CITY OF Grand Junction COLORADO

LETTER OF INTENT

Date: May 29, 2018

Company: RJH Consultants, Inc.

Project: Professional Services for Safety Evaluation of Hogchute Dam (RFP-4519-18-DH)

Based upon review of the proposals received for Professional Services for Safety Evaluation of Hogchute Dam (RFP-4519-18-DH), your company has been selected as the preferred proposer of this solicitation process. It is the intent of the City of Grand Junction to award the aforementioned contract to your company as is listed in the RFP documents and your proposal response.

This contract must be approved by the City Manager prior to award and a contract being issued.

Please feel free to contact me with any questions at 970-244-1545.

Thank you and Best Regards

Duane Hoff Jr., Senior Buyer

CITY OF GRAND JUNCTION, COLORADO

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CONTRACT

This CONTRACT made and entered into this 26th day of June, 2018 by and between the **City of Grand Junction, Colorado,** a government entity in the County of Mesa, State of Colorado, hereinafter in the Contract Documents referred to as the "Owner" and **RJH Consultants, Inc.** hereinafter in the Contract Documents referred to as the "Firm."

WITNESSETH:

WHEREAS, the Owner advertised that sealed Responses would be received for furnishing all labor, tools, supplies, equipment, materials, and everything necessary and required for the Project described by the Contract Documents and known as **Professional Services for Safety Evaluation of Hogchute Dam RFP-4519-18-DH**.

WHEREAS, the Contract has been awarded to the above named Firm by the Owner, and said Firm is now ready, willing and able to perform the Services specified in the Notice of Award, in accordance with the Contract Documents.

- **Proposed Schedule:**

1. Hogchute Reservoir expected to at or near full-capacity – June, 2018.
2. Start Dam Safety Evaluation Study – July, 2018.
3. Consultant completes Task 1 and Task 2 field work as described in Section 4.3 during July, August, and September 2018.
4. Start draining Hogchute Reservoir in early -mid September, 2018. Depending on reservoir pool level, it's anticipated to take 6 – 8 weeks to drain Hogchute.
5. Consultant completes Task 3 field work while reservoir is empty in October and November, 2018.
6. Consultant submits Dam Safety Evaluation Report to City on January 8, 2019.
7. Consultant schedules meeting with the Colo. Dam Safety Office, Division 4 and the City to review and discuss the PFM's that were determined to need rehabilitation and/or repair. This meeting will be scheduled for mid-January, 2018.
8. Winter of 2019, City advertises a RFP for Consultant selection to design and produce a construction package with plans and specifications that will address the PFM's. Construction plans and specifications completed by the end of 2019. *(Not Part of this current RFP)*
9. Construction of improvements to Hogchute Reservoir's dam begins in June, 2020. *(Not Part of this current RFP)*;

NOW, THEREFORE, in consideration of the compensation to be paid the Firm, the mutual covenants hereinafter set forth and subject to the terms hereinafter stated, it is mutually covenanted and agreed as follows:

ARTICLE 1

Contract Documents: It is agreed by the parties hereto that the following list of instruments, drawings, and documents which are attached hereto, bound herewith, or incorporated herein by reference constitute and shall be referred to either as the "Contract Documents" or the "Contract", and all of said instruments, drawings, and documents taken together as a whole constitute the Contract between the parties hereto, and they are fully a part of this agreement as if they were set out verbatim and in full herein:

The order of contract document governance shall be as follows:

a. The body of this contract agreement
b. Solicitation Documents for the Project; **Professional Services for Safety Evaluation of Hogchute Dam;**
c. Firms Response to the Solicitation
d. Services Change Requests (directing that changed services be performed);
e. Field Orders
f. Change Orders.

ARTICLE 2

Definitions: The clauses provided in the Solicitation apply to the terms used in the Contract and all the Contract Documents.

ARTICLE 3

Contract Services: The Firm agrees to furnish all labor, tools, supplies, equipment, materials, and all that is necessary and required to complete the tasks associated with the Services described, set forth, shown, and included in the Contract Documents as indicated in the Solicitation Document.

ARTICLE 4

Contract Time: Time is of the essence with respect to this Contract. The Firm hereby agrees to commence Services under the Contract on or before the date specified in the Solicitation from the Owner, and to achieve Substantial Completion and Final Completion of the Services within the time or times specified in the Solicitation.

ARTICLE 5

Contract Price and Payment Procedures: The Firm shall accept as full and complete compensation for the performance and completion of all of the Services specified in the Contract Documents, the **amended scope** not to exceed price of **One Hundred Twenty One Thousand Two Hundred Thirty Three and 00/100 Dollars ($121,233.00).** If this Contract contains unit price pay items, the Contract Price shall be adjusted in accordance with the actual quantities of items completed and accepted by the

Owner at the unit prices quoted in the Solicitation Response. The amount of the Contract Price is and has heretofore been appropriated by the Grand Junction City Council for the use and benefit of this Project. The Contract Price shall not be modified except by Change Order or other written directive of the Owner. The Owner shall not issue a Change Order or other written directive which requires additional services to be performed, which services causes the aggregate amount payable under this Contract to exceed the amount appropriated for this Project, unless and until the Owner provides Firm written assurance that lawful appropriations to cover the costs of the additional services have been made.

Unless otherwise provided in the Solicitation, monthly partial payments shall be made as the Services progresses. Applications for partial and Final Payment shall be prepared by the Firm and approved by the Owner in accordance with the Solicitation.

ARTICLE 6

Contract Binding: The Owner and the Firm each binds itself, its partners, successors, assigns and legal representatives to the other party hereto in respect to all covenants, agreements and obligations contained in the Contract Documents. The Contract Documents constitute the entire agreement between the Owner and Firm and may only be altered, amended or repealed by a duly executed written instrument. Neither the Owner nor the Firm shall, without the prior written consent of the other, assign or sublet in whole or in part its interest under any of the Contract Documents and specifically, the Firm shall not assign any moneys due or to become due without the prior written consent of the Owner.

ARTICLE 7

Severability: If any part, portion or provision of the Contract shall be found or declared null, void or unenforceable for any reason whatsoever by any court of competent jurisdiction or any governmental agency having the authority thereover, only such part, portion or provision shall be effected thereby and all other parts, portions and provisions of the Contract shall remain in full force and effect.

IN WITNESS WHEREOF, City of Grand Junction, Colorado, has caused this Contract to be subscribed and sealed and attested in its behalf; and the Firm has signed this Contract the day and the year first mentioned herein.

The Contract is executed in two counterparts.

CITY OF GRAND JUNCTION, COLORADO

DocuSigned by:
By: Duane Hoff Jr., Senior Buyer – City of Grand Junction 6/27/2018 | 14:09 MDT
9F789E7D30F14BC...
Duane Hoff Jr., Senior Buyer Date

RJH Consultants, Inc.

DocuSigned by:
By: Robert Huzjak, P.E., RJH Consultants, Inc. 6/27/2018 | 12:27 MDT
1B5C38C418A1EC...
Robert Huzjak, P.E., RJH Consultants, Inc. President Date

Request for Proposal
RFP-4483-18-DH

Design Services for City of Grand Junction Kannah Creek Intake Rehabilitation

RESPONSES DUE:
March 21, 2018 prior to 3:30 PM MST
Accepting Electronic Responses Only
Responses Only Submitted Through the Rocky Mountain E-Purchasing System (RMEPS)
https://www.rockymountainbidsystem.com/default.asp
(Purchasing Representative does not have access or control of the vendor side of RMEPS. If website or other problems arise during response submission, vendor MUST contact RMEPS to resolve issue prior to the response deadline. 800-835-4603)

PURCHASING REPRESENTATIVE:
Duane Hoff Jr., Senior Buyer
duaneh@gjcity.org
970-244-1545

This solicitation has been developed specifically for a Request for Proposal intended to solicit competitive responses for this solicitation, and may not be the same as previous City of Grand Junction solicitations. All offerors are urged to thoroughly review this solicitation prior to submitting. Submittal by **FAX, EMAIL or HARD COPY IS NOT ACCEPTABLE** for this solicitation.

REQUEST FOR PROPOSAL

TABLE OF CONTENTS

Section

REQUEST FOR PROPOSAL

SECTION 1.0: ADMINISTRATIVE INFORMATION & CONDITIONS FOR SUBMITTAL

1.1 Issuing Office: This Request for Proposal (RFP) is issued by the City of Grand Junction. All contact regarding this RFP is directed to:

RFP QUESTIONS:
Duane Hoff Jr., Senior Buyer
duaneh@gjcity.org

1.2 Purpose: The purpose of this RFP is to obtain proposals from qualified professional engineering firms to provide design services for the Kannah Creek Intake Rehabilitation Project.

1.3 The Owner: The Owner is the City of Grand Junction, Colorado and is referred to throughout this Solicitation. The term Owner means the Owner or his authorized representative.

1.4 Site Visit: A site visit is recommended for all prospective offerors. The purpose will be to inspect and to clarify the contents of this Request for Proposal (RFP). Meeting location shall begin at 10001 Kannah Creek Road, Whitewater, CO 81527 on March 7, 2018 at 2:00pm.

1.5 Compliance: All participating Offerors, by their signature hereunder, shall agree to comply with all conditions, requirements, and instructions of this RFP as stated or implied herein. Should the Owner omit anything from this packet which is necessary to the clear understanding of the requirements, or should it appear that various instructions are in conflict, the Offeror(s) shall secure instructions from the Purchasing Division prior to the date and time of the submittal deadline shown in this RFP.

1.6 Submission: Please refer to section 5.0 for what is to be included. ***Each proposal shall be submitted in electronic format only, and only through the Rocky Mountain E-Purchasing website (https://www.rockymountainbidsystem.com/default.asp).*** *This site offers both "free" and "paying" registration options that allow for full access of the Owner's documents and for electronic submission of proposals. (Note: "free" registration may take up to 24 hours to process. Please Plan accordingly.)* Please view our "**Electronic Vendor Registration Guide"** at http://www.gjcity.org/business-and-economic-development/bids/ for details. For proper comparison and evaluation, the City requests that proposals be formatted as directed in Section 5.0 "Preparation and Submittal of Proposals." Submittals received that fail to follow this format may be ruled non-responsive. (Purchasing Representative does not have access or control of the vendor side of RMEPS. If website or other problems arise during response submission, vendor **MUST** contact RMEPS to resolve issue prior to the response deadline. **800-835-4603**).

1.7 Altering Proposals: Any alterations made prior to opening date and time must be initialed by the signer of the proposal, guaranteeing authenticity. Proposals cannot be altered or amended after submission deadline.

1.8 Withdrawal of Proposal: A proposal must be firm and valid for award and may not be withdrawn or canceled by the Offeror for sixty (60) days following the submittal deadline date, and only prior to award. The Offeror so agrees upon submittal of their proposal. After award this statement is not applicable.

1.9 Acceptance of Proposal Content: The contents of the proposal of the successful Offeror shall become contractual obligations if acquisition action ensues. Failure of the successful Offeror to accept these obligations in a contract shall result in cancellation of the award and such vendor shall be removed from future solicitations.

1.10 Addenda: All questions shall be submitted in writing to the appropriate person as shown in Section 1.1. Any interpretations, corrections and changes to this RFP or extensions to the opening/receipt date shall be made by a written Addendum to the RFP by the City Purchasing Division. Sole authority to authorize addenda shall be vested in the City of Grand Junction Purchasing Representative. Addenda will be issued electronically through the Rocky Mountain E-Purchasing website at www.rockymountainbidsystem.com. Offerors shall acknowledge receipt of all addenda in their proposal.

1.11 Exceptions and Substitutions: All proposals meeting the intent of this RFP shall be considered for award. Offerors taking exception to the specifications shall do so at their own risk. The Owner reserves the right to accept or reject any or all substitutions or alternatives. When offering substitutions and/or alternatives, Offeror must state these exceptions in the section pertaining to that area. Exception/substitution, if accepted, must meet or exceed the stated intent and/or specifications. The absence of such a list shall indicate that the Offeror has not taken exceptions, and if awarded a contract, shall hold the Offeror responsible to perform in strict accordance with the specifications or scope of services contained herein.

1.12 Confidential Material: All materials submitted in response to this RFP shall ultimately become public record and shall be subject to inspection after contract award. **"Proprietary or Confidential Information"** is defined as any information that is not generally known to competitors and which provides a competitive advantage. Unrestricted disclosure of proprietary information places it in the public domain. Only submittal information clearly identified with the words "***Confidential Disclosure***" and uploaded as a separate document shall establish a confidential, proprietary relationship. Any material to be treated as confidential or proprietary in nature must include a justification for the request. The request shall be reviewed and either approved or denied by the Owner. If denied, the proposer shall have the opportunity to withdraw its entire proposal, or to remove the confidential or proprietary restrictions. Neither cost nor pricing information nor the total proposal shall be considered confidential or proprietary.

1.13 Response Material Ownership: All proposals become the property of the Owner upon receipt and shall only be returned to the proposer at the Owner's option. Selection or rejection of the proposal shall not affect this right. The Owner shall have the right to use all ideas or adaptations of the ideas contained in any proposal received in response to this RFP, subject to limitations outlined in the entitled "Confidential Material". Disqualification of a proposal does not eliminate this right.

1.14 Minimal Standards for Responsible Prospective Offerors: A prospective Offeror must affirmably demonstrate their responsibility. A prospective Offeror must meet the following requirements.

- Have adequate financial resources, or the ability to obtain such resources as required.
- Be able to comply with the required or proposed completion schedule.
- Have a satisfactory record of performance.
- Have a satisfactory record of integrity and ethics.
- Be otherwise qualified and eligible to receive an award and enter into a contract with the Owner.

1.15 Open Records: Proposals shall be received and publicly acknowledged at the location, date, and time stated herein. Offerors, their representatives and interested persons may be present. Proposals shall be received and acknowledged only so as to avoid disclosure of process. However, all proposals shall be open for public inspection after the contract is awarded. Trade secrets and confidential information contained in the proposal so identified by offer as such shall be treated as confidential by the Owner to the extent allowable in the Open Records Act.

1.16 Sales Tax: The Owner is, by statute, exempt from the State Sales Tax and Federal Excise Tax; therefore, all fees shall not include taxes.

1.17 Public Opening: Proposals shall be opened in the City Hall Auditorium, 250 North 5th Street, Grand Junction, CO, 81501, immediately following the proposal deadline. Offerors, their representatives and interested persons may be present. Only the names and locations on the proposing firms will be disclosed.

SECTION 2.0: GENERAL CONTRACT TERMS AND CONDITIONS

2.1. Acceptance of RFP Terms: A proposal submitted in response to this RFP shall constitute a binding offer. Acknowledgment of this condition shall be indicated on the Letter of Interest or Cover Letter by the autographic signature of the Offeror or an officer of the Offeror legally authorized to execute contractual obligations. A submission in response to the RFP acknowledges acceptance by the Offeror of all terms and conditions including compensation, as set forth herein. An Offeror shall identify clearly and thoroughly any variations between its proposal and the Owner's RFP requirements. Failure to do so shall be deemed a waiver of any rights to subsequently modify the terms of performance, except as outlined or specified in the RFP.

2.2. Execution, Correlation, Intent, and Interpretations: The Contract Documents shall be signed by the Owner and Contractor. By executing the contract, the Contractor represents that they have familiarized themselves with the local conditions under which the Services is to be performed, and correlated their observations with the requirements of the Contract Documents. The Contract Documents are complementary, and what is required by any one, shall be as binding as if required by all. The intention of the documents is to include all labor, materials, equipment, services and other items necessary for the proper execution and completion of the scope of services as defined in the technical specifications and drawings contained herein. All drawings, specifications and copies furnished by the Owner are, and shall remain, Owner property. They are not to be used on any other project.

2.3. Permits, Fees, & Notices: The Contractor shall secure and pay for all permits, governmental fees and licenses necessary for the proper execution and completion of the services. The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and orders of any public authority bearing on the performance of the services. If the Contractor observes that any of the Contract Documents are at variance in any respect, he shall promptly notify the Owner in writing, and any necessary changes shall be adjusted by approximate modification. If the Contractor performs any services knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Owner, he shall assume full responsibility and shall bear all costs attributable.

2.4. Responsibility for those Performing the Services: The Contractor shall be responsible to the Owner for the acts and omissions of all his employees and all other persons performing any of the services under a contract with the Contractor.

2.5. Payment & Completion: The Contract Sum is stated in the Contract and is the total amount payable by the Owner to the Contractor for the performance of the services under the Contract Documents. Upon receipt of written notice that the services is ready for final inspection and acceptance and upon receipt of application for payment, the Owner's Project Manager will promptly make such inspection and, when they find the services acceptable under the Contract Documents and the Contract fully performed, the Owner shall make payment in the manner provided in the Contract Documents. Partial payments will be based upon estimates, prepared by the Contractor, of the value of services performed and materials placed in accordance with the Contract Documents. The services performed by Contractor shall be in accordance with generally accepted professional practices and the level of competency presently maintained by other practicing professional firms in the same or similar type of services in the applicable community. The services and services to be performed by Contractor hereunder shall be done in compliance with applicable laws, ordinances, rules and regulations.

2.6. Protection of Persons & Property: The Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public authority having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. Contractor shall erect and maintain, as required by existing safeguards for safety and protection, and all reasonable precautions, including posting danger signs or other warnings against hazards promulgating safety regulations and notifying owners and users of adjacent utilities. When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct by the Contractor in the execution of the services, or in consequence of the non-execution thereof by the Contractor, they shall restore, at their own expense, such property to a condition similar or equal to that existing before such damage or injury was done, by repairing, rebuilding, or otherwise restoring as may be directed, or it shall make good such damage or injury in an acceptable manner.

2.7. Changes in the Services: The Owner, without invalidating the contract, may order changes in the services within the general scope of the contract consisting of additions, deletions or other revisions. All such changes in the services shall be authorized by Change Order/Amendment and shall be executed under the applicable conditions of the contract documents. A Change Order/Amendment is a written order to the Contractor

signed by the Owner issued after the execution of the contract, authorizing a change in the services or an adjustment in the contract sum or the contract time.

2.8. Minor Changes in the Services: The Owner shall have authority to order minor changes in the services not involving an adjustment in the contract sum or an extension of the contract time and not inconsistent with the intent of the contract documents.

2.9. Uncovering & Correction of Services: The Contractor shall promptly correct all services found by the Owner as defective or as failing to conform to the contract documents. The Contractor shall bear all costs of correcting such rejected services, including the cost of the Owner's additional services thereby made necessary. The Owner shall give such notice promptly after discover of condition. All such defective or non-conforming services under the above paragraphs shall be removed from the site where necessary and the services shall be corrected to comply with the contract documents without cost to the Owner.

2.10. Acceptance Not Waiver: The Owner's acceptance or approval of any services furnished hereunder shall not in any way relieve the proposer of their present responsibility to maintain the high quality, integrity and timeliness of his services. The Owner's approval or acceptance of, or payment for, any services shall not be construed as a future waiver of any rights under this Contract, or of any cause of action arising out of performance under this Contract.

2.11. Change Order/Amendment: No oral statement of any person shall modify or otherwise change, or affect the terms, conditions or specifications stated in the resulting contract. All amendments to the contract shall be made in writing by the Owner.

2.12. Assignment: The Offeror shall not sell, assign, transfer or convey any contract resulting from this RFP, in whole or in part, without the prior written approval from the Owner.

2.13. Compliance with Laws: Proposals must comply with all Federal, State, County and local laws governing or covering this type of service and the fulfillment of all ADA (Americans with Disabilities Act) requirements. Contractor hereby warrants that it is qualified to assume the responsibilities and render the services described herein and has all requisite corporate authority and professional licenses in good standing, required by law.

2.14. Debarment/Suspension: The Contractor herby certifies that the Contractor is not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Governmental department or agency.

2.15. Confidentiality: All information disclosed by the Owner to the Offeror for the purpose of the services to be done or information that comes to the attention of the Offeror during the course of performing such services is to be kept strictly confidential.

2.16. Conflict of Interest: No public official and/or Owner employee shall have interest in any contract resulting from this RFP.

2.17. Contract: This Request for Proposal, submitted documents, and any negotiations, when properly accepted by the Owner, shall constitute a contract equally binding between the Owner and Offeror. The contract represents the entire and integrated agreement between

the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral, including the Proposal documents. The contract may be amended or modified with Change Orders, Field Orders, or Amendment.

2.18. Project Manager/Administrator: The Project Manager, on behalf of the Owner, shall render decisions in a timely manner pertaining to the services proposed or performed by the Offeror. The Project Manager shall be responsible for approval and/or acceptance of any related performance of the Scope of Services.

2.19. Contract Termination: This contract shall remain in effect until any of the following occurs: (1) contract expires; (2) completion of services; (3) acceptance of services or, (4) for convenience terminated by either party with a written *Notice of Cancellation* stating therein the reasons for such cancellation and the effective date of cancellation at least thirty days past notification.

2.20. Employment Discrimination: During the performance of any services per agreement with the Owner, the Offeror, by submitting a Proposal, agrees to the following conditions:

2.20.1. The Offeror shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, age, disability, citizenship status, marital status, veteran status, sexual orientation, national origin, or any legally protected status except when such condition is a legitimate occupational qualification reasonably necessary for the normal operations of the Offeror. The Offeror agrees to post in conspicuous places, visible to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

2.20.2. The Offeror, in all solicitations or advertisements for employees placed by or on behalf of the Offeror, shall state that such Offeror is an Equal Opportunity Employer.

2.20.3. Notices, advertisements, and solicitations placed in accordance with federal law, rule, or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.

2.21. Immigration Reform and Control Act of 1986 and Immigration Compliance: The Offeror certifies that it does not and will not during the performance of the contract employ illegal alien servicesers or otherwise violate the provisions of the Federal Immigration Reform and Control Act of 1986 and/or the immigration compliance requirements of State of Colorado C.R.S. § 8-17.5-101, *et.seq.* (House Bill 06-1343).

2.22. Ethics: The Offeror shall not accept or offer gifts or anything of value nor enter into any business arrangement with any employee, official, or agent of the Owner.

2.23. Failure to Deliver: In the event of failure of the Offeror to deliver services in accordance with the contract terms and conditions, the Owner, after due oral or written notice, may procure the services from other sources and hold the Offeror responsible for any costs resulting in additional purchase and administrative services. This remedy shall be in addition to any other remedies that the Owner may have.

2.24. Failure to Enforce: Failure by the Owner at any time to enforce the provisions of the contract shall not be construed as a waiver of any such provisions. Such failure to enforce shall not affect the validity of the contract or any part thereof or the right of the Owner to enforce any provision at any time in accordance with its terms.

2.25. Force Majeure: The Offeror shall not be held responsible for failure to perform the duties and responsibilities imposed by the contract due to legal strikes, fires, riots, rebellions, and acts of God beyond the control of the Offeror, unless otherwise specified in the contract.

2.26. Indemnification: Offeror shall defend, indemnify and save harmless the Owner and all its officers, employees, insurers, and self-insurance pool, from and against all liability, suits, actions, or other claims of any character, name and description brought for or on account of any injuries or damages received or sustained by any person, persons, or property on account of any negligent act or fault of the Offeror, or of any Offeror's agent, employee, subcontractor or supplier in the execution of, or performance under, any contract which may result from proposal award. Offeror shall pay any judgment with cost which may be obtained against the Owner growing out of such injury or damages.

2.27. Independent Firm: The Offeror shall be legally considered an Independent Firm and neither the Firm nor its employees shall, under any circumstances, be considered servants or agents of the Owner. The Owner shall be at no time legally responsible for any negligence or other wrongdoing by the Firm, its servants, or agents. The Owner shall not withhold from the contract payments to the Firm any federal or state unemployment taxes, federal or state income taxes, Social Security Tax or any other amounts for benefits to the Firm. Further, the Owner shall not provide to the Firm any insurance coverage or other benefits, including Servicesers' Compensation, normally provided by the Owner for its employees.

2.28. Nonconforming Terms and Conditions: A proposal that includes terms and conditions that do not conform to the terms and conditions of this Request for Proposal is subject to rejection as non-responsive. The Owner reserves the right to permit the Offeror to withdraw nonconforming terms and conditions from its proposal prior to a determination by the Owner of non-responsiveness based on the submission of nonconforming terms and conditions.

2.29. Ownership: All plans, prints, designs, concepts, etc., shall become the property of the Owner.

2.30. Oral Statements: No oral statement of any person shall modify or otherwise affect the terms, conditions, or specifications stated in this document and/or resulting agreement. All modifications to this request and any agreement must be made in writing by the Owner.

2.31. Patents/Copyrights: The Offeror agrees to protect the Owner from any claims involving infringements of patents and/or copyrights. In no event shall the Owner be liable to the Offeror for any/all suits arising on the grounds of patent(s)/copyright(s) infringement. Patent/copyright infringement shall null and void any agreement resulting from response to this RFP.

2.32. Venue: Any agreement as a result of responding to this RFP shall be deemed to have been made in, and shall be construed and interpreted in accordance with, the laws of the City of Grand Junction, Mesa County, Colorado.

2.33. Expenses: Expenses incurred in preparation, submission and presentation of this RFP are the responsibility of the company and can not be charged to the Owner.

2.34. Sovereign Immunity: The Owner specifically reserves its right to sovereign immunity pursuant to Colorado State Law as a defense to any action arising in conjunction to this agreement.

2.35. Public Funds/Non-Appropriation of Funds: Funds for payment have been provided through the Owner's budget approved by the City Council/Board of County Commissioners for the stated fiscal year only. State of Colorado statutes prohibit the obligation and expenditure of public funds beyond the fiscal year for which a budget has been approved. Therefore, anticipated orders or other obligations that may arise past the end of the stated Owner's fiscal year shall be subject to budget approval. Any contract will be subject to and must contain a governmental non-appropriation of funds clause.

2.36. Collusion Clause: Each Offeror by submitting a proposal certifies that it is not party to any collusive action or any action that may be in violation of the Sherman Antitrust Act. Any and all proposals shall be rejected if there is evidence or reason for believing that collusion exists among the proposers. The Owner may or may not, at the discretion of the Owner Purchasing Representative, accept future proposals for the same service or commodities for participants in such collusion.

2.37. Gratuities: The Contractor certifies and agrees that no gratuities or kickbacks were paid in connection with this contract, nor were any fees, commissions, gifts or other considerations made contingent upon the award of this contract. If the Contractor breaches or violates this warranty, the Owner may, at their discretion, terminate this contract without liability to the Owner.

2.38. Performance of the Contract: The Owner reserves the right to enforce the performance of the contract in any manner prescribed by law or deemed to be in the best interest of the Owner in the event of breach or default of resulting contract award.

2.39. Benefit Claims: The Owner shall not provide to the Offeror any insurance coverage or other benefits, including Serviceser's Compensation, normally provided by the Owner for its employees.

2.40. Default: The Owner reserves the right to terminate the contract in the event the Contractor fails to meet delivery or completion schedules, or otherwise perform in accordance with the accepted proposal. Breach of contract or default authorizes the Owner to purchase like services elsewhere and charge the full increase in cost to the defaulting Offeror.

2.41. Multiple Offers: If said proposer chooses to submit more than one offer, THE ALTERNATE OFFER must be clearly marked "Alternate Proposal". The Owner reserves the right to make award in the best interest of the Owner.

2.42. Cooperative Purchasing: Purchases as a result of this solicitation are primarily for the Owner. Other governmental entities may be extended the opportunity to utilize the resultant contract award with the agreement of the successful provider and the participating agencies. All participating entities will be required to abide by the specifications, terms, conditions and pricings established in this Proposal. The quantities furnished in this proposal document are for only the Owner. It does not include quantities for any other jurisdiction. The Owner will be responsible only for the award for our jurisdiction. Other participating entities will place their own awards on their respective Purchase Orders through their purchasing office or use their purchasing card for purchase/payment as authorized or agreed upon between the provider and the individual entity. The Owner accepts no liability for payment of orders placed by other participating jurisdictions that choose to piggy-back on our solicitation. Orders placed by participating jurisdictions under the terms of this solicitation will indicate their specific delivery and invoicing instructions.

2.43. Definitions:

2.43.1. "Offeror" and/or "Proposer" refers to the person or persons legally authorized by the Consultant to make an offer and/or submit a response (fee) proposal in response to the Owner's RFP.

2.43.2. The term "Services" includes all labor, materials, equipment, and/or services necessary to produce the requirements of the Contract Documents.

2.43.3. "Contractor" is the person, organization, firm or consultant identified as such in the Agreement and is referred to throughout the Contract Documents. The term Contractor means the Contractor or his authorized representative. The Contractor shall carefully study and compare the General Contract Conditions of the Contract, Specification and Drawings, Scope of Services, Addenda and Modifications and shall at once report to the Owner any error, inconsistency or omission he may discover. Contractor shall not be liable to the Owner for any damage resulting from such errors, inconsistencies or omissions. The Contractor shall not commence services without clarifying Drawings, Specifications, or Interpretations.

2.43.4. "Sub-Contractor is a person or organization who has a direct contract with the Contractor to perform any of the services at the site. The term sub-contractor is referred to throughout the contract documents and means a sub-contractor or his authorized representative.

2.44. Public Disclosure Record: If the Proposer has knowledge of their employee(s) or sub-proposers having an immediate family relationship with an Owner employee or elected official, the proposer must provide the Purchasing Representative with the name(s) of these individuals. These individuals are required to file an acceptable "Public Disclosure Record", a statement of financial interest, before conducting business with the Owner.

SECTION 3.0: INSURANCE REQUIREMENTS

3.1 Insurance Requirements: The selected Firm agrees to procure and maintain, at its own cost, policy(s) of insurance sufficient to insure against all liability, claims, demands, and other obligations assumed by the Firm pursuant to this Section. Such insurance shall be in addition to any other insurance requirements imposed by this Contract or by law. The Firm shall not be relieved of any liability, claims, demands, or other obligations assumed pursuant

to this Section by reason of its failure to procure or maintain insurance in sufficient amounts, durations, or types.
Firm shall procure and maintain and, if applicable, shall cause any Subcontractor of the Firm to procure and maintain insurance coverage listed below. Such coverage shall be procured and maintained with forms and insurers acceptable to The Owner. All coverage shall be continuously maintained to cover all liability, claims, demands, and other obligations assumed by the Firm pursuant to this Section. In the case of any claims-made policy, the necessary retroactive dates and extended reporting periods shall be procured to maintain such continuous coverage. Minimum coverage limits shall be as indicated below unless specified otherwise in the Special Conditions:

(a) Worker Compensation: Contractor shall comply with all State of Colorado Regulations concerning Workers' Compensation insurance coverage.

(b) General Liability insurance with minimum combined single limits of:

ONE MILLION DOLLARS ($1,000,000) each occurrence and
ONE MILLION DOLLARS ($1,000,000) per job aggregate.

The policy shall be applicable to all premises, products and completed operations. The policy shall include coverage for bodily injury, broad form property damage (including completed operations), personal injury (including coverage for contractual and employee acts), blanket contractual, products, and completed operations. The policy shall include coverage for explosion, collapse, and underground (XCU) hazards. The policy shall contain a severability of interests provision.

(c) Comprehensive Automobile Liability insurance with minimum combined single limits for bodily injury and property damage of not less than:

ONE MILLION DOLLARS ($1,000,000) each occurrence and
ONE MILLION DOLLARS ($1,000,000) aggregate

(d) Professional Liability & Errors and Omissions Insurance policy with a minimum of:

ONE MILLION DOLLARS ($1,000,000) per claim

This policy shall provide coverage to protect the contractor against liability incurred as a result of the professional services performed as a result of responding to this Solicitation.

With respect to each of Consultant's owned, hired, or non-owned vehicles assigned to be used in performance of the Services. The policy shall contain a severability of interests provision.

3.2 Additional Insured Endorsement: The policies required by paragraphs (b), and (c) above shall be endorsed to include the Owner and the Owner's officers and employees as additional insureds. Every policy required above shall be primary insurance, and any insurance carried by the Owner, its officers, or its employees, or carried by or provided through any insurance pool of the Owner, shall be excess and not contributory insurance to

that provided by Contractor. The Contractor shall be solely responsible for any deductible losses under any policy required above.

SECTION 4.0: SPECIFICATIONS/SCOPE OF SERVICES

4.1. General/Background: The Kannah Creek Intake diverts water to the primary reservoir for the City of Grand Junction. The diversion has been operating since the early 1900's. While updates have been made in the following decades, much of the existing site is past its design life. The intake also has several maintenance challenges including, debris blockage, ice buildup in the winter, and aging facilities. The purpose of this project is to address these maintenance concerns, upgrade equipment to extend service life and enable more automated control and reporting. The City has plans created plans for replacing a portion of the intake pipeline and installing electromagnetic flow meters, debris screen replacement, and new headgates and electronic control and analytical instrumentation. The existing plans also have preliminary plans for replacing the existing shed, which houses the existing flow monitoring equipment and residential water treatment equipment, with a new prefabricated shed that will house the control equipment and residential treatment equipment. However, the existing check dam is in poor condition and needs to be replaced with the intake rehabilitation project is constructed.

Therefore, the City of Grand Junction, Purchasing Department is requesting qualifications, accompanied by sealed cost proposals, from Consulting Engineers to provide design services, prepare construction drawings, assist in the development of bid documents and assist in the procurement of USACE permit and, if necessary, US Fish and Wildlife approval for the CITY OF GRAND JUNCTION KANNAH CREEK INTAKE REHABILITATION PROJECT. The project calls for the following:

1. Design replacement check dam, including large debris mitigation, headgate design and control integration; revise the design of replacement of existing shed with new prefabricated structure that will house residential water treatment equipment, control and data acquisition hardware; and review of other design considerations to provide automated intake control and measurement system.

2. Provide submittals to USACE, and if necessary, US Fish and Wildlife for Nationwide Permit approval.

3. Provide bidding support.

The Consultant shall be responsible for evaluation the proposed alternative, providing design for the alternative including design, final CAD drawing, obtaining USACE approval and other related services which are included in the following scope of work:

The design and evaluation effort shall include hydraulic evaluation of the proposed pipeline modification, of existing infrastructure where necessary, replacement of the existing control shed, evaluating and design of power supply and control and data collection integration for headgates, electromagnetic flow meters, and water quality monitoring devices, plan for relocation of residential water treatment equipment without service disruption

4.2. Special Conditions/Provisions:

4.2.1 Price/Fees: Project pricing shall be all inclusive, to include, but not be limited to: labor, materials, equipment, travel, design, drawings, engineering work, shipping/freight, licenses, permits, fees, etc.

Provide a not to exceed cost using Solicitation Response Form found in Section 7, accompanied by a complete list of costs breakdown.

All fees will be considered by the Owner to be negotiable.

4.2.2 Codes: Contractor shall ensure that project design, scope, and specifications meets all Federal, State, County, and City Codes.

4.3. Specifications/Scope of Services:

Consultant Responsibilities: The scope of work shall include the following

Task One: Project Management and Coordination

Project Initiation: Develop and prepare a project schedule to meet the proposed construction time frame and assign tasks. The schedule shall show individual tasks described in the scope of work for the project and identify key milestone dates. The Consultant Project Manager (Consultant PM) shall maintain and update the project schedule as the work proceeds. Consultants PM will be assigned to this project for the duration of the work.

Work Task Coordination: The Consultant PM shall assign and coordinate all work tasks being accomplished, including those to be performed by sub-consultants, to ensure project work is completed on schedule.

Project Team Coordination: The City PM and the Consultant PM shall maintain ongoing communication about the project on a frequent and regular basis. Each PM shall provide the other with

- Written synopsis of their respective contracts (both telephone or in person) with others
- Copies of pertinent written communications, including electronic (email) correspondence
- Early identification of potential problems

Progress Meetings: The City and Consultant shall meet, either in person or by telephone conference calls, at regularly scheduled Project Working Group Meetings held at approximate two-week intervals throughout the project. Meetings shall include consultant PM, City PM, and Water Resources Manager. The Project Working Group Meetings shall be used to coordinate the work effort and resolve any outstanding issues or problems. The meetings shall focus on the following topics:

- Activities completed since last meeting
- Problems encountered or anticipated
- Late activities/activities slipping behind schedule
- Solutions for unresolved or newly identified problems

- Schedule of upcoming activities
- Information on items required, or comments from Federal agencies.

The Consultant PM shall prepare a written summary report of the general discussions held including all action items assigned. This scope assumes six (6) Project Working Group Meetings via conference call.

Reporting Requirements: The Consultant PM shall provide the following on a routine basis:

- Bi-weekly status reports (percent of design components complete) and monthly billings.

Task Two: Design Plans and Design Report

The consultant will prepare final design plans, final design report and final design report. Prior to final design, Consultant shall provide 60% design review plans to the City for comment. Final design plans and report shall be submitted for review and approval by City and federal agencies involved. Review of documents and plans will be completed by City Project Engineer and City Water Resources Manager. The final plans and report shall be stamped by a professional engineer registered in the State of Colorado. All submittals shall be in a PDF format, with final electronic files provided at close of design task. This task will also include responding to any comments from review by USACE or other agency for approval by June 31, 2018. Any fees paid to federal agencies will be paid by the City of Grand Junction.

60% design submittal and Final Design Submittal shall include Engineers Opinion of Probable Cost for construction of the design.

Advertisement for Construction should be published on or about July 1, 2018 to allow for construction to occur during the months of September 2018 through December 2018.

City Provided Materials: The City will provide the following:

- As-constructed drawings of existing facilities
- GIS data
- Survey, base mapping and existing plan files

Task Three: Final Bid Documents

The Consultant will prepare final bid documents including Plans and Project Technical Specifications in accordance with the City of Grand Junction Standard Contract Documents for Capital Improvement Construction, Revised July 2010. The final bid documents shall be complete and adequate to obtain competitive construction bids for the Intake Rehabilitation Project. The consultant will also provide the City with an engineering estimate of cost to construct the project that will be used to evaluate adequacy of currently budgeted funds. Final bid documents shall include: Stamped engineering drawings, and technical specifications as well as an itemized line item bid schedule and engineers estimate for the project.

Reproduction: The Consultant will provide electronic copies of the final construction drawings and contract documents (.pdf format).

Authentication: The Consultant's Professional Engineer responsible for the project shall affix his stamp and signature to two (2) original copies of the final drawings, bid documents and design report.

Permitting: The Consultant shall work with USACE and other required agencies regarding plan approval and site application amendment. Any costs associated with this amendment or other permitting fees will be the responsibility of the owner.

Task Four: Construction Phase Services

Bidding Phase: After Completion of the plans, the City will bid the project out, however the consultant shall be available for technical questions and provide to the City appropriate addenda. Consultant shall participate in the pre-bid meeting, however presence at the bid opening is not required.

Construction Phase: The City will provide onsite, full time inspection for the project. Resident engineering shall be provided by the Consultant on an as-needed basis, but no less than once every month (4 visits). Consultant resident engineer shall also assist in reviewing and approving all shop drawings.

4.4. Site Visit: A site visit is recommended for all prospective offerors. The purpose will be to inspect and to clarify the contents of this Request for Proposal (RFP). Meeting location shall begin at 10001 Kannah Creek Road, Whitewater, CO 81527 on March 7, 2018 at 2:00pm.

4.5. RFP Tentative Time Schedule:

• Request for Proposal available	February 23, 2018
• Site Visit	March 7, 2018
• Inquiry deadline, no questions after this date	March 14, 2018
• Post Addendum	March 16, 2018
• Submittal deadline for proposals	March 21, 2018
• Owner evaluation of proposals	March 22-28, 2018
• Final selection	March 30, 2018
• Contract execution	April 3, 2018
• Final Design, Drawings, Scope, Specs	June 15, 2018

4.6. Questions Regarding Scope of Services:

Duane Hoff Jr., Senior Buyer
duaneh@gjcity.org

SECTION 5.0: PREPARATION AND SUBMITTAL OF PROPOSALS

Submission: ***Each proposal shall be submitted in electronic format only, and only through the Rocky Mountain E-Purchasing website (https://www.rockymountainbidsystem.com/default.asp).*** *This site offers both "free" and "paying" registration options that allow for full access of the Owner's documents and for electronic submission of proposals.* *(Note: "free" registration may take up to 24 hours to process. Please Plan accordingly.)* Please view our "**Electronic Vendor Registration Guide"** at http://www.gjcity.org/BidOpenings.aspx for details. (Purchasing Representative does not have access or control of the vendor side of RMEPS. If website or other problems arise during response submission, vendor **MUST** contact RMEPS to resolve issue prior to the response deadline **800-835-4603**). For proper comparison and evaluation, the City requests that proposals be formatted as directed in Section 5.0 "Preparation and Submittal of Proposals." Offerors are required to indicate their interest in this Project, show their specific experience and address their capability to perform the Scope of Services in the Time Schedule as set forth herein. For proper comparison and evaluation, the Owner requires that proposals be formatted **A** to **F**:

A. **Cover Letter:** Cover letter shall be provided which explains the Firm's interest in the project. The letter shall contain the name/address/phone number/email of the person who will serve as the firm's principal contact person with Owner's Contract Administrator and shall identify individual(s) who will be authorized to make presentations on behalf of the firm. The statement shall bear the signature of the person having proper authority to make formal commitments on behalf of the firm. By submitting a response to this solicitation the Contractor agrees to all requirements herein.

B. **Qualifications/Experience/Credentials:** Proposers shall provide their qualifications for consideration as a contract provider to the City of Grand Junction and include prior experience in similar projects.

C. **Strategy and Implementation Plan:** Describe your (the firm's) interpretation of the Owner's objectives with regard to this RFP. Describe the proposed strategy and/or plan for achieving the objectives of this RFP. The Firm may utilize a written narrative or any other printed technique to demonstrate their ability to satisfy the Scope of Services. The narrative should describe a logical progression of tasks and efforts starting with the initial steps or tasks to be accomplished and continuing until all proposed tasks are fully described and the RFP objectives are accomplished. Include a **time schedule** for completion of your firm's implementation plan and an estimate of time commitments from Owner staff.

D. **References:** A minimum of three (3) **references** with name, address, telephone number, and email address that can attest to your experience in projects of similar scope and size.

E. **Fee Proposal:** Provide a not to exceed cost using Solicitation Response Form found in Section 7, accompanied by a complete list of costs breakdown.

F. **Additional Data (optional):** Provide any additional information that will aid in evaluation of your qualifications with respect to this project.

SECTION 6.0: EVALUATION CRITERIA AND FACTORS

6.1 **Evaluation:** An evaluation team shall review all responses and select the proposal or proposals that best demonstrate the capability in all aspects to perform the scope of services and possess the integrity and reliability that will ensure good faith performance.

6.2 **Intent:** Only respondents who meet the qualification criteria will be considered. Therefore, it is imperative that the submitted proposal clearly indicate the firm's ability to provide the services described herein.

Submittal evaluations will be done in accordance with the criteria and procedure defined herein. The Owner reserves the right to reject any and all portions of proposals and take into consideration past performance. The following parameters will be used to evaluate the submittals (in no particular order of priority):

- Responsiveness of submittal to the RFP
- Understanding of the project and the objectives
- Experience/Demonstrated capability
- Necessary resources
- Strategy & Implementation Plan
- References
- Fees

Owner also reserves the right to take into consideration past performance of previous awards/contracts with the Owner of any vendor, contractor, supplier, or service provider in determining final award(s).

The Owner will undertake negotiations with the top rated firm and will not negotiate with lower rated firms unless negotiations with higher rated firms have been unsuccessful and terminated.

6.3 **Oral Interviews:** Interviews are not anticipated for this solicitation process. However, the Owner reserves the right to invite the most qualified rated proposer(s) to participate in oral interviews, if needed.

6.4 **Award:** Firms shall be ranked or disqualified based on the criteria listed in Section 6.2. The Owner reserves the right to consider all of the information submitted and/or oral presentations, if required, in selecting the project Contractor.

SECTION 7.0: SOLICITATION RESPONSE FORM

RFP-4483-17-DH Design Services for City of Grand Junction Kannah Creek Intake Rehabilitation

Offeror must submit entire Form completed, dated and signed.

1) **Not to exceed cost to provide design services for the Kannah Creek Intake Rehabilitation for labor, materials, equipment, travel, design, drawings, engineering work, shipping/freight, licenses, permits, fees, etc. per specifications:**

NOT TO EXCEED COST $_____

WRITTEN:_____dollars.

The Owner reserves the right to accept any portion of the services to be performed at its discretion

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The undersigned has thoroughly examined the entire Request for Proposals and therefore submits the proposal and schedule of fees and services attached hereto.

This offer is firm and irrevocable for sixty (60) days after the time and date set for receipt of proposals.

The undersigned Offeror agrees to provide services and products in accordance with the terms and conditions contained in this Request for Proposal and as described in the Offeror's proposal attached hereto; as accepted by the Owner.

Prices in the proposal have not knowingly been disclosed with another provider and will not be prior to award.

- Prices in this proposal have been arrived at independently, without consultation, communication or agreement for the purpose of restricting competition.
- No attempt has been made nor will be to induce any other person or firm to submit a proposal for the purpose of restricting competition.
- The individual signing this proposal certifies they are a legal agent of the offeror, authorized to represent the offeror and is legally responsible for the offer with regard to supporting documentation and prices provided.
- Direct purchases by the City of Grand Junction are tax exempt from Colorado Sales or Use Tax. Tax exempt No. 98-903544. The undersigned certifies that no Federal, State, County or Municipal tax will be added to the above quoted prices.
- City of Grand Junction payment terms shall be Net 30 days.
- Prompt payment discount of _____ percent of the net dollar will be offered to the Owner if the invoice is paid within _____ days after the receipt of the invoice.

RECEIPT OF ADDENDA: the undersigned Contractor acknowledges receipt of Addenda to the Solicitation, Specifications, and other Contract Documents. State number of Addenda received: _____

It is the responsibility of the Proposer to ensure all Addenda have been received and acknowledged.

_____	_____
Company Name – (Typed or Printed)	Authorized Agent – (Typed or Printed)
_____	_____
Authorized Agent Signature	Phone Number
_____	_____
Address of Offeror	E-mail Address of Agent
_____	_____
City, State, and Zip Code	Date

PROJECT NO. _____

2017 KANNAH CREEK INTAKE REHABILITATION SEPTEMBER, 2017

UTILITIES AND AGENCIES

AGENCY	NAME	POSITION	ROLE	MAILING ADDRESS	STREET ADDRESS	CITY, STATE	VOICE–WK	FAX
GRAND JUNCTION, CITY OF	JOHN EKLUND	PROJECT ENGINEER	PROJECT ENGINEER	250 N. 5th STREET	250 N. 5th STREET	GRAND JCT., CO 81501	(970) 244–1538	(970) 256–4022
GRAND JUNCTION, CITY OF	TRENT PRALL	ENGINEERING MANAGER	ENGINEERING MANAGER	250 N. 5th STREET	250 N. 5th STREET	GRAND JCT., CO 81501	(970) 256–4047	(970) 256–4022
GRAND JUNCTION, CITY OF	RICK BRINKMAN	WATER SERVICES MANAGER	WATER	333 WEST AVENUE	333 WEST AVENUE	GRAND JCT., CO 81501	(970) 244–1439	
GRAND VALLEY POWER		UNIT MANAGER	GAS, ELECTRIC	845 22 RD	845 22 RD	GRAND JCT., CO 81505	(970) 242–0040	

NOTE: NOTIFY AFFECTED UTILITY VENDOR 48 HOURS PRIOR TO EXCAVATIONS THAT WILL EXPOSE UTILITY LINES. THE COVER SHEET WILL HAVE A LISTING OF UTILITY VENDORS AND TELEPHONE NUMBERS.

DESCRIPTION	DATE
REVISION △	
REVISION △	
REVISION △	
REVISION △	

CITY OF Grand Junction COLORADO

Public Works
Engineering Division

Know what's below. Call before you dig.

DRAWING STATUS:
- ( ) PROGRESS
- ( ) BID SET
- (X) FINAL CONSTRUCTION DRAWINGS
- ( ) ASBUILT

DESIGNED BY:
JOHN EKLUND, PROJECT ENGINEER 2017

REVIEWED BY:
TRENTON G. PRALL, ENGINEERING MANAGER 2017

AUTHORIZED FOR CONSTRUCTION
TRENTON G. PRALL, ENGINEERING MANAGER 2017

ACCEPTED AS CONSTRUCTED
JOHN EKLUND, PROJECT ENGINEER 2017

2017 KANNAH CREEK INTAKE REHABILITATION, SEPTEMBER, 2017, PLAN SET NO. ____

N:\Landprv\Kannah Creek Intake\Vday\Kannah Creek Intake Improvements\dwg, 01, 9/13/2017 9:02:48 AM

PROJECT NO. _____

ABBREVIATIONS

AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY & TRANSPORTATION OFFICIALS
ABC	AGGREGATE BASE COURSE
AC	ASPHALTIC CEMENT
ADJ	ADJUST / ADJUSTMENT
ABS	ACRYLONITRILE BUTADIENE STYRENE
AMP	ALUMINIZED STEEL PIPE
ASTM	AMERICAN SOCIETY FOR TESTING MATERIALS
AWWA	AMERICAN WATER WORKS ASSOCIATION
BC	BACK OF CURB
BF	BUTTERFLY VALVE
BOW	BACK OF WALK
BCR	BEGIN CURB RETURN
BOT	BOTTOM
BMP	BEST STORM WATER MANAGEMENT PRACTICES
BLDG	BUILDING
CAP	GALVANIZED ALUMINUM PIPE
CDOT	COLORADO DEPARTMENT OF TRANSPORTATION
CI	CAST IRON
C,G,& SW	CURB, GUTTER & SIDEWALK
CL	CENTER LINE
CLR	CLEAR
CMP	CORRUGATED METAL PIPE
CO	CLEAN OUT
COMB	COMBINATION (AS IN STORM SEWER AND SANITARY SEWER)
CONC	CONCRETE
CORS	CITY SURVEY MONUMENT
CSP	CORRUGATED STEEL PIPE
CULV	CULVERT
D	DEGREE (ANGLE)
DIP	DUCTILE IRON
DWY	DRIVEWAY
E	ELECTRIC
EA	EACH
ECR	END CURB RETURN
EC	EDGE OF GUTTER
EL	ELEVATION
EP	EDGE OF PAVEMENT
EXIST	EXISTING
FL	FLOW LINE
FH	FIRE HYDRANT
FES	FLARED END SECTION
FF	FINISH FLOOR
FG	FINISH GRADE
FH	FIRE HYDRANT
GB	GRADE BREAK
GM	GAS METER
GV	GATE VALVE
HMA	HOT MIXED ASPHALT PAVEMENT
HDPE	HIGH DENSITY POLYETHYLENE
INV	INVERT
IRR	IRRIGATION
L	LENGTH OF ARC
LCD	LOWER CASED
LF	LINEAR FEET
LP	LOAD PER
LT	LEFT
MB	MAILBOX
MCSM	MESA COUNTY SURVEY MONUMENT
MH	MANHOLE
MJ	MECHANICAL JOINT
N	NORTH
N/A	NOT APPLICABLE
NIC	NOT IN CONTRACT
NTS	NO TWO SECTION
NRCP	NON-REINFORCED CONCRETE PIPE
NS	NEAR SIDE
NTS	NOT TO SCALE
OHP	OVERHEAD POWER
OHT	OVERHEAD TELEPHONE
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PED	PEDESTRIAN
PI	POINT OF INTERSECTION
PIV	PLASTIC IRRIGATION PIPE
PRC	POINT OF REVERSE CURVATURE
PT	POINT OF TANGENCY
PVC	POLYVINYL CHLORIDE
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
RT	RIGHT
RCP	REINFORCED CONCRETE PIPE
RS	REVERSE SLOPE
RP	RADIUS POINT
RR	RAIL ROAD
RT	RIGHT RADIUS
S	SOUTH
SLP	SLOPE
SAN	SANITARY
SC	SHORT CHORD
SCD	STANDARD CONTRACT DOCUMENTS
SCH	SCHEDULE
SF	SILT FENCE
SL	STATION LINE
SSRCC	STANDARD SPECIFICATIONS FOR ROAD & BRIDGE CONSTRUCTION
SSWD	STANDARD SPECIFICATIONS FOR CONSTRUCTION OF WASTEWATER LINES
STA	STATION
STL	STEEL
STM	STORM
T	TELEPHONE
TAN	LENGTH OF TANGENT
TOC	TOP OF CURB
TOE	TOE WALL
TELE	TELEPHONE
TYP	TYPICAL
UU	UNDERGROUND UTILITIES
VC	VERTICAL CURVE
VCP	VERIFIED CLAY PIPE
VPC	VERTICAL POINT OF CURVATURE
VPCC	VERTICAL POINT OF COMPOUND CURVATURE
VPRC	VERTICAL POINT OF REVERSE CURVATURE
VPI	VERTICAL POINT OF INTERSECTION
VPT	VERTICAL POINT OF TANGENCY
W	WATER
Δ	DELTA ANGLE

LEGEND

- STORM DRAINAGE BASIN BOUNDARY
- STORM ARCHORED STRAW BALES
- STORM SILT FENCE
- BUILDING
- CONCRETE CURB AND GUTTER
- CONCRETE CURB,GUTTER, & SIDEWALK
- CONCRETE DITCH
- CONCRETE SIDEWALK
- CULVERT
- EARTH DITCH
- EDGE OF GRAVEL
- EDGE OF PAVEMENT
- FENCE (BARBED WIRE)
- FENCE (CHAIN LINK)
- FENCE (MESH)
- FENCE (PLASTIC)
- FENCE (TEMPORARY CONSTRUCTION)
- FENCE (WOOD)
- FENCE (WOVEN WIRE)
- GUARD RAIL
- HATCHING: EXISTING ASPHALT REMOVAL
- HATCHING: EXISTING CONCRETE REMOVAL
- HATCHING: INDICATES STAGING AREA
- LINE (CENTER OF IMPROVEMENTS)
- LINE (CITY LIMITS) — CITY LIMITS
- LINE (CONTROL)
- LINE (EASEMENT)
- LINE (MONUMENT/SECTION)
- LINE (PROPERTY)
- LINE (RIGHT OF WAY)
- MATCH LINE — MATCH LINE SEE SHEET NO ?
- PIPE (IRRIGATION)
- PIPE (SIPHON)

- PROPOSED CONCRETE CURB AND GUTTER
- PROPOSED CONCRETE CURB&GUTTER,& SIDEWALK
- PROPOSED CONCRETE SIDEWALK
- PROPOSED "WET" UTILITIES (CONSTRUCTION NOTE WILL INDICATE TYPE, SIZE, AND MATERIAL OF IRON MAIN) — 8" PVC SANITARY SEWER

ALL PROPOSED FEATURES NOT SHOWN IN LEGEND WILL BE SHOWN THE SAME AS THEIR EXISTING COUNTERPART, BUT INDICATED BY BOLDER LINETYPE

- RAIL ROAD
- RETAINING WALL
- STRIPING (CONTINUOUS WHITE)
- STRIPING (DASHED WHITE)
- STRIPING (CONTINUOUS YELLOW)
- STRIPING (DASHED YELLOW)
- TOP OF SLOPE
- CONTOUR LINES (SHOWN BETWEEN TOP & TOE)
- TOE OF SLOPE
- TRAFFIC DETECTOR LOOP
- UTILITY LINE (ABANDON) (THIS CASE A WATER LINE)
- UTILITY LINE (CABLE TV)
- UTILITY LINE (ELECTRIC)
- UTILITY LINE (FIBER OPTIC)
- UTILITY LINE (GAS)
- UTILITY LINE (HIGH VOLTAGE OVERHEAD POWER)
- UTILITY LINE (OVERHEAD POWER)
- UTILITY LINE (OVERHEAD TELEPHONE)
- UTILITY LINE (SANITARY SEWER)
- UTILITY LINE (SANITARY SEWER FORCE MAIN)
- UTILITY LINE (SANITARY SEWER SERVICE)
- UTILITY LINE (STORM SEWER)
- UTILITY LINE (STORM SEWER, PERFORATED)
- UTILITY LINE (STORM/SANITARY SEWER SERVICE COMBINATION)
- UTILITY LINE (TELEPHONE)
- UTILITY LINE (WATER)

SYMBOLS

- BENCH MARK
- CATCH BASIN
- CLEAN OUT
- CURB STOP
- FIRE HYDRANT
- GUY WIRE ANCHOR
- HEADGATE
- IRRIGATION PUMP
- MAILBOX
- MANHOLE (ELECTRIC)
- MANHOLE (GAS)
- MANHOLE (SANITARY/STORM)
- MANHOLE (TELEPHONE)
- MANHOLE (TV)
- MANHOLE (WATER)
- METER (GAS)
- METER (WATER)
- PEDESTAL (TELEPHONE)
- PEDESTAL (TV)
- PROPERTY PIN
- PULL BOX
- RECLOSER FITTING
- SIGN OR POST (SIGN TYPE NOTED)
- SPRINKLER HEAD
- STREET LIGHT
- SURVEY MONUMENT (CITY)
- SURVEY MONUMENT (TYPE NOTED)
- TEST HOLE
- TRAFFIC PAINT MARKING
- TRAFFIC SIGNAL POLE AND MAST ARM
- UTILITY POLE
- VALVE (GAS)
- VALVE (IRRIGATION)
- VALVE (WATER)
- VEGETATION (HEDGE OR BUSH)
- VEGETATION (TREE STUMP)
- VEGETATION (TREE) (CALIPER SIZE NOTED)
- WATER HYDRANT
- WELL
- YARD LIGHT

BAR SCALE:

0 5 10 20

(IN FEET)
1 inch = 20 ft.

NORTH ARROW:

DESCRIPTION	DATE
REVISION 1	
REVISION 2	
REVISION 3	
REVISION 4	

DRAWN BY JCB DATE 4-02
DESIGNED BY DATE
CHECKED BY DATE
APPROVED BY DATE

HORIZONTAL: 1" =
VERTICAL: 1" =

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

CITY OF GRAND JUNCTION
STANDARD ABBREVIATIONS, LEGEND, AND SYMBOLS

2

N:\Longprj\Ute&Itch Creek\Ditches\dwg\Ute&Itch Creek Ditches_Improvements.R14.dwg, 02.3/3/2002 7:53:36 AM

PROJECT NO. _____

Bid Schedule: Kannah Creek Intake Rehabilitation

Item No.	CDOT, City Ref.	Description	Quantity	Units	Unit Price	Total Price
1	108.2	Irrigation Pipe (6") (SDR 35 PVC)	38.5	LF	$ _____	$ _____
2	108.2	Water Main (6") (C900, DR-18)	27.	LF	$ _____	$ _____
3	108.2	Water Main (8") (C900, DR-18)	34.	LF	$ _____	$ _____
4	108.2	Water Main (18") (C-905, DR-18) (Includes all Bell Joint Restraints and Connection to existing pipe)	282.	LF	$ _____	$ _____
5	108.2	Water Main (24") (C-905, DR-18) (Includes all Bell Joint Restraints and Connection to existing pipe and intake inlet)	237.		$ _____	$ _____
6	108.3	Check Valve (6") (Tideflex Checkmate Series 35 or Engineer approved equal)	2.	EA	$ _____	$ _____
7	108.3	Check Valve (8") (Tideflex Checkmate Series 35 or Engineer approved equal)	1.	EA	$ _____	$ _____
8	108.3	Combination Air Valve and Vault Assembly (6") (Includes Bedding material, flanged butterfly valve w/ 90o angle nut, air valve, 60" concrete vault, frost proof ring and cover, galvanized vent pipe, and all necessary fittings to complete assembly)	2.	EA	$ _____	$ _____
9	108.3	Elbow (2" x 90 deg)	14.	EA	$ _____	$ _____
10	108.3	Elbow (6" x 22.5 deg)	1.	EA	$ _____	$ _____
11	108.3	Elbow (6" x 90 deg)	2.	EA	$ _____	$ _____
12	108.3	Elbow (8" x 90 deg)	3.	EA	$ _____	$ _____
13	108.3	Elbow (18" x 22.5 deg)	1.	EA	$ _____	$ _____
14	108.3	Elbow (18" x 45 deg)	4.	EA	$ _____	$ _____
15	108.3	Elbow (24" x 11.25 deg)	2.	EA	$ _____	$ _____
16	108.3	Elbow (24" x 22.5 deg)	1.	EA	$ _____	$ _____
17	108.3	Electromagnetic Flow Sensor (8") (Spirax-Sarco MagFlow MAG 5100 W or Engineer approved equal) (Includes fittings to connect to waterline)	1.	EA	$ _____	$ _____
18	108.3	Electromagnetic Flow Sensor (18") (Spirax-Sarco MagFlow MAG 5100 W or Engineer approved equal) (Includes fittings to connect to waterline)	1.	EA	$ _____	$ _____
19	108.3	Gate Valve (6") (Manual)	1.	EA	$ _____	$ _____
20	108.3	Gate Valve (8") (Includes Actuator)	1.	EA	$ _____	$ _____
21	108.3	Slide Gate (24") (Whipps 800 Series or Engineering approved equivalent) (Includes modification of existing concrete structure to accommodate new gate and actuator)	2.	EA	$ _____	$ _____
22	108.3	Tee (18" x 6")	1.	EA	$ _____	$ _____
23	108.3	Tee (18" x 8")	1.	EA	$ _____	$ _____
24	108.4	Irrigation Connection (2") (Include connection to Irrigation pump, pump starter, well pump VFD)	Lump	Sum	---	$ _____
25	108.4	Irrigation Service Line (2") (Sch 40) (Include Elbows and Fittings to complete assembly and connect to Tapping Saddle and service line)	56.	LF	$ _____	$ _____
26	108.4	Water Service Line (2") (Sch 40) (Include Elbows and Fittings to complete assembly and connect to existing well and service line)	53.	LF	$ _____	$ _____
27	108.4	Water Treatment Connection (Includes Water meter, Expansion Tank, Filters, UV Filter, Water Softener, Potable Water System Pressure Transmitter) (Water service to house must remain in operation for the duration of the project)	Lump	Sum	---	$ _____
28	108.5	Pipe Valve Vault (60" I.D.) (8' Inside Height) (Inverted Ring/Cover) (Includes 6" thick Type A Bedding, adjustable pipe saddles (2) and all necessary fittings to complete assembly)	4.	EA	$ _____	$ _____
29	201	Clearing and Grubbing (Includes trees, bushes, and native vegetation)	0.27	AC	$ _____	$ _____
30	202	Abandon Pipe (Abandon pipe by plugging both ends with concrete)	1.	EA	$ _____	$ _____
31	202	Remove Building (Includes removal of concrete spillway and foundation wall to minimum 12" below finished grade)	Lump	Sum	---	$ _____
32	202	Remove Existing Air Valve	1.	EA	$ _____	$ _____
33	202	Remove Existing Pipe (Size as shown on plans)	350.	LF	$ _____	$ _____
34	202	Remove Sidewalk	6.44	SY	$ _____	$ _____
35	203	Embankment Fill (Complete-in-Place)	735.	CY	$ _____	$ _____
36	203	Rock Excavation (1 CY and larger)	75.	CY	$ _____	$ _____
37	207	Stripping and Stockpiling Topsoil	90.	CY	$ _____	$ _____
38	207	Topsoil	160.	CY	$ _____	$ _____
39	210	Modify Structure (Remove Steel bars from inlet opening)	Lump	Sum	---	$ _____
40	212	Seeding (Native)	0.3	AC	$ _____	$ _____
41	202	Seeding (Lawn)	0.02	AC	$ _____	$ _____
42	216	Soil Retention Blanket (Biodegradable Straw/Coconut)	725.	SY	$ _____	$ _____
43	304	Aggregate Base Coarse (Class 3) (Place in maximum 12" lifts compacted to 95% Standard Proctor)	70.	CY	$ _____	$ _____
44	506	Riprap Protection (6" D50 CDOT Gradation) Contractor shall use as much riprap from project trench excavation for rock protection where called out on the plans)	13.	CY	$ _____	$ _____
45	608	Concrete Sidewalk (4") (Includes 6" Class 6 Aggregate Base Coarse)	11.	SY	$ _____	$ _____
46	620	Sanitary Facility	Lump	Sum	---	$ _____
47	625	Construction Surveying	Lump	Sum	---	$ _____
48	626	Mobilization	Lump	Sum	---	$ _____
49	SP	Electrical & Control	Lump	Sum	---	$ _____
50	SP	FCA Modular Farmers Screen (Installation only)	Lump	Sum	---	$ _____
51	SP	Prefabricated Shed (10' x 12' Interior Dimensions) (Refer to Appendix _ for information) (Include 4" concrete foundation on 6" Class 6 Aggregate Base Coarse	Lump	Sum	---	$ _____
52		Dewater Inlet	Lump	Sum	---	$ _____
MCR		Minor Contract Revisions	---	---	---	$ 30,000.00

Bid Amount: $ _____

Bid Amount:

_____ **dollars**

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DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY HMC DATE 2017
DESIGNED BY JAE DATE 2017
CHECKED BY JAE DATE 2017
APPROVED BY _____ DATE _____

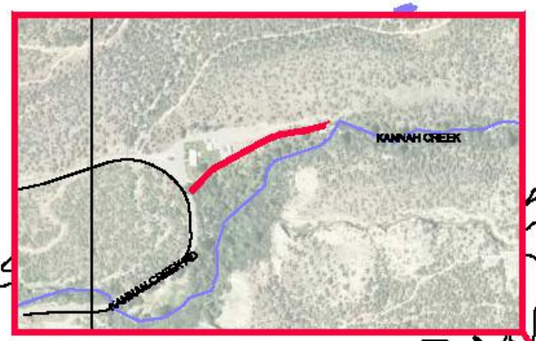
SCALES: PLAN & PROFILE
HORIZONTAL: 1" =
VERTICAL: 1" =

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

2017 KANNAH CREEK INTAKE REHABILITATION
SUMMARY OF APPROXIMATE QUANTITIES

PROJECT NO. _____



PROJECT AREA

HWY 50

TO GRAND JUNCTION

REEDER MESA RD

REEDER MESA RD

PURDY MESA RD

LANDS END RD

KANNAH CREEK RD

KANNAH CREEK RD

KANNAH CREEK

N

DESCRIPTION	DATE
REVISION 1	–
REVISION 2	–
REVISION 3	–
REVISION 4	–

DRAWN BY HMG DATE 2017
DESIGNED BY JME DATE 2017
CHECKED BY JME DATE 2017
APPROVED BY _____ DATE _____

SCALE: PLAN & PROFILE
HORIZONTAL 1" = 2000'
0 1000 2000 4000
VERTICAL: 1" =

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

2017 KANNAH CREEK INTAKE REHABILITATION
VICINITY MAP

4

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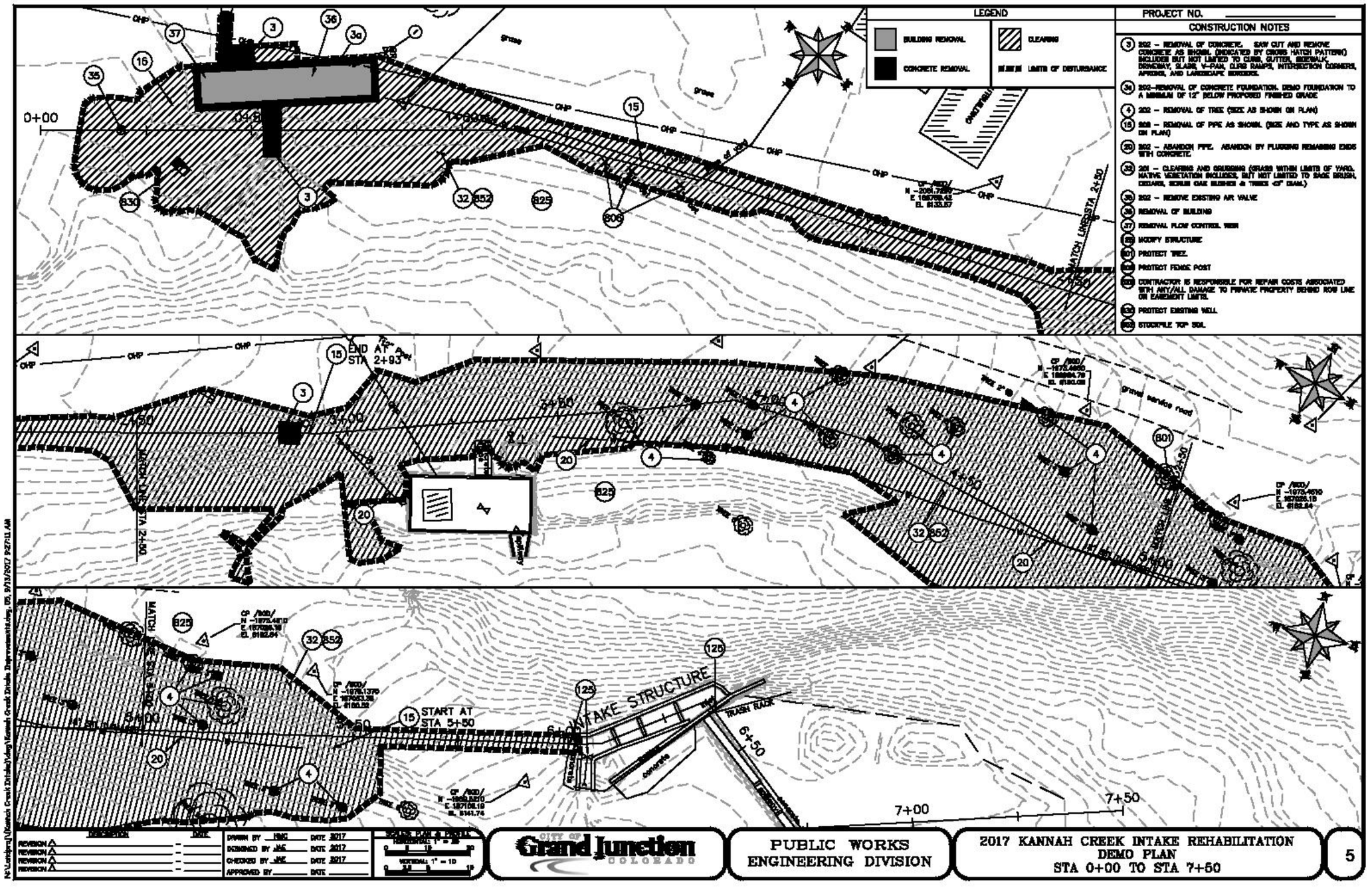

LEGEND
BUILDING REMOVAL
CONCRETE REMOVAL
CLEARING
LIMITS OF DISTURBANCE
PROJECT NO.
CONSTRUCTION NOTES
(3) 202 – REMOVAL OF CONCRETE. SAW CUT AND REMOVE CONCRETE AS SHOWN, (INDICATED BY CROSS HATCH PATTERN) INCLUDES BUT NOT LIMITED TO CURB, GUTTER, SIDEWALK, DRIVEWAY, SLABS, V-PAN, CURB RAMPS, INTERSECTION CORNERS, APRONS, AND LANDSCAPE BORDERS.
(3a) 202–REMOVAL OF CONCRETE FOUNDATION. DEMO FOUNDATION TO A MINIMUM OF 12" BELOW PROPOSED FINISHED GRADE
(4) 202 – REMOVAL OF TREE (SIZE AS SHOWN ON PLAN)
(15) 202 – REMOVAL OF PIPE AS SHOWN. (SIZE AND TYPE AS SHOWN ON PLAN)
(20) 202 – ABANDON PIPE. ABANDON BY PLUGGING REMAINING ENDS WITH CONCRETE.
(32) 201 – CLEARING AND GRUBBING (GRUBB WITHIN LIMITS OF YARD. NATIVE VEGETATION INCLUDES, BUT NOT LIMITED TO SAGE BRUSH, CHISANS, SCRUB OAK BUSHES & TREES <8" DIAM.)
(36) 202 – REMOVE EXISTING AIR VALVE
(36) REMOVAL OF BUILDING
(37) REMOVAL FLOW CONTROL WEIR
(125) MODIFY STRUCTURE
(801) PROTECT TREE.
(808) PROTECT FENCE POST
(825) CONTRACTOR IS RESPONSIBLE FOR REPAIR COSTS ASSOCIATED WITH ANY/ALL DAMAGE TO PRIVATE PROPERTY BEHIND ROW LINE OR EASEMENT LIMITS.
(830) PROTECT EXISTING WELL
(852) STOCKPILE TOP SOIL
0+00
1+00
2+00
3+00
4+00
5+00
6+00
6+50
7+00
7+50
START AT STA 0+00
END AT STA 2+93
START AT STA 5+50
INTAKE STRUCTURE
TRASH RACK
CONCRETE
EXISTING ROAD
gravel service road
MATCH EXISTING GRADE
CP /802/
N =1972.4650
E 1868694.79
EL. 6180.08
CP /803/
N =1972.4610
E 1867225.19
EL. 6182.64
CP /805/
N =2081.7285
E 1867708.42
EL. 6135.67
CP /806/
N =1972.1375
E 1867953.26
EL. 6180.22
CP /807/
N =1968.8210
E 1871081.19
EL. 6141.74
REVISION
DATE
DRAWN BY MMC DATE 2017
DESIGNED BY JMC DATE 2017
CHECKED BY JMC DATE 2017
APPROVED BY DATE
HORIZONTAL 1" = 10'
VERTICAL 1" = 10'
CITY OF Grand Junction COLORADO
PUBLIC WORKS
ENGINEERING DIVISION
2017 KANNAH CREEK INTAKE REHABILITATION
DEMO PLAN
STA 0+00 TO STA 7+50
5

CONSTRUCTION NOTES

PROJECT NO. _____

(552) SDWLKR – CONCRETE SIDEWALK (4" THICK)(INCLUDES 6" AGGREGATE BASE COURSE)

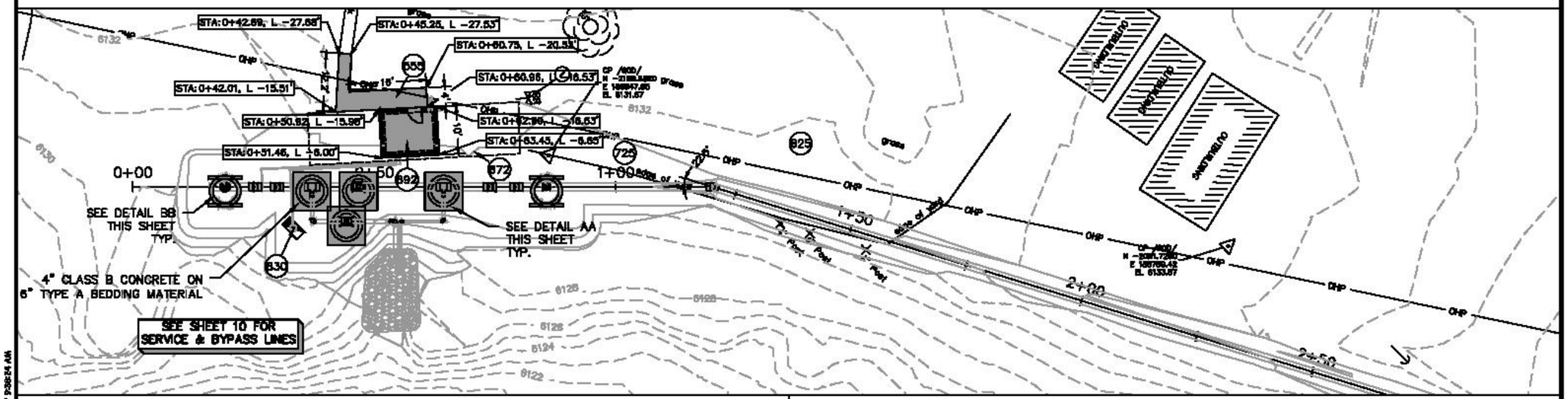
(772) 304–AGGREGATE BASE COURSE (CLASS 3)(FILL CONCRETE FOUNDATION TO DEPTH 6" BELOW FINISHED GRADE, OR TO PROPOSED CONTROL BUILDING FOUNDATION. FILL IN MAX 12" LIFTS COMPACTED TO 95% STANDARD PROCTOR)

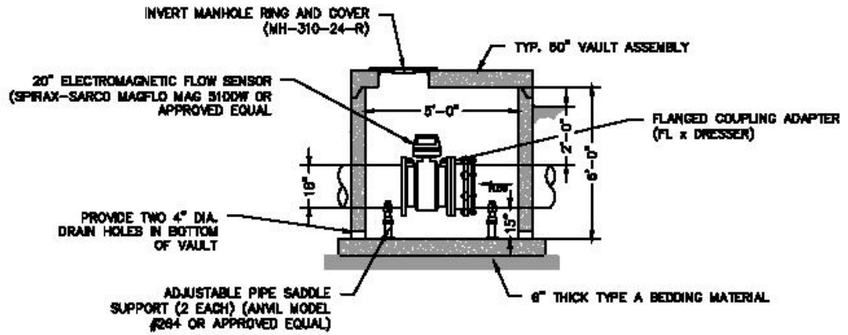
(822) 022–BUILDING FOUNDATION (4") (INCLUDES 6" AGGREGATE BASE COURSE)

(745) 207 – PLACE, GRADE, AND COMPACT 4" SUITABLE TOPSOIL AS SHOWN

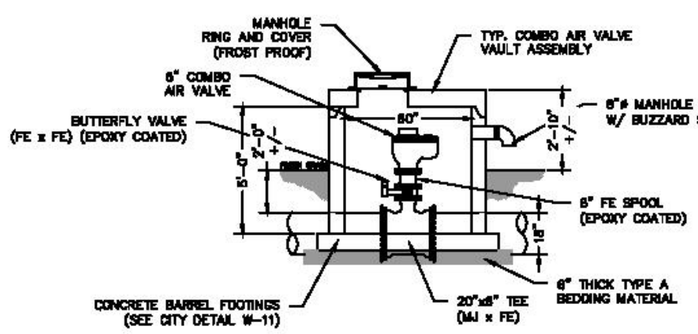
(825) CONTRACTOR IS RESPONSIBLE FOR REPAIR COSTS ASSOCIATED WITH ANY/ALL DAMAGE TO PRIVATE PROPERTY BEHIND ROW LINE OR EASEMENT LIMITS.

(830) PROTECT EXISTING WELL





DETAIL AA
EQUIPMENT VAULT DETAIL ASSEMBLY
N.T.S



DETAIL BB
COMBINATION AIR VALVE DETAIL ASSEMBLY
N.T.S.

NOTES:
– POSITION MANHOLE OPENING DIRECTLY OVER THE BUTTERFLY VALVE NUT FOR EASY OPERATION.

– 6" COMBINATION AIR VALVE AND VAULT ASSEMBLY (INCLUDES BEDDING MATERIAL, FLANGED BUTTERFLY VALVE WITH 90° ANGLE NUT, AIR VALVE, 60"ø CONCRETE VAULT, FROST PROOF RING AND COVER, GALVANIZED VENT PIPE, AND ALL NECESSARY FITTINGS TO COMPLETE AIR VALVE ASSEMBLY)

DESCRIPTION	DATE
REVISION 1	
REVISION 2	
REVISION 3	
REVISION 4	

DRAWN BY HMC DATE 2017
DESIGNED BY JAC DATE 2017
CHECKED BY JAC DATE 2017
APPROVED BY _____ DATE _____

SCALE FOR HARD PRINTS
HORIZONTAL 1" = 20'
VERTICAL 1" = 10'

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

2017 KANNAH CREEK INTAKE REHABILITATION
CONCRETE PLAN
STA 0+00 TO STA 2+50

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CONSTRUCTION NOTES

PROJECT NO. _____

(33) SPECIAL PROVISION CURED IN PLACE

(308) 103 – CLAY CUT-OFF WALL (INCIDENTAL TO WATER INSTALLATION PAY ITEM)

(400) 103.7/108.2 – 16" WATER MAIN PIPE (SDR-18 PVC). INCLUDES TYPE A BEDDING AND HAUNCHING MATERIAL AND BACKFILL OF TRENCH WITH NATIVE MATERIALS MEETING 103.14 EARTH BACKFILL MATERIAL.

(404) 102.8a/108.3 – BUTTERFLY VALVE (SIZE AS SHOWN) (SEE SHEET 10)

(408) 102.8/108.3 – 16", 45° ELBOW

(411) 102.8g/102.8h/108.3 – 6" AIR VALVE AND VAULT

(421) 103.8f/108.4 – METER SETTER (INSTALL ONLY) (SIZE AS SHOWN ON PLAN) (SEE SHEET 10)

(436) CONNECT TO EXISTING WATER PIPE/VALVE/FITTING. THE CONTRACT UNIT PRICE FOR WATER PIPE SHALL INCLUDE THE COST OF CONNECTION TO EXISTING PIPELINE.

(438) 102.8/108.3 – 16" x 6" TEE

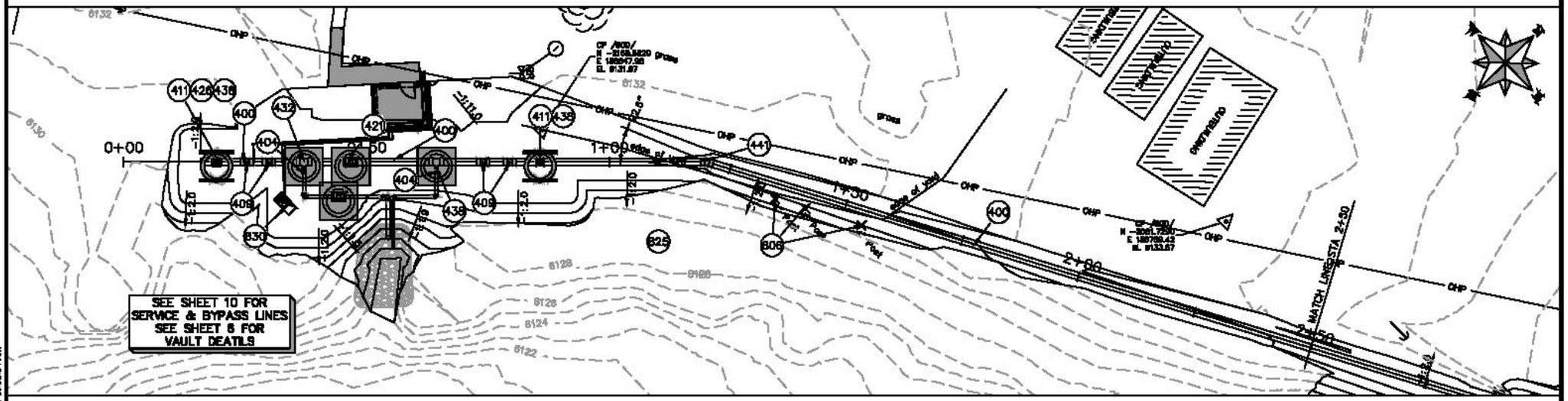
(439) 102.8/108.3 – 16" x 6" TEE

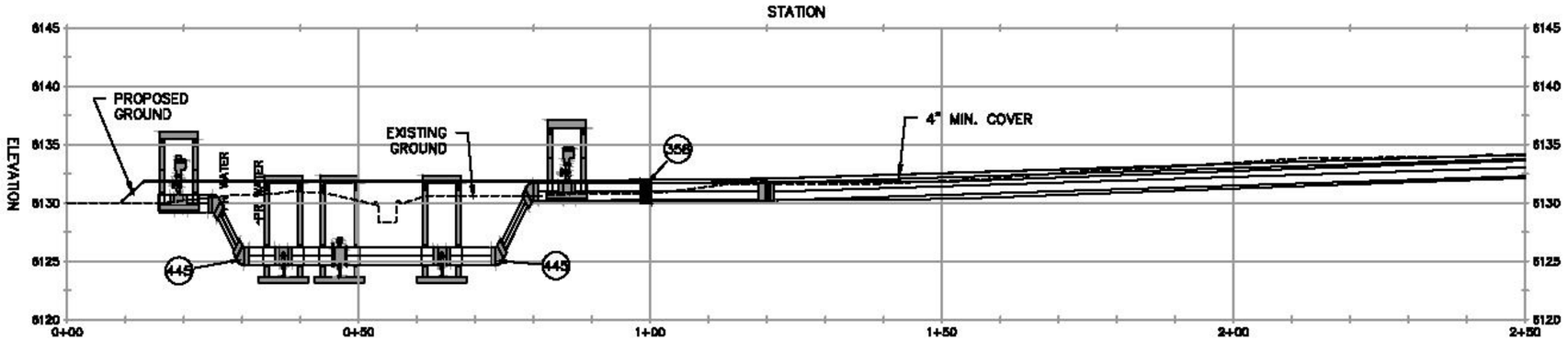
(441) 16", 22.5° ELBOW

(445) 102.8/108.3 16", 45° ELBOW

(556) CONTRACTOR IS RESPONSIBLE FOR REPAIR COSTS ASSOCIATED WITH ANY/ALL DAMAGE TO PRIVATE PROPERTY BEHIND ROW LINE OR EASEMENT LIMITS.

(830) PROTECT EXISTING WELL





REVISION	DATE
REVISION 1	
REVISION 2	
REVISION 3	
REVISION 4	

DRAWN BY NMC DATE 2017
DESIGNED BY JAE DATE 2017
CHECKED BY JAE DATE 2017
APPROVED BY _____ DATE _____

SPACING PLAN & PROFILE
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 10'

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

2017 KANNAH CREEK INTAKE REHABILITATION
WATERLINE PLAN AND PROFILE
STA 0+00 TO STA 2+50

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CONSTRUCTION NOTES

PROJECT NO. _____

(34) PANHORDER INSTALLATION AND CONNECTION PER PROJECT SPECIFICATIONS

(344) 108.2 – 6" IRRIGATION PIPE (SDR 35 PVC).

(356) 103 – CLAY CUT-OFF WALL (INCIDENTAL TO WATER INSTALLATION PAY ITEM)

(400) 108.7/108.8 – 18" WATER MAIN PIPE (SDR-18 PVC). INCLUDES TYPE A BEDDING AND HAUNCHING MATERIAL AND BACKFILL OF TRENCH WITH NATIVE MATERIALS MEETING 103.W EARTH BACKFILL MATERIAL.

(401) 108.7/108.8 – 24" WATER MAIN PIPE (SDR-18 PVC). INCLUDES TYPE A BEDDING AND HAUNCHING MATERIAL AND BACKFILL OF TRENCH WITH NATIVE MATERIALS MEETING 103.W EARTH BACKFILL MATERIAL.

(443) 108.8/108.3 – 24", 22.5° ELBOW

(443) 108.8/108.3 – 24", 11.25° ELBOW

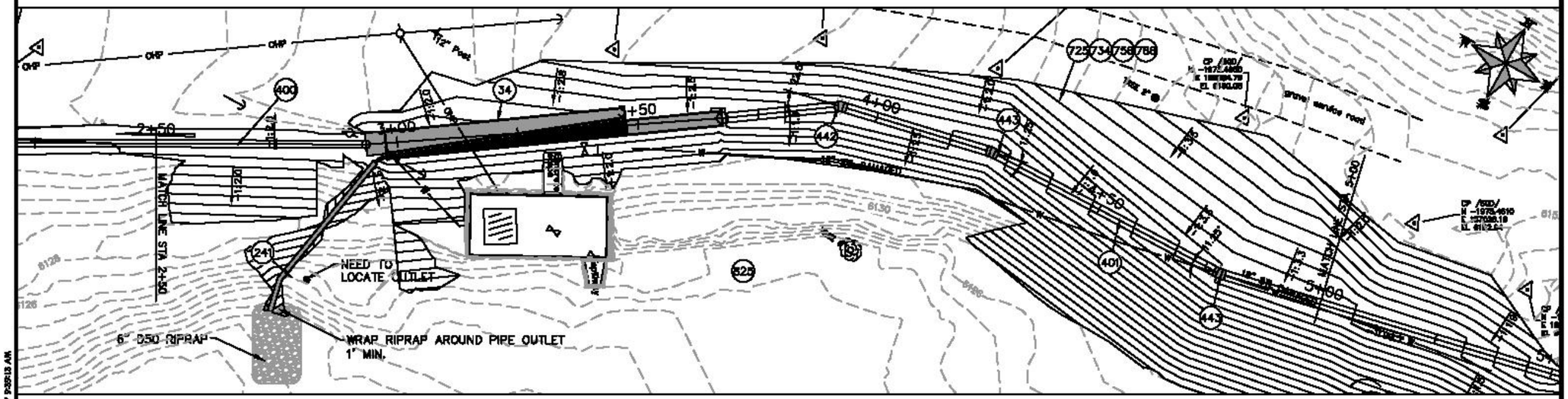
(727) 207 – PLACE, GRADE, AND COMPACT 4" SUITABLE TOPSOIL AS SHOWN

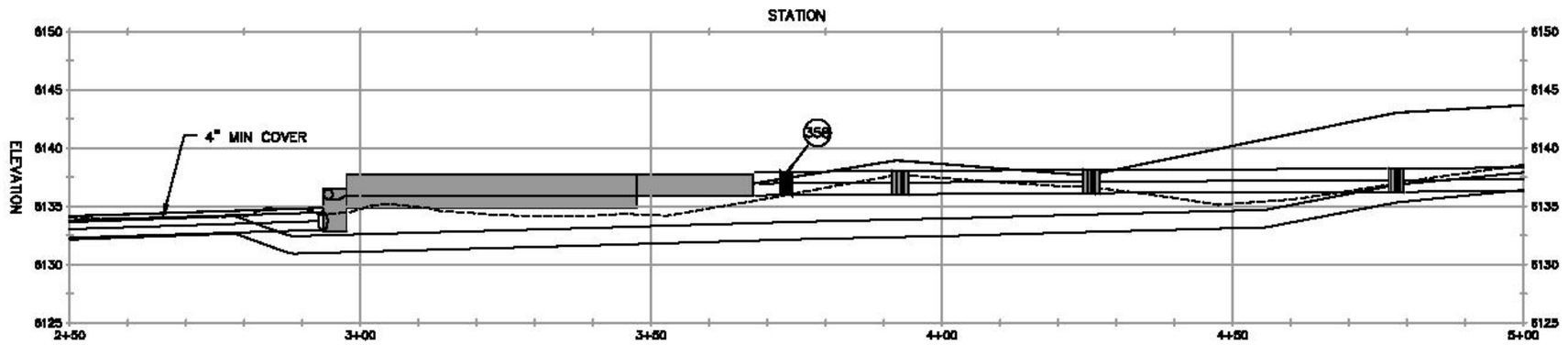
(734) 212 – SEED VARIATION (NATIVE MIX)

(758) 215 – SOIL RETENTION BLANKET (BIODEGRADABLE STRAW (DOUBLE))

(788) 203 – EMBANKMENT FILL (COMPLETION IN PLACE)

(825) CONTRACTOR IS RESPONSIBLE FOR REPAIR COSTS ASSOCIATED WITH ANY/ALL DAMAGE TO PRIVATE PROPERTY BEHIND ROW LINE OR EASEMENT LIMITS.





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REVISION	
REVISION	
REVISION	

DRAWN BY HNG DATE 2017
SCANNED BY JAE DATE 2017
CHECKED BY JAE DATE 2017
APPROVED BY _____ DATE _____

SCALE FOR 8 PRINTS
HORIZONTAL 1" = 20'
VERTICAL 1" = 10'

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

2017 KANNAH CREEK INTAKE REHABILITATION
WATERLINE PLAN AND PROFILE
STA 2+50 TO STA 5+00

8

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CONSTRUCTION NOTES

PROJECT NO. _____

(109) REMOVE STEEL BARS FROM INLET

(203) 103 – CLAY CUT-OFF WALL (INCIDENTAL TO WATER INSTALLATION PAY ITEM)

(401) 103.7/108.3 – 24" WATER MAIN PIPE (SDR-18 PVC). INCLUDES TYPE A BEDDING AND HAUNCHING MATERIAL AND BACKFILL OF TRENCH WITH NATIVE MATERIALS MEETING 103.1E EARTH BACKFILL MATERIAL.

(450) 102.6/108.3 – WHIPPS 900 SERIES SLUDGATE OR ENGINEER EQUIVALENT PER PROJECT SPECS

(725) 207 – PLACE, GRADE, AND COMPACT 4" SUITABLE TOPSOIL AS SHOWN

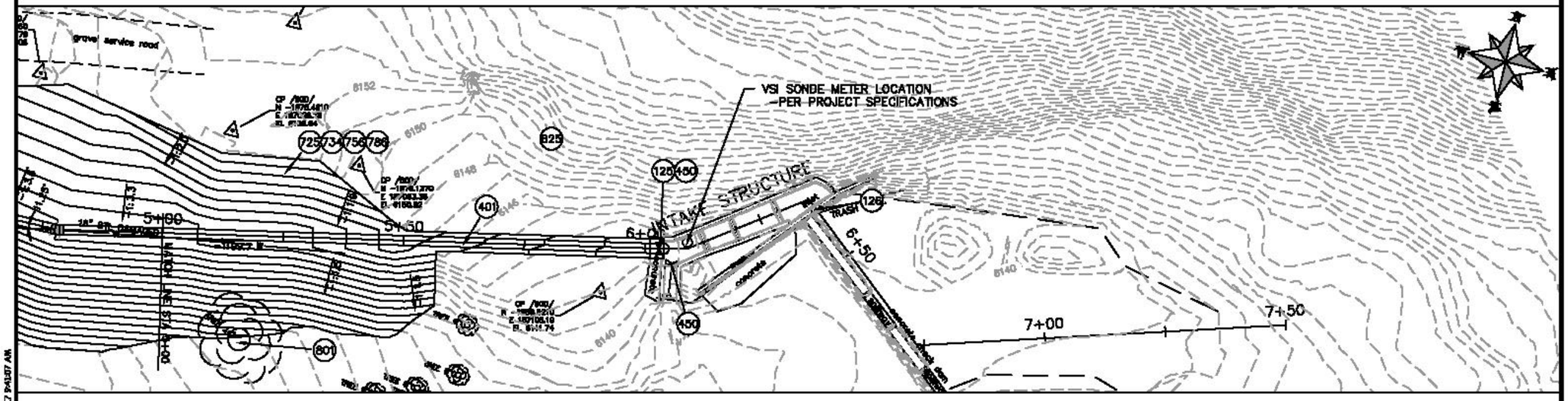
(734) 213 – SEED VARIATION (NATIVE MIX)

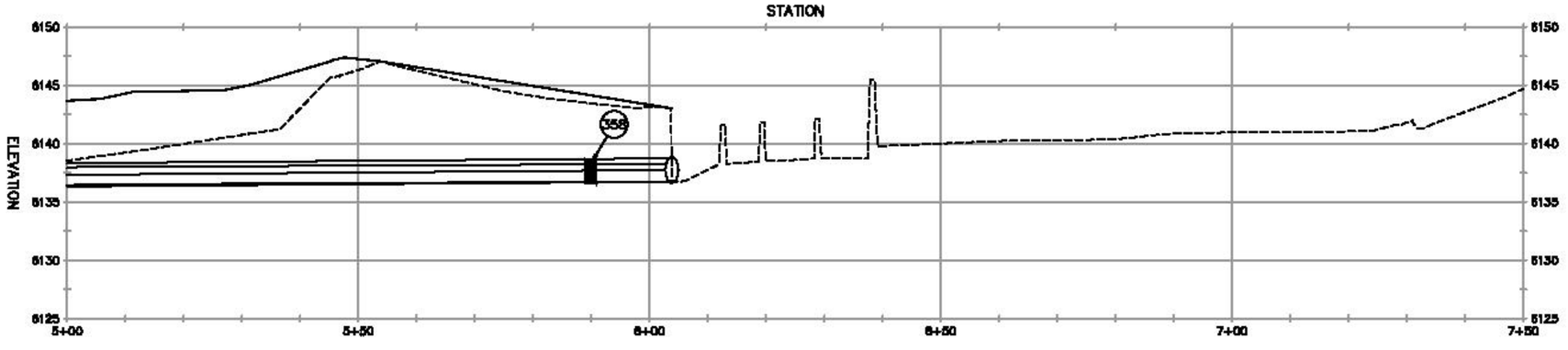
(756) 218 – SOIL RETENTION BLANKET (BIODEGRADABLE STRAW (COCONUT)

(786) 203 – EMBANKMENT FILL (COMPLETEION IN PLACE)

(801) PROTECT TREE.

(825) CONTRACTOR IS RESPONSIBLE FOR REPAIR COSTS ASSOCIATED WITH ANY/ALL DAMAGE TO PRIVATE PROPERTY BEHIND ROW LINE OR EASEMENT LIMITS.





DESCRIPTION	DATE
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REVISION 2	
REVISION 3	
REVISION 4	

DRAWN BY JMC DATE 2017
DESIGNED BY JMC DATE 2017
CHECKED BY JMC DATE 2017
APPROVED BY _____ DATE _____

SCALE FOR 8 PRINTS
HORIZONTAL 1" = 50'
VERTICAL 1" = 10'

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

2017 KANNAH CREEK INTAKE REHABILITATION
WATERLINE PLAN AND PROFILE
STA 5+00TO STA 7+50

9

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CONSTRUCTION NOTES

PROJECT NO. _____

(415) 102.8B/108.4 – TAPPING SADDLE (16"x2")

(426) 102.8/108.4 – METER SETTER (SIZE AS SHOWN ON PLAN)

(439) CONNECT TO EXISTING WATER PIPE/VALVE/FITTING. THE CONTRACT UNIT PRICE PER WATER PIPE SHALL INCLUDE THE COST OF CONNECTION TO EXISTING PIPELINE

(440) 102.6/108.3 – 6", 45° ELBOW

(451) 102.6/108.3 – 6", 90° ELBOW

(761) 108.3 THRUSTBLOCK

(720) 207 – PLACE AND COMPACT FILL TO LEVEL EVEN with TOP OF FOUNDATION WALL

(730) 207 – PLACE, GRADE, AND COMPACT 4" SUITABLE TOPSOIL AS SHOWN

(734) 212 – REGEED AREA AS SHOWN

(734) 212 – SEED VARIATION 1

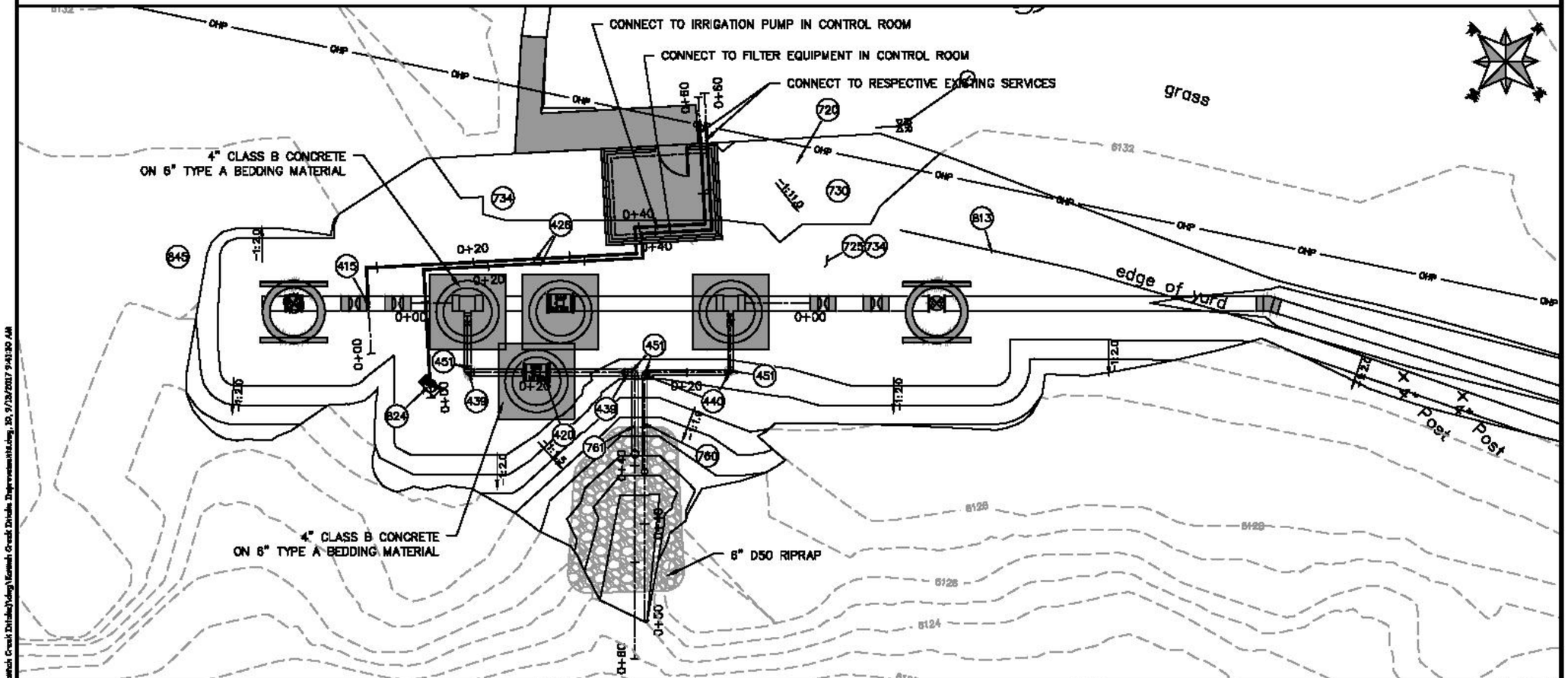
(760) 607 – 6" CHECK VALVE (TIDEFLEX CHECKMATE OR ENGINEER APPROVED EQUIVALENT)

(761) 607 – 8" CHECK VALVE (TIDEFLEX CHECKMATE OR ENGINEER APPROVED EQUIVALENT)

(813) PROTECT LANDSCAPE APPURTENANCE (TYPE AS SHOWN ON PLAN).

(824) PROTECT UTILITY PEDESTAL

(849) NOTE: NOTIFY AFFECTED UTILITY VENDOR 48 HOURS PRIOR TO EXCAVATIONS THAT WILL EXPOSE UTILITY LINES. THE COVER SHEET WILL HAVE A LISTING OF UTILITY VENDORS AND TELEPHONE NUMBERS.



DESCRIPTION	DATE
REVISION 1	
REVISION 2	
REVISION 3	
REVISION 4	

DRAWN BY HMC DATE 2017
DESIGNED BY JAE DATE 2017
CHECKED BY JAE DATE 2017
APPROVED BY _____ DATE _____

SCALING PLAN & PROFILE
HORIZONTAL 1" = 20'
VERTICAL 1" = 10'

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

2017 KANNAH CREEK INTAKE REHABILITATION
PLAN
OVERFLOW AND ADDITIONAL LINES

10

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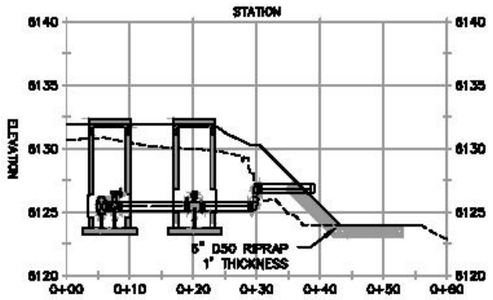
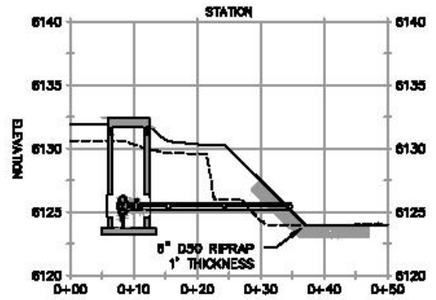
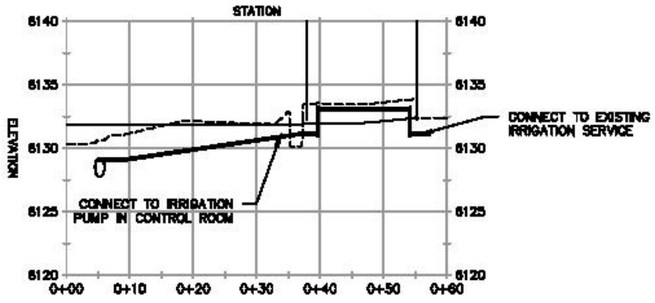
PROJECT NO. _____



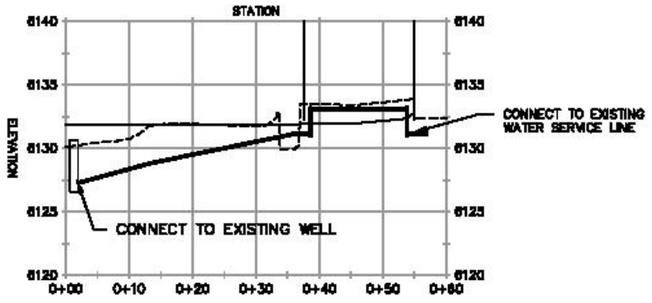
8IN OVERFLOW LINE



6IN OVERFLOW LINE



2IN IRRIGATION LINE



2IN WATER LINE

REVISION	DATE
REVISION 1	
REVISION 2	
REVISION 3	
REVISION 4	

DRAWN BY MAC DATE 2017
DESIGNED BY MAC DATE 2017
CHECKED BY MAC DATE 2017
APPROVED BY _____ DATE _____

SCALING PLAN & PROFILE
HORIZONTAL 1" = 20'
VERTICAL 1" = 10'

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

2017 KANNAH CREEK INTAKE REHABILITATION
PROFILES
OVERFLOW AND ADDITIONAL LINES

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PROJECT NO. _____

ONE LINE DIAGRAM LEGEND

TRANSFORMER, WITH PRIMARY AND SECONDARY VOLTAGE, AMPERAGE RATING AS NOTED.

CIRCUIT, NO. SHOWN OR INDICATED CONDUCTORS, WITH DASH CROSSED WHERE ALL IN X CONDUIT TO 12 OR MORE.

ONE LINE SHOWING POWER AND CONTROL TO A PIECE OF EQUIPMENT OR A SYSTEM CONSISTING OF MORE THAN ONE UNIT. ALL FOR SYSTEM OR EQUIPMENT SHALL ALSO BE INSTALLED AND WIRED AS REQUIRED BY VENDOR SPECIFICATIONS AND OTHER APPLICABLE CODES.

INDICATES THAT ALL CIRCUIT OR CIRCUIT MAY BE ROUTED IN DUCT BANK OR UNDERGROUND. CONDUIT SIZE SHOWN OR ENCLOSE IS ABOVE GROUND AND/OR INSIDE OF STRUCTURE. SEE DUCT BANK SCHEDULES AND SECTIONS FOR CONDUIT SIZE OF UNDERGROUND PORTION OF CIRCUIT.

MAIN CIRCUIT BREAKER OR CIRCUIT BREAKER WITH INTEGRAL TRIP UNIT, 4 POLE, AS NOTED.

LOW VOLTAGE AIR CIRCUIT BREAKER, 4 POLE, AS NOTED.

NEMA 4 COMBINATION MAGNETIC MOTOR STARTER.

LOW VOLTAGE MOLDED CASE CIRCUIT BREAKER.

MANUAL MAGNETIC CONTACTOR.

FUSE AND ENCLOSURE SWITCH.

NOTE 3 COMBINATION MAGNETIC MOTOR STARTER, REVERSING OR 3 SPEED.

POTENTIAL TRANSFORMER.

CURRENT TRANSFORMER.

SCHEMATIC SYMBOLS

- WIRE CONNECTION POINT
- NORMALLY OPEN CONTACT
- NORMALLY CLOSED CONTACT
- STARTER, CONTACTOR OR RELAY COIL
- NORMALLY OPEN PUSH BUTTON
- NORMALLY CLOSED PUSH BUTTON
- MAINTAINED PUSH BUTTON
- NORMALLY CLOSED HINGED LIMIT SWITCH
- NORMALLY OPEN HINGED LIMIT SWITCH
- BOOMSTAND LIMIT
- FUSE
- CAPACITOR, POTENTIAL TRANSFORMER
- SWITCH
- MANUAL STARTER
- OVERLOAD
- FLOAT SWITCH (CLOSING ON RISING LEVEL)
- FLOAT SWITCH (OPEN ON RISING LEVEL)
- PRESSURE SWITCH (CLOSING ON RISING PRESSURE)
- PRESSURE SWITCH (OPENING ON RISING PRESSURE)
- VACUUM SWITCH (CLOSING ON INCREASING VACUUM)
- VACUUM SWITCH (OPENING ON INCREASING VACUUM)
- TEMPERATURE SWITCH (CLOSING ON RISING TEMPERATURE)
- TEMPERATURE SWITCH (OPENING ON RISING TEMPERATURE)
- FLOAT ACTUATED SWITCH (CLOSING ON INCREASE IN FLOW)
- FLOW ACTUATED SWITCH (OPENING ON INCREASE IN FLOW)
- ON TIME DELAY SWITCH (NORMALLY OPEN WITH TIME CLOSING AFTER COIL IS ENERGIZED)
- ON TIME DELAY SWITCH (NORMALLY CLOSED WITH TIME DELAY OPENING AFTER COIL IS ENERGIZED)
- OFF TIME DELAY SWITCH (NORMALLY CLOSED WITH TIME DELAY OPENING AFTER COIL IS ENERGIZED)
- OFF TIME DELAY SWITCH (NORMALLY OPEN WITH TIME DELAY CLOSING AFTER COIL IS ENERGIZED)
- TORQUE SWITCH (NORMALLY OPEN)
- TORQUE SWITCH (NORMALLY CLOSED)
- LIMIT SWITCH (NORMALLY OPEN)
- LIMIT SWITCH (NORMALLY OPEN, HELD CLOSED)
- LIMIT SWITCH (NORMALLY CLOSED)
- LIMIT SWITCH (NORMALLY CLOSED, HELD OPEN)
- DIFFERENTIAL PRESSURE SWITCH (NORMALLY OPEN, CLOSING ON INCREASING DIFF.)
- DIFFERENTIAL PRESSURE SWITCH (NORMALLY CLOSED, OPEN ON INCREASING DIFF.)
- 24 VOLT DC SURGE PROTECTOR

SWITCH & OUTLET SYMBOLS

- SINGLE POLE SWITCH, 3=3 WAY SWITCH DESIGNATION
- TWO POLE SWITCH, A=ARTIFICIAL DESIGNATION
- THERMOSTAT SWITCH, 3=3 WAY SWITCH DESIGNATION
- FOUR-WAY SWITCH, 3=3 WAY SWITCH DESIGNATION
- WEATHERPROOF SWITCH, A=ARTIFICIAL DESIGNATION
- KEY OPERATED SWITCH, A=ARTIFICIAL DESIGNATION
- SOLENOID OPERATED SWITCH, A=ARTIFICIAL DESIGNATION
- DUPLEX RECEPTACLE VERTICALLY
- 240V, 3 PHASE RECEPTACLE, TYP=AMPERE RATING NOTED
- 480V, 3 PHASE WELDING RECEPTACLE, TYP=AMPERE RATING NOTED

MISCELLANEOUS SYMBOLS

- THERMOSTAT
- JUNCTION BOX
- EMERGENCY FIXTURE
- EMERGENCY INVERTER
- POWER PANEL
- LIGHTING PANEL
- MISCELLANEOUS PANEL

ABBREVIATIONS

A	AMMETER, AMPERE, ALARM
AC	ALTERNATING CURRENT
ADJ	ADJUSTABLE FREQUENCY DRIVE
AFF	ABOVE FINISHED FLOOR
AM	AMMETER
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
C	CLOSE, COUNTER, CONDENSER
CAV	CONVECTOR
CB	CIRCUIT BREAKER
CCP	CONTROL CHANNEL
CKT	CIRCUIT
CLG	CEILING
CP	CONTROL PANEL
CPT	CONTROL POWER TRANSFORMER
CR	CONTROL STATION
CTD	CYCLE TIMER, CURRENT TRANSFORMER
CTR	CYCLE TRANSFORMER
DC	DISCONNECTION, SOLENOID OPERATION, DIRECT CURRENT
DET	DETECTOR
DFU	DOMESTIC WATER FIXTURE UNIT
DIM	DIMMER
DISC	DISCONNECT SWITCH
DN	DOWN
DP	DISTRIBUTION PANEL
DPDT	DOUBLE POLE DOUBLE THROW
DPST	DOUBLE POLE SINGLE THROW
DTR	DIFFERENTIAL TEMPERATURE CONTROLLER
E	EAST
EA	EACH
EC	ELECTRICAL CONTRACTOR
EMH	ELECTRICAL METER HOUSE
ETR	ELECTRIC TRACE HEATER
EX	EXISTING
F	FORWARD
FA	FUNCTION
G	GROUND, GROUND
GFI	GROUND FAULT INTERRUPTER
GLB	GLOBE VALVE
HD	HEAVY DUTY
HH	HANDHOLE
HMT	HIGH MOISTURE THERMOSTAT
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE
HP	HORSEPOWER
HWCD	HIGH WATER CUT OFF
HZ	HERTZ (CPS)
IC	INTERRUPTER
J	JUNCTION BOX
KV	KILOVOLT
KVA	KILOVOLT AMPERE
KVAR	KILOVAR
KW	KILOWATT
KWH	KILOWATT HOUR
L	LOW, LEVEL
LA	LIGHTNING ARRESTOR
LAN	LOCAL AREA NETWORK
LP	LIGHTING PANEL
LS	LIMIT SWITCH, LEVEL SWITCH
LWCO	LOW WATER CUTOFF
M	MAGNETIC MOTOR STARTER
MA	MILLIAMPERE
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCM	THOUSAND CIRCULAR MIL
MD	MANIFOLD DISTRIBUTOR
MH	MANHOLE, HALFMAN I-BEAM 'S'
MOV	MOTOR OPERATED VALVE
MS	MANUAL MOTOR STARTER
MWH	METER SPACE HEATER
N	NORTH, NEUTRAL
NO	NORMALLY CLOSED
NC	NORMALLY OPEN, NUMBER
O	OPEN
OL	OVERLOAD
PB	PUSH BUTTON, PULLBAR
PF	POWER FACTOR METER, PI VANE (AS SHOWN, TYPE)
PLC	PROGRAMMABLE LOGIC CONTROLLER
PP	POWER PANEL
PR	PRESSURE RELIEF
PT	POTENTIAL TRANSFORMER, PRESSURE TAKE
PW	PULL WIRE, RELAY, REVERSE
R	RECEPTACLE
RGS	RIGID GALVANIZED STEEL
RMC	RIGID METAL TYPE TRIP DETECTOR
RTU	REMOTE TERMINAL UNIT
RWB	RECLOSE TOL SAW BOLD STATE SWITCH
S	SOUTH, SWITCH
SCADA	SUPERVISORY CONTROL AND DATA ACQUISITOR
SP	SINGLE POLE
SPDT	SINGLE POLE DOUBLE THROW
SPST	SINGLE POLE SINGLE THROW
SR	SOLENOID RATION
SV	SOLENOID VALVE
SWG	SWITCHGEAR
SWBD	SWITCH BOARD
T	THERMOSTAT, TIMER, TOTAL TIME
TAH	TACHometer
TB	TERMINAL BLOCK
TD	TIME DELAY RELAY
TEMP	TEMPERATURE
TG	TONGUE
TR	TRANSFORMER, TRANSFORMER
UG	UNDERGROUND
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLTS
VA	VOLT AMPERE
VLS	VALVE LIMIT SWITCH
VM	VOLTMETER
W	WASTE, WATTS
WH	WATTHOUR METER
WM	WATT METER
WP	WEATHERPROOF
XFMR	TRANSFORMER
XP	EXPLOSION PROOF
Y	YES, WYE
Z	AUXILIARY RELAY POSITION SWITCH

AREA DESIGNATIONS

THE SPECIAL AREA DESIGNATION BOXES, AS DEFINED BELOW, ARE LOCATED WITH PLAN DRAWINGS TO DENOTE ELECTRICAL INSTALLATION REQUIREMENTS. DESIGNATION BOXES ARE LOCATED WITHIN ROOM OPENING AND DOOR NUMBER, ALL ROOM LABELS FOR INDICATED OTHERWISE AND ARE TYPE 1 AND MIN MINIMUM TYPE 1 ENCLOSURE.

ABOVE GRADE OUTDOOR, CHEMICAL FEED AND STORAGE ROOMS. CONDUIT SYSTEM SHALL BE EMBEDDED AND SERVE NON-SEISMIC CONDUIT WITH PROPER FITTINGS, BOXES, AND ACCESSORIES.

WET WELL MOISTURE PROTECTION (SEALS, SEALANTS, SCREENS, LOCKS, GASKETS, ETC. MINIMUM NEMA TYPE 4 ENCLOSURE FOR EQUIPMENT AND GASKETED FITTINGS IN A CONDUIT SYSTEM.

CLASS 1 DIV 1 CLASS 1, DIVISION 1 AREA AS DEFINED BY NEC ALL EQUIPMENT AND CONDUIT SYSTEMS SHALL BE RATED FOR USE IN THIS AREA.

CLASS 1 DIV 2 CLASS 1, DIVISION 2, GROUP D AND CHEMICAL, GASOLINE AS DEFINED BY NEC. EQUIPMENT AND CONDUIT SYSTEMS SHALL BE RATED FOR USE IN THIS AREA.

INDOOR DRY INDOOR, DRY, SEMI-CLEAN, REQUIRES MINIMUM NEMA TYPE 12 GASKETED ENCLOSURES FOR ALL EQUIPMENT AND GASKETED FITTINGS IN CONDUIT SYSTEMS.

OUTDOOR WET OUTDOOR AND INDOOR WET LOCATIONS SUBJECT TO SPRINKLING. CONDUIT SYSTEMS SHALL USE PVC COATED RIGID GALVANIZED STEEL WITH PVC COATED PIT ENDS BOXES, AND FITTINGS OF SEAL ENCLOSURE.

GENERAL REQUIREMENTS

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTITUTIONAL CONDUITS NOT SHOWN ON THE PLANS. THIS SHALL INCLUDE ALL CONDUITS SHOWN ON THE ONE LINE AND WHERE SEE SECTION OF ITEM IN ITALICS. ALL CONDUITS SHALL BE SIZED AS REQUIRED BY THE SPECIFICATIONS.
2. REMOVE WHERE SHALL BE FITTED AND POWER.
3. IF EQUIPMENT SUPPLIED BY MANUFACTURER HAS A LARGER LOAD THAN VALUE SHOWN, THE SIZES FOR CONDUIT AND ELECTRICAL EQUIPMENT SHALL BE ENLARGED, AS REQUIRED, TO ACCOMODATE THE HIGHER VALUE.
4. THE CONTRACTOR SHALL REVIEW POWER REQUIREMENTS OF EQUIPMENT SUPPLIED UNDER THIS CONTRACT AND PROVIDE POWER AS REQUIRED.
5. IN AREAS WHERE THERE ARE OVERHEAD BRIDGE CRANES, HOISTS, ETC., NO CONDUITS SHALL BE RUN OVERHEAD THAT WILL INTERFERE WITH THE OPERATION OF THE EQUIPMENT.

GENERAL NOTES

1. SOLID LINES —— INDICATE INSTRUCTION EQUIPMENT.
2. DOTTED LINES . . . . INDICATE EXISTING WORK OR EQUIPMENT.
3. DASHED LINES _ _ _ INDICATE FUTURE WORK OR EQUIPMENT.
4. THIS IS A GENERAL LEGEND SHEET. SOME SYMBOLS AND ABBREVIATIONS MAY NOT BE UTILIZED ON THIS SPECIFIED PROJECT.
5. INFORMATION RELATED TO CONDUIT IDENTIFICATION, WIRE & CONDUIT SIZES, AND ROUTING, IS ON THE FOLLOWING DRAWING NO. TYPES:
   - A. ONE-LINE DIAGRAM SHOWS CIRCUIT IDENTIFICATION, WIRE QUANTITY AND SIZES, AND CONDUIT SIZE WHEN STUB-UP/EXPOSED. ONE-LINE DIAGRAM ALSO INDICATES ORIGIN AND DESTINATION OF CIRCUITS, AND IDENTIFY CIRCUIT/ROUTED UNDERGROUND.
   - B. FOR CIRCUITS ROUTED UNDERGROUND FOR TRENCH IN SLAB FLOOR PLANS SHOW LOCATION OF EQUIPMENT FOR INTERIOR AND EXTERIOR LIGHTS WITH RISER DIAGRAM FOR CIRCUITS WITH UNDERGROUND PORTIONS, APPROXIMATE ORIENTATION OF UNDERGROUND CONDUITS, USE AS KNOWN FOR STRUCTURES PLANS FOR CONSTRUCTION SECTION LENGTH OF IN STRUCTURE PORTIONS OF CIRCUITS. BUILDING PLOT PLANS MAY ALSO SHOW HOUSE RUNS FOR LIGHTING, RECEPTACLE, AND OTHER MISCELLANEOUS EQUIPMENT CIRCUITS.
   - C. SITE PLANS INDICATE THE GENERAL ROUTING OF UNDERGROUND CONDUITS AND DUCT BANKS. GROUND ROUTED IN UNDERGROUND SEPARATION DUCT BANKS ARE INDICATED IN DUCT BANK SECTIONS REFERENCED ON THE SITE PLAN.
   - D. DUCT BANK SECTIONS AND ASSEMBLIES IDENTIFY CONDUIT SIZE, CONDUIT MATERIAL, ARRANGEMENT OF THE UNDERGROUND CONDUITS, AND CIRCUITS ROUTED WITHIN UNDERGROUND CONDUIT.
6. CLOUDED SYMBOLS INDICATE WORK IN EXISTING AREA THAT IS NEW OR MAY WORK ON AN EXISTING PIECE OF EQUIPMENT.

CONDUIT & WIRING INSTALLATION LEGEND

- CONDUIT EXPOSED.
- CONDUIT CONCEALED.
- CONDUIT TURNING UP, CONDUIT TURNING DOWN.
- CONDUIT PLUGGED/FLUSH, CONDUIT CAPPED.
- TYPICAL FOR POWER PER TO BE ROUTED TO LIGHTING PANEL, IS UNDERSTOOD TO INCLUDE GROUNDING. SEE NEC CONDUCTORS & SIZE PURSUIT.)
- LIGHTING FIXTURE. REFER TO NUMBER SELECTED IN FIXTURE SCHEDULE.
- FLUORESCENT FIXTURE. REFER TO NUMBER OR LETTER IN FIXTURE SCHEDULE.
- EM-4 EMERGENCY INVERTER FROM IDENTIFIED NAME, LP4, CIRCUIT 3.
- LP4 LIGHTING FIXTURE NUMBER FROM LIGHTING PANEL LP4, CIRCUITS (ARM SHARE-WIRE)
- LP4-1 / 1A LIGHTING FIXTURE NUMBER FROM LIGHTING PANEL LP4, CIRCUIT 4
- 1A LIGHTING FIXTURE POWERED VIA SWITCH-A
- UNDERGROUND ADVANCE ENGAGED ELECTRICAL DUCT BANK.
- UNDERGROUND ADVANCE ENGAGED ELECTRICAL DUCT BANK WITH REMOVABLE ENGAGE.
- RIGID CONDUIT.
- GROUND CONDUCTOR.

DESCRIPTION	DATE
REVISION 1	
REVISION 2	
REVISION 3	
REVISION 4	

DRAWN BY: TPR DATE: 8-17
DESIGNED BY: TPR DATE: 8-17
CHECKED BY: _____ DATE: _____
APPROVED BY: _____ DATE: _____

BOILER PLAN & PROFILE
HORIZONTAL 1" =
VERTICAL 1" =

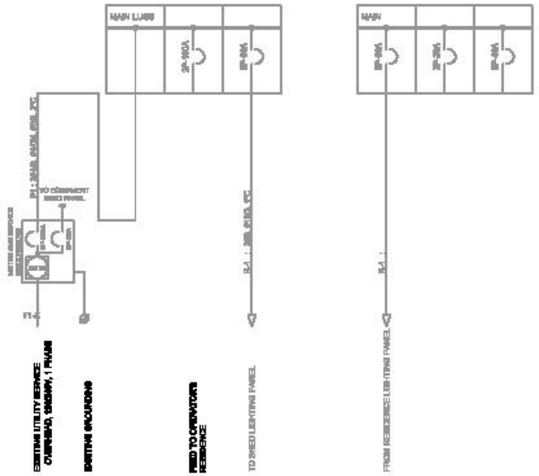
CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

CITY OF GRAND JUNCTION
2017 KANNAH CREEK INTAKE REHABILITATION
ELECTRICAL LEGEND

E1

PROJECT NO. _____



EXISTING SITE POWER
ONE-LINE DIAGRAM

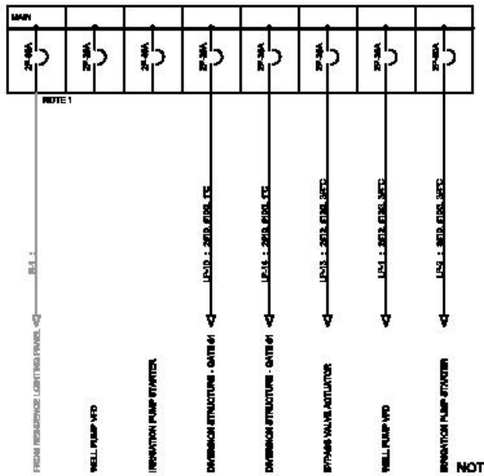
EXISTING WATER SHED POWER
ONE-LINE DIAGRAM

NAME:	LP-1	BUS: 100A		COPPER			MAIN:	2P-60A	
SERVICE:	120/240 VAC	RATING: 100A		100A			LOCATION:	WATER SHED	
MOUNTING:	SURFACE, NEMA 3R								
V.A.				CIRCUIT NUMBER				V.A.	
A	B	LOAD	PHASE	BREAKER		BREAKER	PHASE	LOAD	A	B
920		WELL PUMP (1HP)	2	20	1 2	40	2	IRRIGATION PUMP (5HP)	2875	
	920	-	-	20	3 4	-	-	-		2875
180		RECEPTACLE	1	15	5 6	15	1	RECEPTACLE	180	
	0				7 8	15	1	LIGHTS		150
0					9 10	20	2	SPARE	0	
	0				11 12	-	-	-		0
0					13 14				0	
	0				15 16					0
0					17 18				0	
	0				19 20					0
1100	920	TOTALS PER PHASE PER SIDE							2855	3025
4155	3945	TOTALS PER PHASE								
	8100	PANEL TOTAL								

EXISTING WATER SHED LIGHTING
PANEL, LP-1, PANEL SCHEDULE

NAME:	LP-SHED	BUS: 100A		COPPER			MAIN:	2P-60A	
SERVICE:	120/240 VAC	RATING: 100A		100A			LOCATION:	WATER SHED	
MOUNTING:	SURFACE, NEMA 3R								
V.A.				CIRCUIT NUMBER				V.A.	
A	B	LOAD	PHASE	BREAKER		BREAKER	PHASE	LOAD	A	B
920		WELL PUMP (1HP)	2	20	1 2	60	2	IRRIGATION PUMP (5HP)	2875	
	920	-	-	20	3 4	-	-	-		2875
900		RECEPTACLE	1	15	5 6	15	1	RECEPTACLE	180	
	180	RTU PANEL	1	15	7 8	15	1	LIGHTS		180
20		PIPELINE FLOW METER	1	15	9 10	20	2	DIVERSION GATE #1	600	
	25	BYPASS FLOW METER	1	15	11 12	-	-	-		600
360		BYPASS VALVE ACTUATOR	2	20	13 14	20	2	DIVERSION GATE #2	600	
	360	-	-	-	15 16	-	-	-		600
40		TURBIDIMETER	1	15	17 18				0	
	750	HEATER	2	20	19 20					0
720		-	-	-	21 22				0	
	200	UV FILTER (RECEPT)	1	15	23 24					
100		WATER SOFTENER (RECEPT)	1	15	25 26				0	
	0				27 28					
0					29 30				0	
2545	2385	TOTALS PER PHASE PER SIDE							4055	4025
6930	6430	TOTALS PER PHASE								
	13360	PANEL TOTAL								

NEW WATER SHED LIGHTING PANEL,
LP-SHED, PANEL SCHEDULE



NEW WATER SHED POWER, LP-SHED
ONE-LINE DIAGRAM

FAULT CURRENTS	
LOCATION	VALUE
PI-UTILITY	7,409A

NOTES:
1. THE EXISTING CIRCUIT TO THE EXISTING SHED SHALL BE RELOCATED TO CONNECT TOT HE NEW LIGHTING PANEL, LP-SHED.
2. AN ETHERNET RADIO SHALL BE INSTALLED TO CONNECT THE SHED TO THE RESIDENCE'S INTERNET SERVICE.

DESCRIPTION	DATE
REVISION 1	
REVISION 2	
REVISION 3	
REVISION 4	

DRAWN BY: JCB DATE: 8-17
DESIGNED BY: JCB DATE: 8-17
CHECKED BY: DATE:
APPROVED BY: DATE:

SCALES: PLAN & PROFILE
HORIZONTAL 1" =
VERTICAL 1" =

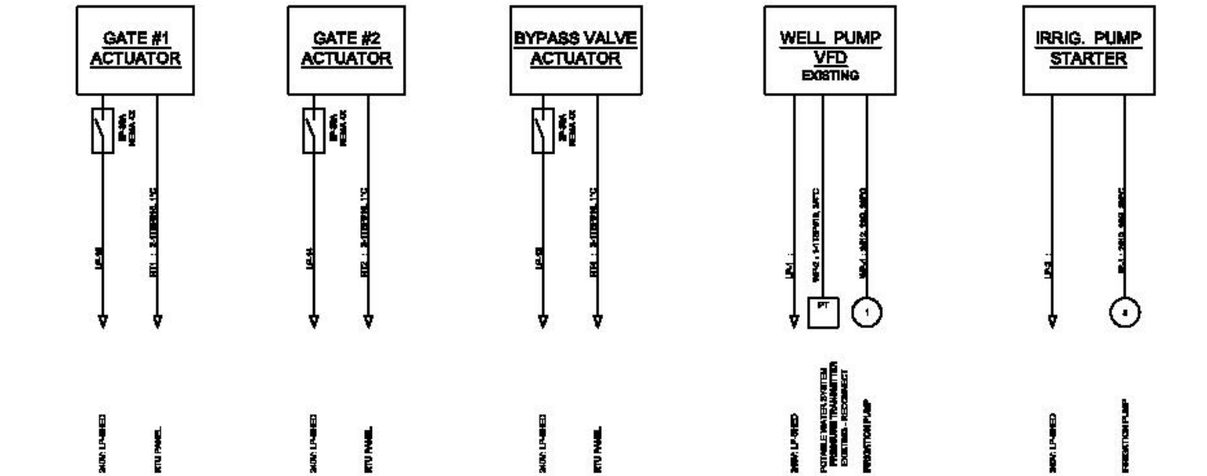
CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

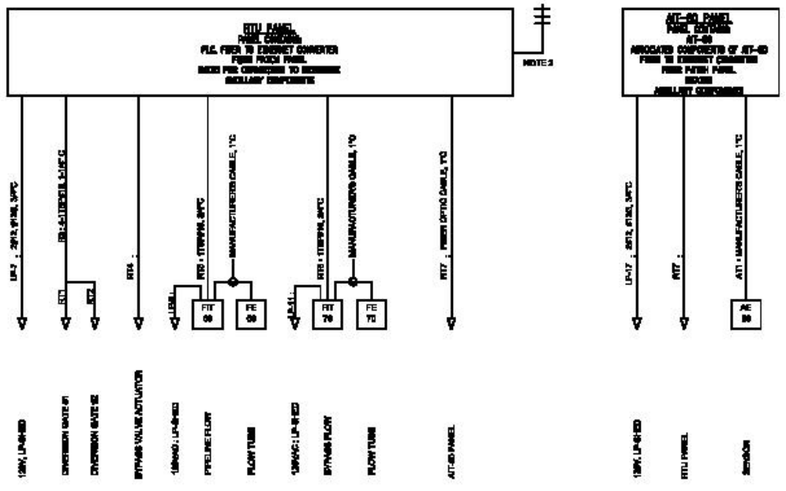
CITY OF GRAND JUNCTION
2017 KANNAH CREEK INTAKE REHABILITATION
ELECTRICAL ONE-LINE DIAGRAMS

E2

PROJECT NO. _____



IRRIGATION PUMP STARTER SCHEMATIC
(NEW STARTER FOR THE EXISTING PUMP SHALL BE PROVIDED)



NOTES:
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2. AN ETHERNET RADIO SHALL BE INSTALLED TO CONNECT THE SHED TO THE RESIDENCE'S INTERNET SERVICE.

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CITY OF Grand Junction COLORADO

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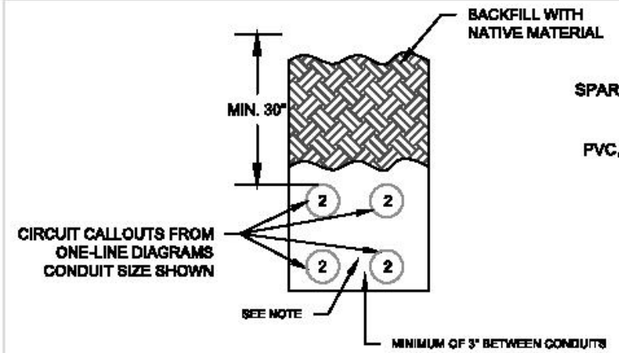
ENGINEERING DIVISION

CITY OF GRAND JUNCTION
2017 KANNAH CREEK INTAKE REHABILITATION
ELECTRICAL ONE-LINE DIAGRAMS

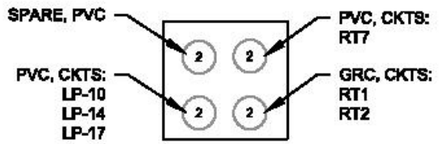
E3

PROJECT NO. _____

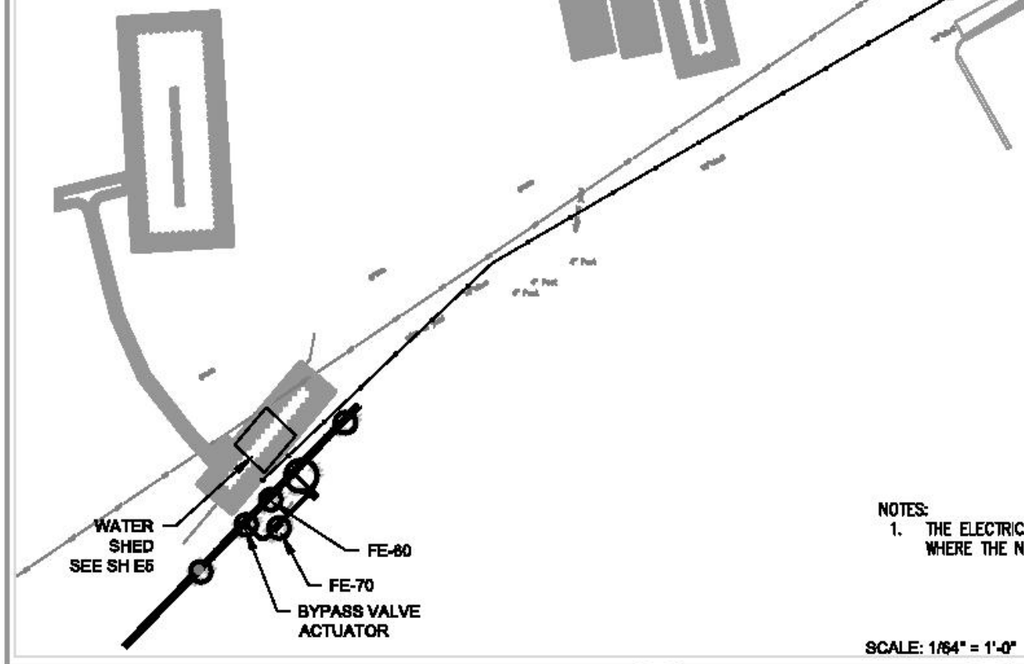


ELECTRICAL DUCT BANK DETAIL

NOTE: CONDUITS SHALL BE EMBEDDED IN SAND. THE SAND SHALL COVER ALL CONDUITS BY AT LEAST 3 INCHES



DUCT BANK SECTION



NOTES:
1. THE ELECTRICAL DUCT BANK CAN BE BURIED IN THE SAME EXCAVATION AS THE PIPELINE WHERE THE NEW PIPELINE IS BEING INSTALLED.

SCALE: 1/64" = 1'-0"

DESCRIPTION	DATE
REVISION 1	
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REVISION 3	
REVISION 4	

DRAWN BY: JCB DATE: 8-17
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BOXED PLAN & PROFILE
HORIZONTAL 1" =
VERTICAL 1" =

CITY OF Grand Junction COLORADO

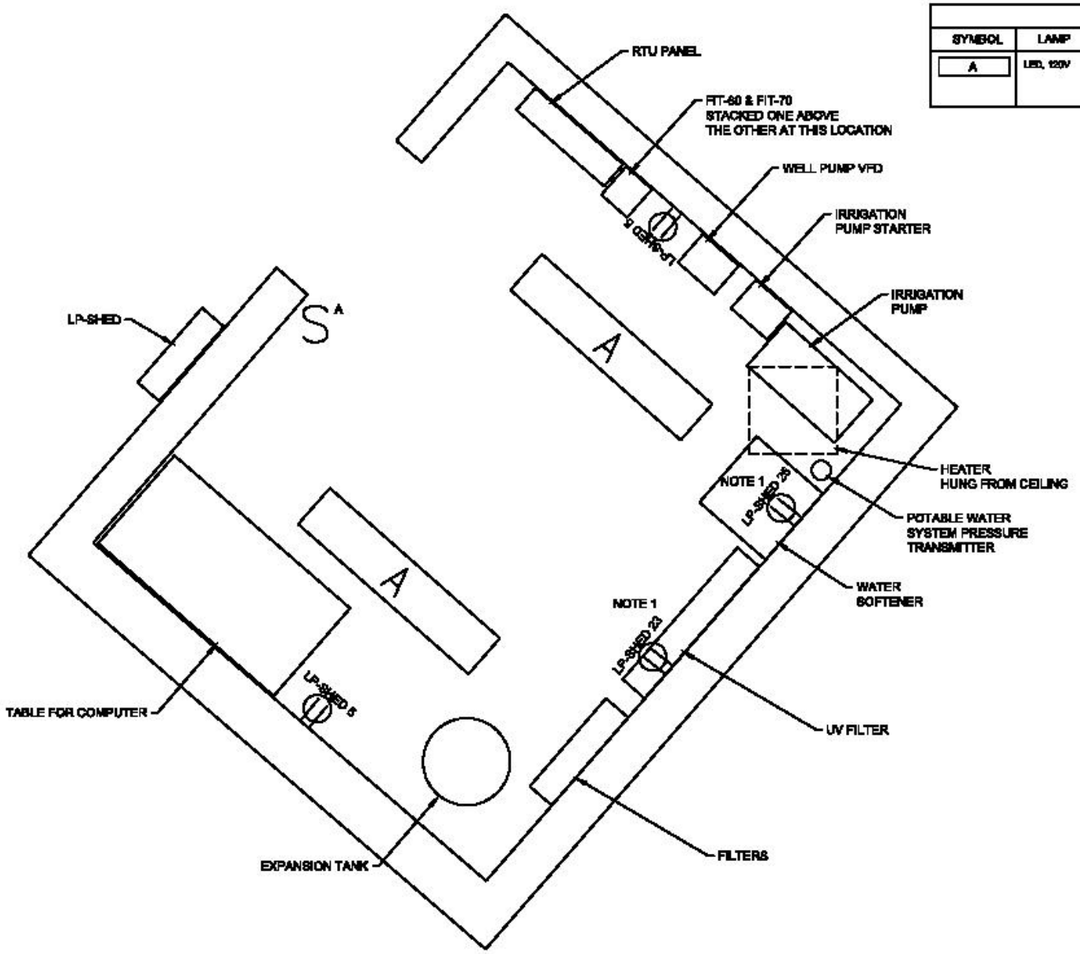
PUBLIC WORKS
ENGINEERING DIVISION

CITY OF GRAND JUNCTION
2017 KANNAH CREEK INTAKE REHABILITATION
ELECTRICAL SITE PLAN

E4

PROJECT NO. _____

LIGHTING FIXTURE SCHEDULE				
SYMBOL	LAMP	MTG HEIGHT	DESCRIPTION	MANUFACTURER
A	LED, 120V	MOUNT ON CEILING	4 FOOT FIXTURE-HEAVY DUTY AND MOUNTING HARDWARE SUITABLE FOR WET LOCATIONS	DIALIGHT: LP644-223DIP



NOTES:
1. MOUNT THE RECEPTACLE NEAR THE EQUIPMENT IT IS DEDICATED FOR.

WATER SHED - PLAN VIEW

NTS

DESCRIPTION	DATE
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REVISION 3	
REVISION 4	

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VERTICAL 1" =

CITY OF Grand Junction COLORADO

PUBLIC WORKS
ENGINEERING DIVISION

CITY OF GRAND JUNCTION
2017 KANNAH CREEK INTAKE REHABILITATION
ELECTRICAL ONE-LINE DIAGRAMS

E5

CITY OF Grand Junction COLORADO

Purchasing Division

ADDENDUM NO. 1

DATE: **April 27, 2018**
FROM: **City of Grand Junction Purchasing Division**
TO: **All Offerors**
RE: **Professional Services for Safety Evaluation of Hogchute Dam RFP-4519-18-DH**

Offerors responding to the above referenced solicitation are hereby instructed that the requirements have been clarified, modified, superseded and supplemented as to this date as hereinafter described.

Please make note of the following clarifications:

1. *Question #1* – Did the survey completed in 2017 extend below the water line? If not, will the City fill in the survey below the water line when the reservoir is drained in 2018?

   Answer – The survey in the fall of 2017 did not extend below the reservoir's water line. When the reservoir is drained in late summer 2018, the City can extend the survey on the upstream side of the dam as the Consultant deems necessary. The City will be able to gather any additional survey information that is needed and requested by the Consultant.

2. *Question #2* – Has the City considered performing a video inspection of the vent and drain lines to the best extent possible while inspecting the 30" outlet conduit?

   Answer – As far as I know, the City hasn't considered and/or tried using a camera to inspect the 4-inch air vent lines. The camera that will be used to inspect the 30-inch outlet conduit is too big for the air vent lines. However, the City does own a small push camera that is used on 4-inch pipes. The City doesn't have a camera for pipes smaller than 4-inch. This is a good idea and something that can be pursued when the City's camera truck goes up to inspect the 30-inch outlet conduit.

3. *Question #3* – Does the City have additional information regarding any work performed on the dam in 1972 and in 1988?

   Answer – Currently, the City doesn't have any records of work done to the dam in 1972. If there was work done to the dam in 1972, the Colorado SEO may have documents from this year that can be provided.

   The City does have a November 14, 1988 year-end report letter to the State Engineer's Office that can be made available to the Consultant. This letter addresses work done to the Hogchute Dam in 1988.

There are no construction plans, but there are photos of City crews extending the 8-inch toe-drain pipe out into the channel on the south side of the concrete outlet structure.

Sections of the letter are pretty faded and scanning the letter results is some pages being blank as the scanner can't recognize the text. This letter will be made available to the Consultant selected.

4. *Question #4* – Separate of the seepage observed at the outlet pipe headwall, have any other seepage areas been observed on the downstream face of the dam?

   Answer – Specific seepage areas observed on the downstream face of the dam embankment haven't been observed due to the large riprap that is on the downstream face because you can't see the embankment soil. As highlighted in the State's 2017 Inspection report, there are two small seepage channels that have formed on the right bank in some willows just downstream of the concrete outlet structure. These small seepage areas daylight out of the ground in what's believed to be native/undisturbed soils.

5. *Question #5* – In addition to CCTV camera inspection of the 30" I.D. steel outlet pipe and the dual 20" steel outlet pipes, can the City also use this equipment to CCTV camera inspect the 8" toe drain pipe?

   Answer – It's possible the City can inspect the 8-inch toe-drain pipe with the CCTV camera. Unknown bends and/or pipe offsets could make it difficult for the camera to inspect the whole toe-drain pipe. While the City's CCTV crew is on-site inspecting the 30-inch outlet pipe, the City can also see how far up the 8-inch toe-drain pipe the camera will make it. I think in order to inspect the 8-inch tile drain pipe; some excavation would be required to expose the original tile drain pipe system.

6. *Question #6* – The description of the project on the RFP notice is to "…identify potential failure modes on the …Hogchute Dam…", but it does not discuss identifying new PFM's in the provided scope of work in the RFP. Can the City provide more detail in what they expect for this task?

   Answer – In Section 4.1 General/Background, it states that "The Consultant shall also determine if there are any other PFM's not identified in the Comprehensive Dam Safety Evaluation Report (CDSER) based on the data collected during this study". The State Engineer's Office, with the history of inspecting this dam, put together a list of PFM's that they believe needs further attention and investigating. The PFM's the State identified are not absolute. However, the Consultant's investigating of the dam embankment should hopefully validate and/or invalidate the PFM's the State identified, as well as, identify any new PFM's the CDSER didn't.

7. *Question #7* – Developing PFM's is often done in a group setting, involving stakeholders and the consultant to develop new PFM's and reviewing existing PFM's. Is the City anticipating a PFM workshop taking multiple days and involving the consultant, city engineers, and operations staff (and possible the Colorado SEO)?

   Answer – Currently, the Consultant is required to meet with City staff and the Colorado SEO in December 2018 to present the Hogchute Dam Safety Evaluation Report and present the PFM's that are determined to need rehabilitation and/or repairs made. This meeting is not expected to go longer then one day.

   If the Consultant believes it's necessary to meet with the City and SEO sooner before the final report is complete to review existing and new PFM's that will be fine. The City and the Consultant can discuss this as the project develops.

8. *Question #8* – It appears there are no piezometers in the dam or surrounding area. Is this true?

   Answer – Yes, there are currently no piezometers in the dam or surrounding area.

9. *Question #9* – Will a recent topographic survey be available for our use? The SEO inspection report notes differences between what is shown on 1940's era drawings and what is observed in the field.

   Answer – The City surveyor completed a comprehensive site survey of the entire dam embankment in November 2017. This survey included the upstream dam slope down to the water level, the spillway, the downstream dam slope, the adjacent native hillsides, and the natural channel downstream of the concrete outlet structure to the Parshall Flume flow measurement equipment. This survey, along with the control points will be available to the Consultant.

10. *Question #10* – Is there any other instrumentation data that can be provided, such as point surveys of monuments and benchmarks, reservoir staff gauge readings, spillway or outlet discharge records?

    Answer – There are no movement monuments or survey benchmarks on the dam crest and/or dam embankment that have been used for monitoring. The City does record staff gauge readings, measures the outlet release flows, and measures toe-drain (seepage) flows. The toe-drain (seepage) flows can only be measured from the small PVC pipe located on the north side of the outlet structure. The 8-inch toe-drain outlet pipe that's on the south side of the outlet structure is submerged under water and the City can't get discharge readings from it. The staff gauge readings, outlet flows, and toe-drain flows will be made available to the Consultant upon request.

11. *Question #11* – We noted that there are bonding requirements for a 5% Bid Bond, 100% Performance Bond, and 100% Payment Bond. Bonding for Professional Services is not common, so we wondered if this is correct?

    Answer – Yes, this is a mistake in the RFP. These Bonds are <u>not required</u> for this project.

12. *Question #12* – Can a 2-week extension be granted for responses to the RFP-4519-18-DH?

    Answer – No. Due to the project needing to get started in the month of June, 2018, the City won't be providing a 2-week extension for responses.

13. *Question #13* – Does the City of Grand Junction have an engineer that commonly works on dam and levee related projects?

    Answer – The engineer that worked on past dam and levee projects no longer works for the City. A City Project Engineer will be assigned to this Hogchute Dam Safety Evaluation Project to represent the City and work closely with the Consultant and the Colorado SEO.

14. *Question #14* – In looking at the Leach Creek dam that was constructed recently, it appears that the City of Grand Junction self-performed part or maybe all of the design with help from the National Guard. Is this the case?

    Answer – The City engineer that put together the design of the Leach Creek dam no longer works for the City. The National Guard volunteered their time for two summers to help construct the dam.

Clarification #1 – Within Section 4.2 Special Conditions/Provision under the Proposed Schedule section in the RFP, replace item #8 with the following:

8. Winter of 2019 (Jan., Feb., & Mar. timeframe), City advertises a RFP for Consultant selection to design and produce a construction package with plans and specifications that will address the PFM's. Construction plans and specifications will need to be completed by the end of 2019. *(Not Part of this current RFP)*

The original solicitation for the project noted above is amended as noted.

All other conditions of subject remain the same.

Respectfully,

Duane Hoff Jr., Senior Buyer
City of Grand Junction, Colorado

CITY OF Grand Junction COLORADO

Purchasing Division

ADDENDUM NO. 2

DATE: **May 1, 2018**
FROM: **City of Grand Junction Purchasing Division**
TO: **All Offerors**
RE: **Professional Services for Safety Evaluation of Hogchute Dam RFP-4519-18-DH**

Offerors responding to the above referenced solicitation are hereby instructed that the requirements have been clarified, modified, superseded and supplemented as to this date as hereinafter described.

Please make note of the following clarifications:

Clarification #1: In Task 1 – Hydraulic Capacity Evaluation within Section 4.3 of the RFP, it states that Consultants need to use the Colorado/New Mexico REPS tool in determining the probable maximum flood (PMF) and for evaluating the adequacy of the existing spillway structure and determining if the reservoir's spillway needs to be resized.

The City has learned that the Colorado/New Mexico REPS tool is still in beta testing mode and may not be formalized and made available prior to or during the Hogchute Dam Safety Evaluation Study. The REPS tool would be a potential source for rainfall depths and temporal distributions used to develop the PMF, but it is not intended as a hydrology software program.

Please make note of the following revision regarding Section 4.3 – Specifications/Scope of Services:

4.3 Specifications/Scope of Services:

Task 1 within Section 4.3 – Specifications/Scope of Services is hereby revised for this project as follows:

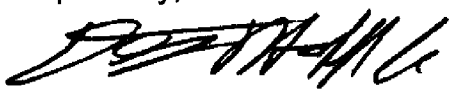
- **Task 1 – Hydraulic Capacity Evaluation:**

  A. Perform a hydrology study per the requirements of the State of Colorado's 2007 Rules and Regulations for Dam Safety and Dam Construction. Using the Hydrometeorological Report 49, or a similar method, would be acceptable for the hydrologic analysis for determining the inflow design flood (IDF) and defining the required spillway capacity area needed. With the dam recently reclassified to a High Hazard structure, the spillway needs to be evaluated to verify it has the required capacity for passing the IDF. Provide necessary spillway area required to pass the IDF volume.
  B. Prepare a hydrology report for Hogchute Reservoir per the requirements of Section 5.4.2.

The original solicitation for the project noted above is amended as noted.

All other conditions of subject remain the same.

Respectfully,



Duane Hoff Jr., Senior Buyer
City of Grand Junction, Colorado

PROFESSIONAL SERVICES FOR SAFETY EVALUATION OF HOGCHUTE DAM

FOR THE CITY OF GRAND JUNCTION

Hogchute Dam, Mesa County, CO


Jerry Creek Reservoirs, Mesa County, CO


Mt. Pisgah Dam, Teller County, CO

SUBMITTED TO:

CITY OF GRAND JUNCTION
250 NORTH 5TH STREET
GRAND JUNCTION, CO 81501

SUBMITTED BY:

RJH CONSULTANTS , INC.
9800 MT PYRAMID COURT, SUITE 330
ENGLEWOOD, CO 80112
www.rjh-consultants.com

MAY 4, 2018
18P020

May 4, 2018
Proposal 18P020

Mr. Duane Hoff, Senior Buyer
City of Grand Junction
250 North 5th Street
Grand Junction, CO 81501

Re: Proposal for Professional Services for Safety Evaluation of Hogchute Dam, RFP-4519-18-DH

Dear Mr. Hoff:

RJH Consultants, Inc. (RJH) is pleased to submit our proposal for the Safety Evaluation of Hogchute Dam (Project). We appreciate the opportunity to submit this proposal and are excited to assist the City of Grand Junction (City) identify and resolve concerns with this dam. We are confident that if selected for this work, RJH will deliver both outstanding client service and excellent engineering services that will be accepted by the Colorado Office of the State Engineer (SEO).

RJH has assembled a team of professionals with the necessary skills and expertise to assist the City with successful implementation of this Project. RJH offers the following unique benefits to the City for this Project:

- Small company personal attention with large company expertise combined with a commitment to provide outstanding service and value to the City.
- Technical expertise in dam engineering services from a firm with a good working relationship and that is respected by the SEO.
- A dedicated RJH Project Manager, Garrett Jackson, that is located in Grand Junction. Mr. Jackson previously worked for the SEO and is very familiar with the dam safety concerns for Hogchute Dam.

Mr. Garrett Jackson will be the primary point of contact for this Project, is authorized to make presentations on behalf of RJH for this Project, and can be reached by phone or email at the following:

RJH Office: (303) 225-4611
Cell Phone: (970) 640-7191
Email: gjackson@rjh-consultants.com

Although our corporate office is located in the south Denver-metro area, Mr. Jackson works remotely in Grand Junction.

Our corporate office is located at:

9800 Mt. Pyramid Court, Suite 330
Englewood, CO 80112

We look forward to this opportunity to work with the City to successfully provide professional dam engineering services that address your needs. With our extensive expertise and experience with dam safety projects, combined with our local Project Manager who has extensive knowledge of Hogchute Dam, we believe RJH is best equipped to deliver a successful project to the City.

By my signature below, I certify that to the best of my knowledge the information and data submitted in this proposal is true, complete, and constitutes a binding offer.

Please call if you have any questions or would like to discuss our proposal further.

Sincerely,

RJH CONSULTANTS, INC.

Robert J. Huzjak, P.E.
President

RJH/tjp

Enclosures: One electronic copy in .pdf format of our proposal.

TABLE OF CONTENTS

SECTION 1 – QUALIFICATIONS, EXPERIENCE, AND CREDENTIALS

INTRODUCTION TO RJH CONSULTANTS

RJH Consultants, Inc. (RJH) is a Colorado-based engineering firm that focuses specifically on dam safety engineering and design. Dam safety engineering and design is not just one service line, it is our company's identity and comprises over 90 percent of our work. RJH's unique mission is to provide our clients with outstanding technical expertise in dam safety and design, delivered with the personalized and responsive service of a small, local business. Since its founding in 2005, RJH has provided engineering services for the assessment, planning, rehabilitation, design, and construction of over 200 dam safety and dam design projects nationwide.

Dam Engineering Represents 90 Percent of Our Firm's Work

RJH has one office located in Colorado, and the company maintains a technically diverse staff of 29 professionals. Our in-house experience and expertise includes all major engineering disciplines related to dams, including geotechnical, geologic, hydrologic, hydraulic, structural, civil design, cost estimating, and construction engineering. Additionally, RJH maintains strong relationships with numerous renowned dam safety experts who work with our firm on a part-time basis.

RJH routinely leads and delivers dam evaluation and rehabilitation projects. Nearly all of our projects have been delivered to public agencies, including numerous Colorado municipalities similar to the City of Grand Junction (City).

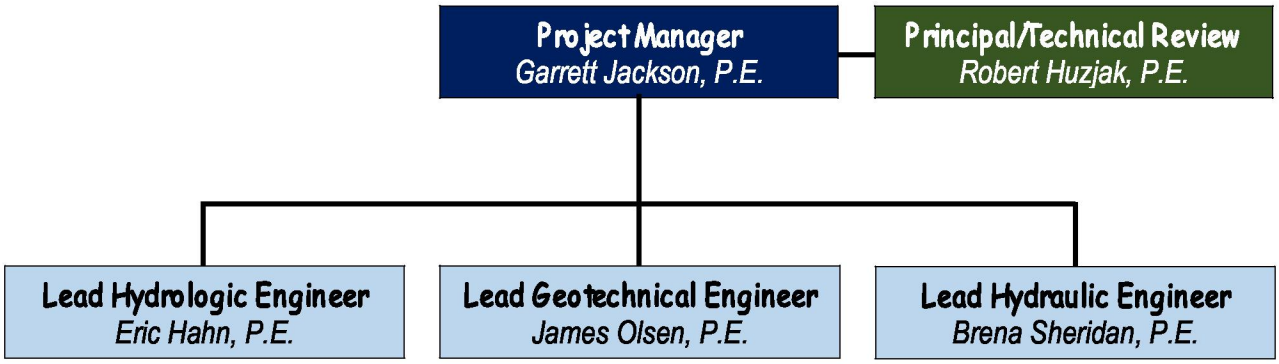
For the Hogchute Dam Safety Evaluation Project (Project), RJH will provide the City with a committed and dedicated Project Manager based in Grand Junction who has proven experience leading technically sound, responsive, risk-managed, and cost-effective engineering services. RJH's support team (i.e., task leaders) includes highly experienced professionals with technical expertise in geotechnical engineering, hydrologic engineering, hydraulic engineering (specializing in dam outlet works and spillways), and a principal engineer/technical reviewer to provide senior-level oversight and support. On multiple occasions, proposed team members have worked together and have a strong record of successfully delivering similar projects.

The RJH Project Manager and task leaders proposed for the Project all exceed the minimum experience requirements listed in the Colorado Office of the State Engineer (SEO), *Rules and Regulations for Dam Safety and Dam Construction*, Rule 4.2.9. RJH looks forward to the opportunity to work with the City, efficiently identify the key dam safety issues, and develop concepts and plans to address the critical issues identified. We commit to providing the City responsive service and at the conclusion of the Project, to provide the City with a clear understanding of the actions needed to address the identified dam safety issues.

PROFESSIONALS OF THE RJH TEAM

RJH commits to provide a dedicated and consistent team of highly-qualified professionals as shown on the organizational chart on the following page. The collective and individual commitment, experience, and abilities of RJH's professionals are key factors in our ability to deliver successful projects to our clients. Below is a brief introduction to each key professional on the RJH Team, which includes an overview of their experience and a description of their roles and responsibilities for this Project.

Resumes for the key RJH Team professionals are provided in Appendix A.



Garrett Jackson, P.E. – Project Manager. Mr. Jackson was selected as the Project Manager because of his exceptional technical qualifications and his familiarity with Hogchute Dam. Additionally, Mr. Jackson is located in Grand Junction, which facilitates effective coordination with the City, and he has the managerial background needed to efficiently deliver this Project. Mr. Jackson recently retired after working as a Colorado State Dam Safety Engineer for 20 years, during which time he inspected Hogchute Dam multiple times. While with the SEO, Mr. Jackson delivered multiple assignments that required the same skills needed to deliver services on this Project. Additionally, Mr. Jackson has performed Comprehensive Dam Safety Evaluations for the State and is extremely familiar with diagnosing and prioritizing potential failure modes.

In his role as Project Manager, Mr. Jackson will provide the following services:

- Serve as the main point of contact with the City of Grand Junction and bear primary responsibility for delivering a successful Project within agreed-upon constraints (i.e., schedule and budget).
- Provide overall technical direction, make technical decisions, and coordinate the work of the technical leads to ensure effective diagnosis of dam safety issues.
- Ensure that the investigation work is performed safely and reliably, will be well-supported and accepted by the SEO.
- Communicate information and results clearly and succinctly to the City.

Robert Huzjak, P.E. – Principal/Technical Review. Mr. Huzjak was selected as the Principal and Technical Reviewer for this Project because of his tremendous experience with similar projects that can be leveraged to benefit Hogchute Dam. Additionally, RJH is interested in developing a long-term relationship with the City and as the President of RJH, Mr. Huzjak has the authority to ensure that this Project receives the highest priority at RJH. Mr. Huzjak has nearly 35 years of experience in geotechnical engineering related to dam safety and design. He has managed the evaluation and rehabilitation of dozens of dams with seepage and hydraulic issues and can provide the full support of the Company to support Mr. Jackson in delivering a project that meets the needs of the City.

Eric Hahn, P.E. – Lead Hydrologic Engineer. Mr. Hahn was selected to lead the hydrologic tasks because of his extensive knowledge and experience in developing inflow design floods (IDF) for dams. With over 13 years of experience in hydrology for dam safety, he has a strong technical understanding of the appropriate level of detail needed for various stages of projects and is excellent at using both engineering judgement and developing thoroughly documented hydrologic analyses computations in accordance with SEO requirements. Mr. Hahn was one of the few consultants involved in beta-testing the Colorado-New Mexico Regional Extreme Precipitation Study (REPS) tool.

In his role as Lead Hydrologic Engineer, Mr. Hahn will provide the following services:

- Perform hydrologic analyses to develop the inflow design and evaluate spillway adequacy.
- Support and provide general hydrologic input needed to evaluate dam safety issues.

James Olsen, P.E. – Lead Geotechnical Engineer. Mr. Olsen has over 12 years of experience in understanding and addressing geotechnical dam safety issues, especially mitigating seepage issues. He has served as the lead geotechnical engineer multiple times and has significant and direct experience with dam rehabilitation projects that involved seepage mitigation, outlet works lining, and spillway reconstructions. Recently, Mr. Olsen was the lead geotechnical engineer and designer responsible to develop a seepage mitigation system for abutment seepage at Cabresto Dam. Additionally, Mr. Olsen has performed extensive research and laboratory experiments to thoroughly understand seepage failure modes.

Mr. Olsen will lead the exploration and subsurface characterization. He will also assist in compiling the collected data, evaluating PFMs, and in developing mitigation concepts.

Brena Sheridan, P.E. – Lead Hydraulics Engineer. Ms. Sheridan has over 11 years of experience in dam safety engineering and has played a key role on RJH teams responsible to deliver dam safety evaluation projects. Ms. Sheridan has diverse design and construction experience gained by working as project engineer, resident engineer, construction manager, and inspector for the design and construction of various water resource projects; including dam rehabilitations, new dams, pipelines, and pump stations. Ms. Sheridan has strong analytical skills in hydraulic engineering. She has recently designed outlet works rehabilitations and spillway rehabilitations on multiple dam and reservoir projects for Denver Water and the cities of Thornton and Brighton, Colorado.

Ms. Sheridan will support the team by performing hydraulic engineering.

PROJECT EXPERIENCE

RJH is a recognized leader for the inspection and evaluation of dams in Colorado and the Rocky Mountain Region. We have planned and executed numerous comprehensive dam evaluations, geotechnical investigations at dams, outlet pipe and spillway inspections, and have developed inflow hydrology for hundreds of dams in the region. We are uniquely qualified to lead the City through the process of bringing Hogchute Dam into compliance with the regulations because of our focus on dams and the resulting unparalleled experience of our Team.

In addition to our experience with the inspection and evaluation of dams, RJH has completed over 40 rehabilitation design projects. This additional experience provides our team with the abilities to not only identify issues, but understand their severity and develop cost-effective methods to address them. We have the experience to distinguish cases in which it may be advantageous to develop robust repairs instead of performing extensive evaluations, and those cases where it likely provides value to perform additional diagnostic study or exploration. In our opinion, this is an important qualification for this Project.

An example of our unique expertise pertinent to this Project is the Ten Mile Creek Water Preserve Area Project. In 2010, the United States Department of Justice (USDOJ) performed a nationwide search of dam safety professionals to assist them in a dispute with another designer. The USDOJ was searching for a group that had a strong record of design performance and expertise in diagnosing seepage issues at dams. Their search resulted in retaining three highly-qualified firms, requesting that each firm review the project file of a recently-constructed dam, and propose a detailed approach to evaluate alleged seepage issues. Following this initial phase of work, each firm was requested to present findings with supporting detail and, based on the work presented, RJH was selected as the most qualified of the three finalists. RJH was successful in diagnosing the seepage issues and developing repair plans. This project is further described on the example project sheet provided in Appendix B.

RJH has delivered numerous other projects that demonstrate our qualifications and abilities to diagnose dam safety issues, develop effective solutions, and deliver efficient projects. Descriptions of a sample of RJH projects that demonstrate our capabilities are included in Appendix B.

SECTION 2 – STRATEGY AND IMPLEMENTATION PLAN

PROJECT UNDERSTANDING

The City of Grand Junction owns and operates Hogchute Dam (DAMID 420127), located in Mesa County, Colorado, approximately 22 miles east-southeast of Grand Junction. The dam is a 56-foot-high earth structure that impounds Carson Lake on Kannah Creek at an elevation of about 9,800 feet in the Grand Mesa National Forest. The reservoir provides water storage for domestic use, irrigation, and fishing recreation. The dam was constructed in 1947 with a low-permeability earthen core protected by upstream and downstream rock shells of gravels, cobbles, and boulders. The outlet works consists of two 20-inch welded steel pipes with hydraulic slide gates at the upstream toe of the dam. The 20-inch pipes converge within the dam into a single 30-inch conduit that discharges into a rock-lined pool at the downstream toe of the dam. There appears to also be a 12-inch outlet gate installed between the two 20-inch gates, but the configuration and use of this gate are not clear. The unlined emergency spillway located at the north (right) end of the dam is somewhat deteriorated but still serviceable.

In 1988, the City relocated the outlet control structure from the downstream toe to the crest of the dam. Apparently, at about the same time, the City extended the 8-inch toe drain discharge pipe into the outlet discharge basin. The work to move the outlet controls and extend the toe drain discharge is described in a 1988 letter, which also includes some photographs of the toe drain work. There are no other construction records for the dam. The City has a four-sheet plan set, dated 1947, that appears to show the original design.

In 2015, the SEO changed the dam's hazard classification to high hazard, based on inundation mapping performed by the City to assess the impacts of a potential dam failure on downstream development that had occurred since construction of the dam. Several SEO dam safety inspection reports over the years have mentioned concerns for undocumented seepage (not collected and not monitored), the absence of any filtering of the embankment core material, apparently broken outlet gate air vents, and the deteriorated condition of the spillway. The City began planning to rehabilitate the outlet works and make other dam safety improvements several years ago.

In 2017, the SEO performed a Comprehensive Dam Safety Evaluation (CDSE) to assess the overall safety of the dam and provide the City with guidance in planning the dam improvements. The CDSE identified several credible potential failure modes (PFMs) and listed specific requirements for the City to bring Hogchute Dam into compliance with the state dam safety standards for high hazard dams. The SEO has decided to not impose a storage restriction at this time, based on the past acceptable performance of the dam and the City's good faith efforts to improve the dam's safety.

PROJECT OBJECTIVES

The Request for Proposals (RFP) for Professional Services for Safety Evaluation of Hogchute Dam describes the City's desire to investigate, identify, and document the seepage conditions at the dam and to evaluate the operation of the outlet works. The City has established an aggressive schedule to evaluate the dam and to move toward developing a design for rehabilitation of the dam.

The dam safety evaluation will be completed in 2018 and will provide a basis for the rehabilitation design. The City intends to perform design in 2019 with construction anticipated to begin by June 2020.

RJH agrees with the City that the scope of this RFP is generally appropriate to meet the City's intent to address the SEO's concerns about the safety of the dam and to provide a basis for the future rehabilitation phase of the Project. To assist the City in meeting their project needs, RJH will focus our efforts on the following objectives:

1. Bring the dam into compliance with SEO requirements for high hazard dams by identifying and taking actions required to respond to the SEO's list of immediate concerns as presented in the CDSE. These actions are specifically necessary to avoid a storage restriction.
2. Identify PFMs that need to be addressed immediately to ensure the safety of the dam and the public.
3. Identify PFMs that are less urgent, but need to be addressed in the City's long-term improvements plan to preserve the safety of the dam.
4. Evaluate the completeness of the list of PFMs considered in the CDSE to identify any additional PFMs pertinent to Hogchute Dam.
5. Provide a basis for developing the scope of a future dam rehabilitation plan.

PROJECT APPROACH

Our approach to achieve the Project goals has been proven on other similar projects to provide outstanding overall value and RJH is confident that we will deliver the best value solution to the City for this Project. Having delivered numerous similar projects, RJH understands that it is critical to obtain reliable data on the existing conditions, because all subsequent decisions on the project will be based on the understanding developed during this phase. Additionally, future construction costs will be dramatically affected by decisions made at this stage of the project. RJH's approach aligns closely with the four primary work tasks presented in the RFP, and additional discussion for each task is presented below. Also, RJH understands the importance of coordinating the project work with the SEO and has done this successfully on all of our Colorado dam projects.

To maximize the value of the information obtained during this evaluation phase, we have made suggestions for modifying the scope of this RFP, as described below under *Task 2 – Geotechnical Investigation and Seepage Analysis* and *Task 3 – Outlet Works Assessment*. The proposed scope modifications will allow a more efficient allocation of the City's budget to permit the collection of pertinent data and provide information that will better inform the scope of the future rehabilitation design.

Task 1 – Hydrology Study

This task is independent of all other tasks and can begin at any time.

- A precipitation study will be performed to define the appropriate design rainfall, which will be estimated using the Colorado REPS tool, if the tool is available in time. Otherwise, the design rainfall will be estimated using HMR-49.

- A runoff model will be developed using HEC-HMS to estimate the Inflow Design Flood (IDF) to the reservoir and evaluate the capacity of the existing emergency spillway to pass IDF and prevent overtopping of the dam. Table 5.2 of the 2007, SEO *Rules and Regulations for Dam Safety and Dam Construction* defines the IDF for a large, high hazard dam as 90 percent of the probable maximum flood (PMF) determined by the appropriate HMR.
- A Hydrology Report with the precipitation study, runoff model, and spillway sizing recommendations will be prepared as an independent report suitable for submittal to the SEO.

Task 2 – Geotechnical Investigation and Seepage Analysis

This task is not dependent on any other task and can begin as soon as the site is accessible.

Task 2a – Seepage investigation (with full reservoir)

- SEO approval will be obtained prior to mobilization and required permits will be obtained from the USACE and USFS. Based on our experience with other dam projects, the USACE and the USFS are generally supportive of evaluating and improving the safety of dams on the Grand Mesa. For permitting purposes, we assume the fieldwork can be accomplished using existing access routes and will not require any special permitting beyond that typical for investigations of a dam on the National Forest. Our investigation plan assumes that no special wetlands or other permitting considerations will be required.
- RJH will perform an investigation using a tracked backhoe (with thumb) to selectively move the large riprap near the bottom of the downstream slope to search for and trace seepage on the slope and groins.
- All seepage locations will be photographed and marked, and global positioning system (GPS) coordinates will be recorded prior to replacing the disturbed riprap. If practical, seepage from identified seepage locations will be collected for monitoring. We assume that City staff will monitor the seepage as the reservoir is drained.
- For safety, we recommend that the City stockpile a quantity of sand and gravel onsite for quickly covering any actively erosive seepage encountered during the investigation.

Task 2b – Install monitoring instrumentation (with full reservoir)

- SEO approval will be obtained prior to mobilization and required permits will be obtained from the USACE and USFS, as discussed under Task 2a. Our investigation plan assumes that access to the drilling locations will not require any special wetlands or other permitting.
- We will use a tracked hollow-stem auger drill rig to install up to three 2-inch open-well piezometers on the dam crest. Soil samples will be collected from the borings. The piezometers will permit monitoring and evaluation of current and future seepage conditions at the dam and can provide information about the likely source of the seepage emerging on the right side of the outlet channel. If the piezometers can be

installed with the reservoir at or near full storage early in the year, they can provide an approximate "baseline" for estimating the phreatic surface in the embankment under full reservoir conditions. If the instruments are not installed until after the reservoir has been drawn down, the phreatic baseline cannot be estimated until the reservoir has been held full or nearly full again for a period of time.

Table 3.3 of the CDSE report noted that drilling, sampling, and soil index testing of the embankment zone 1 core material was a required action for PFM #2. The RFP description of "Task 2 – Geotechnical Investigation and Seepage Analysis" specifies that embankment material samples shall be collected for classification of the embankment soils. Accordingly, our proposed geotechnical investigation for the scope of this RFP assumes that three borings will be drilled from the dam crest and terminated at the contact between the embankment fill and the underlying foundation. Piezometers will be installed in the three borings within the embankment.

We recommend the City consider modifying the scope of the current RFP to more completely address the investigation and evaluation requirements listed in the CDSE.

Proposed Modified Task 2b – Geotechnical Investigation and Piezometer Installation

- The CDSE required actions for PFM #7 include the same requirements as for PFM #2, with the additional requirement to "add foundation depth drilling and sampling." The SEO's requirements for geotechnical investigation of a high hazard dam typically include drilling to a total depth of 1.5 times the embankment height or 10 feet into the underlying foundation rock. Samples of the embankment and foundation materials must be collected for laboratory analyses of shear strengths and permeability, among other properties. Additionally, piezometers on the downstream slope and/or at the dam toe will be required to properly assess and monitor the behavior of the seepage through and under the dam. Modifying the geotechnical investigation scope for this RFP would better fulfill the intent of the RFP to provide information to inform the future dam rehabilitation design, and would reduce the cost for future exploration:
  - The three borings on the dam crest should be drilled to at least 1.5 times the height of the dam at the location of each boring, or 10 feet into bedrock . Piezometers should be installed in each boring.
  - Samples of the embankment and foundation materials should be collected that will be suitable for laboratory testing for analyses to be performed during the rehabilitation design phase of the project.
  - Three additional borings and piezometers paired with the crest piezometers, should be installed along the downstream toe of the dam to provide more complete information about the seepage conditions through and under the dam. Soil samples should also be collected from these borings for testing to support engineering analyses during the design phase of the project.
- Collecting appropriate samples from the embankment and foundation plus installing three pairs of piezometers will enable a more thorough assessment of the seepage conditions during this evaluation phase, and will likely eliminate the need for a second mobilization for another round of drilling during the Project's rehabilitation design phase. We have provided a cost estimate for the modified scope in Table 2.
- We will prepare a long-term piezometer and seepage monitoring program in accordance

with the SEO's dam monitoring requirements. The program will include a narrative description of the instrument monitoring procedures, forms for recording the monitoring data, and a spreadsheet for plotting and evaluating the recorded data.

The SEO also requires movement monuments on high hazard dams. We assume installing the movement monuments will be included in the future dam rehabilitation scope. Monitoring and evaluating the future movement monuments can be easily incorporated into the monitoring program RJH will develop for this task.

- The City plans to begin draining the reservoir following installation of the instrumentation, presumably around August 2018. The estimated drawdown period of 6 to 8 weeks corresponds to a little over 1 foot of reservoir level decrease per day, which is generally a prudent drawdown rate. We assume the City will closely monitor the upstream and downstream slopes during the drawdown for any evidence of concentrated seepage (sinkholes, whirlpools, etc.) or slope failure. Should any such evidence be observed by the City, the reservoir draining should be halted, the SEO should be notified, and RJH will mobilize to the site for a field inspection. Depending on the inspection findings, we may conduct a dye test to evaluate the seepage behavior and severity. If the reservoir level drops below the elevation of a concentrated seepage entrance point on the slope, a dye test will not be possible.
- As the reservoir is drawn down and using the information provided by the City's monitoring, we will communicate regularly with the City to evaluate the behavior of the dam and the seepage. Should conditions indicate a potential benefit of altering the drawdown plan for further evaluation of the field conditions, we will coordinate the change with the City and adjust the Project schedule accordingly.
- With the riprap along the downstream toe temporarily removed, and with the reservoir drained, we will examine and document the conditions around the existing toe drain as closely as possible. We will assist the City with inspection of the toe drain discharge pipe by CCTV camera.

Task 2c – Geotechnical Investigation and Evaluation

- Laboratory analysis of the soil samples will begin following the completion of the drilling and sampling program in Task 2b. The current scope of this RFP requires testing only for classification of the embankment soils.
- Our proposed modified scope incudes testing of embankment and foundation materials to define their classifications, shear strengths, hydraulic conductivity, compressibility, erodibility, and other engineering properties. These material properties will be necessary for engineering analyses to be performed in the rehabilitation design phase of the Project.

Task 2d – Seepage Analysis

- For the current scope of the RFP, field tests will be performed in the borings to provide basic information about the permeability of the embankment materials.
- Our proposed amended scope for this task includes a 2-d seepage analysis performed on a representative section of the dam to assess the seepage characteristics in the embankment and foundation and evaluate the listed PFMs involving backward erosion piping and seepage along the outlet conduit.

Task 2e – Summary of Investigation and Conclusions

- We will prepare a data report that will describe the methods used and data collected, including boring logs, piezometer completion details, and test data. This will enable the data to be easily used in future phases of work.

- We will prepare a memorandum that summarizes the results of our analyses that will be included as an appendix to the report in Task 4.

Task 3 – Outlet Works Assessment

The SEO requires an inspection of outlet conduit interiors on high hazard dams at least every 10 years. The last internal inspection of the Hogchute Dam outlet pipe was in 2008, so another inspection will be due in 2018.

- This task, as presented in the RFP, would be completed after the reservoir has been drained, when the City will perform a CCTV inspection of the 20-inch intake pipes. The City plans to perform a CCTV inspection of the 30-inch pipe before the reservoir is drained for the outlet configuration and condition assessment. If the conduit has defects, it is possible the defects would show up as infiltration into the pipe when the reservoir is full and the embankment above the pipe is saturated. Such infiltration would be a clear indication that a "concentrated leak along the conduit" PFM exists. Infiltration as evidence of a defect would be difficult to confirm for the 20-inch barrels with the reservoir drawn down and the phreatic surface in the embankment at its lowest level.
- With the reservoir drained, we will closely inspect the outlet gate system to evaluate the physical condition, functionality, and reliability of all outlet controls and appurtenant features. We will also discuss alternative outlet gate and intake structure configurations onsite with the City. Specifically, we will evaluate the feasibility and potential functional improvement of removing the 20-inch "wye" assembly and extending the 30-inch conduit to a new single upstream outlet gate. We assume the City will clean the outlet controls and appurtenances prior to the inspection and will provide safe access to the upstream end of the conduits.
- With the reservoir drained, we will also inspect the area around the outlet gates, the upstream dam toe, and the upstream slope and groins to identify any damage or evidence of seepage-, stability-, or erosion-related PFMs.
- With the reservoir drained, RJH will work to pressure test the outlet conduit. If the testing is feasible and leakage is identified, and if the leakage can be confidently attributed to defects in the pipe, the "leak along the conduit" PFM will be confirmed.

The intent of this task, as described in the RFP, is to provide information on the existence of the identified PFMs and to form a basis for evaluating alternative outlet works configurations that would be safer and more efficient. These purposes would be better met through the proposed alternate scope presented below.

Proposed Alternate Task 3 – Outlet Works Assessment

The outlet conduit pressure test required in the RFP is likely to be expensive and potentially dangerous, and the test will probably not provide much valuable information to the City. We have the following technical concerns with pressure testing the conduit:

- To properly test the conduits, the entire system must be sealed and pressurized. According to the 1947 drawings, the existing outlet gates are nominally under approximately 54 feet of reservoir head. The SEO typically

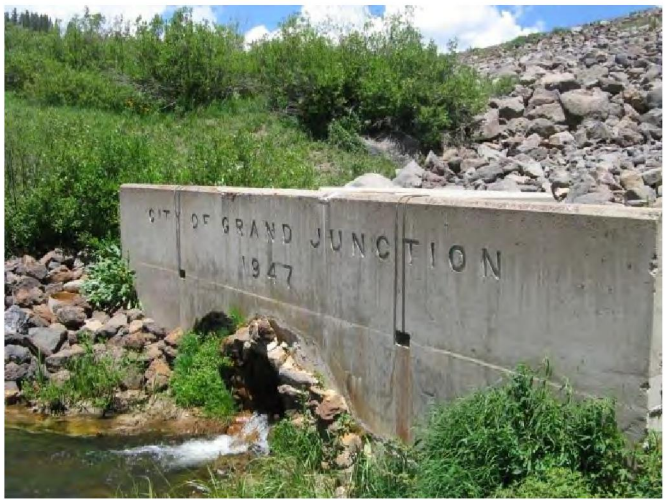
requires testing of new and rehabilitated outlet conduits at 150 percent of the design operating pressure, which means the outlet conduit would need to be tested at approximately 81 feet of head (35.1 pounds per square inch). Conventional inflatable bladders used for testing sewer lines would not be suitable for testing the outlet conduits at the required pressure, and suitable high-pressure bladders will be significantly more expensive. It is possible that appropriate high-pressure pipe plugs could be rented, but it appears that inflatable bladders or plugs would not be practical for this task.

- The most practical alternative to using inflatable bladders would be to temporarily weld steel bulkheads onto the conduits for the pressure test. However, this would require significant pre-test preparation and post-test cleanup, including grinding out the asphaltic coating at the ends of the pipes to expose the steel, verifying that the existing 71-year-old pipes are sound enough for welding, cutting off the bulkheads and grinding off the welds after the test, and repairing the asphaltic coating. Assuming the existing pipes are sound, steel plates or blind flanges could be fitted with pressure connections and welded onto the ends of the conduits for the test. Welding at the upstream and downstream ends of the conduits will require some demolition of the existing concrete headwalls to expose the exterior of the pipes for the required welds, and the known broken air vents will need to be sealed. Experienced welders have expressed concern that producing the air-tight welds required for the pressure test may not be possible.
- Considering that the existing steel conduits were installed in 1947, it is likely that some deterioration has occurred that has resulted in one or more defects somewhere in the over 300 feet of pipes. Any such defect will result in a failed pressure test, but the defect(s) will be nearly impossible to locate and repair. A great deal of time and money could be spent just trying to make the test work. We are also concerned that air and/or water escaping through a defect under the high pressure required for the test could pose a significant risk of damaging the concrete encasement and the surrounding embankment soils.

Since the City has already expressed an intent to evaluate alternative outlet gate configurations, RJH recommends that the pressure test and the CCTV inspection of the 20-inch conduits be deleted from the current Project scope. Our proposed Alternate Task 3 scope would consist of:

- With the reservoir drained, we will inspect the physical condition, functionality, and reliability of all outlet controls and appurtenant features.
- During the inspection, we will discuss alternative outlet works configurations and develop conceptual recommendations for outlet works modifications that would address the concerns for the noted PFMs.
- With the reservoir drained, we will also inspect the area around the outlet gates, the upstream dam toe, and the upstream slope and groins to identify any damage or evidence of seepage-, stability-, or erosion-related PFMs.
- We will present the results of our inspections and provide our recommendations in the final Evaluation Report.

We recommend that the City also plan to survey the upstream slope and outlet works intake area to supplement the site survey the City completed earlier. The survey data will be required for the rehabilitation phase of the Project.



Task 4 – Dam Safety Rehabilitation Evaluation

Preparation of the evaluation report can begin following fieldwork and engineering analyses. We will submit the written report in .pdf file format to the City according to the schedule noted in the RFP and will include descriptions of the fieldwork, seepage evaluation results, a summary of our conclusions and recommendations, and an assessment of the PFMs that the City should address.

The objectives of our report will be to document that the SEO's immediate concerns for the safety of the dam have been addressed and to present a conceptual basis for developing the dam rehabilitation design scope.

- The six "Risk Driving" PFMs are described in the CDSE as the "most alarming from a dam and public safety perspective." As stated in Section 1.2.3 of the CDSE, the actions for these PFMs are required to reduce the risk of dam failure in a timely manner and avoid a storage restriction. All of the actions required by the SEO (CDSE Table 3.2) to address the identified Risk Driving PFMs (with the exception of the foundation drilling for PFM #7) will be accomplished by our proposed work described for Tasks 1 to 3. We will provide recommendations for any additional items identified during our investigations as necessary to fully comply with the SEO's requirements and ensure the safety of the dam and public.
    - The first three actions (seepage investigation, geotechnical investigation, and piezometer installation) under PFM #2 (backward erosion piping through the embankment) will be addressed by our Task 2 work.
    - Part of the fourth action item for PFM #2 (improve seepage collection) will be directly accomplished under Task 2. The Task 2 investigation will identify if this concern constitutes an urgent need, or if the necessary work to improve the seepage monitoring can be more efficiently included in the future dam rehabilitation design scope.
    - The actions for PFMs #7 (contact erosion through the foundation) and #12 (concentrated leak erosion along the conduit) will be accomplished during the Task 2 work, except for the foundation drilling and sampling. Our proposed modified investigation and analyses discussed in Task 2 would fully meet the required actions for PFM #7.
    - The actions for PFM #13 (concentrated leak erosion into the conduit) will be accomplished by our proposed Task 3 outlet assessment work.
    - The actions for PFM #15 (overtopping) will be completed with our Task 1 hydrology study.
    - The action for PFM #26 (outlet gate(s) fail to open) will be accomplished during our Task 3 outlet assessment work.

- The SEO identified nine additional PFMs that were classified as "non-Risk Driving" (CDSE Table 3.3). These PFMs all lack sufficient information for adequate evaluation, and the evaluation team's confidence in their evaluation was therefore "Poor". These non-Risk Driving PFMs could potentially be serious threats to the dam's safety, and they must be adequately evaluated. In general, the information required to increase our confidence in the evaluation of these PFMs will be the product of the more detailed analyses and investigations to be performed during the dam rehabilitation design. We will provide a general concept for a dam rehabilitation analysis and design scope to appropriately address these Non-Risk Driving PFMs.
- We will review the list of PFMs considered in the SEO's comprehensive evaluation to verify its completeness and to identify any additional PFMs the City will need to address. We will provide recommendations on how to address any identified additional PFMs.
- We will develop sketches to illustrate possible rehabilitation concepts to address the PFMs and develop Class 5 (conceptual level) opinions of probable costs to implement the concepts for guidance in the City's capital cost planning.
- We will develop a summary of the risks and consequences of not addressing the identified PFMs.
- We estimate that City staff will need to be present at the dam for approximately 3.5 days during the Project, as follows:
    - One-half day for an on-site kick-off meeting with the SEO.
    - One full day for the outlet works inspection and assessment under Task 3.
    - One to two full days for pressure testing the outlet conduit, if this task is not deleted from the scope.

  In addition, City staff will need to make daily visits to the dam as the reservoir is drained to monitor the drawdown and inspect the upstream and downstream slopes.
- Project Deliverables: We will submit a Dam Safety Rehabilitation Evaluation Report presenting the findings of our evaluation. The report will include the following main sections:
    - Results of our Task 1 hydrology study including spillway sizing recommendations.
    - Results and conclusions of our Task 2 seepage investigation.
    - Results and conclusions of our Task 2 geotechnical investigation, piezometer installation, laboratory testing, and seepage analysis.
    - Results and conclusions of our Task 3 outlet works inspection and assessment.
    - A summary of our Task 4 PFM evaluation and suggested scope for the dam rehabilitation project.
- RJH will present the report conclusions to the City and the SEO's Dam Safety Branch. We assume the presentation will take place at the City offices.

SECTION 3 – PROJECT SCHEDULE

RJH has prepared an aggressive schedule that includes all major Project work items and milestones presented in the RFP. The RFP states that the City will announce the selection of the successful consultant on May 14, 2018. If selected, we estimate that we will be able to confirm the final Project scope of work and finalize the contract within two weeks. We can begin work on the Task 1 Hydrology Study, the subcontractor agreements, and the field investigation permitting tasks immediately upon receipt of the Notice-to-Proceed.

Based on our past experience with the SEO, we estimate the state's approval of our proposed geotechnical investigation plan should be issued within about a week after we submit it. The Federal permitting agencies (USACE and USFS) generally take at least a month to approve an investigation plan. Assuming the federal agencies can approve the investigation plan within about a month, and assuming the site is accessible, we plan to begin our field work by July 9, 2018. The Task 2 seepage and geotechnical investigations will be completed by early- to mid-August, at which time the City will begin draining the reservoir. We will perform our laboratory testing and engineering analyses while the reservoir is draining.

We estimate the reservoir will be drained and the outlet works and upstream slope will be accessible by late September or early October. We will complete our Task 3 outlet works assessment activities by the end of October. This time estimate includes sufficient leeway to adjust the schedule somewhat as needed for weather impacts.

We will complete and submit our Dam Safety Evaluation Report to the City by December 3, 2018. Following the City's review of the report and our resolution of the comments, we will meet with the City and the SEO in mid-December 2018 to present our conclusions and recommendations for the dam rehabilitation design phase of the Project.

SECTION 4 – REFERENCES

In our opinion, one of the most effective ways for the City to evaluate RJH's abilities and qualifications, is to inquire about our past performance with previous clients. The following individuals are RJH clients or have worked previously with RJH on dam safety projects similar to Hogchute Dam. We request you inquire about RJH's technical competence and project delivery history.

RJH is one of the few engineering firms that have repeatedly delivered dam safety work with a full understanding of the SEO rules and regulations, and especially of the intent of the regulations, which is to promote dam safety. RJH has successfully delivered and received SEO dam safety permits for projects throughout the state and specifically in Water Division 4.

Ute Water District
Mr. David Priske, P.E.
P.O. Box 460
Grand Junction, CO 81502
Phone: (970) 242-7491
email: dpriske@utewater.org

City of Thornton
Mr. Jim Jensen
9500 Civic Center Drive
Thornton, CO 80229-4326
Phone: (303) 538-7556
email: jim.jensen@cityofthornton.net

City of Trinidad
Mr. Gil Ramirez
P.O. Box 880
Trinidad, CO 81082
Phone: (719) 846-9843
email: gil.ramirez@trinidad.co.gov

Colorado Office of the State Engineer
Mr. Jason Ward, P.E.
Phone: (970) 249-6622
email: Jason.Ward@state.co.us

SECTION 5 – FEE PROPOSAL

RJH proposes to perform described in Section 2 on a time and materials basis for the not-to-exceed prices shown in the tables below. Table 1 shows our estimated fees for the scope of work requested in the RFP and Table 2 provides our estimated fees for the amended scope we proposed. Although the fees for the amended scope of work could be higher, in our opinion the scope provides more value to the overall Project by providing more reliable information for future phases of this Project. RJH would welcome an opportunity to meet with Grand Junction during contracting, discuss the scope and needs of the Project, and try to identify ways we could reduce the not-to-exceed fees presented in the tables below.

Table 1: Base Scope Fee Proposal

Task	Cost ($)
1 – Hydrology Study	16,448
2 – Seepage and Geotechnical Investigations	46,720
3 – Outlet Works Evaluation (with pressure test)	17,953
4 – Evaluation Report and Presentation	30,812
Total	**111,933**

Table 2: Proposed Amended Scope Fee Proposal

Task	Cost ($)
1 – Hydrology Study	16,448
2 –Expanded Seepage and Geotechnical Investigations	68,325
3 – Modified Outlet Works Evaluation	5,648
4 – Evaluation Report and Presentation	30,812
Total	**121,233**

A completed Section 7.0: Solicitation Response Form with the "Not to Exceed" Project cost is provided following this page.

SECTION 7.0: SOLICITATION RESPONSE FORM

RFP-4519-18-DH Professional Services for Safety Evaluation of Hogchute Dam

Offeror must submit entire Form completed, dated and signed.

1) Not to exceed price to provide all labor, parts, supplies, equipment, travel, etc. necessary for the Forensic Evaluation of Hogchute Dam per specifications:

Base Scope Price: $111,933

NOT TO EXCEED PRICE $ Amended Scope Price: $121,233

One hundred and eleven thousand, nine hundred and thirty-three

WRITTEN: One hundred and twenty-one thousand, two hundred and thirty-three **dollars.**

The Owner reserves the right to accept any portion of the work to be performed at its discretion

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The undersigned has thoroughly examined the entire Request for Proposals and therefore submits the proposal and schedule of fees and services attached hereto.

This offer is firm and irrevocable for sixty (60) days after the time and date set for receipt of proposals.

The undersigned Offeror agrees to provide services and products in accordance with the terms and conditions contained in this Request for Proposal and as described in the Offeror's proposal attached hereto; as accepted by the Owner.

Prices in the proposal have not knowingly been disclosed with another provider and will not be prior to award.

- Prices in this proposal have been arrived at independently, without consultation, communication or agreement for the purpose of restricting competition.
- No attempt has been made nor will be to induce any other person or firm to submit a proposal for the purpose of restricting competition.
- The individual signing this proposal certifies they are a legal agent of the offeror, authorized to represent the offeror and is legally responsible for the offer with regard to supporting documentation and prices provided.
- Direct purchases by the City of Grand Junction are tax exempt from Colorado Sales or Use Tax. Tax exempt No. 98-903544. The undersigned certifies that no Federal, State, County or Municipal tax will be added to the above quoted prices.
- City of Grand Junction payment terms shall be Net 30 days.
- Prompt payment discount of 0 percent of the net dollar will be offered to the Owner if the invoice is paid within _____ days after the receipt of the invoice.

RECEIPT OF ADDENDA: the undersigned Contractor acknowledges receipt of Addenda to the Solicitation, Specifications, and other Contract Documents.

State number of Addenda received: 2.

It is the responsibility of the Proposer to ensure all Addenda have been received and acknowledged.

RJH Consultants, Inc.	Robert Huzjak, P.E.
Company Name (Typed or Printed)	Authorized Agent – (Typed or Printed)
	(303) 225-4611
Authorized Agent Signature	Phone Number
9800 Mt. Pyramid Ct., Suite 330	rhuzjak@rjh-consultants.com
Address of Offeror	E-mail Address of Agent
Englewood, CO 80112	5/4/18
City, State, and Zip Code	Date

APPENDIX A

Resumes of Key Project Staff

GARRETT JACKSON, P.E.

PROJECT MANAGER

BACKGROUND

Mr. Jackson has more than 30 years of experience in civil and geotechnical engineering projects, including site assessments, field and laboratory investigations, engineering design analyses, preparation of construction plans and specifications, construction management, resident engineering, review of engineering designs, review of construction plans and specifications, dam safety inspections, construction inspections, Potential Failure Mode Analyses, and Semi-Quantitative Risk Assessments. He worked for 20 years as a Colorado Dam Safety Engineer responsible for safety inspections of private and municipal dams, review of designs for new dams and repair or rehabilitation of existing dams, construction inspections for new and existing dams, Emergency Action Plan development and exercises, public outreach, and dam owner training.

EDUCATION

M.S., Civil Engineering (Geotechnical), Brigham Young University, 1987

B.S., Civil Engineering, Brigham Young University, 1987

PROFESSIONAL REGISTRATION

Registered Professional Engineer: California, Colorado

RELEVANT EXPERIENCE

COLORADO DIVISION OF WATER RESOURCES, DAM SAFETY BRANCH (1997-2017). Dam Safety Engineer responsible for safety inspections of private and municipal dams. Managed development of the geotechnical and other sections for two updates to the Colorado Rules and Regulations for Dam Safety and Dam Construction. Managed writing and production of the Colorado Dam Safety Branch's Project Review Guide. Managed writing and presentation of the Dam Safety Branch's Basin Response Factors Guidelines and the Guidelines for Hazard Classification.

JERRY CREEK RESERVOIRS ENLARGEMENT, MESA COUNTY, CO. Senior Technical Reviewer responsible for the final design of modifications to the Jerry Creek Reservoirs No. 1 and No. 2 spillways and appurtenant structures for increased storage capacity. The renovations provided about 1,200 acre-feet of additional water storage at Reservoir No. 2. Responsibilities included providing a full and complete review for the Colorado Office of the State Engineer (SEO). Mr. Jackson assisted in review and implementation of unique hydrologic analyses that considered adjustments to the Hydrometerological Report to account for the high elevations of these dams. This Project was awarded the ASDSO regional Project of the Year.

GOOSE PASTURE TARN DAM, TOWN OF BRECKENRIDGE, CO. Senior Technical Reviewer responsible for assisting the Town in identifying and correcting dam safety issues for their primary water supply reservoir. Goose Pasture Tarn is a 52-foot-high earthen embankment with an overtopping concrete spillway and an overtopping RCC section. It is located at an elevation of about 10,500 feet on the Blue River, and the overtopping spillways are operated annually during spring run-off. Mr. Jackson provided technical review of the design consultant's work, including a semi-quantitative risk analysis (based on the Colorado Comprehensive Dam Safety Evaluation tool) to correctly identify the critical dam safety issues, and he assisted with the subsequent Potential Failure Modes Analysis and design alternatives evaluation.

HALLENBECK NO. 1 (PURDY MESA) DAM SLOPE REPAIR, MESA COUNTY, CO. Senior Technical Reviewer for remediation of a failing embankment slope. Purdy Mesa Reservoir is the City of Grand Junction's terminal water supply reservoir, located on the north fork of Kannah Creek adjacent to the city's water treatment plant. As the Dam Safety Engineer, Mr. Jackson responded when City staff reported that an 80-foot long lateral crack had opened up on the downstream slope. He investigated the cracked slope and assisted in developing a field investigation plan. He provided guidance and technical review of the engineering consultant's design for an improved seepage collection system and slope stabilization features. He provided guidance to the City engineering staff during construction and performed the construction inspections for the successful completion of the slope rehabilitation.

WEST RESERVOIR NO.1 OUTLET WORKS REHABILITATION. DELTA COUNTY, CO. Lead Technical Reviewer and Construction Inspector for final design of an outlet works replacement project. The project replaced a severely deteriorated and unsafe outlet works conduit through a 35-foot high homogeneous embankment dam.

WILLOW CREEK DAM (STEAMBOAT LAKE), ROUTT COUNTY, CO. Senior Technical Reviewer for outlet works rehabilitation. Willow Creek dam is a 100-foot high earthen embankment that impounds Steamboat Lake at approximately elevation 8,000 feet. The 51-year old concrete tunnel outlet works was severely deteriorated in places and structurally unsafe, and the owner was faced with an imminent storage restriction. Mr. Jackson provided technical review of the outlet conduit lining design, which included replacing the upstream slide gate and inserting steel lining sections to be welded and grouted in the tunnel without draining the reservoir. The review was expedited through an innovative collaborative process involving the dam owner, the design engineer, the contractor, and the State Engineer's Office. The length of the review process was significantly shortened, saving the dam owner nearly a year in the time between submittal of the design and approval for construction.

ROBERT J. HUZJAK, P.E.

PRINCIPAL/ TECHNICAL REVIEW

BACKGROUND

Mr. Huzjak specializes in dam, reservoir, and water supply engineering; geotechnical engineering; and project management. With over 30 years of experience, he has been instrumental in the successful planning and implementation of dozens of dam projects. Mr. Huzjak has lead numerous multi-disciplined teams of engineers, scientists, and owners through planning and design. He is considered a technical expert in dam and geotechnical engineering. He has successfully led and delivered small to large multi-disciplined water resources and heavy civil planning, permitting, design, and construction projects with professional services budgets as large as $7 million and with construction costs from less than $0.05 million to over $600 million.

EDUCATION

M.S., Civil Engineering (Geotechnical), University of Colorado, Denver, 1988

B.S., Civil Engineering Technology, Youngstown State University, 1982

PROFESSIONAL REGISTRATION

Registered Professional Engineer: Arizona, California, Colorado, Connecticut, Florida, Kansas, Kentucky, Minnesota, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oregon, Utah, Washington, Wisconsin, Wyoming

RELEVANT EXPERIENCE

FRUITA RESERVOIR NO. 2 DAM, MESA COUNTY, COLORADO, FOR CITY OF FRUITA. Senior Reviewer for subsurface investigation and dam safety evaluation for a 40-foot-high significant hazard embankment dam. The dam has a history of cracking, downstream slope instability, and uncontrolled seepage. Work was performed to address dam safety concerns identified by the SEO. Work included drilling and sampling three borings, installation of monitoring wells, laboratory testing, development of material properties, calibration of seepage and stability models to match existing conditions, evaluation of existing dam stability, development and evaluation of rehabilitation concepts, and developing a cost estimate for rehabilitation.

NORTH LAKE DAM AND RESERVOIR, LAS ANIMAS COUNTY, COLORADO, FOR CITY OF TRINIDAD. Principal Engineer for dam safety evaluations and modifications to a 70-foot-high earthen dam to improve seepage stability, embankment stability, and outlet surging problems. As a result of budget constraints, the project was planned to be performed in multiple phases. Provided project management (in the first 8 years) and also supported other project managers (over the past 6 years). Identified dam safety issues. Worked with the owner and SEO to prioritize and plan the sequence in which to address the identified safety issues to meet SEO rules and budgeting constraints. Prepared construction documents and provided construction management for modifications to outlet works, embankment, and spillway. Replaced failed valves in the outlet tower, designed and

constructed a new stream release facility, and abandoned an outlet pipe that contained numerous holes. All of this work was completed while the reservoir was full.

THORNTON'S SOUTHERN RAW WATER SYSTEM, THORNTON, COLORADO, FOR CITY OF THORNTON. Contract Manager for 15 years to plan, develop, evaluate, design, monitor, and construct Thornton's Southern raw water storage system. When completed, the system will provide a combined storage of over 30,000 acre-feet. Mr. Huzjak was part of the founding City-Consultant team responsible for development of the overall integrated system plan. Work has included 35 assignments and engineering, design, and construction of over a dozen dam and reservoir facilities. He was responsible for assigning and supporting task order managers deliver engineering services, and reviewing designs by RJH and other consultants.

JERRY CREEK RESERVOIR NO. 2 REHABILITATION, MESA COUNTY, COLORADO, FOR UTE WATER CONSERVANCY DISTRICT. Principal Engineer and Technical Reviewer for final design of modifications to Jerry Creek Reservoirs No. 1 and No. 2, which provided 1,200 acre-feet of additional storage. Managed geotechnical field exploration and geotechnical seepage, stability, and foundation analyses for the embankment and hydraulic structures. Provided overall technical review of design, drawings, specifications, and contract documents. Responsible for evaluation of existing piezometer data to support seepage and stability analyses and to support design of a new toe drain system. Technical Expert for evaluation of existing dam performance and evaluation of seepage concerns, design of a new toe drain system, and two new emergency spillways, modifications to an existing service spillway, and raising the reservoir by 7 feet.

MT. PISGAH DAM, TELLER COUNTY, COLORADO, FOR PISGAH RESERVOIR AND DITCH COMPANY. Senior Technical Review for the outlet works rehabilitation of an 80-foot-high embankment dam with nearly inoperable outlet valves. The existing 30-inch diameter outlet valves were located at the approximate mid-section of the outlet tunnel and had become very difficult to operate. There was no upstream control gate and the intake tunnel remained pressurized at all times. The outlet works rehabilitation included installing a hydraulically actuated slide gate on the existing intake structure under full reservoir head, slip-lining the dual 30-inch steel pipes, removing and replacing 30-inch knife gate valves, repairing cracks in the existing concrete inlet tunnel, and proper abandonment of partially abandoned dual 16-inch cast iron outlet works pipes. All work was constructed under full reservoir without requiring the reservoir to be drained.

TEN MILE CREEK WATER PRESERVE AREA, ST. LUCIE COUNTY, FLORIDA. Technical Expert for evaluation of concerns related to the design and performance of the dam during first filling that is in support of legal action. The reservoir is created by a perimeter earthen ring dam that is about 20 feet high and about 4 miles long founded on primarily a sandy foundation. The dam includes a soil-cement crest and upstream slope protection. Key issues of concern are seepage instability, slope instability, instability of the soil-cement slope protection, and erosion of the embankment below the soil-cement. Work included review and analyses of design data, geotechnical investigations, steady state and transient seepage analyses to evaluate seepage stability and stability of the soil-cement, slope stability analyses, full scale test fill to observe performance and identify interim remediation to address erosion and boils that developed during the test fill, identification of remediation alternatives, and design of a seepage remediation system. Performed a PFMA in support of developing a test fill plan.

ERIC M. HAHN, P.E.

LEAD HYDROLOGIC ENGINEER

BACKGROUND

Mr. Hahn specializes in dam and water resource engineering and has 13 years of experience in the design of dam, reservoir, water conveyance, and flood control projects. His engineering experience includes the development and evaluation of inflow design floods for dams and reservoirs using a variety of methodologies. His experience also includes the evaluation and design of spillways, outlet works, diversion structures, pump stations, pipelines, open channels and flood inundation mapping for emergency action plans and dam hazard classification studies. Mr. Hahn has specialized experience developing hydrologic models for watershed evaluations and hydraulic models for floodplain and open channel applications. His responsibilities on projects include leading hydrologic evaluations; developing construction drawings and specifications, cost estimates, technical memoranda and reports; infrastructure planning, layout, and design; and construction engineering and support.

EDUCATION

M.S., Civil Engineering, Purdue University, 2005

B.S., Civil Engineering, University of Tennessee, 2003

PROFESSIONAL REGISTRATION

Registered Professional Engineer: Colorado, New Mexico

RELEVANT EXPERIENCE

SOUTH BOULDER CREEK REGIONAL DETENTION FACILITY, BOULDER, COLORADO, FOR CITY OF BOULDER AND URBAN DRAINAGE AND FLOOD CONTROL DISTRICT. Lead Hydrologic Engineer for the preliminary design of a stormwater detention facility along South Boulder Creek that will consist of constructing a combination earthen embankment and floodwall and excavating below existing ground to create sufficient detention storage to prevent adverse downstream flood impacts.

EMERALD VALLEY RANCH DAMS REHABILITATION, EL PASO COUNTY, COLORADO, FOR THE BROADMOOR. Project Engineer and Lead Hydrologic Engineer for rehabilitation of two dams at Emerald Valley Ranch, which is a luxury vacation ranch owned and operated by the Broadmoor Hotel. The dams were originally constructed in the early 1900s and were breached and failed during a large flood event on Little Fountain Creek in 2013. The rehabilitation design was developed in conjunction with a pre-selected contractor to streamline the design process to accommodate an aggressive project schedule. Final design included the installation of two earthen embankment dams each with a low-level outlet works, pre-cast concrete principal spillway riser, and overtopping emergency spillway constructed with articulating concrete blocks. Responsibilities included leading the development of the Hydrology Report, Hazard Classification Report, hydrologic and hydraulic analyses, hydraulic infrastructure design, and drawings and specifications.

JERRY CREEK RESERVOIRS EMERGENCY ACTION PLANS, MESA COUNTY, COLORADO, FOR UTE WATER CONSERVANCY DISTRICT. Hydraulic Engineer for development of Emergency Action Plans for three dams comprising the Jerry Creek Reservoir system. Responsibilities

included assisting in developing the inflow design flood, development of simulated dam breach parameters and dam breach hydrographs, development of unsteady state HEC-RAS models for the hydraulic analysis of downstream river reaches including Plateau Creek and the Colorado River, and preparation of the inundation maps and Emergency Action Plans.

THORNTON'S SOUTHERN RAW WATER SYSTEM, THORNTON, COLORADO, FOR CITY OF THORNTON. Lead Hydrologic Engineer for multiple projects to plan, develop, evaluate, design, monitor, and construct Thornton's raw water storage system. When completed, the system will provide a combined storage of over 30,000 acre-feet. Performed hydraulic analyses and civil layout, develop design drawings and specifications, and performed construction engineering.

MT. PISGAH DAM, TELLER COUNTY, COLORADO, FOR PISGAH RESERVOIR AND DITCH COMPANY. Lead Hydraulic Engineer for the conceptual design of an outlet works rehabilitation of an 80-foot-high embankment dam. The existing 30-inch diameter outlet valves were located at the approximate mid-section of the outlet tunnel and had become very difficult to operate and could fail to open or close at any time. There was no upstream control gate and the intake tunnel remained pressurized at all times. The conceptual evaluations involved analyzing multiple rehabilitation alternatives for cost and feasibility. The selected concept included installing a new upstream slide gate and trash rack on the existing intake structure, lining the 30-inch diameter outlet pipes located in the middle of the dam embankment, and replacing the existing control valves.

ST. CHARLES NO. 2 RESERVOIR DAM, PUEBLO COUNTY, COLORADO, FOR EVRAZ ROCKY MOUNTAIN STEEL. Project Engineer for the conceptual design of a low-level outlet works rehabilitation for a high hazard dam. The outlet works included dual 24-inch-diameter outlet pipes with intake structures that were buried under 10 to 12 feet of compacted silt, control valves were no longer functioning and no energy dissipation structure. One of the outlet pipes was determined to have a breach in the pipe that could have induced internal embankment erosion during reservoir releases. The conceptual evaluations involved analyzing multiple rehabilitation alternatives for cost and feasibility. The selected concept included a new precast concrete intake structures, new upstream hydraulically operated control gates, new HDPE slip-lining in each outlet conduit, and a new downstream outlet and energy dissipation structure.

CABRESTO DAM REHABILITATION, TAOS COUNTY, NEW MEXICO, FOR NEW MEXICO OFFICE OF THE STATE ENGINEER. Lead Hydrologic Engineer for the conceptual and final design of modifications to Cabresto Dam. The conceptual evaluations involved analyzing multiple rehabilitation alternatives for cost and feasibility. Final design features include a removal of the existing dam, outlet works, and spillway and construction a new embankment dam with a roller compacted concrete overtopping spillway and stilling basin.

DAM BREACH INUNDATION ANALYSES AND MAPPING, VARIOUS LOCATIONS. Lead Project Engineer for the development of dam breach analyses and inundation mapping for over 15 projects throughout the western United States. Responsibilities included development of simulated dam breach parameters, dam breach hydrographs, development of HEC-HMS and HEC-RAS models, and preparation of the inundation maps and Breach Analysis Reports. Several projects required the development of unsteady state and two-dimensional hydraulic models with routing and mapping analyses extending from several miles to over 160 miles.

JAMES A. OLSEN, P.E.

LEAD GEOTECHNICAL ENGINEER

BACKGROUND

Mr. Olsen is a geotechnical engineer with 13 years of experience in evaluation, design, and construction of embankment dams, soil-bentonite barrier walls, bio-polymer filter trenches, gravel pit reclamation, and other geotechnical aspects of raw water infrastructure. Responsibilities have included planning and implementation of subsurface geotechnical exploration programs, evaluation of field and laboratory test data, site characterization, and development of material properties, embankment design, finite-element modeling, data interpretation and monitoring of geotechnical instrumentation, construction observation and reporting, dam safety inspections, quantity and cost estimates, and development of design and construction plans. Analyses include static and dynamic slope stability, static and transient seepage, liquefaction triggering, seismic deformation, filter compatibility and slotted drainage pipe, riprap sizing, bearing capacity and settlement of shallow foundations, consolidation monitoring, geomembrane design, expansive soil mitigation, and other geotechnical calculations.

EDUCATION

M.S., Civil Engineering (Geotechnical), University of Colorado at Denver, 2018

B.S., Civil Engineering, University of Colorado at Boulder, 2005

PROFESSIONAL REGISTRATION

Registered Professional Engineer: Colorado

RELEVANT EXPERIENCE

MILLER RESERVOIR AND DAM, ADAMS COUNTY, COLORADO, FOR DENVER WATER. Geotechnical Engineer for the design of a perimeter embankment around an existing sand and gravel mine. Determined material and soil strength properties, performed slope stability analyses, seepage analyses, liquefaction triggering analyses, filter compatibility analyses, settlement analyses, and riprap sizing. Aided in preparation of construction drawings. Field Engineer during construction of over 4,900 linear feet of embankment dam. Provided full-time observation of earthwork, and support to various construction engineering activities. Aided in preparation of the Construction Completion Report and record drawings.

TEN MILE CREEK WATER PRESERVE AREA, ST. LUCIE COUNTY, FLORIDA, FOR U.S. DEPARTMENT OF JUSTICE. Geotechnical Engineer responsible for performing seepage investigation and analyses, and for planning and implementing a geotechnical investigation (including piezometer installation) to evaluate a 20-foot-high, 4-miles-long embankment dam in St. Lucie County, Florida. Developed a laboratory testing program and prepared a geotechnical data report. Supported evaluation by developing geotechnical material properties, performing extensive seepage analyses, and evaluation of others' seepage analyses. Assisted in developing rehabilitation designs. As part of the seepage investigation and analyses, planned and executed an 8-weeks-long, full scale test fill and monitoring program.

ANTERO DAM AND RESERVOIR, PARK COUNTY, COLORADO, FOR DENVER WATER. Geotechnical Engineer for embankment rehabilitation design for a 108-year old, 4,000-foot-

long hydraulic fill core dam. As a result of unsafe seepage through the embankment and foundation, the dam was restricted to a storage limit of 20,000 acre-feet instead of its full 80,000 acre-feet impoundment capacity. Responsible for planning and overseeing geotechnical data collection (including logging multiple borings and installing piezometers), developing material properties, performing geotechnical analyses (i.e., slope stability, seepage, wave run-up, riprap sizing, etc.), and assisting with civil design. Supported preparation of design drawings. Provided construction engineering services for a bio-polymer filter trench. Identified suitable bedrock for the base of the wall in a complex geologic setting including steeply dipping volcanic bedrock, monitored polymer degradation, performed confirmatory geotechnical exploration and laboratory testing, monitored and evaluated piezometer levels, performed dam safety inspections and construction quality assurance testing, and reviewed contractor submittals.

CABRESTO DAM AND RESERVOIR LINER, TAOS COUNTY, NEW MEXICO, FOR NEW MEXICO OFFICE OF THE STATE ENGINEER. Project Engineer responsible for design of a seepage mitigation system on the right abutment of Cabresto Dam. The seepage mitigation system consisted of approximately 50,000 square feet of LLDPE-R reservoir liner. Performed geotechnical exploration, developed excavation and fill plans for a benched liner configuration on steep slopes, incorporated non-woven geotextile cushion materials into the liner design to allow for use of on-site materials as a liner cover, developed material properties and performed analyses to evaluate slope stability and liner survivability, and evaluated liner seaming methods. Estimated quantities and developed an opinion of probable cost, developed schedule of values for bidding, and assisted in development of technical specifications.

J-2 REGULATING RESERVOIRS, GOSPER AND PHELPS COUNTIES, NEBRASKA, FOR PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM. Project Engineer for evaluation and review for two proposed new regulating reservoirs. Responsibilities included review of geotechnical data and embankment design concept developed by others; groundwater characterization; performed seepage and stability analyses of proposed design concept; reviewed collapse potential of soils; directed staff in development of material properties and site characterization; aided in development of reservoir siting study; performed civil layout, wave run-up, and conceptual slope protection design; and reviewed groundwater infiltration evaluation for the Phelps Canal.

KEN MITCHELL LAKES, ADAMS COUNTY, COLORADO, FOR CITY OF BRIGHTON. Staff Engineer responsible for subsurface geotechnical investigations, data reduction, seepage analyses, and reconstruction of an existing soil-bentonite cutoff wall. Work included advancing borings through and adjacent to an existing soil-bentonite cutoff wall, preparation of boring logs, preparation of geotechnical data reports, and laboratory testing of soil-bentonite backfill material. Field Engineer during reconstruction of over 3,000 lineal feet of cutoff wall. Responsibilities during construction included construction observation, quality assurance testing, verification of bedrock material and key depth, technical suggestions to contractor, preparation of Construction Completion Report, quantity estimates for payment, and record drawings of construction.

ATLANTIC RIM DAM AND RESERVOIR REHABILITATION, CARBON COUNTY, WYOMING, FOR WESTER-WETSTEIN & ASSOCIATES, INC. Project Engineer for geotechnical investigations, evaluation, and rehabilitation of a 33-foot-high, 2,300-foot-long earthen embankment dam. Directed staff engineers during field investigations and piezometer installations; developed laboratory testing program; provided guidance to staff engineers when performing various geotechnical analyses.

BRENA E. SHERIDAN, P.E.

LEAD HYDRAULIC ENGINEER

BACKGROUND

Ms. Sheridan specializes in water resources engineering and design. She has served as lead hydraulics engineer, design engineer, field engineer, and resident construction engineer for various water resources projects including pipelines, pump stations, master planning, dam rehabilitation, and new dam projects. Her technical background is in hydrologic and hydraulic engineering and includes analyses, design, and construction of various types of raw storage and conveyance systems. Her construction experience includes field observation and resident engineering for dams and water conveyance facilities. Her design experience spans from developing small designs (approximately 20 drawings) to large complex designs (more than 150 drawings). She has integrated the designs of multiple SCADA systems for instrumentation monitoring, pump station control, and communication with existing systems. Her construction experience includes field observation and resident engineering for dams and water conveyance facilities.

EDUCATION

B.S., Civil Engineering, Colorado State University, 2007

PROFESSIONAL REGISTRATION

Registered Professional Engineer: California, Colorado

RELEVANT EXPERIENCE

LAKE BRONSON DAM, KITTSON COUNTY, MINNESOTA, FOR MINNESOTA DEPARTMENT OF NATURAL RESOURCES. Lead Hydraulic Engineer for the rehabilitation of Lake Bronson Dam. Developed three rehabilitation alternatives to increase the spillway capacity and manage seepage. The selected alternative includes a new labyrinth spillway and embankment modifications. Responsibilities included hydraulic analysis for the outlet works and spillway alternatives and civil layout of the alternatives.

WAKEMAN DAM, DOUGLAS COUNTY, COLORADO, FOR DOUGLAS COUNTY. Lead Hydraulic Engineer for rehabilitation of a 29-foot-high embankment dam located in a recreational area owned by Douglas County Open Space. The project includes rehabilitation to the embankment and outlet conduit, and design of a new auxiliary spillway. Responsible for performing hydrology, hydraulic analysis, and design; civil layout; hazard classification analysis and report; and preparing bid documents, design reports, and cost estimate.

ROGERS RESERVOIR HYDRAULIC FACILITIES, ADAMS COUNTY, COLORADO, FOR THE CITY OF THORNTON. Project Engineer and Construction Manager for construction of hydraulic infrastructure for conversion of a gravel pit into a water storage reservoir. The project includes a 100 cfs pump station and wet well, conveyance pipelines to drain and fill the reservoir, and an inlet/outlet structure on the South Platte River. Responsibilities include assisting the project manager with review of submittals, requests for information, and preparation of engineering directives.

ATOKA DAM, ATOKA COUNTY, OKLAHOMA. Hydraulic Engineer for hydraulic analyses for a new filter/drain system and outlet works extension to address seepage, stability, and erosion issues at the dam. Developed and routed probable maximum flood to determine the adequacy of the spillway capacity and estimated the 100-year flood return period and associated tailwater depths for a new flood protection berm. Prepared preliminary and final design documents and the design report in compliance with Oklahoma State regulations.

BEAVER PARK DAM REHABILITATION, RIO GRANDE COUNTY, COLORADO. Lead Civil Engineer for hydraulic and hydrologic analyses and design for rehabilitation to the dam including spillway crest and chute modifications, a new 375 cfs inlet structure, outlet works energy dissipation structure, and a 42-inch steel outlet pipe and encasement. Project included excavation and backfill of 80,000 cubic yards of material to place a new filter/drain. Responsible for preparing bid documents, basis of design, and final design reports.

Project Manager for Phase I of the spillway modifications. Provided construction engineering services and coordinated daily with the contractor, owner and field staff. Reviewed submittals, requests for information from contractors, and pay applications.

TRUJILLO MEADOWS DAM, CONEJOS COUNTY, COLORADO. Project Engineer and Construction Manager for engineering services for rehabilitation of the existing dam. Responsibilities included observation of the PVC liner installation in the existing spillway channel to mitigate dam seepage. Coordinated construction schedule and inspections with the Colorado Office of the State Engineer. Performed dam monitoring, reviewed contractor pay applications, and prepared construction drawings and the construction report in accordance with Colorado Office of the State Engineer requirements.

RAMPART DAM REMEDIAL DRAINAGE SYSTEM, EL PASO COUNTY, COLORADO. Project Engineer for evaluation of the existing dam seepage collection and monitoring system for remedial design. Assisted in the evaluation and preparation of an alternative remedial design measures in accordance with Colorado Office of the State Engineer rules and regulations. Evaluated constructability and provided an opinion of probable construct cost.

ANTERO DAM AND RESERVOIR, PARK COUNTY, COLORADO, FOR DENVER WATER. Resident Engineer for rehabilitation of a 108-year old, 4,000-foot-long hydraulic fill core dam that had the site conditions to impound 80,000 acre-feet of water but was restricted to 20,000 acre-feet. The project included a biopolymer filter trench, barrier wall, filters and drains, embankment modification, and spillway rehabilitation. Responsibilities included construction observation of the toe drain, blanket drain, and dam fill placement. Reviewed submittals, requests for information, pay applications, and prepared engineer directives.

FORT PECK SPILLWAY, MCCONE COUNTY, MONTANA. Project Hydraulic Engineer for emergency rehabilitation design for the spillway plunge pool interim repair. Provided bid documents for a base bid of $22 million with 32 additional design options up to $44 million to accommodate award to construction contractor before known project funding. Lead Civil Designer for a new RCC apron. Coordinated design drawings and specifications with additional project design engineers in offices across the United States.

APPENDIX B

Project Examples

PROJECT DESCRIPTION SHEET

RJH CONSULTANTS, INC.

GEOTECHNICAL AND WATER RESOURCES ENGINEERING

RELATED SERVICES:

- Geotechnical evaluation
- Dam stability evaluation
- Hazard classification evaluation
- Emergency Action Plan update and verification
- Seepage analysis

Client

City of Fruita

Mr. Tom Huston

325 E. Aspen Ave.

Fruita, CO 81521

Phone: (970) 858-8377

email: thuston@fruita.org

www.rjh-consultants.com

FRUITA RESERVOIR NO. 2 DAM STABILITY PROJECT, MESA COUNTY, CO,

Fruita Reservoir No. 2 Dam is a 40-foot-high earthen dam with a storage volume of 168 acre-feet (ac-ft). The dam was originally constructed in 1935 and enlarged to its current size in 1959, and is classified as a significant hazard dam. Longitudinal cracking of the embankment was first noticed in 2007. In May 2016, a new crack and shallow slope failure was observed in the downstream slope. The Colorado Office of the State Engineer (SEO) issued the need for an inspection report detailing the requirements of further analysis of the dam. Work included a geotechnical evaluation, dam stability analysis, recommendation of a safe storage level, production of dam breach analysis and inundation mapping, and preparation of a report to document the recommendations.

RJH reviewed documents provided by the City of Fruita and the SEO, managed and oversaw geotechnical explorations, developed an exploration plan for the SEO to review, developed dam breach parameters and hydrographs using HEC-HMS software, and created simulated inundation maps. Fruita Reservoir No. 2 is one dam in a network of four total dams, so RJH's hydrograph models incorporated the possibility of a daisy chain failure within the network. New piezometers and monitoring wells were installed to aid in the continual evaluations of the dam.

Two-dimensional seepage and slope stability analyses were performed to evaluate the stability of the existing embankment and support the development of potential rehabilitation alternatives. Upon evaluation of the existing embankment configuration using identified material properties, RJH determined the dam did not meet SEO-required minimum safety factors.

Two alternatives were developed, including 1) reservoir restriction and 2) constructing a downstream stability berm. The reservoir restriction alternative was deemed to not be feasible, whereas the downstream stability berm was a practical alternative. The berm would provide acceptable safety factors at maximum pool level, and would include a drainage blanket and toe drain pipe near the existing embankment to strengthen the seepage management. The remainder of the downstream slope would be flattened to address shallow slope instability and the existing cracking concerns.

RJH recommended that the City of Fruita evaluate the value of the reservoir storage, and if a rehabilitation would be within its best interests. Additionally, RJH recommended that the owner install a SCADA system to monitor the changing water surface elevations in the reservoir, and to support implementation of an early warning system as part of the Emergency Action Plan.

PROJECT DESCRIPTION SHEET

JERRY CREEK RESERVOIRS, MESA COUNTY, CO
UTE WATER CONSERVANCY DISTRICT

RJH was retained by Ute Water Conservancy District (Ute Water) to perform final design and construction support services for renovations necessary to Jerry Creek Reservoirs No. 1 and No. 2, located about 32 miles northeast of Grand Junction, Colorado. Jerry Creek Reservoir No. 2 is the largest reservoir; a high hazard, 135-foot-high, earth embankment dam with a pre-renovation impoundment of 6,300 acre-feet (ac-ft). Jerry Creek Reservoir No. 1 is a 57-foot-high, earth embankment dam impounding 1,100 ac-ft.

The renovation provided 1,200 ac-ft of additional water storage at Jerry Creek Reservoir No. 2. The modified spillway can pass the inflow design flood (IDF) from Jerry Creek Reservoir No. 2 (upper basin reservoir) through Jerry Creek No. 1 (lower basin reservoir) and into Plateau Creek through a local drainage channel, which collects sediment-laden flow from local site drainage that is undesirable for raw water supply.

The following were accomplished to deliver a successful project:

- Raised the existing spillway and normal pool approximately 7 feet at Reservoir No. 2 creating additional water storage without raising the dam crest.
- Incorporated the results of a Site-Specific Probable Maximum Precipitation (SSPMP) Study for the Jerry Creek Reservoirs drainage basin into existing flood and reservoir routing computer models. The revised flood routing models using the SSPMP resulted in a smaller IDF and required less capacity (less construction cost) for the proposed new emergency spillway at both reservoirs.
- Passed a majority of the IDF through the new Reservoir No. 2 emergency spillway directly into Reservoir No. 1. The multi-reservoir routing approach safely passes the IDF through both reservoirs into the lower drainage basin using the new spillways without creating dam safety concerns.
- Provided combination spillway system for maintenance free low-flows (up to the 100-year storm) and "tolerable damage" to the earthen spillways and structures for the IDF.

The relationship between the Owner, Engineer, Contractor, and Office of the State Engineer (SEO) provided innovative, cost-effective solutions that met dam safety, operational, and design intent. The work was completed on schedule for spring runoff and within budget (no claims were filed by the Contractor).

The work products prepared by RJH included geotechnical exploration and data reports; alternatives analyses, final design analyses, calculation packages, and reports; construction specifications and drawings; and construction procurement, administrative, management, inspection, and record documents.

RJH CONSULTANTS, INC.

GEOTECHNICAL AND WATER RESOURCES ENGINEERING

RELATED SERVICES:

- Hydrologic analysis
- Geotechnical analysis
- Spillway sizing
- Multi-reservoir flood routing
- Combination spillway system: low flows and IDF

Client
Ute Water District
Mr. David Priske
P.O. Box 460
Grand Junction, CO 81502
Phone: (970) 242-7491
email: dpriske@utewater.org

www.rjh-consultants.com

PROJECT DESCRIPTION SHEET

RJH CONSULTANTS, INC.

GEOTECHNICAL AND WATER

RELATED SERVICES:

- Assessment of existing conditions
- Outlet inspection
- Outlet works rehabilitation
- Alternatives evaluation

Client

Pisgah Reservoir and Ditch Company

Mr. Greg Williams

917 Elm Street

Rocky Ford, CO 81067

Phone: (719) 254-3389

email: bsgwilliams@aol.com

www.rjh-consultants.com

MT. PISGAH DAM OUTLET WORKS REHABILITATION, TELLER COUNTY, CO PISGAH RESERVOIR AND DITCH COMPANY

Mt. Pisgah Dam is an approximately 80-foot-high, significant hazard earth embankment dam near Cripple Creek, Colorado that was constructed circa 1911. The outlet works consisted of a concrete intake structure, partially lined inlet tunnel, parallel 30-inch diameter steel pipes, gate valves for flow control, and an unlined rock discharge tunnel. The steel pipes were significantly corroded and the gate valves had become difficult to maintain and would only partially open. The outlet works also lacked an upstream guard gate required by current Colorado Office of the State Engineer (SEO) dam safety regulations.

The rehabilitated outlet works facilities include the following new components:

- A new inlet structure with a steel trash rack.
- A 30-inch isolation sluice gate with hydraulic actuation.
- Slip-lining of the existing parallel 30-inch steel pipes.
- 24-inch control valves with hydraulic actuation.
- A valve control house.

RJH performed assessment of the outlet works, design of the rehabilitation, and provided construction phase services for the project. Specific tasks RJH performed included:

- Site and reservoir capacity surveys.
- Dewatered the reservoir and performed a detailed inspection and assessment of the outlet works. A prior attempt to perform the inspection underwater was unsuccessful due to water clarity issues and safety concerns for divers entering into a confined space.
- Developed record drawings of the outlet works facilities based on the inspection and site survey.
- Developed alternative concepts, evaluated concepts, performed analyses, and developed costs to identify a preferred rehabilitation concept for the outlet works.
- Video inspected two abandoned 16-inch diameter outlet pipes and determined they would require remediation to comply with dam safety seepage criteria.

It was the Owner's preference to complete the needed construction without draining the reservoir a second time. Therefore, RJH employed early contractor involvement for underwater construction to evaluate construction details and challenges of underwater construction. RJH developed detailed designs, drawings, and specifications for the recommended alternative.

SEO approval was obtained with minimal comments and construction was completed in June 2016.

PROJECT DESCRIPTION SHEET

RJH CONSULTANTS, INC.

GEOTECHNICAL AND WATER RESOURCES ENGINEERING

RELATED SERVICES:

- Hydrology Report
- Seepage Remediation
- Outlet Works Rehabilitation
- Hazard Classification
- Spillway Modifications
- Bidding Services
- Construction Engineering

Client
City of Trinidad
Mr. Gil Ramirez
P.O. Box 880
Trinidad, CO 81082
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email: gil.ramirez@trinidad.co.gov

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NORTH LAKE DAM, LAS ANIMAS COUNTY, CO, FOR THE CITY OF TRINIDAD

North Lake Dam is a 70-foot-high, high hazard, earthen embankment dam that impounds a 4,200 acre-foot reservoir. It is located about 35 miles west of Trinidad, Colorado, at elevation 8,600 ft. The City of Trinidad (Trinidad) retained RJH to provide engineering services to address numerous dam safety issues including seepage problems, slope instability, outlet surging, inadequate spillway capacity, and structural deterioration of the reinforced concrete spillway.

Based on inspection of the dam and a review and compilation of existing data, RJH developed and implemented a targeted geotechnical data collection program that included geologic mapping, borings, test pits, piezometer installation, packer permeability testing, and laboratory testing, all aimed at understanding the seepage and stability conditions of the dam. RJH also performed a seismic evaluation. The geotechnical program identified high seepage pressures at the toe of the dam and diagnosed that causes of the high downstream pressure included both permeable zones in the foundation alluvium and open fractures in the bedrock foundation. The seepage pressures resulted in a high likelihood for developing backwards erosion piping at the dam-foundation interface, and resulted in an unstable downstream slope.

RJH also identified the likely causes for outlet surging and structural deterioration of the spillway. For design of the new spillway, RJH performed hydrologic analyses to evaluate the inflow design flood and developed a Hydrology Report for approval of the Colorado Office of the State Engineer (SEO). Hydrologic analyses were developed using the SEO's Extreme Precipitation Analysis Tool. A semi-quantitative risk assessment was performed to prioritize the modifications, and video camera inspections of the two outlet works systems were conducted and incorporated into the analyses.

RJH developed computer models and performed seepage, stability, and various other types of geotechnical analyses to support the preferred design of the downstream seepage blanket and stability berm. We also prepared construction drawings, specifications, and contract documents for the rehabilitation design that included the following primary components:

- Installation of a seepage blanket and stability berm to address seepage and high embankment foundation pressures downstream of the dam and to improve downstream slope stability.
- Installation of a new spillway on the left abutment and abandonment of the existing spillway to address structural and hydraulic deficiencies.
- Spillway and outlet works reconstruction and rehabilitation, including adding a new hydraulic valve operation system, abandoning the upper cracked inlet conduit, replacing part of the outlet conduit, and adding a stream release facility.

Portions of the construction were performed using a design-build approach, which significantly reduced the overall cost to Trinidad and demonstrates the SEO's confidence in RJH's services.

RJH provided full-time field engineering during construction, in addition to assisting Trinidad with construction procurement, management, and inspection. All construction was completed with a nearly full reservoir.

PROJECT DESCRIPTION SHEET

TEN MILE CREEK WATER PRESERVE AREA PROJECT, ST. LUCIE COUNTY, FL

GEOTECHNICAL AND WATER RESOURCES ENGINEERING

RELATED SERVICES:

- Data review
- Data compilation
- Seepage analysis
- Dam inspection
- Report preparation

The Ten Mile Creek Water Preserve Area Project (Project) was a joint project by the U.S. Army Corps of Engineers (USACE) and the South Florida Water Management District. The Project was designed in 2003, constructed between 2004 and 2006, and included a 6,000 acre-foot above-ground water storage reservoir. The reservoir was created by constructing a 4-mile-long, 20-foot-high earthen embankment along Ten Mile Creek, southwest of Ft. Pierce in St. Lucie County, Florida. The embankment is constructed primarily of clayey sand soils founded on sandy soils that extend approximately 120 feet deep. The appurtenant hydraulic control structures included intake and outlet structures in the creek, a 380 cfs capacity pumping station, a 40 cfs auxiliary pumping station, an outlet culvert, and an emergency overflow spillway. The Project objectives were to attenuate seasonal (summer) stormwater flows from the Ten Mile Creek Basin into the North Fork of the St. Lucie River.

During first filling in 2006, seepage boils appeared near the downstream toe of the embankment when the reservoir reached about 8 feet deep. Based on the observed boils and seepage, the embankment was considered unsafe for water storage, the reservoir was evacuated, and currently the Project is not in use.

The US Department of Justice retained RJH Consultants, Inc. to provide an independent inspection of the dam, evaluation of the design, assess if the Project was safe to operate, and, if needed, to develop a design to remediate problems and create a functional project. RJH technical tasks completed include the following:

- Performed a thorough review of available information including geotechnical data and design documents.
- Performed a dam safety inspection of the facility to assess condition of the embankment, spillway and inlet and outlet facilities.
- Planned and performed a geotechnical exploration consisting of 20 boreholes, in-situ packer and falling head testing to evaluate the vertical and horizontal permeability of the foundation soils, laboratory testing of permeability, sampling and laboratory testing of the upstream soil-cement embankment revetment, and installation of numerous open-tube and vibrating wire piezometers.
- Performed extensive computer modeling and evaluation to asses slope stability and seepage at the dam.
- Performed a carefully controlled full-scale test filling of the reservoir to confirm and calibrate the analytical results of the seepage modeling.
- Performed a PFMA prior to the test fill to identify potential failure modes, identify the likely reservoir head when seepage, initiation of boils and failure would likely occur. Developed remediation strategies to address seepage and slope stability failure modes and determined when to deploy temporary remediation measures to enable the test to continue. Ultimately compared predicted behavior to actual.
- Developed procedures and forms for inspection and documentation of observations during the test fill.

The dam safety issues that RJH identified as needing remediation included unstable slopes, significant seepage instability of the foundation (i.e., high probability of a backward erosion piping failure in the foundation), instability of the upstream (waterside) slope due to rapid drawdown, and wave-erosion of the upstream (waterside) slope.

Client

U.S. Army Core of Engineers
Mr. Reid Prouty
5109 Leesburg Pike
Falls Church, PA 22041-3208
Phone: (202) 305-7586
email: J.Reid.Prouty@usdoj.gov

www.rjh-consultants.com

PROJECT DESCRIPTION SHEET

WALSENBURG CITY LAKE DAM AND RESERVOIR, HUERFANO COUNTY, CO, FOR CITY OF WALSENBURG

GEOTECHNICAL AND WATER RESOURCES ENGINEERING

RELATED SERVICES:

- Rehabilitation to address dam safety issues
- Inadequate outlet works and spillway

Walsenburg City Lake Dam is a 22-foot-high, 3,000-foot-long earth embankment dam constructed circa 1910. RJH was retained by the City of Walsenburg to perform engineering services to address dam safety issues identified at the dam by the Colorado Office of the State Engineer (SEO). Issues identified include seepage, slope stability, lack of erosion control protection on the upstream slope and dam crest, and an inadequate outlet works and spillway. Rehabilitation of the dam is to be completed in several phases to accommodate budget constraints.

For the first phase of the project, RJH has provided the following services:

- Performed a topographic survey of the dam.
- Performed a geotechnical subsurface investigation including the installation of instrumentation necessary to collect data to perform seepage and stability analyses.
- Performed dam breach mapping and prepared a Dam Breach Mapping Report, Hazard Classification Report, and a revised Emergency Action Plan.
- Performed an underwater internal video inspection of the two primary intake structures and outlet pipes.
- Developed as-constructed drawings of the embankment and outlet works.
- Developed rehabilitation alternatives and associated costs.
- Prepared designs, construction drawings, construction specifications, and contract documents for the selected rehabilitation alternative.

RJH will provide construction engineering support services through bidding and construction of the rehabilitation.

Client

City of Walsenburg
Mr. David Johnson
525 South Albert Street
Walsenburg, CO 81089
Phone: (719) 738-1048
email:
djohnson@cityofwalsenburg.net

www.rjh-consultants.com

CITY OF Grand Junction COLORADO
PUBLIC WORKS

CHANGE ORDER NO. 1

Date: September 12, 2018

To: Randi Kim – Public Works/Utilities Director
Greg Caton – City Manager

From: City of Grand Junction
Utilities Department
Lee Cooper, Project Engineer

Project: **Safety Evaluation of Hogchute Dam**

It is agreed to modify the Contract for the Project as follows:

The City of Grand Junction approves Change Order Request #1 from RJH Consultants, Inc. to proceed with drilling up to three (3) additional bore holes and installing three additional piezometers in the bore holes. The proposed cost for this additional work and analysis is a cost not to exceed of $67,415 unless approval from the City has been given.

Additional information regarding this Change Order #1 can be found in the memo addressed to Greg Caton and in RJH Consultants, Inc. Change Order #1 proposal.

Summary of Contract price adjustments: Price adjustments are itemized on the attached sheet(s).

Original Contract Amount	$121,223.00
Approved Change Orders	0.00
This Change Order	$67,415.00
Revised Contract Amount	$188,638.00

Summary of Contract time adjustments:

Original Completion Date	December 3, 2018
Revised Completion Date	January 4, 2019

This modification constitutes compensation in full for all costs and mark-ups directly and/or indirectly attributable to the changes ordered herein, for all delays, impacts and disruptions related thereto and for performance of the changes within the Contract Time.

City of Grand Junction

Prepared by: DocuSigned by: Lee Cooper – Engineer, City of Grand Junction 17B20F90C55F422... Title: Project Engineer Date: 9/12/2018 | 15:04 MDT

Recommended by: DocuSigned by: Randi Kim – Utilities Director, City of Grand Junction F3B7E9047688412... Title: Utilities Director Date: 9/12/2018 | 15:11 MDT

Approved by: DocuSigned by: Greg Caton – City Manager – City of Grand Junction 2F1EE1D55758492... Title: City Manager Date: 9/12/2018 | 17:29 MDT

Consultant: **RJH Consultants, Inc.**

Accepted by: DocuSigned by: Robert Hrujak, P.E., RJH Consultants, Inc. 1B5C18C718A14EC... Title: President Date: 9/12/2018 | 23:01 MDT

CITY OF Grand Junction COLORADO

PUBLIC WORKS

Memorandum

TO: **Greg Caton, City Manager**

FROM: **Randi Kim, Utilities Director**

PREPARED BY: **Lee Cooper, Project Engineer**

DATE: **September 10, 2018**

SUBJECT: **Hogchute (Carson) Reservoir Safety Evaluation Study – Request for Change Order #1 Authorization**

The City is currently under contract and working with RJH Consultants, Inc. (RJH) on the Hogchute Reservoir Safety Evaluation Study. This study is being conducted because Hogchute dam was reclassified back in 2015 from a "Significant Hazard" dam to a "High Hazard" dam by the State of Colorado's Division of Water Resources Dam Safety Branch (State). The State changed the classification of Hogchute dam to high hazard due to development that has occurred downstream of the dam that could result in loss of life situations if the dam were to fail. This safety evaluation study is determining the current condition of the dam embankment and also identify Potential Failure Modes (PFM) this dam currently has or could develop in the future. The City is planning on a dam reconstruction project in 2020 that will upgrade the dam to the standards required of a high hazard dam and include measuring devices the City and State can use to monitor the conditions within the dam embankment.

Hogchute dam was approved for construction in May of 1947 by the State Engineer and construction of the dam was completed in November 1947. Currently, the reservoir has no storage level restrictions and the State allows "Conditional Full Storage".

With Hogchute dam's high hazard classification, there are certain items the State requires a high hazard dam to have for monitoring and measurement purposes. These items include, but are not limited to, piezometers, seepage collection systems, and seepage measurement devices. Prior to this study, Hogchute dam only possessed a seepage collection system. At this time, the condition of this dam's current seepage collection system is unknown or if it even works.

Part of RJH's original scope of work for this study included drilling six bore holes and installing six piezometers in each boring hole. RJH proposed three borings along the dam crest and three borings along the downstream toe of dam. These six borings and piezometers are critical for the seepage analysis RJH is completing as part of this study and also for verifying the characteristics of the dam's embankment material.

RJH scheduled one week with the drilling subcontractor to complete the six borings. RJH believed one week was enough time to complete six borings based on the information the 1947 dam construction plans provided. However, due to embankment soil conditions that differed from what the 1947 plans showed, RJH's drilling subcontractor was only able to install the three

dam crest borings during the scheduled one-week period and the budget RJH assigned to this part of the study.

Unforeseen conditions drilling down through the embankment dramatically slowed the progress of the drillers who used a hollow-stem auger system for drilling the bore holes. The difficulties include encountering large boulders within the embankment material that either slowed the drillers progress down substantially or the drillers had to abandon the hole they were working on and start drilling at a different location because they encountered a large rock/boulder that they couldn't drill through.

The 1947 construction plans the City provided called out impervious fill of clay or clay, sand, and gravel mixture as the embankment material used. A hollow-stem auger system should have no difficulty drilling through the material called out on the 1947 plans. Unfortunately, the embankment materials that are shown on the construction plans didn't match what was encountered in the field.

To date, only the three dam crest bore holes have been completed with piezometers installed. Unfortunately, the three borings proposed for the downstream toe of the dam were not started due to RJH and the drilling subcontractor running out of time and budget. In addition to running out of time, the hollow-stem auger system would not have been successful drilling through the rock that is present at the toe of the dam.

Having at least one of the three toe of dam borings completed and having a piezometer installed is critical to the successful completion of the dam safety study. By having one, two, or three borings and piezometers installed along the dam toe of slope will greatly improve the accuracy and success of the dam seepage analysis.

Due to the drilling subcontractor's tight and busy schedule and with winter conditions approaching, RJH was able to schedule the drilling subcontractor for September 17 through 22, 2018. This week will be used for drilling the proposed three borings at the downstream toe of slope. The State will be on-site inspecting the drilling operations and making sure there are no concerns with dam safety.

RJH is proposing ODEX style drilling instead of the hollow-stem auger drilling system. ODEX drilling has been approved by the State on this project and ODEX is typically used where there are high concentrations of rock present. ODEX is a more costly drilling system than hollow-stem augering. Permission had to be granted by the State to use ODEX drilling before RJH could schedule the drilling subcontractor.

RJH has estimated $67,415 for this supplemental investigation and analyses for the three toe of dam borings and piezometers using ODEX drilling methods.

This memo is a request for your approval of this Contract Amendment. If you have questions, please let me know, otherwise please sign and return.

Attachments:

- RJH Consultants, Inc. Request for Change Order #1 letter

September 5, 2018
Project 18115

Mr. Lee Cooper, P.E.
Project Engineer
City of Grand Junction
250 N. 5th Street
Grand Junction, CO 81501

Re: Hogchute Dam Safety Evaluation – Purchase Order No. 2018-00000399
Request for Change Order No. 1

Dear Mr. Cooper:

RJH Consultants, Inc. (RJH) has completed installation of three open-well piezometers on the crest of Hogchute Dam and collection of geotechnical samples for laboratory testing. The completed work is in general accordance with Task 2b of the scope of work described in our May 4, 2018 proposal for Professional Services for Safety Evaluation of Hogchute Dam.

As we discussed in our meeting with the City of Grand Junction (City) on August 6, 2018, conditions encountered while drilling the borings on the dam crest differed considerably from conditions estimated based on information on the dam drawings provided by the City. Due to the unanticipated presence of many cobbles and boulders in the embankment fill, the drilling production was significantly slower than estimated.

To date, three of the proposed six piezometers (B-101(P), B-102(P), and B-103(P)) have been installed, as shown on Figure 1. At the conclusion of the fieldwork, the drilling subcontractor had expended approximately 117 percent of their project budget, and RJH had expended about 91 percent of our budget for this task. We therefore request a change order for unanticipated conditions to provide additional budget for completion of the work authorized for Task 2b.

Basis for Proposed Scope of Work

The embankment fill in Hogchute Dam is described on the 1947 design drawings as consisting of cobble and rock shells over an internal core of "impervious fill of clay or clay, sand and gravel graded with the coarser material on outer slopes, and compacted in 6-inch layers. While drilling through the core in borings B-101, B-102A, B-102B, and B-103, we encountered a generally medium-plasticity clayey sand and abundant basalt gravels, cobbles, and boulders. The many cobbles and boulders slowed the progress of the hollow-stem augers significantly. At several locations, the augers were only able to penetrate the core material less than 5 feet in about an hour of drilling, and the augers reached refusal in all borings at total depths less than intended. B-102B was drilled in an attempt to install a piezometer deeper than the 48 feet

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reached in B-102A; however, the augers hit refusal in B-102B on a large rock at only 5 feet below the ground surface.

Hollow-stem augers were used for the drilling because this method is one of very few methods acceptable for drilling in dam embankments. Other acceptable methods, such as sonic drilling, are considerably more expensive, and they were not considered to be needed for this project, based on available information. Conventional down-hole casing-advancement drilling methods employ circulating drilling fluids to flush drill cuttings from the boring. Since the pressurized fluids pose a significant risk of hydro-fracturing the embankment fill or causing eroded voids within the embankment, these methods are not acceptable for drilling on earth dams.

The intent of the drilling program is to provide geotechnical information on the embankment and foundation materials and to enable installation of instrumentation (piezometers) for monitoring water pressures through and under the dam. The geotechnical and water pressure information will be used to evaluate the Potential Failure Modes (PFM) identified in the 2017 Comprehensive Dam Safety Evaluation (CDSE) performed by the Colorado Office of the State Engineer (SEO) Dam Safety Branch. The drilling completed to date has revealed that the embankment was not constructed as shown on the design drawings, in that the embankment core zone contains abundant gravels and cobbles with many boulders. A significant finding from the data collected from the three borings is the presence of a high-pressure zone in the foundation. Although much data has been collected, the three completed borings and piezometers will not provide the required information for evaluation of all the PFMs identified by the SEO as needing to be addressed immediately or to evaluate the impacts of the high-pressure zone. Based on our current understanding of the dam and foundation, it is our opinion that completion of the three remaining borings and piezometers (B-104, B-105, and B-106) should provide valuable information on the dam foundation soil and bedrock and the native material downstream of the dam to enable evaluation of the critical PFMs.

Scope of Work

Proposed borings B-104, B-105, and B-106 for the three piezometers are located on natural ground downstream of the dam toe. Although sonic drilling is the preferred method to advance these borings, this method is very expensive, and mobilizing sonic drilling equipment would likely delay the fieldwork. Since these borings will not be in the footprint of the dam, drilling methods that should not be used in the embankment can be used. We have evaluated both mud rotary and percussion down-hole casing-advancement methods (e.g. ODEX, Symmetrix, etc.) to drill these borings. Both methods have different risks and benefits. Based on our review of federal and state drilling guidelines, discussions with the driller, and our understanding of the site conditions, we recommend that these three borings be drilled using the percussion down-hole casing-advancement method for the following reasons: 1) the percussion casing-advancement method is known to be effective in the expected rocky conditions, 2) the amount of down-hole air pressure will be similar to or less than the pressure used in percussion drilling methods specifically designed for sensitive ground conditions, 3) the casing that is advanced during drilling provides protection against the hole caving, against degradation of exposed weak seams along the walls of the boring, and against the possibility of fracturing the ground material along the walls of the boring.

RJH submitted a revised site investigation plan to the SEO on August 20, 2018, describing our proposal for completing the field investigation. RJH, the SEO, and the City held a telephone conference call on August 27 to discuss the revised plan. Following the call, the SEO issued approval for the proposed investigation with the following conditions:

1. The initial exploration will be limited to a single borehole. Additional drilling may be allowed upon successful completion of the first borehole and good cause shown for needing additional information.
2. Drilling must be scheduled later in the season when the reservoir has been lowered 10 feet below the spillway crest.
3. ODEX (down-hole casing-advancement) methods are acceptable for this investigation. However, the SEO emphasizes that the equipment and materials listed on page 7 of the investigation plan must be on-site and immediately available, should an emergency arise.
4. Drilling is to be scheduled to allow a Colorado Dam Safety representative to attend.

In accordance with the SEO's conditional approval of the revised investigation plan, we will begin the exploration with boring B-105, located at the downstream dam toe north of the outlet channel. We will have the required equipment and materials on hand adjacent to the boring to enable rapid response to an emergency. The drillers will use the percussion Symmetrix drill bit system developed by Atlas Copco. We will collect soil and rock samples and perform permeability testing of the subsurface materials as possible, similar to that performed in the crest borings. If boring B-105 is completed successfully, and if the SEO and the City concur, we will continue with the investigation by drilling borings B-104 and B-106. If boring B-105 cannot be completed as planned due to unacceptable conditions, we will abandon the boring as described in the revised investigation plan and terminate the site investigation.

The high-pressure zone observed in crest borings B-101 and B-102A produced an upward hydraulic gradient in the borings, which complicated placement of the well pack sand around the piezometer casing. Even though these piezometers were successfully completed, we plan to avoid complications of potential upward gradients in the remaining borings by installing pre-packed well screens in piezometers B-104(P), B-105(P), and B-106(P). As conditions permit, we will install the piezometers as open-well standpipes similar to the piezometers on the dam crest. If significant upward gradients (artesian or near-artesian conditions) are encountered in a boring, we will complete that piezometer as a closed well, where the water pressure can be measured with a conventional pressure gage.

Fee Estimate and Schedule

Engineering services will be provided on a time and expense basis as presented on the attached Table 1 and in accordance with our current contract. Our estimated costs for the supplemental investigation and analyses are $67,415. Our budget includes our estimated costs for completion of all three borings during the same mobilization. If RJH, the City, and the SEO decide to drill all the borings, having the full budget approved in advance will reduce the potential for delays and additional costs associated with obtaining a separate authorization. The City will be invoiced only for the actual costs of the borings drilled and instruments installed. Expenditures will not exceed the values in Table 1 without approval from the City.

Currently we have scheduled the drilling for September 17 through 22, 2018. Our Site Investigation Plan has already been approved by the U.S. Forest Service and the U.S. Army Corps of Engineers, so no additional permitting will be required.

We appreciate your consideration of this change order request, and we look forward to working with the City to complete this project. Please contact me if you have any questions or for any additional information.

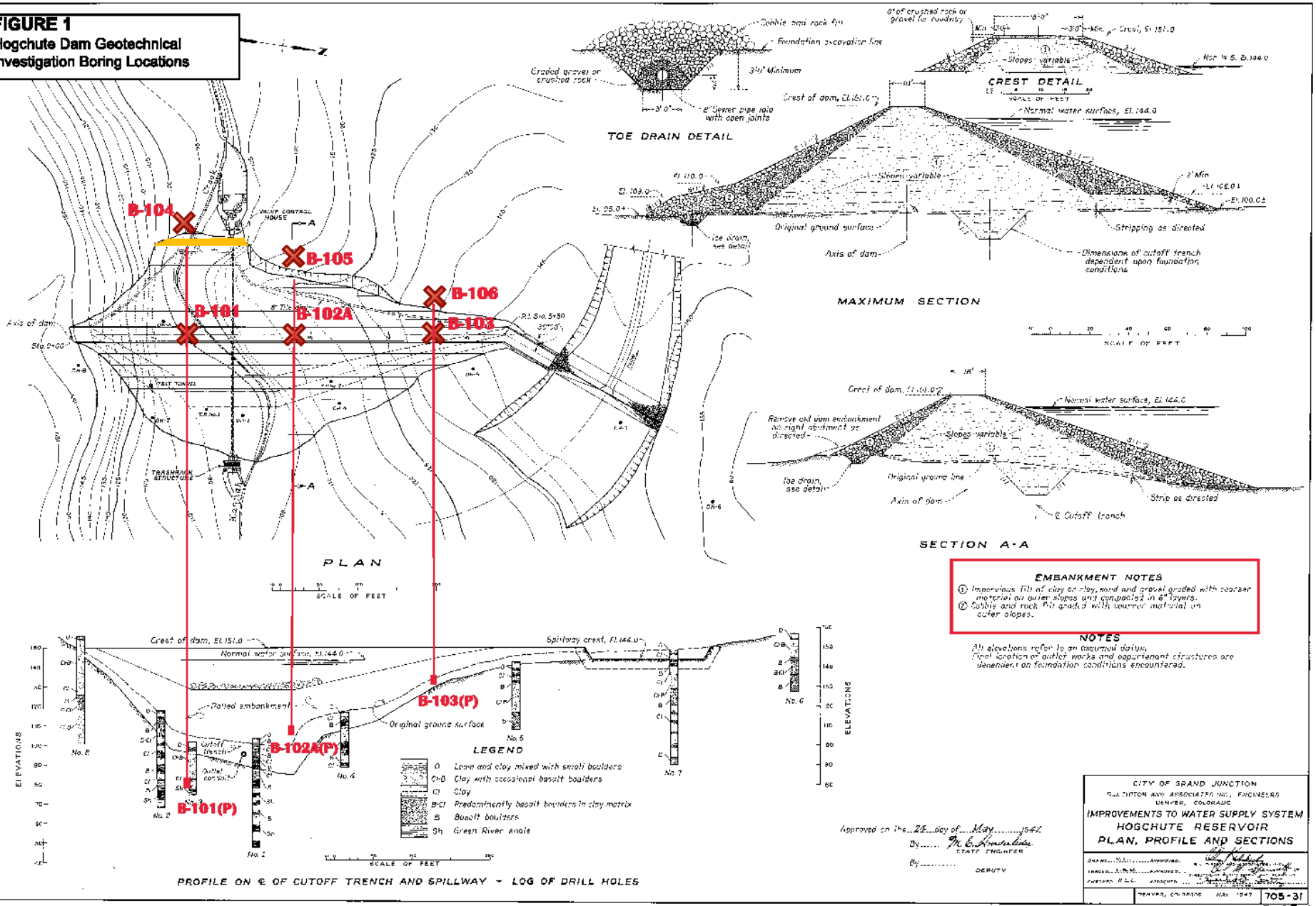
Sincerely,

RJH CONSULTANTS, INC.

Garrett Jackson, P.E.
Project Manager

Attachment: Figure 1 – Geotechnical Investigation Boring Locations
Table 1 – Summary of Estimated Costs

FIGURE 1
Hogchute Dam Geotechnical Investigation Boring Locations



EMBANKMENT NOTES

① Impervious fill of clay or clay, sand and gravel graded with coarser material on outer slopes and compacted in 6" layers.
② Cobble and rock fill graded with coarser material on outer slopes.

NOTES

All elevations refer to an assumed datum.
Final location of outlet works and appurtenant structures are dependent on foundation conditions encountered.

Approved on the 22 day of May 1947
By M. E. Hinderlider STATE ENGINEER
By ..... DEPUTY

CITY OF GRAND JUNCTION
GAIL TITTON AND ASSOCIATES INC. ENGINEERS
DENVER, COLORADO
IMPROVEMENTS TO WATER SUPPLY SYSTEM
HOGCHUTE RESERVOIR
PLAN, PROFILE AND SECTIONS
DENVER, COLORADO MAY 1947
705-31

C-454

TABLE 1
Summary of Estimated Costs

RJH CONSULTANTS, INC.

PROJECT NAME: Hogchute Dam
PHASE: --
DATE: 9/5/2018
NOTES:

TASK	1	
TASK	2	Supplemental Geotechnical Investigation and Analyses
TASK	3	
TASK	4	
TASK	5	
TASK	6	
TASK	7	
TASK	8	
TASK	9	
TASK	10	
TASK	11	
TASK	12	
TASK	13	
TASK	14	
TASK	15	

			TASK 1		TASK 2		TASK 3		TASK 4		TASK 5			
			EXTRA		Supplemental Geotechnical Investigation and Analyses		EXTRA		EXTRA		EXTRA			
COST ITEMS	RATE		TOTAL # or HOURS	TOTAL BUDGET	TOTAL # or HOURS	TOTAL BUDGET	TOTAL # or HOURS	TOTAL BUDGET	TOTAL # or HOURS	TOTAL BUDGET	TOTAL # or HOURS	TOTAL BUDGET	TOTAL # or HOURS for THIS PHASE	TOTAL BUDGET FOR THIS PHASE
LABOR COSTS														
Technical Expert	$ 255.00	HR	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
Senior Professional-Grade 8	$ 220.00	HR	0	$ -	11	$ 2,420.00	0	$ -	0	$ -	0	$ -	11	$ 2,420.00
Senior Professional-Grade 7	$ 205.00	HR	0	$ -	51	$ 10,455.00	0	$ -	0	$ -	0	$ -	51	$ 10,455.00
Senior Professional - Grade 6	$ 180.00	HR	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
Grade 5	$ 167.00	HR	0	$ -	6	$ 1,002.00	0	$ -	0	$ -	0	$ -	6	$ 1,002.00
Grade 4	$ 138.00	HR	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
Grade 3	$ 124.00	HR	0	$ -	141	$ 17,484.00	0	$ -	0	$ -	0	$ -	141	$ 17,484.00
Grade 2	$ 114.00	HR	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
Grade 1	$ 105.00	HR	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
CADD Designer	$ 106.00	HR	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
Word Processing/Administration	$ 82.00	HR	0	$ -	4	$ 328.00	0	$ -	0	$ -	0	$ -	4	$ 328.00
TOTAL LABOR COSTS			**0**	**$ -**	**213**	**$ 31,689.00**	**0**	**$ -**	**0**	**$ -**	**0**	**$ -**	**213**	**$ 31,689.00**
SUBCONTRACT COSTS														
Drilling Subcontractor (incl. stand-by materials and equipment)	$ 31,489.10	LS		$ -		$ 31,489.10		$ -		$ -		$ -		$ 31,489.10
Piezometer Supplies (pre-pack)	$ 350.00	LS		$ -		$ 350.00		$ -		$ -		$ -		$ 350.00
	$ -	EA		$ -		$ -		$ -		$ -		$ -		$ -
	$ -	EA		$ -		$ -		$ -		$ -		$ -		$ -
	$ -	HR		$ -		$ -		$ -		$ -		$ -		$ -
	$ -	LS		$ -		$ -		$ -		$ -		$ -		$ -
	$ -	LS		$ -		$ -		$ -		$ -		$ -		$ -
	$ -	LS		$ -		$ -		$ -		$ -		$ -		$ -
	$ -	LS		$ -		$ -		$ -		$ -		$ -		$ -
TOTAL SUBCONTRACT COSTS				**$ -**		**$ 31,839.10**		**$ -**		**$ -**		**$ -**		**$ 31,839.10**
OTHER DIRECT COSTS														
Other Expenses at Percent of Labor	5%	LS		$ -		$ 1,584.45		$ -		$ -		$ -		$ 1,584.45
TOTAL OTHER DIRECT COSTS				**$ -**		**$ 1,584.45**		**$ -**		**$ -**		**$ -**		**$ 1,584.45**
TRAVEL														
AIRFARE	$ -	EA	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
MOTEL	$ 120.00	EA	0	$ -	7	$ 840.00	0	$ -	0	$ -	0	$ -	7	$ 840.00
MEALS (GSA Per Diem Rate)	$ 51.00	EA	0	$ -	21	$ 1,071.00	0	$ -	0	$ -	0	$ -	21	$ 1,071.00
RENTAL CAR	$ -	EA	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
MILEAGE	$ 0.52	MI	0	$ -	760	$ 391.40	0	$ -	0	$ -	0	$ -	760	$ 391.40
PARKING	$ -	EA	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
TOTAL TRAVEL COSTS				**$ -**		**$ 2,302.40**		**$ -**		**$ -**		**$ -**		**$ 2,302.40**
TOTAL PROJECT COSTS				**$ -**		**$ 67,414.95**		**$ -**		**$ -**		**$ -**		**$ 67,414.95**