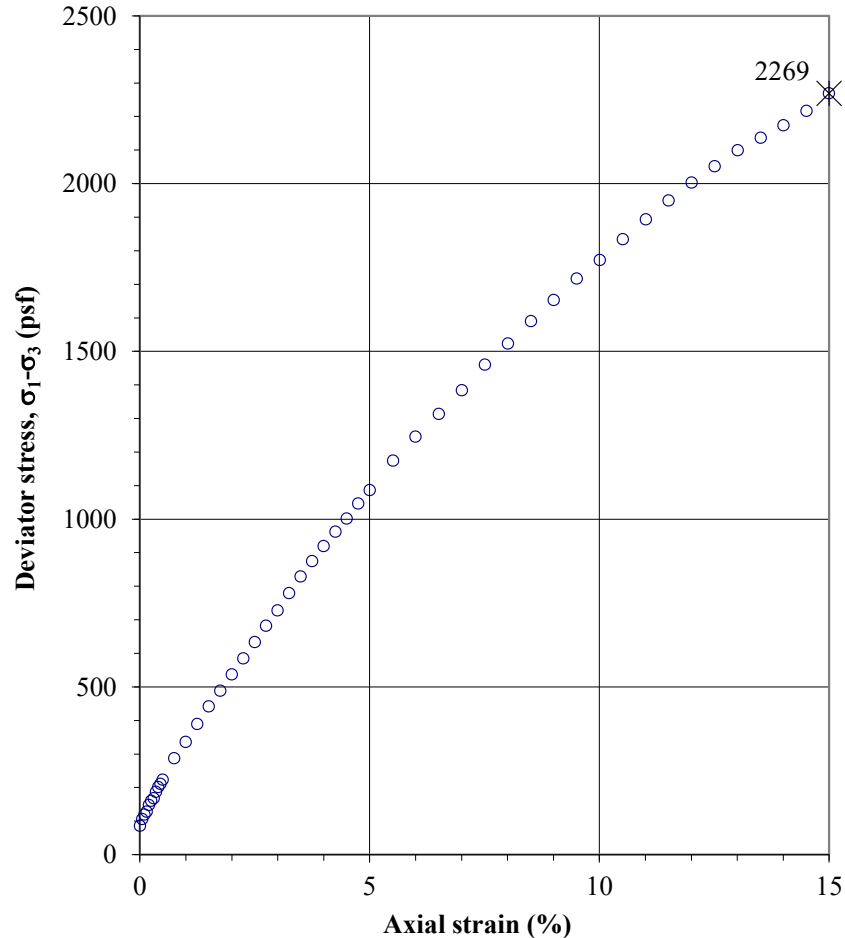
Boring No.: B-2
Sample: 13
Depth: 15.0'
 Sample Description: Grey sandy clay
 Sample type: Undisturbed-trimmed from thin-wall

Specific gravity, G_s	2.70	Assumed
Sample height, H (in.)	5.870	
Sample diameter, D (in.)	2.401	
Sample volume, V (ft ³)	0.0154	
Wt. rings + wet soil (g)	1049.71	
Wt. rings/tare (g)	236.16	
Moist soil, W_s (g)	813.55	
Moist unit wt., γ_m (pcf)	116.6	
Dry unit wt., γ_d (pcf)	89.1	
Saturation (%)	93.1	
Void ratio, e	0.89	



Wet soil + tare (g)	454.50
Dry soil + tare (g)	377.64
Tare (g)	128.37
Water content, w (%)	30.8
Confining stress, σ_3 (psf)	824
Shear rate (in/min)	0.0176
Strain at failure, ϵ_f (%)	15.00
Deviator stress at failure, $(\sigma_1 - \sigma_3)_f$ (psf)	2269
Shear stress at failure, $q_f = (\sigma_1 - \sigma_3)_f / 2$ (psf)	1134

Axial Strain	σ_d	Q
	$\sigma_1 - \sigma_3$	$1/2 \sigma_d$
0.00	85.3	42.7
0.05	104.7	52.4
0.10	118.8	59.4
0.15	127.0	63.5
0.20	146.9	73.4
0.25	159.2	79.6
0.30	167.1	83.6
0.35	185.9	93.0
0.40	200.3	100.1
0.45	209.9	105.0
0.50	222.5	111.2
0.75	286.2	143.1
1.00	335.4	167.7
1.25	388.3	194.2
1.50	440.9	220.5
1.75	488.0	244.0
2.00	536.4	268.2
2.25	584.2	292.1
2.50	632.8	316.4
2.75	681.7	340.8
3.00	726.6	363.3
3.25	778.4	389.2
3.50	828.2	414.1
3.75	873.7	436.8
4.00	918.3	459.1
4.26	962.0	481.0
4.50	1000.9	500.5
4.75	1045.7	522.8
5.00	1085.4	542.7
5.51	1173.0	586.5
6.00	1244.7	622.4
6.51	1312.5	656.3
7.01	1382.9	691.5
7.51	1459.5	729.7
8.01	1522.7	761.4
8.51	1589.3	794.7
9.01	1652.4	826.2
9.51	1716.4	858.2
10.01	1771.8	885.9
10.51	1833.4	916.7
11.01	1892.7	946.4
11.51	1948.6	974.3
12.01	2002.2	1001.1
12.51	2050.6	1025.3
13.01	2098.1	1049.0
13.51	2135.7	1067.9
14.01	2172.7	1086.4
14.51	2215.9	1108.0
15.00	2268.6	1134.3



Entered by: _____
 Reviewed: _____

**Minimum Laboratory Soil Resistivity, pH of Soil for Use in Corrosion Testing, and
Ions in Water by Chemically Suppressed Ion Chromatography** (AASHTO T 288, T 289, ASTM D4327, and C1580)



Project: Benjamin Slough Culvert

No: 00511-032

Location: Benjamin, Utah

Date: 2/16/2024

By: SE/JJ

Sample info.	Boring No.	B-1							
	Sample								
	Depth	2.5'							
Water content data	Wet soil + tare (g)	54.42							
	Dry soil + tare (g)	50.52							
	Tare (g)	23.36							
	Water content (%)	14.4							
Chem. data	pH	8.4							
	Soluble chloride (ppm)	130							
	Soluble sulfate (ppm)	<50							
Resistivity data	Pin method	2							
	Soil box	Miller Small							
		Approximate Soil condition (%)	Resistance Reading (Ω)	Soil Box Multiplier (cm)	Resistivity (Ω-cm)	Approximate Soil condition (%)	Resistance Reading (Ω)	Soil Box Multiplier (cm)	Resistivity (Ω-cm)
		As is	4870	0.67	3263				
		+3	2870	0.67	1923				
		+6	2510	0.67	1682				
		+9	2510	0.67	1682				
		+12	2610	0.67	1749				
		Minimum resistivity (Ω-cm)	1682						

Entered by: _____
Reviewed: _____

APPENDIX C

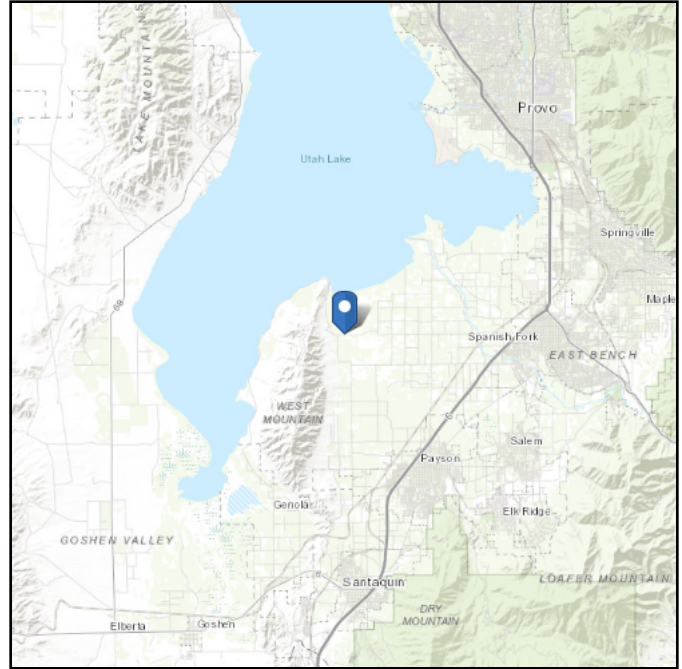
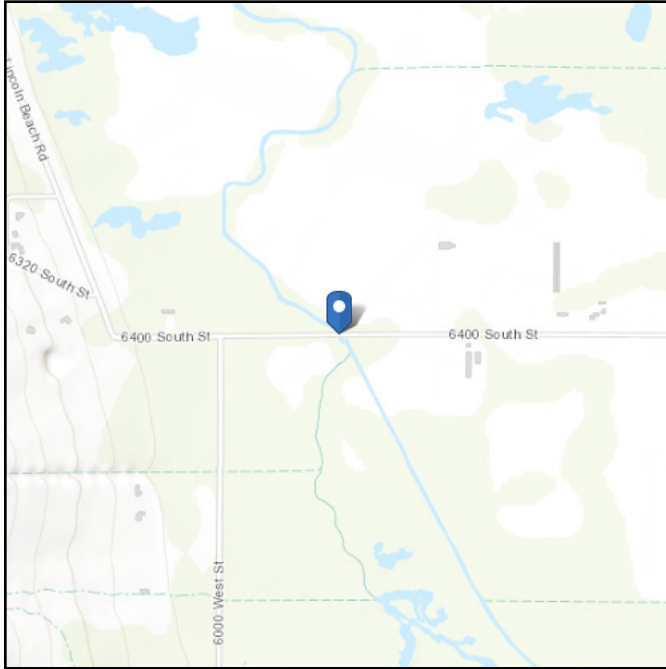


ASCE Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Default (see Section 11.4.3)

Latitude: 40.114233
Longitude: -111.793135
Elevation: 4495.0539733266305 ft (NAVD 88)



Site Soil Class: D - Default (see Section 11.4.3)

Results:

S_s :	1.333	S_{D1} :	N/A
S_1 :	0.486	T_L :	8
F_a :	1.2	PGA :	0.596
F_v :	N/A	PGA _M :	0.715
S_{MS} :	1.6	F_{PGA} :	1.2
S_{M1} :	N/A	I_e :	1
S_{DS} :	1.067	C_v :	1.367

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

Data Accessed: Wed Mar 27 2024

Date Source: [USGS Seismic Design Maps](#)

The ASCE Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE Hazard Tool.

EXHIBIT A

CONTRACTOR INFORMATION FORM

In order to receive consideration, submitted bids must contain responses to all questions.
Failure to respond to all questions may result in disqualification of the bid.

COMPANY NAME & ADDRESS: _____

Is this an Office: _____, Home: _____, Shop: _____, Other: _____
Telephone Number: (____) _____, Emergency Number: (____) _____.
Answering Machine: (____) _____, Fax Number: (____) _____.

COMPANY OWNER: _____
COMPANY PRESIDENT: _____
CONTACT PERSON: _____ Phone: _____
EMAIL ADDRESS: _____

Type of Company (Partnership, Corporation, Venture etc.): _____

If a Corporation, in what State Incorporated: _____
Business License Number: _____
State of Utah Contractor License Number: _____
Federal Tax Identification Number: _____
D&B D-U-N-S Number: _____
How long has this company been in business: _____ Years, and _____ Months.

Officers authorized to execute contracts: _____

What would happen to your company in the event of the owner's absence or death?

Brief History of the Company: _____

Are there any judgments, suits or claims pending against your company? If yes, attach a written explanation. **YES NO**

Has your company operated under any other name (s)? If yes, attach a written explanation. **YES NO**

CONTRACTOR INFORMATION FORM Page 2

Has your firm failed to complete a contract within the last five years?
If "yes" attach explanation. **YES NO**

Has your firm or any partner or officers ever been involved in any
bankruptcy action? If "yes" attach explanation. **YES NO**

Has your firm ever been listed on the Excluded Parties List System? **YES NO**

Are any of your firm's owners, officers, employees, or agents also
employees of Utah County or related to any employees of Utah County
If "yes" attach explanation. **YES NO**

FINANCIAL REFERENCES

1. Bank Name & Address _____

Manager _____ Phone _____

2. Bank Name & Address _____

Manager _____ Phone _____

CLIENT REFERENCES

1. Name: _____, Contact: _____
Address: _____, Phone: _____

2. Name: _____, Contact: _____
Address: _____, Phone: _____

3. Name: _____, Contact: _____
Address: _____, Phone: _____

4. Name: _____, Contact: _____
Address: _____, Phone: _____

EXHIBIT B

CERTIFICATE OF NON-COLLUSION

STATE OF UTAH) Invitation to Bid
)SS for
COUNTY OF UTAH) 6400 South Bridge Replacement

AFFIDAVIT

The undersigned of lawful age, being first duly sworn, disposes and says:
That as a condition precedent to the award of the Utah County project as above captioned,

I _____
 (owner, partner, officer or delegate)

of _____ do
 (company)

solemnly swear that neither I, nor to the best of my knowledge any member or members of my firm or company have either directly or indirectly restrained free and competitive bidding on this project by entering into any agreement, participating in any collusion, or otherwise taking any action unauthorized by Utah County, with regard to this bid or potential agreement resulting therefrom.

Contractor Signature

By: _____
Title: _____

Subscribed/sworn to before me this ____ day of _____ 2024 A.D.
My Commission Expires _____
Residing at _____

Seal

By: _____ Notary Public

EXHIBIT C

SAMPLE AGREEMENT WITH STANDARD TERMS & CONDITIONS



AGREEMENT

THIS AGREEMENT is made and entered into by and between Utah County, a political and corporate body of the State of Utah, located at 100 East Center Street, Provo, Utah 84606, and the following CONTRACTOR:

Name: _____ Contact Person: _____

Address: _____ Phone #: _____

City: _____ State: _____ Zipcode: _____ Email: _____

Legal Status of Contractor: [] Sole Proprietor [] Non-Profit Corporation Limited Liability Company (LLC)
[] Partnership [] For-Profit Corporation
[] Government Department: _____

1. PURPOSE OF CONTRACT

This agreement is to obtain the following products, services, or products and services (be specific):

2. CONTRACT COSTS

Contractor will be:

- [] paid a maximum of \$_____ for costs authorized by this agreement;
[] compensated in accordance with ATTACHMENT A: CONTRACTOR's Proposal.

3. CONTRACT PERIOD

The term of this agreement shall commence on: [] _____, or [] the date of execution of this agreement. This agreement shall terminate on _____ unless terminated early or performance has been completed.

4. ATTACHMENTS

The following indicated attachments are fully incorporated into this agreement:

- [] A: Utah County Standard Terms and Conditions [] F: _____
[] B: CONTRACTOR's Proposal [] G: _____
[] C: Special Provisions [] H: _____
[] D: Utah County Procurement Compliance
[] E: General Liability and Workers Compensation Certificate

Except as explicitly modified by ATTACHMENT C: Special Provisions, any ambiguities or conflicting terms will be resolved by granting deference to the terms of ATTACHMENT A: Utah County's Standard Terms and Conditions.

IN WITNESS WHEREOF, the parties have executed this agreement on ____ of _____ 20__.

ATTEST:
AARON R. DAVIDSON
Utah County Clerk

BOARD OF COUNTY COMMISSIONERS,
UTAH COUNTY, UTAH

By: _____
Deputy Clerk

By: _____
BRANDON B. GORDON, Chair

APPROVED AS TO FORM AND LEGALITY:
JEFFREY S. GRAY
Utah County Attorney

CONTRACTOR

By: _____
Deputy Utah County Attorney

By: _____
Its: _____

ATTACHMENT A:
UTAH COUNTY STANDARD TERMS AND CONDITIONS FOR PRODUCTS AND SERVICES

1. DEFINITIONS. The following terms shall have the meanings set forth below:

(A) The “Agreement” consists of the following documents:

(i) The Utah County Agreement cover page, which contains the signatures of Utah County and Contractor;

(ii) This Attachment A: Utah County Standard Terms and Conditions for Products and Services; and

(iii) Any other express written attachments that are incorporated by reference on the Utah County Agreement cover page.

(B) “Contractor” means the individual or entity delivering the Products and Services identified in the Agreement. The term “Contractor” shall include the individual’s or entities’ agents, officers, employees, and partners.

(C) The “County” means Utah County, a political subdivision of the State of Utah, as directed and managed by a majority vote of the Board of County Commissioners of Utah County.

(D) “Products” means any products to be delivered to the County by Contractor as described in the Utah County Agreement cover page, including any products described in any attachments that are incorporated by reference on the Utah County Agreement cover page.

(E) “Services” means any services to be performed for the County by Contractor as described in the Utah County Agreement cover page, including any services described in any attachments that are incorporated by reference on the Utah County Agreement cover page.

(F) “Subcontractors” mean subcontractors or subconsultants that are under the direct or indirect control or responsibility of Contractor, and includes all independent contractors, agents, employees, or authorized resellers.

2. EXTRA WORK.

(A) Extra work shall be undertaken only when previously authorized in writing by the County and is defined as additional work which is neither shown nor defined in the Agreement or the attached Contractor’s proposal (if any) but determined by the County to be necessary to the project. Extra work is also defined as that additional effort necessary by reason of changed conditions which are radical and unforeseeable.

(B) Miscellaneous items normally associated with the major work items included in the Agreement, but which may not be specifically identified, shall be furnished by Contractor as if they had been included in the Agreement, without additional cost to the County. After written prior authorization of the Board of County Commissioners of Utah County, payment for authorized extra work will be made in the previously authorized amount only.

3. PAYMENT. Payments from the County are normally made within thirty (30) days following the date an order is delivered, service is performed, or the date a correct invoice is received, whichever is later. All payments for the Agreement will be remitted electronically, by mail, or as otherwise determined by the County. Contractor shall accept payment by check or by Purchasing Card without any additional fees.

4. OWNERSHIP IN INTELLECTUAL PROPERTY. The County and Contractor each recognize that each has no right, title, interest, proprietary or otherwise in the intellectual property owned or licensed by the other, unless otherwise agreed upon by the parties in writing. The County will have all rights, title, and

ownership of all websites and social media accounts, including any passwords, usernames, or other pertinent login information or hosting credentials; advertising materials, including any content or work product; images; newsletters; and intellectual property, including derivative works, created, or arising out of the performance of the Agreement, unless otherwise indicated in the Agreement. Contractor will give the County a list of all current passwords, usernames, and any other relevant information or credentials necessary for access and control of any property under the Agreement upon completion of the Agreement or upon the County's request.

5. INSURANCE.

(A) Contractor agrees to carry Commercial General Liability insurance coverage equal to or greater than three million dollars (\$3,000,000) per occurrence, or in a lesser amount if explicitly authorized and identified on the Utah County Agreement cover page. This coverage shall provide liability insurance to cover the activities of Contractor and its subcontractors, all equipment and vehicles, public or private, used in the performance of the Agreement, and to add the County as an additional insured for any Services in the contract. Prior to commencement of work, Contractor shall furnish a Certificate of Insurance to the County evidencing that Contractor has this insurance in place and that the County is an additional insured. An umbrella policy may be used to supplement the Commercial General Liability insurance coverage if needed to reach the coverage requirement.

(B) Prior to commencement of Services, Contractor shall furnish a Certificate of Insurance to the County evidencing that Contractor has Workers Compensation Insurance for the Contractor and Subcontractors.

6. Data Privacy. If Contractor, as part of this agreement or transaction, will receive or work with County information, or if they will be gathering data on behalf of the County, Contractor will be required to comply with the following provisions as applicable.

(A) **Cyber Insurance.** Contractor agrees to purchase and maintain throughout the term of this Agreement a technology and professional liability insurance policy, including coverage for network security and data protection liability insurance (also called "cyber liability") covering liabilities for financial loss resulting or arising from acts, errors, or omissions, in rendering technology or professional services or in connection with the specific services described in violation or infringement of any right of privacy, including breach of security and breach of security or privacy laws, rules or regulations globally, now or hereinafter constituted or amended; data theft, damage, unauthorized disclosure, destruction, or corruption, including without limitation, unauthorized access, unauthorized use, identity theft, theft of personally identifiable information or confidential government, corporate, or public information in whatever form; transmission of a computer virus or other type of malicious code; participation in a denial of service attack on third party computer systems; loss or denial of service; with no cyber terrorism exclusion; with a minimum limit of three million dollars (\$3,000,000) for each and every claim and in the aggregate. Such coverage must include technology and professional liability including breach of contract, privacy and security liability, privacy regulatory defense and payment of civil fines, payment of credit card provider penalties, and breach response costs (including without limitation, notification costs, forensics, credit protection services, call center services, identity theft protection services, and crisis management and public relations services). Such insurance must explicitly address all of the foregoing without limitation if caused by an employee of the Contractor or an independent contractor working on behalf of the Contractor in performing services under this Agreement. Policy must provide coverage for wrongful acts, claims, and lawsuits anywhere in the world. Such insurance must include affirmative contractual liability coverage for any data breach indemnity in this Agreement, for all damages, defense costs, privacy regulatory civil fines and penalties, and reasonable and necessary data breach notification, forensics, credit protection services, public relations and crisis management, and other data breach mitigation services resulting from a confidentiality or security breach by or on behalf of the Contractor. Contractor shall furnish evidence of coverage at the time of any bid or proposal, and upon request at any time during the term of the Agreement.

(B) Protecting Personal Identifying Information. Utah Code 63A-19-101 *et seq.* requires governmental agencies follow specific standards to protect personal data privacy. Consistent with Utah Code 63A-19-401(4)(a) Contractor acknowledges that Contractor is also required to comply with the relevant requirements of this chapter with regard to the personal data processed or accessed by Contractor as part of Contractor's duties under the Agreement to the same extent as required of the governmental entity.

7. **GOVERNING LAW AND VENUE.** The Agreement shall be governed, construed, and enforced in accordance with the laws of the State of Utah and Utah County. Any action or proceeding arising from the Agreement shall be brought in a court of competent jurisdiction in the State of Utah. Venue shall be in Provo, in the Fourth Judicial District Court for Utah County.
8. **COMPLIANCE WITH LAWS AND REGULATIONS.** At all times during the Agreement, Contractor and all Products and Services performed under the Agreement shall comply with all applicable federal and state constitutions, laws, rules, codes, orders, and regulations, including applicable licensure and certification requirements. Any violation by Contractor of applicable law shall constitute an event of default under the Agreement and Contractor shall indemnify the County from and against any and all liability arising out of or connected with the violation, to include all attorney fees and costs incurred by the County as a result of the violation. Contractor is responsible, at its expense, to acquire, maintain, and renew all necessary permits and licenses required for its lawful performance of its duties and obligations under the Agreement during the term of the Agreement. To the extent that Contractor uses, stores, transfers, or manipulates any data in the performance of its obligations, Contractor will further comply with all applicable privacy and data laws and regulations, including but not limited to General Data Protection Regulation 2016/679 of the European Union ("GDPR") and similar provisions from any jurisdiction in the United States and any locations where data is or may be stored.
9. **EMPLOYMENT STATUS VERIFICATION.** Contractor shall register and participate in the Status Verification System and comply with Utah Code section 63G-12-302 of the Identity Documents and Verification Act. Contractor shall require an affidavit verifying compliance with Utah Code section 63-G-12-302 from each of its contractors and subcontractors.
10. **INDEPENDENT CONTRACTOR.** Contractor's legal status is that of an independent contractor, and in no manner shall Contractor be deemed an employee or agent of the County, and therefore is not entitled to any of the benefits associated with such employment. As an independent contractor, Contractor shall have no express or implied authority to bind the County to any agreements, settlements, liabilities, or understandings whatsoever, and agrees not to perform any acts as an agent for the County. Contractor shall remain responsible for all applicable federal, state, and local taxes, and all FICA contributions.
11. **INDEMNIFICATION.** To the fullest extent permitted by law, Contractor shall indemnify, defend, and hold harmless the County, its officers, employees, and agents, from and against any and all claims, demands, causes of action, orders, decrees, judgements, losses, risks of loss, damages, expenses, and liabilities arising out of or related to the Agreement. Contractor shall also pay any litigation expenses that the County incurs, including attorney's fees, arising out of or related to the Agreement. As between the parties to the Agreement, Contractor shall assume sole liability for any injuries or damages caused to a third party as a result of fulfillment of the Agreement. The County reserves the right to conduct, control, and direct its own defense for any claims, demands, causes of action, orders, decrees, judgements, losses, damages, expenses, and liabilities arising out of or related to the Agreement.
12. **INDEMNIFICATION RELATING TO INTELLECTUAL PROPERTY.** Contractor shall indemnify and hold the County harmless from and against any and all damages, expenses (including reasonable attorney's fees), claims, judgments, liabilities, and costs in any action or claim brought against the County for infringement of a third party's copyright, trademark, trade secret, or other proprietary right arising from this Agreement.

13. **GOVERNMENTAL IMMUNITY.** The County is a corporate and political subdivision of the State of Utah, subject to the Governmental Immunity Act of Utah (the “Act”). The County does not waive any procedural or substantive defense or benefit provided or to be provided by the Act or any comparable legislative enactment. The parties agree that the County shall only be liable within the parameters of the Act. Nothing contained in the Agreement shall be construed in any way to modify the limits set forth in that Act or the basis for liability as established in the Act.
14. **NON-FUNDING CLAUSE.** The County intends to request the appropriation of funds to be paid for the services provided by Contractor under the Agreement. The Agreement shall create no obligation on the County as to succeeding annual budget cycles and if funds are not available beyond December 31 of any effective annual budget cycle of the Agreement, or if the budget is amended and such funds are no longer available, the County’s obligation for performance of the Agreement shall be null and void. This termination shall not be construed as a breach of the Agreement or any event of default under the Agreement and the termination shall be without penalty, and no right of action for damages or other relief shall accrue to the benefit of Contractor, its successors, or its assigns, as to the Agreement. If funds are not appropriated for a succeeding annual budget cycle to fund performance by the County under the Agreement, or if the budget is amended to make such funds no longer available, the County shall attempt to notify Contractor of non-funding and the termination of the Agreement.
15. **SALES TAX EXEMPTION.** The County’s sales and use tax exemption number is 11748944 002 STC. The tangible personal property or services being purchased are to be paid from the County’s funds and used in the exercise of that entity’s essential functions. If the items being purchased are construction materials, they will be converted into real property by employees of this government entity, unless otherwise stated in the Agreement. As such, Contractor shall not charge the County any sales tax for the product(s) purchased under the Agreement.
16. **CONFIDENTIALITY.** Materials, information, data, reports, plans, analyses, budgets, and similar documentation provided to or prepared by Contractor in performance of the Agreement shall be owned by the County and shall be held confidential by Contractor. In addition, all information provided to Contractor by the County for the purposes of Contractor’s performance of the Products or Services, whether provided in writing or any other form, shall be held in confidence by Contractor and Contractor shall not release any of the information to any third party, any member of Contractor’s firm who is not involved in the performance of Products or Services, or to any representative of the news media without prior written consent of the County. The County shall have the sole obligation or privilege of releasing such information as required by law. Any employee or member of Contractor’s firm, subcontractor, or agent with whom Contractor shares any information as described in this section will be under the same obligations of confidentiality, and Contractor is required to secure and provide to County written commitments to that effect from each such recipient of information.
17. **TERMINATION.** Unless otherwise stated in Attachment C: Special Provisions, the Agreement may be terminated with cause by either party, in advance of the specified termination date, upon written notice being given by the other party. If the violation is reasonably subject to cure, the party in violation will be given 10 working days after notification to correct and cease the violation, after which the Agreement may be terminated for cause. Time allowed for cure will not diminish or eliminate Contractor’s liability for damages. The Agreement may be terminated without cause, in advance of the specified expiration date, by the County upon 30 days prior written notice being given to Contractor. On termination of the Agreement, all accounts and payments will be processed according to the financial arrangements in the Agreement for approved services rendered prior to the date of termination, subject to any offsetting claims by the County.
18. **FORCE MAJEURE.** The County will not be held liable for delay or default caused by fire, riot, acts of God, State or Utah County declared state of emergency, or war. The County may terminate the Agreement after determining such delay or default will reasonably prevent successful performance of the Agreement.
19. **SEVERABILITY OF AGREEMENT.** The invalidity of any portion of the Agreement shall not prevent

the remainder from being carried into effect.

20. **LEGAL SUPPORT.** Contractor shall be responsible to provide all legal support for the project including but not limited to the preparation of contracts with subcontractors.
21. **NO PRESUMPTION.** Should any provision of the Agreement require judicial interpretation, the Court interpreting or construing the same shall not apply a presumption that the terms in the Agreement shall be more strictly construed against the party, by reason of the rule of construction that a document is to be construed more strictly against the person who himself or through his agents prepared the same, it being acknowledged that all parties have participated in the preparation hereof.
22. **WARRANTY.** To the maximum extent permitted under Utah State law, Contractor warrants to the County that all services and materials furnished under the Agreement will be of the highest quality, consistent with the degree of skill and care ordinarily exercised by similarly situated members of Contractor's profession, and in conformance with the terms hereof.

Contractor warrants and assumes responsibility for all products (including hardware, firmware, and software products) that it licenses, contracts, or sells to the County under the Agreement for a period of one year, unless otherwise specified and mutually agreed upon elsewhere in the Agreement or Contractor's proposal, attached hereto (if any). Contractor (seller) acknowledges that all warranties granted to the buyer by the Uniform Commercial Code of the State of Utah apply to the Agreement. Product liability disclaimers and warranty disclaimers from the seller are not applicable to the Agreement unless otherwise specified and mutually agreed upon elsewhere in the Agreement. In general, Contractor warrants that: (1) the product will do what the salesperson said it would do, (2) the product will live up to all specific claims that the manufacturer makes in their advertisements, (3) the product will be suitable for the ordinary purposes for which such product is used, (4) the product will be suitable for any special purposes that the County has relied upon Contractor's skill or judgment to consider when it advised the County about the product, (5) the product has been properly designed and manufactured, and (6) the product is free of defects or unusual problems about which the County has not been warned in writing prior to entering into the Agreement. Remedies available to the County include, without limitation, the following: Contractor will repair or replace (at no charge to the County) the product whose nonconformance is discovered and made known to Contractor in writing. If the repaired or replaced product proves to be inadequate, or fails of its essential purpose, Contractor will refund the full amount of any payments that have been made. Nothing in this warranty will be construed to limit any rights or remedies the County may otherwise have under the Agreement.

23. **TIME IS OF THE ESSENCE.** The County and Contractor recognize that time is of the essence here and the County will suffer financial loss if any Products or Services are not delivered and performed within the time specified in the Agreement, plus any extensions approved in writing by the County. Contractor shall be liable for all reasonable damages to the County and to anyone whom the County may be liable to as a result of Contractor's failure to timely deliver and perform the Products and Services.
24. **DELIVERY.** Unless otherwise specified in this contract, all deliveries will be F.O.B. destination with all transportation and handling charges paid by Contractor. Responsibility and liability for loss or damage will remain with Contractor until final inspection and acceptance when responsibility will pass to the County except as to latent defects, fraud, and Contractor's warranty obligations, if applicable.
25. **CONDITION AND TITLE.** The products delivered by Contractor to the County shall be new and free of all faults and defects. Upon payment of the purchase price by the County to Contractor, Contractor shall provide the County with clear title, free and clear of all liens and encumbrances, if applicable.
26. **INTERPRETATION OF AGREEMENT.** Whenever the context of any provision shall require it, the singular number shall be held to include the plural number, and vice versa, and the use of any gender shall include all genders. The paragraph and section headings in this Agreement are for convenience only and do

not constitute a part of the provisions hereof.

27. **NOTICES.** All notices, demands and other communications required or permitted to be given hereunder shall be in writing and shall be deemed to have been properly given if delivered by hand or by certified mail, return receipt requested, postage paid, to the parties at their respective places of business, or at such other addresses as may be designated by notice given hereunder, including by email to the contact person for Contractor at the email address identified on the Utah County Agreement cover page.
28. **COUNTERPARTS AND FACSIMILE SIGNATURES.** The Agreement may be executed in counterparts, each of which when executed and delivered shall be deemed to be an original, binding between the executing parties, and all of which together constitute one and the same instrument. Original, facsimile, emailed, texted, electronic, or power of attorney signatures shall be binding upon the executing party.
29. **AMENDMENTS.** No oral modifications or amendments to the Agreement shall be effective. The Agreement may be modified or amended by a written agreement signed by the parties.
30. **ASSIGNMENT.** The parties to the Agreement shall not assign the Agreement without the prior written consent of the other party to the Agreement. No assignment shall relieve the original parties from any liability arising out of or related to the Agreement.
31. **SUCCESSORS IN INTEREST.** The Agreement shall be binding upon the heirs, successors, administrators, and assigns of each of the parties.
32. **WAIVER.** A waiver of any right, power, or privilege shall not be construed as a waiver of any subsequent right, power, or privilege. Any waiver must be in writing and signed by the party making the waiver.
33. **SURVIVAL.** The provisions of this Agreement which by their terms call for performance subsequent to termination of the Agreement shall so survive such expiration or termination, such as but not limited to: **Section 4. Ownership of Intellectual Property, Section 11. Indemnification, Section 12. Indemnification Relating to Intellectual Property, and Section 16. Confidentiality.**
34. **ENTIRE AGREEMENT.** The Agreement shall constitute the entire agreement between the parties and any prior understanding or representation of any kind preceding the date of the Agreement shall not be binding upon either party except to the extent incorporated in the Agreement.

Revised June 11, 2024