Purchasing Division

Invitation for Bid

IFB-4799-20-DH
Riverfront at Dos Rios Phase II Construction

Responses Due:

June 29, 2020 prior to 3:30pm

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

Invitation for Bids

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1. Instructions to Bidders

1.1. **Purpose:** The City of Grand Junction is soliciting competitive bids from qualified and interested companies for all labor, equipment, and materials required to successfully complete the Riverfront at Dos Rios Phase II Construction. All dimensions and scope of work should be verified by Contractors prior to submission of bids.

IFB Questions:
Duane Hoff Jr., Senior Buyer
duaneh@gjcity.org

The City would like to remind all Contractors, Sub-Contractors, Vendors, Suppliers, Manufacturers, Service Providers, etc. that (with the exception of Pre-Bid or Site Visit Meetings) all questions, inquiries, comments, or communication pertaining to any formal solicitation (whether process, specifications, scope, etc.) must be directed (in writing) to the Purchasing Agent assigned to the project, or Purchasing Division. Direct communication with the City assigned Project Managers/Engineers is not appropriate for public procurement, and may result in disqualification.

1.2. **Mandatory Pre-Bid Meeting:** **Prospective bidders are required to attend one of two, mandatory pre-bid meetings being offered for this solicitation process.** Meeting location shall be in the City Hall Auditorium, located at 250 N. 5th Street, Grand Junction, CO. The purpose of this visit will be to inspect and to clarify the contents of this Invitation for Bids (IFB).

Two pre-bid meetings will be offered to all Contractors interested in this project. Attending at least one **(and only one)** of these meetings is required by all Primary/General Contractors intending to submit a response to this IFB. Due to the limited number of seating available at this time, all attendees must pre-register with the purchasing agent assigned, and receive a conformation e-mail acknowledging their reservation. Since pre-bid meeting attendance is only required for the Primary/General Contractors, they shall be given preference over Sub-Contractors and Suppliers for pre-bid meeting pre-registration and attendance. We also request that no more than one representative from each company attend the pre-bid meeting.

Please contact Duane Hoff Jr., Senior Buyer at 970-244-1545 or via e-mail at duaneh@gjcity.org .

We ask that all attendees practice social distancing guidelines, and wear masks, if possible.

-The 1st pre-bid meeting shall be held at the City of Grand Junction City Hall Auditorium located at 250, N. 5th Street, Grand Junction, CO on June 8, 2020 at 1:00pm.

OR

-The 2nd pre-bid meeting shall be held at the City of Grand Junction City Hall Auditorium located at 250, N. 5th Street, Grand Junction, CO on June 8, 2020 at 2:00pm

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. **Procurement Process:** Procurement processes shall be governed by the most current version of the City of Grand Junction Purchasing Policy and Procedure Manual.

1.5. **Submission:** ***Each bid 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. (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**)

1.6. **Modification and Withdrawal of Bids Before Opening.** Bids may be modified or withdrawn by an appropriate document stating such, duly executed and submitted to the place where Bids are to be submitted at any time prior to Bid Opening.

1.7. **Printed Form for Price Bid:** All Price Bids must be made upon the Price Bid Schedule attached, and should give the amounts both in words and in figures, and must be signed and acknowledged by the bidder.

The Offeror shall specify a unit price in figures for each pay item for which a quantity is given and shall provide the products (in numbers) of the respective unit prices and quantities in the Extended Amount column. The total Bid price shall be equal to the sum of all extended amount prices. When an item in the Price Bid Schedule provides a choice to be made by the Offeror, Offeror's choice shall be indicated in accordance with the specifications for that particular item and thereafter no further choice shall be permitted.

Where the unit of a pay item is lump sum, the lump sum amount shall be shown in the "extended amount" column and included in the summation of the total Bid.

All blank spaces in the Price Bid Schedule must be properly filled out.

Bids by corporations must be executed in the corporate name by the president or vice president or other corporate office accompanied by evidence of authority to sign. The corporate address and state of incorporation shall be shown below the signature.

Bids by partnerships must be executed in the partnership name and signed by a partner whose title must appear under the signature and the official address of the partnership must be shown below the signature.

All names must be typed or printed below the signature.

The Offeror's Bid shall contain an acknowledgement of receipt of all Addenda, the numbers of which shall be filled in on the Contractor's Bid Form.

The contact information to which communications regarding the Bid are to be directed must be shown.

1.8. Exclusions: No oral, telephonic, emailed, or facsimile bid will be considered

1.9. Contract Documents: The complete IFB and bidder's response compose the Contract Documents. Copies of bid documents can be obtained from the City Purchasing website, http://www.gjcity.org/business-and-economic-development/bids/ .

1.10. Additional Documents: The July 2010 edition of the "City Standard Contract Documents for Capital Improvements Construction", Plans, Specifications and other Bid Documents are available for review or download on the Public Works & Planning/Engineering page at www.gjcity.org. Electronic copies may be obtained on a CD format at the Department of Public Works and Planning at City Hall.

1.11. Definitions and Terms: See Article I, Section 3 of the General Contract Conditions in the *Standard Contract Documents for Capital Improvements Construction*.

1.12. Examination of Specifications: Bidders shall thoroughly examine and be familiar with the project Statement of Work. The failure or omission of any Offeror to receive or examine any form, addendum, or other document shall in no way relieve any Offeror from any obligation with respect to his bid. The submission of a bid shall be taken as evidence of compliance with this section. Prior to submitting a bid, each Offeror shall, at a minimum:

a. Examine the *Contract Documents* thoroughly;

b. Visit the site to familiarize themselves with local conditions that may in any manner affect cost, progress, or performance of the Work;

c. Become familiar with federal, state, and local laws, ordinances, rules, and regulations that may in any manner affect cost, progress or performance of the Work;

d. Study and carefully correlate Bidder's observations with the *Contract Documents*, and;

e. Notify the Purchasing Agent of all conflicts, errors, ambiguities or discrepancies in or among the *Contract Documents* within the designated inquiry period.

On request, the Owner will provide each Offeror access to the site to conduct such investigations and tests as each Bidder deems necessary for submission of a Bid. It shall be the Offeror's responsibility to make or obtain any additional examinations, investigations, explorations, tests and studies and obtain any additional information and data which pertain to the physical conditions (including without limitation, surface, subsurface and underground utilities) at or contiguous to the site or otherwise which

may affect cost, progress or performance of the work and which the Offeror deems necessary to determine its Bid for performing the work in accordance with the time, price and other terms and conditions of the Contract Documents. Location of any excavation or boring made by Offeror shall be subject to prior approval of Owner and applicable agencies. Offeror shall fill all holes, restore all pavements to match the existing structural section and shall clean up and restore the site to its former condition upon completion of such exploration. The Owner reserves the right to require the Offeror to execute an access agreement with the Owner prior to accessing the site.

The lands upon which the Work is to be performed, rights of way, and access thereto, and other lands designated for use by Contractor in performing the Work, are identified on the Drawings.

Information and data reflected in the *Contract Documents* with respect to underground utilities at or contiguous to the site are based upon information and data furnished to the Owner and the Engineer by the owners of such underground utilities or others, and the Owner does not assume responsibility for the accuracy or completeness thereof, unless it is expressly provided otherwise in the *Contract Documents*.

By submission of a Bid, the Offeror shall be conclusively presumed to represent that the Offeror has complied with every requirement of these Instructions to Bidders, that the *Contract Documents* are not ambiguous and are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the Work.

1.13. Questions Regarding Statement of Work: Any information relative to interpretation of Scope of Work or specifications shall be requested of the Purchasing Representative, in writing, in ample time, prior to the inquiry deadline.

1.14. Addenda & Interpretations: If it becomes necessary to revise any part of this solicitation, a written addendum will be posted electronically on the City's website at http://www.gjcity.org/business-and-economic-development/bids/ . The Owner is not bound by any oral representations, clarifications, or changes made in the written specifications by Owner, unless such clarification or change is provided in written addendum form from the City Purchasing Representative.

1.15. Taxes: The Owner is exempt from State retail and Federal tax. The bid price must be net, exclusive of taxes.

1.16. Sales and Use Taxes: The Contractor and all Subcontractors are required to obtain exemption certificates from the Colorado Department of Revenue for sales and use taxes in accordance with the provisions of the General Contract Conditions. Bids shall reflect this method of accounting for sales and use taxes on materials, fixtures and equipment.

1.17. Offers Binding 60 Days: Unless additional time is required by the Owner, or otherwise specified, all formal offers submitted shall be binding for sixty (60) calendar days following opening date, unless the Bidder, upon request of the Purchasing Representative, agrees to an extension.

1.18. Exceptions and Substitutions: Bidders taking exception to the specifications and/or scope of work 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, Bidder 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 and/or scope of work. The absence of such a list shall indicate that the Bidder has not taken exceptions, and if awarded a contract, shall hold the Bidder responsible to perform in strict accordance with the specifications and/or scope of work contained herein.

1.19. Collusion Clause: Each bidder by submitting a bid 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 bids shall be rejected if there is evidence or reason for believing that collusion exists among bidders. The Owner may, or may not, accept future bids for the same services or commodities from participants in such collusion.

1.20. Disqualification of Bidders: A Bid will not be accepted from, nor shall a Contract be awarded to, any person, firm, or corporation that is in arrears to the Owner, upon debt or contract, or that has defaulted, as surety or otherwise, upon any obligation to the Owner, or that is deemed irresponsible or unreliable.

Bidders may be required to submit satisfactory evidence that they are responsible, have a practical knowledge of the project bid upon and that they have the necessary financial and other resources to complete the proposed Work.

Either of the following reasons, without limitation, shall be considered sufficient to disqualify a Bidder and Bid:

a. More than one Bid is submitted for the same Work from an individual, firm, or corporation under the same or different name; and

b. Evidence of collusion among Bidders. Any participant in such collusion shall not receive recognition as a Bidder for any future work of the Owner until such participant has been reinstated as a qualified bidder.

1.21. Public Disclosure Record: If the bidder has knowledge of their employee(s) or sub-contractors having an immediate family relationship with a City employee or elected official, the bidder 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 City.

2. General Contract Conditions for Construction Projects

2.1. The Contract: This Invitation for Bid, submitted documents, and any negotiations, when properly accepted by the City, shall constitute a contract equally binding between the City and Contractor. The contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or

agreements, either written or oral. The contract may be amended or modified with Change Orders, Field Orders, or Addendums.

2.2. The Work: The term Work includes all labor necessary to produce the construction required by the Contract Documents, and all materials and equipment incorporated or to be incorporated in such construction.

2.3. Execution, Correlation, Intent, and Interpretations: The Contract Documents shall be signed by the Owner (City) and Contractor. City will provide the contract. By executing the contract, the Contractor represents that he/she has visited the site, familiarized himself with the local conditions under which the Work is to be performed, and correlated his 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 and other items necessary for the proper execution and completion of the scope of work as defined in the technical specifications and drawings contained herein. All drawings, specifications and copies furnished by the City are, and shall remain, City property. They are not to be used on any other project, and with the exception of one contract set for each party to the contract, are to be returned to the owner on request at the completion of the work.

2.4. The Owner: The Owner is the City of Grand Junction, Colorado and is referred to throughout the Contract Documents. The term Owner means the Owner or his authorized representative. The Owner shall, at all times, have access to the work wherever it is in preparation and progress. The Contractor shall provide facilities for such access. The Owner will make periodic visits to the site to familiarize himself generally with the progress and quality of work and to determine, in general, if the work is proceeding in accordance with the contract documents. Based on such observations and the Contractor's Application for Payment, the Owner will determine the amounts owing to the Contractor and will issue Certificates for Payment in such amounts, as provided in the contract. The Owner will have authority to reject work which does not conform to the Contract documents. Whenever, in his reasonable opinion, he considers it necessary or advisable to insure the proper implementation of the intent of the Contract Documents, he will have authority to require the Contractor to stop the work or any portion, or to require special inspection or testing of the work, whether or not such work can be then be fabricated, installed, or completed. The Owner will not be responsible for the acts or omissions of the Contractor, and sub-Contractor, or any of their agents or employees, or any other persons performing any of the work.

2.5. Contractor: The Contractor is the person or organization 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 Work, 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 work without clarifying Drawings, Specifications, or Interpretations.

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

2.7. Award of Sub-Contractors & Other Contracts for Portions of the Work: Contractor shall submit with their bid response to the Owner, in writing for acceptance, a list of the names of the sub-contractors or other persons or organizations proposed for such portions of the work as may be designated in the proposal requirements, or, if none is so designated, the names of the sub-contractors proposed for the principal portions of the work. Prior to the award of the contract, the Owner shall notify the successful Contractor in writing if, after due investigation, has reasonable objection to any person or organization on such list. If, prior to the award of the contract, the Owner has a reasonable and substantial objection to any person or organization on such list, and refuses in writing to accept such person or organization, the successful Contractor may, prior to the award, withdraw their proposal without forfeiture of proposal security. If the successful Contractor submits an acceptable substitute with an increase in the proposed price to cover the difference in cost occasioned by the substitution, the Owner may, at their discretion, accept the increased proposal or may disqualify the Contractor. If, after the award, the Owner refuses to accept any person or organization on such list, the Contractor shall submit an acceptable substitute and the contract sum shall be increased or decreased by the difference in cost occasioned by such substitution and an appropriate Change Order shall be issued. However, no increase in the contract sum shall be allowed for any such substitution unless the Contractor has acted promptly and responsively in submitting a name with respect thereto prior to the award.

2.8. Quantities of Work and Unit Price: Materials or quantities stated as unit price items in the Bid are supplied only to give an indication of the general scope of the Work, and are as such, estimates only. The Owner does not expressly or by implication agree that the actual amount of Work or material will correspond therewith, and reserves the right after award to increase or decrease the quantity of any unit item of the Work without a change in the unit price except as set forth in Article VIII, Section 70 of the *General Contract Conditions*. The City also reserves the right to make changes in the Work (including the right to delete any bid item in its entirety or add additional bid items) as set forth in Article VIII, Sections 69 through 71 of the *General Contract Conditions*.

2.9. Substitutions: The materials, products and equipment described in the *Solicitation Documents* shall be regarded as establishing a standard of required performance, function, dimension, appearance, or quality to be met by any proposed substitution. No substitution will be considered prior to receipt of Bids unless the Offeror submits a written request for approval to the City Purchasing Division at least ten (10) days prior to the date for receipt of Bids. Such requests for approval shall include the name of the material or equipment for which substitution is sought and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for evaluation, including samples if requested. The Offeror shall set forth changes in other materials, equipment, or other portions of the Work including changes of the work of other contracts, which incorporation of the proposed substitution would require to be included. The Owner's decision of approval or disapproval of a proposed substitution shall be final. If the Owner approves a proposed substitution before receipt

of Bids, such approval will be set forth in an Addendum. Offerors shall not rely upon approvals made in any other manner.

2.10. Supervision and Construction Procedures: The Contractor shall supervise and direct the work, using his best skill and attention. He shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the work under the contract.

2.11. Warranty: The Contractor warrants to the Owner that all materials and equipment furnished under this contract will be new unless otherwise specified, and that all work will be of good quality, free from faults and defects and in conformance with the Contract Documents. All work not so conforming to these standards may be considered defective. If required by Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. If within ten (10) days after written notice to the Contractor requesting such repairs or replacement, the Contractor should neglect to make or undertake with due diligence to the same, the City may make such repairs or replacements. All indirect and direct costs of such correction or removal or replacement shall be at the Contractor's expense. The Contractor will also bear the expenses of making good all work of others destroyed or damaged by the correction, removal or replacement of his defective work.

2.12. 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 work. 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 work. 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 work 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.

2.13. Responsibility for Those Performing the Work: The Contractor shall be responsible to the Owner for the acts and omissions of all his employees and all sub-contractors, their agents and employees, and all other persons performing any of the work under a contract with the Contractor.

2.14. Use of the Site: The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents, and shall not unreasonably encumber the site with any materials or equipment.

2.15. Cleanup: The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by his operations. At the completion of work, he shall remove all his waste materials and rubbish from and about the project, as well as all his tools, construction equipment, machinery and surplus materials.

2.16. Insurance: The Contractor shall secure and maintain such insurance policies as will provide the coverage and contain other provisions specified in the General Contract Conditions, or as modified in the Special Contract Conditions.

The Contractor shall file a copy of the policies or Certificates of Insurance acceptable to the City with the Engineer within ten (10) Calendar Days after issuance of the Notice of Award. These Certificates of Insurance shall contain a provision that coverage afforded under the policies shall not be canceled unless at least thirty (30) Calendar Days prior written notice has been given to the City.

2.17. Indemnification: The Contractor 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 Contractor, or of any Contractor's agent, employee, sub-contractor or supplier in the execution of, or performance under, any contract which may result from proposal award. Contractor shall pay any judgment with cost which may be obtained against the Owner growing out of such injury or damages.

2.18. Miscellaneous Conditions: Material Availability: Contractors must accept responsibility for verification of material availability, production schedules, and other pertinent data prior to submission of bid. It is the responsibility of the bidder to notify the Owner immediately if materials specified are discontinued, replaced, or not available for an extended period of time. **OSHA Standards:** All bidders agree and warrant that services performed in response to this invitation shall conform to the standards declared by the US Department of Labor under the Occupational Safety and Health Act of 1970 (OSHA). In the event the services do not conform to OSHA standards, the Owner may require the services to be redone at no additional expense to the Owner.

2.19. Time: Time is of the essence with respect to the time of completion of the Project and any other milestones or deadline which are part of the Contract. It will be necessary for each Bidder to satisfy the City of its ability to complete the Work within the Contract Time set forth in the Contract Documents. The Contract Time is the period of time allotted in the Contract Documents for completion of the work. The date of commencement of the work is the date established in a Notice to Proceed. If there is no Notice to Proceed, it shall be the date of the Contract or such other date as may be established therein, or as established as entered on the Bid Form. The Date of Final Completion of the work is the date certified by the Owner when all construction, and all other work associated to include, but not be limited to: testing, QA/QC, receipt of required reports and/or forms, grant requirements (if applicable), punch list items, clean-up, receipt of drawings and/or as-builts, etc., is fully complete, and in accordance with the Contract Documents.

2.20. Progress & Completion: The Contractor shall begin work on the date of commencement as defined in the Contract, and shall carry the work forward expeditiously with adequate forces and shall complete it within the contract time.

2.21. 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 work under the Contract Documents. Upon receipt of written notice that the work 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 he finds the work

acceptable under the Contract Documents and the Contract fully performed, the Owner shall make payment in the manner provided in the Contract Documents.

2.22. Bid Bond: Each Bid shall as a guaranty of good faith on the part of the Bidder be accompanied by a Bid Guaranty consisting of: a certified or cashier's check drawn on an approved national bank or trust company in the state of Colorado, and made payable without condition to the City; or a **Bid Bond** written by an approved corporate surety in favor of the City. The amount of the Bid Guaranty shall not be less than 5% of the total Bid amount. Once a Bid is accepted and a Contact is awarded, the apparent successful bidder has ten calendar days to enter into a contractor in the form prescribed and to furnish the bonds with a legally responsible and approved surety. Failure to do so will result I forfeiture of the Bid Guaranty to the City as Liquidated Damages.

Each bidder shall guaranty its total bid price for a period of sixty (60) Calendar Days from the date of the bid opening.

2.23. Performance & Payment Bonds: Contractor shall furnish a Performance and a Payment Bond, each in an amount at least equal to that specified for the contract amount as security for the faithful performance and payment of all Contractor's obligations under the Contract Documents. These bonds shall remain in effect for the duration of the Warranty Period (as specified in the Special Conditions). Contractor shall also furnish other bonds that may be required by the Special Conditions. All bonds shall be in the forms prescribed by the Contract Documents and be executed by such sureties as (1) are licensed to conduct business in the State of Colorado and (2) are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff, Bureau of Accounts, U.S. Treasury Department. All bonds singed by an agent must be accompanied by a certified copy of the Authority Act. If the surety on any bond furnished by the Contractor is declared bankrupt, or becomes insolvent, or its rights to do business in Colorado are terminated, or it ceases to meet the requirements of clauses (1) and (2) of this section, Contractor shall within five (5) days thereafter substitute another bond and surety, both of which shall be acceptable to the City.

2.24. Retention: The Owner will deduct money from the partial payments in amounts considered necessary to protect the interest of the Owner and will retain this money until after completion of the entire contract. The amount to be retained from partial payments will be five (5) percent of the value of the completed work, and not greater than five (5) percent of the amount of the Contract. When the retainage has reached five (5) percent of the amount of the Contract no further retainage will be made and this amount will be retained until such time as final payment is made.

2.25. Liquidated Damages for Failure to Enter Into Contract: Should the Successful Bidder fail or refuse to enter into the Contract within ten Calendar Days from the issuance of the Notice of Award, the City shall be entitled to collect the amount of such Bidder's Bid Guaranty as Liquidated Damages, not as a penalty but in consideration of the mutual release by the City and the Successful Bidder of all claims arising from the City's issuance of the Notice of Award and the Successful Bidder's failure to enter into the

Contract and the costs to award the Contract to any other Bidder, to readvertise, or otherwise dispose of the Work as the City may determine best serves its interest.

2.26. Liquidated Damages for Failure to Meet Project Completion Schedule: If the Contractor does not achieve Final Completion by the required date, whether by neglect, refusal or any other reason, the parties agree and stipulate that the Contractor shall pay liquidated damages to the City for each such day that final completion is late. As provided elsewhere, this provision does not apply for delays caused by the City. The date for Final Completion may be extended in writing by the Owner.

The Contractor agrees that as a part of the consideration for the City's awarding of this Contract liquidated damages in the daily amount of **$2,000.00** is reasonable and necessary to pay for the actual damages resulting from such delay. The parties agree that the real costs and injury to the City for such delay include hard to quantify items such as: additional engineering, inspection and oversight by the City and its agents; additional contract administration; inability to apply the efforts of those employees to the other work of the City; perceived inefficiency of the City; citizens having to deal with the construction and the Work, rather than having the benefit of a completed Work, on time; inconvenience to the public; loss of reputation and community standing for the City during times when such things are very important and very difficult to maintain.

The Contractor must complete the Work and achieve final completion included under the Bid Schedule in the number of consecutive calendar days after the City gives is written Notice to Proceed. When the Contractor considers the entire Work ready for its intended use, Contractor shall certify in writing that the Work is fully complete. Final Completion date is the date by which the Contractor shall have fully completed all clean-up, and all items that were identified by the City in the inspection for final completion. Unless otherwise stated in the Special Conditions, for purposes of this liquidated damages clause, the Work shall not be finished and the Contract time shall continue to accrue until the City gives its written Final Acceptance.

If the Contractor shall fail to pay said liquidated damages promptly upon demand thereof after having failed to achieve Final Completion on time, the City shall first look to any retainage or other funds from which to pay said liquidated damages; if retainage or other liquid funds are not available to pay said liquidated damages amounts, the Surety on the Contractor's Performance Bond and Payment Bond shall pay such liquidated damages. In addition, the City may withhold all, or any part of, such liquidated damages from any payment otherwise due the Contractor.
Liquidated damages as provided do not include any sums to reimburse the City for extra costs which the City may become obligated to pay on other contracts which were delayed or extended because of the Contractor's failure to complete the Work within the Contract Time. Should the City incur additional costs because of delays or extensions to other contracts resulting from the Contractor's failure of timely performance, the Contractor agrees to pay these costs that the City incurs because of the Contractor's delay, and these payments are separate from and in addition to any liquidated damages.

The Contractor agrees that the City may use its own forces or hire other parties to obtain Final Completion of the work if the time of completion has elapsed and the Contractor is

not diligently pursuing completion. In addition to the Liquidated Damages provided for, the Contractor agrees to reimburse the City for all expenses thus incurred.

2.27. Contingency/Force Account: Contingency/Force Account work will be authorized by the Owner's Project Manager and is defined as minor expenses to cover miscellaneous or unforeseen expenses related to the project. The expenses are not included in the Drawings, Specifications, or Scope of Work and are necessary to accomplish the scope of this contract. Contingency/Force Account Authorization will be directed by the Owner through an approved form. Contingency/Force Account funds are the property of the Owner and any Contingency/Force Account funds, not required for project completion, shall remain the property of the Owner. Contractor is not entitled to any Contingency/Force Account funds, that are not authorized by Owner or Owner's Project Manager.

2.28. 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 work, or in consequence of the non-execution thereof by the Contractor, he shall restore, at his 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.

2.29. Changes in the Work: The Owner, without invalidating the contract, may order changes in the work within the general scope of the contract consisting of additions, deletions or other revisions, the contract sum and the contract time being adjusted accordingly. All such changes in the work shall be authorized by Change Order and shall be executed under the applicable conditions of the contract documents. A Change Order is a written order to the Contractor signed by the Owner issued after the execution of the contract, authorizing a change in the work or an adjustment in the contract sum or the contract time. The contract sum and the contract time may be changed only by Change Order.

2.30. Claims for Additional Cost or Time: If the Contractor wishes to make a claim for an increase in the contract sum or an extension in the contract time, he shall give the Owner written notice thereof within a reasonable time after the occurrence of the event giving rise to such claim. This notice shall be given by the Contractor before proceeding to execute the work, except in an emergency endangering life or property in which case the Contractor shall precede in accordance with the regulations on safety. No such claim shall be valid unless so made. Any change in the contract sum or contract time resulting from such claim shall be authorized by Change Order.

2.31. Minor Changes in the Work: The Owner shall have authority to order minor changes in the work 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.

2.32. Field Orders: The Owner may issue written Field Orders which interpret the Contract Documents in accordance with the specifications, or which order minor changes in the work in accordance with the agreement, without change in the contract sum or time. The Contractor shall carry out such Field Orders promptly.

2.33. Uncovering & Correction of Work: The Contractor shall promptly correct all work rejected by the Owner as defective or as failing to conform to the contract documents whether observed before or after substantial completion and whether or not fabricated installed or competed. The Contractor shall bear all costs of correcting such rejected work, including the cost of the Owner's additional services thereby made necessary. If within one (1) year after the date of completion or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the contract documents, any of the work found to be defective or not in accordance with the contract documents, the Contractor shall correct it promptly after receipt of a written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discover of condition. All such defective or non-conforming work under the above paragraphs shall be removed from the site where necessary and the work shall be corrected to comply with the contract documents without cost to the Owner. The Contractor shall bear the cost of making good all work of separate Contractors destroyed or damaged by such removal or correction. If the Owner prefers to accept defective or non-conforming work, he may do so instead of requiring its removal and correction, in which case a Change Order will be issued to reflect an appropriate reduction in the payment or contract sum, or, if the amount is determined after final payment, it shall be paid by the Contractor.

2.34. 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.

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

2.36. Compliance with Laws: Bids 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.

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

2.38. Conflict of Interest: No public official and/or City/County employee shall have interest in any contract resulting from this IFB.

2.39. 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.

2.40. Employment Discrimination: During the performance of any services per agreement with the Owner, the Contractor, by submitting a Bid, agrees to the following conditions:

3.40.1 The Contractor shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, age, handicap, or national origin except when such condition is a legitimate occupational qualification reasonably necessary for the normal operations of the Contractor. The Contractor agrees to post in conspicuous places, visible to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

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

3.40.3 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.

2.41. Affirmative Action: In executing a Contract with the City, the Contractor agrees to comply with Affirmative Action and Equal Employment Opportunity regulations presented in the General Contract Conditions.

2.42. 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 workers 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).

2.43. Ethics: The Contractor 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.

2.44. Failure to Deliver: In the event of failure of the Contractor 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 Contractor 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.

2.45. 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.

2.46. Force Majeure: The Contractor 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 Contractor, unless otherwise specified in the contract.

2.47. Independent Contractor: The Contractor shall be legally considered an Independent Contractor and neither the Contractor 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 Contractor, its servants, or agents. The Owner shall not withhold from the contract payments to the Contractor any federal or state unemployment taxes, federal or state income taxes, Social Security Tax or any other amounts for benefits to the Contractor. Further, the Owner shall not provide to the Contractor any insurance coverage or other benefits, including Workers' Compensation, normally provided by the Owner for its employees.

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

Items for non-responsiveness may include, but not be limited to:

3.48.1 Submission of the Bid on forms other than those supplied by the City;

3.48.2 Alteration, interlineation, erasure, or partial detachment of any part of the forms which are supplied herein;

3.48.3 Inclusion of unauthorized additions conditional or alternate Bids or irregularities of any kind which may tend to make the Bid incomplete, indefinite, or ambiguous as to its meaning;

3.48.4 Failure to acknowledge receipt of any or all issued Addenda;

3.48.5 Failure to provide a unit price or a lump sum price, as appropriate, for each pay item listed except in the case of authorized alternative pay items;

3.48.6 Failure to list the names of Subcontractors used in the Bid preparation as may be required in the Solicitation Documents;

3.48.7 Submission of a Bid that, in the opinion of the Owner, is unbalanced so that each item does not reasonably carry its own proportion of cost or which contains inadequate or unreasonable prices for any item;

3.48.8 Tying of the Bid with any other bid or contract; and

3.48.9 Failure to calculate Bid prices as described herein.

2.49. Evaluation of Bids and Offerors: The Owner reserves the right to:

- reject any and all Bids,
- waive any and all informalities,
- take into account any prompt payment discounts offered by Bidder,
- negotiate final terms with the Successful Bidder,
- take into consideration past performance of previous awards/contracts with the Owner of any Contractor, Vendor, Firm, Supplier, or Service Provider in determining final award; and
- disregard any and all nonconforming, nonresponsive or conditional Bids.

Discrepancies between words and figures will be resolved in favor of words. Discrepancies between Unit Prices and Extended Prices will be resolved in favor of the Unit Prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. The corrected extensions and totals will be shown in the tabulation of Bids.

The Owner may consider the qualifications and experience of Subcontractors and other persons and organizations (including those who are to furnish the principal items of material or equipment) proposed for those portions of the work as to which the identity of Subcontractors and other persons and organizations must be submitted. Operating costs, maintenance considerations performance data, and guarantees of materials and equipment may also be considered by the Owner.

The Owner will conduct such investigations as deemed necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of the Offeror, proposed Subcontractors and other persons and organizations to do the Work in accordance with the *Contract Documents* to the City's satisfaction within the Contract Time.

The Offeror shall furnish the Owner all information and data requested by the Owner to determine the ability of the Offeror to perform the Work. The Owner reserves the right to reject the Bid if the evidence submitted by, or investigation of such Offeror fails to satisfy the Owner that such Offeror is properly qualified to carry out the obligations of the Contract and to complete the Work contemplated therein.

By submitting a Bid, each Offeror authorizes the Owner to perform such investigation of the Offeror as the Owner deems necessary to establish the responsibility, qualifications and financial ability of the Offeror and, by its signature thereon, authorizes the Owner to obtain reference information concerning the Offeror and releases the party providing such information and the Owner from any and all liability to the Offeror as a result of such reference information so provided.

The Owner reserves the right to reject the Bid of any Offeror who does not pass any evaluation to the Owner’s satisfaction.

If the Contract is to be awarded, it will be awarded to the Offeror who, by evaluation, the Owner determines will best meet the Owner's interests.

The Owner reserves the right to accept or reject the Work contained in any of the Price Bid Schedules or alternates, either in whole or in part.

2.50. Award of Contract: Unless otherwise indicated, a single award will be made for all the bid items in an individual bid schedule. In the event that the Work is contained in more than one Bid Schedule, the City may award Schedules individually or in combination. In the case of two Bid Schedules which are alternative to each other, only one of such alternative Schedules will be awarded. Within forty-five (45) Calendar Days of Bid Opening, the City will issue a Notice of Award to the Successful Bidder which will be accompanied by four (4) unsigned copies of the Contract and the Performance and Payment Bond forms. Within ten (10) Calendar Days thereafter, the Successful Bidder shall sign and deliver four (4) copies of the Contract, Performance Bond, Payment Bond and Certificates of Insurance to the City. Within ten (10) Calendar Days thereafter, the City will deliver two (2) fully executed counterparts of the Contract to the Contractor. No contract shall exist between the Successful Bidder and the City and the Successful Bidder shall have no rights at law or in equity until the Contract has been duly executed by the City.

The Successful Bidder's failure to sign and submit a Contract and other documents set forth in this Paragraph within the prescribed time shall be just cause of annulment of the award, and forfeiture of the Bid Guaranty. The award of Contract may then be made to the next qualified Bidder in the same manner as previously prescribed.

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

2.52. 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.

2.53. Patents/Copyrights: The Contractor 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 Contractor 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 IFB.

2.54. Remedies: The Contractor and Owner agree that both parties have all rights, duties, and remedies available as stated in the Uniform Commercial Code.

2.55. Venue: Any agreement as a result of responding to this IFB 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.

2.56. Expenses: Expenses incurred in preparation, submission and presentation of this IFB are the responsibility of the company and cannot be charged to the Owner.

2.57. 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.

2.58. Non-Appropriation of Funds: The contractual obligation of the Owner under this contract is contingent upon the availability of appropriated funds from this fiscal year budget as approved by the City Council or Board of County Commissioners from this fiscal year only. State of Colorado Statutes prohibit obligation of public funds beyond the fiscal year for which the budget was approved. Anticipated expenditures/obligations beyond the end of the current Owner's fiscal year budget shall be subject to budget approval. Any contract will be subject to and must contain a governmental non-appropriation of funds clause.

2.59. Cooperative Purchasing: Purchases as a result of this solicitation are primarily for the City/County. 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 Bid. The quantities furnished in this bid document are for only the City/County. It does not include quantities for any other jurisdiction. The City or County will be responsible only for the award for its 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 City/County 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.

2.60. Keep Jobs in Colorado Act: Contractor shall be responsible for ensuring compliance with Article 17 of Title 8, Colorado Revised Statutes requiring 80% Colorado labor to be employed on public works. Contractor shall, upon reasonable notice provided by the Owner, permit the Owner to inspect documentation of identification and residency required by C.R.S. §8-17-101(2)(a). If Contractor claims it is entitled to a waiver pursuant to C.R.S. §8-17-101(1), Contractor shall state that there is insufficient Colorado labor to perform the work such that compliance with Article 17 would create an undue burden that would substantially prevent a project from proceeding to completion, and shall include evidence demonstrating the insufficiency and undue burden in its response.

Unless expressly granted a waiver by the Owner pursuant to C.R.S. §8-17-101(1), Contractor shall be responsible for ensuring compliance with Article 17 of Title 8, Colorado Revised Statutes requiring 80% Colorado labor to be employed on public works. Contractor shall, upon reasonable notice provided by the Owner, permit the Owner to inspect documentation of identification and residency required by C.R.S. §8-17-101(2)(a).

3.60.1 "Public project" is defined as:

(a) any construction, alteration, repair, demolition, or improvement of any land, building, structure, facility, road, highway, bridge, or other public improvement suitable for and intended for use in the promotion of the public health, welfare, or safety and any maintenance programs for the upkeep of such projects

(b) for which appropriate or expenditure of moneys may be reasonably expected to be $500,000.00 or more in the aggregate for any fiscal year
(c) except any project that receives federal moneys.

3. Statement of Work

3.1. GENERAL: The City of Grand Junction is soliciting competitive bids from qualified and interested companies for all labor, equipment, and materials required to perform earthwork, concrete, asphalt, utility installation and all other work associated with the Riverfront at Dos Rios Phase 2 Project. All dimensions and scope of work should be verified by Contractors prior to submission of bids.

***Site electrical plan set, specifications and updated bid schedule will be issued in a later Addendum. This work shall include, but may not be limited to: approximately 176 pedestrian and 15 street light poles and bases, vendor power supply, park holiday lighting supply and all appurtenances associated to complete said work. The plan set shall also include joint trench detail consisting of Xcel, Century Link, Charter and City Fiber Conduit mainline and laterals, pull boxes and appurtenances**.

Total length for the joint trenching is an approximation, and is so noted within the Bid Schedule. The final length shall be revised up or down, and will be reflected within a later Addendum.

***Landscaping and Irrigation Plan set will be issued in a later Addendum.**

***Final construction plans for approximately 900 lineal feet of bank stabilization along the Colorado River will be issued in a later Addendum. Construction for bank stabilization will not be allowed until after September 1st as part of CPW construction restrictions during migratory fish spawning and bird nesting seasons.**

***Final construction plans for Dos Rios Park shelters and restroom structure, to be issued in a later Addendum.**

NOTE: The descriptions of the pay items listed in the Price Bid Schedule for this Project may not agree with those listed in the Standard Specifications. Payment for all Work performed, as required in the Contract Documents, will be in accordance with the items and units listed in the Price Bid Schedule.

The performance of the Work for this Project shall conform to the General Contract conditions presented in the City of Grand Junction's Standard Contract Documents for Capital Improvements Construction, revised July 2010, except as specifically modified or supplemented herein or on the Construction Drawings.

3.2. PROJECT DESCRIPTION: (Refer to Plan Sets)

3.3. SPECIAL CONDITIONS & PROVISIONS:

3.3.1 Mandatory Pre-Bid Meeting: **Prospective bidders are required to attend one of two, mandatory pre-bid meetings being offered for this solicitation process.** Meeting location shall be in the City Hall Auditorium, located at 250 N. 5th Street, Grand Junction, CO. The purpose of this visit will be to inspect and to clarify the contents of this Invitation for Bids (IFB).

Two pre-bid meetings will be offered to all Contractors interested in this project. Attending at least one **(and only one)** of these meetings is required by all Primary/General Contractors intending to submit a response to this IFB. Due to the limited number of seating available at this time, all attendees must pre-register with the purchasing agent assigned, and receive a conformation e-mail acknowledging their reservation. Since pre-bid meeting attendance is only required for the Primary/General Contractors, they shall be given preference over Sub-Contractors and Suppliers for pre-bid meeting pre-registration and attendance. We also request that no more than one representative from each company attend the pre-bid meeting.

Please contact Duane Hoff Jr., Senior Buyer at 970-244-1545 or via e-mail at duaneh@gjcity.org

We ask that all attendees practice social distancing guidelines, and wear masks, if possible.

-The 1st pre-bid meeting shall be held at the City of Grand Junction City Hall Auditorium located at 250, N. 5th Street, Grand Junction, CO on June 8, 2020 at 1:00pm.

OR

-The 2nd pre-bid meeting shall be held at the City of Grand Junction City Hall Auditorium located at 250, N. 5th Street, Grand Junction, CO on June 8, 2020 at 2:00pm

3.3.2 QUESTIONS REGUARDING SOLICIATION PROCESS/SCOPE OF WORK:
Duane Hoff Jr., Senior Buyer
City of Grand Junction
duaneh@gjcity.org

3.3.3 Project Manager: The Project Manager for the Project is Brendan Hines, Project Engineer who can be reached at (970)256-4038. During Construction, all notices, letters, submittals, and other communications directed to the City shall be addressed and mailed or delivered to:

City of Grand Junction
Department of Public Works and Planning
Attn: Brendan Hines, Project Manager
250 North Fifth Street
Grand Junction, CO 81501

3.3.4 Affirmative Action: The Contractor is not required to submit a written Affirmative

Action Program for the Project.

3.3.5 Pricing: Pricing shall be all inclusive to include but not be limited to: all labor, equipment, supplies, materials, freight (F.O.B. Destination – Freight Pre-paid and Allowed to each site), travel, mobilization costs, fuel, set-up and take down costs, and full-time inspection costs, and all other costs related to the successful completion of the project.

The Owner shall not pay nor be liable for any other additional costs including but not limited to: taxes, shipping charges, insurance, interest, penalties, termination payments, attorney fees, liquidated damages, etc.

3.3.6 Freight/Shipping: All freight/shipping shall be F.O.B. Destination – Freight Pre-Paid and Allowed to the project site(s), Grand Junction, CO.

Contractor must meet all federal, state, and local rules, regulations, and requirements for providing such services.

3.3.7 References: A minimum of five (5) **references** with name, address, telephone number, and email address that can attest to your experience in projects of similar scope and size.

3.3.8 Contract: A binding contract shall consist of: (1) the IFB and any amendments thereto, (2) the bidder's response (bid) to the IFB, (3) clarification of the bid, if any, and (4) the City's Purchasing Department's acceptance of the bid by "Notice of Award" or by "Purchase Order". All Exhibits and Attachments included In the IFB shall be incorporated into the contract by reference.

A. The contract expresses the complete agreement of the parties and, performance shall be governed solely by the specifications and requirements contained therein.

B. Any change to the contract, whether by modification and/or supplementation, must be accomplished by a formal contract amendment signed and approved by and between the duly authorized representative of the bidder and the City Purchasing Division or by a modified Purchase Order prior to the effective date of such modification. The bidder expressly and explicitly understands and agrees that no other method and/or no other document, including acts and oral communications by or from any person, shall be used or construed as an amendment or modification to the contract.

3.3.9 Time of Completion: The scheduled time of Completion for the Project is 305 Calendar Days from the starting date specified in the Notice to Proceed.

Completion is achieved when site cleanup and all punch list items (resulting from the final inspection) have been completed. Completion shall have the meaning set forth in Article I, Section 3 (Definitions and Terms) of the General Contract Conditions.

3.3.10 Working Days and Hours: The working days and hours shall be as stated in the General Contract Conditions or as mutually agreed upon in the preconstruction meeting with the following exception:

All work shall be performed between the hours of 7:00 AM to 5:00 PM.

3.3.11 Licenses and Permits: Contractor is responsible for obtaining all necessary licenses and permits required for Construction, at Contractors expense. See Section 2.12. Contractor shall supply to Owner all copies of finalized permits.

3.3.12 Permits: The following permits are required for the Project and will be obtained by the City at no cost to the Contractor:

- CDPHE Construction Storm Water Permit

The following permits are required for the Project and will be obtained by the City at no cost to the Contractor:

- Mesa County Storm Water Permit.

3.3.13 City Furnished Materials: The City will furnish the following materials for the Project:

- Door-hangers

3.3.14 Project Newsletters: A newsletter for the Project will be prepared and distributed by the City. It will include general information about the Project including interruptions in utility services, street closures, parking restrictions, project schedule, and the names and telephone numbers of the contacts for the City and Contractor. The newsletter will be mailed approximately one week before the Contractor commences work.

The Contractor will be responsible for notifying all businesses and / or residents located adjacent to the work. Door hanger notifications shall be distributed at least two (2) working days prior to the day the work is scheduled to begin.

3.3.15 Project Sign: Project signs, if any, will be furnished and installed by the City.

3.3.16 Authorized Representatives of the City: Those authorized to represent the City shall include Purchasing Agent, Engineers, and Inspectors employed by the City, only.

3.3.17 Stockpiling Materials and Equipment: All stockpiling/storage shall be in accordance with General Contract Condition Section 51.

3.3.18 Traffic Control: The Contractor shall provide and maintain traffic control in accordance with the approved Traffic Control Plan and the Manual on Uniform Traffic Control Devices. A Traffic Control Plan shall be prepared by the Contractor and reviewed by the City two days prior to the pre-construction meeting.

3.3.19 Temporary Parking to Bicycle Playground: After construction activities conclude each day at 5pm, as well as during weekend days, the Contractor shall open access to 2601 Dos Rios Drive, with access from Dos Rios Drive, off of Riverside Parkway. This property shall be used as temporary public parking for those using the bicycle playground. Material stockpiling shall not be placed within 2601 Dos Rios Drive. The Contractor shall provide materials for vehicles to drive over the existing mountable curb within Dos Rios Drive, and provide space within the lot for approximately 20 vehicles to park. The Contractor must incorporate this access into their **traffic control plans**, as well as the installation of temporary signage for 2601 Dos Rios

Drive to be used for bicycle playground parking, which shall be reflected on the Riverfront Trail Detour Plans. Upon completion of the Riverfront Trail improvements, the Contractor shall coordinate with the Project Engineer about removing the temporary parking within 2601 Dos Rios Drive.

3.3.20 Riverfront Trail: The Contractor shall provide detour signage to route all southbound Riverfront Trail traffic to the Riverside Parkway sidewalk, by way of Fairview Avenue, prior to approaching Hale Avenue. The Contractor shall detour all northbound Riverfront Trail traffic to the Riverside Parkway sidewalk by way of the Highway 50/Riverside Parkway off ramp. The Contractor must provide an approved detour plan for all Riverfront Trail traffic as part of their submittal list items. Contractor must coordinate with the City prior to commencement of work.

3.3.21 Clean-Up: The Contractor is responsible for cleaning up all loose materials that have been deposited or swept into gutters, and onto sidewalks and driveways as a result of sidewalk operations. The costs for all clean-up work shall be considered incidental and will not be paid for separately.

3.3.22 Quality Control Testing: Supplier shall perform Quality Control (QC) testing on the Asphalt. The Contractor shall provide QC throughout the Contract, with the use of their own QC Technicians or the use of a certified laboratory. In accordance with Section 401.06.3 of the City of Grand Junction Standard Specifications for Road and Bridge Construction, results of all QC tests shall be submitted to the Project Engineer and the City's Quality Assurance (QA) Technician within 4 hours of the time of sampling. Failure to do so may require that paving be suspended until all sampling results have been received, reviewed, and approved. The Contractor shall supply QC Lab personnel for night work for comparison of test data. If lab personnel are not supplied, paving operations will be suspended until one is available. QC Field personnel shall remain on site during the duration of the paving operation or until in-place density are met.

The Contractor/Supplier shall perform QC testing on all concrete. The City will perform QA testing for concrete.

The Contractor, at their own discretion, may elect to forgo the soils QC field testing (in-place soils density) for placement of Embankment and Aggregate Base Course. QA testing for these items will be performed by the City, and laboratory results for submittal purposes will be provided by the contractor. However, if a sufficient number of failed test results are observed by the City and/or it's QA testing representatives, written notification will be provided to the contractor, and back payment to the City for failed location re-tests will be required.

3.3.23 Discrepancy between Bid Schedule and Construction Notes: In the event of a discrepancy between a Pay Item description in the Bid Schedule and the description for the same Pay Item in the drawings/construction notes; the language in the Bid Schedule shall govern or supersede that found elsewhere.

3.3.24 Schedule of Submittals: Contractor shall deliver these submittals at least two days prior to the pre-construction meeting:

- Traffic Control Plans

- Riverfront Trail Detour Plans
- Project Schedule

3.3.25 Uranium Mill Tailings: Radioactive mill tailings are not anticipated to be encountered on this Project. However, if encountered the Contractor shall adhere to the Uranium Mill Tailings Management Plan throughout all phases of construction, supplied in Appendix D.

3.3.26 Fugitive Petroleum or Other Contamination: It is anticipated that soil contamination from fugitive petroleum or other contaminants will not be encountered with the Project.

3.3.27 Excess Material: All excess materials shall be disposed in accordance with General Contract Condition Section 50. All asphalt millings shall be delivered to the City Storage Yard located adjacent to the City Cemetery at 2620 Legacy Way, and become the property of the City of Grand Junction.

3.3.28 Existing Utilities and Structures: Utilities were **not** potholed during design of this project. The location of existing utilities and structures shown on the Plans is approximate with the information gathered during design. It is the responsibility of the Contractor to pothole/locate and protect all structures and utilities in accordance with General Contract Condition Section 37.

The site currently has several CDPHE monitoring wells located throughout the proposed development for the purposes of monitoring VOCs and SVOCs. The Contractor must coordinate with the City prior to removing them. Current location of well is provided in Appendix F.

3.3.29 Incidental Items: Any item of work not specifically identified or paid for directly, but which is necessary for the satisfactory completion of any paid items of work, will be considered as incidental to those items, and will be included in the cost of those items.

3.3.30 Survey: The Contractor shall give the City survey crew a minimum of 72 hours' notice for all requested survey.

The cost of any survey necessary for the completion of the project will be considered incidental to the work and will not be paid for separately.

3.3.31 Work to be Performed by the City (Prior to Construction Work for each site listed below):

3.3.31.1 Easement acquisition from 636 Lawrence Avenue: The City is in the process of acquiring the necessary right-of-way and easement from 636 Lawrence Avenue for the project. The City does not anticipate completion of this acquisition until November 25, 2020. Contractor shall plan accordingly.

3.3.31.2 Environmental No Action Determination (N.A.D.): The City is currently coordinating with the Colorado Department of Public Health and Environment (CDPHE), for the No Further Action Determination (NAD), after minimal site cleanup within several newly acquired properties (603

Lawrence Ave, as well as 201, 205, 211 & 219 Hale Avenue). The City does not anticipate acceptance of the (NAD) by the State until the week of July 6th, 2020. The Contractor shall plan the phasing of their improvements around these properties accordingly.

3.3.31.3 201 Lila Avenue: The City anticipates that 201 Lila will not be available to include within the overall development until November 25, 2020. The Contractor shall plan accordingly to work around the property until it becomes available.

3.3.31.4 Demolition of Existing Building at 211 Hale Ave.: It is proposed to demolish the existing building and any appurtenances currently residing at 211 Hale Avenue. The City anticipates the existing structure(s) will be demolished and removed by August 1st, prior to the beginning of construction.

3.3.32 Existing Concrete Sidewalks, Pans, Fillets, Curbs and Gutters: The existing sidewalks, pans, fillets, curb and gutter are in good serviceable condition. In most instances the installation of new sidewalk and pavement will be adjacent to existing concrete. The Contractor will need to protect all concrete adjacent to construction. If the concrete is damaged during construction the Contractor will be responsible for its replacement at no cost to the City. The Contractor, the City Project Inspector, and/or the City Project Manager will walk and record any concrete that is deemed to be damaged before construction has started.

3.3.33 ACI Concrete and Flatwork Finisher and Technician: Hand finishing concrete will be permitted only when performed under the direct supervision of a craftsman holding the following certificate: ACI Concrete Flatwork Finisher and Technician (ACICFFT) or other Flatwork Finisher certification program approved by the City Public Works Director.

3.3.34 Payment for Hot Mix Asphalt: Section 401.07.1 of the City of Grand Junction Standard Specifications for Road and Bridge Construction will be used to determine Pay Factors for calculating the basis of payment for Hot Bituminous Pavement with the following modifications:

The pay factor (PF) should be calculated for mat density (excluding joint density), air voids, and VMA daily. An average daily pay factor (DPF) should then be calculated/weighted in the following proportion:

- Mat Density (excluding joint density) – 50%
- Air Voids – 25%
- VMA – 25%

The incentive payment will then be based on a weighted average project pay factor (PPF). The PPF shall be calculated/weighted per the DPFs and accepted quantities placed for each day's production of each pay item. This PPF will then be applied to the total accepted quantities for each pay item, as applicable.

3.3.35 **Materials:** In the event that excavation of the manholes grade rings are disturbed or removed and replaced due to damage the contractor is instructed to follow these guidelines:

The annular area beneath the bottom of the uppermost grade ring shall either be filled with a self-consolidating material, i.e. ¾" screened rock or engineer approved equal or shall be completely filled with Quikrete's Rapid Road Repair or Engineer approved equal. No other means will be considered.

3.3.36 Work by others / Coordination:

3.3.36.1 Xcel Energy/Gas, Charter, and Century Link: Xcel Energy/Gas and Charter shall provide and place conduit, and install utilities within the Joint Trench. The trench shall be excavated by the Contractor per plans and specifications.

Along with said work, the Contractor shall also be responsible for providing and installing conduit in the trench for Century Link. Coordination with Xcel, Charter and Century Link shall be the responsibility of the Contractor. The Contractor shall be responsible for bedding, haunching and backfill of the trench. See Special Provisions 8 (SP – 7) for more information.

City Traffic Department to supply and install street/stop signs and double yellow striping.

3.3.36.2 Xcel Energy: Xcel Energy shall be removing the existing 230KV transmission towers, currently located throughout the proposed development, and shall be installing new transmission towers within the proposed median of Hale Avenue, and extending across Riverside Parkway. Materials will be delivered in mid-July, with construction beginning in mid-September. Delivered materials shall be stored within 2600 Riverside PKWY, which is the property located on the east side of Riverside Parkway, directly across from the Dos Rios site. The Contractor shall coordinate construction phasing with Xcel Energy to avoid overlapping construction activities within Hale Avenue. The Contractor shall coordinate with Xcel Energy for the undergrounding of the existing under-hung service line(s), currently installed on the transmission towers prior to the existing transmission towers being removed.

3.3.36.3 535 Hale Avenue: Construction for the private development, owned by Buena Vida, LLC is tentatively scheduled to begin in April of 2021. However, construction may be underway by the time construction for the overall Dos Rios site begins. The contractor shall coordinate with Buena Vida, LLC to ensure access to 535 Hale is maintained throughout construction.

3.4. SCOPE OF WORK:

STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION:

The ***City of Grand Junction Standard Specifications for Road and Bridge Construction*** are hereby modified or supplemented for this Project by the following modifications to ***The Standard Specifications for Road and Bridge Construction***, State Department of Highways, Division of Highways, State of Colorado:

SP-1 SECTION 103 – REMOVALS, EXCAVATION, BACKFILL AND RESTORATION:

Add the following:

103.4 Bracing and Sheeting of Trenches

Add the following:

Trench wall support will be required when installing all new pipeline included in this project. The Contractor shall provide trench boxes, sheet piles and bracing, or other approved method of supporting trench walls that will limit the top width of any trench to a maximum of six (6) feet. Payment for trench bracing by the Contractors chosen method shall be included in the lineal foot pipe price for all pipe installed in this contract. Bracing required for manhole installation shall be included in the price of the manhole.

103.10 Cutoff Walls.

Add the following:

The cost of installing cutoff walls shall be incidental to the cost of pipe installation.

103.16 Earth Backfill Material (Imported Trench Backfill).

Add the following:

Material excavated on site shall not be used in the trench backfill if determined to be unsuitable by the Engineer or his representative. The excavated material shall ***NOT*** be hauled off, rather stockpiled on site in designated location approved by the Project Engineer. Imported Trench Backfill shall be pitrun or other approved material meeting the requirements of Section 103.16. During placement of imported backfill over the initial backfill material (Type A) that extends to 6 inches above the top of the pipe, the Contractor shall not place any rocks over 4 inches in diameter within the first 12 inches above the initial backfill material to protect the pipe from damage.

SP-2 SECTION 202- REMOVAL OF STRUCTURES AND OBSTRUCTIONS:

Section 202 of the Standard Specifications for Road and Bridge Construction is hereby revised for this Project as follows:

Subsection 202.07, shall include the following:

Excess Material. Excavated material generated on site shall remain on site and is to be stockpiled in designated area(s). Materials may only leave the site when directed by the City of Grand Junction. Prior from being removed from the site,

materials must first undergo testing for radioactivity. Any/all materials over or under radioactivity limits that are directed to be removed from the site shall be delivered to a licensed disposal facility or to the interim storage facility to be defined by the City of Grand Junction and as described in the Uranium Mill Tailings Management Plan (UMTMP) provided in Appendix B. A log of these actions must be kept.

The current Uranium Mill Tailings Management Plan shall be adhered to during all construction activities. The most current version can be found at the State of Colorado's website https://www.colorado.gov/pacific/sites/default/files/HM_umilltail-mgt-plan.pdf. All contractors and trades working on this project shall become familiar with this and related documents.

SP-3 SECTION 203 – EXCAVATION AND EMBANKMENT

Section 203 of the Standard Specifications is hereby revised for this project as follows:

Subsections 203.1 General, shall include the following:

Excavated material generated during construction phases such as, but not limited to roadway construction, utility installation, and any other work that is deemed suitable for embankment shall be placed per plan at building foot print(s) and identified fill areas. Stockpiled material on site shall be included as part of said work. Material shall be screened onsite as necessary to ensure a maximum partial dimension no greater than 8" and all embankment material be free of trash and organic materials. Aggregate generated from screening processes from said work shall be stockpiled.

The material that classify as cohesive materials per ASTM shall be placed in maximum 9-Inch loose lifts, moisture conditioned, and compacted at a minimum of 95% of the standard Proctor maximum dry density, within +/-2% of optimum moisture content as determined by ASTM D-698 or 95% of the modified Proctor ASTM D-1557 for materials that classify non-cohesive.

203.14 Basis of Payment.

Add the following:

Payment for work shall be made under Excavation and Embankment and will be measured by cubic yard of placed and compacted material per plan. Unsuitable material generated from utility construction will not be measured or paid for separately and shall be stockpiled on site in designated area. Material placed and compacted is be quantified by survey following completion of work.

Pay Item	**Pay Unit**
Excavation and Embankment	CY

SP-4 SECTION 601 – STRUCTURAL CONCRETE

Section 601 of the Standard Specifications is hereby revised for this project as follows:

Subsection 601.02, Classification:

CONCRETE SHALL MEET THE FOLLOWING REQUIREMENTS:

- 4,500 PSI Compressive at 28 Days
- 6% air ±1.5%
- Slump 4", Loads exceeding 4 ½" shall be rejected
- Maximum Water Cement Ratio no greater than 0.45.

Subsection 601.06, Batching:

This CDOT Specification has been added to this Project:

The Contractor shall furnish a batch ticket (delivery ticket) with each load for all concrete. Concrete delivered without a batch ticket containing complete information as specified shall be rejected. The Contractor shall collect and complete the batch ticket at the placement site and deliver all batch tickets to the Engineer or his representative at the end of each day. The Engineer or his representative shall have access to the batch tickets at any time during the placement. The following information shall be provided on each ticket:

1. Suppliers name and date
2. Truck number
3. Project name and location
4. Concrete class and designation number
5. Cubic yards batched
6. Type brand and amount of each admixture
7. Type, brand, and amount of cement and fly ash
8. Weights of fine and course aggregates
9. Moisture of fine and course aggregates
10. Gallons of batch water

The contractor shall add the following information to the batch ticket at time of placement:

1. Gallons of water added by the truck operator.
2. Number of revolutions of the drum for mixing
3. Discharge time

SP-5 SECTION 608 – CURBS, GUTTERS, SIDEWALKS, AND TRAILS

Section 608 of the Standard Specifications is hereby revised for this project as follows:

Subsections 608.06, Basis of Payment shall include the following:

The Contract Unit Price for the various concrete items shall be full compensation for all equipment, labor, materials, and incidentals required for the complete installation. Incidental items include excavation, subgrade compaction, cutting and removal of asphalt and concrete in areas where new concrete will be installed; disposal of

excavated and removed materials; furnishing, placement and compaction of Aggregate Base Course; forming, furnishing and placement, finishing, curing and protection of the concrete; reinforcing steel, jointing (tool or saw cut) and joint filler.

Concrete walk greater than 8' in width shall be saw cut longitudinally at w/2.

SP-7 SECTION 613 – CONDUIT

ELECTRICAL CONDUIT AND PULL BOXES

Section 613 of the Colorado Department of Transportation Standard Specifications is hereby revised for this project as follows:

MATERIALS

Subsection 613.02 shall include the following:

All materials furnished, assembled, fabricated, or installed under this item shall be new, corrosion resistant and in strict accordance with the Plans and these Special Provisions.

CONDUIT

Conduit shall be Schedule 80 OR C-900, as called out for in the Plans, with a nominal diameter of 2" and 6". The conduit shall be constructed out of either RNC (i.e., PVC) or HDPE. The coefficient of friction and cut-through rating of the conduit shall meet or exceed the requirements stated in Bellcore/Telcordia GR-356-CORE *Generic Requirements for Optical Cable Innerduct and Accessories*.

All empty conduit runs shall have a pull rope (8KN) installed in each conduit after installation. Broad Band conduit shall include 10 AWG tracer wire. Pull boxes for City Fiber shall have fiber called out on the lid. Pull rope, tracer wire and tape will not be measured and paid separately, but shall be included in the unit price for conduit.

Conduit shall always enter a pull box, hand-hole, or any other type structure from the direction of the run only.

PVC conduit shall be listed as approved for use by the RUS. PVC conduit shall be manufactured in accordance with the following industry standards:

- NEMA TC-2 *Electrical Polyvinyl Chloride (PVC) Conduit*
- UL 651 *Schedule 40 and 80 Rigid PVC Conduit and Fittings*

PVC fittings shall be manufactured in accordance with the following industry standards:

- NEMA TC-3 *PVC Fittings for Use with Rigid PVC Conduit and Tubing*
- UL 514B *Conduit, Tubing, and Cable Fittings*

HDPE conduit shall be listed as approved for use by the RUS. HDPE conduit shall be manufactured in accordance with the following industry standards:

- ASTM D-2447 *Standard Specification for PE Plastic Pipe, Schedules 40 and 80, Based on Outside Diameter*
- ASTM F-2160 *Standard Specification for Solid Wall HDPE Conduit Based on Controlled Outside Diameter*
- NEMA TC-7 *Smooth-Wall Coilable Electrical PE Conduit*
- EPEC-80 for Schedule 80 HDPE

HDPE conduit shall be capable of being coiled or placed on reels in continuous lengths, transported, stored outdoors and subsequently uncoiled for installation without affecting its properties or performance.

The Contractor shall utilize either all PVC or HDPE conduit for underground installations on this Contract. The mixing of PVC and HDPE conduit types for underground installations shall not occur without prior written approval from the Engineer.

All underground-to-aboveground and aboveground conduit installations shall utilize RMC as indicated on the Plans.

Where RMC is used, the uncoupled end shall be covered by industry color-coded thread protectors to aid in trade size recognition and protect the threads. Since 2",4" and 6" diameter conduit is called out throughout the entire project, the thread protectors should be color-coded blue. Threads shall conform to ANSI B1.20.1 *Pipe Threads, General Purpose (inch).* RMC, including factory manufactured threads, shall be hot-dipped galvanized inside and out. It shall also be top-coated with a compatible organic layer to inhibit white rust and increase corrosion resistance. RMC shall meet UL safety standard UL 6 *Electrical Rigid Metal Conduit - Steel* and be manufactured to ANSI C80.1 *Electrical Rigid Steel Conduit (ERSC)*.

All conduit transitions shall be constructed in a smooth and gradual manner as directed by the Engineer. Conduit sweeps into pull boxes and splice vaults shall be installed to facilitate pulling fiber optic cable directly through the pull box or splice vault. PVC conduits shall utilize 45° elbows with a minimum radius of 36". Similarly, HDPE conduits shall be installed with a 45° bend with a minimum radius of 36". The sum of the individual conduit bends, both horizontal and vertical, on a single conduit run between two pull boxes or a pull box and splice vault shall not exceed 270°. No individual bend shall be greater than 45°, unless indicated on the Plans for building access and pole-mounted cabinets where conduits transition from underground to above ground installations.

When conduits are coupled, the coupling technology shall allow the conduit to plug together without the need for special tools, and shall form both an airtight and watertight seal. Breaking force between segments shall exceed 250 lbs. The couplings shall be specifically designed for use with the size and type of conduits to be joined. Where toneable conduits are to be joined, the couplings shall be specifically designed for that purpose to ensure continuous conduit run detectability. If the Contractor intends to employ air-assisted fiber optic cable installation techniques, the couplings shall be pressure tight to internal conduit pressures not less than 200 psi when unrestrained.

The Contractor shall use conduit plugs and sealing plugs for sealing all empty conduits and conduits occupied with cabling, respectively, installed under this Contract. Conduit plugs shall be utilized in conduit ends (for all empty conduits shown on the Plans) as soon as the conduit is installed. End caps, appropriately sized for the installed conduit, shall be utilized on conduit ends (for all conduits to be occupied with cabling as shown on the Plans) as soon as the conduit is installed and sealed with electrical tape. The end caps shall be replaced with the appropriate sealing plugs as soon as cabling is installed within the conduit. Conduits shall be plugged or capped at all termination points such as pull boxes, splice vaults, junction boxes and building entries.

- Conduit plugs shall be manufactured from high-impact plastic components, combined with durable elastic gaskets. They shall be corrosion proof and appropriate for use as either a long-term or temporary seal. Conduit plugs shall be removable and reusable. They shall be both watertight and airtight to prevent the flow of water and buildup of sedimentation within the conduit. Each conduit plug shall be equipped with a rope tie device to allow the securing of pull rope to the plug's back compression plate. The Contractor shall attach the pull rope to the back compression plate of the plug and store excess slack pull rope behind the plug within the conduit for future use.

- Sealing plugs shall be simplex, biplex or triplex depending on the number of cables within a single conduit. They shall be removable and reusable. All sealing plugs shall be of the split type design, manufactured without metallic parts and easily removable and reinstallable around in-place cables without damaging the outer cable jacket. Sealing plugs shall provide a minimum watertight and airtight seal of 20 psi. They shall be installable by hand without using special tools and have no sharp corners that could damage the outer cable jacket.

Pull rope shall be a pre-lubricated, woven polyester tape made from low friction, high abrasion resistant yarns providing a low coefficient of friction. It shall be printed with sequential footage markings. The pull rope shall not be less than ½" with a minimum tensile strength of 1,250 lbs.

Warning tape shall be of the non-detectable variety. It shall be fabricated using a pigmented polyolefin film that has been specially treated so as not to degrade when exposed to acids or other destructive chemicals. The warning tape thickness shall be at least 4 mil and have a width not less than 3". The color of the warning tape shall be an APWA-approved orange color with black letters of approximately ¾" printed on one side with the wording "CAUTION FIBER OPTIC CABLE BURIED BELOW". The wording shall be repeated at approximately 3' intervals. Fiber optic warning tape shall be installed above the conduit in all open trenches for short conduit runs where directional boring methods are not feasible. A ½" diameter by 8' long ground rod shall be installed in each vault. The cost of the ground rod shall be included in the price of the vault or manhole.

Prior to installation, the specifications for all conduit types, couplings, fittings, elbows, L-bends, mounting hardware, conduit plugs, sealing plugs, pull tape, warning tape and curb markers shall be submitted to the Engineer for written approval.

BASIS OF PAYMENT

Subsection 613.11 shall include the following:

Accepted quantities of electrical conduit will be paid as measured above which price includes all items as listed above including full compensation for trenching, furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in furnishing and installing electrical conduit as shown on the Plans, as specified in the Standard Plans and Standard Specifications, as specified in these Special Provisions, and as directed by the Engineer.

Accepted quantities of pull boxes and junction boxes will be paid as measured above which price includes all items as listed above including full compensation for excavation, furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in furnishing and installing each pull box and junction box as shown on the Plans, as specified in the Standard Plans and Standard Specifications, as specified in these Special Provisions, and as directed by the Engineer.

The Contractor shall coordinate work with Utility Companies as the trench work may be multiphase.

Joint Utility Trench: At any time the joint utility trench may consist of the following conduits. Plans, specifications and bid schedule for site electrical and dry utilities will be included in **Addendum No. 1**.

- Site Lighting (Street and Holiday)
  - 2” SCHD. 80 PVC –Contractor Provide and Place
- Electrical Conduit (Extra)
  - 2” SCHD. 80 PVC – Contractor Provide and Place
- Broadband Infrastructure
  - 2” SCHD. 80 PVC – Contractor Provide and Place
- CATV (Charter)
  - 2” SCHD. 80 PVC – Charter Provide and Place
- Communications Cable (Century Link)
  - 2” SCHD. 80 PVC – Contractor Provide and Place
  - 4” SCHD. 80 PVC – Contractor Provide and Place
- Vault(s) – Century Link Provides, Contractor Installs.
- Gas Main (Xcel)
  - 4” P.E. – Xcel Provide and Place
- Electrical Primary (Xcel)
  - 6” SCHD. 80 PVC – Xcel Provide and Place
  - 6” SCHD. 80 PVC (Extra) – Xcel Provide and Place
- Single Phase Power (Xcel)
  - 2” SCHD. 80 PVC – Xcel Provide and Place
- Three Phase Power (Xcel)
  - 4” SCHD. 80 PVC – Xcel Provide and Place

3/8” chips or #10 CHAT (rock crusher reject) is to be utilized as bedding and haunching for both the Street and Property Side Joint Utility Trench. Cost of materials shall be included in the linear foot contract price in the bid schedule and we considered incidental.

Payment will be made under:

Pay Item	**Pay Unit**
Joint Trench (30” W x 42” D)	LF
4” SCHD 80 PVC	LF
2” SCHD 80PVC	LF

Pay Item	**Pay Unit**
Vault (Century Link)	EA
Vault (City Fiber)	EA

3.5. Attachments:

Appendix A: Project Submittal Form
Appendix B: Landscape and Irrigation Specifications
Appendix C: Geotechnical Report
Appendix D: Uranium Mill Tailings Management Plan
Appendix E: Construction Drawings
Appendix F: Existing CDPHE Monitoring Well Location Exhibit
Appendix G: Preliminary Plaza Shelter and Restroom Structure Plans (in future addendum)

3.6. Contractor Bid Documents: For Contractor’s convenience, the following is a list of forms/items to be submitted with the Contractor’s bid response. However, should a form/item not be listed in this section, but required in the solicitation documents, it is the Contractor’s responsibility to ensure all forms/items are submitted.

- **Contractor’s Bid Form**
- **Price Bid Schedule**
- **References**

3.7. IFB TENTATIVE TIME SCHEDULE:

Invitation For Bids available	May 22, 2020
Mandatory Pre-Bid Meeting (two options)	June 8, 2020
Inquiry deadline, no questions after this date	June 17, 2020
Addendum Posted	June 19, 2020
Submittal deadline for proposals	June 29, 2020
City Council Approval	July 15, 2020
Notice of Award & Contract execution	July 16, 2020
Bonding & Insurance Cert due	July 23, 2020
Preconstruction meeting	July 24, 2020
Work begins no later than	Upon Receipt of Notice to Proceed
Final Completion	305 Calendar Days from Notice to Proceed
Holidays:	September 7, 2020
	November 11, 2020
	November 26-27, 2020
	December 25, 2020
	January 1, 2020
	January 18, 2020
	February 15, 2020
	May 31, 2020

Contractor's Bid Form

Bid Date: _____

Project: IFB-4799-20-DH "Riverfront at Dos Rios Phase II Construction"

Bidding Company: _____

Name of Authorized Agent: _____

Email _____

Telephone_____ Address_____

City_____State_____Zip_____

The undersigned Bidder, in compliance with the Invitation for Bids, having examined the Instruction to Bidders, General Contract Conditions, Statement of Work, Specifications, and any and all Addenda thereto, having investigated the location of, and conditions affecting the proposed work, hereby proposes to furnish all labor, materials and supplies, and to perform all work for the Project in accordance with Contract Documents, within the time set forth and at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents, of which this Contractor's Bid Form is a part.

The undersigned Contractor does hereby declare and stipulate that this offer is made in good faith without collusion or connection to any person(s) providing an offer for the same work, and that it is made in pursuance of, and subject to, all terms and conditions of the Instructions to Bidders, the Specifications, and all other Solicitation Documents, all of which have been examined by the undersigned.

The Contractor also agrees that if awarded the Contract, to provide insurance certificates within ten (10) working days of the date of Notification of Award. Submittal of this offer will be taken by the Owner as a binding covenant that the Contractor will be prepared to complete the project in its entirety.

The Owner reserves the right to make the award on the basis of the offer deemed most favorable, to waive any formalities or technicalities and to reject any or all offers. It is further agreed that this offer may not be withdrawn for a period of sixty (60) calendar days after closing time. Submission of clarifications and revised offers automatically establish a new thirty day (30) period.

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

- Prices in this bid 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 bid proposal for the purpose of restricting competition.
- The individual signing this bid 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. The Owner reserves the right to take into account any such discounts when determining the bid award.

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 Bidder to ensure all Addenda have been received and acknowledged.

By signing below, the Undersigned agree to comply with all terms and conditions contained herein.

Company: _____

Authorized Signature: _____

Title: _____

Bid Schedule: 2019 Riverfront at Dos Rios (PH2)

Contractor:_____

Item No.	CDOT, City Ref.	Description	Quantity	Units	Unit Price	Total Price
1	626	Mobilization	1.	Lump Sum	$ _____	$ _____
2	626	Construction Surveying	1.	Lump Sum	$ _____	$ _____
3	620	Sanitary Facility	1.	EA	$ _____	$ _____
4	209	Dust Abatement	500.	DAYS	$ _____	$ _____
5	208	Stabilized Construction Entrance	5.	EA	$ _____	$ _____
6	208	Erosion Control (Complete in Place)	1.	Lump Sum	$ _____	$ _____
7		Potholing	1.	Lump Sum	$ _____	$ _____
8	108.2	4" Sewer Service Pipe (SDR 35)	786.	LF	$ _____	$ _____
9	108.2	6" Sewer Service Pipe (SDR 35)	93.	LF	$ _____	$ _____
10	108.2	8" Gravity Sewer Pipe (SDR 35)	1,682.	LF	$ _____	$ _____
11	108.2	Import Trench Backfill	4,000.	CY	$ _____	$ _____
12	108.3	4" Sewer Service Tap to Existing Main	18.	EA	$ _____	$ _____
13	108.3	4" Sewer Service Tap to New Main	8.	EA	$ _____	$ _____
14	108.3	8" End Cap/Plug Sewer	1.	EA	$ _____	$ _____
15	108.3	Sanitary Sewer Cleanout (2-way) to Include Appurtenances per City Standard Detail SS-07.	26.	EA	$ _____	$ _____
16	108.5	Sanitary Sewer Basic Manhole Placed on Existing Line (60" I.D.) (Complete in Place).	2.	EA	$ _____	$ _____
17	108.5	Sanitary Sewer Basic Manhole Placed on Existing Line (48" I.D.) (Complete in Place).	1.	EA	$ _____	$ _____
18	108.5	Sanitary Sewer Basic Manhole (48" I.D.) (Complete in Place).	12.	EA	$ _____	$ _____
19	108.5	Sanitary Manhole Barrel Section (D>5') (60" I.D.).	6.	VLF	$ _____	$ _____
20	108.5	Sanitary Manhole Barrel Section (D>5') (48" I.D.).	33.6	VLF	$ _____	$ _____
21	108.5	Connect to Existing Manhole or Sewer Main	3.	EA	$ _____	$ _____
22	210	Adjust Sewer Manhole to Finished Grade.	15.	EA	$ _____	$ _____
23	104.4	Fully Encased Sewer in Concrete per City Standard Detail GU-04. See Plan Sheet 6.	11.	EA	$ _____	$ _____
24	104.4	Cap Top Half of Sewer in Concrete per City Standard Detail GU-04.	12.	EA	$ _____	$ _____
25	108.2	6" Water Pipe (C-900 PVC).	632.	LF	$ _____	$ _____
26	108.2	8" Water Pipe (C-900 PVC).	5,230.	LF	$ _____	$ _____
27	108.3	6" Gate Valve	16.	EA	$ _____	$ _____
28	108.3	8" Gate Valve	22.	EA	$ _____	$ _____
29	108.3	8" X 6" Tee	14.	EA	$ _____	$ _____
30	108.3	8" X 8" Tee	5.	EA	$ _____	$ _____
31	108.3	8" X 6" Cross	1.	EA	$ _____	$ _____

Bid Schedule: 2019 Riverfront at Dos Rios (PH2)

Contractor:_____

Item No.	CDOT, City Ref.	Description	Quantity	Units	Unit Price	Total Price
32	108.3	8" Cross	1.	EA	$ _____	$ _____
33	108.3	8", 22.5° Elbow	10.	EA	$ _____	$ _____
34	108.3	8", 45° Elbow	8.	EA	$ _____	$ _____
35	108.3	8", 11.25° Elbow	14.	EA	$ _____	$ _____
36	108.3	6", 45° Elbow	3.	EA	$ _____	$ _____
37	108.3	8" X 6" Reducer	4.	EA	$ _____	$ _____
38	108.3	6" End Cap/Plug Water	4.	EA	$ _____	$ _____
39	108.3	Fire Hydrant Assembly	12.	EA	$ _____	$ _____
40	108.3	1" Tapping Saddle	27.	EA	$ _____	$ _____
41	108.3	1" Corporation Stop	27.	EA	$ _____	$ _____
42	108.3	Potable Water - 8" Tapping Sleeve	1.	EA	$ _____	$ _____
43	108.4	Water Service Line (1") (Type K Copper)	1,130.	LF	$ _____	$ _____
44	108.4	1" Water Service Assembly	27.	EA	$ _____	$ _____
45	202	Remove Water Valve	3.	EA	$ _____	$ _____
46	202	Remove Fire Hydrant	1.	EA	$ _____	$ _____
47	202	Abandon Water Valve	2.	EA	$ _____	$ _____
48	202	Abandon Water Pipe (Plug Remaining Ends with Concrete).	4.	EA	$ _____	$ _____
49	202	Remove Water Meter	2.	EA	$ _____	$ _____
50	210	Adjust Water Valve to Finished Grade	4.	EA	$ _____	$ _____
51	210	Adjust Water Meter to Finished Grade	2.	EA	$ _____	$ _____
52	210	Adjust Fire Hydrant to Finished Grade	1.	EA	$ _____	$ _____
53	108.2	Storm Drain Pipe - 72" x 24" Concrete Box Culvert	557.	LF	$ _____	$ _____
54	108.2	Storm Drain Pipe - 29" x 18" Concrete Horizontal Elliptical Arch Pipe.	895.	LF	$ _____	$ _____
55	108.2	Storm Drain Pipe - 48" Concrete Pipe	50.	LF	$ _____	$ _____
56	108.2	Storm Drain Pipe - 42" Concrete Pipe	363.	LF	$ _____	$ _____
57	108.2	Storm Drain Pipe - 36" Concrete Pipe	1,092.	LF	$ _____	$ _____
58	108.2	Storm Drain Pipe - 24" Concrete Pipe	853.	LF	$ _____	$ _____
59	108.2	Storm Drain Pipe - 18" Concrete Pipe	2,252.	LF	$ _____	$ _____
60	108.2	Storm Drain Pipe - 12" Concrete Pipe	703.	LF	$ _____	$ _____
61	108.2	Storm Drain Pipe - 8" PVC Pipe (C-900)	68.	LF	$ _____	$ _____
62	108.5	Storm Drain Manhole (48" I.D.)	6.	EA	$ _____	$ _____
63	108.5	Storm Drain Manhole (60" I.D.)	4.	EA	$ _____	$ _____
64	108.5	Storm Drain Manhole (60" I.D.) with Flat Top Lid	5.	EA	$ _____	$ _____
65	108.5	Storm Drain Manhole (72" I.D.)	1.	EA	$ _____	$ _____
66	108.6	Storm Drain - Outlet Structure - See "Water Quality Outlet Structure" to Include All Appurtenances (Complete in Place).	1.	EA	$ _____	$ _____
67	108.6	Storm Drain Inlet with Vertical Curb Opening (24" x 36")	20.	EA	$ _____	$ _____
68	108.6	Storm Drain Inlet with Drive Over Curb Opening (24" x 36")	2.	EA	$ _____	$ _____
69	108.6	Storm Drain - Large Area Inlet (24" x 36")	14.	EA	$ _____	$ _____

Bid Schedule: 2019 Riverfront at Dos Rios (PH2)

Contractor:_____

Item No.	CDOT, City Ref.	Description	Quantity	Units	Unit Price	Total Price
70	108.5	Storm Drain - Concrete Headwall (8'-9" wide x 9'-10" height) per CDOT M&S Standard Plan M-601-10 and 48" Flap	1.	EA	$ _____	$ _____
71	108.5	Storm Drain - Conflict Structure	1.	EA	$ _____	$ _____
72	108.5	Storm Drain - Access Manhole	3.	EA	$ _____	$ _____
73	108.5	Storm Drain - Access Inlet (24" x 36" I.D.) Vertical Curb Opening	1.	EA	$ _____	$ _____
74	108.6	Storm Drain - Access Inlet (24" x 36" I.D.) Area Inlet Opening	1.	EA	$ _____	$ _____
75	108.6	Storm Drain - 42" x 48" Tee Manhole	2.	EA	$ _____	$ _____
76	108.6	Storm Drain - 42" x 48" x 36" Tee	1.	EA	$ _____	$ _____
77	108.5	Storm Drain - 36" x (24" x 36" Box Leg) Tee Inlet Area Inlet Frame and Grate (24" x 36" Opening)	1.	EA	$ _____	$ _____
78	108.5	Storm Drain - 72" x 24" Prefabricated Pipe Elbow	2.	EA	$ _____	$ _____
79	108.5	Storm Drain - Inlet Over MH (Vertical Curb Opening) (24" x 36" I.D.)	2.	EA	$ _____	$ _____
80	108.5	Storm Drain - Inlet Over MH (Large Area Inlet Opening) (24" x 36" I.D.)	4.	EA	$ _____	$ _____
81	108.5	Storm Drain - Prefab Pipe Transition per Plan	1.	EA	$ _____	$ _____
82	108.6	Storm Drain - Manhole Barrel Section (D>5')(72" I.D.)	5.1	VLF	$ _____	$ _____
83	108.5	Storm Drain - Manhole Barrel Section (D>5')(60" I.D.)	2.2	VLF	$ _____	$ _____
84	108.5	Storm Drain - Manhole Barrel Section (D>5')(48" I.D.)	5.23	VLF	$ _____	$ _____
85	108.5	Core and Connect New 18" Storm Pipe to New Box Culvert	4.	EA	$ _____	$ _____
86	108.7	Granular Stabilization Material (Type B)	2,300.	TON	$ _____	$ _____
87	202	Remove Storm Drain Inlet	1.	EA	$ _____	$ _____
88	202	Remove 15" Flared End Section	1.	EA	$ _____	$ _____
89	202	Remove 15" Storm Pipe	90.	LF	$ _____	$ _____
90	202	Abandon Storm Pipe	1.	EA	$ _____	$ _____
91	210	Reset Storm Drain Inlet D1-252-099	1.	EA	$ _____	$ _____
92	210	Connect to and Adjust to Finished Grade Storm MH C4-252-017	1.	EA	$ _____	$ _____
93	210	Adjust Storm Manhole to Finished Grade	1.	EA	$ _____	$ _____
94	420	Geosynthetics - Mirifi RS580i or Approved Equal	5,600.	SY	$ _____	$ _____
95	506	Riprap (d50=12" to Include Geogrid)	40.	SY	$ _____	$ _____
96	203	Unclassified Excavation	43,790.	CY	$ _____	$ _____
97	203	Unclassified Embankment	67,341.	CY	$ _____	$ _____
98	203	Debris Processing and Removal	12,000.	CY	$ _____	$ _____
99	203	Colorado River Bank Stabilization	900.	LF	$ _____	$ _____
100	203	Import and Place Clean Fill	43,753.	CY	$ _____	$ _____
101	210	Adjust Pull Box to Finished Grade	9.	EA	$ _____	$ _____

Bid Schedule: 2019 Riverfront at Dos Rios (PH2)

Contractor:_____

Item No.	CDOT, City Ref.	Description	Quantity	Units	Unit Price	Total Price
102	210	Adjust Light Pole and Foundation to Finished Grade	2.	EA	$ _____	$ _____
103	613	Joint Trench with Broad Band (Site Electrical - Street LT Circuits (2)-2" Schedule 80 PVC conduit). Refer to Utility Trench Detail	32,600.	LF	$ _____	$ _____
104	613	Joint Trench with Site Electrical (Broad Band (3)-2" Schedule 80 PVC conduit). Refer to Utility Trench Detail	48,900.	LF	$ _____	$ _____
105	613	Joint Trench with XCEL Energy and Charter who provides and places their materials (Century Link - 4" Schedule 80 PVC conduit). Refer to Utility Trench	16,300.	LF	$ _____	$ _____
106	613	Joint Trench with XCEL Energy and Charter who provides and places their materials (Century Link - 2" Schedule 80 PVC conduit). Refer to Utility Trench	16,300.	LF	$ _____	$ _____
107	613	Large Splice Box (Quasite) (3' - 2 5/8" x 2'-2") Broadband Logo.	32.	EA	$ _____	$ _____
108	613	Splice Box (Provided by Others - Century Link)	20.	EA	$ _____	$ _____
109	613	Type One Pull Box	211.	EA	$ _____	$ _____
110	Elec	Wiring (LCBP x1.74)	1.	Lump Sum	$ _____	$ _____
111	Elec	Light Standard and Luminaire	176.	EA	$ _____	$ _____
112	Elec	Light Standard and Luminaire (Street)	15.	EA	$ _____	$ _____
113	Elec	Light Standard Foundation (Pedestrian)	176.	EA	$ _____	$ _____
114	Elec	Light Standard Foundation (Street)	15.	EA	$ _____	$ _____
115	Elec	Lighting Control Center PWR Pedestal (Special) (LCBP x1.74)	5.	EA	$ _____	$ _____
116	202	Remove Asphalt Mat	11,800.	SY	$ _____	$ _____
117	202	Remove Concrete	400.	SY	$ _____	$ _____
118	202	Romove Ground Sign	10.	EA	$ _____	$ _____
119	202	Remove High Voltage Overhead Power Pole Foundations	2.	EA	$ _____	$ _____
120	202	Remove Tree	10.	EA	$ _____	$ _____
121	202	Remove Property Pin (No Reference or Reset)	4.	EA	$ _____	$ _____
122	202	Remove Fencing (Includes All Gates and Associated Appurtenances.)	2,000.	LF	$ _____	$ _____
123	202	Remove Mail Box	1.	EA	$ _____	$ _____
124	202	Clearing and Grubbing	1.	Lump Sum	$ _____	$ _____
125	210	Reference/Reset Survey Monument	6.	EA	$ _____	$ _____
126	210	Reset Ground Sign	2.	EA	$ _____	$ _____
127	304	Aggregate Base Course (Class 6) (4" Thick)(Co. River Trail Shoulder)	1,015.	SY	$ _____	$ _____
128	304	Subgrade Stabilization - Aggregate Base Course (Class 3)(12" Thick)	5,600.	SY	$ _____	$ _____
129	304	Aggregate Base Course (Class 6) (13" Thick)	18,200.	SY	$ _____	$ _____

Bid Schedule: 2019 Riverfront at Dos Rios (PH2)

Contractor:_____

Item No.	CDOT, City Ref.	Description	Quantity	Units	Unit Price	Total Price
130	304	Aggregate Base Course (Class 6) (6" Thick)	30.	SY	$ _____	$ _____
131	306	Reconditioning (12" Deep)	25,000.	SY	$ _____	$ _____
132	401	Hot Mix Asphalt (5" Thick) (Grading SX 75, Binder Grade 64-22) (Roadways)	5,000.	TON	$ _____	$ _____
133	401	Hot Mix Asphalt (3" Thick) (Grading SX 75, Binder Grade 64-22) (Driveways)	5.	TON	$ _____	$ _____
134	627	Preformed Thermoplastic Pavement Marking (Handicap Symbol)	4.	EA	$ _____	$ _____
135	627	Preformed Thermoplastic Pavement Marking (X-walk) (2' x 10' TYP.)	131.	EA	$ _____	$ _____
136	627	Preformed Thermoplastic Pavement Marking (8" White Dotted Line, 2' Segment, 3' Gap)	100.	LF	$ _____	$ _____
137	627	Preformed Thermoplastic Pavement Marking (4" White Solid)	2,750.	LF	$ _____	$ _____
138	627	Preformed Thermoplastic Pavement Marking (2' White Solid)	170.	LF	$ _____	$ _____
139	630	Traffic Control (Complete In Place)	1.	Lump Sum	$ _____	$ _____
140	630	Trafic Control Plan	1.	Lump Sum	$ _____	$ _____
141	202	Remove Asphalt Mat	40.	SY	$ _____	$ _____
142	202	Remove Concrete	313.	SY	$ _____	$ _____
143	202	Remove Pull Box	2.	EA	$ _____	$ _____
144	202	Remove Concrete Pole Box	3.	EA	$ _____	$ _____
145	202	Remove Tree	7.	EA	$ _____	$ _____
146	203	Unclassified Excavation	437.	CY	$ _____	$ _____
147	208	Erosion Control (Complete in Place)	1.	Lump Sum	$ _____	$ _____
148	304	Aggregate Base Course (Class 6) (8" Thick) (Left Turn Lane)	565.	SY	$ _____	$ _____
149	401	Hot Mix Asphalt (6" Thick) (Grading SX, Binder Grade 64-22) (Left Turn Lane)	187.	TON	$ _____	$ _____
150	608	Concrete Bullnose End Section (8" Thick) to include 6" of Class 6 Aggregate Base Course	5.	SY	$ _____	$ _____
151	608	Concrete Curb and Spill Gutter (1.5' Wide) to include 6" of Class 6 Aggregate Base Course.	320.	LF	$ _____	$ _____
152	608	Concrete Median Edging (2' Wide) (Colored Concrete) (Davis Colors Sunset Rose) to include 6" of Class 6 Aggregate Base Course	40.	LF	$ _____	$ _____
153	608	Concrete Cover Material (Colored Concrete) (Davis Colors Sunset Rose) (4" Thick) to include 6" of Class 6 Aggregate Base Course	185.	SY	$ _____	$ _____
154	627	Preformed Thermoplastic Pavement Marking (Left Turn Symbol)	2.	EA	$ _____	$ _____
155	630	Traffic Control (Complete In Place)	1.	Lump Sum	$ _____	$ _____
156	630	Traffic Control Plan	1.	Lump Sum	$ _____	$ _____

Bid Schedule: 2019 Riverfront at Dos Rios (PH2)

Contractor:_____

Item No.	CDOT, City Ref.	Description	Quantity	Units	Unit Price	Total Price
157	SP	Safe Hit Flexible Delineator (SH248GP3--WS 09) to include 4" PVC Sleeve	2.	EA	$ _____	$ _____
158	608	Concrete Pavement (Roundabout) (10" Thick) to include 6" Class 6 Aggregate Base Course	1,415.	SY	$ _____	$ _____
159	608	Concrete Curb and Spill Gutter (1.5' Wide) to include 6" of Class 6 Aggregate Base Course.	1,705.	LF	$ _____	$ _____
160	608	Concrete Truck Apron (Roundabout) (10" Thick) to include 6" of Class 6 Aggregate Base Course	310.	SY	$ _____	$ _____
161	608	Concrete Curb (6" Wide) (6" High) to include 6" of Class 6 Aggregate Base Course.	975.	LF	$ _____	$ _____
162	608	Concrete Curb and Gutter (2' Wide) (Both Collector and Spill Gutters) to include 6" of Class 6 Aggregate Base Course.	9,500.	LF	$ _____	$ _____
163	608	Concrete Drive-Over Curb and Gutter both 3' and 3.5' Wide and Both Collector and Spill Gutter to include 6" of Class 6 Aggregate Base Course.	1,075.	LF	$ _____	$ _____
164	608	Concrete Sidewalk (6" Thick) to include 6" of Class 6 Aggregate Base Course	13,875.	SY	$ _____	$ _____
165	608	Concrete Pavement (Parking & Plain Color Paving Bike Park Plaza) (8" Thick) to include 6" of Class 6 Aggregate Base Course.	4,725.	SY	$ _____	$ _____
166	608	Concrete Sculpture Pad (Bike Park Plaza) (8" Thick) to include 6" of Class 6 Aggregate Base Course and Reinforcement as Specified.	20.	SY	$ _____	$ _____
167	608	Concrete Pavement Band (Bike Park Plaza) (8" Thick) (Color Landscape per Landscape Plans) to include 6" of Class 6 Aggregate Base Course.	80.	SY	$ _____	$ _____
168	608	Concrete Drainage Pan (3' Wide) to include 6" of Class 6 Aggregate Base	307.	LF	$ _____	$ _____
169	608	Concrete Drainage Pan (6' Wide) to include 6" of Class 6 Aggregate Base	27.	LF	$ _____	$ _____
170	608	Concrete Intersection Corner (8" Thick) to include 6" of Class 6 Aggregate Base Course. Includes All Items Labeled as Concrete Bullnose End Section and Concrete Corner Fillet on the Plans.	85.	SY	$ _____	$ _____
171	608	Concrete Curb Ramp to include 6" of Class 6 Aggregate Base Course.	600.	SY	$ _____	$ _____
172	608	Concrete Driveway Section (8" Thick) (Commercial) to include 6" Class 6 Aggregate Base Course.	190.	SY	$ _____	$ _____
173	608	Detectable Warning (Cast Iron, Wet Set (2'x2')	150.	EA	$ _____	$ _____

Bid Schedule: 2019 Riverfront at Dos Rios (PH2)

Contractor:_____

Item No.	CDOT, City Ref.	Description	Quantity	Units	Unit Price	Total Price
174	RAW 108.2	4" Raw Water Pipe (C-900 PVC)	255.	LF	$ _____	$ _____
175	RAW 108.2	8" Raw Water Pipe (C-900 PVC)	2,585.	LF	$ _____	$ _____
176	RAW 108.2	10" Raw Water Pipe (C-900 PVC)	2,500.	LF	$ _____	$ _____
177	RAW 108.3	Raw Water - 4" Gate Valve	5.	EA	$ _____	$ _____
178	RAW 108.3	Raw Water - 8" Butterfly Valve	7.	EA	$ _____	$ _____
179	RAW 108.3	Raw Water - 10" Butterfly Valve	3.	EA	$ _____	$ _____
180	RAW 108.3	Raw Water - Combination Air Valve and Vault Assembly. Complete in Place	8.	EA	$ _____	$ _____
181	RAW 108.3	Raw Water - 8" x 4" Tee	3.	EA	$ _____	$ _____
182	RAW 108.3	Raw Water - 8" x 8" Tee	2.	EA	$ _____	$ _____
183	RAW 108.3	Raw Water - 8" Cross	1.	EA	$ _____	$ _____
184	RAW 108.3	Raw Water - 10" x 4" Tee	2.	EA	$ _____	$ _____
185	RAW 108.3	Raw Water - 10" x 10" Tee	1.	EA	$ _____	$ _____
186	RAW 108.3	Raw Water - 4", 11.25° Elbow	5.	EA	$ _____	$ _____
187	RAW 108.3	Raw Water - 4", 22.5° Elbow	5.	EA	$ _____	$ _____
188	RAW 108.3	Raw Water - 8", 11.25° Elbow	6.	EA	$ _____	$ _____
189	RAW 108.3	Raw Water - 8", 22.5° Elbow	14.	EA	$ _____	$ _____
190	RAW 108.3	Raw Water - 8", 45° Elbow	10.	EA	$ _____	$ _____
191	RAW 108.3	Raw Water - 8", 90° Elbow	1.	EA	$ _____	$ _____
192	RAW 108.3	Raw Water - 10", 11.25° Elbow	11.	EA	$ _____	$ _____
193	RAW 108.3	Raw Water - 10", 22.5° Elbow	16.	EA	$ _____	$ _____
194	RAW 108.3	Raw Water - 10", 45° Elbow	6.	EA	$ _____	$ _____
195	RAW 108.3	Raw Water - 8" x 4" Reducer	4.	EA	$ _____	$ _____
196	RAW 108.3	Raw Water - 10" x 8" Reducer	1.	EA	$ _____	$ _____
197	RAW 108.3	Raw Water - 10" x 4" Reducer	1.	EA	$ _____	$ _____
198	RAW 108.3	Raw Water - 8" End Cap/Plug	1.	EA	$ _____	$ _____
199	RAW 108.3	Raw Water - 4" End Cap/Plug	10.	EA	$ _____	$ _____
200	RAW 202	Remove Raw Water Blow off Assembly	1.	EA	$ _____	$ _____
201	LSC in ROW	Topsoil (18" Thick) (All Planting Areas Within ROW)	4,800.	SY	$ _____	$ _____
202	LSC in ROW	Cost per SF of Area to be Landscaped Inside the Roadway ROW.	50,000.	SF	$ _____	$ _____
203	LSC in ROW	Riparian Restoration	108,900.	SF	$ _____	$ _____
204	LSC in ROW	Irrigation Controls (Inside ROW)	2.	EA	$ _____	$ _____
205	LSC in ROW	Trees, 2" Deciduous	50.	EA	$ _____	$ _____
206	LSC in ROW	Trees, 1-1/2" Deciduous	25.	EA	$ _____	$ _____
207	LSC in ROW	Shrubs	200.	EA	$ _____	$ _____
208	LSC in Park	Restroom Shelter	1.	EA	$ _____	$ _____
209	LSC in Park	Small Shelters	1.	Lump Sum	$ _____	$ _____
210	LSC in Park	Modular Block Walls (Versa-Lok)(Park Plaza Amphitheater)	424.	FF	$ _____	$ _____
211	LSC in Park	Concrete Landscape Edger	45.	LF	$ _____	$ _____
212	LSC in Park	Play Area Barrier Curb	290.	LF	$ _____	$ _____
213	LSC in Park	Engineered Wood Fiber Play Material	319.	CY	$ _____	$ _____
214	LSC in Park	Play Area ADA Ramp	2.	EA	$ _____	$ _____

Bid Schedule: 2019 Riverfront at Dos Rios (PH2)

Contractor:_____

Item No.	CDOT, City Ref.	Description	Quantity	Units	Unit Price	Total Price
215	LSC in Park	Concrete Stain Treatment	741.	SF	$ _____	$ _____
216	LSC in Park	Benches	10.	EA	$ _____	$ _____
217	LSC in Park	Bike Racks - (Inverted "U") Style	5.	EA	$ _____	$ _____
218	LSC in Park	Trees, 2" Deciduous	58.	EA	$ _____	$ _____
219	LSC in Park	Trees, 1-1/2" Deciduous	5.	EA	$ _____	$ _____
220	LSC in Park	Shrubs	128.	EA	$ _____	$ _____
221	LSC in Park	Perennials	24.	EA	$ _____	$ _____
222	LSC in Park	Boulders, 3' x 2'	10.	EA	$ _____	$ _____
223	LSC in Park	Boulders, 3' x 5'	14.	EA	$ _____	$ _____
224	LSC in Park	Lawn Fine Grade, Seed	45,683.	SF	$ _____	$ _____
225	LSC in Park	Irrigation System	1.	Lump Sum	$ _____	$ _____
226	LSC in Park	Soil Amendment, Delivered, Tilled,	50,383.	SF	$ _____	$ _____
227	LSC in Park	Shrub Bed - Fine Grade, Rock Mulch	4,700.	SF	$ _____	$ _____
228	LSC Bike Prk	Lawn Fine Grade, Seed	25,500.	SF	$ _____	$ _____
229	LSC Bike Prk	Lawn Irrigation	25,500.	SF	$ _____	$ _____
230	LSC Bike Prk	Irrigation Controls	1.	Lump Sum	$ _____	$ _____
231	LSC Bike Prk	Soil Amendment, Delivered, Tilled,	25,000.	SF	$ _____	$ _____
232	LSC Bike Prk	Split 2-Rail Fence, Cedar, Not incl. Future Track or Pump Park	965.	LF	$ _____	$ _____
233	LSC Bike Prk	Concrete Landscape Edger, Not incl. Future Track or Pump Park	968.	LF	$ _____	$ _____
234	LSC Bike Prk	Trees, 2" Deciduous	26.	EA	$ _____	$ _____
235	LSC Bike Prk	Trees, 1-1/2" Deciduous	8.	EA	$ _____	$ _____
236	LSC Bike Prk	Rock Type 1 (Smaller), not incl. Future Track or Pump Park, no Fabric or Soil Prep	11,291.	SF	$ _____	$ _____
237	LSC Bike Prk	Rock Type 2 (Larger), not incl. Future Track or Pump Park, no Fabric or Soil Prep	17,106.	SF	$ _____	$ _____
238	Amenities	Trash Recepticals	5.	EA	$ _____	$ _____
239	Amenities	Drinking Fountains	1.	EA	$ _____	$ _____
240	Amenities	Concrete for Bike/Racks Bollards (8 ft x 8 ft)	5.	EA	$ _____	$ _____
241	Amenities	Picnic Tables Associated with Restrooms/Shelters	8.	EA	$ _____	$ _____
MCR		Minor Contract Revisions	- - -	- - -	- - -	$ 319,715.00

Bid Amount: **$** _____

Bid Amount:

_____ **dollars**

Bid Schedule: 2019 Riverfront at Dos Rios (PH2)

Contractor:_____

Item No.	CDOT, City Ref.	Description	Quantity	Units	Unit Price	Total Price

Contractor Name:
Contractor Address:
Contractor Phone #:

The undersigned Bidder proposes to subcontract the following portion of Work:

Name & address of Sub-Contractor	Description of work to be performed	% of Contract

The undersigned Bidder acknowledges the right of the City to reject any and all Bids submitted and to waive informalities and irregularities therein in the City's sole discretion.

By submission of the Bid, each Bidder certifies, and in the case of a joint Bid each party thereto certifies as to his own organization, that this Bid has been arrived at independently, without collusion, consultation, communication, or agreement as to any matter relating to this Bid with any other Bidder or with any competitor.

Appendix A

Project Submittal Form

PROJECT SUBMITTAL FORM

PROJECT: **Riverfront at Dos Rios Phase II Construction**

CONTRACTOR: _____

PROJECT MANAGER: Brendan Hines

Description	Date Received	Resubmittal Requested	Resubmittal Received	Date Accepted
STREET CONSTRUCTION				
Pavement mix design				
Base course gradation, Proctor curve				
Sub-base course gradation, Proctor curve				
Concrete mix designs				
Class 3 Pit Run				
STORM DRAINAGE CONSTRUCTION				
Pipe				
Bedding gradation				
Backfill gradation, Proctor curve, plasticity index (PI)				
Manhole				
Ring and cover				
Inlet box				
Grate & frame				
Flared End Section				
Pipe to manhole / inlet connection				
Outlet Structure – Water Quality Pond				
Small Area Inlets				

Description	Date Received	Resubmittal Requested	Resubmittal Received	Date Accepted

SEWER CONSTRUCTION

Pipe				
Connectors				
Bedding gradation				
Backfill gradation, Proctor curve, plasticity index (PI)				
48” Manhole				
60” Manhole				
Ring and cover				
Pipe to manhole connection				
Sewer Service Tap (Full Body Wye)				
Clean Out Appurtenances				

WATER CONSTRUCTION

Pipe				
2” HDPE				
Fittings				
Valves				
Tracing Wire				
Tapping Saddle and Corp Stop.				
Ring and Cover				
Bedding Gradation				
Backfill Gradation, Procter Curve, Plasticity Index (PI)				
Valve Box				
Yard Hydrant				
Fire Hydrant				

Description	Date Received	Resubmittal Requested	Resubmittal Received	Date Accepted

EROSION CONTROL / STORMWATER MANAGEMENT

Mesa County Storm Water Permit				
Construction Entrance				
Inlet Protection				
Concrete Washout				
Straw Bale				
Erosion Log				

PERMITS, PLANS, OTHER

Traffic Control Plan				
Dewatering Permit				
ACI Flatwork Finisher and Technician				
Construction Schedule				
Thermoplastic				
Large Splice Box (Quasite)				
Irrigation Pull Box (Large)				
Detectable Warning				
Geosynthetics – Mirafi or equivalent				
Topsoil				
Import Fill				
Reinforcing Steel (epoxy coated)				

Appendix B

Landscape and Irrigation Specifications

Technical Specifications for:

Dos Rios Park

129 Other Furnishings

1 General

129040.021 Scope of Site Improvements

Site Improvements include specified 16' square shelter, benches and bike posts/racks, and associated concrete footings. Contractor shall perform required assembly. Acquire Stamped Engineered Drawings from manufacturer, obtain and pay for any permits or inspections required for the construction of improvements described in the scope of work

129371.011 Locations

Stake locations of site improvements prior to installation. Notify Owner's Representative to verify locations.

2 Products

129340.22 16' Steel Shelter

Small Shelters to be Icon DS16X16M-P64 16'x16' square shelter with "Surrey Beige" Powder-coated steel frame and columns, and Colonial Red multi-rib steel roof panels as available through: Recreation Plus: 15207 W. Ellsworth Drive, Golden, CO 80228, 303-278 -1455

129371.22 Anchor Bolts

Hilti Kwik-Bolts 1/2"dia. x 2-1/2"

129371.22 Bench-Embed Mount

Bench to be Wabash Valley Contemporary Series Welded Wire 6' inground mount. Bench and Leg color to be blue, Rib pattern with Plastisol. Bench is available through Recreation Plus : 15207 W. Ellsworth Drive, Golden, CO 80228, 303-278-1455

129373.22 Bike Post

Bike Post shall be "Inverted U" bike racks, model #1608-01, 2-3/8" inch diameter, in ground/Permanent mount, as manufactured by Patterson Williams and available through Recreation Plus, Ltd. 888-278-145. Color to be Regal Blue.

3 Materials

129371.33 Concrete for Footings

Concrete footings are to be constructed as per Stamped engineered drawings from Shelter Manufacturer.

4 Execution

129340.44 16' Steel Shelter

Shelter to be installed on specified foundation as shown in drawings and details. Contractor is to install footings to a depth adequate to allow minimum coverage of foundation with road base prior to installation of pavement. Pavement is to be installed to grades shown on drawings and details.

129371.44 Bike Post

Bike Post shall be located and installed according to drawings & details.

129371.44 Bench-Embed Mount

Install plumb and level in concrete footing as shown on detail. Top of footing is to be below finish grade of granite fines and sloped to allow drainage away from support posts, .

1 General

328400.011 Scope of Landscape Irrigation Work

Furnish all labor, equipment, appliances, materials and perform all operations required to complete irrigation system installation and other work as shown on the applicable drawings and as specified herein, guarantee and meet conditions of this Contract.

328400.451 Job Supervision - Irrigation

All work specified herein shall be performed under the direct supervision of a superintendent thoroughly familiar with the work of this Section and who shall be at the Project site for the duration of the work of this Section.

328400.541 Job Conditions and Provisions-Irrigation

No irrigation system construction shall take place during freezing or wet weather or when temperatures are less than 40 degrees Fahrenheit, and no trenches shall be backfilled with frozen material. Installation of the system shall not take place until all earthwork has been substantially completed, compacted. Errors, conflicts or omissions from the Drawings or Specifications, or the misdescription of details of work which are manifestly necessary to carry out the intent of the Drawings or Specifications, or which are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details or work, but they shall be performed as if fully and clearly set forth and described in the Drawings and Specifications.

328400.551 Substitute Products

Requests for substitution of products named in this section must be approved by the Owner's Representative one week prior to bid opening.

328401.011 Tolerances

Depths of mains shall be twenty-four inches (24") bury, and laterals eighteen inches (18"), and pitch of pipes as specified shall be minimums. Coverage achieved on site shall be guaranteed according to plan; any unwatered areas due to poor placement of or insufficient heads shall be corrected by the Contractor.

328401.021 Layout of Lines & Levels

Before any installation operations are started, the site shall be completely staked out for the work of this Section by the Contractor. Pipes are not to be installed through tree root ball locations. All mains and valve locations shall be staked out for approval before installation by the Owners Representative.

2 Products

328413.512 Automatic Master Valve

Automatic Master Valve are to be Bermad IR-410-X solenoid controlled normally open control valve, or equal.

328413.552 Flow Sensor

Rainbird FS300P Flow Sensor for use with control system.

328413.562 Pressure Regulating Valve

Pressure regulating valve to be Bermad IR-420-KXZ pressure reducing valve, including installation hardware and fittings.

328418.342 Bubbler Head

Bubbler heads shall be Rainbird 1401 full circle pressure compensating nozzle, mounted on 1/2" swing pipe and SB Series Spiral Barb Fittings, as shown on detail or equal, approved prior to bidding.
Minimum length to be 2'.

328423.112 4" Spray Sprinkler Head for Small Lawn Areas

Pop-up spray heads shall be Rainbird 1804 plastic 4" pop-up heads with Rainbird R-VAN Rotary Nozzles as shown on drawing, or equal, approved prior to bidding.

328423.412 Gear Drive Rotor Pop-Up Sprinkler Head - Mid-size Lawn areas

Rotor Pop-Up Sprinkler Heads shall be Rainbird 5004 4" Pop-Up with both Standard and MPR nozzle sized as indicated on drawing.

328424.092 Automatic Control Valves

Automatic Control Valves are to be Rainbird PEB Electric Remote Control Irrigation Valves of size indicated on drawings, or equal.

328424.362 Isolation Gate Valve

Isolation valves (3") are to be 3" Mueller A-2360 Resilient Wedge Gate Valve, and shall be listed by NSF for use in potable water service.

328424.382 Quick Coupler Valves

Quick coupler valves are to be Rainbird #33-D two piece assembly with 3/4" schedule. 80 PVC nipple of length to bring head 1" above finish grade. Marlex Street Ells are to be used for a swing joint assembly to main line.

328424.662 Manual Drain Valves

Manual Drain Valves shall be 3/4" Mueller curb stop or equal. Valves shall be of bronze construction with threaded connections, cross handle and operating key;

328424.702 Valve Boxes

Super Jumbo box (2 valves max), or equal.

328424.722 Manual Drain Valve Boxes

Manual drain valve boxes shall be 10" circular box with lid.

328425.102 Irrigation Pipe - Main Pressure Line

Main Pressure Line pipe shall be 3 inch Class 200, solvent weld PVC, with PVC schedule 40 fittings, sized as shown on plans.

328425.202 Irrigation Pipe - Lateral Lines

Pipe shall be PVC Class 160 with PVC Schedule 40 fittings, solvent weld, as detailed, sized as shown on the plan.

328427.342 Irrigation Head Risers- Swing Pipe

All sprinkler heads with less than 5 gallons per minute flow shall have Rainbird SP-100 Swing Pipe, SB Series Spiral Barb Fittings, as shown in detail. Maximum length of swing pipe to be 10', minimum length to be 2'. No Spiral Barbed "T" fittings are to be used without prior approval from Owners Representative.

328428.402 CL 200 PVC Sleeving

PVC sleeving shall be PVC Class 200, solvent weld, sized as shown on drawings

328429.452 Pipe Thread Material
All threaded pipe connections shall be made with Weld-on 87685 thread sealant shall be used, or equal.

328429.462 Solvent Weld Primer & Cement
Solvent Weld Primer & Cement shall be only that which is recommended for use on pipe installed.

328446.202 Irrigation Controller- LXD with IQ
Automatic irrigation controller shall be Rainbird ESP-LXD Two Wire Decoder Controller with IQ Communications Cartridge computer type controller.

328449.882 Irrigation 2 wire Field Decoder
Field decoder shall be Rainbird FD-101TURF. Contractor may use FD-102 for two valves in one location, or FD-104 for 4 valves in one location.

328449.922 Rainbird Sensor Decoder
Rainbird SD-210 Decoder for use with irrigation controller system

328452.132 Wire Connectors
Wire connectors at electric control valves and all splices of irrigation controller wire in the field shall be made using "3M DBR-6" only.

328454.132 P7072 Decoder Cable
Communication cable for irrigation system shall be P7072 Shielded Communication Cable. Connections are to be made with waterproof connectors.

328454.512 Surge Protection for 2 wire system
Surge protection for 2 wire system shall be Rainbird LSP-1, or equal.

328455.092 Irrigation Controller Grounding
Copper components, ground enhancing material and ground rods as required per detail

328460.232 Irrigation Controller Cabinet
Automatic irrigation controller cabinet shall be Rainbird stainless steel pedestal and cabinet, Models LXMMSSPED AND LXMSS, floor mount, with locking door. Cabinet shall have mounting brackets to allow the installation of all components without puncturing the cabinet enclosure or door. Power conduit shall be of size to allow 110 power and valve control wires to be pulled without damage to either the wire or conduit.

3 Materials

328452.113 Controller 110V Power Wire
Electrical wire to controller shall be 14 gauge UV rated insulated copper U.L. approved for direct burial. All other wiring materials shall be per applicable codes.

4 Execution

328410.204 Water Service Connection - Raw Water line
The Contractor shall tie into existing raw water line where shown on drawing. Contractor to coordinate with City of Grand Junction (Public Works) for tie-in. See specifications and details for appliances.

328413.514 Automatic Master Valve

Automatic Master Valve is to be installed as shown in the detail. Valve control is to include FD -102Turf decoder connected to the irrigation control system

328413.554 Flow Sensor

Install Flow Sensor in valve box as shown on drawings, with no fittings on the upstream side for 10 diameters of the pipe, and no fittings on the downstream side for 5 pipe diameters, according to manufacturer's recommendations.

328418.354 Bubbler Head

Install bubbler heads on Rainbird SP-100 Swing Pipe, SB Series Spiral Barb Fittings as shown on the detail. Heads shall be set perpendicular with finished grade, bubbler nozzle 2" above finished grade, at locations shown on drawing. After finished grades are established and the ground has settled, Contractor shall adjust heads within adjacent planting saucer of shrub or perennial.

328423.154 Pop-Up Spray Sprinkler Head

Install spray heads as shown in detail. Spray heads shall be set perpendicular with finished grade at locations shown on drawing. After finished grades are established and the ground has settled, Contractor shall lower heads to finished grade.

328423.304 Gear Drive Rotor Pop-Up Sprinkler Head

Install gear drive rotor pop-up heads as shown in detail. Gear Drive Rotor Pop-Up Sprinkler heads shall be set perpendicular with finished grade at locations shown on drawing. Where finish grade has not been established, head shall be installed on temporary risers extending minimum 3" above grade. After finished grades are established and the ground has settled, Contractor shall lower heads to finished grade.

328424.384 Quick Coupler Valves

Quick coupler valves are to be installed on swing pipe swing joint at location and grade as indicated on drawings and as per details. Installation in soft soils may require staking and tying quick coupler to stake. Drive stake to 4" below grade and tie with nylon tie.

328424.664 Manual Drain Valves

Manual drain valve shall be located at low points on irrigation main. A drain sump of not less than 4.0 cu. ft. of 3/4" washed gravel shall be installed surrounding each drain valve.

328424.694 Pressure Regulating Valve

Pressure regulating valve to be installed per detail and manufacturer's recommendations.

328424.714 Valve Boxes

Install valve box at locations shown on drawings. Extensions and adjustments shall be made to establish the valve box and cover flush with the final grade level, and provide 4" layer of washed gravel as sump.

328424.724 Manual Drain Valve Boxes

All manual drain valves are to be installed with 6" round valve box and cover and 4" PVC sleeve of length to allow hand access to valve.

328428.424 CL 200 PVC Sleeving

Sleeving shall be installed in locations noted on drawings and at a depth to accommodate irrigation lines at their required depth. No changes in direction are allowed in sleeves. Ends are to be taped to prevent filling by backfill. Mark locations with lath and notation indicating "sleeve".

328440.44 Automatic Control Valves

All control valves shall be installed as close as possible to the locations shown on the plan; any variances must be approved by the Owners Representative. Install valves, unions, reducers, pipes, wiring, etc. per detail. Control valves shall be installed in accordance with the manufacturer's recommendations. All valves shall have sufficient clearance from adjacent obstructions to provide accessibility for maintenance, including complete removal without removal of valve box. Valves are not to be located in flow line of swales or drainages.

328446.084 Irrigation Controller Cabinet

Install automatic irrigation controller cabinet in locations noted with anchor bolts specified in concrete pad as per drawings. Secure all conduit as per code.

328449.884 Irrigation 2 wire Field Decoder

Field decoder shall be installed in line at valve locations as per manufacturer's directions

328449.934 Sensor Decoder

Install Sensor Decoder in valve box as shown on drawings and according to manufacturer's recommendations.

328452.024 Wire Connectors

Wire connectors are to be installed as per manufacturers recommendation.

328454.134 P7072 Decoder Cable

Communication cable for irrigation system is to be installed below irrigation mainline with loops at valve locations allowing connections to be made in valve boxes. Splices are to be made in valve boxes only.

328454.514 Surge Protection for 2 wire system

Surge protection for 2 wire system shall be installed as per manufacturer's instructions at locations shown. Surge protection is provided if FD-401 Field Decoder is used.

328455.104 Irrigation Controller Grounding

All Maxicom components to meet current Rainbird grounding specifications. Grounding resistance shall be tested by a Meggar or Vigra Ground type equipment. Contractor is required to achieve a maximum resistance of 5 ohms.

328455.154 Trench Excavation

Trenches shall be cut to true line and grade. Over-excavation of trenches for piping shall require compacted backfill to bring bottom of trench up to grade. Provide for surface drainage during construction. De-water all excavations immediately.

328455.164 Trenching & Backfilling

Comply with earthwork specifications, see Civil spec as required.

328456.044 Piping- general

Manufacturer's specifications covering installation of their material shall be followed. Underground lines up to 2" shall have minimum horizontal clearance of 2" of each other. No sprinkler lines shall be stacked vertically in a common trench. Lines shall have minimum horizontal clearance of 12" from the lines of other trades, and minimum 2" vertical clearance between lines crossing at 45° - 90°. Trenches for irrigation mainline shall be excavated so that the pipe shall drain uniformly toward drain valves deemed necessary to properly drain the system. Minimum grade of piping to drains shall be 3"/100'. When pipe laying is not in progress, or at end of each day, pipe ends shall be closed with tight plug or cap.

328464.44 Irrigation Head Risers

Riser assembly is to be installed to allow free movement of head without interfering with pipe, wire, or other obstructions. Follow manufacturers recommendations.

328470.054 Irrigation Valve Control Wires

Control wires shall be placed carefully alongside and slightly below the water main where it will receive the greatest possible protection. Control wire not protected by the water main shall be laid in a suitable sized PVC conduit unless otherwise noted on the plans. Control wire shall have an eighteen (18") inch expansion loop at each valve and every 200' of wire. Contractor to avoid mid-line splices, but where necessary will adequately note location on the "as-builts".

5 Warranty

328400.815 As-Built Submittals

Contractor shall submit an as-built or record plan upon completion of work showing precise location of control valves, mains, drain valves, etc., and any changes in location of heads, piping, etc. to the Owner and their representative before final application for payment. Provide one reproducible and three prints.

329380.55 Vandalism

Minor vandalism or other damage to the plantings or related work shall be the responsibility of the Contractor until all work receives Final Acceptance. Major vandalism or damage caused by others through no fault of the Contractor or his subcontractors shall be immediately brought to the attention of the Owners Representative who will be the sole judge as to the extent of such damage. Major damage is typically any damage over $500.00 worth of materials and/or labor required to repair the damage. For the Contractor to be awarded additional monies under the provisions of "extra work" stated in the General Conditions, he shall have fully protected his work as specified herein. Any failure, however slight, of the Contractor to have protected his work shall be grounds to nullify any request for additional remuneration.

329 Planting

1 General

329000.121 Scope of Landscape Work

Include labor, equipment, material, incidentals, for the completion of planting, boulder placement, lawn, edging, and mulch work shown on the Drawings, stated in the Specifications or otherwise required.

329080.501 Stake Out Location of Landscape Work

The Contractor shall completely stake out the location of all trees, shrubs, and lawn area limits on the site for the approval of the Landscape Architect, making modifications as required.

329301.081 Applicable Standards

U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act, American Association of Nurserymen, current edition of "American Standard for Nursery Stock". Published by the American Association of Nurserymen, Inc., 635-636 Southern Building, Washington D.C. and/or Colorado State Law, whichever is greater.

329301.101 Shipment and Delivery

No plant materials shall be delivered to the site more than 3 days before planting. Plants left unplanted for more than 3 days shall be subject to rejection by the Owners Representative. A suitable method of handling shall be employed to insure the careful, workmanlike delivery of all plants, especially heavy balled trees. The Contractor shall protect the stock in a temporary nursery at the project, protected from sun, drying winds and shaded, kept moist and protected with damp soil, moss or other acceptable material.

329301.151 Notification of Delivery

The Landscape Contractor shall notify the General Contractor and Owners Representative a minimum of 2 days in advance of the delivery of the plant materials. Notification shall include the time and method of delivery.

329301.181 Quality Control Submittals

Certificates of Inspection for Plants: All necessary State, Federal and other inspection certificates shall accompany the invoice for each shipment of plant materials as may be required by law, and showing source of origin. Certificates shall be filed with the Owners Representative prior to his acceptance of the material.

329301.201 Plant Material Labeling

Durable, legible labels stating in weather-resistant ink indicating the correct plant name and size as specified on the plant list shall be securely attached to all plants, bundles or packages of plants of a single species and size, or plant container delivered to the planting site. Plants not properly labeled shall be subject to rejection by the Owners Representative.

329301.211 Plant List

A list of purchased plants to be provided is shown on the Drawings.

329301.221 Plant Material Inspection

The Owners Representative reserves the right to reject at any time or place prior to acceptance, any and all materials which in their opinion fail to meet specifications. Inspection of materials is primarily for quality, size and variety, but other requirements are not waived even though visual inspection results in approval. Plants may be inspected where available, but inspected at the places of supply shall not preclude the right of rejection at the site. Rejected materials shall be promptly removed from the site. No installation shall occur prior to inspection and acceptance of all plant material.

329320.021 Plant Sizes

Requirements for the measurement follow the code for standards currently recommended by the American Association of Nurserymen, Inc. in the American Standard for Nursery Stock

329350.011 Planting Commencement

No planting work shall commence until the adjacent site improvements, drainage improvements, pavements, irrigation installation and finish grading is completed. No heavy trucking or moving of plant materials or equipment shall be permitted on newly completed pavements, sod or seeded areas. Further, the irrigation system shall have been tested in the presence of the Operator's Representative and be in operating order prior to any planting, seeding or sodding, with the exception of drip emitters, which shall be placed following planting.

329350.051 Weather Restrictions

No lawn or planting work shall take place during inclement weather or when the ground conditions are, in the opinion of the Owners Representative, not in a condition to be properly worked.

329350.151 Irrigation & Establishment Restrictions

No seeding or planting operations shall occur prior to April 15 nor later than September 30.

329381.011 Substitute Products

Requests for substitution of products named in this section must be approved by the Owner's Representative one week prior to bid opening.

2 Products

329219.032 "No Mow" Fescue Lawn Seed Mix

Contractor shall submit variety and mixture to the Landscape Architect for approval. Quantity of bulk seed required to provide the specified PLS/1000 S.F. shall be calculated from purity and germination (as shown on sack tags) of the lot of seed actually purchased.
Fescue seed mix shall be No Mow Lawn Seed Mix available from Prairie Nursery. https://www.prairienursery.com/resources-and-guides/no-mow-resources/. Mixture to include Hard Fescue, Sheep Fescue, Chewings Fescue, Red Fescue, and Creeping Red Fescue.

329219.752 Hydromulch-Conwed

"Conwed 2000" or approved equal

329219.802 Fertilizer for Seeded Lawn Areas

A commercial fertilizer of di-ammonium phosphate (18-46-0) shall be supplied, in original manufacturer's containers, with label showing composition intact, free-flowing and dry, in quantity necessary to apply 1 pound/1000 sq. ft. over all areas to be seeded with the lawn mix. Retain all invoices for proof of purchase.

329333.022 Fertilizer for Shrub Areas

A commercial fertilizer providing 2 pounds per 1000 sq. ft. Phosphate, and 1 pound per 1000 sq. ft. Potash, shall be supplied, in original manufacturer's containers, with label showing composition intact, free-flowing and dry, in quantities necessary to apply over all shrub bed areas.

329413.012 Biosol Soil Amendment

Biosol soil amendment shall be "Biosol Planters Kit" as manufactured by Rocky Mountain Bio Products, 10801 E 54th Avenue, Denver, CO 80239 (888)696-8960, (20 lb Biosol, 50 lb humate, and 1 lb all purpose mycorrhizae),
or equal if approved by Owner's Representative prior to bidding.

329413.022 Concrete Edging

Concrete Edging for use as shrub bed borders shall be 6" x 4" fiber mesh reinforced extruded Mortar. Mortar shall consist of fine and course sands, 6 sacks Portland Cement per cubic yard, fiber mesh reinforcing as per manufacturers recommendations. Mix at least three minutes and not more than five minutes in mechanical batch mixer, with maximum amount of water to produce workable consistency.

329443.042 Tree Wrapping Material

Tree wrapping material shall be first quality 4" wide, bituminous impregnated tape, corrugated or crepe paper, brown in color, specifically manufactured for tree wrapping and having qualities to resist insect infestation.

329443.062 Protective Nylon Loops

1-1/2" wide (min.) for restraining tree in guying operations. Lengths as required.

329443.072 Guy Wire

10 or 12 gauge, double strand, pliable galvanized steel wire twisted to remove slack to each stake.

3 Materials

329113.013 Soil Amendment

50% Ground well-aged cow or chicken manure, or ground sheep manure, 50% finely ground and aged wood chip, with a proven analysis to verify organic content, PH, electro-conductivity, nitrogen, potassium, and phosphorus content. A sample of the material will be supplied to the Owner's Representative with an analysis.

329301.223 Specifics for the Selection of Shade Trees, Part 1

1. Trees greater than one and one-half inches (1-1/2") caliper shall be able to stand erect without a supporting stake.
2. Trees shall have straight trunks with less than a five percent (5%) bow. 3. Branches shall be less than two-thirds (2/3) the trunk diameter.
4. Trees shall be healthy and have had adequate annual growth the previous two (2) growing seasons for that species. (See fact sheets on growth rates).
5. Trees shall be rooted into the root ball so that soil or media remains intact and trunk and root ball move as one when lifted, bur not root bound. The trunk should bend when gently pushed and should not be loose so it pivots at or below the soil line.
6. Trees shall have no roots larger than one-fifth (1/5) the diameter of the trunk protruding from the grow bag or container.

329301.233 Specifics for the Selection of Shade Trees, Part 2

7. Trees shall have one dominant leader for the top of the tree with a viable terminal bud or shoot.
8. Trees shall have no vertical branches except for those cultivars reported to be fastigiated.
9. Trees shall have branches evenly distributed around the trunk and no branches shall be directly above another.
10. The largest branches shall be spaced at least six inches (6") apart except for those cultivars with characteristic multiple tops.
11. The tree canopy shall be mostly symmetrical and free of large voids. Clear trunk should be no more than 40% of tree height unless otherwise specified in the planting specifications.
12. If any of the above conditions are not met, trees may be rejected by the Owner.

329301.243 General Considerations for Plant Quality

Trees and shrubs will be inspected by the Owner prior to panting and rejected if damage or imperfections in development are noted to include: flush cuts or open injuries on the main trunk; trunk cankers; Loose or torn bark in excess of 10% of the circumference of the trunk or branch; Borer holes or boring dust in trunks or main branches; Branch attachments with the included bark; Co-dominate stems - trees only; Trees and Shrubs in violation of Rules and Regulations pertaining to Title 34, Article 26 of the Colorado Nursery Act; Damaged or incomplete graft unions; When in leaf, with more than five percent (5%) chlorotic leaves; When any root is greater than one-tenth (1/10th) the diameter of the trunk, circles more than one-third (1/3) the trunk and is in the top half of the root ball; Plants infested with colonies of other insect pests will be rejected or properly treated at the discretion of the Owner.

329401.013 Granite Rock Mulch -1/2" for shrub beds

Rock Mulch shall be 1/2" inch tan granite covering shrub beds. Rock mulch shall be free of trash, sticks or roots, Submit sample to Owner's Representative prior to construction.

329401.013 Rock Mulch -Larger type for Bike park

Rock Mulch in between Bike park tracks and smaller type rock, where shown on drawings shall be 3" Rounded Colorado River Rock. Rock mulch shall be free of trash, sticks or roots, Submit sample to Owner's Representative prior to construction.

329401.013 Rock Mulch - Smaller type for Bike park

Rock Mulch adjacent to Bike park Dirt Track shall be 1/2" inch red decomposed granite. Rock mulch shall be free of trash, sticks or roots, Submit sample to Owner's Representative prior to construction.

329460.083 Boulders

Landscape boulders to be of two sizes shown on drawings. Boulders shall be buried such that exposed rock surface depicts natural exposure of outcrop formation. Boulders are to be Rounded Colorado River Rock. Exposed surface of installed landscape boulders shall not show machine caused scarring or breakage. Contractor to submit sample to Owner's Representative prior to acquisition.

4 Execution

329113.314 Fine Grading for Landscape areas

Smooth surface, contour to distribute irrigation to root ball. Remove any saucers/dikes in shrub beds at bubblers where there are no plants. Form trench at all landscape edgers or pavements to accommodate mulch at depth specified. See details. All rocks bigger than 1" shall be picked up and removed from the site

329219.064 Hydroseed Fescue Lawn

Following approval of the lawn seed bed by the Landscape Architect, seed shall be applied with a hydroseeder at a rate of 6 lbs. /1000 s.f. The hydromulch shall be applied at a rate of 45 pounds per 1000 s.f. (1 ton/acre). Contractor to apply with a dye to allow inspection for proper coverage. Contractor shall be responsible for the masking and or cleaning of all adjacent surfaces, including but not limited to: pavements, fencing, plant materials, buildings, utility appurtenances, and foundations.

329219.504 Hydromulch of Seed Mix

After seeding operations have been completed, the entire seeded area shall be hydromulched with specified hydromulch material. The hydromulch shall be applied by using a mechanical hydromulcher, evenly distributed on a still day. The hydromulch material shall be applied at the rate of one ton per acre (50 lbs/1000 s.f.).

329219.804 Fertilizer for Seeded lawn areas

Fertilizer shall be spread at the rate of 1 pound/1000 sq. ft. The area shall again be disced or rototilled at right angles to the first tillage, seed beds shall be totally free from rock or clay clods over 1" diameter.

329219.814 Irrigation of Lawn Areas

Within 12 hours after planting lawn, the sprinkler system shall be activated to moisten planted areas to a depth of 1". All areas shall be kept moistened by frequent light watering for 3 weeks, or until the Final Acceptance of the Project, and such watering shall be the responsibility of the Contractor until seeded areas are accepted by the Owner.

329301.224 Tree Location conflicts with Underground Lines

The Contractor shall be responsible for damage to any underground utility, irrigation line or other improvements. In the event a pipe or line obstructs a plant location, the Contractor will notify the Owners Representative to receive a new plant location.

329310.024 Layout of Plant Locations

Contractor stake out the location of all trees, shrubs, perennials, and lawn area limits, or place containerized shrubs and perennials for approval by Landscape Architect prior to planting. All planting stake locations shall be observed and approved by the Landscape Architect, prior to planting operations.

329310.034 Layout of Planted Areas

The Contractor shall layout and stake the boundary of all areas to be planted and rough grades. All layout and rough grades to be approved by the Landscape Architect prior to commencing any work.

329312.044 Amended Plant Pit Backfill

Amended planter soil shall be used for backfill after being mixed with 1/3 part specified soil amendment. Gravel shall be replaced with topsoil.

329312.054 Plant Pit Excavation

The plant pit, centered on the location stake, shall be excavated at least twice the spread of ball, spade or container in a cylindrical shape with tapered sides and flat or saucer-shaped bottom. Sides of pit shall be rough and irregular, not smooth. Plant pits shall be excavated below finish grade as required to accommodate the ball.

329312.084 Planting Techniques - Part 1

1. Trees, shrubs and perennial flowers shall be in planting areas separate from turf areas.
a. In those instances where the Owner requires trees or shrubs planted in turf areas, the turf will be established prior to installation of trees or shrubs.
b. Trees and shrubs shall be planted a minimum of four inches (4") above the finished grade of the turf or mulched area based on their uppermost structural roots.
c. If the planting hole is inadvertantly dug too deep, soil shall be added and compacted.
d. The width of the planting hole shall be a minimum of at least one and one-half times the diameter of the root ball, two times the diameter of the rootball where possible.
2. Trees and shrubs shall be planted with two (2) or more of the upper-most structural roots no more than two inches (2”) below the surface of the root ball measured three to four inches (3-4”) from the trunk (except as noted below).

329312.094 Planting Techniques - Part 2

Soil shall be removed from the top of the root ball prior to planting to determine the actual depth of the structural roots. a. Hackberry (*Celtis occidentalis*), green ash (*Fraxinus americana*), red maple (*Acer rubrum*), little leaf linden (*Tilia cordata*), crabapples (*Malus spp.*) and poplars (*Populus spp.*) shall be planted with no more than one inch (1”) of soil over the uppermost structural roots. b. Adventitious roots above the structural roots shall be removed. c. The presence of encircling roots shall be checked for and treated as in 9. below. d. The planting hole shall be dug two to four inches (2-4”) shallower than the depth of the root ball (based on the location of the structural roots.) e. Soil shall be graded from the surrounding soil to near the top of the root ball to cover the exposed sides of the root ball. f. There shall be no landscape soil placed on top of the root ball.

329312.104 Planting Techniques - Part 3

3. The top 12 to 18 inches (two or three levels) of wire basket shall be removed from the root ball. The bottom half of baskets more than about 40 inches in diameter can be left intact.
4. All twine and wire at the base of the trunk shall be removed and disposed of offsite.
5. All synthetic and plastic burlap shall be cut as far down the root ball as possible so soil along the side of the root ball is in direct contact with backfill soil. All synthetic and plastic burlap shall be removed from the site.
6. Natural burlap shall be removed from the top of the ball and at least one-half (1/2) way down the side of the root ball. Burlap shall be removed from the site.
7. Fertilizer shall not be added to the back-fill soil.
8. Containers shall be removed from the root ball prior to planting. Containers shall be removed from the site and properly disposed of.

329312.114 Planting Techniques - Part 4

9. Pot bound (root bound) trees and shrubs shall be avoided.
a. There shall be no roots greater than 1/10 diameter of the trunk circling more than one-third the way around the top half of the root ball. There shall be no kinked roots greater than 1/5 the trunk diameter. Roots in violation can be cut and the tree accepted at the option of the Owner. b. If it is necessary to plant a pot bound tree or shrub, encircling roots shall be cut to prevent them from girdling the plant in the future. Three (3) or four (4) slices one inch (1”) or two inches (2”) deep shall be made from the bottom to the top of the root ball.
10. Mulch shall be placed on the root ball to within 6 to 8 inches of the trunk or main stem(s), and no closer.

329312.124 Planting Techniques - Part 5

11. The planting of clump aspen and other trees (i.e. two or more stems in one root ball) shall be avoided.
a. If a clump effect is desired, separate trees shall be planted with their root balls touching.
12. Trees and shrubs shall be moved by their root balls, not their trunks, in such a manner that trunk and branch damage shall be avoided.
13. Trees and shrubs planted on slopes shall be set so the to-most root in the ball on the uphill side is even with the soil. The side of the root ball on the downhill side shall be well above the surrounding soil and a basin formed to retain water. Sufficient soil shall be applied to cover the sides of the root ball.

329312.134 Planting Techniques - Part 6

14. A three inch (3") layer of mulch shall be applied around trees and shrubs to within six to eight (6-8") inches of the trunk or stem (s). A mulched area two feet (2') in diameter for each one inch (1") of tree trunk DBH (with a minimum diameter of eight feet (8') for trees), shall be maintained during the establishment period.
15. If staking is necessary it shall be accomplished using one of the following methods:
a. Two or three wood dowels shall be driven through the edge of the root ball into the underlying soil for three gallon and smaller trees.
b. One horizontal 2X2 shall be screwed or nailed to two 2X2's driven 12 inches into undisturbed soil on each side of the root ball. Two sets shall be needed for each root ball.
c. Two or three (2-3) t-posts driven into a minimum of 12 inches of undisturbed soil.

329312.144 Planting Techniques - Part 7

i. When two (2) posts are specified, these shall be placed on either side of the tree parallel to the prevalent wind direction.
ii. When three (3) posts are specified these shall be placed equidistant (120 degrees) around the tree.
iii. Stakes will be kept clear of branches to prevent rub damage.
iv. Guys shall be flagged with a conspicuous material and replaced as required by the Owner.
16. Feather growth on the lower portion of the trunk shall remain in place for one (1) year after planting.

329312.154 Planting Techniques - Part 8

17. Pruning other than to correct structural problems or remove broken branches shall be avoided.
18. The trunks and large branches and foliage of all pines shall be sprayed with a pyrethrum (organic product), pyrethroid or similar insecticide prior to or within a day of planting by a qualified applicator.
a. A wettable powder formulation shall be used if available.
b. Phytotoxicity resulting from this treatment shall be the responsibility of the applicator.

329312.204 Plant Pit Backfill

On-site soil shall be used for backfill (unless excavated soil is gravel) after being mixed with 1/3 part specified soil amendment. Gravel shall be replaced with topsoil.

329343.054 Layout of Tree Locations

The Contractor shall locate and stake all tree locations. All planting stake locations shall be observed and approved by the Landscape Architect, prior to planting operations.

329343.104 Watering

All trees and shrubs shall be watered-in using a deep-watering device, immediately after planting, staking and guying. All planting shall be watered the same day it is planted.

329401.014 Installation of Rock Mulch

Place rock in all areas shown to receive mulch on drawings. Spread carefully and evenly to a minimum depth of 3" on areas shown on drawing.

329401.024 Preparation for Mulch

Perimeter of Shrub Beds shall be graded 2" below top of curbs, walks, edger (see detail), or any other grade level improvements for receiving mulch. Planted area of shrub bed shall remain at the same grade or higher than adjacent pavements or lawn areas to insure adequate drainage of shrub beds.

329413.014 Biosol Soil Amendment

Biosol Planters Mix shall be incorporated at the following rates

a. 1/2 cup per 1 gal Perennial
b. 1 cup per 5 gal shrub
c. 2 cups per 2" caliper of tree size of each tree.

329413.034 Concrete Edging

The Contractor shall lay out and stake the location of all concrete edger defining shrub beds (coordinate with irrigation) to be approved by the Landscape Architect prior to commencing any work. Upon approval, concrete edger shall be installed to match existing top of curb or walk (where adjoining), or 1/2" to 3/4" above finish grade of lawn area. Lines are to be straight, and curbs to be single radius curves with adjoining lines tangent to curve. Curbing installed not in line, grade, or proper curve will be removed and replaced at Contractor expense. Edger to be scored perpendicular to vertical face at intervals not to exceed 4'.

329413.044 Concrete Edging

Concrete Edging shall be extruded into a trench which allows the top of curbing to be 1/2"-1" above adjacent lawn grade. Curbing installed not in line, grade, or proper curve will be removed and replaced at Contractor expense.

329443.044 Tree Wrapping Material

All deciduous tree trunks shall be wrapped after October 1, with wrapping material overlapping one and one-half (1 1/2") inches wound from ground line to the second branch, and securely taped at five places, including the top, middle and bottom. Wrap is to be removed the following spring.

329460.094 Play Boulders

Boulders are to be placed where indicated on drawings. The nature of the selected rock will require excavation of a pit approximately 1/3 the height of the rock in the position rock is to be placed, as shown on detail. Backfill following placement, compact.

5 Warranty

329219.905 Maintenance Period for Lawn Areas (seed)

The maintenance period shall begin immediately after each area is seeded and continue for thirty days or until final acceptance, whichever is longer. During this time the Contractor shall be responsible for watering, mowing, spraying, weeding, repair of areas damaged by erosion, wind, fire or other causes. Such areas shall be repaired to reestablish the condition and grade of the soil prior to application of the netting or mulch and shall be refertilized, reseeded, and remulched as directed. After 30 days or until final acceptance of the entire project (whichever is longer), maintenance shall become the responsibility of Owner. The Landscape Architect will direct the Contractor on what seed areas need to be replaced at the final walk-through.

329219.955 Final Acceptance for Lawn Areas

The seeded area shall be accepted on the basis of having a uniform plant growth over the entire seeded area. Acceptable uniform plant growth shall be defined as when the scattered bare spots, not greater then one (1) sq. ft., do not exceed five (5%) percent of the irrigated seeded area.

329310.015 Protection and Maintenance of Plant Materials

All planting shall be protected and maintained until final acceptance of all work. Maintenance shall include watering, weeding, cultivating, mulching, insect control (through spraying, biological control, or whatever method is recommended by the Tri River Extension Service), tightening and repairs of guys, removal of dead branches, resetting plants to proper grade or upright position, and other necessary operations.

329380.025 Replacement

All replacement planting is to be executed within ten (10) days of notice to replace such plants. Replacement of planting is to be in accordance with the original specifications and its cost considered to be included in the bid price. All areas damaged by tree or shrub planting or replacement operations are to be fully restored to their original condition as specified.

329380.055 Final Inspection and Acceptance

Inspection of the work to determine completion of contract, exclusive of the possible replacement of plants, will be made by the Owners Representative at the conclusion of construction operations. The condition of all planting will be noted and a determination made by the Owners Representative whether maintenance shall continue in any part. Contractor will be notified of acceptance of the work or any deficiencies in the requirements for completion. Plants must be in excellent and vigorous conditions. Excessively pruned trees and shrubs which, in the opinion of the Owners Representative, are no longer excellent representatives of their species shall be replaced prior to Final Acceptance.

Appendix C

Geotechnical Report

Huddleston-Berry
Engineering & Testing, LLC

GEOLOGIC HAZARDS AND GEOTECHNICAL INVESTIGATION RIVERFRONT AT DOS RIOS GRAND JUNCTION, COLORADO PROJECT#00208-0111

CITY OF GRAND JUNCTION
333 WEST AVENUE, BLDG C
GRAND JUNCTION, COLORADO 81501

MARCH 10, 2020

Huddleston-Berry Engineering and Testing, LLC
2789 Riverside Parkway
Grand Junction, Colorado 81501

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FIGURES

Figure 1 – Site Location Map
Figure 2 – Site Plan
Figure 3 – Waste Delineation

APPENDICES

Appendix A – UDSA NRCS Soil Survey Data
Appendix B – Typed Boring and Test Pit Logs
Appendix C – Laboratory Testing Results

1.0 INTRODUCTION

As part of continued development in Western Colorado, the City of Grand Junction proposes to create the Riverfront at Dos Rios mixed development in Grand Junction. As part of the design development process, Huddleston-Berry Engineering and Testing, LLC (HBET) was retained by the City of Grand Junction to conduct a geologic hazards and geotechnical investigation at the site.

1.1 Scope

As discussed above, a geologic hazards and geotechnical investigation was conducted for the Riverfront at Dos Rios in Grand Junction, Colorado. The scope of the investigation included the following components:

- Conducting a subsurface investigation to evaluate the subsurface conditions at the site.
- Collecting soil samples and conducting laboratory testing to determine the engineering properties of the soils at the site.
- Providing preliminary recommendations for foundation types and subgrade preparation.
- Providing preliminary recommendations for bearing capacity.
- Providing recommendations for lateral earth pressure.
- Providing recommendations for drainage, grading, and general earthwork.
- Providing recommendations for pavements.
- Evaluating potential geologic hazards at the site.

The investigation and report were completed by a Colorado registered professional engineer in accordance with generally accepted geotechnical and geological engineering practices. This report has been prepared for the exclusive use of the City of Grand Junction.

1.2 Site Location and Description

The site includes roughly 40 acres south of Hale Avenue and west of the Riverside Parkway, north and east of the Colorado River. The project location is shown on Figure 1 – Site Location Map.

At the time of the investigation, most of the site was open. However, several small existing structures were present in the northeastern corner of the site. In addition, large piles of fill materials were stockpiled in the northwestern portion of the site. With the exception of the fill materials, the general site grade was gently down to the south/southwest towards the Colorado River. Vegetation consisted primarily of grasses and weeds, with brush along the river. The site was bordered to the north by Hale Avenue, to the north and east by the Riverside Parkway, to the east by railroad tracks, and to the south and west by the Colorado River.

1.3 Proposed Construction

The proposed construction is anticipated to initially include site grading and infrastructure including utilities and new site roadways. The future development at the site is anticipated to include both multi-family residential and commercial construction.

2.0 GEOLOGIC SETTING

2.1 Soils

Soils data was obtained from the USDA Natural Resource Conservation Service Web Soil Survey. The data indicates that the site is underlain by Massadona silty clay loam, saline surface, 0 to 2 percent slopes and Green River clay loam, 0 to 2 percent slopes. Soil survey data is included in Appendix A.

Structure construction in the Massadona soils is described as being somewhat limited to very limited due to shrink-swell, flooding, and/or depth to saturated zone. Road construction in the site soils is indicated to be somewhat limited to very limited due to frost action, low strength, flooding, and/or shrink-swell. Excavation in the site soils is described as being somewhat limited due to dust, clay content, depth to saturated zone, and/or unstable excavation walls. The site soils are indicated to have a low to moderate potential for frost action, high risk of corrosion of steel, and moderate to high risk of corrosion of concrete.

2.2 Geology

According to the *Geologic Map of the Grand Junction Quadrangle, Mesa County, Colorado* (2002), most of the site is underlain by the youngest alluvium deposited by the Colorado River. However, the eastern portion of the site is mapped as being underlain by undivided alluvium and colluvium.

2.3 Groundwater

Groundwater was encountered in the subsurface at depths of between 7.0 and 13.0 feet below the existing ground surface at the time of the investigation. However, due to the proximity of the site to the Colorado River, the groundwater elevations at the site will fluctuate based upon the river level. During the spring runoff, HBET anticipates that the groundwater elevations across the site will be significantly higher than encountered during the subsurface investigation.

3.0 FIELD INVESTIGATION

3.1 Current Subsurface Investigation

The current subsurface investigation was conducted in February 2020 and included twelve borings and six test pits. The borings and test pits extended to depths of between 6.0 and 20.0 feet below the existing ground surface. Boring and test pit locations are shown on Figure 2 – Site Plan. Typed boring and test pit logs are included in Appendix B. Samples of the native soils were collected during Standard Penetration Testing (SPT) and using bulk sampling methods at the locations shown on the logs.

As shown on the logs, the subsurface conditions were variable. However, the borings and test pits generally encountered native clay, sand, and silt soils in the shallow subsurface. The native clay, sand, and silt soils were underlain by dense to very dense gravel and cobble soils to the depths explored.

Borings B-11 and B-12, conducted in the western portion of the site, encountered 4 feet of fill material above the native soils. In addition, Test Pits TP-2 and TP-3 encountered thick trash and debris materials. These materials are similar to those encountered during previous subsurface exploration at the site which will be discussed in the following section.

In addition to the borings and test pits, HBET collected random samples of the more clayey fill materials stockpiled on the site. HBET understands that the City will be using the stockpiled materials to raise the grade across the site. The sampling was to verify that the materials are generally suitable for use as grading fill. The locations of the samples are shown on Figure 2.

3.2 Previous Subsurface Investigation

In 2017, HBET conducted a soils investigation for a proposed commercial property in the southeastern portion of the site. Unfortunately, municipal waste materials were encountered in the subsurface. As a result, subsequently, the City of Grand Junction in conjunction with Austin Civil Group completed a large scale subsurface investigation across the site to delineate the extents of the waste. Figure 3 is a copy of the summary plan prepared by Austin Civil Group showing the limits of the waste.

HBET understands that a portion of the waste at the south end of Dos Rios Way was already removed. In addition, HBET understands that the waste materials north and west of Dos Rios Way are proposed to be removed. However, the waste materials in the southeastern portion of the site is an area proposed to be greenspace and a bicycle playground. As a result, the waste in this area will likely remain.

4.0 LABORATORY TESTING

Selected native soil samples collected from the borings, test pits, and stockpiled fill materials were tested in the Huddleston-Berry Engineering and Testing LLC geotechnical laboratory for natural moisture content, grain size analysis, Atterberg limits, maximum dry density and optimum moisture (Proctor), California Bearing Ratio (CBR), and water soluble sulfates content. The laboratory testing results are included in Appendix C.

The laboratory testing results indicate that the native clay range from slightly to moderately plastic. In addition, the CBR results indicate that the native clay soils are very slightly expansive with up to approximately 0.9% expansion measured in the laboratory.

The native sand soils were indicated to be non-plastic. The native silt soils were indicated to be very slightly plastic. In general, based upon our experience with similar soils in the vicinity of the subject site, the native sand and silt soils are anticipated to be slightly collapsible. Water soluble sulfates were detected in the site soils in a concentration of 0.1%.

The stockpiled materials with higher clay content were indicated to be slightly plastic. As a result, these materials are generally suitable for use as grading fill across the site.

5.0 GEOLOGIC INTERPRETATION

5.1 Geologic Hazards

The most significant geologic hazard identified on the site is the potential impacts to the site of flooding of the Colorado River. However, The City of Grand Junction has been placing fill materials across the site to raise the general site grade above the 100-year floodplain. In addition to the risk of flooding, moisture sensitive soils were also encountered at the site. Shallow groundwater was encountered in portions of the site.

5.2 Geologic Constraints

In general, the primary geologic constraint to construction at the site is the presence of moisture sensitive soils. However, shallow groundwater and associated soft soil conditions may also impact the construction depending upon the time of year that construction is completed.

5.3 Water Resources

No water supply wells were observed on the property. As discussed previously, the site lies adjacent to the Colorado River. In general, with proper design and construction, the development of the property is not anticipated to adversely impact surface water or groundwater.

5.4 Mineral Resources

Potential mineral resources in western Colorado generally include gravel, uranium ore, and commercial rock products such as flagstone. As discussed previously, gravels were encountered in the subsurface at the site. However, economic valuation of gravel extraction at this site is beyond the scope of our work.

6.0 CONCLUSIONS

Based upon the available data sources, field investigation, and nature of the proposed construction, HBET does not believe that there are any geologic conditions which should preclude construction at this site. However, foundations, pavements, and earthwork may have to consider the impacts of moisture sensitive soils, potential flooding of the Colorado River, and/or shallow groundwater.

7.0 RECOMMENDATIONS

7.1 Foundations

As discussed previously, moisture sensitive soils were encountered at the site. However, the magnitude of anticipated volume change in most of the soils is small. As a result, for lightly loaded structures, HBET believes that shallow foundations such as spread footings or monolithic structural slabs will be appropriate. However, for multi-story or other heavily loaded structures, deep foundations such as helical piles are an appropriate alternative due to the generally shallow depth to a competent bearing stratum. The generally recommended foundation alternatives are discussed in the following sections. However, HBET should be provided the opportunity to evaluate individual structures proposed at the site to ensure that the best foundation alternative is used for each structure.

Shallow Foundations

In order to provide a uniform bearing stratum and reduce the potential for excessive differential movements, HBET recommends that shallow foundations be constructed above a minimum of 24-inches of structural fill. Structural fill materials will be discussed later in this report.

For spread footing foundations, the footing areas may be trenched. However, for monolithic slab foundations, the structural fill should extend across the entire building pad area to a depth of 24-inches below the lowest portion of the foundation. Structural fill should extend laterally beyond the edges of the foundation a distance equal to the thickness of structural fill for both foundation types.

Prior to placement of structural fill, it is recommended that the bottoms of the foundation excavations be scarified to a depth of 9 to 12-inches, moisture conditioned, and compacted to a minimum of 95% of the standard Proctor maximum dry density, within ± 2% of the optimum moisture content, as determined in accordance with ASTM D698. However, depending upon the depth of excavation and time of year during construction, shallow groundwater and associated soft soil conditions may exist. It may be necessary to utilize geotextile and/or geogrid in conjunction with up to approximately 30-inches of granular fill to stabilize the subgrade.

Structural fill should be extended to within 0.1-feet of the bottom of the foundation. No more than 0.1-feet of gravel should be placed below the footings or turndown edge as a leveling course.

Structural fill should be moisture conditioned, placed in maximum 8-inch loose lifts, and compacted to a minimum of 95% of the standard Proctor maximum dry density for fine grained soils and 90% of the modified Proctor maximum dry density for coarse grained soils, within ± 2% of the optimum moisture content as determined in accordance with ASTM D698 and D1557, respectively.

For the foundation building pads prepared as recommended with structural fill in accordance with this report, a maximum allowable bearing capacity of 1,500 psf may be used. In addition, a modulus of subgrade reaction of 150 pci may be used for structural fill consisting of suitable native soils and a modulus of 200 pci may be used for structural fill consisting of approved imported materials as discussed later in this report. The bottoms of exterior foundations should extend a minimum of 24-inches below grade for frost protection.

For shallow foundations prepared as recommended, HBET believes that structure settlements will be less than 1.0-inch.

Helical Piles

Helical piles consist of circular or square steel shafts with load carrying helices attached to them. Some of these types of piers are proprietary. In general, the precise type, size, and quantity of piles should be established by the contractor in conjunction with the structural engineer. However, HBET provides the following preliminary design comments.

In general, helical piles should be designed to penetrate the shallow soils and bear into the dense gravel and cobble soils. It is anticipated that the helical piles will reach refusal within 3 to 10 feet of the top of the gravel and cobble soils. Therefore, pile lengths of up to approximately 20 feet may be possible (measured from existing grade).

In general, for helical piles installed to refusal, the allowable structural capacity is used. Based upon our experience with other projects utilizing helical piles, allowable axial capacities of between approximately 20 and 40 tons are anticipated for helical piles, depending upon the shaft diameter. However, higher capacities are possible, if necessary. The actual allowable capacity should be determined based upon the results of load testing conducted on the individual project sites. To eliminate reductions in capacity from group effects, the piles should be spaced a distance equal to three times the diameter of the largest helix.

For helical pile foundations in accordance with the above, HBET believes that structure settlements will be less than 1.0-inch.

7.2 Structural Fill and Site Grading Fill

As discussed above, the native clay soils ranged from slightly to moderately plastic. In general, the native silt, sand, and low plasticity clay soils are suitable for reuse as structural fill. However, the moderately plastic clay soils are not suitable for reuse as structural fill. HBET recommends that native soils on each building site proposed to be reused as structural fill be evaluated to verify that they are suitable for reuse.

Imported structural fill should consist of a non-free draining, non-expansive material approved by HBET. It is anticipated that CDOT Class 6 base course, ¼-inch minus, or other commonly available structural fill material in Western Colorado will be suitable.

As discussed previously, HBET understands that the City proposes to raise the grade across the site to be above the 100-year floodplain. In addition, HBET understands that the fill materials stockpiled in the northwestern portion of the site are proposed to be used as the grading fill. The laboratory testing results on stockpiled materials observed to have a higher clay content indicates that the clays are slightly plastic. As a result, the stockpiled materials are anticipated to be generally suitable for use as site grading fill. However, a significant quantity of fill will be necessary to raise the site grade and variations in the imported materials may occur. Therefore, it is recommended that periodic sampling and testing of the imported materials be conducted to ensure that expansive or otherwise deleterious materials are not present in the grading fill.

7.3 Seismic Design Criteria

In general, based upon the results of the subsurface investigation, the site classifies as Site Class D for a stiff soil profile.

7.4 Corrosion of Concrete and Steel

As indicated previously, water soluble sulfates were encountered in the site soils in a concentration of 0.1%. This concentration represents a moderate degree of potential sulfate attack on concrete. Therefore, Type I-II sulfate resistant cement is recommended for construction at this site.

The Soil Survey Data suggests that the native soils have a high potential for corrosion of steel. In addition, groundwater levels are anticipated to fluctuate over time and the Colorado River elevation fluctuates and this will increase the corrosion potential. As a result, HBET recommends that helical piles be galvanized or that steel section loss due to corrosion be considered in the design.

7.5 Non-Structural Floor Slabs and Exterior Flatwork

As mentioned above, moisture sensitive soils are present at the site. Therefore, in order to reduce the risk of excessive differential movements, it is recommended that floor slabs be constructed above a minimum of 18-inches of structural fill. Exterior flatwork around structures should be constructed above a minimum of 12-inches of structural fill.

7.6 Drainage

In order to improve the long-term performance of the foundations and slabs-on-grade, grading around the structures should be designed to carry precipitation and runoff away from the structures. It is recommended that the finished ground surface drop at least twelve inches within the first ten feet away from the structures. However, where impermeable surfaces (i.e. sidewalks, pavements, etc.) are adjacent to the structures, the grade can be reduced to approximately 2.5-inches (ADA grade) within the first ten feet away from the structures. Downspouts should empty beyond the backfill zone. It is recommended that landscaping within five feet of the structures include primarily desert plants with low water requirements. In addition, it is recommended that automatic irrigation within ten feet of foundations, including drip lines, be minimized.

7.7 Lateral Earth Pressures

Stemwalls and/or any retaining walls should be designed to resist lateral earth pressures. For backfill consisting of the native soils, stockpiled fill, or imported granular, non-free draining, non-expansive material, we recommend that the walls be designed for an active equivalent fluid unit weight of 50 pcf in areas where no surcharge loads are present. An at-rest equivalent fluid unit weight of 70 pcf may be used. Lateral earth pressures should be increased as necessary to reflect any surcharge loading behind the walls.

7.8 Excavations

Excavations in the soils at the site may stand for short periods of time but should not be considered to be stable. The native soils generally classify as Type C soil with regard to OSHA's *Construction Standards for Excavations*. For Type C soils, the maximum allowable slope in temporary cuts is 1.5H:1V.

7.9 Pavements

The proposed construction is anticipated to include new parking lots and internal site roadways. As discussed previously, the pavement subgrade materials at the site range from clay soils to fill materials. The design California Bearing Ratio (CBR) of a composite sample of the site soils was determined in the laboratory to be less than 2.0. Therefore, the minimum recommended Resilient Modulus of 3,000 psi was used for the design.

Based upon the subgrade conditions and anticipated traffic loading, pavement section alternatives were developed using M-E procedures through the PerRoad software program. The following pavement section alternatives are recommended:

Automobile Parking Areas (Limited Truck Traffic)

ALTERNATIVE	PAVEMENT SECTION (Inches)				
	Hot-Mix Asphalt Pavement	CDOT Class 6 Base Course	CDOT Class 3 Subbase Course	Concrete Pavement	TOTAL
A	3.0	13.0			16.0
B	4.0	10.0			14.0
C	3.0	6.0	10.0		19.0
Rigid Pavement		6.0		6.0	12.0

Mixed Use Areas (Higher Truck Traffic)

ALTERNATIVE	PAVEMENT SECTION (Inches)				
	Hot-Mix Asphalt Pavement	CDOT Class 6 Base Course	CDOT Class 3 Subbase Course	Concrete	TOTAL
A	4.0	14.0			18.0
B	5.0	11.0			16.0
C	4.0	6.0	11.0		21.0
Concrete Pavement		6.0		8.0	14.0

Internal Roadways

ALTERNATIVE	PAVEMENT SECTION (Inches)				
	Hot-Mix Asphalt Pavement	CDOT Class 6 Base Course	CDOT Class 3 Subbase Course	Concrete	TOTAL
A	4.0	16.0			20.0
B	5.0	13.0			18.0
C	4.0	6.0	14.0		24.0
Concrete Pavement		6.0		8.0	14.0

Prior to new pavement placement, areas to be paved should be stripped of all topsoil, uncontrolled fill, or other unsuitable materials. It is recommended that the subgrade soils be scarified to a depth of 12-inches; moisture conditioned, and recompacted to a minimum of 95% of the standard Proctor maximum dry density, within ±2% of optimum moisture content as determined by AASHTO T-99. However, as discussed previously, soft soils may be encountered associated with shallow groundwater. It may be necessary to utilize geotextile and/or geogrid in conjunction with up to approximately 30-inches of granular fill to stabilize the subgrade.

Aggregate base course and subbase course should be placed in maximum 9-inch loose lifts, moisture conditioned, and compacted to a minimum of 95% and 93% of the maximum dry density, respectively, at -2% to +3% of optimum moisture content as determined by AASHTO T-180. In addition to density testing, base course should be proofrolled to verify subgrade stability.

It is recommended that Hot-Mix Asphaltic (HMA) pavement conform to CDOT grading SX or S specifications and consist of an approved 75 gyration Superpave method mix design. HMA pavement should be compacted to between 92% and 96% of the maximum theoretical density. An end point stress of 50 psi should be used. It is recommended that rigid pavements consist of CDOT Class P concrete or alternative approved by the Engineer. In addition, pavements should conform to local specifications.

The long-term performance of the pavements is dependent on positive drainage away from the pavements. Ditches, culverts, and inlet structures in the vicinity of paved areas must be maintained to prevent ponding of water on the pavement

8.0 GENERAL

The recommendations included above are based upon the results of the subsurface investigation and on our local experience. These conclusions and recommendations are valid only for the proposed construction.

As discussed previously, the subsurface conditions encountered at the site were variable. However, the precise nature and extent of any subsurface variability may not become evident until construction. As a result, it is recommended that HBET provide construction materials testing and engineering oversight during the entire construction process.

It is important to note that the recommendations herein are intended to reduce the risk of structural movement and/or damage, to varying degrees, associated with volume change in the native soils. However, HBET cannot predict long-term changes in subsurface moisture conditions and/or the precise magnitude or extent of volume change. Where significant increases in shallow subsurface moisture occur due to poor grading, improper stormwater management, utility line failure, excess irrigation, or other cause, either during construction or the result of actions of the property owner, several inches of movement of shallow foundations and/or slabs on grade are possible. In addition, any failure to comply with the recommendations in this report releases Huddleston-Berry Engineering & Testing, LLC of any liability with regard to the structure performance.

Huddleston-Berry Engineering and Testing, LLC is pleased to be of service to your project. Please contact us if you have any questions or comments regarding the contents of this report.

Respectfully Submitted:
Huddleston-Berry Engineering and Testing, LLC

Michael A. Berry, P.E.
Vice President of Engineering

FIGURES

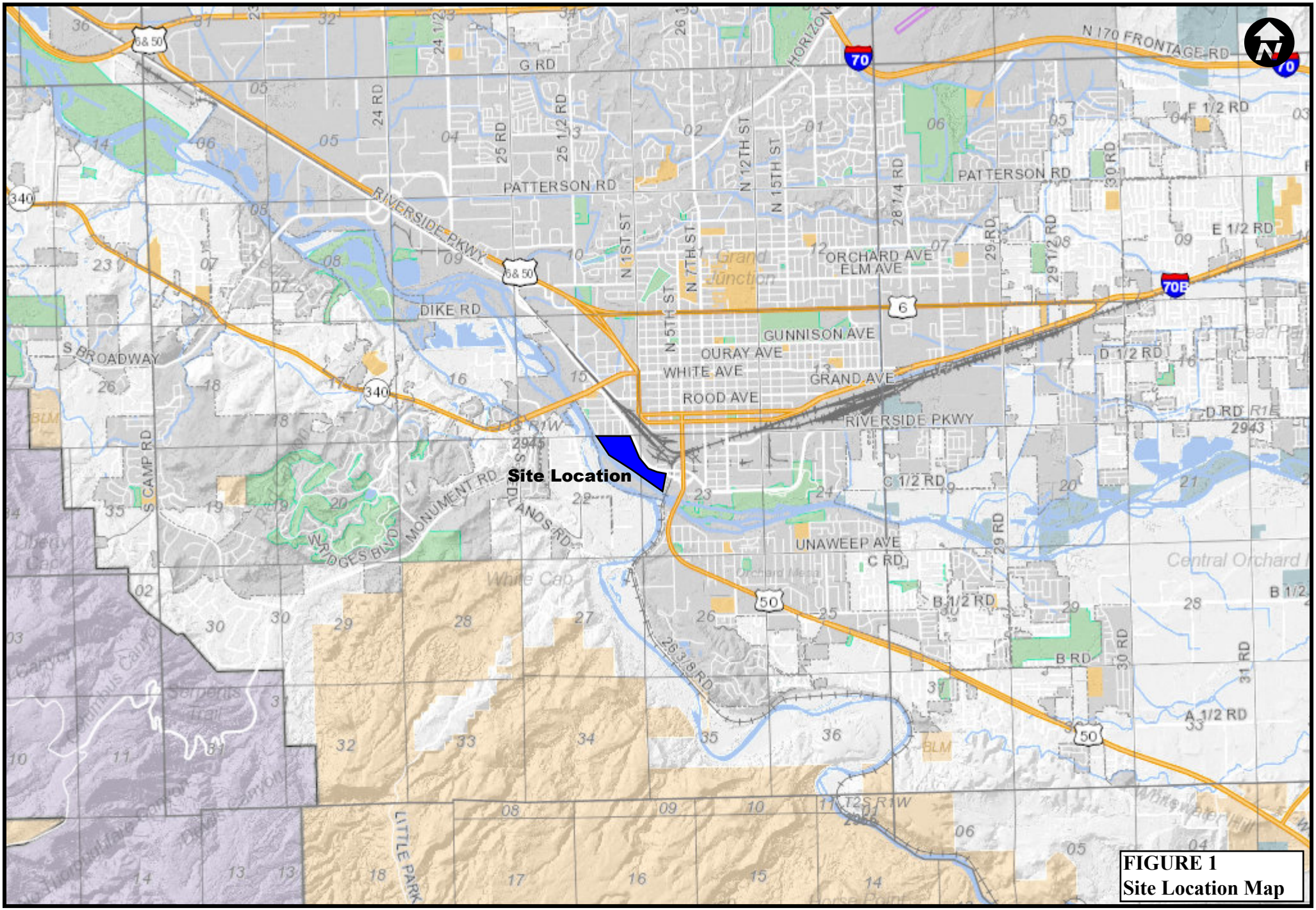

FIGURE 1
Site Location Map

Mesa County Map

The Geographic Information System (GIS) and its components are designed as a source of reference for answering inquiries, for planning and for modeling. GIS is not intended or does not replace legal description information in the chain of title and other information contained in official government records such as the County Clerk and Recorders office or the courts. In addition, the representations of location in this GIS cannot be substitute for actual legal surveys.
The information contained herein is believed accurate and suitable for the limited uses, and subject to the limitations, set forth above. Mesa County makes no warranty as to the accuracy or suitability of any information contained herein. Users assume all risk and responsibility for any and all damages, including consequential damages, which may flow from the user's use of this information.

0 0.5 1 2 mi
0 0.5 1 2 km

Print Date: March 10, 2020

Mesa County, Colorado
GIS/IT Department
gis.mesacounty.us

City of Grand Junction

FIGURE 2
Site Plan

N

0 0.28 0.55 mi

Printed: 3/10/2020

1 inch equals 376 feet

Scale: 1:4,514

CITY OF Grand Junction COLORADO
GEOGRAPHIC INFORMATION SYSTEM

RIVERSIDE PARKWAY

TEST PIT #17 5-26-17
CLEAN
8' TO PIT RUN

TEST PIT #16 5-26-17
CLEAN
8' TO PIT RUN

TEST PIT #15 5-26-17
CLEAN
8' TO PIT RUN

TEST PIT #14 5-26-17
DEBRIS
8' TO PIT RUN

TEST PIT #13 5-26-17
DEBRIS BROKEN CONCRETE SLABS
6' PIT RUN

TEST PIT #12 5-26-17
CLEAN
8' FILL TO BOG MUD

TEST PIT #11 5-26-17
CLEAN
8' TO PIT RUN

DEBRIS AREA
±58,000 SF
3' AVG DEPTH = ±6,500 CY

TEST PIT #4
CLEAN 7' TO PIT RUN

TEST PIT #5
CLEAN 6' TO PIT RUN

TEST PIT #6
TRASH AND BROKEN
CONCRETE 0.5' FROM SURFACE
TO 7' AND TOP OF PIT RUN

TEST PIT #8
0.5' FROM SURFACE TO 1'
SMALL AMOUNT OF DEBRIS
8' TO PIT RUN

TEST PIT #7
CLEAN 7' TO PIT RUN

TEST PIT #8
CLEAN
7' TO PIT RUN

TEST PIT #8 TRENCH
0.5' FROM SURFACE TO 1'
SMALL AMOUNT OF DEBRIS
6.5' TO PIT RUN

TEST PIT #10
DIRTY OLD TIRES, DEBRIE
0.5' FROM SURFACE TO 2.5'
ABOVE PIT RUN HOLE 8' DEEP

TEST PIT #10 TRENCH
DEBRIE
0.5' FROM SURFACE TO PIT RUN
TRENCH 8' DEEP

TEST PIT #10 TRENCH
DEBRIE
0.5' FROM SURFACE TO 1.5' TRENCH 2' DEEP

TEST PIT #13 TRENCH
DEBRIE 0.5' FROM SURFACE TO 0.5'
TO 1' DEEP 2.5' TO PIT RUN

TEST PIT #12
CLEAN

TEST PIT #11 TRENCH
DEBRIE 0.5' FROM SURFACE TO 1'
HOLE 2' DEEP

TEST PIT #13 TRENCH
DEBRIE 0.5' FROM SURFACE
TO 1' DEEP 2' TO PIT RUN

TEST PIT #15 TRENCH
DEBRIE FROM SURFACE
TO 1' DEEP 3' TO PIT RUN

TEST PIT #15
DEBRIE 0.5' FROM SURFACE
TO 1' DEEP 5' TO PIT RUN

TEST PIT #15 TRENCH
DEBRIE FROM SURFACE
TO 1' DEEP 3' TO PIT RUN

TEST PIT #15 TRENCH
DEBRIE FROM SURFACE
TO 1' DEEP 3' TO PIT RUN

TP-15
CLEAN TO 7'

TP-14
TRASH AND ASH
FROM SURFACE TO 7'

TEST PIT #15 TRENCH
DEBRIE FROM SURFACE
TO 1' DEEP 3' TO PIT RUN

TP-13
TRASH FROM
3' TO 8'

TP-1A
TRASH FROM 2.5'
TO 8'

TRASH AREA
±182,200 SF
6' AVG DEPTH = ±40,500 CY

TP-3
CLEAN TO 8'

TP-12
CLEAN TO 7'

TP-2
CLEAN TO 7'

TP-11
CLEAN TO 8'

TP-5
CLEAN

TP-2A
TRASH FROM 2.5'
TO 8'

TP-3A
TRASH FROM 2'
TO 8'

TEST PIT #8 TRENCH
0.5' FROM SURFACE TO 1'
SMALL AMOUNT OF DEBRIS
4' TO PIT RUN

166.93'

204.40'

191.69'

TEST PIT #5
CLEAN 7' TO PIT RUN

TEST PIT #11
DEBRIE
0.5' FROM SURFACE
TO PIT RUN HOLE
6.5' DEEP

TEST PIT #2
CLEAN 7' TO PIT RUN

TEST PIT #13
DEBRIE 0.5' FROM SURFACE TO 0.5'
TO 2' DEEP 7' TO PIT RUN

TEST PIT #14
CLEAN 6' TO PIT RUN

TEST PIT #15 TRENCH
DEBRIE FROM SURFACE
TO 2.5' DEEP 3' TO PIT RUN

TEST PIT #1
CLEAN
8' TO PIT RUN

TEST PIT #15 TRENCH
DEBRIE FROM SURFACE
TO 1' DEEP 3' TO PIT RUN

TP-4
CLEAN TO 8'

TP-8
CLEAN TO 8'

TP-9
CLEAN TO 8'

TP-10
CLEAN TO 5.5'

TP-6
TRASH FROM
SURFACE TO 7'

TP-1
CLEAN TO 8'

TP-7
TRASH FROM
SURFACE TO 7.5'

TP-4A
TRASH FROM 2'
TO 8'

TP-16
TRASH FROM
2' TO 8'

TEST PIT #10 5-26-17
CLEAN
8' TO PIT RUN

TEST PIT #4 5-26-17
TRASH AT 2' IN PIT RUN
TO 9' DEEP

TEST PIT #3 5-26-17
CLEAN
8' TO PIT RUN

TEST PIT #2 5-26-17
CLEAN
8' TO PIT RUN

TEST PIT #9 5-26-17
TRASH AT 2' TO 8' DEEP
TO PIT RUN

TEST PIT #8 5-26-17
TRASH AT 1.5' TO 8' DEEP
TO PIT RUN

TEST PIT #7 5-26-17
CLEAN
8' TO PIT RUN

TEST PIT #6 5-26-17
TRASH AT 2' TO 5' DEEP
TO PIT RUN

TEST PIT #5 5-26-17
TRASH AT 2' TO 5' DEEP
TO PIT RUN

TEST PIT #1 5-26-17
CLEAN
8' TO PIT RUN

0' 100' 200' 300'

TEST PIT TRASH
TEST PIT CLEAN
TEST PIT WITH DEBRIS
TEST PIT TRENCH
PREVIOUS TEST PIT

FIGURE 3
Waste Delineation

CALL UTILITY NOTIFICATION CENTER OF COLORADO
1-800-922-1987
CALL 2 BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES

SCALE VERIFICATION
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET
ADJUST SCALES ACCORDINGLY

REVISIONS

NO.	DESCRIPTION	DATE	BY

A • C • G
AUSTIN CIVIL GROUP, INC
Land Planning • Civil Engineering • Development Services
123 N 7th Street, Suite 300 • Grand Junction, Colorado 81501
(970) 242-7540

JARVIS PROPERTY
TEST PIT & TRENCH LOCATIONS
CITY OF GRAND JUNCTION

DRAWN BY:	JOS
DESIGNED BY:	JOS
CHECKED BY:	MRA
APPROVED BY:	MRA
JOB NUMBER:	1024.006
DATE:	5/23/17
SCALE:	1" = 100'
SHEET NO:	C-1

APPENDIX A
Soil Survey Data

Map Scale: 1:5,310 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Mesa County Area, Colorado
Survey Area Data: Version 10, Sep 13, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 13, 2010—Aug 8, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BaS	Massadona silty clay loam, saline surface, 0 to 2 percent slopes	35.0	79.2%
Gm	Green River clay loam, 0 to 2 percent slopes	9.2	20.8%
Totals for Area of Interest		**44.2**	**100.0%**

Map Unit Description

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named, soils that are similar to the named components, and some minor components that differ in use and management from the major soils.

Most of the soils similar to the major components have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Some minor components, however, have properties and behavior characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description

Mesa County Area, Colorado

BaS—Massadona silty clay loam, saline surface, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: k06p

Elevation: 4,490 to 4,920 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Massadona, saline surface, and similar soils: 70 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Massadona, Saline Surface

Setting

Landform: Fan remnants
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Cretaceous source alluvium derived from clayey shale

Typical profile

Apz - 0 to 2 inches: silty clay loam
Bwz - 2 to 12 inches: silty clay
Bkyz - 12 to 24 inches: silty clay
BCkyz1 - 24 to 48 inches: fine sandy loam
BCkyz2 - 48 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.07 to 0.21 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 2 percent
Salinity, maximum in profile: Strongly saline (16.0 to 40.0 mmhos/cm)
Available water storage in profile: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): 7s
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: Desert Clay (Castlevalley saltbush) (R034BY103UT)
Hydric soil rating: No

Gm—Green River clay loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: k0dd
Elevation: 4,430 to 4,820 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 135 to 180 days
Farmland classification: Prime farmland if irrigated and drained

Map Unit Composition

Green river and similar soils: 90 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Green River

Setting

Landform: Flood-plain steps
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey alluvium over coarse-loamy alluvium derived from sandstone and shale

Typical profile

Ap - 0 to 10 inches: clay loam
C1 - 10 to 16 inches: fine sandy loam
C2 - 16 to 24 inches: fine sandy loam
C3 - 24 to 32 inches: fine sandy loam
C4 - 32 to 44 inches: fine sandy loam
C5 - 44 to 52 inches: fine sandy loam
2C - 52 to 60 inches: very cobbly sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.21 to 0.71 in/hr)
Depth to water table: About 36 to 60 inches
Frequency of flooding: Very rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: River Floodplain (Fremont Cottonwood) (R034BY011UT)
Hydric soil rating: No

Data Source Information

Soil Survey Area: Mesa County Area, Colorado
Survey Area Data: Version 10, Sep 13, 2019

Dwellings and Small Commercial Buildings

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. This table shows the degree and kind of soil limitations that affect dwellings and small commercial buildings.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Information in this table is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this table. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Report—Dwellings and Small Commercial Buildings

[Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

Dwellings and Small Commercial Buildings–Mesa County Area, Colorado							
Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BaS—Massadona silty clay loam, saline surface, 0 to 2 percent slopes							
Massadona, saline surface	70	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.17	Shrink-swell	0.06	Shrink-swell	0.17

Dwellings and Small Commercial Buildings–Mesa County Area, Colorado							
Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Gm—Green River clay loam, 0 to 2 percent slopes							
Green river	90	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.89		

Data Source Information

Soil Survey Area: Mesa County Area, Colorado
Survey Area Data: Version 10, Sep 13, 2019

Roads and Streets, Shallow Excavations, and Lawns and Landscaping

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. This table shows the degree and kind of soil limitations that affect local roads and streets, shallow excavations, and lawns and landscaping.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer.

Information in this table is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this table. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Report—Roads and Streets, Shallow Excavations, and Lawns and Landscaping

[Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

Roads and Streets, Shallow Excavations, and Lawns and Landscaping–Mesa County Area, Colorado							
Map symbol and soil name	Pct. of map unit	Lawns and landscaping		Local roads and streets		Shallow excavations	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BaS—Massadona silty clay loam, saline surface, 0 to 2 percent slopes							
Massadona, saline surface	70	Very limited		Very limited		Somewhat limited	
		Salinity	1.00	Low strength	1.00	Dusty	0.50
		Dusty	0.50	Shrink-swell	0.17	Too clayey	0.02
		Droughty	0.11			Unstable excavation walls	0.01

Roads and Streets, Shallow Excavations, and Lawns and Landscaping–Mesa County Area, Colorado							
Map symbol and soil name	Pct. of map unit	Lawns and landscaping		Local roads and streets		Shallow excavations	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Gm—Green River clay loam, 0 to 2 percent slopes							
Green river	90	Somewhat limited		Somewhat limited		Somewhat limited	
		Dusty	0.23	Frost action	0.50	Depth to saturated zone	0.89
		Salinity	0.13	Flooding	0.20	Dusty	0.23
						Unstable excavation walls	0.01

Data Source Information

Soil Survey Area: Mesa County Area, Colorado
Survey Area Data: Version 10, Sep 13, 2019

Soil Features

This table gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness and thickness of the restrictive layer, both of which significantly affect the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence generally results from either desiccation and shrinkage, or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. The table shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, saturated hydraulic conductivity (Ksat), content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low*, *moderate*, or *high.* It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Report—Soil Features

Soil Features–Mesa County Area, Colorado									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
		In	*In*		*In*	*In*			
BaS—Massadona silty clay loam, saline surface, 0 to 2 percent slopes									
Massadona, saline surface		—	—		0	0	Low	High	High
Gm—Green River clay loam, 0 to 2 percent slopes									
Green river		—	—		0	0	Moderate	High	Moderate

Data Source Information

Soil Survey Area: Mesa County Area, Colorado
Survey Area Data: Version 10, Sep 13, 2019

APPENDIX B
Typed Boring and Test Pit Logs

Huddleston-Berry Engineering & Testing, LLC
2789 Riverside Parkway
Grand Junction, CO 81501
970-255-8005

BORING NUMBER B-1

CLIENT City of Grand Junction
PROJECT NAME Riverfront at Dos Rios
PROJECT NUMBER 00208-0111
PROJECT LOCATION Grand Junction, CO
DATE STARTED 2/12/20 **COMPLETED** 2/12/20
GROUND ELEVATION ___ **HOLE SIZE** 4-inch
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Track Rig
AT TIME OF DRILLING 9.0 ft
LOGGED BY SD **CHECKED BY** MAB
AT END OF DRILLING 9.0 ft
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Lean CLAY (CL), brown, moist, stiff to very stiff										
		***Lab Classified SS1	SS 1	78	7-9-14 (23)			17	45	23	22	97
5												
		Silty SAND (SM), brown, moist to wet, loose to medium dense										
		***Lab Classified SS2	SS 2	56	4-4-3 (7)			20	NP	NP	NP	21
10		Sandy GRAVEL and COBBLES (gw), brown, wet, dense to very dense										
15			SS 3	100	18-32							
		Bottom of hole at 16.0 feet.										

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2789 Riverside Parkway
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BORING NUMBER B-2

CLIENT City of Grand Junction
PROJECT NAME Riverfront at Dos Rios
PROJECT NUMBER 00208-0111
PROJECT LOCATION Grand Junction, CO
DATE STARTED 2/12/20 **COMPLETED** 2/12/20
GROUND ELEVATION _____ **HOLE SIZE** 4-inch
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Track Rig
AT TIME OF DRILLING 8.0 ft
LOGGED BY SD **CHECKED BY** MAB
AT END OF DRILLING 8.0 ft
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Silty SAND (sm), brown, moist, medium dense										
2.5			SS 1	61	8-13-11 (24)							
5.0		Sandy GRAVEL and COBBLES (gw), brown, moist to wet, medium dense to very dense										
7.5		***Unable to sample past 8 ft due to caving	SS 2	83	4-4-5 (9)							
10.0												
12.5												
		Bottom of hole at 14.0 feet.										

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2789 Riverside Parkway
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970-255-8005

BORING NUMBER B-3

CLIENT City of Grand Junction
PROJECT NAME Riverfront at Dos Rios
PROJECT NUMBER 00208-0111
PROJECT LOCATION Grand Junction, CO
DATE STARTED 2/12/20 **COMPLETED** 2/12/20
GROUND ELEVATION _____ **HOLE SIZE** 4-inch
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Track Rig
AT TIME OF DRILLING dry
LOGGED BY SD **CHECKED BY** MAB
AT END OF DRILLING dry
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Sandy Lean CLAY (CL), brown, moist, medium stiff to stiff										
		***Lab Classified SS1										
2.5			SS 1	72	3-5-5 (10)			14	26	17	9	69
5.0												
		Sandy GRAVEL and COBBLES (gw), brown, moist, dense to very dense										
7.5			SS 2	83	19-50							
		***Auger refusal at 8 ft										
		Bottom of hole at 8.0 feet.										

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BORING NUMBER B-4

CLIENT City of Grand Junction
PROJECT NAME Riverfront at Dos Rios
PROJECT NUMBER 00208-0111
PROJECT LOCATION Grand Junction, CO
DATE STARTED 2/12/20 **COMPLETED** 2/12/20
GROUND ELEVATION ___ **HOLE SIZE** 4-inch
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Track Rig
AT TIME OF DRILLING 7.5 ft
LOGGED BY SD **CHECKED BY** MAB
AT END OF DRILLING 7.5 ft
NOTES ___
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Silty SAND (sm), brown, moist, loose to medium dense										
2.5			SS 1	94	2-2-2 (4)							
5.0		Sandy GRAVEL and COBBLES (gw), brown, moist to wet, dense to very dense										
7.5			SS 2	89	20-50/3"							
		***Auger refusal at 8 ft										
		Bottom of hole at 8.0 feet.										

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BORING NUMBER B-5

CLIENT City of Grand Junction
PROJECT NAME Riverfront at Dos Rios
PROJECT NUMBER 00208-0111
PROJECT LOCATION Grand Junction, CO
DATE STARTED 2/12/20 **COMPLETED** 2/12/20
GROUND ELEVATION _____ **HOLE SIZE** 4-inch
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Track Rig
AT TIME OF DRILLING dry
LOGGED BY SD **CHECKED BY** MAB
AT END OF DRILLING dry
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Sandy Lean CLAY (cl), brown, moist, medium stiff to stiff										
2.5			SS 1	72	5-7-7 (14)							
5.0												
7.5		Silty SAND (sm), brown, moist, loose to medium dense	SS 2	61	3-3-3 (6)							
		Sandy GRAVEL and COBBLES (gw), brown, moist, dense to very dense										
10.0		***Auger refusal at 10 ft Bottom of hole at 10.0 feet.										

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BORING NUMBER B-6

CLIENT City of Grand Junction
PROJECT NAME Riverfront at Dos Rios
PROJECT NUMBER 00208-0111
PROJECT LOCATION Grand Junction, CO
DATE STARTED 2/12/20 **COMPLETED** 2/12/20
GROUND ELEVATION _____ **HOLE SIZE** 4-inch
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Track Rig
AT TIME OF DRILLING dry
LOGGED BY SD **CHECKED BY** MAB
AT END OF DRILLING dry
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Sandy Lean CLAY (cl), brown, moist, medium stiff to stiff										
2.5			SS 1	72	3-5-9 (14)							
5.0												
7.5		Sandy GRAVEL and COBBLES (gw), brown, moist, dense to very dense	SS 2	83	50							
10.0		***Auger refusal at 10 ft Bottom of hole at 10.0 feet.										

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2789 Riverside Parkway
Grand Junction, CO 81501
970-255-8005

BORING NUMBER B-7

CLIENT City of Grand Junction
PROJECT NAME Riverfront at Dos Rios
PROJECT NUMBER 00208-0111
PROJECT LOCATION Grand Junction, CO
DATE STARTED 2/12/20 **COMPLETED** 2/12/20
GROUND ELEVATION _____ **HOLE SIZE** 4-inch
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Track Rig
AT TIME OF DRILLING dry
LOGGED BY SD **CHECKED BY** MAB
AT END OF DRILLING dry
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Silty SAND (sm), brown, moist, loose to medium dense										
2.5			SS 1	78	3-3-3 (6)							
5.0		Sandy GRAVEL and COBBLES (gw), brown, moist, dense to very dense ***Auger refusal at 6.75 ft	SS 2	89	45-50/3"							
		Bottom of hole at 6.8 feet.										

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BORING NUMBER B-8

CLIENT City of Grand Junction
PROJECT NAME Riverfront at Dos Rios
PROJECT NUMBER 00208-0111
PROJECT LOCATION Grand Junction, CO
DATE STARTED 2/12/20 **COMPLETED** 2/12/20
GROUND ELEVATION _____ **HOLE SIZE** 4-inch
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Track Rig
AT TIME OF DRILLING 7.0 ft
LOGGED BY SD **CHECKED BY** MAB
AT END OF DRILLING 7.0 ft
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Silty SAND (sm), brown, moist, loose to medium dense										
2.5			SS 1	89	5-5-5 (10)							
5.0		Sandy GRAVEL and COBBLES (gw), brown, moist to wet, dense to very dense										
7.5			SS 2	50	33-50							
		***Auger refusal at 8 ft										
		Bottom of hole at 8.0 feet.										

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BORING NUMBER B-9

CLIENT City of Grand Junction
PROJECT NAME Riverfront at Dos Rios
PROJECT NUMBER 00208-0111
PROJECT LOCATION Grand Junction, CO
DATE STARTED 2/12/20 **COMPLETED** 2/12/20
GROUND ELEVATION _____ **HOLE SIZE** 4-inch
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Track Rig
AT TIME OF DRILLING 7.0 ft
LOGGED BY SD **CHECKED BY** MAB
AT END OF DRILLING 7.0 ft
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Silty SAND (sm), brown, moist, loose to medium dense										
2.5			SS 1	83	5-3-3 (6)							
5.0												
7.5		Sandy GRAVEL and COBBLES (gw), brown, wet, dense to very dense	SS 2	67	1-6-12 (18)							
10.0												
12.5			SS 3	75	26-25							
		Bottom of hole at 13.0 feet.										

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2789 Riverside Parkway
Grand Junction, CO 81501
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BORING NUMBER B-10

CLIENT City of Grand Junction
PROJECT NAME Riverfront at Dos Rios
PROJECT NUMBER 00208-0111
PROJECT LOCATION Grand Junction, CO
DATE STARTED 2/12/20 **COMPLETED** 2/12/20
GROUND ELEVATION ---- **HOLE SIZE** 4-inch
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Track Rig
AT TIME OF DRILLING 7.0 ft
LOGGED BY SD **CHECKED BY** MAB
AT END OF DRILLING 7.0 ft
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Silty SAND (sm), brown, moist, loose to medium dense										
		Sandy GRAVEL and COBBLES (gw), brown, moist to wet, medium dense to very dense	SS 1	56	13-15-13 (28)							
5												
10			SS 2	39	6-8-11 (19)							
15												
20		***Auger refusal at 20 ft Bottom of hole at 20.0 feet.										

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Huddleston-Berry Engineering & Testing, LLC
2789 Riverside Parkway
Grand Junction, CO 81501
970-255-8005

BORING NUMBER B-11

CLIENT City of Grand Junction
PROJECT NAME Riverfront at Dos Rios
PROJECT NUMBER 00208-0111
PROJECT LOCATION Grand Junction, CO
DATE STARTED 2/12/20 **COMPLETED** 2/12/20
GROUND ELEVATION ___ **HOLE SIZE** 4-inch
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Track Rig
AT TIME OF DRILLING 9.0 ft
LOGGED BY SD **CHECKED BY** MAB
AT END OF DRILLING 9.0 ft
NOTES ___
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Sandy GRAVEL (FILL)										
2.5			SS 1	0	13-13-17 (30)							
5.0		Sandy Lean CLAY (cl), brown, moist, medium stiff										
7.5		Silty SAND (sm), brown, moist, loose to medium dense	SS 2	72	5-6-9 (15)							
		Sandy GRAVEL and COBBLES (gw), brown, moist, dense to very dense	SS 3	100	50							
		***Auger refusal at 9 ft										
		Bottom of hole at 9.5 feet.										

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BORING NUMBER B-12

CLIENT City of Grand Junction
PROJECT NAME Riverfront at Dos Rios
PROJECT NUMBER 00208-0111
PROJECT LOCATION Grand Junction, CO
DATE STARTED 2/12/20 **COMPLETED** 2/12/20
GROUND ELEVATION ---- **HOLE SIZE** 4-inch
DRILLING CONTRACTOR S. McKracken
GROUND WATER LEVELS:
DRILLING METHOD Simco 2000 Track Rig
AT TIME OF DRILLING 13.0 ft
LOGGED BY SD **CHECKED BY** MAB
AT END OF DRILLING 13.0 ft
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Sandy GRAVEL (FILL)										
2.5		***Lab Classified SS1	SS 1	44	4-5-3 (8)			10	31	19	12	53
5.0		Gravelly Lean CLAY with Sand (CL), brown, moist, medium stiff to stiff										
7.5			SS 2	39	4-5-8 (13)							
10.0		Sandy GRAVEL and COBBLES (gw), brown, moist to wet, medium dense to very dense										
12.5			SS 3	33	6-13-13 (26)							
		Bottom of hole at 13.5 feet.										

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2789 Riverside Parkway
Grand Junction, CO 81501
970-255-8005

TEST PIT NUMBER TP-1

CLIENT City of Grand Junction
PROJECT NAME Riverfront at Dos Rios
PROJECT NUMBER 00208-0111
PROJECT LOCATION Grand Junction, CO
DATE STARTED 2/12/20 **COMPLETED** 2/12/20
GROUND ELEVATION _____ **TEST PIT SIZE** 4-inch
EXCAVATION CONTRACTOR S. McKracken
GROUND WATER LEVELS:
EXCAVATION METHOD Simco 2000 Track Rig
AT TIME OF EXCAVATION dry
LOGGED BY SD **CHECKED BY** MAB
AT END OF EXCAVATION dry
NOTES _____
AFTER EXCAVATION ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Sandy Lean CLAY (CL), brown, moist, medium stiff										
2.5		***Lab Classified GB1	GB 1					8	27	18	9	70
5.0		Silty SAND (SM), brown, moist, loose to medium dense										
		***Lab Classified GB2	GB 2					5	NP	NP	NP	20
7.5		***Gravel and Cobbles at bottom of excavation										
		Bottom of test pit at 8.0 feet.										

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2789 Riverside Parkway
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970-255-8005

TEST PIT NUMBER TP-2

CLIENT City of Grand Junction
PROJECT NAME Riverfront at Dos Rios
PROJECT NUMBER 00208-0111
PROJECT LOCATION Grand Junction, CO
DATE STARTED 2/12/20 **COMPLETED** 2/12/20
GROUND ELEVATION _____ **TEST PIT SIZE** 4-inch
EXCAVATION CONTRACTOR S. McKracken
GROUND WATER LEVELS:
EXCAVATION METHOD Simco 2000 Track Rig
AT TIME OF EXCAVATION dry
LOGGED BY SD **CHECKED BY** MAB
AT END OF EXCAVATION dry
NOTES _____
AFTER EXCAVATION ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Trash, debris, etc. mixed with clayey sand (FILL)										
2.5												
5.0		Sandy GRAVEL and COBBLES (gw), brown, moist, dense to very dense										
		Bottom of test pit at 7.0 feet.										

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TEST PIT NUMBER TP-3

CLIENT City of Grand Junction
PROJECT NAME Riverfront at Dos Rios
PROJECT NUMBER 00208-0111
PROJECT LOCATION Grand Junction, CO
DATE STARTED 2/12/20 **COMPLETED** 2/12/20
GROUND ELEVATION _____ **TEST PIT SIZE** 4-inch
EXCAVATION CONTRACTOR S. McKracken
GROUND WATER LEVELS:
EXCAVATION METHOD Simco 2000 Track Rig
AT TIME OF EXCAVATION dry
LOGGED BY SD **CHECKED BY** MAB
AT END OF EXCAVATION dry
NOTES _____
AFTER EXCAVATION ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Trash, debris, etc. mixed with gravel and cobbles (FILL)										
2.5												
5.0												
		Bottom of test pit at 7.0 feet.										

Huddleston-Berry Engineering & Testing, LLC
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TEST PIT NUMBER TP-4

CLIENT City of Grand Junction
PROJECT NAME Riverfront at Dos Rios
PROJECT NUMBER 00208-0111
PROJECT LOCATION Grand Junction, CO
DATE STARTED 2/12/20 **COMPLETED** 2/12/20
GROUND ELEVATION _____ **TEST PIT SIZE** 4-inch
EXCAVATION CONTRACTOR S. McKracken
GROUND WATER LEVELS:
EXCAVATION METHOD Simco 2000 Track Rig
AT TIME OF EXCAVATION dry
LOGGED BY SD **CHECKED BY** MAB
AT END OF EXCAVATION dry
NOTES _____
AFTER EXCAVATION ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Sandy GRAVEL and COBBLES (gw), brown, moist, dense to very dense										
2.5												
5.0												
		Bottom of test pit at 6.0 feet.										

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TEST PIT NUMBER TP-5

CLIENT City of Grand Junction
PROJECT NAME Riverfront at Dos Rios
PROJECT NUMBER 00208-0111
PROJECT LOCATION Grand Junction, CO
DATE STARTED 2/12/20 **COMPLETED** 2/12/20
GROUND ELEVATION _____ **TEST PIT SIZE** 4-inch
EXCAVATION CONTRACTOR S. McKracken
GROUND WATER LEVELS:
EXCAVATION METHOD Simco 2000 Track Rig
AT TIME OF EXCAVATION dry
LOGGED BY SD **CHECKED BY** MAB
AT END OF EXCAVATION dry
NOTES _____
AFTER EXCAVATION ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Sandy SILT (ML), brown, moist, loose to medium dense										
2.5		***Lab Classifed GB1	GB 1					4	23	21	2	62
5.0		***Gravel and Cobbles at bottom of excavation										
		Bottom of test pit at 7.0 feet.										

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TEST PIT NUMBER TP-6

CLIENT City of Grand Junction
PROJECT NAME Riverfront at Dos Rios
PROJECT NUMBER 00208-0111
PROJECT LOCATION Grand Junction, CO
DATE STARTED 2/12/20 **COMPLETED** 2/12/20
GROUND ELEVATION _____ **TEST PIT SIZE** 4-inch
EXCAVATION CONTRACTOR S. McKracken
GROUND WATER LEVELS:
EXCAVATION METHOD Simco 2000 Track Rig
AT TIME OF EXCAVATION dry
LOGGED BY SD **CHECKED BY** MAB
AT END OF EXCAVATION dry
NOTES _____
AFTER EXCAVATION ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		Silty SAND (SM), brown, moist, loose to medium dense										
2.5		***Lab Classified GB1	GB 1					17	NP	NP	NP	43
5.0		***Gravel and Cobbles at bottom of excavation										
		Bottom of test pit at 7.0 feet.										

APPENDIX C
Laboratory Testing Results

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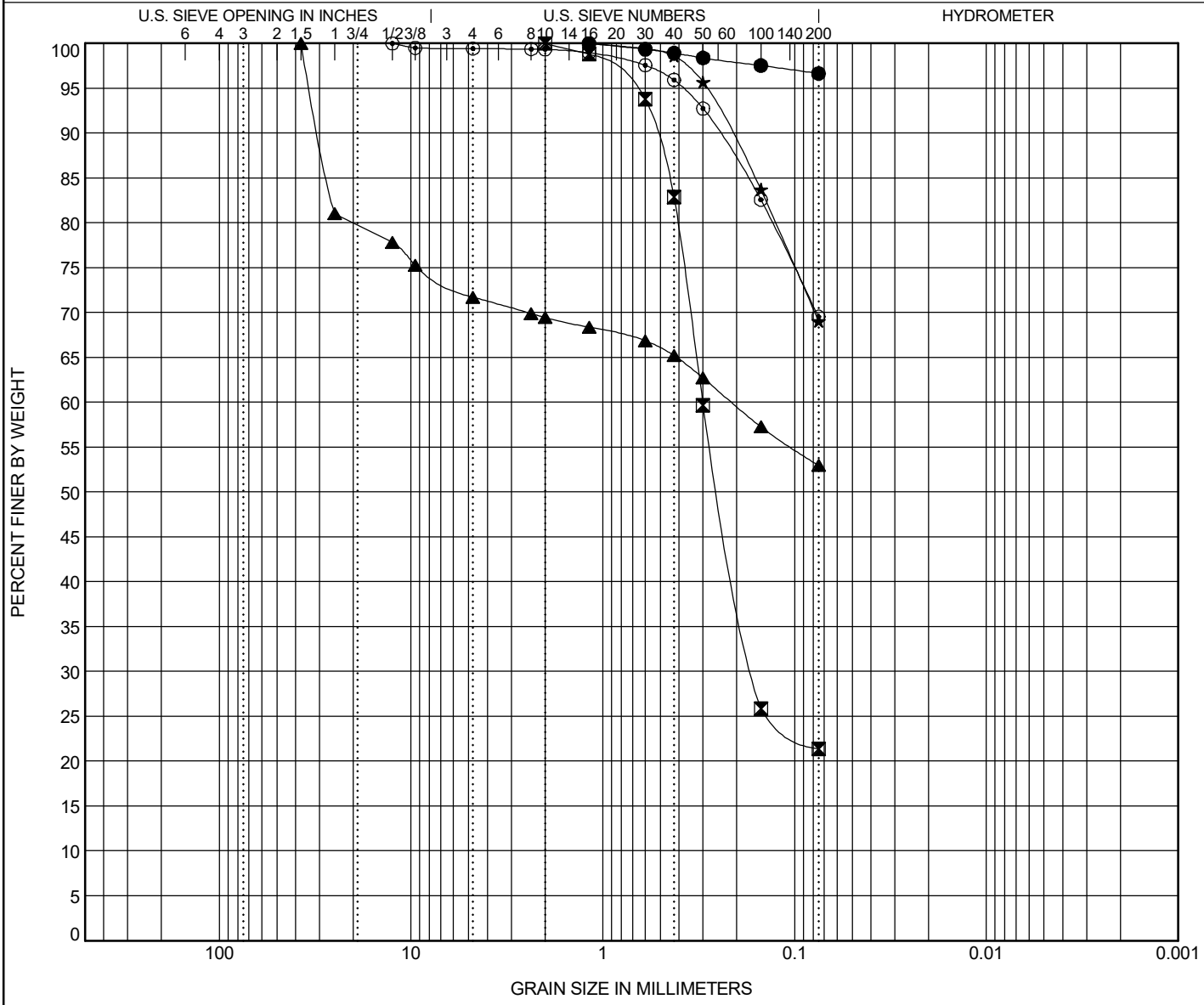
GRAIN SIZE DISTRIBUTION

CLIENT City of Grand Junction **PROJECT NAME** Riverfront at Dos Rios

PROJECT NUMBER 00208-0111 **PROJECT LOCATION** Grand Junction, CO



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-1, SS1	2/20	LEAN CLAY(CL)	45	23	22		
⊠	B-1, SS2	2/20	SILTY SAND(SM)	NP	NP	NP		
▲	B-12, SS1	2/20	GRAVELLY LEAN CLAY with SAND(CL)	31	19	12		
★	B-3, SS1	2/20	SANDY LEAN CLAY(CL)	26	17	9		
⊙	TP-1, GB1	2/20	SANDY LEAN CLAY(CL)	27	18	9		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-1, SS1	2/20	1.18				0.0	3.4	96.6	
⊠	B-1, SS2	2/20	2	0.301	0.163		0.0	78.6	21.4	
▲	B-12, SS1	2/20	37.5	0.213			28.3	18.8	53.0	
★	B-3, SS1	2/20	1.18				0.0	30.9	69.1	
⊙	TP-1, GB1	2/20	12.5				0.6	29.9	69.5	

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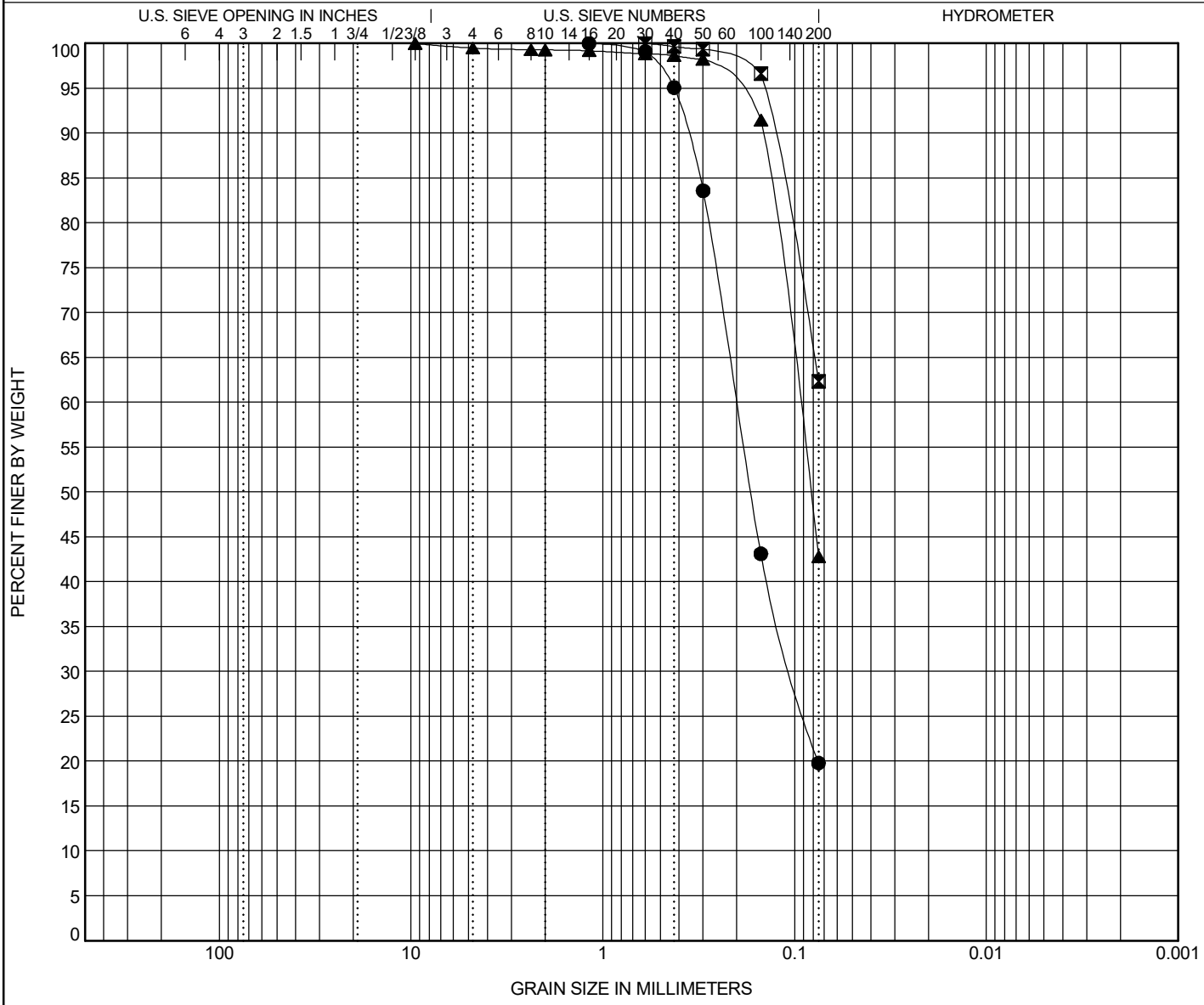
GRAIN SIZE DISTRIBUTION

CLIENT City of Grand Junction **PROJECT NAME** Riverfront at Dos Rios

PROJECT NUMBER 00208-0111 **PROJECT LOCATION** Grand Junction, CO



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**TP-1, GB2 2/20**	**SILTY SAND(SM)**	**NP**	**NP**	**NP**		
⊠	**TP-5, GB1 2/20**	**SANDY SILT(ML)**	**23**	**21**	**2**		
▲	**TP-6, GB1 2/20**	**SILTY SAND(SM)**	**NP**	**NP**	**NP**		

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**TP-1, GB2 2/20**	**1.18**	**0.2**	**0.102**		**0.0**	**80.2**	**19.8**	
⊠	**TP-5, GB1 2/20**	**0.6**				**0.0**	**37.7**	**62.3**	
▲	**TP-6, GB1 2/20**	**9.5**	**0.096**			**0.5**	**56.7**	**42.8**	

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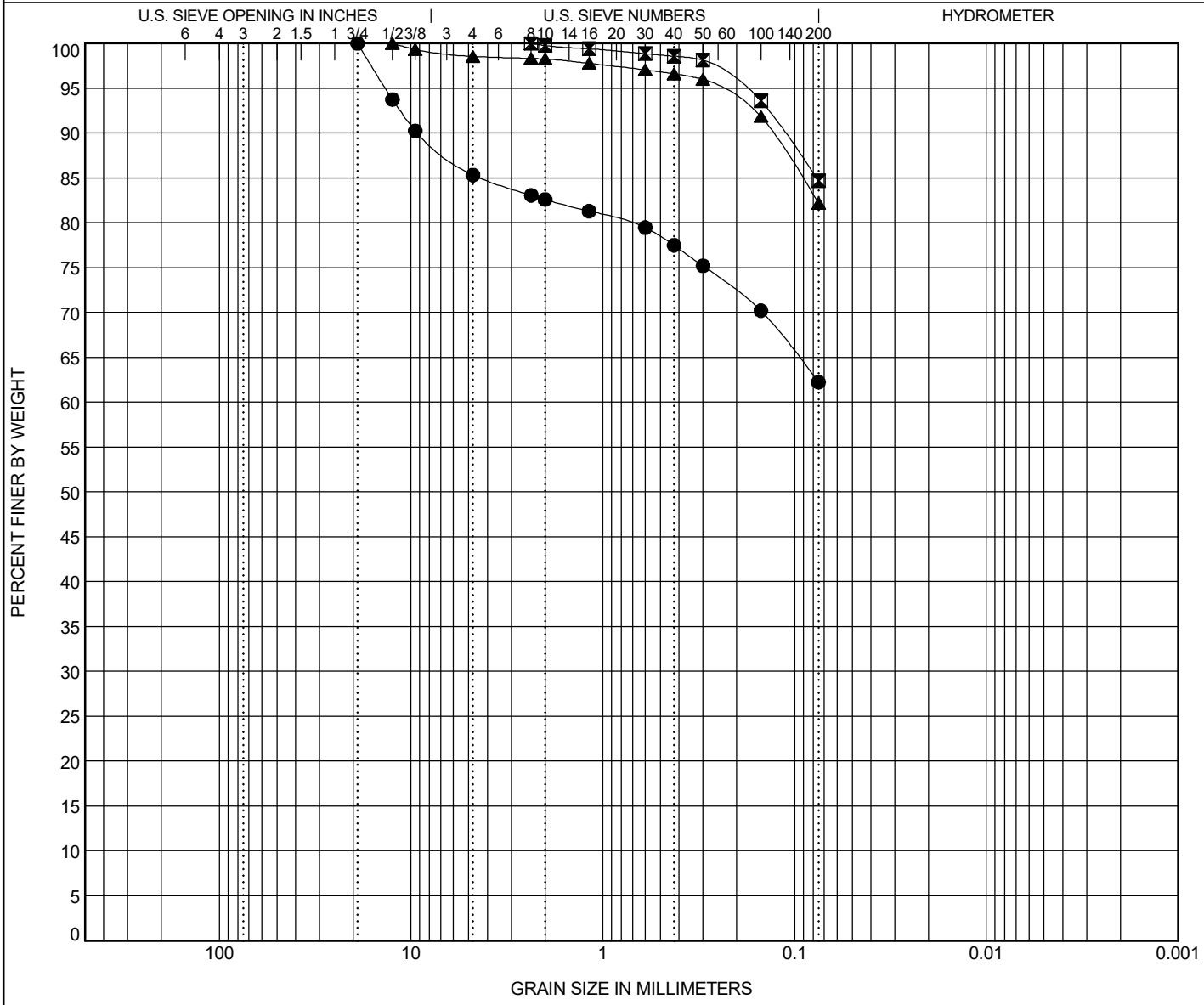
GRAIN SIZE DISTRIBUTION

CLIENT City of Grand Junction **PROJECT NAME** Riverfront at Dos Rios

PROJECT NUMBER 00208-0111 **PROJECT LOCATION** Grand Junction, CO



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	LL	PL	PI	Cc	Cu
● P1	2/20/2020	SANDY LEAN CLAY(CL)	25	16	9		
⊠ P2	2/20/2020	LEAN CLAY with SAND(CL)	28	17	11		
▲ P3	2/20/2020	LEAN CLAY with SAND(CL)	26	18	8		

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● P1	2/20/2020	19				14.7	23.1	62.2	
⊠ P2	2/20/2020	2.36				0.0	15.3	84.7	
▲ P3	2/20/2020	12.5				1.4	16.4	82.2	

GRAIN SIZE 00208-0111 RIVERFRONT AT DOS RIOS.GPJ GINT US LAB.GDT 3/10/20

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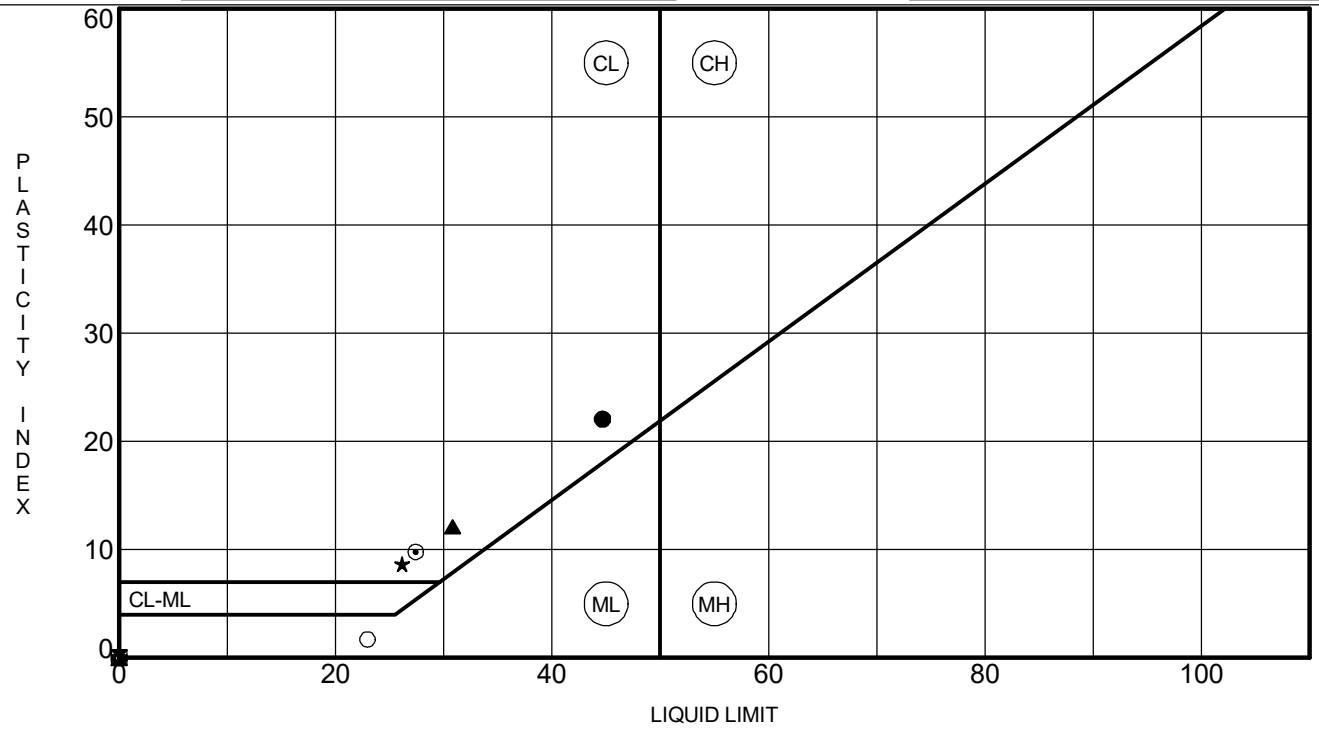
ATTERBERG LIMITS' RESULTS

CLIENT City of Grand Junction **PROJECT NAME** Riverfront at Dos Rios

PROJECT NUMBER 00208-0111 **PROJECT LOCATION** Grand Junction, CO



	Specimen Identification		LL	PL	PI	#200	Classification
●	B-1, SS1	2/12/2020	45	23	22	97	LEAN CLAY(CL)
⊠	B-1, SS2	2/12/2020	NP	NP	NP	21	SILTY SAND(SM)
▲	B-12, SS1	2/12/2020	31	19	12	53	GRAVELLY LEAN CLAY with SAND(CL)
★	B-3, SS1	2/12/2020	26	17	9	69	SANDY LEAN CLAY(CL)
⊙	TP-1, GB1	2/12/2020	27	18	9	70	SANDY LEAN CLAY(CL)
✿	TP-1, GB2	2/12/2020	NP	NP	NP	20	SILTY SAND(SM)
○	TP-5, GB1	2/12/2020	23	21	2	62	SANDY SILT(ML)
△	TP-6, GB1	2/12/2020	NP	NP	NP	43	SILTY SAND(SM)

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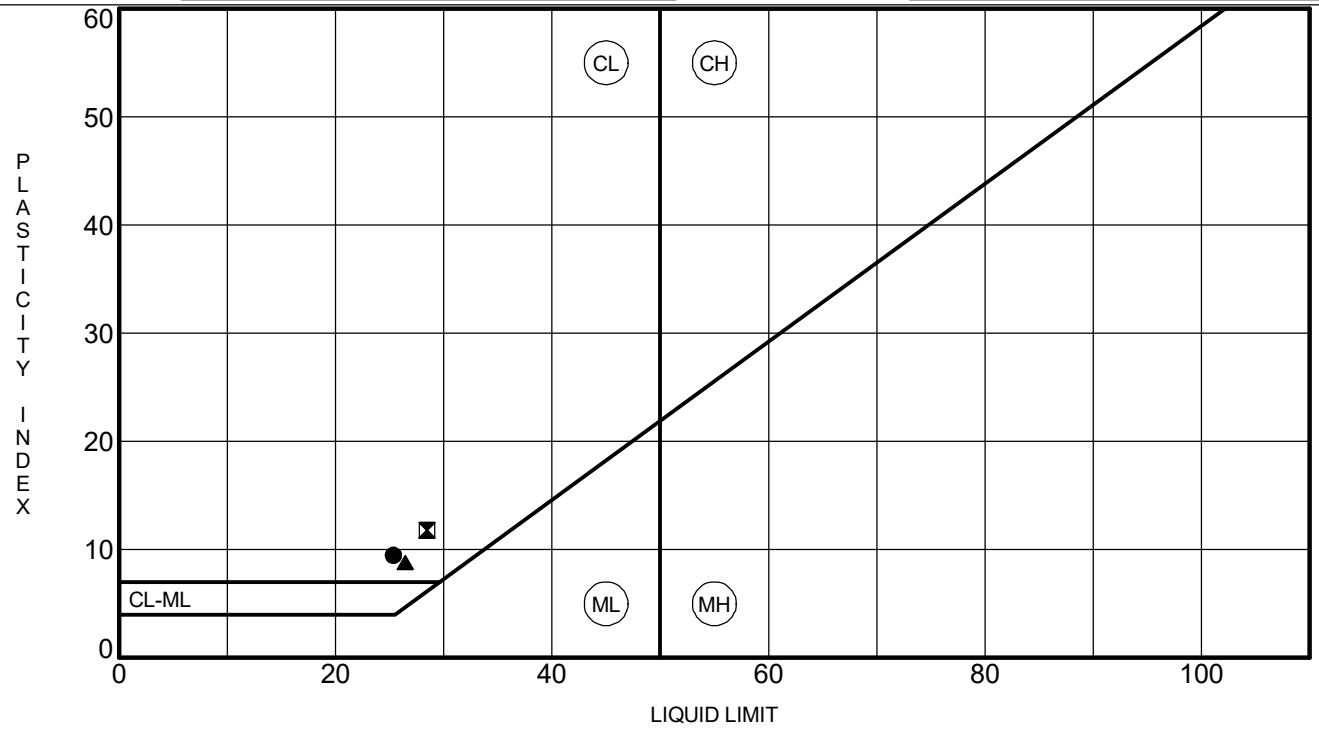
ATTERBERG LIMITS' RESULTS

CLIENT City of Grand Junction **PROJECT NAME** Riverfront at Dos Rios

PROJECT NUMBER 00208-0111 **PROJECT LOCATION** Grand Junction, CO



	Specimen Identification		LL	PL	PI	#200	Classification
●	P1	2/20/2020	25	16	9	62	SANDY LEAN CLAY(CL)
⧓	P2	2/20/2020	28	17	11	85	LEAN CLAY with SAND(CL)
▲	P3	2/20/2020	26	18	8	82	LEAN CLAY with SAND(CL)

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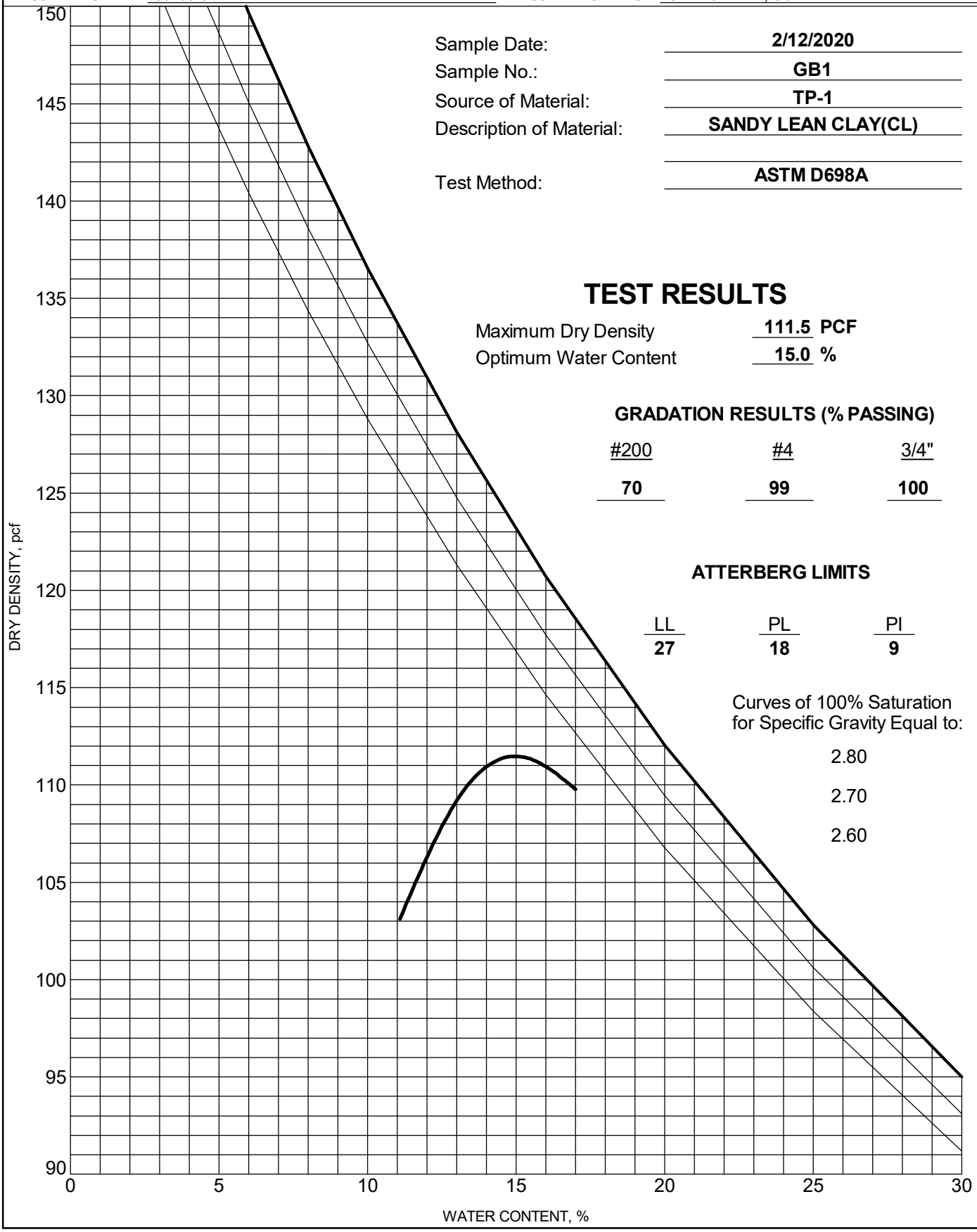
970-255-8005

MOISTURE-DENSITY RELATIONSHIP

CLIENT City of Grand Junction **PROJECT NAME** Riverfront at Dos Rios

PROJECT NUMBER 00208-0111 **PROJECT LOCATION** Grand Junction, CO



Sample Date: **2/12/2020**

Sample No.: **GB1**

Source of Material: **TP-1**

Description of Material: **SANDY LEAN CLAY(CL)**

Test Method: **ASTM D698A**

TEST RESULTS

Maximum Dry Density **111.5** PCF

Optimum Water Content **15.0** %

GRADATION RESULTS (% PASSING)

#200	#4	3/4"
70	99	100

ATTERBERG LIMITS

LL	PL	PI
27	18	9

Curves of 100% Saturation for Specific Gravity Equal to:

2.80

2.70

2.60

COMPACTION 00208-0111 RIVERFRONT AT DOS RIOS.GPJ GINT US LAB.GDT 3/5/20

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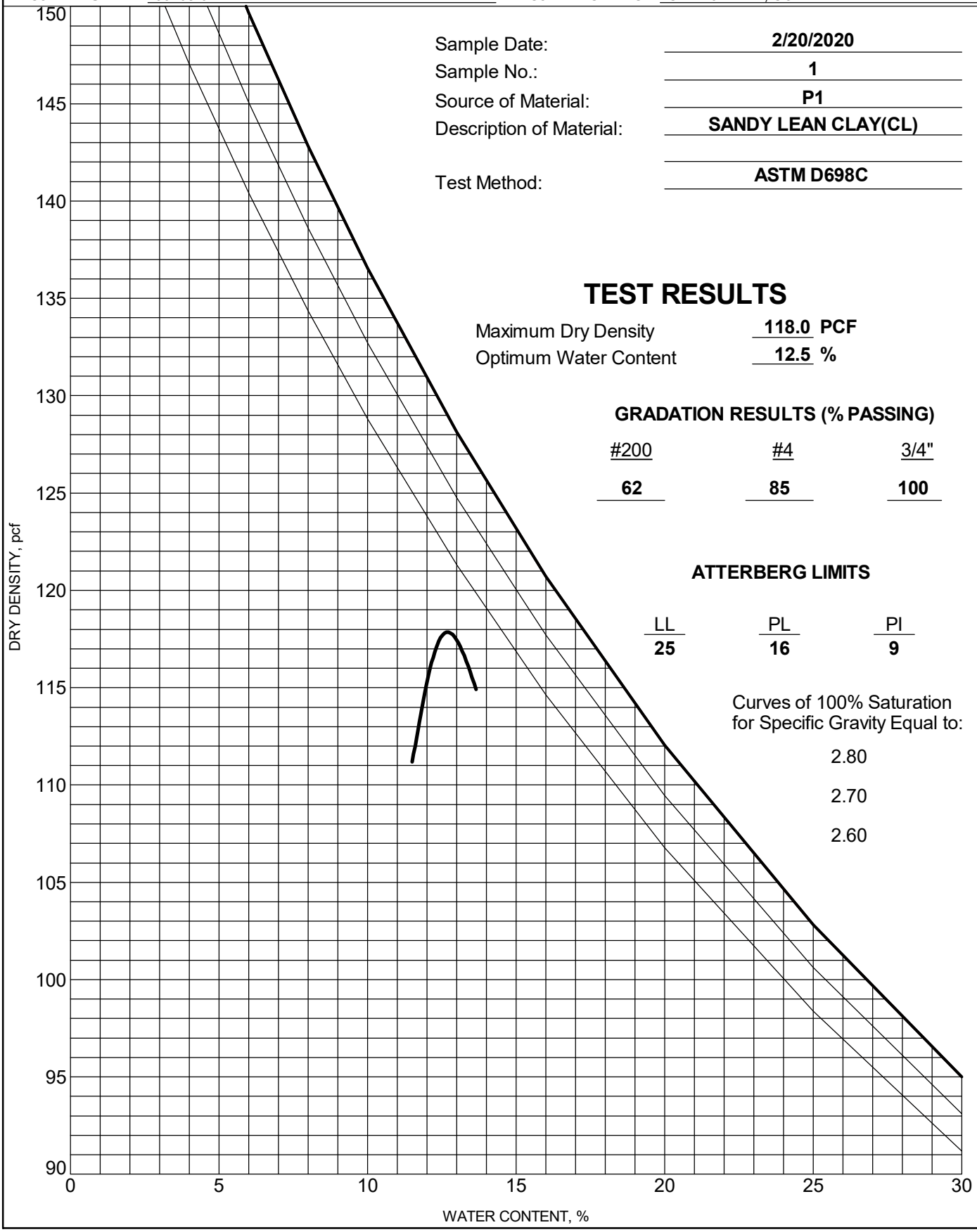
MOISTURE-DENSITY RELATIONSHIP

CLIENT City of Grand Junction **PROJECT NAME** Riverfront at Dos Rios

PROJECT NUMBER 00208-0111 **PROJECT LOCATION** Grand Junction, CO



Sample Date: **2/20/2020**

Sample No.: **1**

Source of Material: **P1**

Description of Material: **SANDY LEAN CLAY(CL)**

Test Method: **ASTM D698C**

TEST RESULTS

Maximum Dry Density **118.0** PCF

Optimum Water Content **12.5** %

GRADATION RESULTS (% PASSING)

#200	#4	3/4"
62	85	100

ATTERBERG LIMITS

LL	PL	PI
25	16	9

Curves of 100% Saturation for Specific Gravity Equal to:

2.80

2.70

2.60

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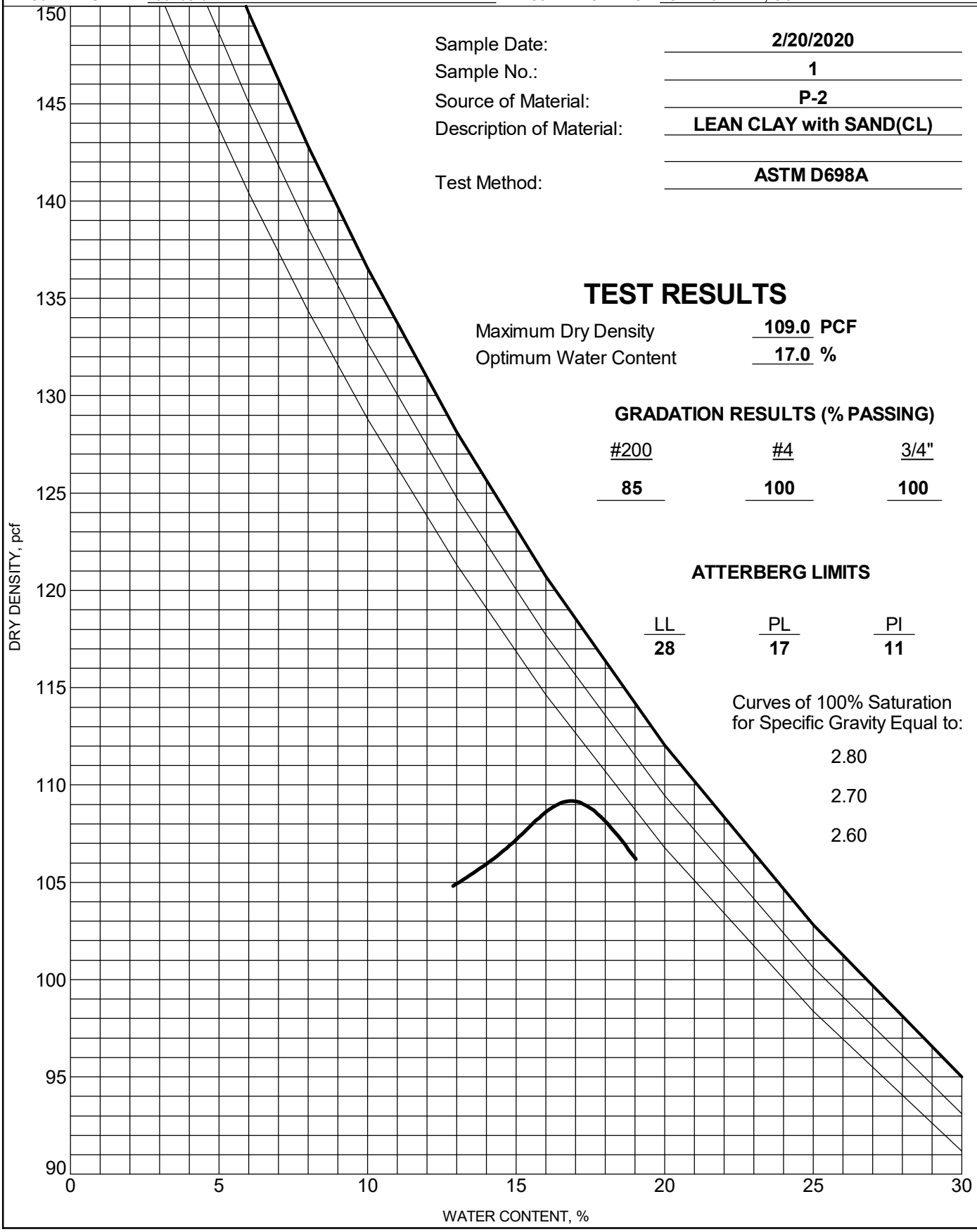
MOISTURE-DENSITY RELATIONSHIP

CLIENT City of Grand Junction **PROJECT NAME** Riverfront at Dos Rios

PROJECT NUMBER 00208-0111 **PROJECT LOCATION** Grand Junction, CO



Sample Date: **2/20/2020**

Sample No.: **1**

Source of Material: **P-2**

Description of Material: **LEAN CLAY with SAND(CL)**

Test Method: **ASTM D698A**

TEST RESULTS

Maximum Dry Density **109.0** PCF

Optimum Water Content **17.0** %

GRADATION RESULTS (% PASSING)

#200	#4	3/4"
85	100	100

ATTERBERG LIMITS

LL	PL	PI
28	17	11

Curves of 100% Saturation for Specific Gravity Equal to:

2.80

2.70

2.60

COMPACTION 00208-0111 RIVERFRONT AT DOS RIOS.GPJ GINT US LAB.GDT 3/10/20

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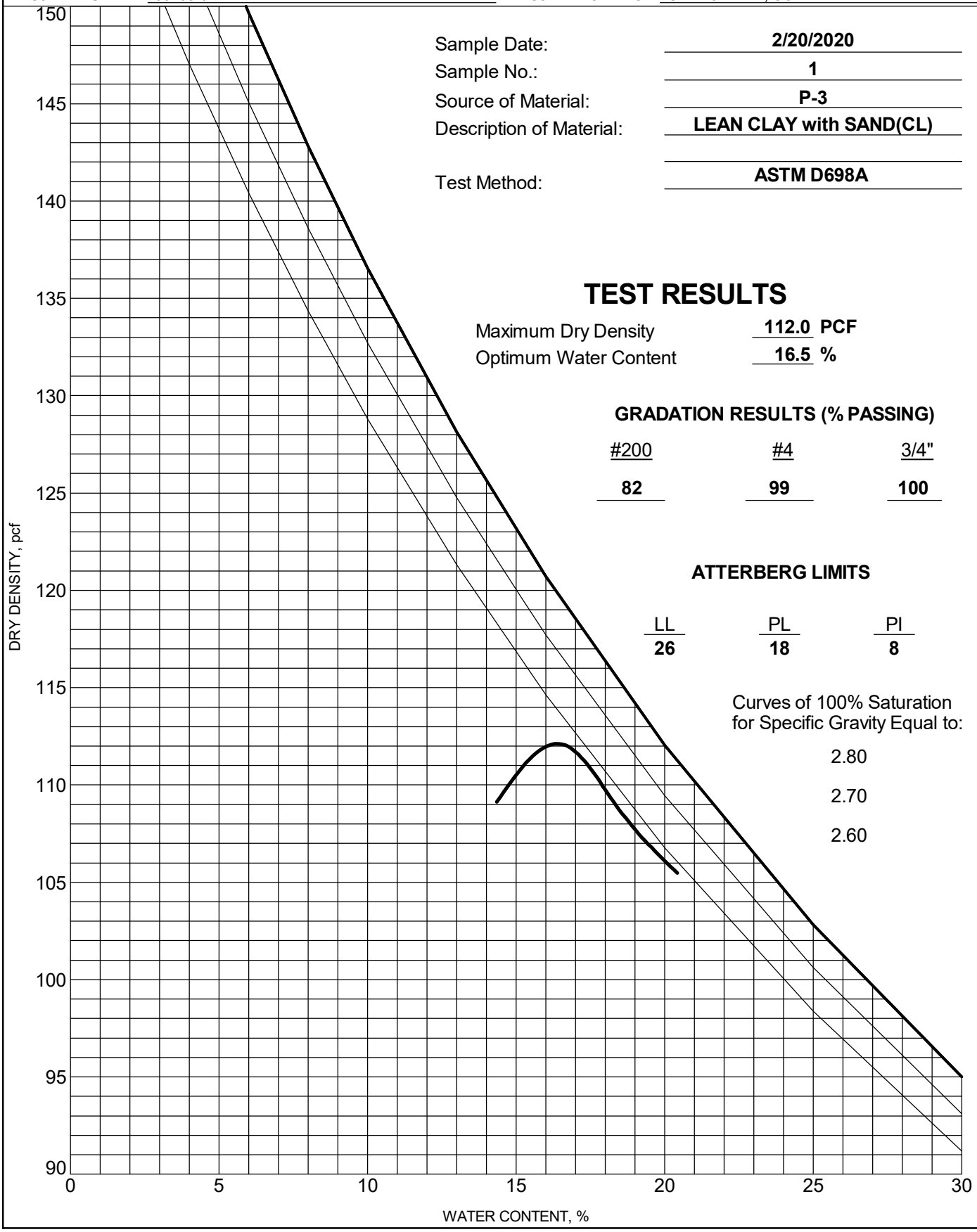
MOISTURE-DENSITY RELATIONSHIP

CLIENT City of Grand Junction **PROJECT NAME** Riverfront at Dos Rios

PROJECT NUMBER 00208-0111 **PROJECT LOCATION** Grand Junction, CO



Sample Date: **2/20/2020**

Sample No.: **1**

Source of Material: **P-3**

Description of Material: **LEAN CLAY with SAND(CL)**

Test Method: **ASTM D698A**

TEST RESULTS

Maximum Dry Density **112.0** PCF

Optimum Water Content **16.5** %

GRADATION RESULTS (% PASSING)

#200	#4	3/4"
82	99	100

ATTERBERG LIMITS

LL	PL	PI
26	18	8

Curves of 100% Saturation for Specific Gravity Equal to:

2.80

2.70

2.60

Huddleston-Berry
Engineering & Testing, LLC

CALIFORNIA BEARING RATIO
ASTM D1883

Project No.:	00205-0111		**Authorized By:**	Client	**Date:** 02/19/20
Project Name:	Riverside at Dos Rios		**Sampled By:**	SD	**Date:** 02/19/20
Client Name:	City of Grand Junction		**Submitted By:**	SD	**Date:** 02/19/20
Sample Number:	20-0107	**Location:** TP-1, GB1	**Reviewed By:**	MAB	**Date:** 03/06/20

Compaction Method: ASTM D698, Method A

Maximum Dry Density (pcf): 111.5

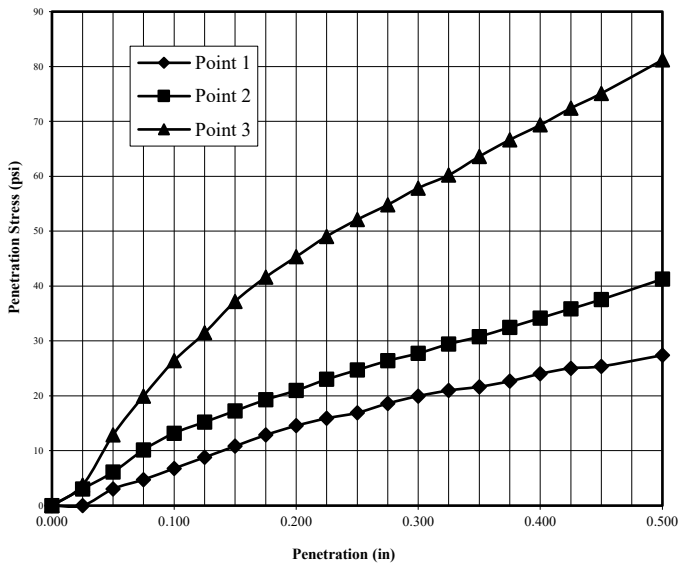
Opt. Moisture Content (%): 15.0

Sample Condition: Soaked

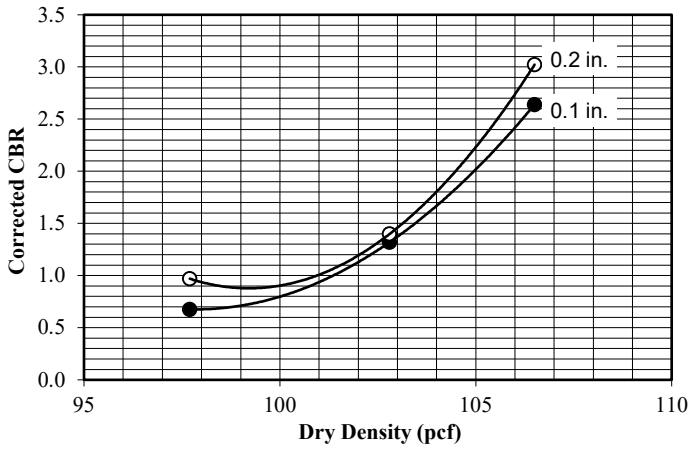
Remarks:

		Sample Data		
		Point 1	Point 2	Point 3
Blows per Compacted Lift:		15	25	56
Surcharge Weight (lbs):		10.0	10.0	10.0
Dry Density Before Soak (pcf):		97.7	102.8	106.5
Dry Density After Soak (pcf):		96.9	102.0	105.6
Moisture Content (%)	Bottom Pre-Test	15.3	14.9	15.0
	Top Pre-Test	15.6	14.2	15.4
	Top 1" After Test	26.9	27.0	24.5
	Average After Soak:	21.3	19.7	18.8
Percent Swell After Soak:		0.8	0.8	0.9

Load Pentration Curve(s)



Dry Density vs CBR



Penetration Data								
Point 1			Point 2			Point 3		
Dist. (in)	Load (lbs)	Stress (psi)	Dist. (in)	Load (lbs)	Stress (psi)	Dist. (in)	Load (lbs)	Stress (psi)
0.000	0	0	0.000	0	0	0.000	0	0
0.025	0	0	0.025	9	3	0.025	11	4
0.050	9	3	0.050	18	6	0.050	38	13
0.075	14	5	0.075	30	10	0.075	59	20
0.100	20	7	0.100	39	13	0.100	78	26
0.125	26	9	0.125	45	15	0.125	93	31
0.150	32	11	0.150	51	17	0.150	110	37
0.175	38	13	0.175	57	19	0.175	123	42
0.200	43	15	0.200	62	21	0.200	134	45
0.225	47	16	0.225	68	23	0.225	145	49
0.250	50	17	0.250	73	25	0.250	154	52
0.275	55	19	0.275	78	26	0.275	162	55
0.300	59	20	0.300	82	28	0.300	171	58
0.325	62	21	0.325	87	29	0.325	178	60
0.350	64	22	0.350	91	31	0.350	188	64
0.375	67	23	0.375	96	32	0.375	197	67
0.400	71	24	0.400	101	34	0.400	205	69
0.425	74	25	0.425	106	36	0.425	214	72
0.450	75	25	0.450	111	38	0.450	222	75
0.500	81	27	0.500	122	41	0.500	240	81

Corrected CBR @ 0.1"		
0.7	1.3	2.6
Corrected CBR @ 0.2"		
1.0	1.4	3.0

Penetration Distance Correction (in)		
0.000	0.000	0.000

Figure:

Appendix D

Uranium Mill Tailings Management Plan

URANIUM MILL TAILINGS MANAGEMENT PLAN

FOR MANAGING TITLE I URANIUM MILL TAILINGS ENCOUNTERED DURING CONSTRUCTION ACTIVITIES IN WESTERN COLORADO

UPDATED May 2015

Colorado Department
of Public Health
and Environment

URANIUM MILL TAILINGS MANAGEMENT PLAN

FOR MANAGING TITLE I URANIUM MILL TAILINGS ENCOUNTERED DURING CONSTRUCTION ACTIVITIES IN WESTERN COLORADO

UPDATED MAY 2015

Colorado Department of Public Health and Environment

For Information or Assistance Contact:

Colorado Department of Public Health and Environment
222 South 6th Street, Room 232
Grand Junction, Colorado 81501

Michael Cosby
(970) 248-7171

Kate Elsberry
(970) 248-7164

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INTRODUCTION

PURPOSE

In 1978 the U.S. Congress passed the Uranium Mill Tailings Radiation Control Act (UMTRCA Public Law 95-604) which tasked the U.S. Department of Energy with stabilizing, disposing, and controlling uranium mill tailings and other contaminated material at 24 inactive uranium processing (mill) sites located in ten different states, where uranium was processed for sale to a federal agency. Nine of the inactive uranium processing sites are located in Colorado. These Title I sites (referred to as "Title I" because the sites were listed in Title I of the law) were located in Grand Junction, Gunnison, Rifle (2), Durango, Maybell, Naturita and Slick Rock (2). While the active cleanup required by UMTRCA has been completed, residual uranium mill tailings remain in the nine affected communities. These residual tailings deposits are referred to as "UMTRA Title I uranium mill tailings" throughout this plan, in order to clearly delineate that this plan pertains only to radioactive materials that originated from UMTRA Title I mill sites.

The Colorado Department of Public Health and Environment is authorized by Colorado Revised Statutes (C.R.S. 25-11-301 et. seq.) to assist local governments in the identification and management of uranium mill tailings remaining in western Colorado communities. Because tailings deposits are often associated with utility rights-of-ways and private property, this plan is also designed to assist utilities and private parties in the identification, proper handling and disposal of uranium mill tailings.

The purpose of this plan is to describe responsibilities and procedures for managing UMTRA Title I uranium mill tailings encountered or disturbed during construction activities in the nine UMTRA communities in western Colorado. All work procedures are designed to minimize worker contact with radioactive materials and comply with the ALARA principle, keeping radiation exposures As Low As Reasonably Achievable. All work will be performed in accordance with *Colorado Rules and Regulations Pertaining to Radiation Control,* (Regulations) 6CCR-100-7, current version.

HISTORY

Beginning around the turn of the century, exploration for ore deposits bearing radioactive elements began in the United States. Western Colorado and adjoining states in the Four Corners area, being rich in these deposits, were heavily prospected. Radium was the primary radioactive element of interest produced by the early mines and mills, followed by exploration for, and production of vanadium, which occurs in the same geologic ores. Then, in the 1940s, the demand for uranium rapidly grew as research progressed for development of atomic weapons and energy. After World War II, the continued research,

nuclear reactor use and the arms race accelerated the demand for uranium, which produced a uranium boom lasting through the 1950s and into the 1960s.

Many hundreds of mines were explored and often developed for ores. Many mill pilot plants, and later operating mill sites, were built to crush ore and separate uranium compounds from the waste materials. The mills produced a uranium product called "yellowcake" and waste tailings sands. These tailings contained most of the original natural radioactivity of the ore, since only one of the radioactive constituents was recovered in the milling process.

The waste tailings were piled at the mills, but erosion from wind and water invariably spread the tailings to adjacent areas. In addition, tailings from many of the mills were transported off site and used for construction or as fill materials. As the mills fell into disuse and obsolescence, and as the uranium boom faded, more of the tailings were eroded away or removed for construction.

The Public Health Service and the Colorado Department of Health conducted studies that demonstrated the magnitude of the health-related issues caused by the presence of uranium mill tailings in residential areas. Health effects result from exposure to gamma radiation, inhalation of radioactive particles and from radon gas, produced by natural radioactive breakdown of radium contained in the tailings. In places where uranium mill tailings were used for construction, radon can seep into buildings (homes**,** offices, schools) and can build up to high concentrations. Many research studies have demonstrated that people breathing air containing elevated levels of radon are at greater risk of lung cancer.

The Public Health Service documented the association between elevated radon and lung cancer during uranium mine studies conducted in the 1950s. In the 1960s, the Colorado Department of Health and the Public Health Service expanded the studies to include areas around mill sites. The studies concluded that excessive radiation exposure could result from indiscriminate use of tailings and that persons were at increased risk due to the presence of the uranium mill tailings. By this time, thousands of tons of tailings from the uranium mills had been used in residential areas for construction. In Grand Junction, Colorado, mill tailings from the former Climax Mill Site, which had been spread throughout the community, were identified as a health risk and the Colorado Department of Health soon issued an order to cease the use of tailings in construction.

Because of the availability and many possible uses of the sandy uranium mill tailings as a building material, the dispersal and misuse was widespread. Some examples of uranium mill tailings use were: soil attenuation, concrete mix, bedding for concrete and utilities, stucco, and brick production.

Experience has shown that as construction and demolition activities occur, new uranium mill tailings deposits will be discovered and disturbance of known deposits will occur. New construction close to such deposits increases potential public exposure to gamma radiation and radon.

GRAND JUNCTION REMEDIAL ACTION PROGRAM

Concerns about health risks and property values grew as the extent of the uranium mill tailings misuse became public. Nationwide publicity announced and often exaggerated the problem. Congressional hearings were conducted, and in 1972, Public Law 92-314 created the Grand Junction Remedial Action Program to reduce radiation exposures inside structures affected by uranium tailings in the Grand Junction community. The U.S. Surgeon General published cleanup guidelines for the voluntary project. During the 15-year program, 594 structures in Mesa County underwent remedial action, where the radioactive material was removed by government contractors.

URANIUM MILL TAILINGS REMEDIAL ACTION PROGRAM

From the late 1960s, it was known that the misuse of uranium tailings was not unique to the Grand Junction, Mesa County area. In 1978, the U.S. Congress passed Public Law 95-604, the Uranium Mill Tailings Radiation Control Act (UMTRCA). This law enabled the creation of the Uranium Mill Tailings Remedial Action Project and required the U.S. Environmental Protection Agency to develop cleanup standards. The U.S. Department of Energy was responsible for stabilizing, disposing, and controlling uranium mill tailings and other contaminated material in cooperation with States and Tribes. The project extended the assessment and cleanup of uranium tailings nationwide for both structure interiors and exterior deposits. By the conclusion of the Uranium Mill Tailings Remedial Action Program in 1998, approximately 5,000 properties and nine uranium mill sites had been cleaned up in Colorado. In Colorado alone, approximately 15 million cubic yards of uranium tailings were removed to controlled disposal sites.

Nine uranium mill sites in western Colorado qualified for remedial action under Title I of the Uranium Mill Tailings Remedial Action Program. These Title I sites were located in Grand Junction, Gunnison, Rifle (2), Durango, Maybell, Naturita and Slick Rock (2). These were inactive or abandoned sites, which had sold uranium to the U.S. Atomic Energy Commission exclusively. The Department of Energy performed site assessments and environmental impact studies and developed options for permanent, environmentally safe disposal of the radioactively contaminated materials.

Disposal cells were designed and constructed to comply with strict criteria regarding ground water protection, seismology, erosion protection, settlement and infiltration. The cells were designed to last for 200 to1,000 years. Therefore, erosion resistant, natural materials were used in the construction of the cells. The typical cell was excavated into low permeability bedrock and filled with compacted uranium mill tailings. A very low permeability layer was added on top of the uranium mill tailings as a cover to contain the radon gas and limit the entry of water. An erosion resistant rock layer capped the cells.

All of the Colorado Title I disposal cells, except for the Maybell site in Moffat County, were located away from the mill sites to situate the tailings out of floodplains and away from shallow ground water. The Maybell tailings pile was reengineered and reworked to provide compaction and erosion protection and capped in place. All of the disposal cells will be monitored and maintained under the Long Term Surveillance and Maintenance Program managed by the Department of Energy.

The Title I disposal cell for Mesa County, known as the Grand Junction Disposal Facility (GJDF) at 4800 Hwy 50 Whitewater, CO will remain open to receive tailings from all UMTRA Title I communities until at least 2023. (The GJDF was formerly known as the Cheney Disposal Site or Cell.) Recognizing the need for long term management and storage of the remaining uncontrolled tailings, Congress revised the Uranium Mill Tailings Radiation Control Act in 1996 to allow for continued use of the GJDF. The Department of Energy will continue to maintain, operate and fund the GJDF cell. The GJDF cell is the only Uranium Mill Tailings Remedial Action Program site remaining open and available to receive uranium tailings.

MANAGEMENT OF UNCONTROLLED TITLE I URANIUM MILL TAILINGS

UNCONTROLLED TITLE I URANIUM MILL TAILINGS

Despite widespread publicity, two cleanup programs extending over 25 years, and thousands of property investigations, Title I uranium mill tailings remain in several western Colorado communities. It is suspected that up to half a million cubic yards of tailings remain outside of the controlled disposal cells.

Over 70,000 properties have been surveyed in Colorado for uranium mill tailings. Because of the voluntary nature of the project and difficulty in finding hidden, shielded deposits such as those beneath soils or under foundations, not all properties were investigated and not all deposits were found. Also, in some circumstances an owner refused to participate in the cleanup project after tailings were found on their property.

In addition to tailings that were never detected, or those where the owner refused cleanup, there were several other situations where tailings were left in place, including 1) Tailings excluded from exterior removals; 2) Tailings excluded from interior removals and 3) Supplemental Standards areas. All of these situations, explained in detail below, represent potential instances where tailings may be uncovered and require safe management in the future.

TAILINGS EXCLUDED FROM EXTERIOR REMOVALS

The Environmental Protection Agency standards for exteriors allowed measurements of radiation exposure to be averaged over 100 square meters. Thus, a small area of elevated contamination was often averaged with uncontaminated areas, resulting in small quantities of uranium mill tailings being left in place. The Colorado Department of Public Health and Environment now advises/recommends that all areas of elevated concentrations (also known as “hot spots”) be removed from the construction footprint plus a ten-foot buffer area, in order to minimize future exposure to the hot spot and/or further spreading of the tailings material during future construction activities.

TAILINGS EXCLUDED FROM INTERIOR REMOVALS

The Environmental Protection Agency standards for interiors addressed the interior average gamma exposure rate and the annual average radon levels. Contaminated structural materials, such as foundations or tailings under slabs, were often left in place if the interior radiation levels were below the standards. The State advises removal of all tailings from under slabs or structures.

SUPPLEMENTAL STANDARDS

The Environmental Protection Agency cleanup standards allowed for a variance from meeting standards in certain situations. This variance was called "supplemental standards." The most common use of supplemental standards was in situations where the cost of tailings removal was greater than the health risks associated with leaving the tailings deposit in place. The use of supplemental standards resulted in tailings being left in place. Approval of supplemental standards by the Colorado Department of Public Health and Environment and the Nuclear Regulatory Commission required that the deposit was in such an area that current and future land use would result in minimal radiation exposures to the public. Often, when Supplemental Standards were used, some partial removal would take place to remove surface contamination, but leave uranium mill tailings at depth. Records of Supplemental Standards applications are available from the Colorado Department of Public Health and Environment.

Examples of areas containing uranium mill tailings left in place through the application of supplemental standards include railroad tracks, city streets and curb/gutter, steep slopes, river islands, basements, patios, currently uninhabited structures, and utility lines. Grand Junction, Colorado, has the greatest number of supplemental standards areas, but supplemental standards deposits also exist in the Maybell, Durango, Rifle, Gunnison, Naturita and Slick Rock communities.

TAILINGS MANAGEMENT PLAN

The laws and regulations pertaining to UMTRA Title I materials did not anticipate the impacts on new construction projects or changes in land use when residual tailings were left in place after the remediation projects were completed. Thus, there is a need for a long-term management plan to help guide persons who may contact residual Title I tailings materials. This management plan is designed to be relatively simple and easy to use. The main elements of the management plan include:

1) the availability of an interim storage facility, useable by local governments, utilities and private parties on short notice,
2) the assignment of responsibilities,
3) health and safety concerns, including procedures to limit radiation exposure
4) training requirements and responsibilities,
5) procedures for excavation and transportation, and
6) the availability of a long-term disposal site.

These elements are addressed in the following sections.

The general process related to uncontrolled tailings is outlined as follows, and discussed in greater detail in the following sections. A property owner, owner's representative or realtor requests information about a property from the Colorado Department of Public Health and Environment, either for a property transaction or a building permit application. Available records are provided to the property owner at that time. If no records exist, or if there is a question about whether or not tailings may be present, the Colorado Department

of Public Health and Environment may send an inspector to the property to conduct a gamma radiation survey. If tailings are present on the property, the Colorado Department of Public Health and Environment will provide a recommendation and information regarding the procedures for removing the material, following this plan. The removal of the material may be conducted by the property owner (referred to later in this plan as "private citizen") or through the use a contractor. Local governments may also conduct tailings removals. The tailings are removed from the property, following the procedures outlined in this plan, and hauled to the Interim Storage Facility. Once the materials are safely stored and the vehicle and personnel have been decontaminated and released by the Colorado Department of Public Health and Environment, the materials are stored until the Grand Junction Disposal Facility is opened to accept material. The material is then hauled to the Disposal Facility by the City of Grand Junction. The Department of Energy requires compliance with the Waste Acceptance Criteria for the Grand Junction Disposal Site (most recent version).

INTERIM STORAGE FACILITY

THE FACILITY

The Interim Storage Facility (ISF) is a temporary holding area for uranium mill tailings. The facility is owned by the City of Grand Junction and operated in coordination with the Colorado Department of Public Health and Environment. The facility is located at 333 West Avenue, Grand Junction, Colorado.

The ISF provides a temporary, secure, and safe storage for uranium mill tailings excavated during construction activities in Colorado communities. Access to the ISF is facilitated through the Colorado Department of Public Health and Environment or the City of Grand Junction. The tailings will ultimately be transported to the Grand Junction Disposal Facility (GJSF) south of Grand Junction, Colorado. This transfer is normally scheduled on an annual basis.

The interim storage facility consists of an abandoned sewage treatment plant clarifier that is 75 feet in diameter and surrounded by concrete walls approximately 10 feet high. The bottom is a concrete slab, sloping to the center for drainage. A slot has been cut through the walls wide enough to admit a dump truck. A concrete ramp provides access to the entrance. A lockable gate protects the entrance. All holes in the bottom were sealed to make a water-tight storage area.

The facility also includes a shed for storage of records regarding materials brought to the ISF. The City provides a water line extension for decontamination spray or dust control upon request.

The Colorado Department of Public Health and Environment is responsible for access control, decontamination, and maintenance of records regarding materials brought to the

ISF. If Department personnel are not available, such as during an emergency water main break, the City of Grand Junction may assume these duties. Prior to accessing the ISF, the Colorado Department of Public Health and Environment will arrange for someone to meet the truck and provide a radiation meter for frisking and decontamination. Supervision of unloading, decontamination of vehicles and personnel after Colorado Department of Public Health and Environment working hours is the responsibility of the City of Grand Junction, which is the only entity authorized to access the facility after hours.

UNLOADING

The hauling truck will back into the facility to place the load as close as possible to the back wall or near already placed material. The driver should prevent tires from coming in contact with contaminated materials in order to reduce the need for decontamination. Material brought to the interim storage facility must be sized as small as possible to allow for compaction at the Grand Junction Disposal Facility site. No debris may exceed 3 feet cubed or 10 feet in any dimension. Waste brought to the ISF should be in compliance with the Department of Energy's Waste Acceptance Criteria for the Grand Junction Disposal Site (most recent version). No uncovered loads may be brought to the ISF unless all transported contamination is in a solid form; such as bound in concrete (see Hauling).

DECONTAMINATION

The truck bed will be inspected for visible uranium mill tailings contamination, soil and debris remaining after dumping. Material that did not dislodge will be pushed out with shovels or brooms. The truck will then proceed to the entrance for inspection of tires and undercarriage. All visible or measureable contamination will be removed from the tires and undercarriage.

Any use of the interim storage facility will be recorded. . The logbook will be kept in the facility shed. Logbook records will be transferred to the Colorado Department of Public Health and Environment office quarterly for permanent storage. The following information is required for every load brought to the ISF:

Date
Origin of contamination (street address)
Estimated cubic yardage
Name of driver/Company
Truck identification (license number)
Inspection for hazardous wastes
High gamma meter reading of the material
Time in and out of the facility
Decontamination status/notes/information

The truck tires and tailgate will undergo frisking according to the frisking procedure in Appendix B. If the tailgate or tires will not pass the frisking limits, the water hose will be

used to further decontaminate the vehicle. If material cannot be dislodged from the bed, it can also be sprayed out at this point. After washing, the tires and tailgate will again be frisked. All water or dislodged material will drain into the interim storage facility. No uranium mill tailings contamination shall be allowed to escape containment within the facility walls.

Individuals that have had physical contact with the uranium mill tailings will have all visible contamination removed by sweeping. The individual will undergo a full body frisk with the frisking meter. If the frisking limits are exceeded, further sweeping or washing will occur, followed by another frisking. If clothing will not decontaminate visibly or pass the frisking survey, the clothing will be changed out in the storage shed. Contaminated clothing will be left at the ISF for disposal.

Once decontamination is deemed complete by the Colorado Department of Public Health and Environment, and the logbook has been filled out, the truck and users may leave the interim storage facility access area. All materials used in decontamination will be returned to the shed. The gate and shed will be locked. The final determination that all procedures, including decontamination, have been completed according to the protocols is the responsibility of the Colorado Department of Public Health and Environment.

RESPONSIBILITIES

Colorado Department of Public Health and Environment

COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

The Colorado Department of Public Health and Environment is responsible for the overall oversight of the Title I Uranium Mill Tailings Management Plan. The Department has more than 30 years experience in the management of uranium mill tailings, including expertise in radiation protection, clean up programs, record keeping, public information and health physics.

Colorado Department of Public Health and Environment's responsibilities include:

1) Maintaining, updating and sharing records and documentation
2) Conducting inspections
3) Conducting excavation control
4) Providing technical expertise
5) Overseeing use of the ISF
6) Providing instrumentation

PUBLIC RECORDS AND DOCUMENTATION

The Uranium Mill Tailings Management Plan will be used for technical information and field guidance. The Colorado Department of Public Health and Environment is responsible for the maintenance, distribution and revision of this plan.

The Colorado Department of Public Health and Environment will maintain and update uranium mill tailings records available to the general public and local government agencies. The Colorado Department of Public Health and Environment will produce or update property records as the conditions change due to excavation of the uranium mill tailings. The Colorado Department of Public Health and Environment will provide personnel to interpret records and give health risk information to the public regarding the presence of uranium mill tailings on properties.

The Colorado Department of Public Health and Environment will keep records of Title I uranium mill tailings excavated, received at the interim storage facility, and transported to Grand Junction Disposal Facility. The Colorado Department of Public Health and Environment will maintain records for decontamination of personnel and equipment.

For the UMTRA Title I communities outside of Grand Junction/Mesa County, the Colorado Department of Public Health and Environment will provide general information about uranium mill tailings to the public and local governments.

INSPECTIONS

The Colorado Department of Public Health and Environment will provide inspections of new building areas and demolition sites and inform the appropriate City and County Planning agencies for all pertinent building permits in Mesa County. All properties in Mesa County are to be monitored for the presence of mill tailings by the Colorado Department of Public Health and Environment, and if any are detected they are to be removed from all building sites before new construction commences.

For the UMTRA Title I communities outside of Grand Junction/Mesa County, the Colorado Department of Public Health and Environment will keep available Title I uranium mill tailings records and coordinate inspections of new construction in other communities as time permits and as requested.

EXCAVATION CONTROL

The Colorado Department of Public Health and Environment will provide excavation control for uranium mill tailings removals by private parties, contactors and government agencies by request.

Tailings co-mingled with other wastes cannot be hauled to the ISF or to the GJDF, as these materials are not in compliance with the Department of Energy's Waste Acceptance

Criteria for the Grand Junction Disposal Site. The Colorado Department of Public Health and Environment will conduct inspections prior to tailings removal for the presence of hazardous wastes that could be commingled with uranium mill tailings. The Colorado Department of Public Health and Environment will provide expertise on segregation, testing and storage of commingled waste. The Colorado Department of Public Health and Environment will provide documentation to the Department of Energy that materials transported to the Grand Junction Disposal Facility do not contain commingled waste.

TECHNICAL EXPERTISE

The Colorado Department of Public Health and Environment will provide technical expertise to communities, local governments or private parties in identifying, handling and management of Title I uranium mill tailings.

INTERIM STORAGE FACILITY

The Colorado Department of Public Health and Environment will routinely manage operations and record keeping at the interim storage facility. The Colorado Department of Public Health and Environment will conduct radiological surveys of the interim storage facility to insure its proper operation and containment of material. Spot checks will occur during heavy use, high winds or rain.

RADIOLOGICAL SURVEY INSTRUMENTS

The Colorado Department of Public Health and Environment will provide radiological survey instruments on loan to local governments and private parties on an as-needed basis. The Colorado Department of Public Health and Environment will maintain and calibrate the instruments annually as budgets allow and provide training in the use of the instruments**.**

TRAINING

The Colorado Department of Public Health and Environment will provide training to workers excavating tailings and will provide on-site safety briefings as needed. The Colorado Department of Public Health and Environment will be available to explain technical problems, options, radiation health risks or any part of the Uranium Mill Tailings Management Plan. The "Training" section of this plan describes the safety training in more detail.

LOCAL GOVERNMENTS AND PUBLIC UTILITIES

The local governments and public utilities are responsible for following the procedures in this plan, designed to locate residual uranium mill tailings in construction areas, and to excavate and transport contaminated material while minimizing impact and radiation exposure. The local governments and utilities recognize that cooperation and coordination between the Colorado Department of Public Health and Environment, the Department of Energy, utilities, and local governments is paramount. All parties recognize and understand that some inconvenience and costs are involved in the proper handling and disposal of residual uranium mill tailings.

TRAINING

Local governments and utilities will require and assign radiation training as required under this plan for workers potentially exposed to ionizing radiation from uranium mill tailings. Training requirements are described later in this document.

COSTS

The costs of excavation, handling and transporting of uranium mill tailings by local governments and public utilities will be borne by these entities. Local governments may apply for grants to cover these costs in accordance with HB 97-1248, through the Colorado Department of Local Affairs and the Associated Governments of Northwest Colorado.

ENFORCEMENT OF PROCEDURES

Local governments and public utilities will be responsible for monitoring and enforcing the procedures for workers under their direct control. Supervisors will observe operations and enforce the written procedures of the Uranium Mill Tailings Management Plan, and the Colorado Rules and Regulations Pertaining to Radiation Control.

POINT OF CONTACT

Local governments and public utilities will identify personnel responsible for contact and coordination with Colorado Department of Public Health and Environment.

INSTRUMENTS

Local governments and public utilities will maintain the radiological detection instruments provided on loan by the Colorado Department of Public Health and Environment in good working order. The instruments are expensive and require proper care and usage. The instruments will be kept on hand for ease of checking potentially contaminated areas. The

instruments will be returned to the Colorado Department of Public Health and Environment annually for an operations check.

Surveys must be performed in accordance with Appendix D and Colorado Department of Public Health and Environment training.

HAZARDOUS WASTE

Local governments and public utilities will notify the Colorado Department of Public Health and Environment of unusual coloration, smells, or materials such as car batteries or transformers discovered in excavations. Coordination with the Colorado Department of Public Health and Environment shall be made prior to the removal of such materials or soils, as they may contain hazardous wastes substances like asbestos which require special storage, handling or treatment if excavated. A certified asbestos inspector should be used to determine the presence or absence of asbestos contamination if it is suspected. If hazardous material is suspected it should be analyzed by a qualified inspector. Hazardous material may not be taken to the interim storage facility. If hazardous material is taken to the interim storage facility by any local government or public utility, that entity will be responsible for removing the hazardous waste and associated tailings within 30 days of being so notified and manage the material in accordance with all federal, state and local requirements. The Hazardous Materials and Waste Management Division technical assistance line (303) 692-3320 is available to provide instructions on how to manage the waste. All materials brought to the ISF must comply with the Department of Energy's Waste Acceptance Criteria for the Grand Junction Disposal Site (most recent version.)

RECORDS CHECK

Local governments and public utilities are responsible for checking available records or maps prior to a planned excavation activity. Up-front knowledge of tailings locations will enable subcontractors to more accurately bid projects. The Colorado Department of Public Health and Environment has copies of the supplemental standards database to assist in locating tailings deposits. The Colorado Department of Public Health and Environment also will retain the records of several thousand properties assessed or cleaned up in Uranium Mill Tailings Remedial Action Program communities.

PERMITS

Construction activities in public right-of-ways are controlled by local governments through the issuance of permits. Work permitted in an area of known tailings involvement will have the statement "tailings procedures in effect" written on the work order and will include a requirement for coordination with the Colorado Department of Public Health and Environment.

EXCAVATION CONTROL

The local governments and public utilities supervising excavations into deposits of uranium mill tailings will minimize over-excavation. Over-excavation is the removal of uncontaminated materials or mixing of uncontaminated materials with uranium tailings for transport to the interim storage facility. Over-excavation is controlled by radiological surveys and segregation of contaminated and uncontaminated material. In most cases, tailings deposits are small and localized. For such situations, a small excavator is the appropriate equipment for this type of removal. In general, the size and capacity of the excavator should match the size of the job. The excavation tool should fit the job to prevent over excavation.

INTERIM STORAGE FACILITY

The City of Grand Junction will be responsible for providing and maintaining the infrastructure necessary for operation of the interim storage facility (ISF), including an operating water line. The City will provide a gate and lock for security of the ISF and equipment shed. The City will also consolidate stockpiles within the ISF as requested by the Colorado Department of Public Health and Environment. No material will enter the ISF without proper documentation completed and stored in the ISF shed. All non-city generated material will be cleared through the Grand Junction UMTRA CDPHE office prior to placement in the ISF.

TRANSPORT TO THE GRAND JUNCTION DISPOSAL FACILITY

The City of Grand Junction will be responsible for transport of the uranium mill tailings to the Department of Energy disposal site from the interim storage facility. All training and procedures required by the Department of Energy for entering the Grand Junction Disposal Facility site (GJDF) will be adhered to. In cases of large quantities, the Colorado Department of Public Health and Environment may arrange for direct transport of the material from the excavation to the GJDF cell. In these cases, the property owner is responsible for transportation. Transportation must meet the requirements of the Colorado Rules and Regulations Pertaining to Radiation Control Part 17 and Colorado Department of Transportation requirements. In addition, all material hauled to the GJDF must be cleared by the CDPHE and meet the Waste Acceptance Criteria for the Grand Junction Disposal Site, as established by the Department of Energy.

UNITED STATES DEPARTMENT OF ENERGY

OPERATION OF THE GRAND JUNCTION DISPOSAL FACILITY

The Department of Energy is responsible for providing resources and coordination necessary to receive uranium mill tailings at the GJDF disposal cell periodically from the

stockpile at the interim storage facility. Currently, it is projected that materials will be trucked from the interim storage facility to the GJDF at least once a year for a two-to-three-week period. This frequency will vary as needed.

The Department of Energy is responsible for providing resources and coordination necessary to receive uranium mill tailings at the GJDF during large planned construction projects, such as sewer line replacement in a supplemental standards area. Planned disturbance of large quantities of uranium mill tailings may be trucked directly to the GJDF without using the interim storage facility, if approved by the Department of Energy.

The Department of Energy is also responsible for developing and maintaining the Waste Acceptance Criteria for the Grand Junction Disposal Site and for assuring that any changes to the criteria are communicated to the Colorado Department of Public Health and Environment.

LONG TERM SURVEILLANCE AND MAINTENANCE

The Department of Energy is responsible for the long-term surveillance and maintenance of the Grand Junction Disposal Facility disposal cell. All costs associated with the operation and maintenance of Grand Junction Disposal Facility is at Department of Energy expense.

CONTACT PERSON

The Department of Energy shall provide a point of contact for coordinating and planning between local governments, utilities and the Colorado Department of Public Health and Environment. The point of contact will receive any reports that the Department of Energy requires.

MAPS

The Department of Energy will provide maps delineating supplemental standards areas to the Colorado Department of Public Health and Environment and local governments.

PRIVATE PROPERTY OWNERS

In Mesa County, private parties or their contractors will notify the Colorado Department of Public Health and Environment of a request for a building or demolition permit through the Mesa County Planning Department. The owners or contractors will follow the recommendations issued to the Planning Department by the Colorado Department of Public Health and Environment through the Building Permit Survey Program.

In Title I uranium mill tailings impacted communities, property owners bear the costs of excavating, stockpiling, and transporting of uranium mill tailings contaminated materials to the interim storage facility, a licensed disposal facility, or to the GJDF. Prior to moving material to the facility, the owner must coordinate with the Colorado Department of Public Health and Environment

The private parties or their contractors will follow the ALARA principle throughout all work with uranium mill tailings. See the ALARA section.

HEALTH AND SAFETY

IONIZING RADIATION EXPOSURE CONCERNS

Uranium mill tailings consist of sand-like wastes generated from the milling of uranium ores to extract "yellowcake," a uranium oxide compound. These tailings contain most of the original radioactivity found in the unprocessed ores. Radioactive radium, thorium, lead and other elements in tailings are unstable and decay by ejecting alpha and beta particles from the nucleus and by releasing excess energy as radiation. The radiation from the decaying tailings atoms has the potential to cause cancer in living tissues.

The main radiation exposures from uranium mill tailings are from direct exposure to gamma radiation, inhalation of radon, and inhalation of airborne radioactive particles.

Based on a human health risk assessment conducted by the Department of Energy (DOE, 1989) gamma radiation exposure to the public from residual uranium mill tailings is expected to be below the 100 millirem per year exposure limit for the general public.

Radon is formed when the radium in the tailings decays. Radon decays by ejecting alpha and beta particles and forms a series of short-lived radioactive products. The particles ejected by radon and its products cannot travel very far in air and cannot penetrate skin, thus are not an external hazard. However, if inhaled, these particles can cause damage to the lungs that could eventually result in lung cancer. Radon is found naturally in air in small amounts. Exposure to radon becomes a health hazard when it accumulates in buildings or mines to higher levels and is inhaled for extended periods. .

A third potential source of radiation exposure is radioactive particles (dust) associated with the tailings that can become airborne. Once airborne, these particles can be inhaled, with subsequent exposure to the respiratory tract. Airborne particulate contamination is routinely controlled to negligible concentrations by the application of water mists or sprays to equipment or tailings releasing dust. Dust masks can also be worn to control this exposure for workers.

The radiation exposures to utility workers excavating uranium mill tailings are greatest in trenches. Radon is heavier than air, and before dispersal occurs, will be at higher levels at the bottom of the trench. The radon levels would probably be greatest when the trench is opened up and lessen somewhat later due to mixing with air. Gamma radiation exposure is also more likely in a contaminated trench. There may be pure tailings in the bedding of the utility line and tailings mixed with the soils in the walls of the trench. The result is radiation exposure to workers from the sides as well as the bottom of the trench.

RADIATION RISK ANALYSIS

The limit for radiation exposure from uranium mill tailings for non-radiation workers is 100 millirem per year in the Regulations, Part 4.14.1, Radiation Dose Limits for Individual Members of the Public. This is a "total dose limit" which includes both internal and external exposure, rather than only external exposure to gamma radiation. The Environmental Protection Agency is currently considering lowering this limit to 15 millirem per year, while the Nuclear Regulatory Commission believes that 25 millirem per year should be used (as applied in the decommissioning of facilities). The allowable exposure for radiation workers is 5,000 millirem per year. Radiation workers are carefully and continuously scrutinized in a radiation workers health monitoring program.

The Department of Energy prepared a health risk analysis in 1989 for utility workers entering trenches that contain uranium mill tailings. The analysis calculated potential worst-case exposures to workers in trenches and compared them to the regulatory limit, (100 millirem per year above background for non-radiation workers, required by the Code of Federal Regulations (CFR), Title I0, Part 20). In the Colorado, background radiation varies from 350 to 650 millirems per year.

The analysis was based on a series of hypothetical projects to remove uranium mill tailings surrounding buried utilities. Water line repairs were estimated to last 39 hours. It was assumed that an individual worker would be in the trench only 25 percent of the time due to scheduling rotations. Thus, 10 hours per year of exposure was allotted to water line repairs.

Approximately eight hours of exposure was allotted to sewer line work with an individual spending only 10 percent of the time in a contaminated trench. Extra exposures were added to account for potential manhole repair. Therefore, two hours of exposure was used in the calculation for sewer line work.

Twelve total hours (10 for water lines and 2 for sewer lines) of yearly potential exposure at the highest, worst-case radiation levels detected in trenches gives an estimated exposure of 9.6 millirem to a utility worker, or 1/10 of the 100 millirem limit.

No exposure limit or regulation exists for radon in outside air, except for uranium and thorium mill tailings disposal cells. The radon limit for miners is four working level months per year. The Environmental Protection Agency has set a voluntary suggested indoor action level at 0.02 Working Levels (WL). This equates to about one working level month per year. The highest radon levels encountered in trenches during the analysis were 0.058 WL. The potential annual working level months-per-year after exposure to 0.058 working levels for 12 hours is 0.004 working level months-per-year, which is below the Environmental Protection Agency indoor action level.

The conclusion of the Department of Energy health risk analysis is that based upon these presumptions, "there is no clear present or future health risk to utility workers in Mesa

County due to potential gamma or radon exposure, even based upon the worst-case scenarios."

AS LOW AS REASONABLY ACHIEVABLE (ALARA)

Even though the Department of Energy's risk assessment demonstrated that risk to utility workers in trenches containing uranium mill tailings is expected to remain below regulatory limits, the Tailings Management Plan supports adherence to the ALARA philosophy, as stated in Part 4.5 of the Regulations, to limit exposure to levels less than the regulatory requirement.

ALARA is an approach to radiation protection to manage and control exposures (both individual and collective to the work force and the general public) and release of radioactive materials to the environment at levels as low as is practical below the regulatory requirement, taking into account social, technical, economic, practical and public policy considerations. As used in this context, ALARA is not a dose limit but a process, which has the objective of attaining doses as far below the applicable controlling limits as is reasonably achievable.

The ALARA principle will be the primary philosophy and tool used for controlling radiation exposures during all activities of managing uranium mill tailings. The ALARA principle will be implemented by use of the following requirements to control exposure:

- The upper limit of gamma exposure allowed will be 15 millirem per year. Supervisors of local government and utility workers should maintain records regarding the number of hours of exposure for their employees who work near uranium mill tailings. If badges are not used to track actual exposures, the exposures can be roughly estimated. Using the average tailings activity, approximately 300 hours of trench work is allowable per year under this exposure limit. The local government or public utility and the Colorado Department of Public Health and Environment may consider additional rotations out of trench work when any individual worker has accumulated 100 hours of work in contaminated trenches in any given year, in order to ensure worker protection.

- When possible, the local government or public utility should consider establishing a control area around exposed tailings. Only trained personnel should be allowed into the controlled area. Individuals entering the controlled area will limit the amount of time spent within the controlled area. Individuals will position their work as far from the contaminated areas as possible. Only necessary equipment or tools will be allowed into the controlled area. Uranium mill tailings contaminated areas will be fenced off from the public during non work hours. No unauthorized entry into the controlled areas is allowed by the public.

- No visible dust is allowed to leave the controlled area. Dust will be controlled through the use of water sprays. However, spraying should be limited to the

amount necessary to keep the excavation dust-free, but should not create runoff from the excavation.

- No eating, drinking, chewing, or smoking is allowed in the controlled area.

- All equipment and personnel in contact with tailings will be surveyed with a radiation meter. If contamination is present, they must undergo decontamination. Haul trucks and contaminated personnel will be frisked with a radiation meter to verify decontamination. Surface meter readings should be under 18 μ R/hr (microRem [Rem = roentgen equivalent man] per hour) or equivalent.

- Haul trucks will be covered with a tarp to prevent windblown transportation. . If the tailings are wet or have the potential of leaking out, a plastic sheet should be positioned in the tailgate to contain tailings.

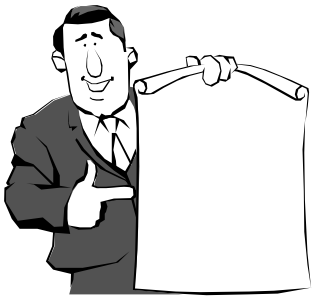
- If a spill occurs, the spill procedures must be followed (see "Transport of Tailings").

- Tailings deposits excavated from the top three feet of an excavation should not be replaced into the excavation. These tailings should be removed and transported to a controlled onsite stockpile or to the interim storage facility. Clean fill should replace tailings deposits for up to three feet from the ground surface. If this is not readily performable, a cap of 6 inches in non traffic areas and 18 inches in high traffic areas should be placed over the tailings at a minimum. This should be placed over stockpiled material as well and a tactifyer such as magnesium chloride should be applied to minimize weathering. This tactifyer should be applied to all temporary stockpiled tailings if stored over 30 days or if weather conditions indicate that tailings may be spread from the stockpile.

TRAINING

COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

The Colorado Department of Public Health and Environment employees responsible for implementing the Uranium Mill Tailings Management Plan, and employees who may receive radiological exposures in the work place, will be provided with training and be proficient in the following areas:



40 Hour Hazardous Waste Training
8-hr Refresher Training

Radiological Worker Training
Radiological Refresher Training

The Department will develop and update the curriculum for training of local government and public utilities workers or private owners and agents. The curriculum will include:

Basic Health Physics
Radiation Exposure Limits and Monitoring
Excavation and Transport Procedures
Survey Meter Operation
The ALARA Principle
Decontamination Procedures

LOCAL GOVERNMENTS AND PUBLIC UTILITIES

It is recommended that local governments and public utilities workers who may potentially be exposed to uranium mill tailings will receive training in the following areas:

Radiological Worker Training
Radiological Refresher Training

The workers for these agencies will attend on-site briefings to review uranium mill tailings management procedures before beginning work in an area known to contain uranium mill tailings. The Colorado Department of Public Health and Environment or the local government/public utility supervisors will conduct the briefings.

EXCAVATION PROCEDURES

RADIATION SURVEY

A gamma radiation survey instrument will be accessible to excavation crews working in areas known to be contaminated with uranium mill tailings. The instrument will be provided on loan by the Colorado Department of Public Health and Environment and will be capable of detecting uranium mill tailings in the range of 0-1000 micro Roentgen per hour (μR/h).

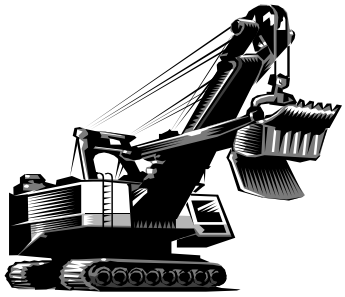
A field operations check on the instrument will be performed before surveying for uranium tailings contamination.

Refer to Appendix D – Generic Survey Procedures for more detailed procedures.

IDENTIFYING CONTAMINATED MATERIAL

For purposes of this plan, residual uranium mill tailings will be identified based on a reading of 30 percent above the normal background gamma radiation. A reading of fourteen μR/h is generally considered the average for western Colorado soils. As such, the background gamma plus 30 percent results in a value of 18 μR/h. Any reading of 18 μR/hr will be considered contaminated with uranium tailings. In non-habitable areas (and non-habitable in the future), a reading of 20 μR/h is allowable. Every area with contamination is to be evaluated and handled individually based on consultation with the Colorado Department of Public Health and Environment. For purposes of this Uranium Mill Tailings Management Plan, and in adherence to the ALARA principle, hot spots will be removed and area averaging is not allowed.

Uranium mill tailings contamination may be in surface deposits or buried, especially in utility trenches. Where applicable, the Department of Energy supplemental standards maps may be used to generally indicate potential areas of contamination. Prior to surface penetration, a check shall be made with a scintillometer. After a trench is excavated, the meter shall be lowered for spot checks along the length of the excavation. Any suspicious gray or purple sands should be particularly checked.
Tailings are often mixed with soils are indistinguishable and appear to be normal dirt.



EXCAVATION

CONTROLLED AREAS

If tailings are identified, a controlled area shall be established, extending 10 feet from the edge of the deposit. Once tailings are identified,

tailings excavation procedures and ALARA principles immediately become effective. The supervisor/property owner is responsible for enforcement of the procedures.

HAZARDOUS WASTES

Uranium mill tailings contaminated areas shall be inspected for asbestos, visible discoloration, odd smells, or for materials such as car batteries or transformers. Mixing of hazardous wastes with the tailings will probably cause the deposit to be considered a commingled waste. Commingled wastes, if above regulatory limits, and untreated, cannot be hauled to the Grand Junction Disposal Facility disposal site. Material hauled to the Grand Junction Disposal Facility must meet the Department of Energy's Waste Acceptance Criteria.

Co-mingled wastes are regulated with specific handling and storage requirements. The Colorado Department of Public Health and Environment shall be notified immediately upon suspicion of such wastes. These deposits shall not be excavated unless necessary and then shall be segregated and stored separately from the other non-comingled tailings and clean soils. The local government or public utility will be responsible for managing commingled wastes in accordance with applicable hazardous waste regulations.

AVOIDING OVER EXCAVATION

If uranium mill tailings need to be excavated, the amount of material disturbed or removed should be minimized. Over excavation causes extra handling costs and fills the limited permanent storage room available in the Grand Junction Disposal Facility disposal cell. Appropriately sized equipment should be used based on the size of the deposit to be excavated. If the tailings cannot be directly loaded onto transportation, stockpiled tailings should be placed onto concrete or plastic sheeting to delineate and separate from the clean soil below it.

Uncontaminated overburden shall be removed and segregated from uranium mill tailings below. Only uranium mill tailings contaminated materials shall be transported to the interim storage facility or Grand Junction Disposal Facility. Care shall be taken to avoid mixing contaminated soils with uncontaminated soils. The radiation meter shall be used to identify soils in question.

The uranium mill tailings contaminated areas considered for removal will be visibly marked for the machine operator. This is to segregate the contaminated material and avoid mixing. Spray paint, colored flags or fencing are appropriate to delineate the uranium mill tailings contaminated areas.

No trash, wood, tires or other non-contaminated solid waste shall be shipped to the interim storage facility or GJDF. Such materials may be decontaminated and disposed of as solid waste. Care shall be taken to segregate uncontaminated concrete from contaminated concrete (It has been our experience that uncontaminated concrete is the material that most

often is improperly brought to the interim storage facility). Contaminated concrete or asphalt shall be sized properly to allow compaction at Grand Junction Disposal Facility. No debris shall be larger than 3 feet in any dimension. No pipe shall be longer than 10 feet in length. All materials shall be sized in accordance with the Department of Energy's Waste Acceptance Criteria for the Grand Junction Disposal Site.

Proper disposal of tailings is always the best means of dealing with tailings. It is the ultimate final termination of the contamination. However, in some cases, particularly in Title I communities outside of the Grand Junction area, transportation to the ISF or GJDF is just not feasible. In these situations, uranium mill tailings can be re-buried on site provided that the following conditions are met:

1) A discussion with CDPHE about disposal options prior to any excavation activities must be conducted.
2) Tailings may be returned to the original excavation, in a last out-first in order.
3) The tailings should be re-buried under a minimum of 6 inches of clean soil in low exposure/traffic areas and 18 inches in high exposure/traffic areas and no deeper than a foot above the vadose (ground-water capillary) zone. 18 inches of clean cover should be used in areas with high erosion potential.
4) Contaminated surface deposits must be re-buried beneath clean fill material as listed in 2).
5) A written record that indicates the approximate volume of material that was re-buried, the meter reading for the material, the approximate depth of burial and the burial location, shall be submitted to CDPHE. These records shall also be maintained in perpetuity by the property owner, provided to any subsequent owner and to any contractors performing work on the property.

STOCKPILING

Stockpiling of uranium mill tailings contaminated material should be avoided whenever possible. Stockpiling may cause concerns to property owners, and may present an exposure hazard. Stockpiling on the same property that the tailings came from is allowable, but not advisable. Tailings may not be removed from the original property except to be taken to a licensed disposal facility, the interim disposal facility at the City of Grand Junction's yard, or the Grand Junction Disposal Facility in Whitewater, CO. Stockpiled material should be fenced from public access, and must be covered or a tacktifyer applied to prevent wind and water erosion. Stockpiles should not be left in place longer than 60 days. If it is necessary to leave them longer than that, or if inclimate weather is emanate, they must be properly covered or sealed.

ASPHALT

When working with asphalt placed over uranium mill tailings contaminated soils, care shall be taken to not penetrate into the tailings and/or mix the tailings with the asphalt. If tailings are mixed with the asphalt, the asphalt should be inspected with a meter. If the

mixture shows a meter reading of 30 percent above the radiological background (a reading of 18 uR/hr or greater), it is considered contaminated.

Asphalt removed in chunks over uranium mill tailings contaminated soils should be inspected on the underside with the survey meter. If excavation into the bedding material is necessary, care must be taken to segregate contaminated and uncontaminated materials.

WATER MAIN BREAKS

If uranium mill tailings are washing away due to a water line break, sediment dams shall be established to halt the spread of contamination. Following repair of the break, a meter survey should be conducted downstream to insure that any contaminated materials spread by the break are identified and are cleaned up. Any material exceeding 30 percent above background (18 μR/hr) should be returned to the excavation or taken to the interim storage facility.

DECONTAMINATION

All equipment used for excavation or hauling of tailings shall be inspected and decontaminated. Visible tailings shall be swept or sprayed away and placed in the ISF.

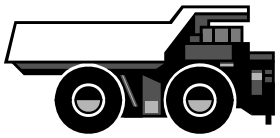
Workers in contact with tailings shall be decontaminated. Visible tailings shall be swept or washed away. These workers shall be frisked with the beta-gamma meter for verification of decontamination (See Appendix B). If clothing will not pass the frisk, the workers shall change into clean clothing. Contaminated clothing and contaminated decontamination materials shall be taken to the interim storage facility for further decontamination and frisking or disposal. The Colorado Department of Public Health and Environment will be available to assist in these operations.

CEASE WORK

Work shall cease when the project supervisor or the Colorado Department of Public Health and Environment determines that the procedures have not or cannot be followed. Examples include: high winds making it impossible to control dust, a truck that leaks tailings or non-cooperation of workers. Work may be resumed when the supervisor and the CDPHE determines that the procedures issue has been resolved and it is safe to resume work.

TRANSPORT OF TAILINGS

REGULATIONS



Transportation of radioactive material over public roads in Colorado is regulated under the Code of Federal Regulations (CFR) Title 49, Parts 171-178 and 390-397, and Part 17 of the Colorado Regulations, which mirror 49 CFR. Generally, uranium decay series material is low specific activity as defined by the International Atomic Energy Agency and U.S. Department of Transportation.

The Department of Transportation defines a concentration of radioactivity above which material like uranium mill tailings is considered radioactive for purposes of the transportation regulations. At present, the Department of Transportation defines any material with radioactivity greater than 70 Becquerel per gram (B/g) as radioactive for transport purposes. For uranium mill tailings, 70 B/gm total activity is calculated to be less than approximately 174 pCi/g radium-226. Therefore, if a truckload of tailings material averages overall below less than 174 pCi/g radium-226, it is not considered radioactive material for purposes of transportation under 49 CFR and Part 17 of the Regulations. From our experience in the Uranium Mill Tailings Remedial Action Program, tailings excavated from streets or other properties are usually mixed with clean soil and do not exceed 174 pCi/g radium-226.

HAULING

The ALARA principle will be followed during transportation of tailings. This will be insured by covering and not overfilling loads to prevent dust or spillage. If very wet or fine-grained material is to be loaded, a plastic sheet diaper will be placed in the rear of the truck bed in a manner to exclude leaking out the tailgate. Loads should not be piled any higher than the sidewall of the truck. The most direct route possible with no off-road stops will be used to transport tailings to the interim storage facility. All loads will be covered to ensure that no tailings are blown out during transport.

SPILL PROCEDURE

When transporting mill tailings, if a spill from the haul truck occurs, the supervisor and the Colorado Department of Public Health and Environment will be notified as soon as possible. The spill will be isolated and protected from further dispersal. Traffic cones and flagmen will be used as necessary for traffic safety. The truck should pull off the road if possible. If there has been an accident, the driver should call the state patrol or 911 as necessary. Drivers should also call their supervisor and the Colorado Department of Public Health and Environment in responding to the spill. Traffic safety has priority over isolating or recovering the spill

The spill will be swept up and put into a closed container appropriate to its volume and transported to the interim storage facility for disposal. The area is considered clean if no contamination is seen or detected. If the spill was onto a dirt road, the radiation survey meter will be used to verify the spill cleanup. If no readings above 18 μR/h are noted on the gamma survey meter, the area is considered clean.

APPENDIX A

DEFINITIONS

Access Control: A designated entrance/exit point to a controlled area.

ALARA: Acronym for "As Low as Reasonably Achievable," a basic concept of radiation protection that specifies that radioactive discharges from nuclear plants and radiation exposures to personnel be kept as far below regulatory limits as feasible.

Alpha Particle: A positively charged particle ejected spontaneously from the nucleus of some radioactive elements. It is identical to a helium nucleus and has a mass number of 4 and an electrostatic charge of +2. It has low penetrating power and short range. The most energetic alpha particle will generally fail to penetrate the skin. Alphas are hazardous when an alpha-emitting isotope is introduced into the body.

Beta Particle: A charged particle emitted from a nucleus during radioactive decay. A negatively charged beta is identical to an electron. A positively charged beta particle is called a positron. Large amounts of beta radiation may cause skin burns. Beta emitters are harmful if they enter the body. A thin sheet of metal or plastic easily stops beta particles.

Grand Junction Disposal Facility (GJDF): The Uranium Mill Tailings Remedial Action Program disposal cell, operated by Department of Energy, located about 15 miles south of Grand Junction on U.S. Highway 50, will remain open until the year 2023 or until filled. This will be the only permanent (program) disposal cell available to uranium mill tailings disturbed by construction activities after 1998. This cell was previously known as the Cheney Disposal Cell and was renamed in 2012.

Contamination: Unwanted radioactive materials (uranium mill tailings) that are present on/in a particular object or area. It can also refer to other contaminants such as asbestos.

Controlled Area: Any area to which access is managed in order to protect individuals from exposure to radiation and/or radioactive material. Individuals who enter a controlled area are not expected to receive a total effective dose equivalent of more than 100 millirem in one year**.**

Decontamination: The reduction or removal of contaminating radioactive material from a structure, area, object or person**.**

Frisk: A radiological survey of personnel or equipment utilizing a portable radiation detector.

Gamma Ray: High-energy, short wavelength electromagnetic radiation (a packet of energy) emitted from the nucleus of an unstable atom. It is very penetrating and is best stopped by dense materials such as lead. They are similar to x-rays but are usually more energetic.

Interim Storage Facility: The facility located in Grand Junction available for temporary storage of uranium mill tailings disturbed during construction activities. The interim storage facility is located on the City of Grand Junction property at 333 West Avenue, Grand Junction, Co. and managed by the Colorado Department of Public Health and Environment**.**

Radiation: Particles (alpha, beta or neutrons), or photons (gamma) emitted from the nucleus of an unstable (radioactive) atom as a result of radioactive decay.

Radioactive: Exhibiting radioactivity or pertaining to radioactivity.

Radioactivity: The spontaneous emission of radiation, generally alpha or beta particles often accompanied by gamma rays, from the nucleus of an unstable atom.

Uranium Mill Tailings: Radioactive residues from the processing of uranium ore into yellowcake in a mill. Although the milling process recovers about 93 percent of the uranium, the residues, or tailings, contain several radioactive elements, including uranium, thorium, radium and polonium.

Yellowcake: A product of uranium milling process, yellowcake is a solid uranium oxide compound (U3O8) that takes its name from its color and texture. Yellowcake is the feed material for fuel enrichment and fuel pellet fabrication.

APPENDIX B

FRISKING AND DECONTAMINATION PROCEDURE

FRISKING

PURPOSE

This procedure establishes the requirements for decontamination frisking prior to exiting the controlled area of the interim storage facility. Frisking for contamination will limit exposure of the workers and the general public to radioactive material and prevent the spread of contamination beyond controlled areas.

APPLICABILITY

This procedure applies to all people entering and exiting the controlled area of the interim storage facility.

PRECAUTIONS

All personnel who enter a controlled area (the interim storage facility or an excavation into tailings) are expected to keep their exposures to radiation and radioactive materials as low as reasonably achievable (ALARA).

Personnel or equipment may not leave the interim storage facility with any detectable radioactive contamination**.**

FRISKING SURVEY METER

A portable monitor, such as the Ludlum Model 44-9, pancake GM beta-gamma detector, or equivalent, shall be used for frisking. The frisking instrument shall have a valid calibration and be functionally checked before using this procedure.

EQUIPMENT FOR FRISKING AND DECONTAMINATION

Frisking Meter	Broom
Sturdy Brush	Wash Tub
Mild Soap	Laundry Soap
Garden Hose	Frisking Log

FRISKING PROCEDURE

Personnel shall frisk using the techniques defined. Personal items such as flashlights, notebooks or hats shall be subject to the same frisking requirements as the person carrying them.

Verify the instrument is in service, set to the proper scale, and the audio output can be heard during frisking.

Hold the probe less than half an inch from the surface being surveyed.

Move the probe slowly over the surface, approximately two inches per second.

If the count rate increases during frisking, pause for 5 to 10 seconds over the area to provide adequate time for instrument response.

If the count rate increases beyond background, the area shall be decontaminated and frisked again.

PERSONNEL FRISKING ORDER

Frisk the hands before picking up the probe.

Frisk in the following order:

Head (pause at the mouth and nose for five seconds)
Neck
Arms (pause at the elbows)
Chest and abdomen
Back, hips and seat of pants
Legs (pause at the knees and cuffs)
Shoes
Shoe bottoms
Personal items (hat, gloves)

DECONTAMINATION

PERSONNEL DECONTAMINATION

Skin contamination may be removed by washing with lukewarm water and mild soap. Personnel may flush ears/eyes with cool, clear water to decontaminate those areas. If flushing is not successful, qualified medical personnel shall direct additional decontamination efforts.

Clothing and shoes may be brushed clean. If clothing will not decontaminate with brushing, it shall be removed and exchanged with the supplied coveralls in the access shed. Contaminated shoes may be brushed and washed without removing and re-frisked.

EQUIPMENT AND TRUCK DECONTAMINATION

Prior to frisking a truck, the vehicle engine will be shut off, placed in 1st gear and have the wheels chocked. No person shall physically go beneath a piece of equipment to perform inspections or decontamination.

All visible contamination shall be swept or washed into the interim storage facility. Tailgate areas and tires will be frisked with the probe at two inches per second and with the probe half inch from the surface. If the instrument rate count registers above background, further brushing and washing will be performed until it is deemed acceptable.

EXITING THE INTERIM STORAGE FACILITY

Return the frisk probe to its holder. The probe shall be placed face up to allow the next person to monitor his/her hands before holding the probe.

After decontamination of equipment and personnel and successful frisking, personnel may leave the controlled area, sign out on the access/frisking log, secure the gate and shed and exit the area.

APPENDIX C

BUILDING PERMIT SURVEYS

BUILDING PERMIT SURVEY HISTORY

In 1971, the Colorado Department of Public Health and Environment, formerly the Colorado Department of Health, began a cooperative program with the Mesa County Planning Department to conduct radiation surveys at new construction sites. The radiation surveys were integrated into the building permit process, and it was therefore called the Building Permit Survey Program.

As discussed in the History section of the Uranium Mill Tailings Management Plan, radioactive tailings were used in Mesa County and other uranium mill towns for building materials and fill dirt. Many structures were modified or built over tailings. Therefore, potential health risks were being created due to the increased gamma radiation and radon exposure.

Surveys are performed by the Colorado Department of Public Health and Environment before a building permit is issued. The surveys include the footprint of the proposed building, plus 10 feet extra around the perimeter. After the survey, an inspection form is filled out indicating that no radioactive materials were found or with recommendations for removal, or other options, if tailings are found. The form is given to the owner (or contractor) with a copy entered into the Colorado Department of Public Health and Environment database. If tailings are found, a map is drawn indicating the areas of concern.

When tailings are removed from a building site, another form and map is filled out declaring the removal of the contamination, which allows the issuance of the building permit. Copies of the information are entered into the Colorado Department of Public Health and Environment database for reference and documentation.

The survey is considered valid for six months, after which another survey may be necessary if the structure hasn't been constructed. This is because, within six months, the site could have been re-contaminated.

The surveys include all structures that could possibly be converted into living spaces. During the oil shale boom, people were known to live in sheds or any space available. Thus, sheds and garages, as well as business sites and houses, are inspected. Areas such as patios, carports and porches are also inspected as these are often enclosed later as part of the living space.

Currently, the Colorado Department of Public Health and Environment surveys demolition

sites and building sites in Mesa County. Procedures now concentrate the surveys on properties or areas with a known history of tailings. Much of the construction activity currently in Mesa County is new subdivisions in former fields, where tailings are unlikely to be encountered.

PROCEDURES FOR THE REQUIREMENT OF A BUILDING PERMIT SURVEY

Upon receiving a request for a building permit survey, a record review will be performed by the Colorado Department of Public Health and Environment to ascertain the need for a field survey. The review will include the CDPHE gamma table, and, if necessary, the Department of Energy microfiche records for the location.

The following criteria will result in the execution of a field survey:

1. Records indicate the presence of historic tailings or ore. . Historic tailings properties will always be surveyed, even if remedial action took place. Remedial actions did not always find or completely remove tailings.

2. Tailings have been found on an adjacent property. Adjacent properties will be surveyed if it is in an area where extensive tailings were used.

3. For information: Information surveys are in areas where previous surveys were not performed. The inspector will perform surveys on several properties in the new area (subdivisions) and determine from visual observations which properties in the area may need surveys when they are requested, due to radiation readings, fill areas, geography, or previous structures.

If it is determined that a survey is not to be performed, the program assistant will fill out a Building Permit Records card, print out a form in duplicate, sign the form and give one copy to the requestor. The other copy is filed and entered into the database. The Building Permit Records form indicates, “No field survey is required based upon a record review of the vicinity of the building site. No tailings deposits were identified from available records that would affect the construction site.”

In communities outside of Mesa County, the Colorado Department of Public Health and Environment will provide assistance to monitor construction and demolition sites with a history of tailings involvement, if requested. The Colorado Department of Public Health and Environment data and files may be used to determine if a site needs a radiation survey. The Department may perform site visits to conduct the surveys if the data base information is inconclusive.

APPENDIX D

GAMMA RADIATION SURVEY PROCEDURES

GAMMA RADIATION SURVEYS

OBJECTIVES OF GAMMA SURVEYS

The objective of a gamma survey is to determine if radioactive materials, especially uranium mill tailings, are present on individual properties, to acquire sufficient data to evaluate the gamma levels and health risks, and to document the location and conditions of radioactive materials. Uranium mill tailings are the primary radioactive materials being surveyed, due to their radium content and potential to cause elevated radon gas in structures. The gamma surveys may locate natural soils, rocks or ores that have elevated gamma radiation and have the potential to increase indoor radon levels. The gamma survey may also locate and identify other radioactive sources such as ore or petrified wood, which may not have a potential to increase radon, but increases health risks through gamma exposure.

BACKGROUND GAMMA RADIATION

Background radiation is the natural radioactivity of an area. Background radiation varies due to the influence of natural mineral deposits, building materials and elevation. The most common outside background levels in Mesa County are 10 to 14 micro roentgens per hour (μR/h). Fourteen μR/h shall be considered background in Mesa County, Colorado. A meter reading 30 percent higher than the local background level (18 μR/h) is significant and requires investigation.

NON-TAILINGS GAMMA SOURCES

There are many different radioactive materials besides uranium mill tailings that may be encountered during a gamma survey. Luminous-dial compasses, clocks, aircraft instruments, propane tanks, petrified wood, dinosaur bones and ore samples may emit gamma radiation levels above 20 μR/h. Natural outcroppings of granite rocks may demonstrate elevated gamma radiation. These objects may act as point sources, as the gamma field drops off rapidly when the survey meter is moved away. Coal ash and shale may also cause meter readings above 20 μR/h, but seldom appear as point sources. Brick may cause readings of 22 μR/h due to the materials used in their manufacture. Some granite countertops exhibit meter readings far in excess of 20 μR/h as well.

INTERPRETATION OF READINGS

SHINE

Radiation detected that is from a source some distance away is called shine. Shine will make it more difficult to determine the levels of radiation from nearby objects. The meter readings are higher than if the shine radiation did not exist. An example of a shine source is a large pile of radioactive tailings or large radioactive ore pile. Shine fields are also created by strong local radioactive sources such as density gauges or metal weld x-ray devices.

To check for shine, the meter reading can be compared at ground level, waist level and overhead. If a shine field is present, the meter will detect about the same radiation levels at waist and surface levels.

Lead shielding can be used to help interpret meter readings in a shine field. A lead shield may be wrapped around the sides of the meter to block the shine.

A comparison of shielded meter readings and unshielded readings, called a differential, may help distinguish localized elevated gamma levels from shine. A sheet of lead is placed between the instrument and the suspected area, and a meter reading is taken. The shield is removed, and a second meter reading is taken. The difference between the shielded and unshielded reading is the differential. The differential should not be greater than six, which is about 30 percent, for background radiation areas around 14 μR/h. If the differential is greater than six, the area under the shielding may be contaminated with a radioactive source. This technique loses accuracy when higher gamma fields are encountered.

The Colorado Department of Public Health and Environment will provide assistance if a shine field is suspected and the meter readings are difficult to interpret.

GEOMETRY

A meter reading in a hole or trench may indicate higher radiation levels than a flat surface. The meter receives gamma radiation from many directions in a hole, while a surface reading mainly detects the area directly beneath it.

SHIELDING

Dense materials shield gamma radiation from detection. Examples are rock road base, asphalt, concrete and hard packed soils. The amount of shielding depends upon the thickness. Radiation surveys over asphalt or concrete need to be performed more slowly so that the technician can observe small fluctuations on the meter. While normal soils reading 14 μR/h usually indicate no contamination, this reading on asphalt or concrete may indicate a shielded radioactive deposit.

STANDARD GAMMA SURVEY PROCEDURE

SURVEY INSTRUMENTS

The survey instruments used by the Colorado Department of Public Health and Environment and loaned to local governments, public utilities, and private parties are adequate to locate uranium mill tailings situated close to the ground surface. If a deposit is heavily shielded, the meter may not indicate any change from background radiation. The meters are calibrated yearly and should be given an operations check before use. Many of the instruments have been calibrated and electronically modified to give a fast response time. Instruments with an audio device are the easiest to use as one can notice the faster change in the sound (clicking speed), which is an indication of a radioactive source. The instruments are designed to give a meter reading in micro roentgen per hour. If the surveyor's meter shows 18 μR/h on the scale, this is considered 30 percent above background of 14 μR/h and that tailings contamination is present.

PERMISSION TO SURVEY

Permission to access private property must be obtained before a survey is undertaken. The owner or owner representative may give a verbal or written permission to enter a property. The surveyor should identify himself to residents on the property and state the purpose of the survey.

HEALTH AND SAFETY

Performing a gamma radiation survey is not entirely risk free. The major hazards are potential physical injuries due to falling or being trapped in a confined space. The surveyor should comply with Occupational Safety and Health Administration (OSHA)-confined space entry requirements. Prior to entering any crawlspace, the surveyor should notify a coworker of the location and intent to survey. Some crawlspaces are too tight to enter safely. If such areas must be checked for a radiation source, an extension pole attached to a meter with audio capability would allow limited probing into the tight areas.

No hole or trench deeper than 4 feet or with sides steeper than a 45-degree angle should be entered unless the sidewall stability conforms to OSHA standards. These areas, as well as vertical cliffs, can be surveyed by lowering the meter on a rope and listening to the audio or observing the meter face with binoculars.

Head injuries can be avoided by not watching the meter while walking. Tree limbs, air conditioners, pipes and other extending objects are commonly at head level around houses. Using meters with the audio capability and watching the path of the survey will avoid injury.

Dogs are potentially a risk when surveying. Always ask the residents if there are dogs present and to place them indoors or tie them up in an area not needed to be surveyed. Personnel should always be watching for dogs when entering a property.

Exposure to gamma radiation is a potential health risk to the surveyor. During the many years that the Colorado Department of Public Health and Environment has conducted gamma surveys, it is rare that the monitoring badges worn by surveyors record any exposures above background. It would be possible to receive limited gamma exposure if uranium ore samples were carried around in a vehicle. If ore is transported, it should be placed as far away from occupants as possible and removed from the vehicle and properly disposed of as soon as possible.

If the surveyor detects a radiation source above 1,000 micro roentgen per hour (one mill roentgen), and the source is not obviously ore or uranium mill tailings, the surveyor should immediately leave the area and notify the Colorado Department Of Public Health And Environment, Radiation Control Program. Such sources could be radium sources or instruments, such as moisture density gauges.

The surveyor is expected to adhere to the ALARA principle and keep all radiation exposures As Low As Reasonably Achievable.

GENERIC SURVEY PROCEDURES

All gamma surveys will use generic procedures that address situations commonly encountered. These are centered on the readiness of the survey meter; interpretation of findings and investigating shielded radiation sources.

The survey meter must be checked for operation before use. The meter battery level and meter scales can be compared with historical levels by using known radioactive sources. If the instrument is in the field, and no radioactive check source is available, the meter can be placed on the ground and comparisons made between the different scales and background level.

Before surveying, the area background must be determined. Background is the normal radiation level in an uncontaminated area. Radiological contamination may be assumed if the meter registers 30 percent above background. However, holes or trenches may register 30 percent above background and not be contaminated due to the geometry. Interpretation of meter readings in trenches and holes is difficult and usually requires experience and a judgment call. It is not unusual for a water meter pit to read 20 μR/h on the survey meter and not be contaminated. If a water meter pit reads over 20 μR/h on the survey meter, one should be suspicious of possible uranium tailings.

The survey should be conducted at a slow walk, using an established grid pattern. Specific spots may be checked by hesitating, placing the meter on the ground and noting the reading. The meter should be carried no more than one to four inches from the surface

when walking with no wide arcing swings. The meter is placed in fast response mode on the lower scale with the audio switch on.

When surveying areas with tall vegetation (weeds), the meter will have to be alternately lifted and lowered rather than maintaining a constant one to four inches from the surface.

Shielding will hide radioactive sources from detection. The survey may detect borderline elevated readings. These areas should be explored by removing some of the shielding. Dirt or gravel may be kicked aside or shoveled away. Asphalt and concrete may be checked from the edge where an inspection hole can be dug. Woodpiles and debris may be moved to find a spot to lower the meter to the ground. Water meter pits and manholes can be inspected by removing the cover and lowering the meter. Large manhole covers are heavy and may need a shovel or crowbar to pry it off and therefore may not be accessible. At no time will the Colorado Department Of Public Health And Environment conduct a survey where personnel safety may be compromised.

SPECIFIC SURVEY PROCEDURES

BUILDING PERMIT SURVEY (NEW STRUCTURE)

In Mesa County, a cooperative program exists between the Colorado Department of Public Health and Environment and the City/County Planning Department to screen proposed building sites for uranium mill tailings. The generic survey procedures apply. Three-foot survey grids extending an extra 10 feet beyond the site footprint are adequate to screen for radioactive materials.

The Colorado Department of Public Health and Environment requires that the builder stake out the site footprint. If the site is not staked or marked at the time of the survey, the requester may mark it out and reschedule the survey. The property must be clear of hindrances or restrictions so that a valid survey can be completed. Dirt/gravel piles must be removed as well as any obstructions for a survey. Colorado Department Of Public Health And Environment requires any proposed building site be officially addressed by the City/County Planning Department before any field gamma screening are preformed or Building Permit Survey forms are issued.

If no unusual gamma radiation above background is detected, the Building Permit Survey form is completed, signed and given to the builder for inclusion with paperwork submitted to the Planning Department for a building permit.

If elevated gamma radiation is detected, the surveyor will explore the area to determine the source. The elevated gamma area may be checked by digging out shovel scoops. This method often determines that the source of elevated gamma is a small ore rock or that the source is not extensive.

If an extensive gamma source is discovered that cannot be removed by a few shovel scoops, the Building Permit Survey form is filled out to reflect the finding, a map is drawn to locate and document the area and the builder notified.

The Colorado Department of Public Health and Environment presents options to owners to mitigate radiation sources discovered on building sites. The main concern is mitigation of potential radon sources inside the structure. The secondary concern is mitigation of gamma radiation exposure through the floors of the structure. The optimum solution is the complete removal of the source of radiation.

BUILDING PERMIT SURVEY (DEMOLITION)

Structures being demolished in Mesa County are controlled through the permit system of the County Planning Department. Structures planned for destruction should be surveyed to locate any potential uranium mill tailings contamination in the building materials.

The lower levels and all floors made from concrete should be scanned using 5-foot grids. The inspection should also include closets, bathrooms and kitchens.

Areas to survey include the following:

Lower Level Floors	Cinder Blocks
Foundations	Stucco
Brick and Mortar	Sidewalks
Driveways	Rock Walls/Fences
Sandboxes	Rock Gardens
Planters	Patios
Garages	Carports

If radioactive sources are discovered, the survey form is filled out, and the owner or contractor is notified. Options are discussed to separate radioactive contaminated materials from other debris. The radioactive materials can be located by the survey meter and marked with paint. Contaminated materials should be segregated and stockpiled or taken to the interim storage facility. Items transported to the interim storage facility shall comply with the Department of Energy's Waste Acceptance Criteria for the Grand Junction Disposal Site.

These procedures are in addition to the State of Colorado Demolition permit processes.

GAMMA RADIATION SURVEY FOR INFORMATION

The Colorado Department of Public Health and Environment has a vast database documents the radiological conditions on thousands of properties in western Colorado. However, many properties were never surveyed, and no information is available. Thus, the

Department will occasionally conduct a gamma survey on a property for information purposes.

Surveys on an entire property present a problem because of the size of the area. The grids for survey must be appropriate to the area. If the area is no larger than two acres, 10-foot grids are used. . For very large areas, grids as large as 50 feet may be used.

The larger the grid size, the greater the chance of overlooking a radiation source. In the case of very large properties, the areas one inspects, like a potential building site may be more important than walking the entire site on grids. Disturbed areas, likely dump areas, roads and gates should be inspected. Any structures should be checked using the techniques for demolition sites. Lawns, gardens, and septic systems should be checked. All concrete, metal debris, hoses, and fiberglass panels should be inspected.

If a linear pattern of elevated gamma readings is detected, it may indicate a buried utility line packed in uranium mill tailings. The Colorado Department of Public Health and Environment may assist in conducting large-area surveys, but the responsibility for a complete (non-building permit) survey on any property is that of the owner. A survey meter may be checked out (borrowed) from the Colorado Department of Public Health and Environment, or a consulting company/contractor may be hired by the property owner. However, Colorado Department of Public Health and Environment will conduct complete surveys on building sites.

STREETS, ALLEYS, AND UTILITY LINE CONSTRUCTION

Prior to construction involving streets, alleys or utility lines, the contractors should consult Department of Energy maps delineating supplemental standard areas. City workers or their contractors using instruments on loan from the Colorado Department of Public Health and Environment can survey the areas. Identified uranium mill tailings contaminated areas can be marked with paint. As trenches and excavations are opened, the meter can be lowered down to better determine if the subsurface material is contaminated. If the contamination is to be removed, it must be segregated from other materials and transported to the interim storage facility.

Surveys over concrete or asphalt should be conducted at a slow walk to give the meter time to respond. The meter must be in the fast response mode. Concrete and asphalt shields radioactive materials below, and meter changes may be only slightly higher than background when measured through them.

PRIVATE REMOVALS

Private removals are remedial actions performed by property owners or their contractors to clear an area, or entire property, of radioactive uranium mill tailings. The material may have been identified by the Building Permit Survey, by an information survey or street/utility line construction.

For private parties, the Colorado Department of Public Health and Environment will identify and delineate uranium mill tailings for removal. The identified contamination will be excavated by the owner and segregated from clean material by stockpiling on site or removal from the property to the interim storage facility with Colorado Department of Public Health and Environment approval. A meter may be checked out by the private party.

For private parties, the removals of uranium mill tailings will be monitored by the Colorado Department of Public Health and Environment to guide and document the excavation. The Department will perform excavation control, provide health and safety guidance and operate the interim storage facility. The Department will document the results of the removal.

DOCUMENTATION MAPS

In Mesa County, maps are generally required for the documentation of radioactive contamination discovered or removed during a Building Permit Survey, information survey or private removal. The Colorado Department of Public Health and Environment will map and document any uranium tailings discovered, disturbed or removed from the communities in western Colorado that were not already mapped., as appropriate.

The map will include the following information in the upper right corner:

Location Number (assigned by the Department)
Street Address, Date, and Name of Surveyor

The map will include a legend with an arrow indicating north. Permanent and semi-permanent reference points, such as structures, streets, driveways, streets, power poles or irrigation ditches, will be drawn on the map.

Shading with cross marking or other appropriate indicators should show areas of radiation contamination. The meter readings for the contamination should be written in the contaminated area. If the area is too small to write in, the meter reading should be indicated by an arrow drawn to the contaminated area.

If a private removal of radioactive contamination occurs, the documentation may include a map showing the conditions of the area after excavation. If the area is large, a range of readings will be shown. The gamma reading and an arrow pointing to the spot will identify areas still demonstrating elevated gamma readings.

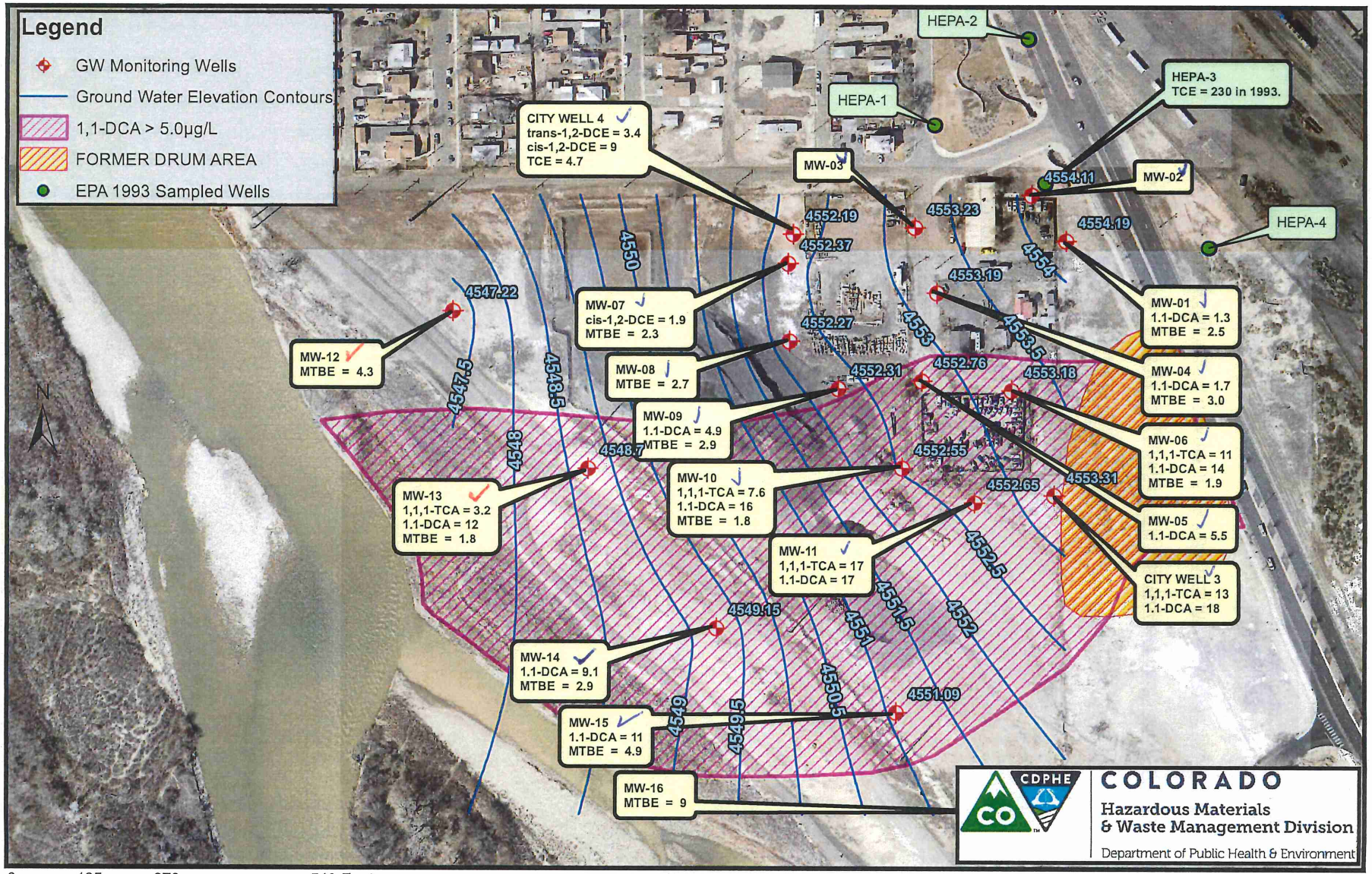
Appendix E

Construction Drawings
(See in Separate Attachments)

Appendix F

Existing CDPHE Monitoring Well Location Exhibit

FIGURE 1 - GRAND JUNCTION - HANSEN CONTAINER GROUND WATER ELEVATION and RESULTS MAP



0 135 270 540 Feet

March, 2019