

GCWSD #2 Enlarging and Lining Project Construction Completion Report

Grand County Water and Sanitation District No. 1

Dam ID 610210

Filing No. C-1903-A

Fraser, Colorado

Submitted to:

Grand County Water and Sanitation District No. 1

50 Vasquez Road

Winter Park, CO 80482

Submitted by:

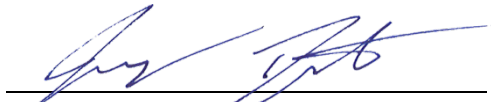
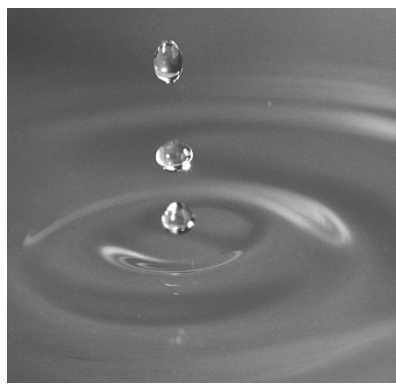
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April 2016

Project 1331330



Jeremy Deuto, P.E., P.G.
Project Manager



Chad Masching, P.E.
Engineer of Record



COLORADO
Division of Water Resources
Department of Natural Resources

Dam Safety Branch

July 12, 2016

Mr. Bruce Hutchins
Grand County Water and Sanitation District
50 Vasquez Road
PO Box 3077
Winter Park, CO 80482
bhutchins@gcws1.com

VIA EMAIL

**When replying, please refer to:
GCWSD #2 DAM, DAMID 510210
Water Division 5, Water District 51
Construction File No. C-1903A**

SUBJECT: Acceptance of Construction

Dear Mr. Hutchins,

A final inspection of construction at the referenced dam was conducted on December 9, 2015, by Dana Miller of the Dam Safety Branch to confirm that this project had been completed as approved. Subsequent to that inspection, on July 5, 2016, we received acceptable final construction documents in accordance with Rule 10 of the State of Colorado Rules and Regulations for Dam Safety and Dam Construction (2-CCR 402-1; January 2007).

The project consisted of enlarging (via reservoir area excavation) and lining the dam and reservoir to increase available storage and reduce the volume of water lost to seepage. Based on observations during the final construction inspection and our review of the above mentioned documents, we believe the project has been satisfactorily completed in general accordance with the approved plans and specifications. Therefore, the project is accepted for full use when water is physically and legally available.

The completion of this rehabilitation project resulted in an increased crest width from 8 to 12 feet in areas, a consistent 3:1 upstream slope, and the addition of a stability berm along the south side. The reservoir area was also excavated up to 8 feet in areas. The dam has a jurisdictional height of 18 feet and a crest length of 1600 feet. The reservoir created by the dam covers approximately 5 acres and now has a normal storage capacity of 70 acre-feet.

The State Engineer, by providing this construction acceptance does not assume responsibility for any unsafe condition of the subject dam. The sole responsibility for the safety of this dam



Mr. Bruce Hutchins
GCWSD #2 Dam - Construction Acceptance
DAMID 510210, Construction File No. C-1903A
July 12, 2016
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rests with the reservoir owner and operator, who should take every step necessary to prevent damages caused by leakage or overflow of waters from the reservoir or floods resulting from a failure of the dam. Therefore, it is in the owner's best interest to operate and maintain the facility in a manner such that the safety of the dam and the general public are not jeopardized. We are enclosing a copy of Rules 12 and 15 of the Rules and Regulations for your reference and use. These rules pertain to general maintenance items and the owner's responsibilities, respectively.

If you have any questions, please do not hesitate to contact Dana Miller in our Steamboat Springs Office at 970-879-0272, ext. 6414. Thank you for these recent improvements to your dam.

Sincerely,

William T. McCormick III, P.E., P.G.
Chief, Dam Safety Branch
for, Deputy State Engineer

Enc: Copies of Rule 12 and 15 of the "Rules and Regulations for Dam Safety and Dam Construction"

cc: Alan Martellaro, Division Engineer
Susan Avre, WD 51 Water Commissioner
Dana Miller, Dam Safety Engineer
Jeremy Franz, Design Review Engineer
Neal Misbach, Division 5 Lead Water Commissioner
Chad Masching, GEI Consultants, cmasching@geiconsultants.com



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1. Introduction

1.1 Purpose

This construction completion report presents the scope and methods used for the enlarging and lining of an augmentation reservoir in Fraser, Colorado. The project location is Grand County Water and Sanitation District No. 1 (GCWSD) Reservoir 2 (GCWSD #2). This report summarizes background information, contractor means and methods, problems encountered during construction, field quantities, and construction quality assurance activities performed by GEI Consultants, Inc. (GEI).

This report is intended to satisfy the requirements of the Colorado Office of the State Engineer (SEO) as defined by Rule 10 of the Rules and Regulations for Dam Safety and Dam Construction (Colorado SEO, 2007).

1.2 Construction Completion Report Organization

This construction completion report is organized into the following sections and appendices:

- **Section 1 – Introduction.** This section describes the site, previous geotechnical investigations at the site, and the construction objectives.
- **Section 2 – Summary of Construction.** This section describes contractor selection and contracting and the construction scope of work.
- **Section 3 – Problems Encountered During Construction.** This section identifies minor problems that delayed project completion.
- **Section 4 – Summary of Field Quantities.** This section presents a summary of the field quantities calculated for each bid item and a comparison between design, surveyed, and eligible-for-payment quantities. It also discusses the reservoir storage capacity.
- **Section 5 – Construction Quality Assurance.** This section describes construction observation and materials testing activities.
- **Appendix A – For Construction Drawings**
- **Appendix B – Record Drawings**
- **Appendix C – Permits**
- **Appendix D – CDPS Reports**
- **Appendix E – Weekly Progress Reports**
- **Appendix F – Weekly Meeting Minutes**

- **Appendix G – Materials Testing Reports**
- **Appendix H – Volume Calculations by Tim Shenk Land Surveying**
- **Appendix I – Lining Approval Letter**

1.3 Site Background and Description

1.3.1 Site Background

Reservoirs GCWSD #1 and #2 are located approximately 1 mile southeast of the Town of Fraser on the north side of U.S. Highway 40. The reservoirs are owned and operated as augmentation reservoirs by GCWSD. They were converted from decommissioned water treatment lagoons to augmentation reservoirs between 2005 and 2008. During the conversion the existing liners and reservoir depths were maintained.

After five years of operation as an augmentation reservoir, GCWSD determined that GCWSD #2 was not performing satisfactorily as a water storage facility. Throughout each year water levels in this reservoir had dropped beyond anticipated evapotranspiration losses which indicated seepage out of the reservoir.

GEI designed liner improvements within GCWSD #2 intended to reduce the volume of water lost to seepage out of the reservoir and increase available storage within the reservoir through below grade excavation of the reservoir floor. The reservoir improvements were constructed between May 2015 and January 2015.

1.3.2 Site Description

Terrain around the perimeter of both reservoirs is relatively flat and slopes gently from south to northwest, down valley toward the town of Fraser. Topographic relief across the site is about 42 feet, with elevations ranging from about 8,650 feet near the south access entrance of GCWSD #1 to about 8,608 feet beyond the GCWSD #2 embankment's downstream slope, where the Fraser River leaves the site. The drainage area for the reservoirs is approximately 18 acres, composed primarily of the reservoir footprints and adjacent areas. The site is vegetated mostly with annual weeds, perennial grasses, marsh floodplain vegetation, and occasional scattered shrubs and trees.

The pre-construction GCWSD #2 had a surface area of approximately 5.9 acres and was impounded by a 20-foot embankment classified as low hazard by the SEO providing approximately 54.3 acre-feet of storage with a normal high water elevation of 8624.0 feet and a crest elevation of 8626.0 feet.

The normal high water elevation and crest elevation did not change during construction. The post-construction GCWSD #2 had a surface area of approximately 5.3 acres and was impounded by the same 20-foot embankment providing approximately 70 acre-feet of storage.

1.3.3 Site Location

The reservoirs are located on U.S.G.S. Sixth Principal Meridian, Township 1 South, Range 75 West, Section 20 and are within Water Division No. 5, Water District 51.

1.4 Previous Investigations

For the project design, GEI conducted a field investigation in late 2013 and early 2014 to supplement subsurface information obtained during previous investigations conducted for the 2008 reservoir conversion project. Results of the investigations are presented in the Design Report (GEI, 2015).

1.5 Design Objectives

The design objectives were as follows:

- Mitigate the observed seepage losses from GCWSD #2 by constructing a low-permeability barrier on the reservoir slopes
- Increase the storage volume of GCWSD #2 by deepening the reservoir

1.6 Authorization

GEI performed the work described in this report under the terms and conditions of the Master Services Agreement between GEI and GCWSD dated November 19, 2013 and Task Orders No. 4 through No. 14.

1.7 Project Personnel

Bruce Hutchins was the GCWSD Project Manager and was primarily responsible for project management and coordination.

GEI personnel primarily responsible for project design and construction included:

■ Project Manager	Jeremy Deuto, P.E., P.G.
■ Engineer of Record	Chad Masching, P.E.
■ Subconsultant Engineer	Ed Duerr, P.E.
■ Field Engineer	Ben Taylor, EIT

Colorado SEO personnel primarily responsible for regulatory oversight of the jurisdictional dam sections of the reservoir included:

- SEO Dam Safety Engineer Dana Miller, P.E.
- Water Commissioner, District 51 Sue Avre

Colorado Division of Reclamation Mining and Safety (Colorado DRMS) personnel primarily responsible for regulatory oversight of the 111 Special Operations Permit included:

- DRMS Permit Manager Peter Hays

2. Summary of Construction

This section presents the phases of construction and the contractor's means and methods for enlarging and lining GCWSD #2.

2.1 Contractor Selection and Contracting

2.1.1 *Project Bidding and Award*

Bids for the project were first solicited in May 2014. Only one bid was received and it was substantially greater than the original engineer's opinion of probable construction costs. GEI recommended that GCWSD re-bid the project for construction in 2015.

Project re-bidding took place in October 2014 with three prime contractors submitting bids. The chronology of events during the bidding and pre-construction activities are summarized as follows:

- Pre-Bid Meeting September 16, 2014
- Bid Opening September 16, 2014
- Addendum 1 October 1, 2014
- Bid Closing October 8, 2014

The bid amounts from the October 2015 re-bid are listed in Table 1.

Table 1: Bids Received for October 2015 Re-Bid

Bid Contractor	Bid Amount
Tezak Heavy Equipment	\$2,424,000
American Civil Constructors	\$1,631,000
Everist Materials, LLC dba Morrow and Sons Construction	\$1,447,590

In coordination with GCWSD and the low bidder (Everist), GEI performed a value engineering evaluation to reduce the scope and cost of construction.

The contract was awarded to Everist Materials, LLC dba Morrow and Sons (Morrow) on February 18, 2015. The contract price was \$1,147,355.

2.1.2 *Project Organization*

During construction, multiple entities were involved in the project. Table 2 presents a list of entities and their project role(s) and responsibilities.

Table 2: Entities Involved in Construction at GCWSD #2

Entity Name	Project Role	Project Responsibilities/ Work Performed
Grand County Water and Sanitation District No. 1	Owner and Operator	Contracting with Engineer-of-Record, Prime Contractor, and Materials Testing Consultant
Everist Materials, LLC dba Morrow and Sons Construction	Prime Contractor	Enlargement and lining of reservoir, contracting with Surveyor
GEI Consultants, Inc.	Engineer-of-Record, Construction Quality Assurance	Construction oversight and documentation, coordination of materials testing subcontractor
Tim Shenk Land Surveying, Inc.	Surveyor	Establishing site survey control; pre- and post-construction topographic surveys; site layout
Ground Engineering Consultants, Inc.	Materials Testing Consultant	Field density testing and laboratory testing of soil and concrete
Diamond Excavating, Inc.	Earthwork Subcontractor, Trucking Subcontractor	Contracted by Morrow to assist in reservoir lining earthwork
Colorado Office of the State Engineer (SEO)	Dam Safety Regulatory Oversight	Review of construction documents, periodic construction inspection
Colorado Division of Reclamation Mining and Safety (DRMS)	Mining Permit Regulatory Oversight	Approval of application for special operation reclamation permit
Colorado Department of Public Health and Environment	Discharge Permit Regulatory Oversight	Provide certification to discharge under CDPS General Permit

Note:

CDPS = Colorado Discharge Permit System

2.1.3 Contract Documents

The contract for the enlarging and lining of GCWSD #2 was defined by the following Contract Documents and Specifications:

- Division 0: Procurement and Contracting Requirements
- Division 1: General Requirements
- Division 2: Existing Conditions
- Division 3: Concrete
- Division 31: Earthwork
- Construction Drawings: Sheets 1 through 11 inclusive, dated March 2015 (Appendix A). Revision 1 and 2, dated August 2015 and September 2015, respectively.

2.1.4 Project Schedule

The dates in the Contract Documents included a Notice to Proceed date of May 15, 2015, a substantial completion date of October 15, 2015, and a final completion date of October 31, 2015.

At the request of Morrow, the GCWSD Board of Directors voted on October 21 and again on November 18 to extend the substantial completion date to November 21, 2015 and December 16, 2015 respectively.

2.2 Construction Scope of Work

The construction scope of work included the following:

- Permitting
- Change orders
- Site preparation
- Contractor equipment
- Water management and discharge
- Excavation and haul off
- Materials processing
- Foundation preparation
- Low-permeability soil barrier construction
- Instrumentation
- Restoration

2.2.1 Permitting

Several permits were required for enlarging and lining GCWSD #2. The following permits are included in Appendix C.

2.2.1.1 Colorado SEO Rules and Regulations for Dam Safety and Dam Construction

Work on jurisdictional portions of the reservoir was permitted through the Colorado SEO and final approval was issued by the Colorado SEO on July 2, 2015.

2.2.1.2 Colorado DRMS 111 Special Operations Mining Permit

GCWSD applied for a Colorado DRMS 111 Special Operations permit so that excess reservoir deepening material could be legally exported from the site. The permit was issued on June 10, 2015. A post-construction reservoir leak test was performed to evaluate compliance of the liner with regulations set forth by the Colorado SEO. The leak test results indicated that the apparent seepage rate into the reservoir was 40% lower than the design standard seepage rate. The Colorado SEO approved the liner on March 30, 2016 and a copy of the approval letter was provided to the DRMS. The approval letter is provided in Appendix I.

2.2.1.3 CDPS General Permit for Construction Dewatering Discharges

The CDPS provided a certification authorizing GCWSD to discharge in accordance with the conditions in the CDPS General Permit effective June 5, 2015. GCWSD requested a termination of the certification in November 2015 after construction dewatering activities were completed. Monthly CDPS reports are provided in Appendix D.

2.2.2 **Change Orders**

One change order was submitted by Morrow and approved by GCWSD. Change Order No. 1 was issued on July 27, 2015 and increased the contract value by \$2,750 for widening approximately 300 feet of haul road along the northwest corner of the reservoir.

2.2.3 **Site Preparation**

Morrow mobilized to the site in May 2015 and established erosion control measures, equipment staging areas, site control, haul roads, and excavation dewatering systems.

2.2.4 **Contractor Equipment**

A list of contractor equipment used onsite for all or part of the construction is as follows:

Excavators (2)	<i>Volvo EC480EL, Komatsu PC300LC</i>
Mini Excavator (1)	<i>CAT305C</i>
Dozers (3)	<i>Komatsu D155AX, Komatsu D65EX, Komatsu D39EX</i>
Wheel Loaders (4)	<i>Volvo L150C, Deere 744K-11, Deere 844L-11, CAT 966G</i>
Track Loader (1)	<i>CAT 953D</i>
Compact Track Loader (1)	<i>CAT 259D</i>
Compaction rollers (3)	<i>Dynapac CA262 (8-ft vibratory sheepsfoot)</i> <i>Dynapac A121 (4-ft vibratory smooth drum)</i> <i>Hamm H-7 (6-ft vibratory sheepsfoot)</i>
Compactor (1)	<i>CAT 815F</i>
Articulated Hauler (1)	<i>Volvo A30C</i>
Crusher (1)	<i>Terex Pegson CR2</i>
Grader (1)	<i>Komatsu GD650A</i>
Pumps (4)	2 x 2-inch pumps, 1 x 3-inch pump, 1 x 4-inch pump
Water Truck (1)	

2.2.5 Water Management and Discharge

Morrow utilized a system of 2-inch, 3-inch, and 4-inch pumps to manage water in the excavation. Pumps discharged into bale boxes at locations as determined by the CDPS certification.

Due to excessive turbidity in water being pumped to the northwestern discharge location, Morrow rerouted all of their dewatering hoses in September 2015 to discharge into the bale box adjacent to the GCWSD #1 reservoir, where suspended solids were able to settle out of discharge water.

2.2.6 Excavation and Haul Off

Initial excavation and haul off started on May 18, 2015. Existing slopes on the south, east, and north sides of the reservoir were stripped and shaped to a 3H:1V (Horizontal [H]: Vertical [V]) slope. Overburden from the reservoir floor was excavated. On the west side of the reservoir, Morrow began excavation of existing slopes to a 1H:1V.

Excavated material was either processed into Zone 1B or hauled offsite to the Grand County pit or Morrow pit.

2.2.7 Materials Processing

Morrow utilized a combination of on-site and off-site processing to produce Zone 1a, Zone 1b, and Zone 2 materials.

Zone 1a was processed offsite at Morrow's gravel pit in Fraser, Colorado. The borrow material consisted of clayey sand overburden material that had previously been stripped and stockpiled on the east rim of the pit. Morrow used front-end loaders to excavate the borrow material from the stockpiles, place it in short windrows, and mix and turn it with added powdered bentonite to create stockpiles of Zone 1a. The material was hauled to the site where it was stockpiled and moisture conditioned before being placed as fill.

Zone 1b was processed onsite from excavated native pit run using a TEREX Pegasus 2 track-mounted crusher. The crusher was set up to produce a minus 6-inch material that would conform to the project specifications for Zone 1b fill. Zone 1b was stockpiled in the center of the reservoir.

With GEI's approval, Morrow utilized imported 5/8-inch minus material (referred to as Zone 2) as a substitute for Zone 1b in reclamation slopes. Zone 2 consisted of sand "naturals" from aggregate processing at the Morrow pit and was hauled to the site and moisture conditioned in stockpiles before being placed and compacted. Zone 2 was not used in the top 1 foot of reclamation slope fill.

GEI submitted Change Order 1 to the Colorado SEO on September 1, 2015 for the substitution of Zone 2 in the stability buttress between approximate stations 5+00 and 8+00. The Colorado SEO approved the change order.

2.2.8 Foundation Preparation

Morrow prepared the foundation for slope liner placement by excavating overburden material down to bedrock and then stripping approximately 1 foot of weathered and/or wet bedrock. Once documented by the GEI Field Engineer, Morrow would begin placing materials (typically Zone 1b) to provide a hard and dry working surface for equipment to access the toe of the 1H:1V slope for key construction.

2.2.9 Low-Permeability Soil Barrier Construction

Against the 1H:1V excavated slopes on the west side of the reservoir, Morrow constructed the low-permeability soil barrier by working in approximately 50-foot sections to excavate keyway, backfill with Zone 1a, compact with a sheepsfoot roller, and place fill perpendicular to the top of the slope. The Zone 1a material was overlain with Zone 2 extending into the reservoir at a 3H:1V slope. A minimum 1-foot-thick layer of Zone 1b covered all areas of Zone 2 to provide slope protection.

Diamond Excavating, under contract with Morrow, placed Zone 1a fill on the 3H:1V shaped slopes on the south, east, and north sides (jurisdictional) of the reservoir starting September 14, 2015. Zone 1a fill was placed perpendicular to the top of the slope and compacted with a sheepsfoot roller. After a minimum of 3 feet of Zone 1a was placed, Diamond placed a 1-foot-thick zone of Zone 1b and compacted it by wheel rolling with front-end loaders.

2.2.10 Instrumentation

During construction, the Colorado SEO determined that GCWSD would need to install a staff gage in GCWSD #2 to accurately monitor post-construction reservoir water levels. GEI prepared an addendum to the construction drawings and submitted them to the SEO for approval. Morrow constructed three concrete staff gage pedestals at Station 9+50 near the reservoir outlet structure. Figure plates were mounted to each pedestal such that water elevations can be measured between elevations 8612.0 and 8626.0 feet. Morrow chose to perform the work at no direct cost to GCWSD and no change order was submitted for this work.

2.2.11 Restoration

Final removal of silt fences and demobilization of contractor laydown areas will be completed in spring 2016 due to deep snow currently present at the site.

3. Problems Encountered During Construction

This section presents the problems that were encountered during improvements to the GCWSD #2 reservoir. All problems were minor in nature and mainly added to the difficulty and length of construction.

3.1 Groundwater

Groundwater seepage on the south and west sides of the excavation were a persistent nuisance to the contractor. Multiple dewatering sumps were constructed during excavation and fill placement on the 1H:1V “west” slope. With GEI’s approval, Morrow adjusted the location of the bedrock keyway approximately 3 feet away from the toe of the west slope to allow water seeping from the slope to drain to the north and not flow over recently constructed sections of keyway.

3.2 Weather

Rainstorms in June and July delayed the excavation and haul off phase of the project. Snow and freezing conditions in November delayed the completion of liner placement and reclamation slope construction.

Freezing temperature starting in November resulted in frost penetration of previously placed fill. Morrow ripped and removed frozen fill each morning before placing the next lift of fill. This greatly reduced in production and pushed the construction completion date into January 2016.

3.3 Contractor Staffing

Problems with contractor staffing also contributed to delays in the construction schedule. The contractor was frequently unable to maintain a crew of more than five personnel, with many days worked by a three or four-person crew. The contractor augmented their field crew by hiring Diamond Excavating which often used a two-person crew to place fill on three sides of the reservoir.

4. Summary of Field Quantities

This section presents the quantities of materials, in order of bid item, excavated and placed by the contractor to complete improvements to the GCWSD #2 reservoir.

4.1 Shaping Existing Reservoir Slopes to 3:1(H:V)

Bid Item No. 1 Shaping Existing Reservoir Slopes to 3H:1V was measured for payment as one unit (lump sum). The volume of soil stripped and excavated serves only as a reference and a component of the project materials balance. GEI measured the volume by comparing pre-construction topographic data with subsequent topographic data of shaped slopes.

The topographical survey data was collected by Tim Shenk Land Surveying, Inc. (TSLSI) under contract with GEI for surveying pre-construction conditions and under contract with Morrow for surveying as-built conditions. GEI created digital terrain models (DTMs) using topographic contours provided in the as-built DWG file. The pre-construction and lowest excavation DTMs were compared between stations 4+50 and 18+75 from the crest of the slopes to the pre-construction toe of the slopes to calculate the change in volume.

The measured net volume of soil shaped under Bid Item No. 1 yielded a cut of approximately 1,090 bank cubic yards.

4.2 Excavation (of material from existing reservoir slopes to 1H:1V)

Bid Item No. 2 Excavation was measured for payment on a per cubic yard basis surveyed in place. GEI measured Bid Item No. 2 by comparing pre-construction topographic survey data with as-built topographic survey data of 1H:1V slopes.

The topographical survey data was collected by TSLSI under contract with GEI for surveying pre-construction conditions and under contract with Morrow for surveying as-built conditions. GEI created DTMs using topographic contours provided in the as-built DWG file. The pre-construction and lowest excavation DTMs were compared between stations 18+75 and 23+76 (same as 0+00) and stations 0+00 and 4+50 to calculate the volume of material excavated from the 1H:1V slopes.

The measured volume of soil excavated under Bid Item No. 2 is approximately 27,980 bank cubic yards.

4.3 Keyway Excavation

Bid Item No. 3 Keyway Excavation was measured for payment on a per linear foot basis. GEI measured Bid Item No. 3 by using as-built survey data collected from the keyway by TSLSI.

GEI averaged the length of the inner and outer top of keyway polylines provided in the as-built DWG file.

The measured length of keyway excavated under Bid Item No. 3 is approximately 2,020 feet.

4.4 Foundation Preparation

Bid Item No. 4 Foundation Preparation was measured for payment on a per cubic yard basis surveyed in place. GEI measured Bid Item No. 4 by using topographic data of the prepared foundation surface and assuming a 1-foot-thick layer of weathered bedrock or wet soil was removed above the surveyed points.

The survey data was collected by TSLSI under contract with Morrow. GEI measured the area between the toe of the excavation 1H:1V slope and the toes of the final grade 3H:1V slope using as-built contours between stations 18+75 and 23+76 (same as 0+00) and stations 0+00 and 4+50. The area of the polygon was multiplied by a depth of 1 foot to generate an estimated volume wet/weathered material removed.

The measured volume of soil excavated under Bid Item No. 4 is approximately 1,300 bank cubic yards.

4.5 Zone 1a

Bid Item No. 5 Zone 1a was measured for payment on a per cubic yard basis surveyed in place. GEI measured Bid Item No. 5 using lowest excavation contours provided by TSLSI to create a DTM to represent the surface of Zone 1a fill with geometries as shown in the Contract Drawings.

The survey data was collected by TSLSI under contract with Morrow. GEI created a DTM from the lowest excavation contours and changed the elevation of the surface to reflect a 3-foot-thick Zone 1a fill placed on the lowest excavation DTM. The design Zone 1a DTM and the lowest excavation DTM were compared to produce a theoretical volume of Zone 1a placed on reservoir slopes if Zone 1a had been placed according to the Contract Drawings. The bedrock keyway cross-sectional area was calculated from Contract Drawings and multiplied by the surveyed length of keyway excavation to produce a theoretical volume of Zone 1a placed in the keyway if the keyway had been constructed according to Contract Drawings.

The measured volume of Zone 1a placed under Bid Item No. 5 is approximately 13,600 bank cubic yards. The actual volume of Zone 1a placed based on topographic survey data provided by TSLSI is 21,800 cubic yards (Appendix H).

4.6 Zone 1b (and Zone 2)

Bid Item No. 6 Zone 1b was measured for payment on a per cubic yard basis surveyed in place. Bid Item No. 6 included the placement of Zone 1b and Zone 2 material at the same unit price, therefore the volumes of each material were not measured separately. GEI measured Bid Item No. 6 by comparing the lowest excavation topographic survey data with the as-built topographic survey data to generate a total volume of fill placed and then subtracting the volume of Zone 1a calculated as described above.

The survey data was collected by TSLSI under contract with Morrow for as-built surveying and provided to GEI in a DWG file. GEI created a DTM surface using the lowest excavation contours and a DTM using the finished grade contours. A comparison of the DTMs produced a total fill volume of 48,430 cubic yards. Subtracting the Zone 1A volume calculated as described in Section 3.5 produced a theoretical Zone 1b/Zone 2 volume of 34,830 cubic yards if Zone 1a fill had been placed according to Contract Drawings.

The measured volume of Zone 1b/Zone 2 placed under Bid Item No. 6 is approximately 34,830 bank cubic yards. The actual volume of Zone 1b/Zone 2 placed based on topographic survey data provided by TSLSI is 26,480 bank cubic yards.

4.7 Riprap Rundown Channel

Bid Item No. 7 Riprap Rundown Channel was measured for payment on a per cubic yard basis surveyed in place. For purposes of final payment the as-built volume of riprap rundown channel was assumed to be the same as the quantity on the contract bid schedule. This assumption was supported by GEI's observation of rundown channel construction.

4.8 Riprap Spillway Protection

Bid Item No. 8 Riprap Spillway Protection was measured for payment on a per cubic yard basis surveyed in place. For purposes of final payment the as-built volume of riprap spillway protection was assumed to be the same as the quantity on the contract bid schedule. This assumption was supported by GEI's observation of riprap spillway protection construction.

4.9 Excavation (of material from reservoir floor)

Bid Item No. 9 Excavation was measured for payment on a per cubic yard basis surveyed in place. GEI measured Bid Item No. 9 by comparing pre-construction topographic survey data of the reservoir floor with as-built topographic survey data.

The survey data was collected by TSLSI under contract with GEI for pre-construction survey and under contract with Morrow for as-built surveying. GEI created a DTM surface using pre-construction reservoir floor contours bounded by the toe of the as-built 3H:1V slopes between stations 18+75 and 4+50 (the 1H:1V cut slope side) and by the toe of the

pre-construction slopes between stations 4+50 and 18+75 (the 3H:1V shaped slope sides). We then compared it to a DTM surface created using post-construction reservoir floor contours bounded by the toe of as-built 3H:1V slopes on the 1H:1V cut slope side and by the toe of pre-construction slopes on the 3H:1V shaped slope sides to calculate the volume of soil excavated from the reservoir floor.

The measured volume of soil excavated under Bid Item No. 9 is approximately 42,710 bank cubic yards.

4.10 Offsite Haul/Disposal

Bid Item No. 10 Offsite Haul/Disposal was measured for payment on a per cubic yard basis. GEI measured Bid Item No. 10 by summing the excavated material volumes in Bid Item Nos. 1, 2, and 9 and subtracting the Zone 1b/Zone 2 placed material volume in Bid Item No. 6.

The survey data was collected by TSLSI under contract with GEI for pre-construction surveying and under contract with Morrow for as-built surveying. GEI compared pre-construction topographic survey data from the entire reservoir with post-construction topographic data from the entire reservoir. Because Bid Item No. 6 Zone 1b was bid as being processed on-site and not imported to the site, the theoretical volume of Zone 1b calculated as described in Section 4.6 (34,830 bank cubic yards) must be subtracted from the total volume of excavation to produce a theoretical haul-off volume. This final volume represents the volume of excavated bedrock, soils unsuitable for reuse, and excavated pit run that exceeded the volume of Zone 1b/Zone 2 required for construction 3H:1V reclamation slopes.

The theoretical volume of material hauled and disposed of offsite is approximately 36,950 bank cubic yards. The measured volume eligible for payment under Bid Item No. 10, which takes into account the surveyed quantity of Zone 1b/Zone 2 (26,480 bank cubic yards), is approximately 44,810 bank cubic yards. The actual volume of offsite haul/disposal calculated by GEI in a memorandum dated February 15, 2016 was 71,330 loose cubic yards.

4.11 Materials Balance

GEI performed a materials balance to check that volumes measured for individual bid items collectively matched total cut and fill volumes calculated by TSLSI from topographic survey data. Table 3 presents a summary of total cut and fill volumes calculated by TSLSI. Table 4 compares the measured cut volumes of Bid Item Nos. 1, 2, and 9 with the total cut volume calculated by TSLSI. Table 5 compares quantities estimated during the design with as-built quantities measured for each bid item and the quantities for final payment agreed upon at the final construction meeting held on February 3, 2016.

Table 3: Comparison of DTMs Generated from As-built DWG File

Base DTM	Comparison DTM	Cut (CY)	Fill (CY)	Net (CY)
Pre-construction	Lowest Excavation	71,285	-	71,285
Lowest Excavation	Finished Grade	-	48,270	48,270
Pre-Construction	Finished Grade	34,280	11,940	22,340

Note:

CY = cubic yards

Table 4: Excavated Material under Bid Item Nos. 1, 2, and 9

Bid Item No.	Item	Cut (CY)
1	Shaping Existing Reservoir Slopes to 3H:1V	1,090
2	Excavation (of material from existing reservoir slopes to 1H:1V)	27,980
9	Excavation (of material from reservoir floor)	42,710
	TOTAL	71,780
	Total Excavation from Table 3	71,285

Note:

CY = cubic yards

Table 5: Comparison of Design and Surveyed Quantities

Bid Item No.	Item	Unit ¹	Estimated Design Quantity	Surveyed Construction Quantity	Difference in Construction Quantity	Quantity Eligible for Payment	Quantity Used for Final Payment
1	Shaping Existing Reservoir Slopes to 3H:1V	LS	1	1	None	1	1
2	Excavation (to 1H:1V)	CY	33,000	27,980	(5,020)	27,980	33,000
3	Keyway Excavation	LF	2,000	2,020	20	2,020	2,000
4	Foundation Preparation	CY	2,500	1,300	(1,200)	1,300	2,500
5	Zone 1a	CY	18,700	21,800	3,100	13,600	18,700
6	Zone 1b	CY	28,700	26,480	(2,220)	34,830	28,700
7	Riprap Rundown Channel	CY	100	NM	NM	100	100
8	Riprap Spillway Protection	CY	15	NM	NM	15	15
9	Excavation	CY	43,000	42,710	(290)	42,710	43,000
10	Offsite Haul/Disposal	CY	43,000	60,630	17,630	44,810	43,000
11	Mobilization/Demobilization	LS	1	1	None	1	1
12	Dewatering	LS	1	1	None	1	1

Notes:¹. All cubic yard volumes are in bank cubic yards.

NM = Not Measured

4.12 Reservoir Storage Capacity

Using pre-construction topographic data provided by TSLSI, GEI has calculated the previous storage capacity of GCWSD #2 to be approximately 54 acre-feet. Using as-built topographic data, GEI calculated the current storage capacity of the enlarged GCWSD #2 to be approximately 70 acre-feet. This represents an increased capacity of approximately 16 acre-feet (30%) compared to the pre-construction reservoir capacity.

5. Construction Quality Assurance

GEI performed construction quality assurance during project construction according to the scope of services described in the contract between GEI and GCWSD dated November 19, 2013 and Task Order 10.

5.1 Construction Observation

5.1.1 *Scope of Work*

Construction observation activities performed by GEI included the following:

- Reviewed contractor submittals for conformance with the intent of the design and technical specifications.
- Provided clarification and technical assistance regarding the intent of the design and prepared design modifications as appropriate.
- Observed and documented construction materials and activities for conformance with contractor submittals, construction drawings, technical specifications, and the intent of the design.
- Observed and documented bedrock foundation and cut-off key sections prepared by the contractor.
- Participated in weekly progress meetings.
- Responded to contractor Requests for Information, prepared change order requests, weekly progress meeting minutes (Appendix F), and weekly progress reports for the Colorado SEO (Appendix E).
- Evaluated if work completed by the contractor was in general conformance with the intent of the design, construction drawings, and technical specifications for the project.
- Prepared Record Drawings (Appendix B) and this Construction Completion Report.

5.1.2 *Personnel*

GEI personnel primarily responsible for the completion of construction observation work included:

■ Project Manager	Jeremy Deuto, P.E., P.G.
■ Senior Engineering Consultant	Ed Duerr, P.E.
■ Field Engineer	Ben Taylor, EIT

5.1.3 **Schedule**

During the excavation-only phase of construction, from June to late August 2015, the GEI Project Manager performed part-time construction observation in conjunction with weekly site meetings.

Beginning the week of August 24th and ending the week of November 10th the GEI Field Engineer performed full-time construction observation during the liner construction phase of the project. GEI performed full-time observation during the construction on Colorado SEO-jurisdictional portions of the reservoir. GEI personnel returned to part-time construction observation (1 to 3 days per week) from mid-November through mid-December until reservoir slopes were completed.

During the final excavation and haul-off phase of construction, GEI personnel performed part-time construction observation on a weekly basis in conjunction with reservoir leak test tasks.

5.2 **Materials Testing**

GCWSD retained the materials testing services of Ground Engineering Consultants, Inc. (Ground) of Granby, Colorado. GEI coordinated with Ground on the scope and schedule of testing.

5.2.1 **Scope**

Materials testing activities performed by Ground included the following:

- Performed Standard Proctor testing on samples of soil materials
- Performed field density testing on in-place fill at locations selected by the GEI Field Engineer.
- Performed laboratory gradation and Atterberg Limits analysis of samples of soil materials chosen by the GEI Field Engineer.
- Performed field and laboratory grout and concrete testing on samples collected during pours for construction of onsite structures.
- Prepared and distributed test reports to Owner, Engineer, and Contractor.

5.2.2 **Personnel**

Ground personnel primarily responsible for the completion of materials testing work included:

■ Area Manager	Steve Peters
■ Engineering Technician	Parker Wells
■ Engineering Technician	Graham Basecke

5.2.3 **Schedule**

An Engineering Technician visited the site at least once per day, typically five days per week, between the weeks of August 24th and November 30th to conduct field density testing on in-place fill. A few separate trips were made by the Area Manager during project start up to collect material sample from stockpiles for proctor and gradation tests.

5.2.4 **Field Density Testing**

Ground Engineering performed field density testing on compacted layers of Zone 1a, Zone 1b, and Zone 2 fill at locations selected by the GEI Field Engineer. Field density testing results were compared to the results of standard proctor tests also performed by Ground. Testing results were given to the GEI Field Engineer who, in cases of a test not meeting specifications, instructed the Morrow to take corrective action so that Ground could retest the placed material. The majority of the test passed material moisture and density requirements. Those materials that exhibited failing results were reworked and retested until they passed.

Ground Engineering reported a total of 151 passing density tests and 24 failing tests. They estimated that the failed tests accounted for approximately 13% of the technician's testing time.

Field density testing reports are provided in Appendix G.

5.2.5 **Laboratory Gradation and Atterberg Limits Testing**

Ground Engineering performed laboratory gradation and Atterberg Limits testing on Zone 1a, Zone 1b, and Zone 2 materials to check conformance with project specifications. Testing results were distributed to GCWSD, Morrow, and GEI. When test results did not meet project specifications, GEI instructed Morrow to take corrective action so the material could be retested by Ground.

All tests were in general conformance with project specifications. Laboratory gradation reports are provided in Appendix G.

5.2.6 ***Grout and Concrete Testing***

Ground Engineering performed grout testing for riprap rundown channel and concrete testing for staff gage support column construction. Testing results were distributed to GCWSD, Morrow, and GEI.

All tests were in conformance with project specifications. Grout and concrete testing reports are provided in Appendix G.

6. References

Dam Safety Branch, Office of the State Engineer. Division of Water Resources, Department of Natural Resources. State of Colorado. "Rules and Regulations for Dam Safety and Dam Construction." January 2007.

GEI Consultants, Inc. "Design Report – GCWSD #2 Enlarging and Lining Project, Fraser, Colorado." June 2015.

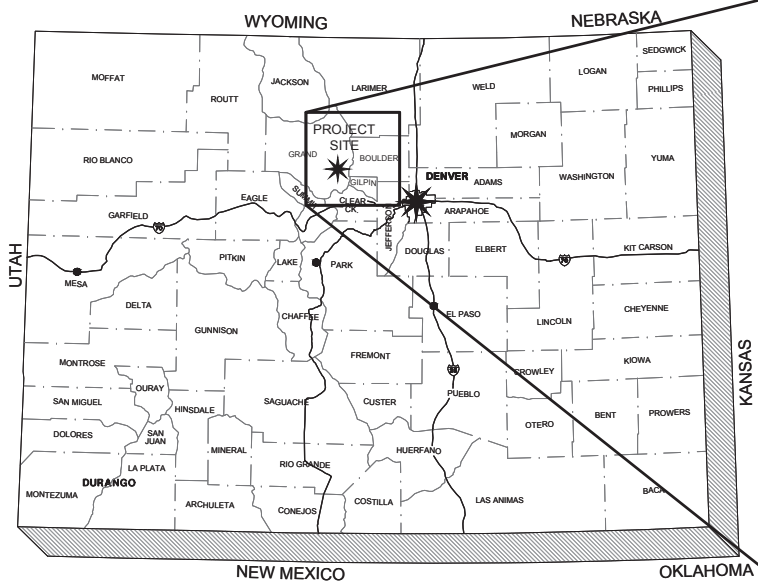
Appendix A For Construction Drawings

GCWSD #2 IMPROVEMENTS

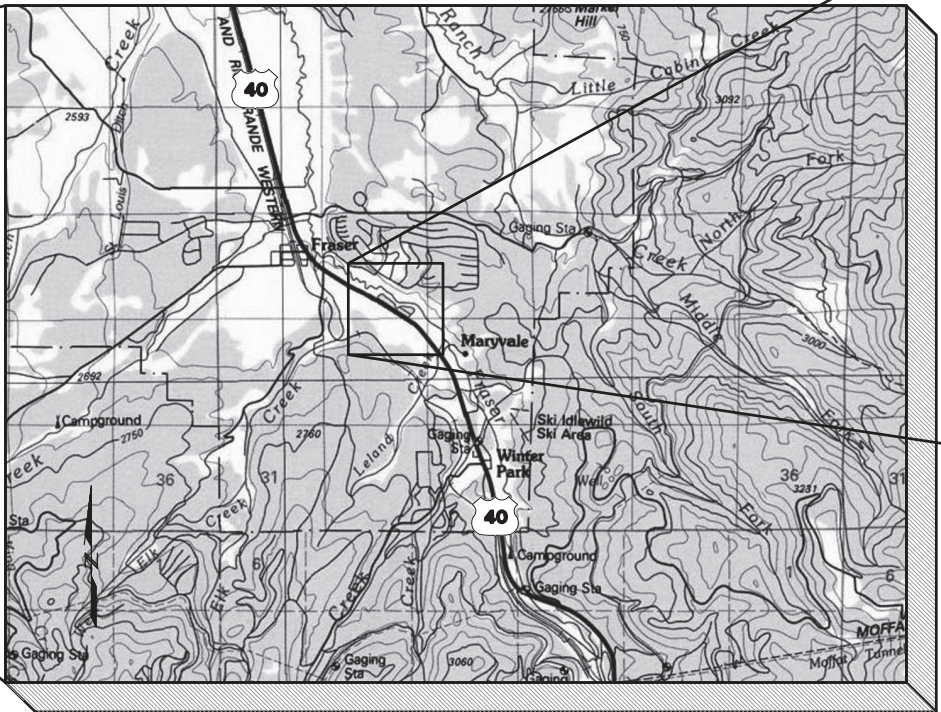
GRAND COUNTY WATER AND SANITATION DISTRICT NO. 1

DAM ID #510210

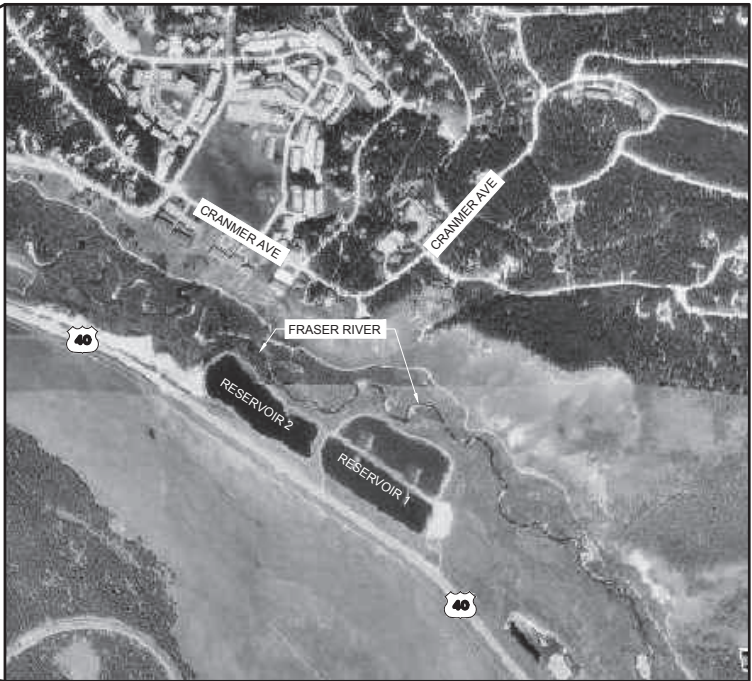
GRAND COUNTY, COLORADO
WATER DIVISION 5, WATER DISTRICT 51



PROJECT LOCATION MAP
(NOT TO SCALE)



SITE LOCATION MAP
(NOT TO SCALE)



SITE VICINITY MAP
(NOT TO SCALE)

GENERAL PROJECT INFORMATION

GRAND COUNTY WATER AND SANITATION DISTRICT NO. 1
OWNER

CONTRACTOR

GEI CONSULTANTS, INC., DENVER, COLORADO
ENGINEER

CONSTRUCTION STARTED

CONSTRUCTION COMPLETED

PREPARED FOR

Grand County
Water & Sanitation
District #1

GRAND COUNTY WATER AND
SANITATION DISTRICT NO. 1
50 VASQUEZ ROAD
WINTER PARK, CO 80482

PREPARED BY

GEI
DENVER • COLORADO

I HEREBY CERTIFY THAT THESE PLANS FOR THE CONSTRUCTION OF THE RESERVOIR NO. 2
IMPROVEMENTS PROJECT WERE PREPARED BY ME (OR UNDER MY DIRECT SUPERVISION).

CHAD MASCHING, P.E. COLORADO P.E. #39806
REGISTERED ENGINEER
GEI CONSULTANTS, INC.

APPROVED ON THE 2nd DAY OF July 20 15

Dick Wolfe

STATE ENGINEER

WILLIAM T. MCCORMICK III, CO P.E. #29127
CHIEF - DAM SAFETY BRANCH

THESE PLANS MAY NOT BE MATERIALLY CHANGED, EXCEPT WITH THE PRIOR WRITTEN CONSENT OF
THE STATE ENGINEER.

AS-CONSTRUCTED CERTIFICATION

THESE PLANS REPRESENT THE "AS-CONSTRUCTED" CONDITIONS FOR THE
GCWSD RESERVOIR NO. 2 IMPROVEMENTS PROJECT TO THE BEST OF OUR
KNOWLEDGE AND JUDGMENT, BASED IN PART ON INFORMATION FURNISHED BY
OTHERS AS OF
THE ____ DAY OF _____, 20 ____

(ENGINEER'S PRINTED NAME)
GEI CONSULTANTS, INC.

(SIGNATURE)



THIS DOCUMENT, AND THE IDEAS AND DESIGNS
INCORPORATED HEREIN, AS AN INSTRUMENT OF
PROFESSIONAL SERVICE, IS THE PROPERTY OF GEI
CONSULTANTS, INC. AND IS NOT TO BE USED, IN
WHOLE OR IN PART, FOR ANY OTHER PROJECT
WITHOUT THE WRITTEN AUTHORIZATION OF GEI
CONSULTANTS, INC.

DWG. NO.

G-1

SHEET NO.

1 of 11

C-1903A

DRAWING INDEX:

DWG	SHEET	TITLE
G-1	1	COVER SHEET
G-2	2	DRAWING INDEX, ABBREVIATIONS, LEGEND, AND NOTES
G-3	3	SUMMARY BORING LOGS
C-1	4	EXISTING SITE PLAN
C-2	5	GENERAL MODIFICATION PLAN
C-3	6	STRIPPING PLAN
C-4	7	LINER IMPROVEMENTS
C-5	8	EMBANKMENT SECTIONS
C-6	9	TYPICAL SECTIONS AND DETAILS 1 OF 2
C-7	10	TYPICAL SECTIONS AND DETAILS 2 OF 2
C-8	11	OUTLET WORKS PLAN AND PROFILE
C-9	12	OUTLET WORKS SECTIONS AND DETAILS

ABBREVIATIONS:

APPROX.	= APPROXIMATE
DIA., Ø	= DIAMETER
DRMS	= DIVISION OF RECLAMATION, MINING, AND SAFETY
DWG	= DRAWING
E	= EAST, EASTING
EL.	= ELEVATION
EW	= EACH WAY
GCWSD	= GRAND COUNTY WATER AND SANITATION DISTRICT
H	= HORIZ. ONTAL
HWY	= HIGHWAY
IN.	= INCH, INCHES
INV.	= INVERT
I.E.	= INVERT ELEVATION
LFT	= LINEAR FEET
MAX.	= MAXIMUM
MIN.	= MINIMUM
MISC.	= MISCELLANEOUS
N	= NORTH, NORTHING
NO.	= NUMBER
OC	= ON CENTER
S	= SOUTH
SFT	= SQUARE FEET
T.B	= TOP AND BOTTOM
TYP.	= TYPICAL
US	= UNITED STATES
V	= VERTICAL
W	= WEST
W/	= WITH

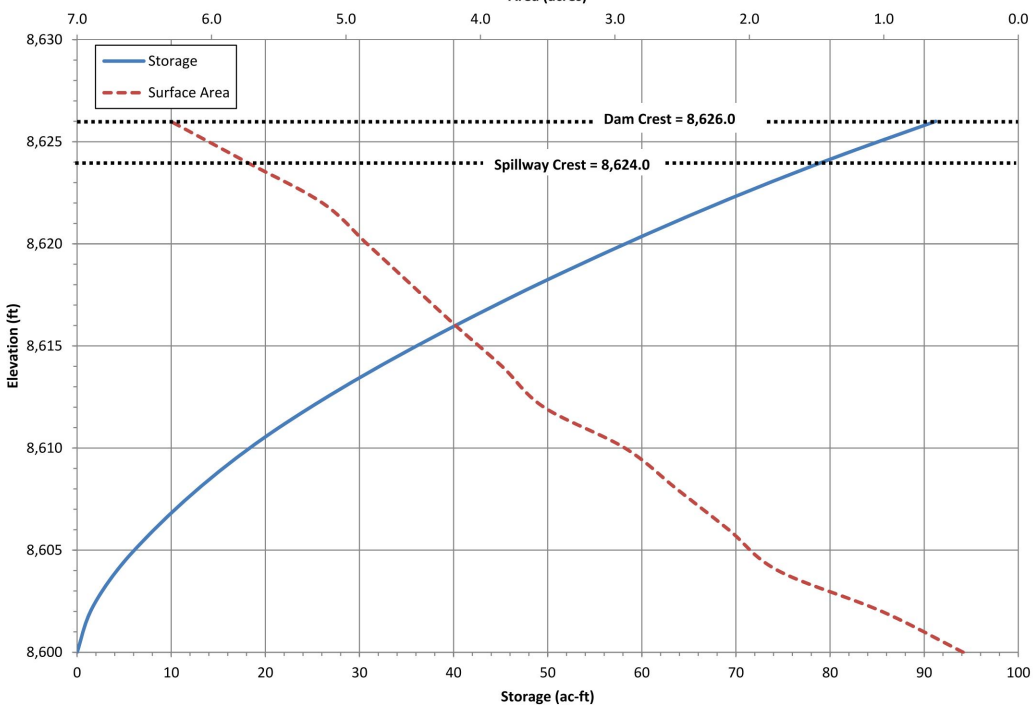
NOTES:

- SITE TOPOGRAPHY AND EXISTING INFRASTRUCTURE REPRESENTS ASSUMED EXISTING CONDITIONS BASED ON 2005 RESERVOIR DESIGN MODIFICATIONS, GEI PROJECT #05075.
- WETLANDS LAST DELINEATED IN 2005. REDELINEATION REQUIRED PRIOR TO CONSTRUCTION.
- CONSTRUCTION IS SUBJECT TO THE RULES AND REGULATIONS OF COLORADO OFFICE OF THE STATE ENGINEER, THE TOWN OF FRASER ENGINEERING AND CONSTRUCTION STANDARDS AND THE GRAND COUNTY WATER AND SANITATION DISTRICT NO. 1 GCWSD#1 ENGINEERING STANDARDS.
- LOCATION AND NATURE OF EXISTING UTILITIES SHOWN ON THE DRAWINGS ARE APPROXIMATE. CONTRACTOR SHALL FIELD LOCATE ALL UTILITIES, WHETHER SHOWN ON THE DRAWINGS OR NOT, PRIOR TO EXCAVATION. CONTRACTOR SHALL PROTECT ALL UTILITIES IN PLACE UNLESS DESIGNATED FOR REMOVAL OR REPLACEMENT.
- UNLESS SHOWN OR SPECIFIED OTHERWISE, PAYLINES FOR UNIT PRICE PAY ITEMS ARE BASED ON THE DESIGN LINES NEAT LINES SHOWN ON THE DRAWINGS.
- WHERE THE TERM "PROJECT SITE" IS USED, IT IS UNDERSTOOD TO MEAN THE LIMITS OF SITE DISTURBANCE SHOWN ON THE DRAWINGS DRMS PERMIT BOUNDARY OR OTHERWISE DESIGNATED BY THE ENGINEER.
- DURING CONSTRUCTION, MATERIAL REMOVED FROM WITHIN THE RESERVOIR FOOTPRINT AND NOT UTILIZED IN CONSTRUCTION WILL BE HAULED OFFSITE TO THE GRAND COUNTY BENSON GRAVEL PIT.
- CONTRACTOR SHALL FOLLOW ALL GRAND COUNTY EROSION CONTROL REQUIREMENTS AS STATED IN THE *EROSION AND SEDIMENT CONTROL FOR CONSTRUCTION ACTIVITIES GUIDANCE HANDBOOK* BY KEVIN E. VECCHIARELLI, EGWB EROSION CONTROL PROGRAM, SPRING 2005.

LEGEND:

	INDICATES CROSS SECTION LOCATION. "C" REFERS TO CROSS SECTION DESIGNATION. "C-3" REFERS TO THE SHEET NUMBER WHERE THE SECTION IS SHOWN.
	INDICATES DETAIL LOCATION. "6" REFERS TO THE DETAIL DESIGNATION. "C-8" REFERS TO THE SHEET NUMBER WHERE THE DETAIL IS SHOWN.
	SURVEY CONTROL POINT
	LOCATIONS OF GEI BORINGS B-201 THROUGH B-403
	LOCATIONS OF GEI TEST PITS TP-201 THROUGH TP-205
	LOCATIONS OF OTHER BORINGS
	MONITORING WELL
	EXISTING TOPOGRAPHIC CONTOUR WITH ELEVATION IN FEET
	SITE ACCESS ROAD
	DRMS 111 PERMIT BOUNDARY PROJECT BOUNDARY
	PROPERTY OWNERSHIP BOUNDARY
	WATER SURFACE BOUNDARY
	LIMIT OF DELINEATED WETLANDS
	8" Ø HDPE OUTLET PIPE
	ASSUMED LINE
	SLOPE ARROW, FILL
	SLOPE ARROW, CUT
	APPROXIMATE NEW LINER FOOTPRINT
	EXISTING GROUND
	RESERVOIR FLOOR IMPROVEMENTS WITH BLENDED BENTONITE LAYER
	RESERVOIR FLOOR TO BE EXCAVATED TO TOP OF BEDROCK
	ZONE 1A
	ZONE 1B
	GROUTED RIPRAP
	CONCRETE

RESERVOIR NO. 2 ELEVATION-AREA-CAPACITY CURVE



RESERVOIR ELEVATION-AREA-CAPACITY TABLE		
ELEVATION FT	AREA ACRES	STORAGE AC-FT
8,600.0	0.4	0.0
8,602.0	1.0	1.4
8,604.0	1.8	4.2
8,606.0	2.2	8.2
8,608.0	2.5	12.9
8,610.0	2.9	18.3
8,612.0	3.5	24.8
8,614.0	3.8	32.2
8,616.0	4.2	40.2
8,618.0	4.5	48.9
8,620.0	4.8	58.2
8,622.0	5.2	68.3
8,624.0	5.7	79.2
8,626.0	6.3	91.2

ISSUED FOR CONSTRUCTION

C-1903A

Attention:

01"

If this scale bar does not measure 1" then drawing is not original scale.

4	03/15	ISSUED FOR CONSTRUCTION	CMM
3	08/14	ISSUED FOR BID	CMM
2	05/14	SEO REVIEW SUBMITTAL	CMM
1	03/14	60 SUBMITTAL	CMM
NO.	DATE	ISSUE/REVISION	APP



Designed:	J. DEUTO
Checked:	K. PRICE
Drawn:	C. NIEMELA
Approved By:	C. MASCHING
Approval Date:	MAY 2015

GEI

Consultants

4601 DTC Boulevard
Denver, Colorado 80237
303-662-0100

Grand County

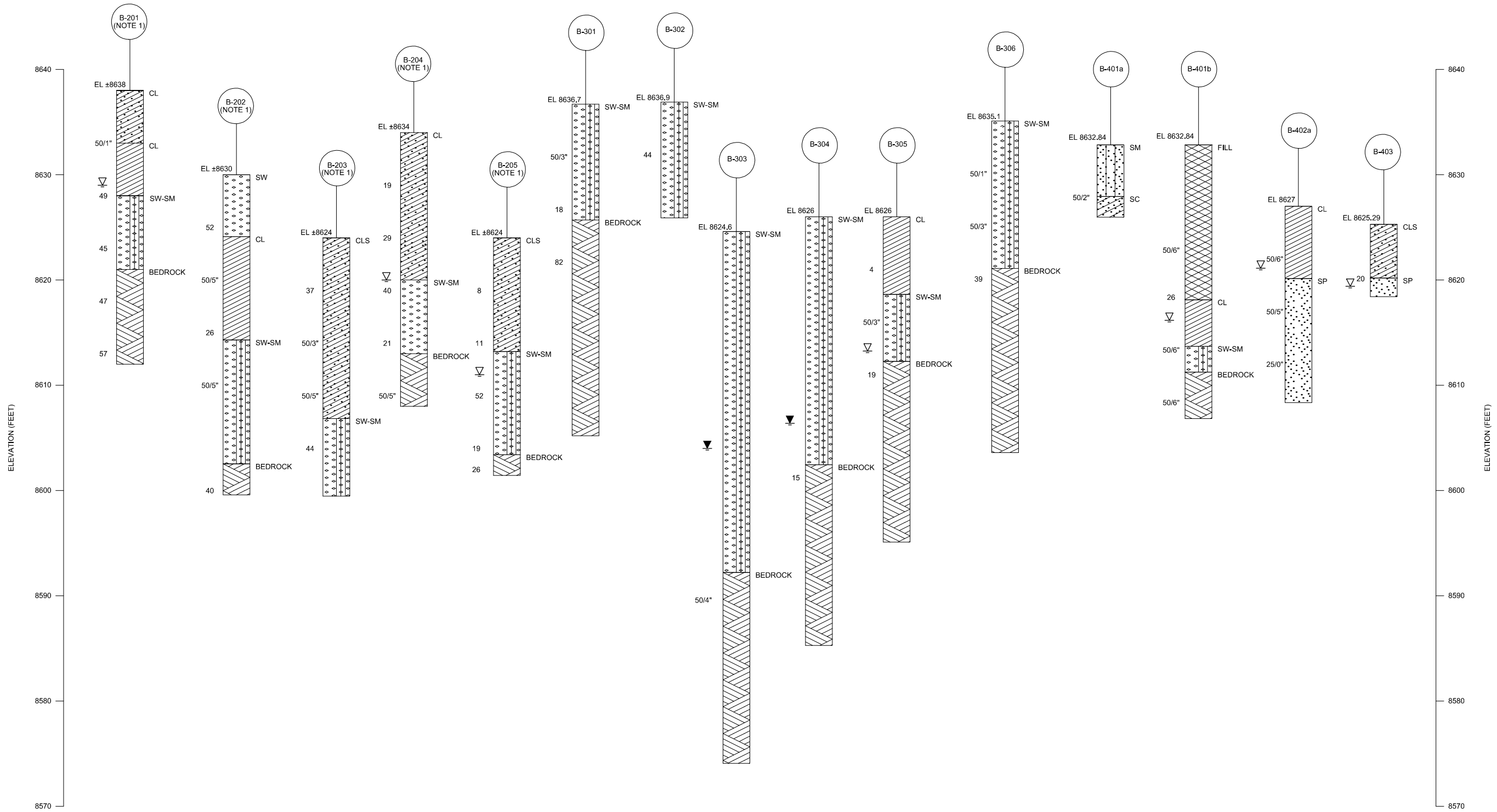
Water & Sanitation District #1

GCWSD No. 1
50 Vasquez Road
Winter Park, CO 80482

GEI Project 1331330

GCWSD #2 Improvements Fraser, Colorado	DWG. NO. G-2
DRAWING INDEX, LEGEND, ABBREVIATIONS, AND GENERAL NOTES	SHEET NO. 2 of 11

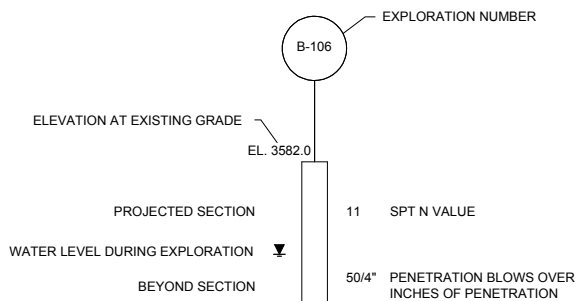
P:\13133 - GCWSD - Reservoir 2 Improvements\Civil\Production Drawings\G-3 - Summary - Boring Logs.dwg Jun 03, 2015 njorgensen



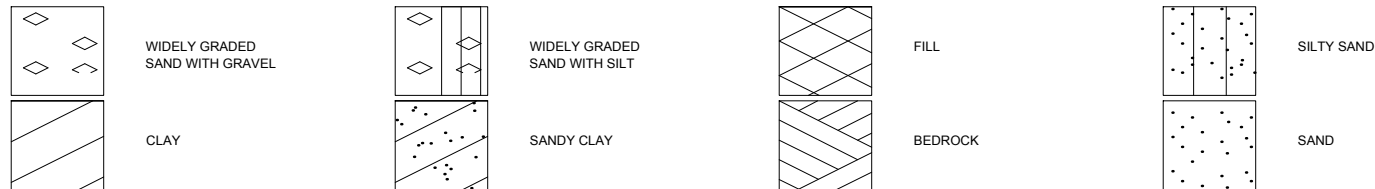
NOTES:

1. SPT N-VALUES FOR ALL B-200 SERIES BORINGS ARE BASED ON MAXIMUM SAMPLER PENETRATIONS OF 12-INCHES.

BORING LEGEND:



MATERIALS LEGEND:



ISSUED FOR CONSTRUCTION C-1903A

Attention:				
	4	03/15	ISSUED FOR CONSTRUCTION	CMM
	3	08/14	ISSUED FOR BID	CMM
	2	05/14	SEO REVIEW SUBMITTAL	CMM
	1	03/14	60 SUBMITTAL	CMM
NO.	DATE	ISSUE/REVISION		APP



Designed:	J. DEUTO
Checked:	C. MASCHING
Drawn:	C. NIEMELA
Approved By:	C. MASCHING
Approval Date:	MAY 2015

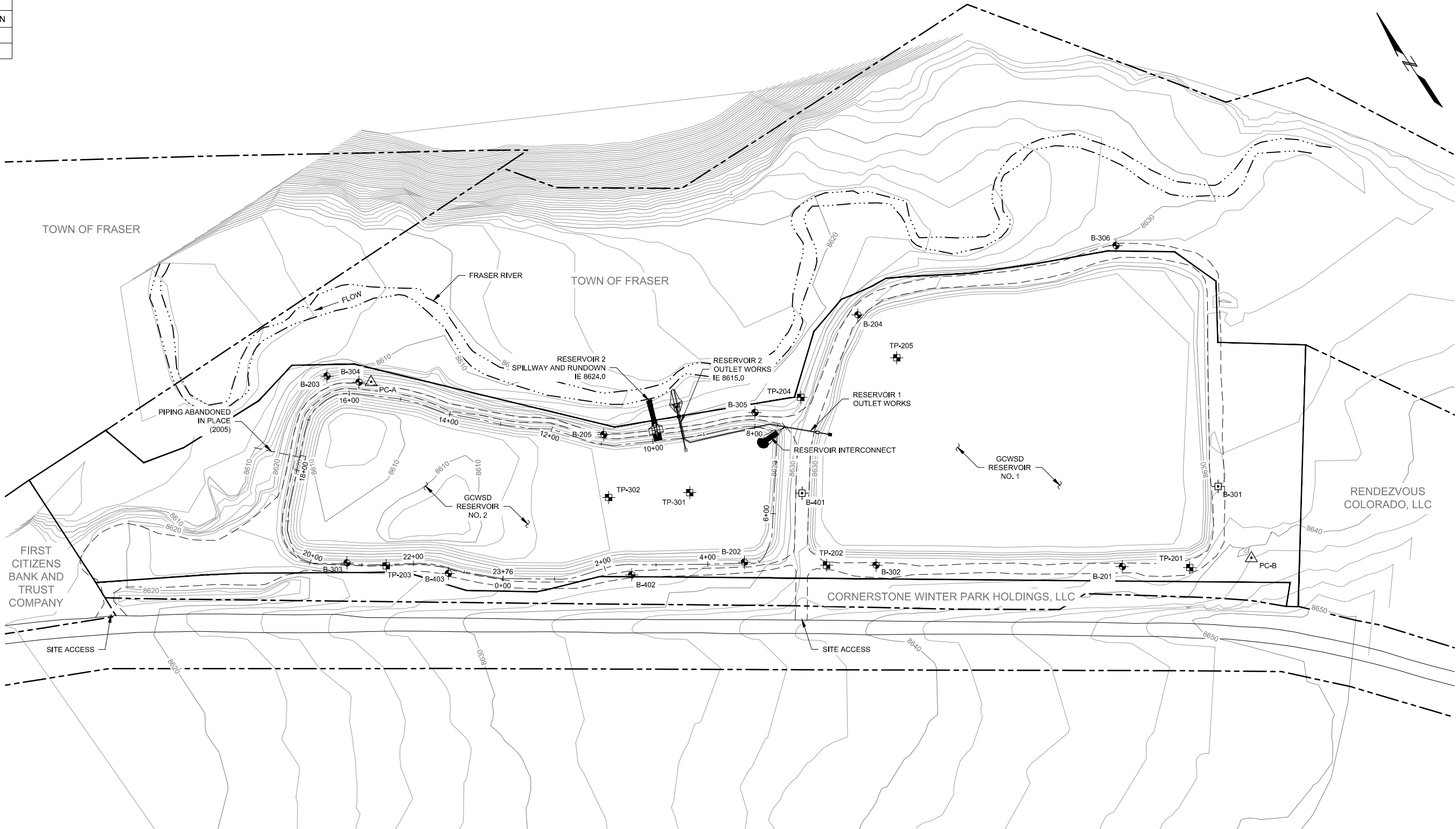


Grand County Water & Sanitation District #1	GCWSD No. 1 50 Vasquez Road Winter Park, CO 80482
GEI Project 1331330	

GCWSD #2 Improvements Fraser, Colorado	DWG. NO. G-3
SUMMARY BORING LOGS	SHEET NO. 3 of 11

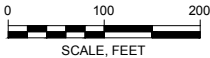
PROJECT CONTROL POINT TABLE			
POINT	NORTHING	EASTING	ELEVATION
PC-A	6131.69	5668.79	8624.91
PC-B	4919.08	6911.75	8642.27

SURVEY CONTROL POINT TABLE		
STATION	NORTHING	EASTING
0+00	5673.81	5675.34
1+00	5618.60	5758.71
2+00	5583.18	5851.41
3+00	5534.77	5938.15
4+00	5481.76	6022.37
5+00	5431.38	6108.69
6+00	5494.33	6182.09
7+00	5575.07	6241.08
8+00	5654.94	6244.03
9+00	5695.77	6153.16
10+00	5738.63	6062.86
11+00	5788.52	5976.84
12+00	5864.46	5912.11
13+00	5926.59	5834.01
14+00	5996.46	5762.53
15+00	6072.59	5698.12
16+00	6136.20	5621.05
17+00	6136.56	5527.20
18+00	6066.74	5455.05
19+00	5993.83	5386.85
20+00	5903.28	5379.98
21+00	5845.07	5461.00
22+00	5792.43	5545.99
23+00	5725.59	5619.53



NOTE:
POINTS PC-A AND PC-B WILL BE USED AS PROJECT CONTROL POINTS. THE BENCHMARK FOR THIS SURVEY IS THE FOUND SPIKE (PC-A) AND THE FOUND #5 REBAR (PC-B). SAID POINTS BEING RETRIEVED CONTROL FROM SURVEY WORK PERFORMED IN MAY, 2005 BY TIM SHENK LAND SURVEYING, INC. VERTICAL DATUM FOR THIS PROJECT IS NGVD 29.

- LEGEND
- LOCATIONS OF GEI BORINGS (B-201 THROUGH B-403)
 - LOCATIONS OF GEI TEST PITS (TP-201 THROUGH TP-302)
 - LOCATIONS OF OTHER BORINGS
 - LOCATION OF MONITORING WELL
 - PROJECT CONTROL POINT



Attention:				
	4	03/15	ISSUED FOR CONSTRUCTION	CMM
	3	08/14	ISSUED FOR BID	CMM
	2	05/14	SEO REVIEW SUBMITTAL	CMM
	1	03/14	60 SUBMITTAL	CMM
	NO.	DATE	ISSUE/REVISION	APP



Designed:	J. DEUTO
Checked:	C. MASCHING
Drawn:	C. NIEMELA
Approved By:	C. MASCHING
Approval Date:	MAY 2015

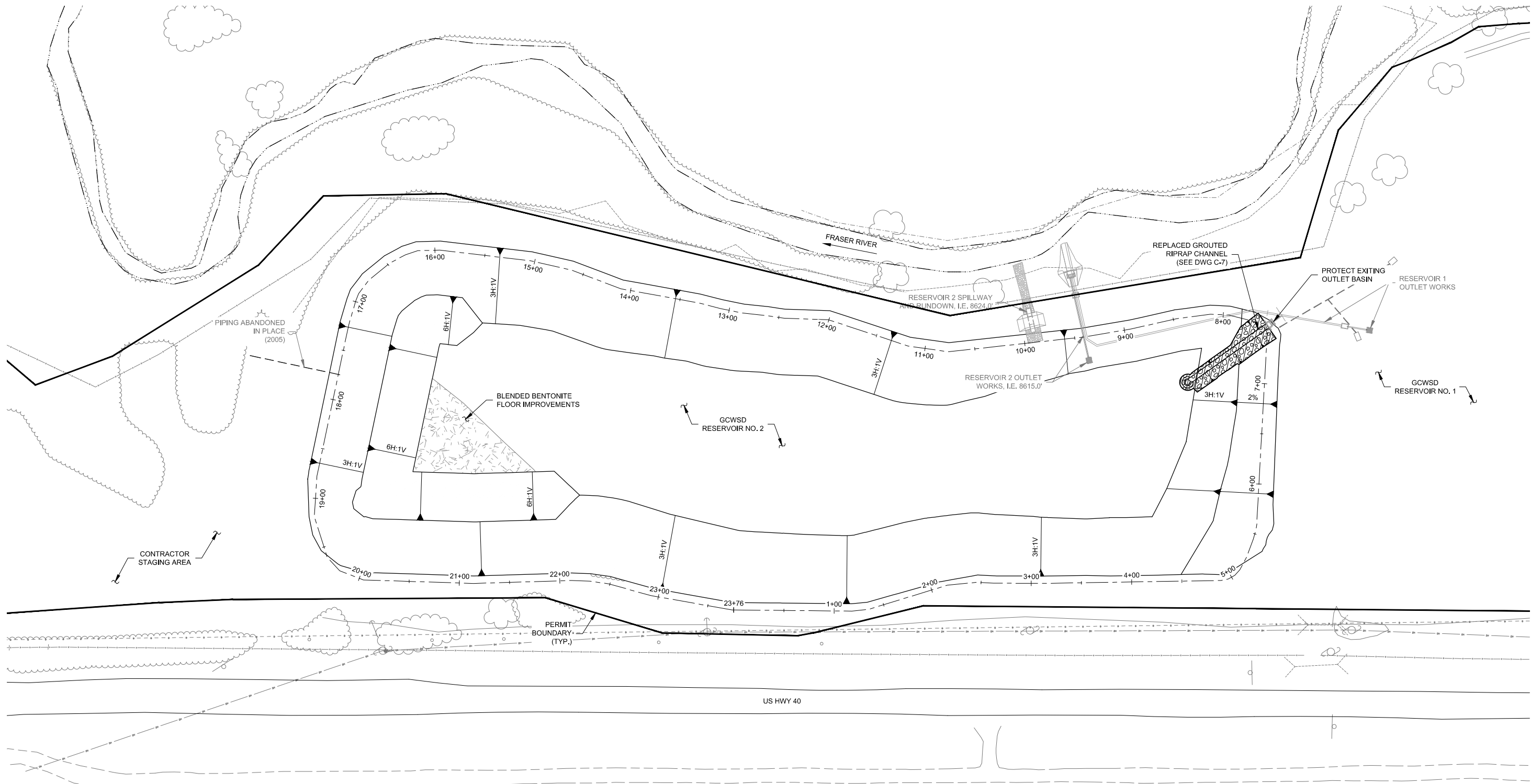
GEI Consultants
4601 DTC Boulevard
Denver, Colorado 80237
303-662-0100

Grand County
Water & Sanitation District #1
GCWSD No. 1
50 Vasquez Road
Winter Park, CO 80482
GEI Project 1331330

GCWSD #2 Improvements Fraser, Colorado		DWG. NO. C-1
EXISTING SITE PLAN		SHEET NO. 4 of 11

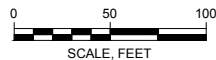
P:\133133 - GCWSD - Reservoir 2 Improvements\Civil\Production Drawings\Working Drawings\C-1 - Existing Site Plan.dwg Jun 23, 2015 smickell

P:\13133 - GCWSD - Reservoir 2 Improvements\Civil\Production Drawings\Working Drawings\C-2 - General Modifications.dwg Jun 03, 2015 njorgensen



NOTES:

1. ACCESS ROADS NOT SHOWN.



Attention:				
4	03/15	ISSUED FOR CONSTRUCTION	CMM	
3	08/14	ISSUED FOR BID	CMM	
2	05/14	SEO REVIEW SUBMITTAL	CMM	
1	03/14	60 SUBMITTAL	CMM	
NO.	DATE	ISSUE/REVISION	APP	



Designed:	J. DEUTO
Checked:	C. MASCHING
Drawn:	C. NIEMELA
Approved By:	C. MASCHING
Approval Date:	MAY 2015

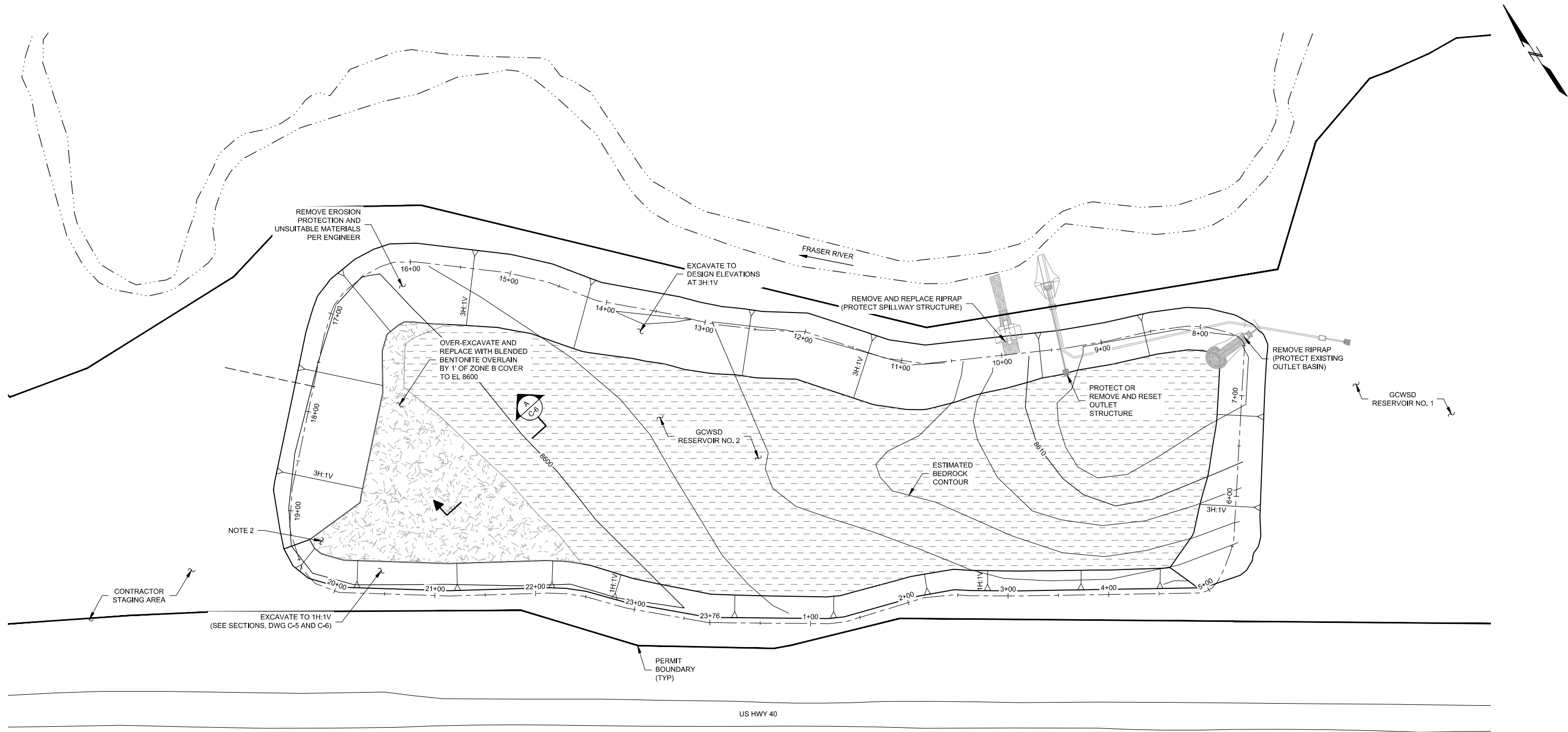


Grand County Water & Sanitation District #1	GCWSD No. 1 50 Vasquez Road Winter Park, CO 80482
GEI Project 1331330	

GCWSD #2 Improvements Fraser, Colorado	DWG. NO. C-2
GENERAL MODIFICATION PLAN	SHEET NO. 5 of 11

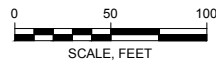
ISSUED FOR CONSTRUCTION C-1903A

P:\13133 - GCWSD - Reservoir 2 Improvements\Civil\Production Drawings\C-3 - Stripping Plan.dwg Jun 03, 2015 njorgensen



NOTES:

1. ACCESS ROADS NOT SHOWN.
2. STRIPPING OF EMBANKMENT BETWEEN STA 19+00 AND STA 19+50 SHALL EXHIBIT A SMOOTH TRANSITION FROM THE 3H:1V SLOPE UP TO STA 19+00, TO THE 0.75H:1V SLOPE PAST STA 19+50.



Attention:				
	4	03/15	ISSUED FOR CONSTRUCTION	CMM
	3	08/14	ISSUED FOR BID	CMM
	2	05/14	SEO REVIEW SUBMITTAL	CMM
	1	03/14	60 SUBMITTAL	CMM
NO.	DATE		ISSUE/REVISION	APP



Designed:	J. DEUTO
Checked:	C. MASCHING
Drawn:	C. NIEMELA
Approved By:	C. MASCHING
Approval Date:	MAY 2015

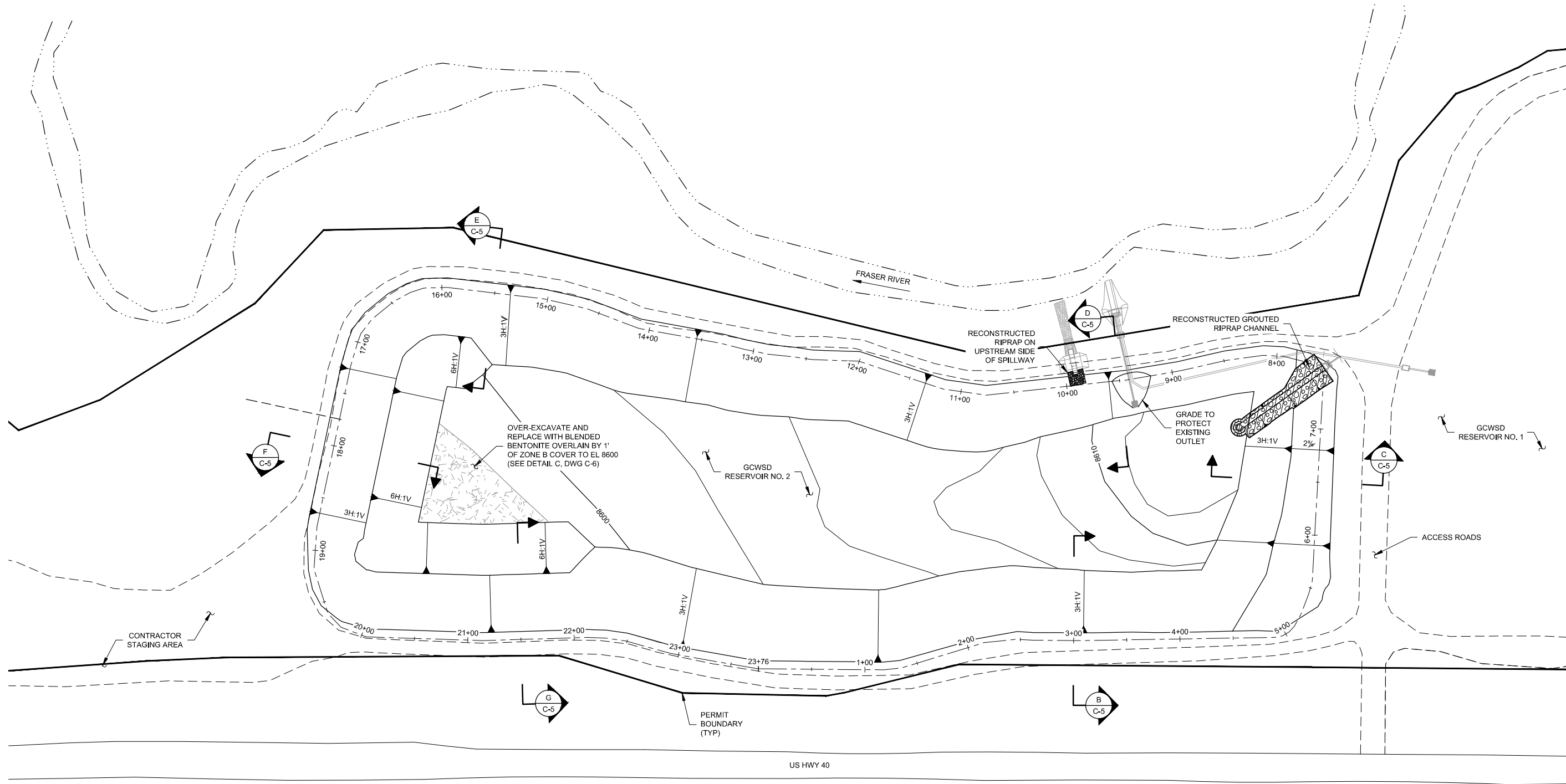
GEI Consultants
4601 DTC Boulevard
Denver, Colorado 80237
303-662-0100

Grand County
Water & Sanitation District #1
GCWSD No. 1
50 Vasquez Road
Winter Park, CO 80482
GEI Project 1331330

GCWSD #2 Improvements Fraser, Colorado		DWG. NO. C-3
STRIPPING PLAN		SHEET NO. 6 of 11

ISSUED FOR CONSTRUCTION C-1903A

P:\13133 - GCWSD - Reservoir 2 Improvements\Civil\Production Drawings\C-4 - Liner Improvements.dwg Jun 03, 2015 njorgensen



Attention:

4	03/15	ISSUED FOR CONSTRUCTION	CMM
3	08/14	ISSUED FOR BID	CMM
2	05/14	SEO REVIEW SUBMITTAL	CMM
1	03/14	60 SUBMITTAL	CMM
NO.	DATE	ISSUE/REVISION	APP

If this scale bar does not measure 1" then drawing is not original scale.



Designed: J. DEUTO
Checked: C. MASCHING
Drawn: C. NIEMELA
Approved By: C. MASCHING
Approval Date: MAY 2015

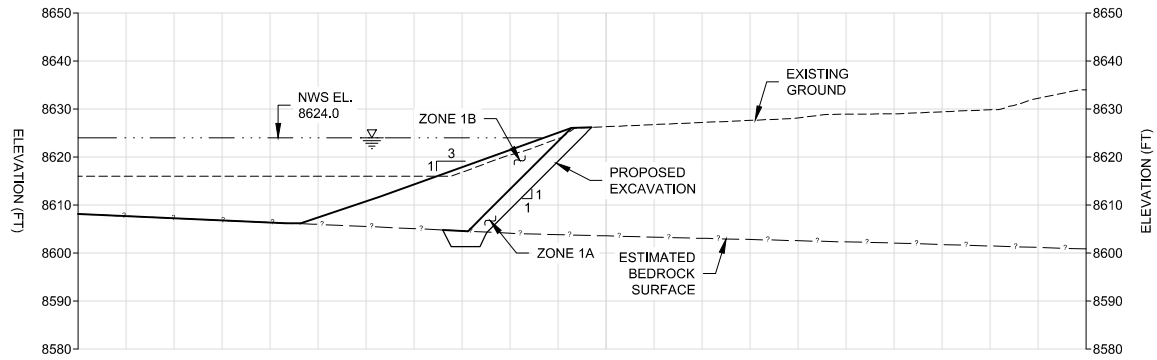


Grand County
Water & Sanitation District #1
GCWSD No. 1
50 Vasquez Road
Winter Park, CO 80482
GEI Project 1331330

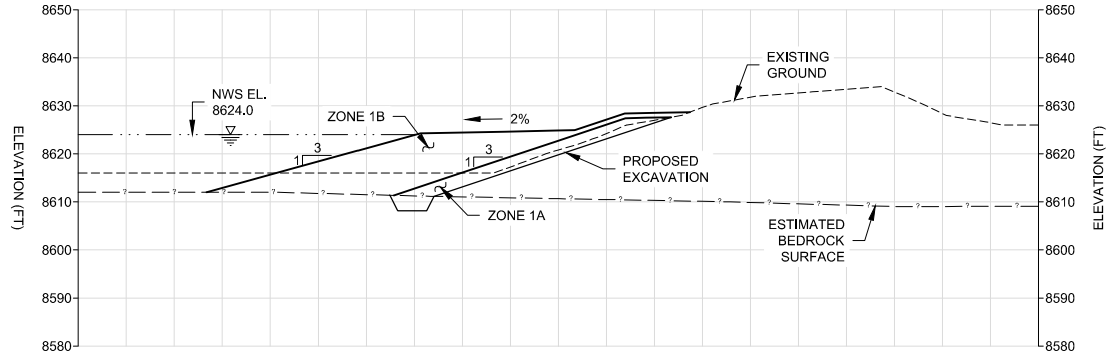
GCWSD #2 Improvements Fraser, Colorado	DWG. NO. C-4
LINER IMPROVEMENTS	SHEET NO. 7 of 11

ISSUED FOR CONSTRUCTION C-1903A

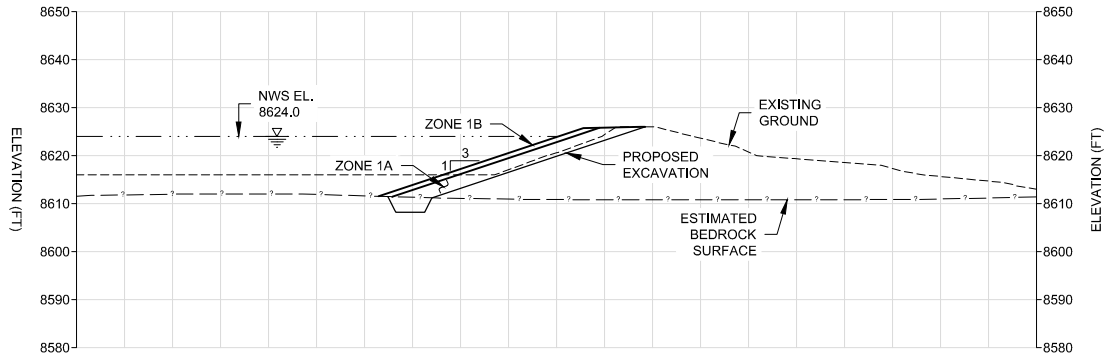
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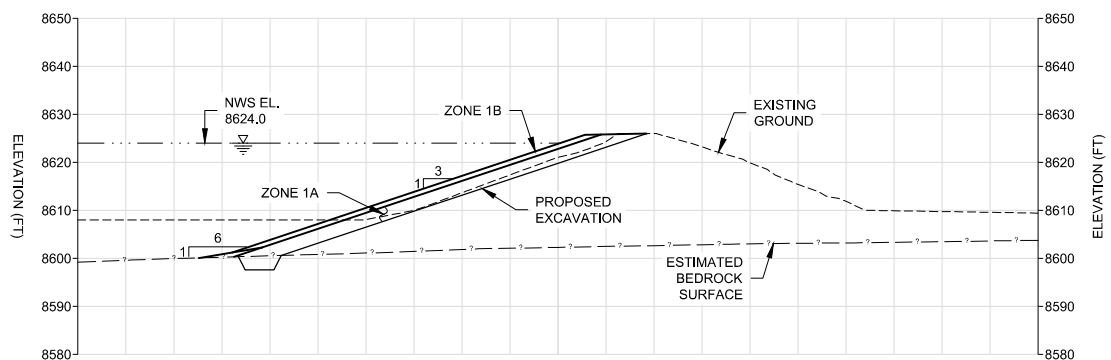
SECTION B
STA. 3+00 C-4



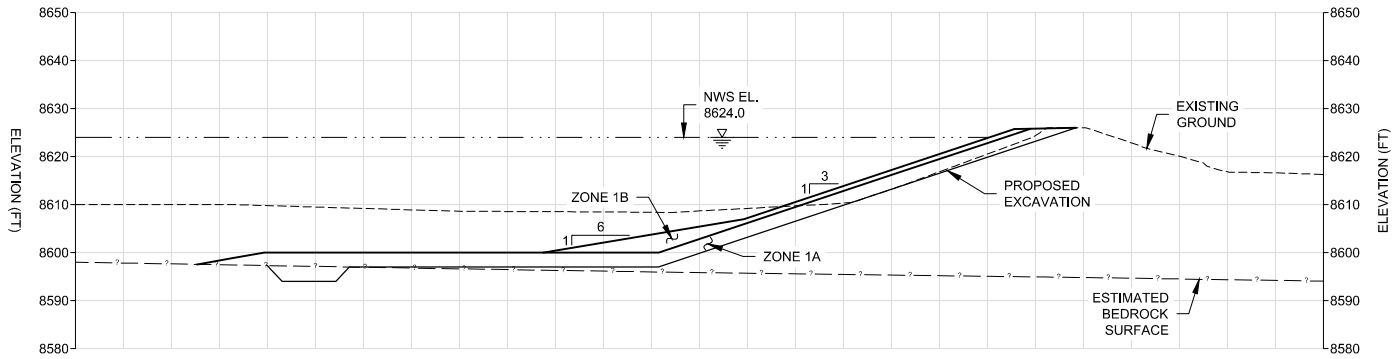
SECTION C
STA. 6+50 C-4



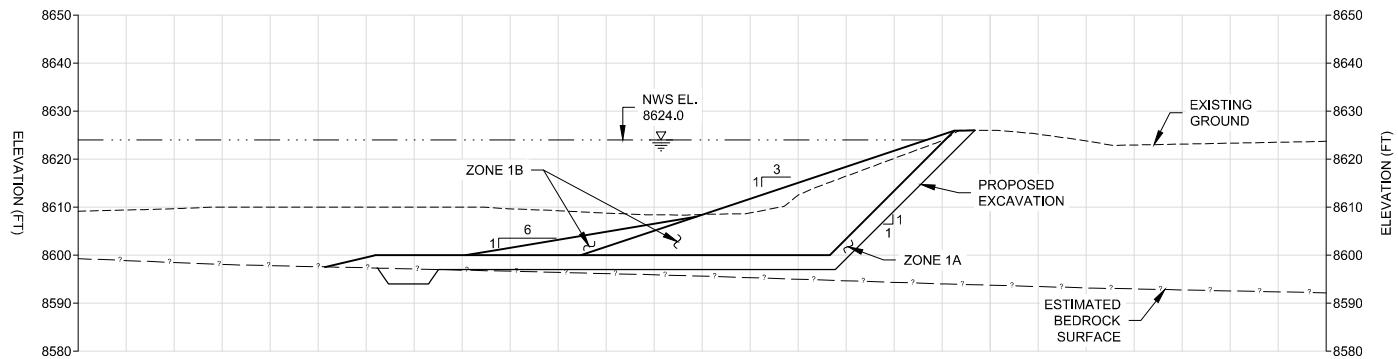
SECTION D
STA. 9+50 C-4



SECTION E
STA. 15+50 C-4



SECTION F
STA. 18+00 C-4



SECTION G
STA. 21+50 C-4

ISSUED FOR CONSTRUCTION C-1903A



Attention:				
	4	03/15	ISSUED FOR CONSTRUCTION	CMM
	3	08/14	ISSUED FOR BID	CMM
	2	05/14	SEO REVIEW SUBMITTAL	CMM
	1	03/14	60 SUBMITTAL	CMM
	NO.	DATE	ISSUE/REVISION	APP



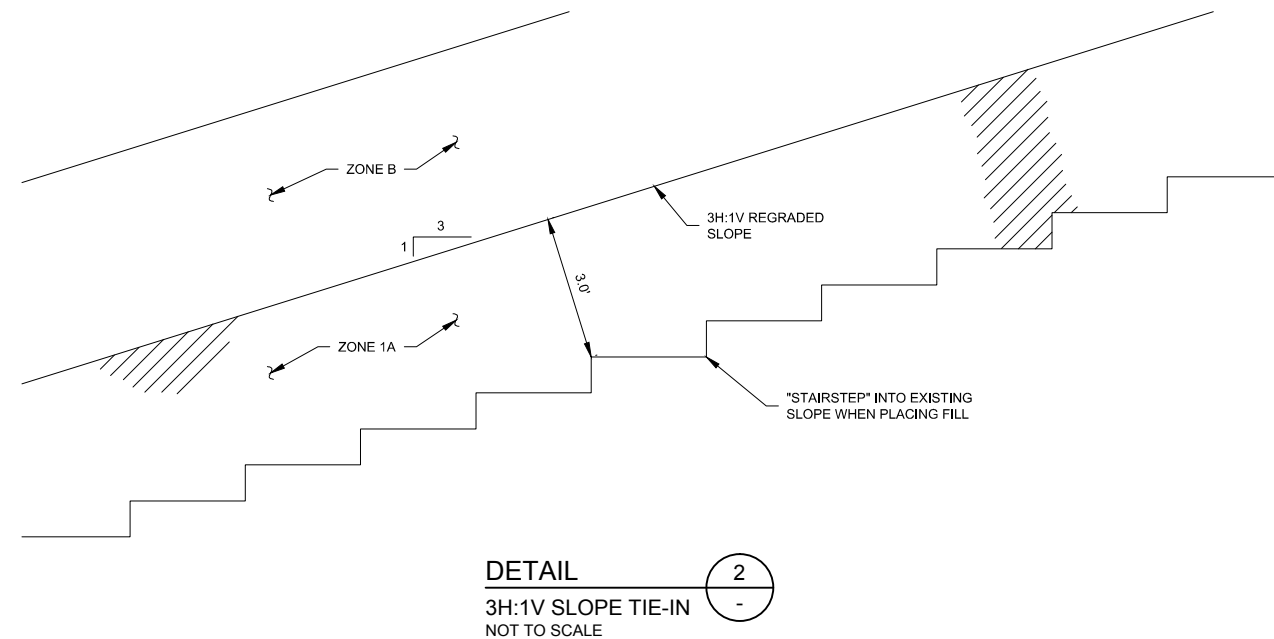
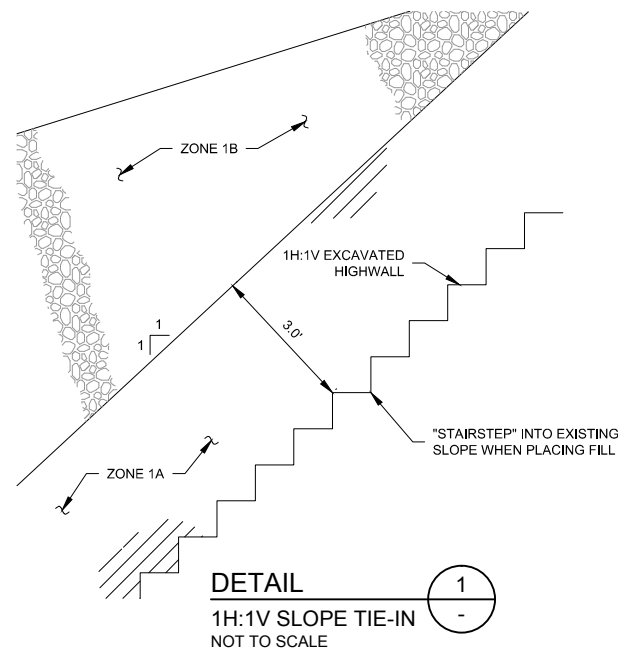
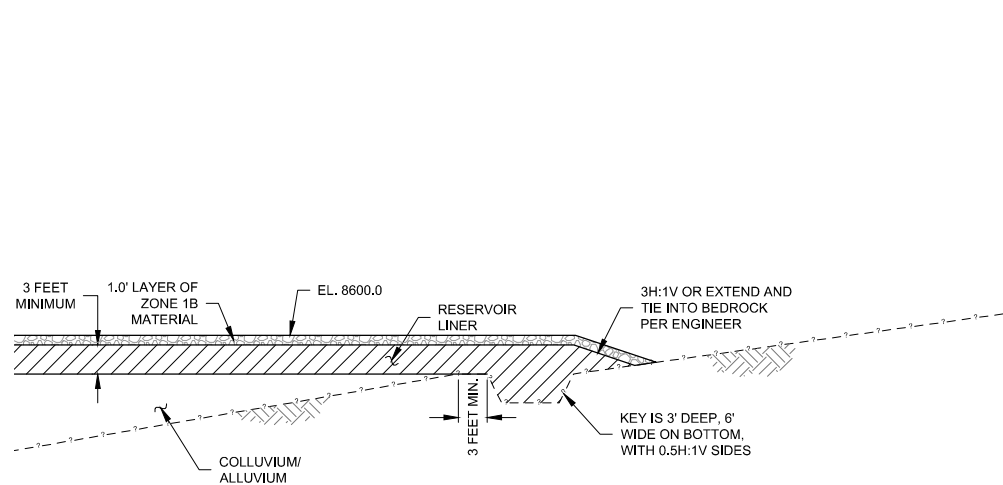
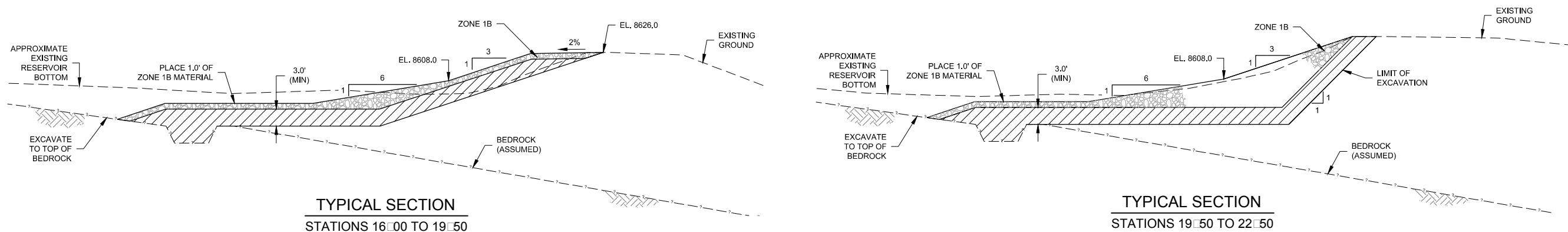
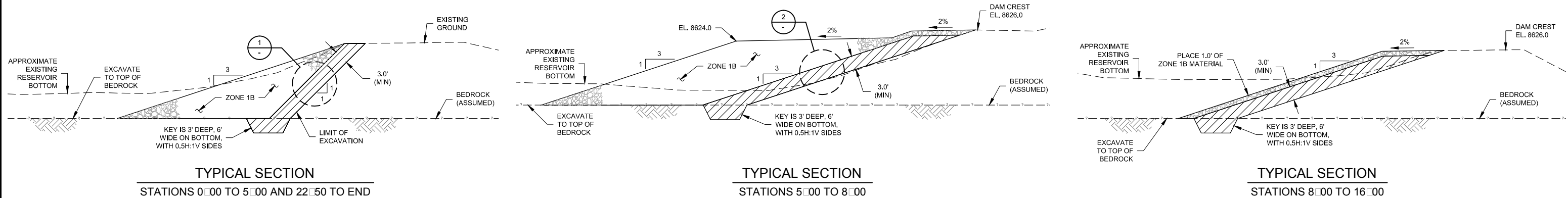
Designed:	J. DEUTO
Checked:	C. MASCHING
Drawn:	C. NIEMELA
Approved By:	C. MASCHING
Approval Date:	MAY 2015



Grand County Water & Sanitation District #1	GCWSD No. 1 50 Vasquez Road Winter Park, CO 80482
GEI Project 1331330	

GCWSD #2 Improvements Fraser, Colorado	DWG. NO. C-5
EMBANKMENT SECTIONS	SHEET NO. 8 of 11

P:\13133 - GCWSD - Reservoir 2 Improvements\Civil\Production Drawings\C-6 - Details 1 of 2.dwg Jun 03, 2015 njorgensen



Attention:					
4	03/15	ISSUED FOR CONSTRUCTION	CMM		
3	08/14	ISSUED FOR BID	CMM		
2	05/14	SEO REVIEW SUBMITTAL	CMM		
1	03/14	60% SUBMITTAL	CMM		
NO.	DATE	ISSUE/REVISION	APP		

Designed: J. DEUTO
Checked: C. MASCHING
Drawn: C. NIEMELA
Approved By: C. MASCHING
Approval Date: MAY 2015



Grand County
Water & Sanitation District #1
GCWSD No. 1
50 Vasquez Road
Winter Park, CO 80482
GEI Project 1313330

ISSUED FOR CONSTRUCTION

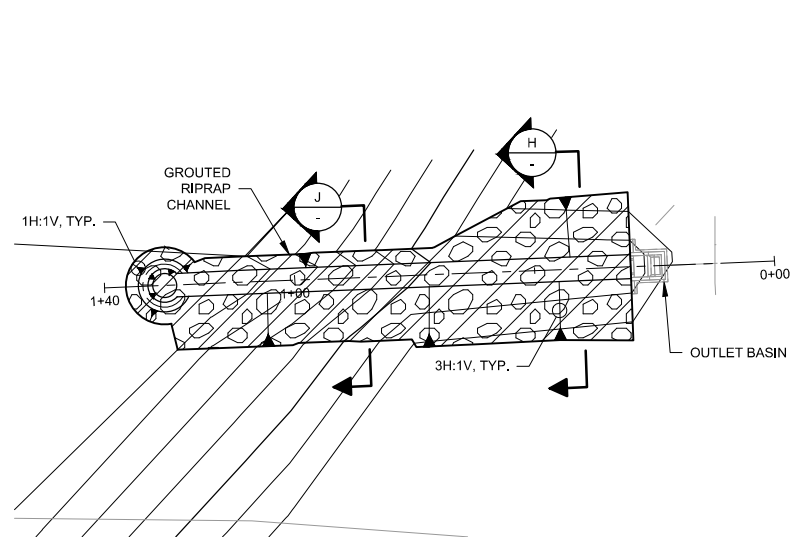
C-1903A

GCWSD #2 Improvements
Fraser, Colorado

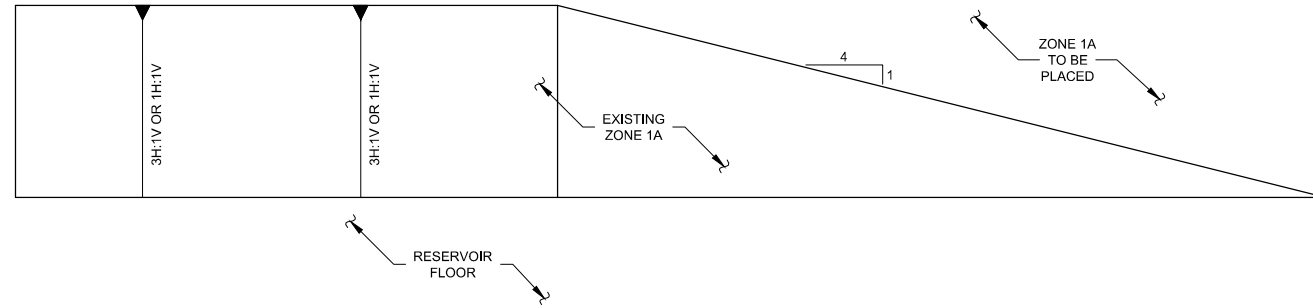
TYPICAL SECTIONS
AND DETAILS
1 OF 2

DWG. NO.
C-6
SHEET NO.
9 of 11

P:\13133 - GCWSD - Reservoir 2 Improvements\Civil\Production Drawings\C-7 - Details 2 of 2.dwg Jun 03, 2015 njorgensen

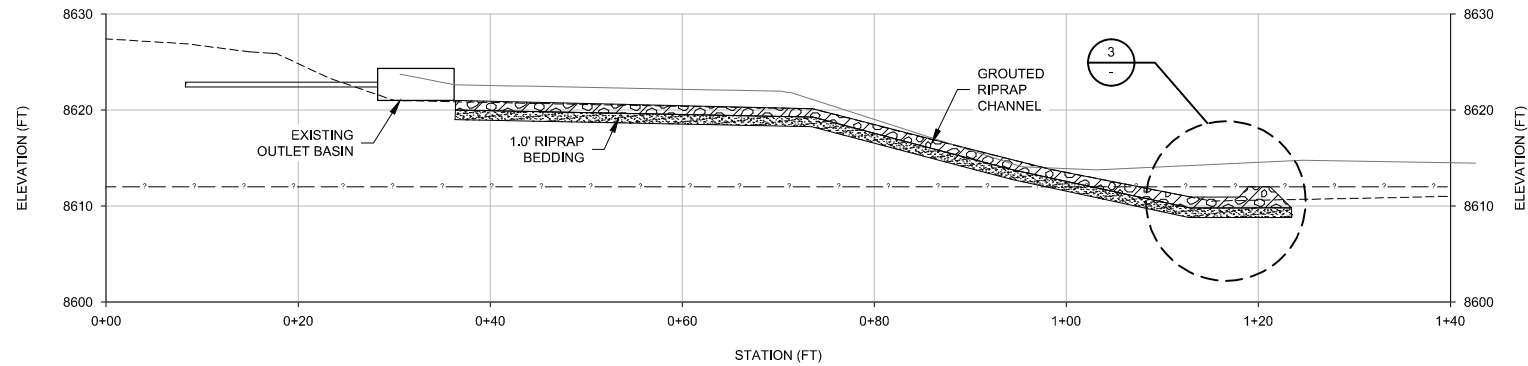


PLAN
INTERCONNECT RUNDOWN CHANNEL

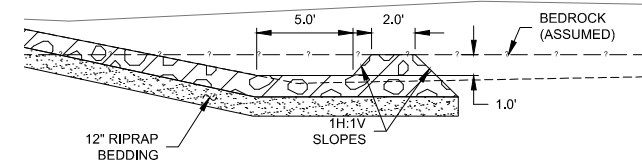


NOTE:
TRANSVERSE SLOPES SHALL NOT EXCEED 4:1 H:V

TYPICAL DETAIL
ONE 1A TIE IN
NOT TO SCALE

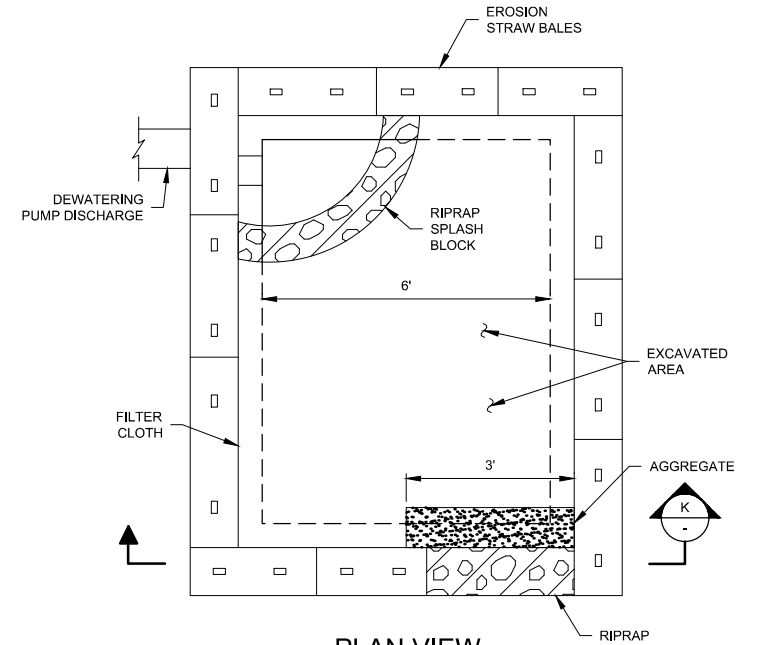


PROFILE
INTERCONNECT RUNDOWN CHANNEL

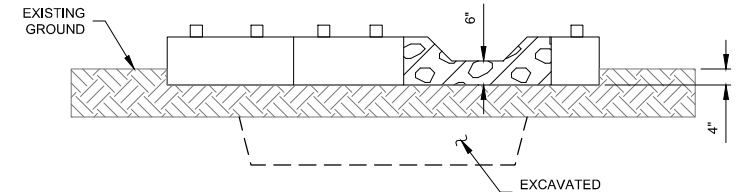


DETAIL
BOTTOM OF RUNDOWN CHANNEL

3



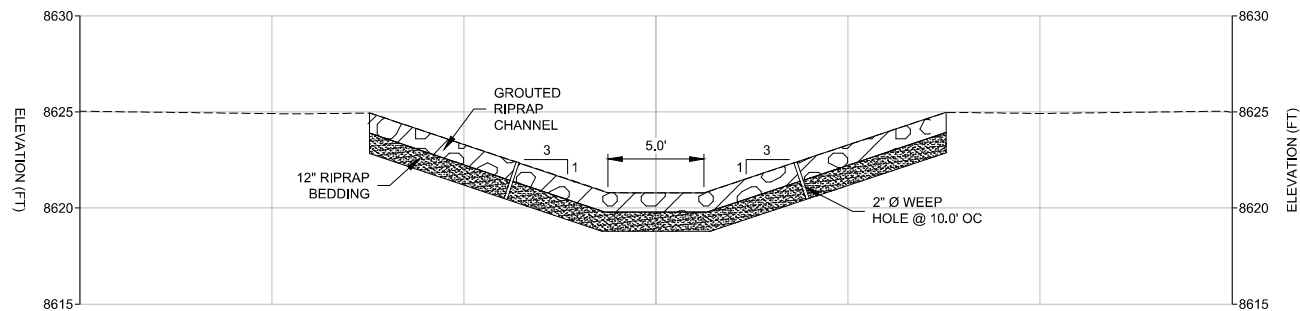
PLAN VIEW



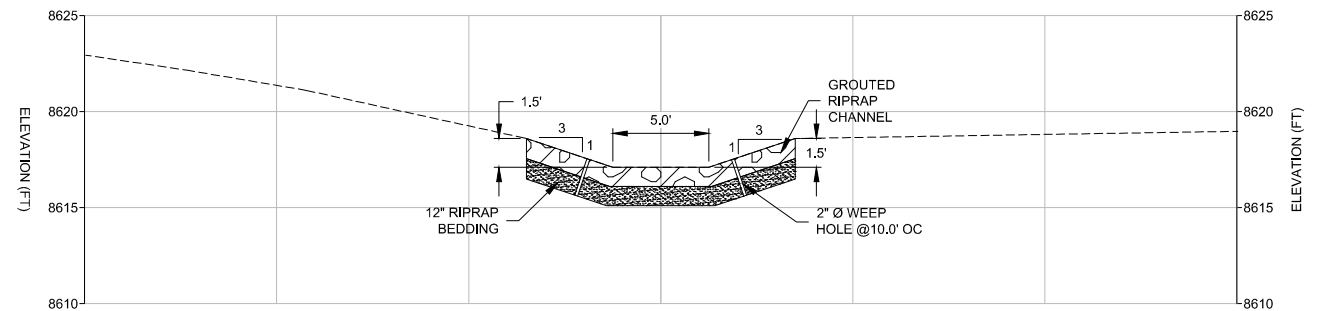
SECTION K

- NOTES:
1. ALL SITE DEWATERING ROUTED TO THIS LOCATION.
 2. TEMPORARY STORM WATER DITCHES ROUTED TO DEWATERING STRUCTURE.
 3. COORDINATE PLACEMENT WITH OWNER'S REP.

TYPICAL DETAIL
DEWATERING STRUCTURE
NOT TO SCALE



SECTION H
RESERVOIR INTERCONNECT



SECTION J
RESERVOIR INTERCONNECT



ISSUED FOR CONSTRUCTION

C-1903A

Attention:				
	4	03/15	ISSUED FOR CONSTRUCTION	CMM
	3	08/14	ISSUED FOR BID	CMM
	2	05/14	SEO REVIEW SUBMITTAL	CMM
	1	03/14	60 SUBMITTAL	CMM
	NO.	DATE	ISSUE/REVISION	APP



Designed: J. DEUTO
Checked: C. MASCHING
Drawn: C. NIEMELA
Approved By: C. MASCHING
Approval Date: MAY 2015



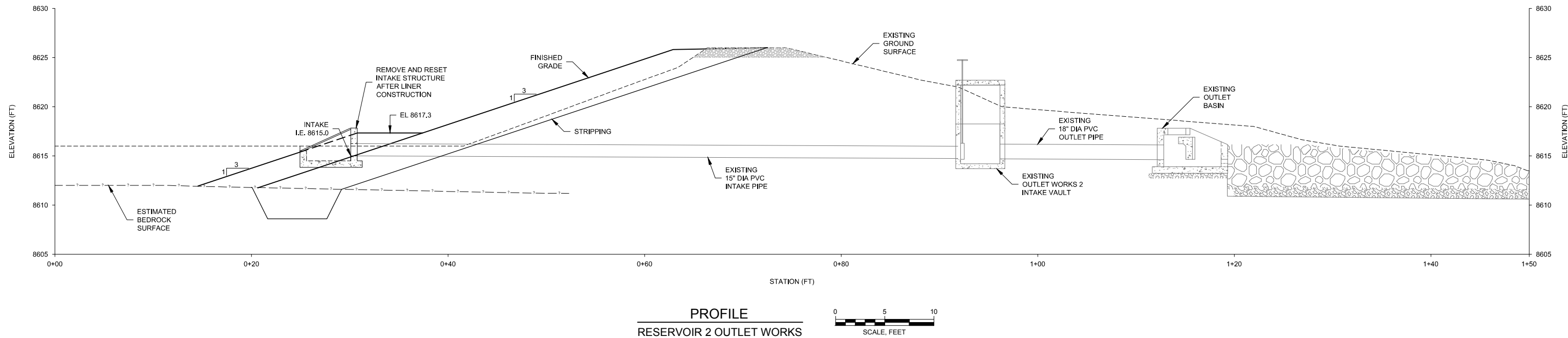
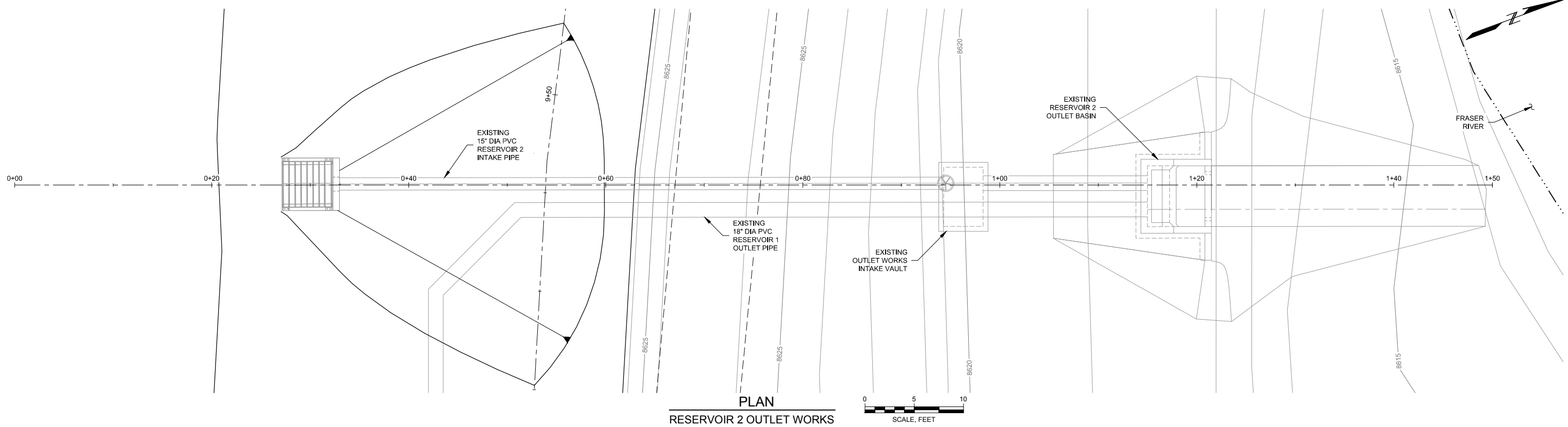
Grand County
Water & Sanitation District #1
GCWSD No. 1
50 Vasquez Road
Winter Park, CO 80482
GEI Project 1331330

GCWSD #2 Improvements
Fraser, Colorado

TYPICAL SECTIONS
AND DETAILS
2 OF 2

DWG. NO.
C-7
SHEET NO.
10 of 11

P:\133133 - GCWSD - Reservoir 2 Improvements\Civil\Production Drawings\C-8 - Outlet Works Plan and Profile.dwg Jun 03, 2015 jingjensen



ISSUED FOR CONSTRUCTION C-1903A

Attention:				
	4	03/15	ISSUED FOR CONSTRUCTION	CMM
	3	08/14	ISSUED FOR BID	CMM
	2	05/14	SEO REVIEW SUBMITTAL	CMM
	1	03/14	60 SUBMITTAL	CMM
	NO.	DATE	ISSUE/REVISION	APP



Designed:	J. DEUTO
Checked:	C. MASCHING
Drawn:	C. NIEMELA
Approved By:	C. MASCHING
Approval Date:	MAY 2015



	GCWSD No. 1 50 Vasquez Road Winter Park, CO 80482
	GEI Project 1331330

GCWSD #2 Improvements Fraser, Colorado	DWG. NO. C-8
OUTLET WORKS PLAN AND PROFILE	SHEET NO. 11 of 11

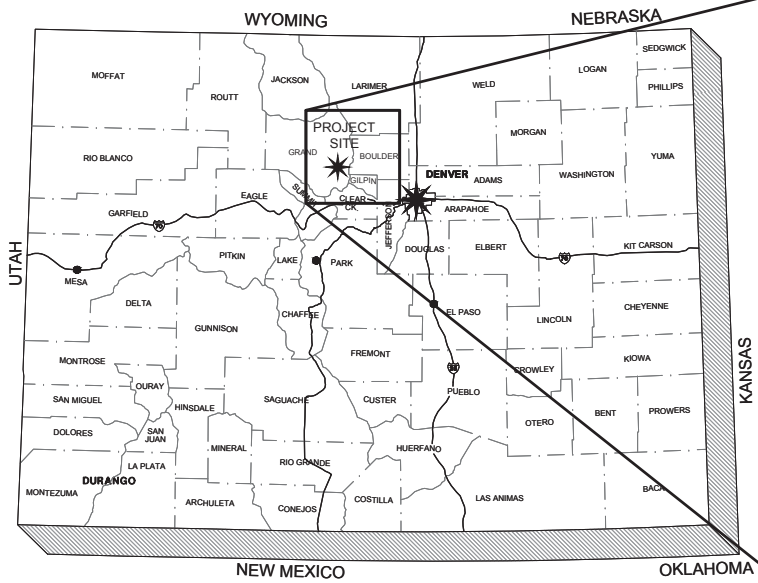
Appendix B Record Drawings

GCWSD #2 IMPROVEMENTS

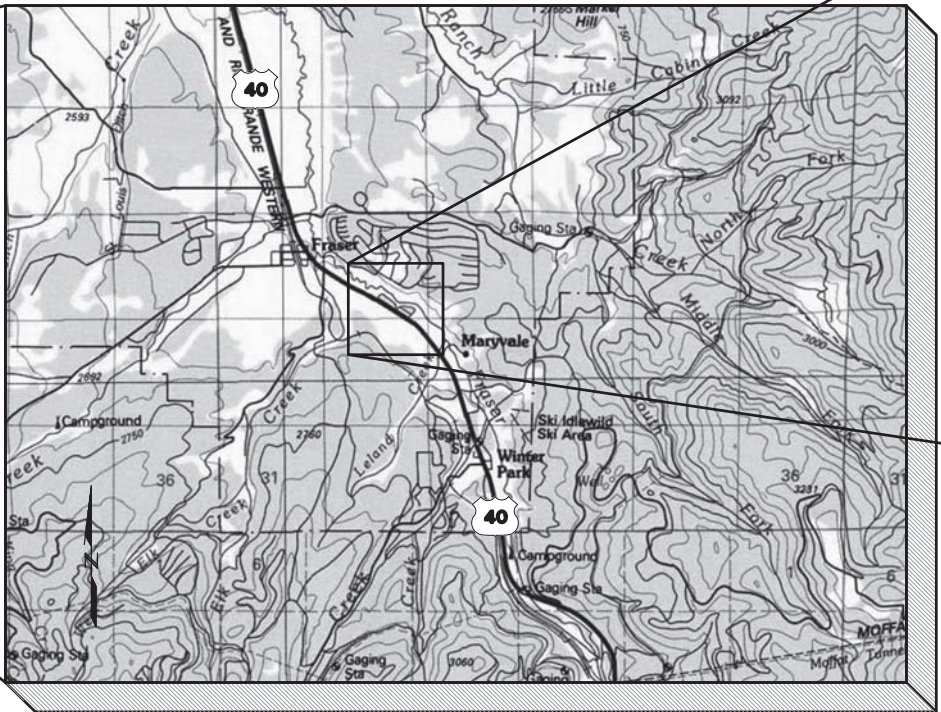
GRAND COUNTY WATER AND SANITATION DISTRICT NO. 1

DAM ID #510210

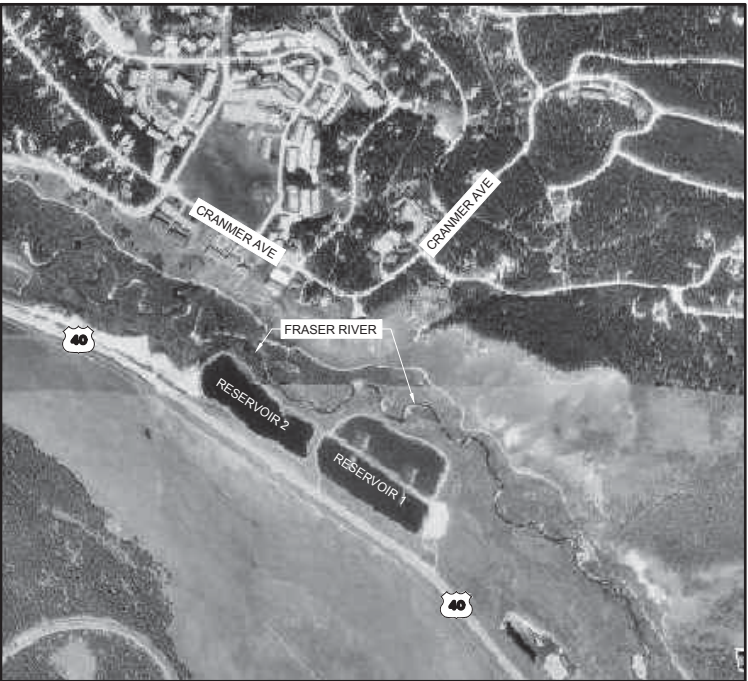
GRAND COUNTY, COLORADO
WATER DIVISION 5, WATER DISTRICT 51



PROJECT LOCATION MAP
(NOT TO SCALE)



SITE LOCATION MAP
(NOT TO SCALE)



SITE VICINITY MAP
(NOT TO SCALE)

GENERAL PROJECT INFORMATION

GRAND COUNTY WATER AND SANITATION DISTRICT NO. 1
OWNER

CONTRACTOR

GEI CONSULTANTS, INC., DENVER, COLORADO
ENGINEER

CONSTRUCTION STARTED

CONSTRUCTION COMPLETED

PREPARED FOR



GRAND COUNTY WATER AND
SANITATION DISTRICT NO. 1
50 VASQUEZ ROAD
WINTER PARK, CO 80482

PREPARED BY



CHAD MASCHING, P.E. COLORADO P.E. #39806
REGISTERED ENGINEER
GEI CONSULTANTS, INC.

APPROVED ON THE 2nd DAY OF July 20 15

Dick Wolfe

STATE ENGINEER

WILLIAM T. MCCORMICK III, CO P.E. #29127
CHIEF - DAM SAFETY BRANCH

THESE PLANS MAY NOT BE MATERIALLY CHANGED, EXCEPT WITH THE PRIOR WRITTEN CONSENT OF THE STATE ENGINEER.

AS-CONSTRUCTED CERTIFICATION

THESE PLANS REPRESENT THE "AS-CONSTRUCTED" CONDITIONS FOR THE GCWSD RESERVOIR NO. 2 IMPROVEMENTS PROJECT TO THE BEST OF OUR KNOWLEDGE AND JUDGMENT, BASED IN PART ON INFORMATION FURNISHED BY OTHERS AS OF

THE DAY OF , 20

(ENGINEER'S PRINTED NAME)
GEI CONSULTANTS, INC.

(SIGNATURE)



THIS DOCUMENT, AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF GEI CONSULTANTS, INC. AND IS NOT TO BE USED, IN WHOLE OR IN PART, FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF GEI CONSULTANTS, INC.

DWG. NO.
G-1

SHEET NO.

1 of 11

C-1903A

P:\13133 - GCWSD - Reservoir 2 Improvements\Civil\Production Drawings\Working Drawings\G-2 - General Notes and Information.dwg Feb 16, 2016 smickell

DRAWING INDEX:

DWG	SHEET	TITLE
G-1	1	COVER SHEET
G-2	2	DRAWING INDEX, ABBREVIATIONS, LEGEND, AND NOTES
G-3	3	SUMMARY BORING LOGS
C-1	4	EXISTING SITE PLAN
C-2	5	GENERAL MODIFICATION PLAN
C-3	6	STRIPPING PLAN
C-4	7	LINER IMPROVEMENTS
C-5	8	EMBANKMENT SECTIONS
C-6	9	TYPICAL SECTIONS AND DETAILS :1 OF 2
C-7	10	TYPICAL SECTIONS AND DETAILS :2 OF 2
C-8	11	OUTLET WORKS PLAN AND PROFILE
D-1	12	STAFF GAGE PLAN

ABBREVIATIONS:

APPROX.	= APPROXIMATE
DIA., Ø	= DIAMETER
DRMS	= DIVISION OF RECLAMATION, MINING, AND SAFETY
DWG	= DRAWING
E	= EAST, EASTING
EL.	= ELEVATION
EW	= EACH WAY
GCWSD	= GRAND COUNTY WATER AND SANITATION DISTRICT
H	= HORIZ. ONTAL
HWY	= HIGHWAY
IN.	= INCH, INCHES
INV.	= INVERT
I.E.	= INVERT ELEVATION
LFT	= LINEAR FEET
MAX.	= MAXIMUM
MIN.	= MINIMUM
MISC.	= MISCELLANEOUS
N	= NORTH, NORTHING
NO.	= NUMBER
OC	= ON CENTER
S	= SOUTH
SFT	= SQUARE FEET
T.B	= TOP AND BOTTOM
TYP.	= TYPICAL
US	= UNITED STATES
V	= VERTICAL
W	= WEST
W/	= WITH

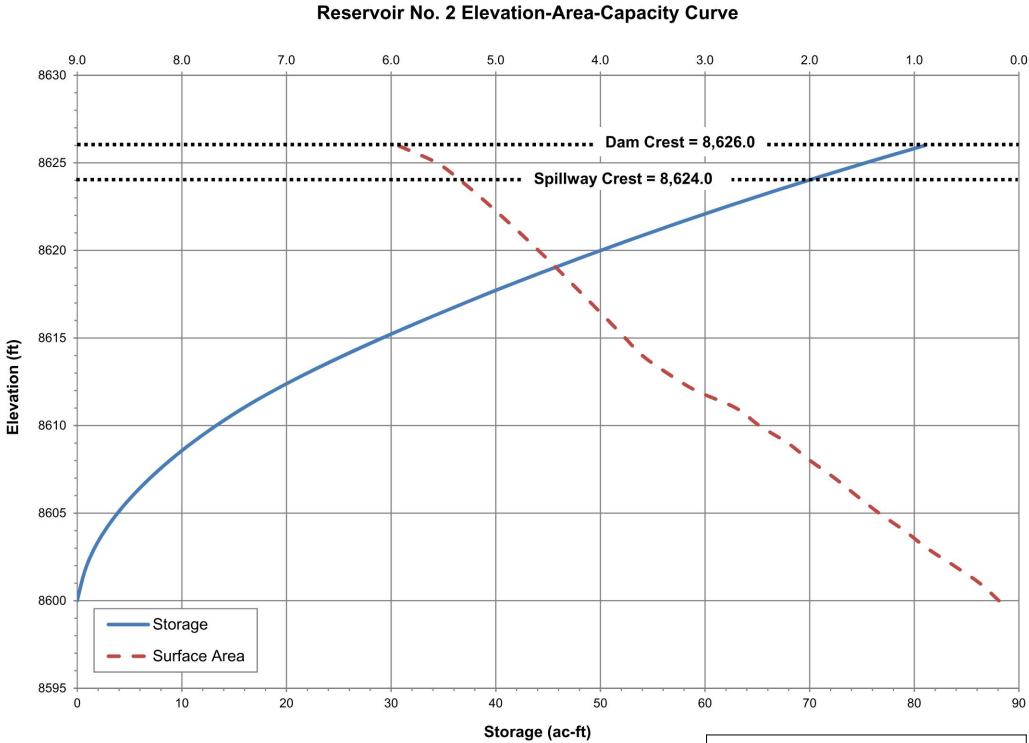
NOTES:

1. SITE TOPOGRAPHY AND EXISTING INFRASTRUCTURE REPRESENTS ASSUMED EXISTING CONDITIONS. BASED ON 2005 RESERVOIR DESIGN MODIFICATIONS, GEI PROJECT #05075.
2. WETLANDS LAST DELINEATED IN 2005. REDELINEATION REQUIRED PRIOR TO CONSTRUCTION.
3. CONSTRUCTION IS SUBJECT TO THE RULES AND REGULATIONS OF COLORADO OFFICE OF THE STATE ENGINEER, THE TOWN OF FRASER ENGINEERING AND CONSTRUCTION STANDARDS AND THE GRAND COUNTY WATER AND SANITATION DISTRICT NO. 1 (GCWSD#1) ENGINEERING STANDARDS.
4. LOCATION AND NATURE OF EXISTING UTILITIES SHOWN ON THE DRAWINGS ARE APPROXIMATE. CONTRACTOR SHALL FIELD LOCATE ALL UTILITIES, WHETHER SHOWN ON THE DRAWINGS OR NOT, PRIOR TO EXCAVATION. CONTRACTOR SHALL PROTECT ALL UTILITIES IN PLACE UNLESS DESIGNATED FOR REMOVAL OR REPLACEMENT.
5. UNLESS SHOWN OR SPECIFIED OTHERWISE, PAYLINES FOR UNIT PRICE PAY ITEMS ARE BASED ON THE DESIGN LINES. NEAT LINES: SHOWN ON THE DRAWINGS.
6. WHERE THE TERM "PROJECT SITE" IS USED, IT IS UNDERSTOOD TO MEAN THE LIMITS OF SITE DISTURBANCE SHOWN ON THE DRAWINGS. DRMS PERMIT BOUNDARY OR OTHERWISE DESIGNATED BY THE ENGINEER.
7. DURING CONSTRUCTION, MATERIAL REMOVED FROM WITHIN THE RESERVOIR FOOTPRINT AND NOT UTILIZED IN CONSTRUCTION WILL BE HAULED OFFSITE TO THE GRAND COUNTY BENSON GRAVEL PIT.
8. CONTRACTOR SHALL FOLLOW ALL GRAND COUNTY EROSION CONTROL REQUIREMENTS AS STATED IN THE *EROSION AND SEDIMENT CONTROL FOR CONSTRUCTION ACTIVITIES GUIDANCE HANDBOOK* BY KEVIN E. VECCHIARELLI, EGWB EROSION CONTROL PROGRAM, SPRING 2005.
9. AS-BUILT SURVEY PROVIDED BY TIM SHENK LAND SURVEYING, FEBRUARY 2016.

LEGEND:

	INDICATES CROSS SECTION LOCATION. "C" REFERS TO CROSS SECTION DESIGNATION. "C-3" REFERS TO THE SHEET NUMBER WHERE THE SECTION IS SHOWN.
	INDICATES DETAIL LOCATION. "6" REFERS TO THE DETAIL DESIGNATION. "C-8" REFERS TO THE SHEET NUMBER WHERE THE DETAIL IS SHOWN.
	SURVEY CONTROL POINT
	LOCATIONS OF GEI BORINGS (B-201 THROUGH B-403)
	LOCATIONS OF GEI TEST PITS (TP-201 THROUGH TP-205)
	LOCATIONS OF OTHER BORINGS
	MONITORING WELL
	EXISTING TOPOGRAPHIC CONTOUR WITH ELEVATION IN FEET
	SITE ACCESS ROAD
	DRMS 111 PERMIT BOUNDARY (PROJECT BOUNDARY)
	PROPERTY OWNERSHIP BOUNDARY
	WATER SURFACE BOUNDARY
	LIMIT OF DELINEATED WETLANDS
	8" Ø HDPE OUTLET PIPE
	ASSUMED LINE
	SLOPE ARROW, FILL
	SLOPE ARROW, CUT
	APPROXIMATE NEW LINER FOOTPRINT
	EXISTING GROUND
	RESERVOIR FLOOR IMPROVEMENTS WITH BLENDED BENTONITE LAYER
	RESERVOIR FLOOR TO BE EXCAVATED TO TOP OF BEDROCK
	ZONE 1A
	ZONE 1B
	GROUTED RIPRAP
	CONCRETE
	ZONE 1B / ZONE 2

RESERVOIR NO. 2 ELEVATION-AREA-CAPACITY CURVE



RESERVOIR ELEVATION-AREA-CAPACITY TABLE		
ELEVATION (FT)	AREA (ACRES)	STORAGE (AC-FT)
8600	0.19	0.00
8601	0.38	0.40
8602	0.62	0.90
8603	0.88	1.65
8604	1.09	2.64
8605	1.34	3.85
8606	1.55	5.30
8607	1.76	6.96
8608	2.00	8.84
8609	2.21	10.94
8610	2.48	13.28
8611	2.70	15.88
8612	3.09	18.77
8613	3.36	22.00
8614	3.60	25.48
8615	3.76	29.16
8616	3.93	33.00
8617	4.09	37.01
8618	4.26	41.18
8619	4.42	45.52
8620	4.59	50.03
8621	4.77	54.71
8622	4.95	59.57
8623	5.14	64.61
8624	5.34	69.85
8625	5.56	75.30
8626	5.94	81.05

RECORD DRAWINGS

C-1903A

	Attention:			
If this scale bar does not measure 1" then drawing is not original scale.	0	04/16	RECORD DRAWINGS	CMM
	NO.	DATE	ISSUE/REVISION	APP

Designed:	J. DEUTO
Checked:	K. PRICE
Drawn:	C. NIEMELA
Approved By:	C. MASCHING
Approval Date:	

4601 DTC Boulevard
Denver, Colorado 80237
303-662-0100

GCWSD No. 1
50 Vasquez Road
Winter Park, CO 80482

GEI Project 1331330

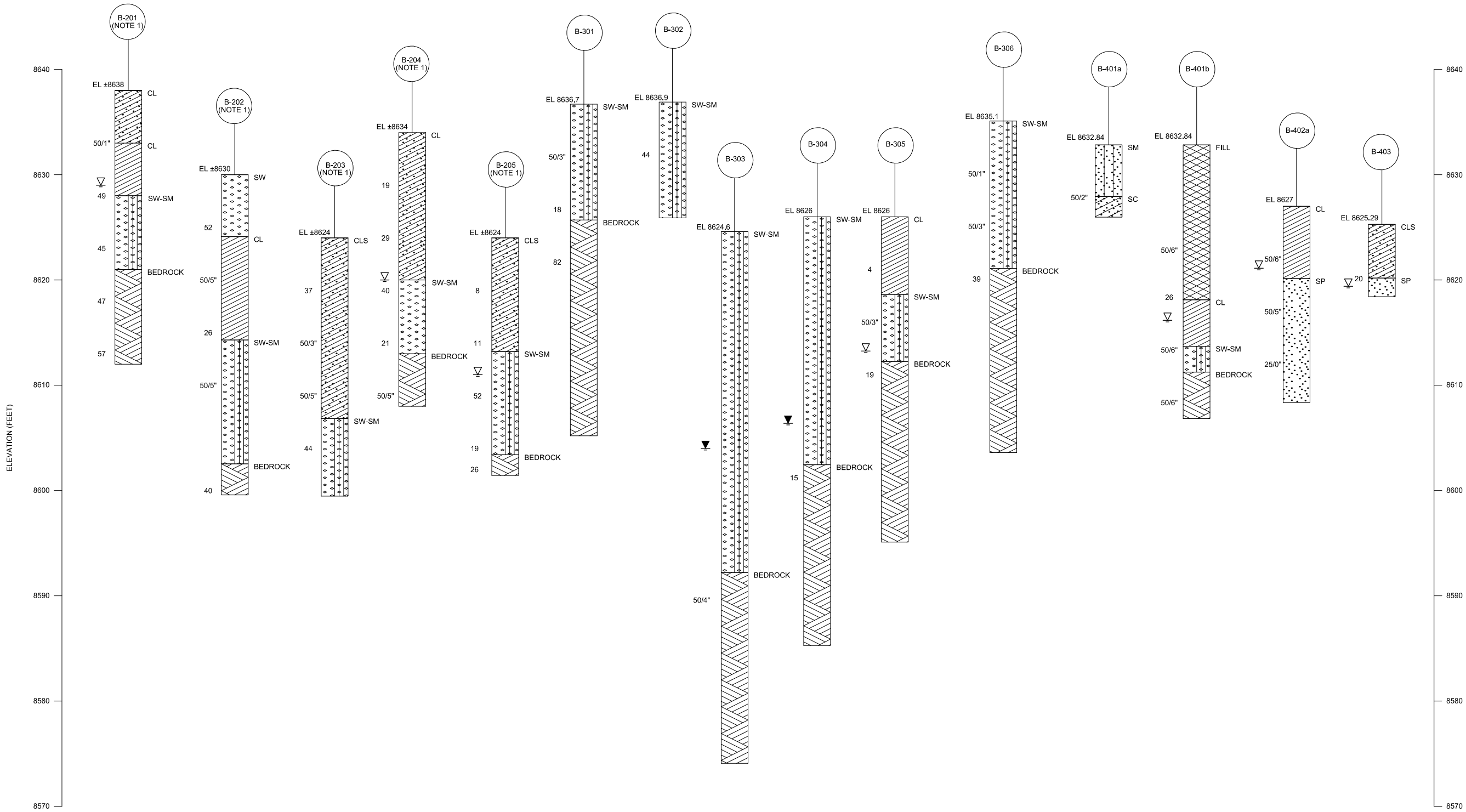
GCWSD #2 Improvements
Fraser, Colorado

DRAWING INDEX, LEGEND,
ABBREVIATIONS,
AND GENERAL NOTES

DWG. NO.
G-2

SHEET NO.
2 of 12

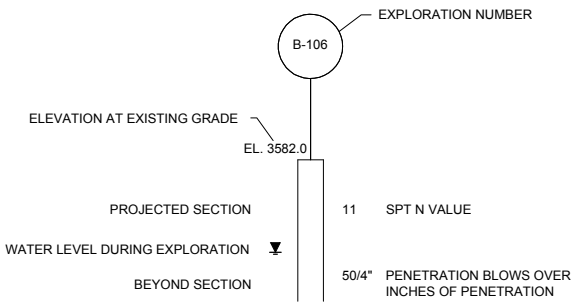
P:\13133 - GCWSD - Reservoir 2 Improvements\Civil\Production Drawings\Working Drawings\G-3 - Summary - Boring Logs.dwg Feb 16, 2016 smickell



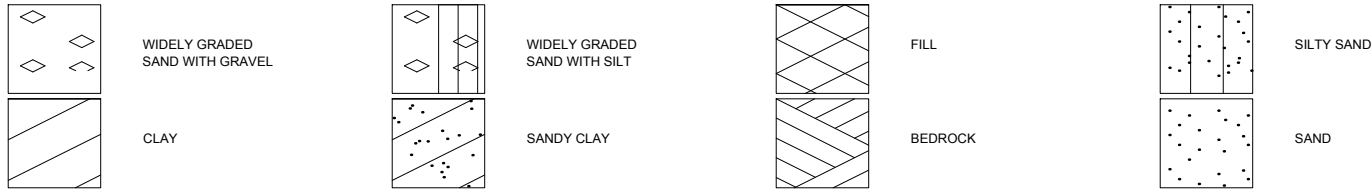
NOTES:

1. SPT N-VALUES FOR ALL B-200 SERIES BORINGS ARE BASED ON MAXIMUM SAMPLER PENETRATIONS OF 12-INCHES.

BORING LEGEND:



MATERIALS LEGEND:



Attention:					
If this scale bar does not measure 1" then drawing is not original scale.					
NO.	DATE	RECORD DRAWINGS		CMM	
		ISSUE/REVISION		APP	

Designed: J. DEUTO
Checked: C. MASCHING
Drawn: C. NIEMELA
Approved By: C. MASCHING
Approval Date:

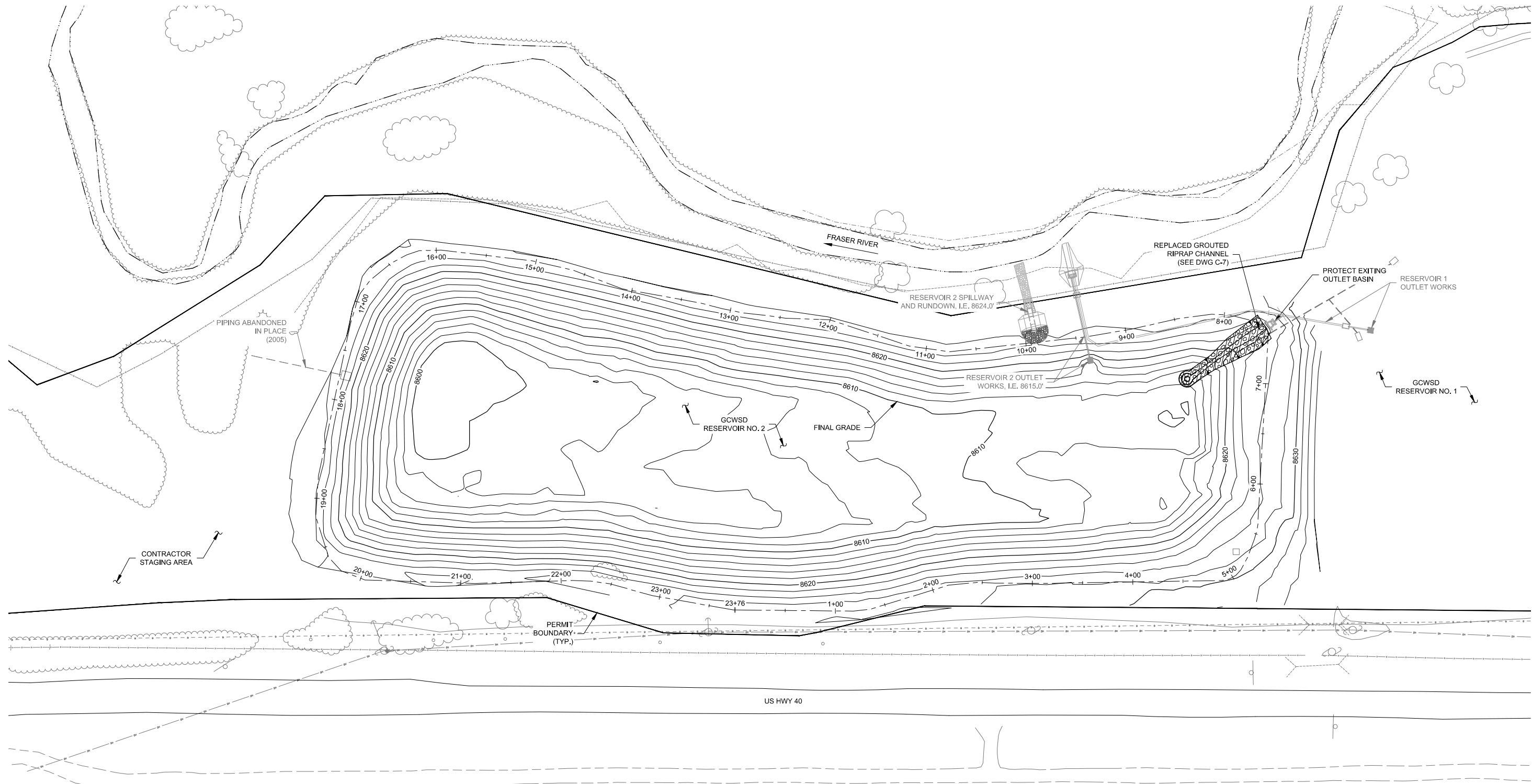


Grand County
Water & Sanitation District #1
GCWSD No. 1
50 Vasquez Road
Winter Park, CO 80482
GEI Project 1331330

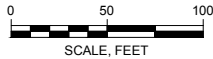
RECORD DRAWINGS C-1903A

GCWSD #2 Improvements Fraser, Colorado	DWG. NO. G-3
SUMMARY BORING LOGS	SHEET NO. 3 of 12

P:\13133 - GCWSD - Reservoir 2 Improvements\Civil\Production Drawings\Working Drawings\C-2 - General Modifications.dwg Feb 16, 2016 smickell



NOTES:
1. ACCESS ROADS NOT SHOWN.



Attention:				
If this scale bar does not measure 1" then drawing is not original scale.				
NO.	DATE	ISSUE/REVISION	APP	
0	04/16	RECORD DRAWINGS	CMM	

Designed: J. DEUTO
Checked: C. MASCHING
Drawn: C. NIEMELA
Approved By: C. MASCHING
Approval Date:

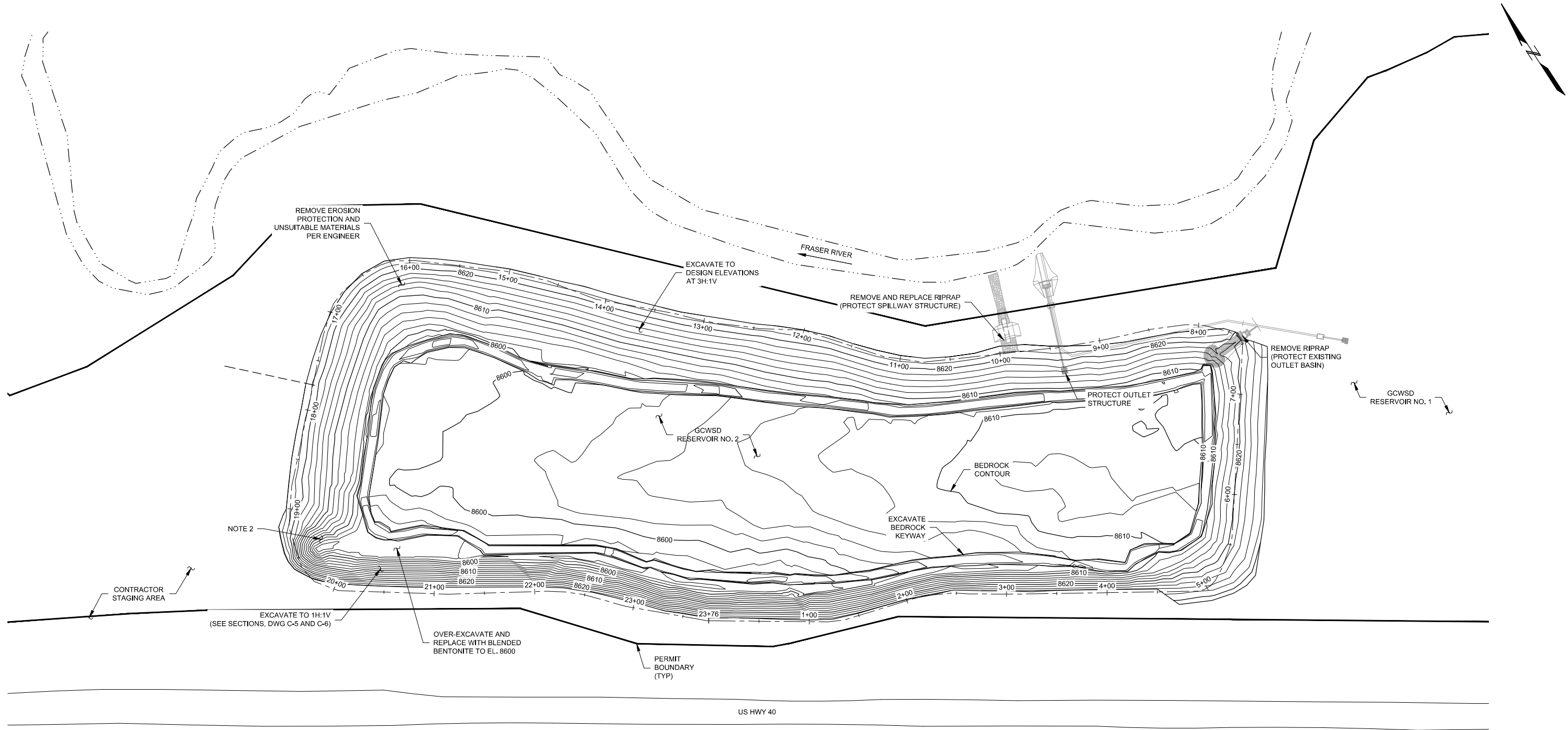


Grand County
Water & Sanitation District #1
GCWSD No. 1
50 Vasquez Road
Winter Park, CO 80482
GEI Project 1331330

RECORD DRAWINGS C-1903A

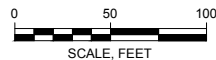
GCWSD #2 Improvements Fraser, Colorado	DWG. NO. C-2
GENERAL MODIFICATION PLAN	SHEET NO. 5 of 12

P:\13133 - GCWSD - Reservoir 2 Improvements\Civil\Production Drawings\C-3 - Stripping Plan.dwg Apr 01, 2016 njorgensen



NOTES:

- ACCESS ROADS NOT SHOWN.
- STRIPPING OF EMBANKMENT BETWEEN STA 19+00 AND STA 19+50 SHALL EXHIBIT A SMOOTH TRANSITION FROM THE 3H:1V SLOPE UP TO STA 19+00, TO THE 0.75H:1V SLOPE PAST STA 19+50.



Attention:				
0	04/16	RECORD DRAWINGS	CMM	
NO.	DATE	ISSUE/REVISION	APP	

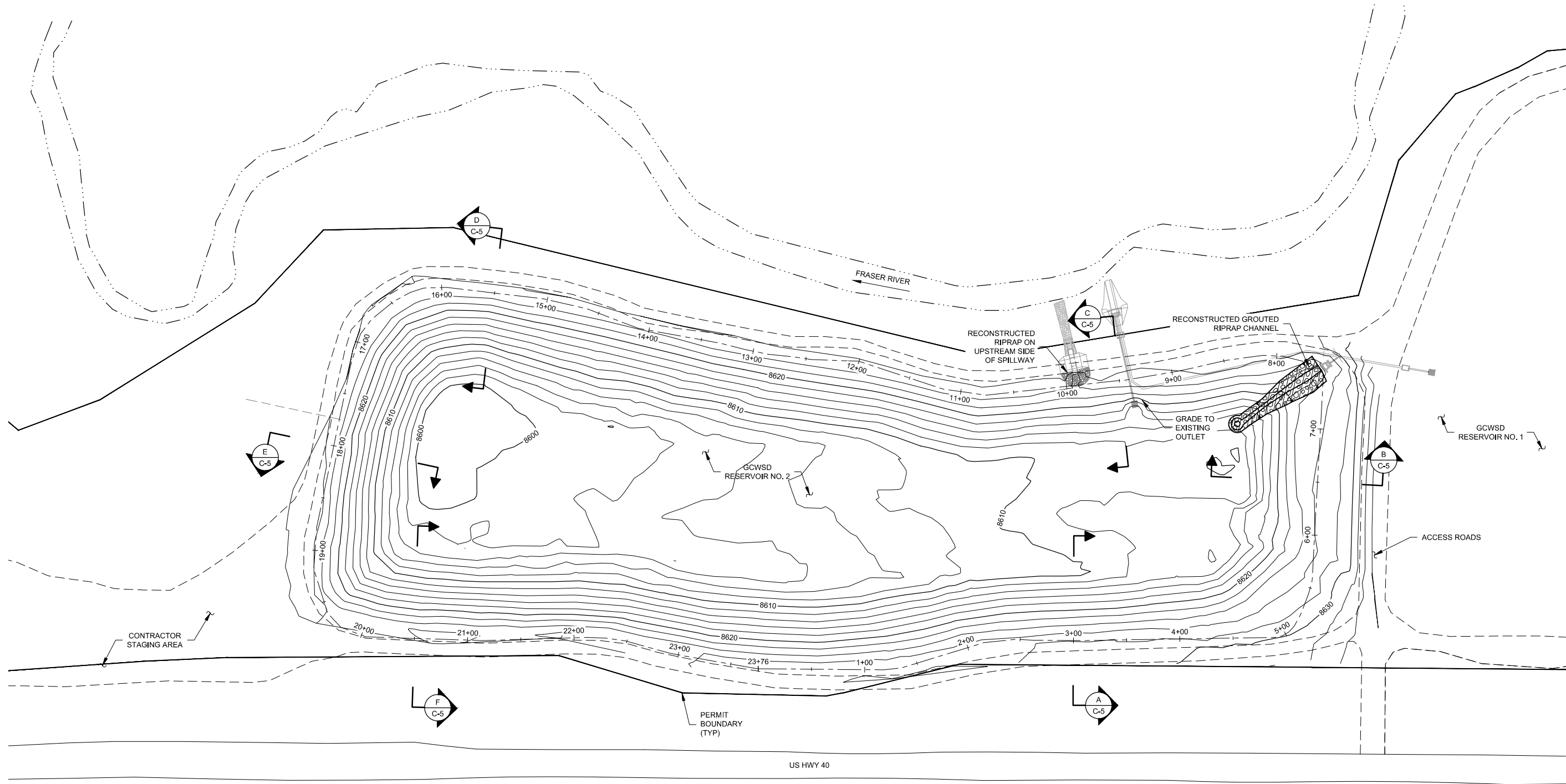
Designed:	J. DEUTO
Checked:	C. MASCHING
Drawn:	C. NIEMELA
Approved By:	C. MASCHING
Approval Date:	

GEI Consultants
4601 DTC Boulevard
Denver, Colorado 80237
303-662-0100

Grand County
Water & Sanitation District #1
GCWSD No. 1
50 Vasquez Road
Winter Park, CO 80482
GEI Project 1331330

RECORD DRAWINGS		C-1903A
GCWSD #2 Improvements Fraser, Colorado		DWG. NO. C-3
STRIPPING PLAN		SHEET NO. 6 of 12

P:\133133 - GCWSD - Reservoir 2 Improvements\Civil\Production Drawings\C-4 - Liner Improvements.dwg Apr 01, 2016 njorgensen



Attention:					
If this scale bar does not measure 1" then drawing is not original scale.					
NO.	DATE	ISSUE/REVISION		APP	
0	04/16	RECORD DRAWINGS		CMM	

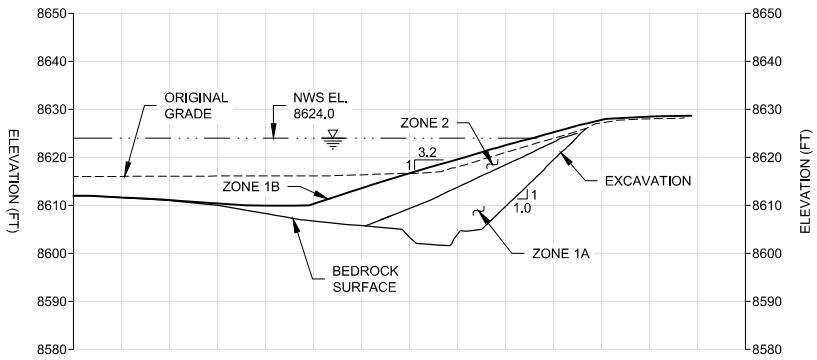
Designed:	J. DEUTO
Checked:	C. MASCHING
Drawn:	C. NIEMELA
Approved By:	C. MASCHING
Approval Date:	

GEI Consultants
4601 DTC Boulevard
Denver, Colorado 80237
303-662-0100

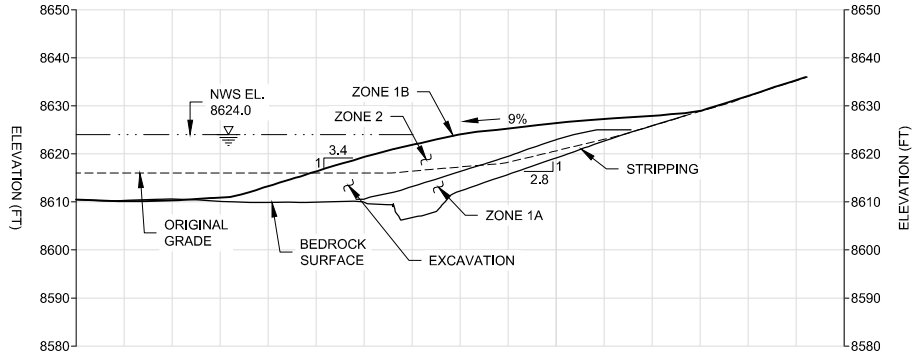
Grand County
Water & Sanitation District #1
GCWSD No. 1
50 Vasquez Road
Winter Park, CO 80482
GEI Project 1331330

RECORD DRAWINGS		C-1903A	
GCWSD #2 Improvements Fraser, Colorado		DWG. NO. C-4	
LINER IMPROVEMENTS		SHEET NO. 7 of 12	

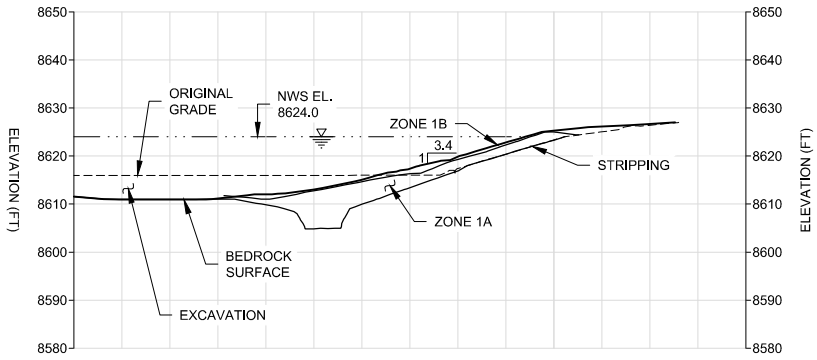
P:\13133 - GCWSD - Reservoir 2 Improvements\Civil\Production Drawings\Working Drawings\C-5 - Embankment Sections.dwg Apr 01, 2016 njorgensen



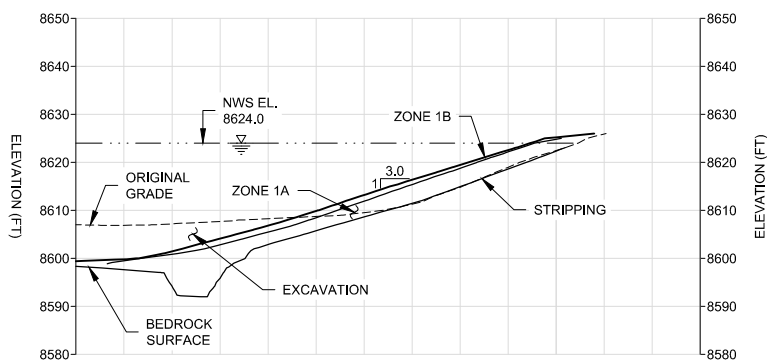
SECTION A
STA. 3+00 C-4



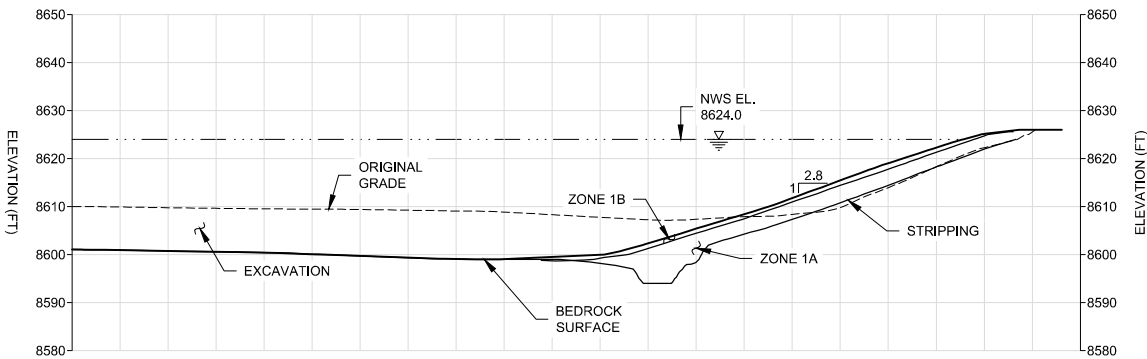
SECTION B
STA. 6+50 C-4



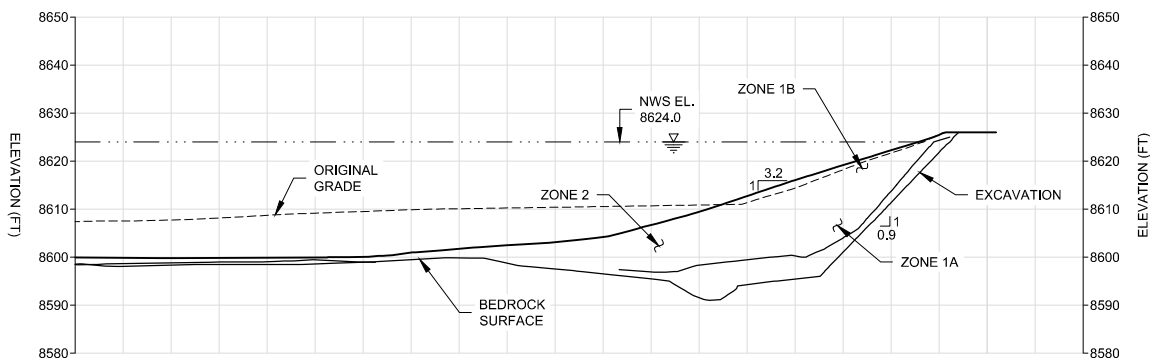
SECTION C
STA. 9+50 C-4



SECTION D
STA. 15+50 C-4



SECTION E
STA. 18+00 C-4



SECTION F
STA. 20+50 C-4



Attention:				
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0	04/16	RECORD DRAWINGS	CMM	
NO.	DATE	ISSUE/REVISION	APP	

Designed:	J. DEUTO
Checked:	C. MASCHING
Drawn:	C. NIEMELA
Approved By:	C. MASCHING
Approval Date:	

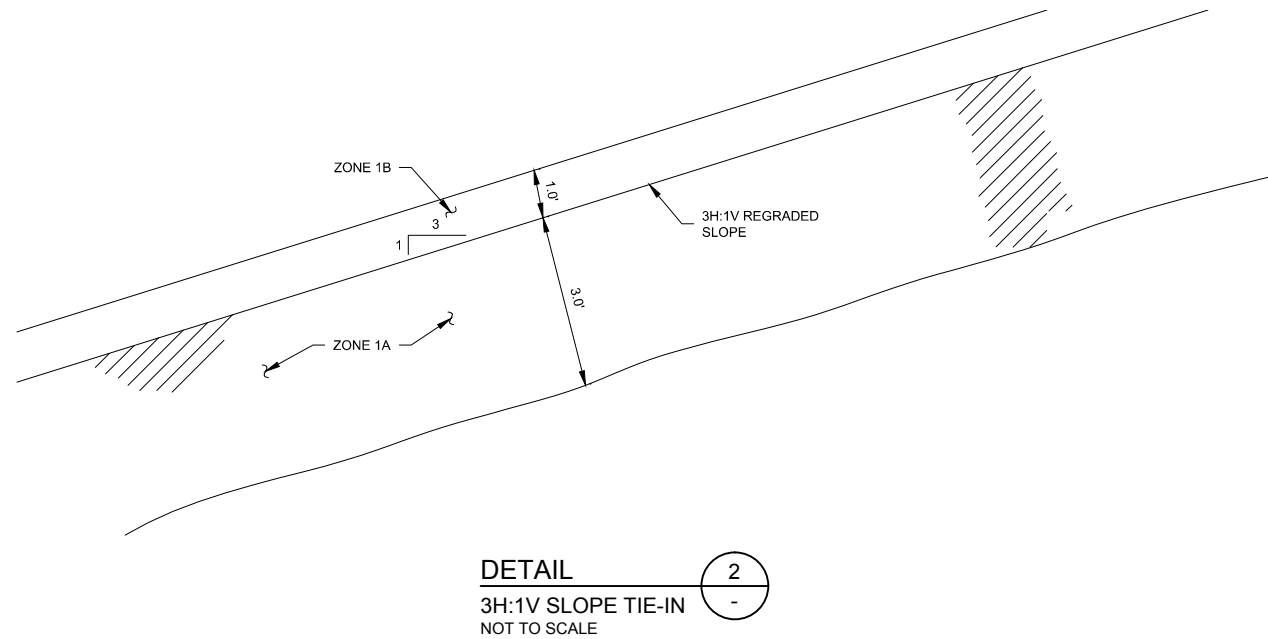
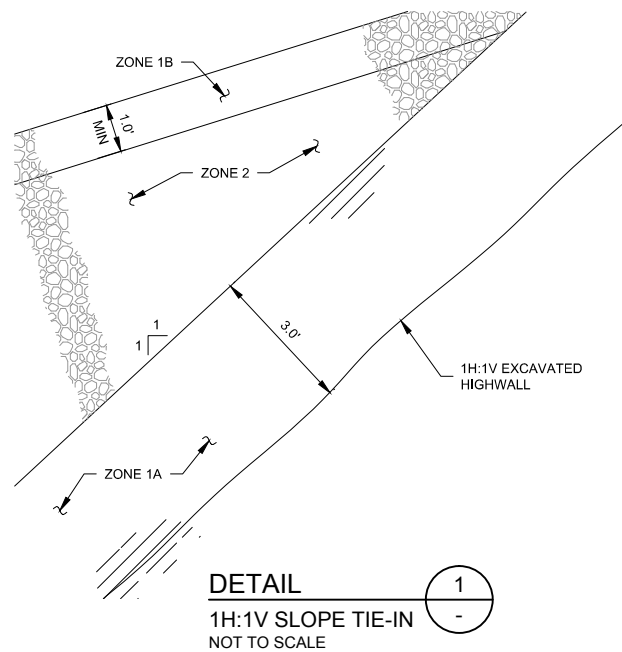
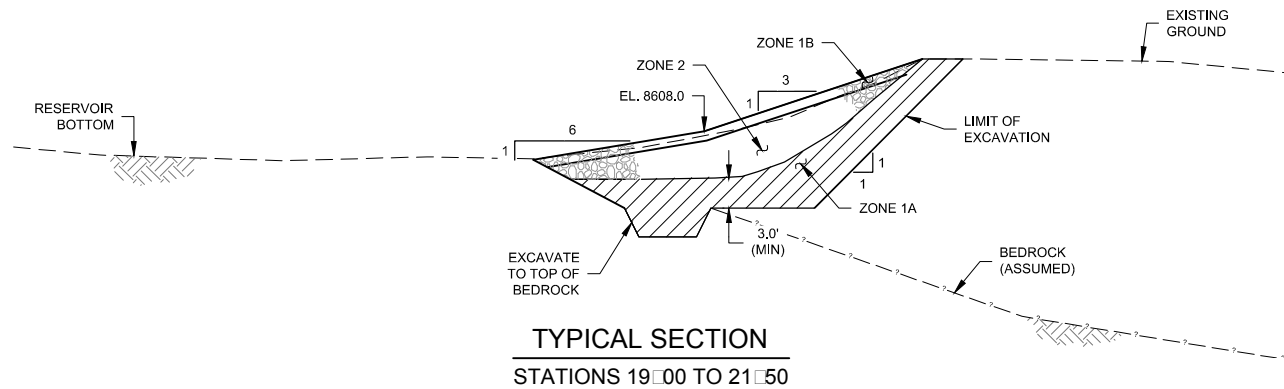
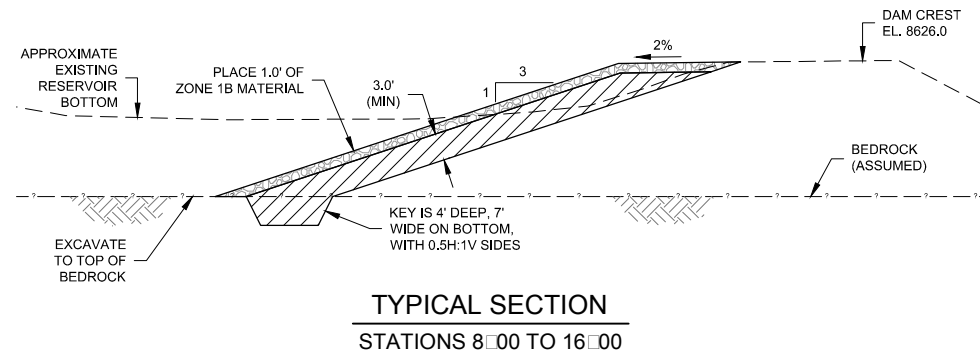
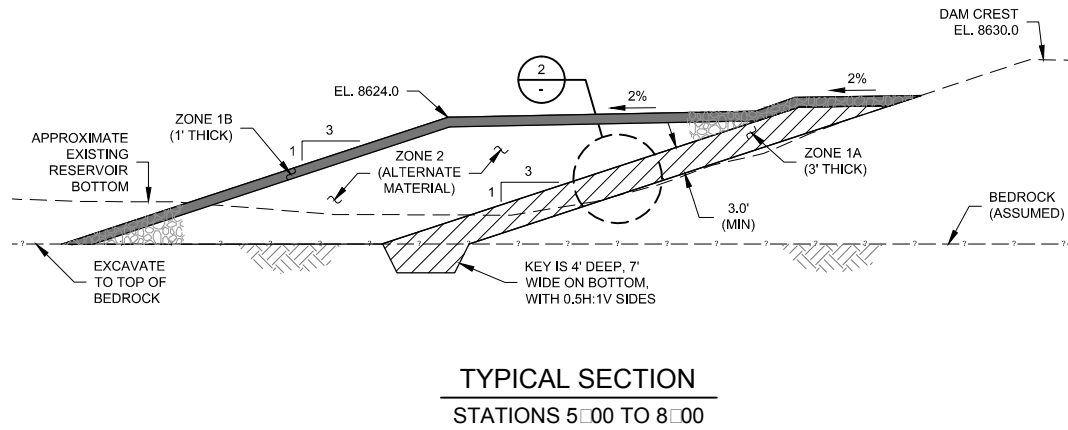
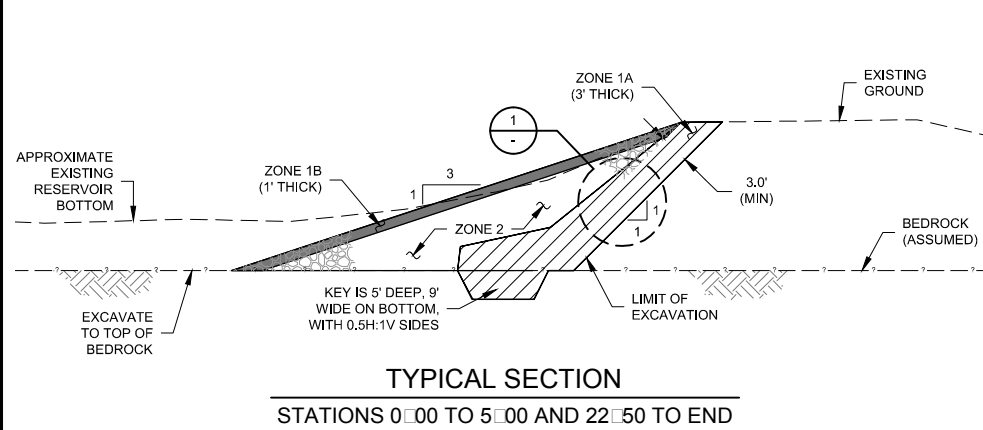


Grand County Water & Sanitation District #1	GCWSD No. 1 50 Vasquez Road Winter Park, CO 80482
GEI Project 1331330	

RECORD DRAWINGS C-1903A

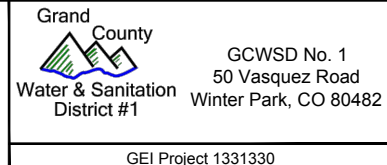
GCWSD #2 Improvements Fraser, Colorado	DWG. NO. C-5
EMBANKMENT SECTIONS	SHEET NO. 8 of 12

P:\13133 - GCWSD - Reservoir 2 Improvements\Civil\Production Drawings\C-6 - Details 1 of 2.dwg Apr 01, 2016 njorgensen



Attention:					
If this scale bar does not measure 1" then drawing is not original scale.					
0	04/16	RECORD DRAWINGS	CMM		
NO.	DATE	ISSUE/REVISION	APP		

Designed:	J. DEUTO
Checked:	C. MASCHING
Drawn:	C. NIEMELA
Approved By:	C. MASCHING
Approval Date:	



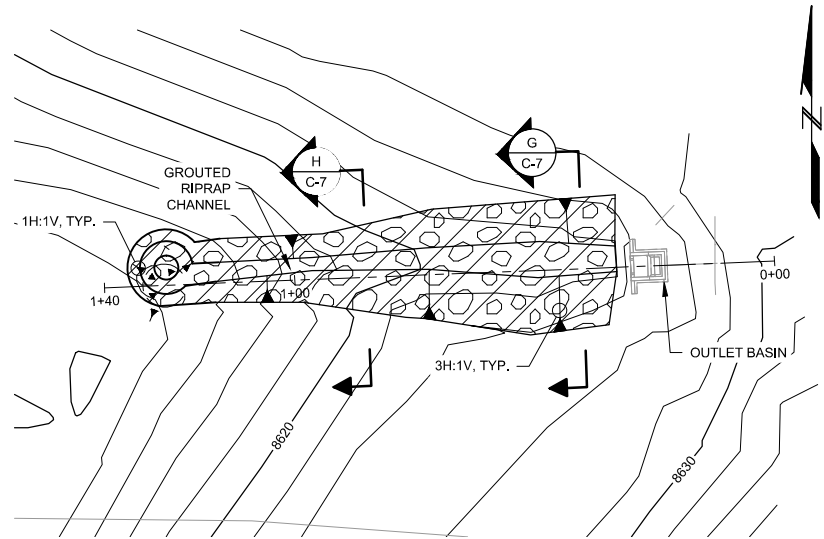
RECORD DRAWINGS C-1903A

GCWSD #2 Improvements
Fraser, Colorado

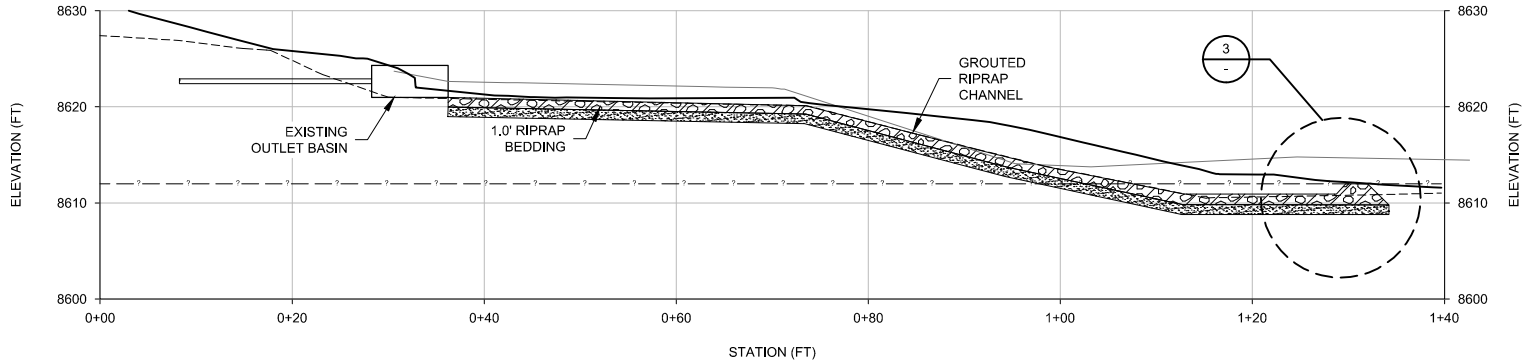
TYPICAL SECTIONS
AND DETAILS
1 OF 2

DWG. NO.
C-6
SHEET NO.
9 of 12

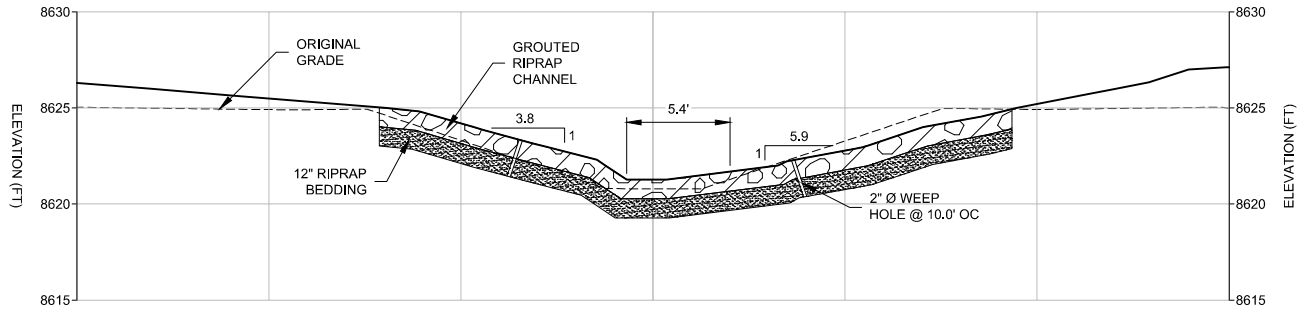
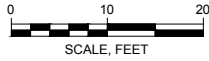
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PLAN
INTERCONNECT RUNDOWN CHANNEL

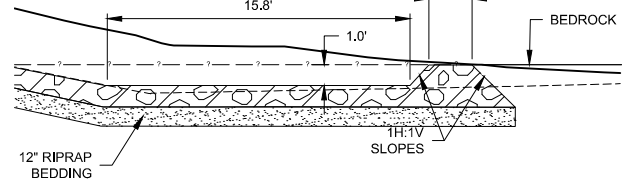


PROFILE
INTERCONNECT RUNDOWN CHANNEL



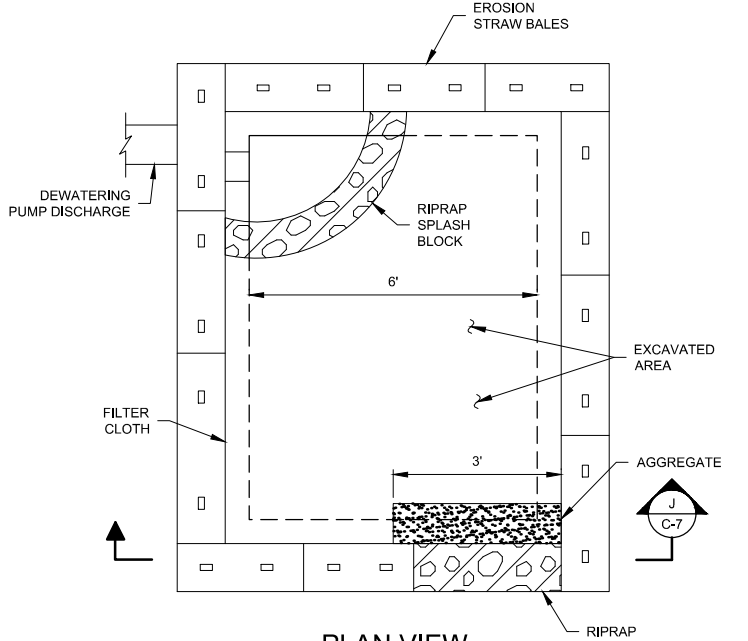
SECTION
RESERVOIR INTERCONNECT

G
C-7

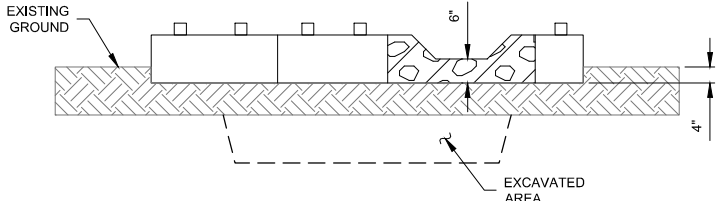


DETAIL
BOTTOM OF RUNDOWN CHANNEL

3
C-7



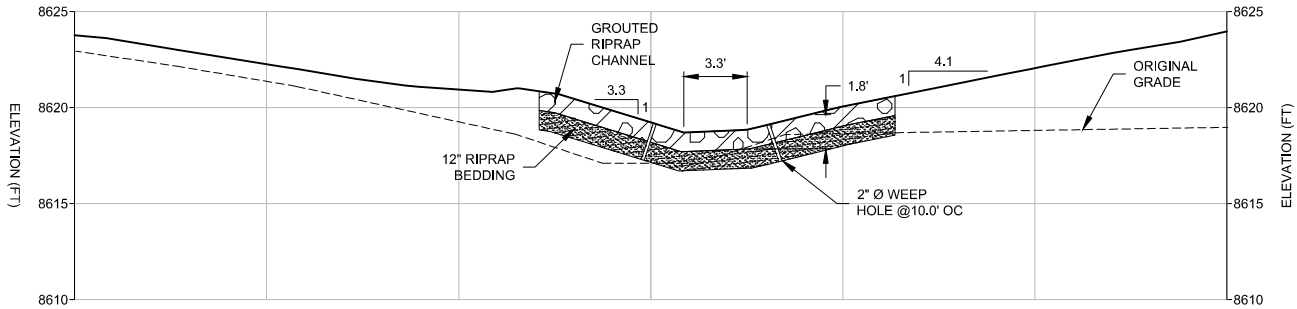
PLAN VIEW



SECTION
J
C-7

TYPICAL DETAIL
DEWATERING STRUCTURE
NOT TO SCALE

- NOTES:
1. ALL SITE DEWATERING ROUTED TO THIS LOCATION.
 2. TEMPORARY STORM WATER DITCHES ROUTED TO DEWATERING STRUCTURE.
 3. COORDINATE PLACEMENT WITH OWNER'S REP.



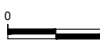
SECTION
RESERVOIR INTERCONNECT

H
C-7



RECORD DRAWINGS

C-1903A

Attention:				
				
If this scale bar does not measure 1" then drawing is not original scale.				
0	04/16	RECORD DRAWINGS	CMM	
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Designed: J. DEUTO
Checked: C. MASCHING
Drawn: C. NIEMELA
Approved By: C. MASCHING
Approval Date:

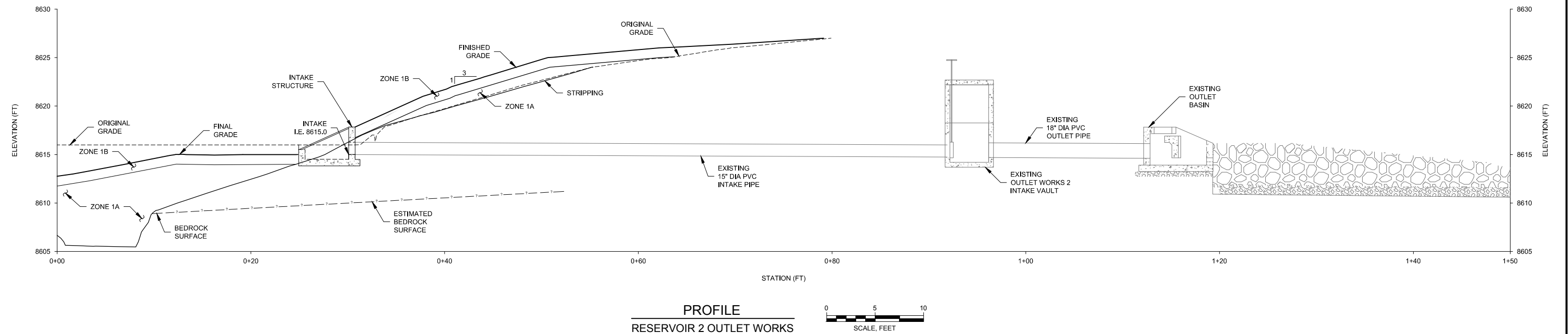
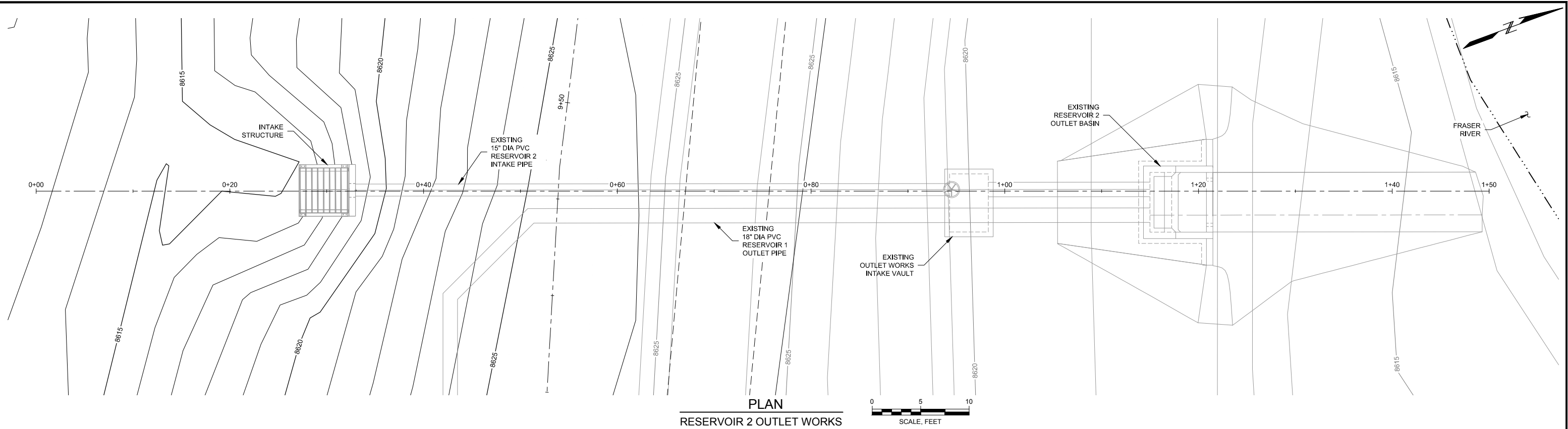
GEI Consultants
4601 DTC Boulevard
Denver, Colorado 80237
303-662-0100

Grand County
Water & Sanitation District #1
GCWSD No. 1
50 Vasquez Road
Winter Park, CO 80482
GEI Project 1331330

GCWSD #2 Improvements
Fraser, Colorado
TYPICAL SECTIONS
AND DETAILS
2 OF 2

DWG. NO.
C-7
SHEET NO.
10 of 12

P:\13133 - GCWSD - Reservoir 2 Improvements\Civil\Production Drawings\C-8 - Outlet Works Plan and Profile.dwg Apr 01, 2016 njorgensen



RECORD DRAWINGS				C-1903A
GCWSD #2 Improvements Fraser, Colorado				DWG. NO. C-8
OUTLET WORKS PLAN AND PROFILE				SHEET NO. 11 of 12

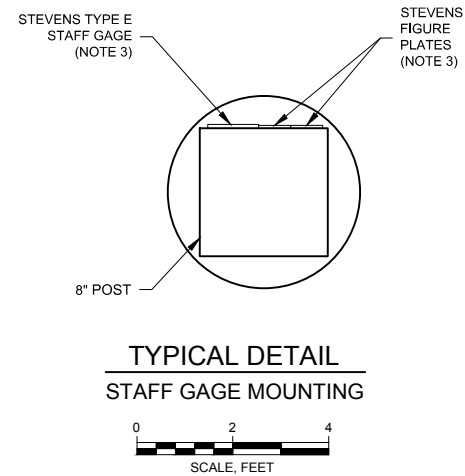
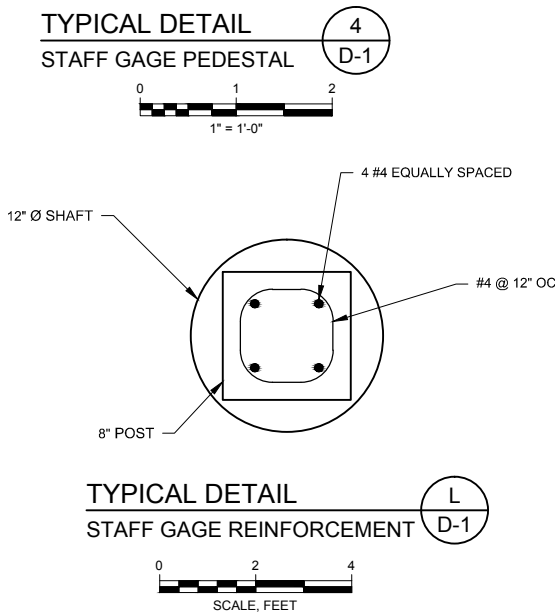
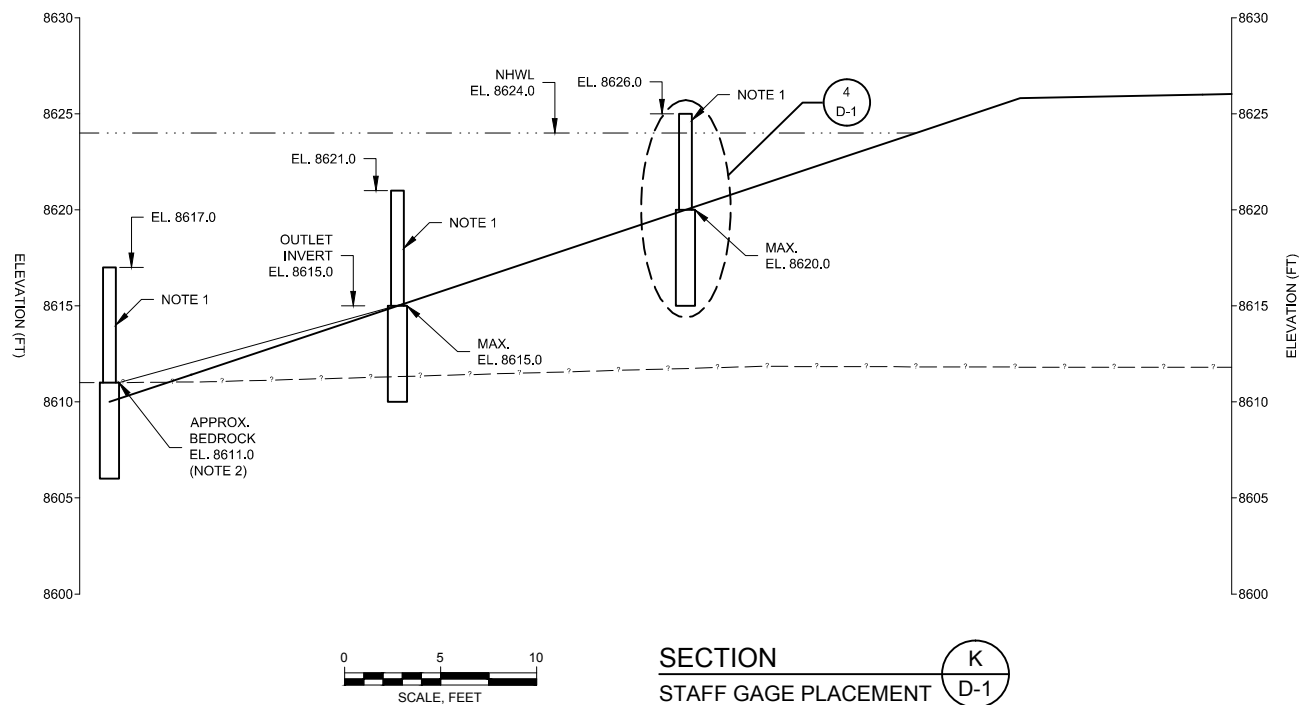
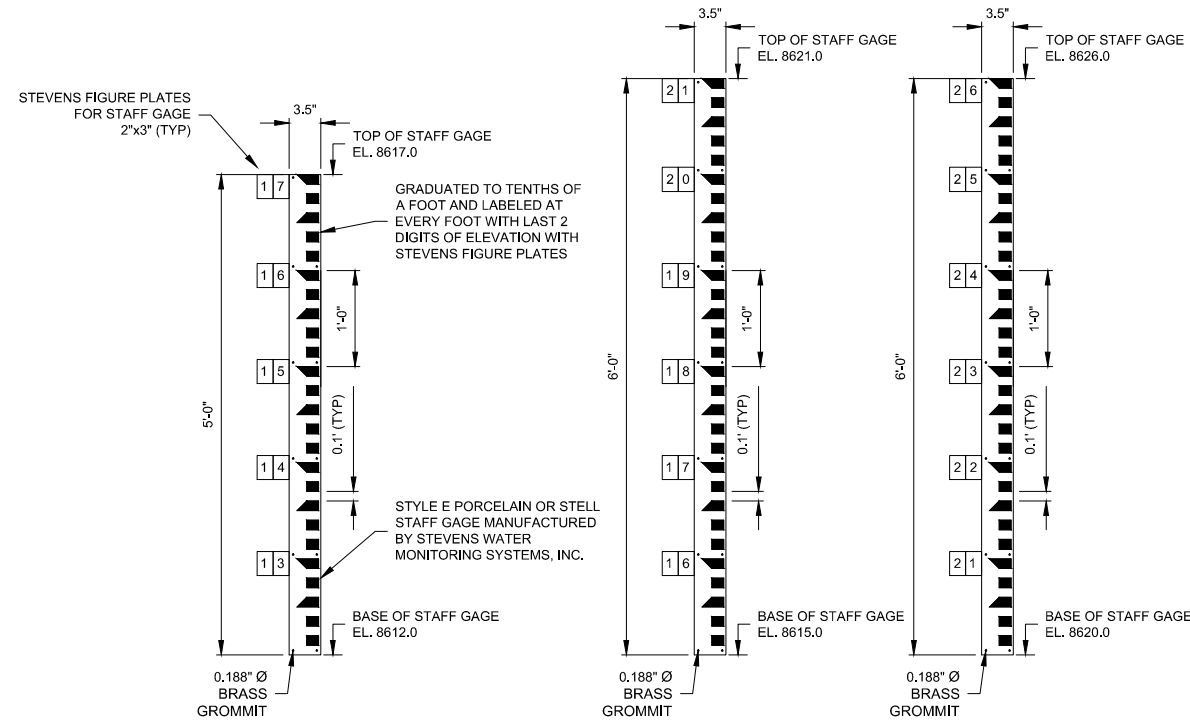
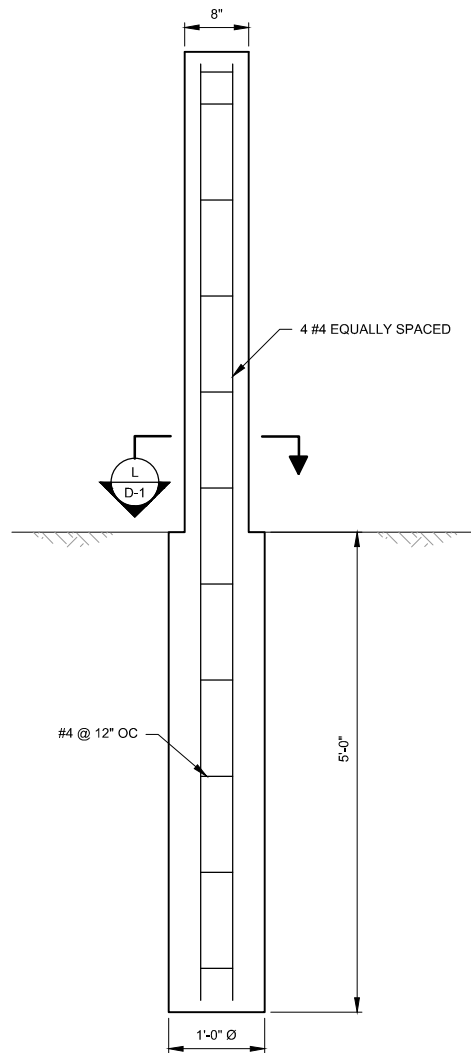
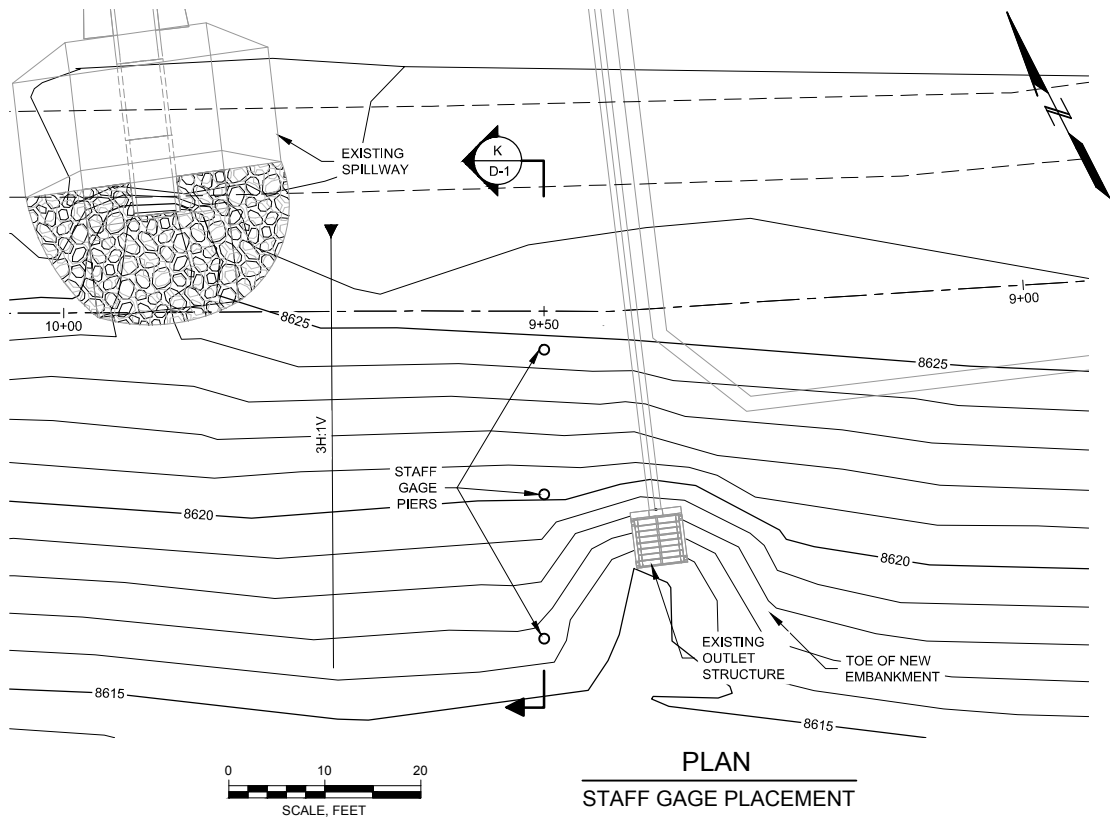
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If this scale bar does not measure 1" then drawing is not original scale.				
0	04/16	RECORD DRAWINGS	CMM	
NO.	DATE	ISSUE/REVISION	APP	

Designed:	J. DEUTO
Checked:	C. MASCHING
Drawn:	C. NIEMELA
Approved By:	C. MASCHING
Approval Date:	

GEI Consultants
4601 DTC Boulevard
Denver, Colorado 80237
303-662-0100

Grand County
Water & Sanitation District #1
GCWSD No. 1
50 Vasquez Road
Winter Park, CO 80482
GEI Project 1331330

P:\13133 - GCWSD - Reservoir 2 Improvements\Civil\Production Drawings\Working Drawings\D-1 - Staff Gage Plan.dwg Apr 01, 2016 njorgensen



NOTES:

1. ATTACH STEVENS TYPE E STAFF GAGE WITH REDWOOD WITH U-BOLT. USE STEVENS ELEVATION PLATES. FACE UPSTREAM.
2. TOE ELEVATION WILL BE BASED ON ACTUAL SITE CONDITIONS
3. AFFIX STEVENS TYPE E STAFF GAGE AND FIGURE PLATES TO CONCRETE PILLAR WITH EPOXY AND BOLTS.

Attention:				
0 1"				
If this scale bar does not measure 1" then drawing is not original scale.				
0	04/16	RECORD DRAWINGS	CMM	
NO.	DATE	ISSUE/REVISION	APP	

Designed:	J. DEUTO
Checked:	C. MASCHING
Drawn:	N. JORGENSEN
Approved By:	C. MASCHING
Approval Date:	SEPTEMBER 2015



Grand County Water & Sanitation District #1	GCWSD No. 1 50 Vasquez Road Winter Park, CO 80482
GEI Project 1313330	

RECORD DRAWINGS

C-1903A

GCWSD #2 Improvements
Fraser, Colorado

STAFF GAGE PLAN, SECTION,
AND DETAIL

DWG. NO.
D-1

SHEET NO.
12 of 12

Appendix C Permits



COLORADO
Division of Water Resources
Department of Natural Resources

Dam Safety Branch

July 2, 2015

Mr. Chad Masching, P.E.
GEI Consultants, Inc.
4601 DTC Blvd., Ste 900
Denver, CO 80237
cmasching@geiconsultants.com

VIA EMAIL

When replying, please refer to:
GCWSD #2, DAMID 510210
Water Division 5, Water District 51
Construction File No. C-1903A

SUBJECT: Approval of Plans and Specifications for the GCWSD #2 Enlargement and Lining Project

Dear Mr. Masching,

Thank you for submitting plans and specifications for the proposed enlargement and lining of GCWSD #2 Reservoir/Dam for approval by the Office of the State Engineer. GCWSD #2 is located between the towns of Fraser and Winter Park in Grand County, Colorado. This project involves deepening the current reservoir bottom to bedrock and lining the banks to decrease permeability. We have completed our review of the design and construction documents and found them acceptable for construction. We are transmitting one copy each of the construction drawings and specifications with approval signatures digitally as digitally signed PDF files. Our acceptance and approval of these documents are effective as of the date of this letter.

The construction of this project must be performed under the purview of a professional engineer registered in the State of Colorado. Your attention is directed to Rule 9.2 (copy enclosed) of the Rules and Regulations concerning construction observations, coordination and documentation activities required for this minor size, low hazard Dam. Please keep Ms. Dana Miller of our Steamboat Springs office at (970) 879-0272 ext. 6014 informed of the construction status so she may also meet our obligations under Rule 9. Once you have assembled the drawings and specifications packages for construction, please coordinate with Dana on the number and size of reproductions she will need in order to facilitate her Rule 9 responsibilities.



Mr. Chad Masching, P.E.
GCWSD #2 Construction Approval Letter
DAMID 510210, Construction File No. C-1903A
July 2, 2015
Page 2 of 2

Please submit "As-Constructed" documents including mylar reproductions of the approved drawings with a wet signature and date on the "as-constructed" statement. In addition, please include one set of drawings in PDF format, upon completion of construction. Final acceptance of the construction will be contingent upon our receipt and acceptance of the "As-Constructed" drawings, as well as the other requirements of Rule 10 (copy enclosed) of the Rules and Regulations.

We are also requesting that you submit the final payment information for the completed project along with your Rule 10 submission; the Dam Safety Branch is developing a dam construction cost database and your final cost information will be utilized anonymously in that database. The database when fully developed will be used as a resource for dam engineers and dam owners statewide.

We look forward to working with GEI and the Grand County Water and Sanitation District No. 1 on the successful completion of this project. Please do not hesitate to contact me at (719) 530-5536 if you have any questions concerning this matter or any other dam safety related issues.

Sincerely,



William T. McCormick, III, P.E., P.G.
Chief, Dam Safety Branch
for, Deputy State Engineer

Enc: Copies of Rule 9 and 10 of the "Rules and Regulations for Dam Safety and Dam Construction"

ec: Alan Martellaro, Division Engineer
Neal Misbach, Division 5 Lead Water Commissioner
Sue Avre, District 51 Water Commissioner
Dana Miller, Dam Safety Engineer
Jeremy Franz, Design Review Engineer





COLORADO

Division of Reclamation,
Mining and Safety

Department of Natural Resources

1313 Sherman Street, Room 215
Denver, CO 80203

June 10, 2015

Mr. Bruce Hutchins
Grand County Water and Sanitation District Number 1
P.O. Box 3077
Winter Park, CO 80482

Re: GCWSD No. 1 Reservoirs 1 and 2, M-2015-019, Permit Issuance - County Construction Material Operation

Dear Mr. Hutchins:

On June 10, 2015 the Division of Reclamation, Mining and Safety, ("Division") found Grand County Water and Sanitation District Number 1 to have satisfied the applicable requirements of C.R.S. 34-32.5-101 et seq. for obtaining a mining and reclamation permit. Two signed originals of the permit have been executed. We have kept one copy for our files and are enclosing one copy for your use. It is your responsibility to comply with all of the terms of the permit.

1. All of the original application materials, as amended and supplemented, are an integral part of your permit and are incorporated into the permit by reference. We presume that you have a copy of all of these materials; therefore, none have been enclosed with this mailing. We suggest that you keep a copy of the permit and the permit application at the mining operation as a reference for operating personnel to help ensure compliance with the terms of the permit.

2. Changes in the mining and reclamation operations that differ from those described in the permit may require a modification to the permit. We suggest consulting the Construction Materials Rules and Regulations and/or contacting us to determine if a revision to the permit is necessary. Rule 1.10 pertains to Amendments, Rule 1.9 to Technical Revisions, and Rule 1.11 to Conversions.

3. On your permit anniversary date each year, June 10, you must submit an annual fee and an annual report to the Division. The annual fee for this permit is \$504.00. Please consult the Act, Rules and Regulations, and your permit for specific annual report requirements applicable to your mine.

If you have any questions, please contact the Division.

Sincerely,

VIRGINIA BRANNON
Division Director

Enclosure

Certified Mail No. 7014 0150 0000 9138 1350, return receipt requested
cc: Jeremy Deuto, GEI Consultants, Inc.





COLORADO

Division of Reclamation,
Mining and Safety

Department of Natural Resources

1313 Sherman Street, Room 215
Denver, CO 80203

MINING AND RECLAMATION PERMIT COUNTY CONSTRUCTION MATERIAL MINING OPERATIONS

Permit Number: M-2015-019

Type of Permit: 111

Permit Date: June 10, 2015

(Anniversary date for annual report and fees purposes)

THIS PERMIT is issued by the Mined Land Reclamation Board, Department of Natural Resources, State of Colorado.

RECITALS

A. The Permittee, Grand County Water and Sanitation District Number 1, desires to conduct a mining operation known as GCWSD No. 1 Reservoirs 1 and 2, for the purpose of extracting Sand and gravel. Unless this permit is modified or a separate permit is issued to cover the mining and/or recovery of other minerals or extractive products, the Permittee will not mine or recover any other commodities at this site.

B. On June 10, 2015 the Mined Land Reclamation Board (the "Board") approved the Permittee's application for this permit and directed that this permit be issued upon the filing with the Division of Reclamation, Mining and Safety (the "Division") of performance warranty approved by the Division. Said warranty has been filed with the Division.

C. If the Permittee desires to extract materials other than those listed in (A), a separate permit or a permit modification may be required.

D. On June 10, 2015 the Board made the following findings:

1. The application for this permit complies with the requirements of the Colorado Mined Land Reclamation Act for the Extraction of Construction Materials, C.R.S. 34-32.5-101 et seq., as amended, and with all applicable local, state and federal laws;

2. The operation will not adversely affect the stability of any significant, valuable, and permanent man-made structure located within two hundred feet of the Affected Land, except where there is an agreement between the Operator and the persons having an interest in the structure that damage to the structure is to be compensated for by the Permittee if such an agreement cannot be reached, an engineering analysis establishes no damage will occur to the structure to the satisfaction of the Division; and;



3. The proposed mining and reclamation operations can be carried out in conformance with the requirements of the Act, and the Construction Material Rules and Regulations.

E. The Permittee has made a showing satisfactory to the Board that: 1) it will employ, during and after its underground mining and/or surface operations, procedures designed to minimize environmental disturbance from such operation; 2) it will provide for reclamation of the Affected Lands appropriate to the subsequent beneficial use of such lands; and 3) in the event of the failure of its proposed reclamation plan, it will take whatever measures may be necessary to assure the success of reclamation of the lands affected by such operations in accordance with the Act.

F. A copy of the Permittee's application, as amended and supplemented, has been approved by the Board and is, by this reference, incorporated herein.

G. The issuance of this permit does not relieve the Permittee from having to comply with all applicable Federal, State and County statutes, including State water law.

GRANTS, CONDITIONS AND AGREEMENTS

The Board, in reliance upon the representations and promises made in the permit application, as amended and supplemented, and the performance warranty, hereby issues a life of the mine permit to the Permittee, to engage in the operations described in the application on certain lands lying in the County of Grand, State of Colorado. These lands are described in the permit application, as amended and supplemented, and are referred to herein as the "Affected Lands".

This permit is issued subject to the following conditions and agreements:

1) The Permittee will be bound by all applicable requirements of the Act, and all applicable rules and regulations of the Board, as amended from time to time, the terms of the permit application, and the terms of the performance warranty filed with the Division.

2) The Permittee will file with the Division its annual report and fees on each anniversary date of this permit.

3) If analyses of the mining and reclamation operation and the data collected through monitoring and experimentation by the Permittee or monitoring by the Division indicate that the operation will not be able to comply with the requirements of the Act and applicable rules and regulations of the Board, the Permittee hereby agrees to exercise its best efforts, after consulting with the Division, to modify the plans to correct such deficiencies in the future. Such modifications may require technical revisions or amendments to the permit.

4) The Board or its authorized representative may enter upon the lands of the permitted operation at all reasonable times for the purpose of inspection to determine whether the provisions of the Act, Rules and Regulations, and permit have been complied with pursuant to C.R.S. 34-32.5-121.

5) This permit may be revoked or suspended for non-compliance with the Act or applicable rules or regulations promulgated by the Board, the permit, or by violation of a Board Order.

6) a) Pursuant to 34-32.5-118(5) of the Act, the Board has a right of entry to reclaim the lands affected by the operation or to respond to an emergency as defined by C.R.S. 34-32.5-121(2).

b) The Board will enter the lands to perform reclamation only if the Board has determined that:

i. reclamation required by the permit, statute, or regulations to be performed upon such lands has not been performed, or

ii. permit revocation proceedings described in the Act or similar provisions of subsequent laws, if any, have been initiated.

c) The Division, acting for the Board, will enter lands to respond to an emergency only where the Division determines that any of the conditions of Construction Material Rule 8.4.2 exist.

7) The additional conditions set forth in the attached rider, if any, are incorporated herein by reference.

/___/ a) Rider is attached.

/ XX / b) No rider is attached.

MINED LAND RECLAMATION BOARD
COLORADO DEPARTMENT OF NATURAL RESOURCES


for

VIRGINIA BRANNON
Division Director



Bruce Hutchins, Dist Mgr
Grand County Water Sanitation Dist 1
PO Box 3077
Winter Park, CO 80482

Memorandum

TO: Grand County Water Sanitation Dist 1

FROM: Margo Griffin, Permit Writer 303-692-3607
or (contacts) Debbie Jessop Tech IV 303-692-3590, Karen Harford 303-691-4019, Loretta Houk 303-692-3531

DATE: June 5, 2015

RE: Certification, Colorado Discharge Permit System - Construction Dewatering Discharges
Fact Sheet and Information for Permit Number COG070000 Certification Number: COG075141
Permittee-Facility: Grand County Water Sanitation Dist 1 - Augmentation Reservoir 2 Grand County

ATTACHMENTS:

Certification COG075141
CDPS General Permit for Construction Dewatering Discharges

The Water Quality Control Division (the division) has reviewed the application submitted for the Augmentation Reservoir 2 Grand County facility and determined that it qualifies for coverage under the CDPS General Permit for Construction Dewatering Discharges (the permit).

Attached is your Certification to discharge under the CDPS General Permit for Construction Dewatering Discharges along with a copy of the general permit. This Certification authorizes you to discharge in accordance with the conditions of the general permit and provides site-specific monitoring requirements per Part I.B of the permit. You are required to comply with the requirements included in the general permit as well as the Certification.

DISCHARGE SPECIFIC INFORMATION

The discharge is to the Fraser River within Segment 10b of the Upper Colorado Sub-basin, Upper Colorado River Basin, found in the Classifications and Numeric Standards for the Upper Colorado River Basin (Regulation No. 33) (COUCUC10b). Segment 10b is Reviewable, and is classified for the following beneficial uses: Aquatic Life, Class 1 Cold; Recreation Class E; Water Supply; and Agriculture.

The discharge is also to the Augmentation Pond 1 which is tributary to the Fraser River within Segment 13 of the Upper Colorado Sub-basin, Upper Colorado River Basin, found in the Classifications and Numeric Standards for the Upper Colorado River Basin (Regulation No. 33) (COUCUC13). Segment 13 is Reviewable, and is classified for the following beneficial uses: Aquatic Life, Class 1 Cold; Recreation Class E; Water Supply; and Agriculture.

Applicable surface water standards are included in the permit certification.

BASIS FOR SITE SPECIFIC PARAMETERS

- All discharges to the Colorado River Basin require sampling and monitoring for Total Dissolved Solids as required by the Colorado River Salinity Standards (Regulation No. 39).

FEE INFORMATION

The Annual Fee for this certification is \$500 [category 7, subcat 2 - Construction Dewatering per CRS 25-8-502] and is invoiced every July. Do Not Pay This Now. The initial invoice will be prorated and sent to the legal contact shortly.



DISCHARGE MONITORING REPORTS (DMRs)

- **Discharge Monitoring Reports (DMRs) for Defined Discharge Locations:** DMRs will be mailed to the permittee within the next month for each of the numbered defined discharge outfalls identified in the permit certification. DMRs for all outfalls must be submitted **monthly** as long as the certification is in effect. DMRs must be submitted for each outfall even if there was not a discharge from the outfall in a given month. For each outfall where no discharge occurs in a given month, the permittee shall mark 'No Discharge' on the DMR form(s). The permittee shall provide the division with any additional monitoring data on the permitted discharge collected for entities other than the division. If forms have not been received, please contact the division at 303-692-3517.

The division now has the ability to allow facility's to submit their DMRs electronically. For more information, please call the NetDMR team at 303-691-4046 or CDPHE.WQNetDMRHelp@state.co.us.

CHEMICAL USAGE

The permittee did not specify any chemicals for use in waters that may be discharged. On this basis, no chemicals are approved under this permit. Prior to use of any applicable chemical, the permittee must submit a request for approval which includes the most current Material Safety Data Sheet (MSDS) for that chemical. Until approved, use of a chemical in waters that may be discharged could result in discharge of pollutants not authorized under the permit.

CERTIFICATION RECORDS INFORMATION:

The following information is what the division records show for this certification.

For any changes to Contacts - Legal, Local, Billing, or DMR - a "Notice of Change of Contacts form" must be submitted to the division. This form is also available on our web site and must be signed by the legal contact.

Facility: Augmentation Reservoir 2 Grand County

County: Grand

Activity Description: Deepen and expand storage in Augmentation Reservoir 2

SIC Code: 1799

Other CDPS Permits for this Facility: Stormwater Discharges Associated with Construction Activity:

Legal Contact *Receives all legal documentation, pertaining to the permit certification. [including invoice; is contacted for any questions relating to the facility; and receives DMRs as appropriate*

Bruce Hutchins, Dist Mgr

Phone number: 970-726-5583

Grand County Water Sanitation Dist 1

Email: bhutchins@gcws1.com

PO Box 3077

Winter Park, CO 80482

Facility Contact *(contacted for general inquiries regarding the facility):*

Bruce Hutchins, Dist Mgr

Phone number: 970-726-5583

Grand County Water Sanitation Dist 1

Email: bhutchins@gcws1.com

PO Box 3077

Winter Park, CO 80482

Billing Contact *(receives the invoice pertaining to the permit certification):*

Bruce Hutchins, Dist Mgr

Phone number: 970-726-5583

Grand County Water Sanitation Dist 1

Email: bhutchins@gcws1.com

PO Box 3077

Winter Park, CO 80482

DMR Contact :

Bruce Hutchins, Dist Mgr

Phone number: 970-726-5583

Grand County Water Sanitation Dist 1

Email: bhutchins@gcws1.com

PO Box 3077

Winter Park, CO 80482

For answers to common questions surrounding construction dewatering, please review the Construction Dewatering FAQ available on our website at: www.Coloradowaterpermits.com. Select Construction and Construction Compliance Assistance and Guidance.



COLORADO

Department of Public
Health & Environment

CERTIFICATION TO DISCHARGE UNDER CDPS GENERAL PERMIT COG070000 CONSTRUCTION DEWATERING DISCHARGES

Certification Number: COG075141

This Certification to Discharge specifically authorizes:

Grand County Water Sanitation Dist 1
to discharge from the facility identified as
Augmentation Reservoir 2 Grand County
to: Fraser River and/or Augmentation Pond 1

Facility Located at: 77101 US 40 Fraser, CO 80442, Grand County
Center Point Latitude 39.939508 Longitude -105.800069

Defined Discharge Outfall(s) to Surface Water	Outfall(s) Lat Long	Discharge Outfall(s) Description*	Receiving Stream
Outfall Number 001-A	39.939533, - 105.801964	The construction dewatering effluent will be discharged to the Fraser River. Sampling and monitoring shall occur prior to discharge to the river.	Fraser River
Outfall Number 002-A	39.938967, - 105.798256	The construction dewatering effluent will be discharged to the Augmentation Pond 1. Sampling and monitoring shall occur prior to discharge to the pond.	Augmentation Pond 1

*All discharges must comply with the lawful requirements of federal agencies municipalities, counties, drainage districts and other local agencies regarding any discharges to storm drain systems, conveyances, or other water courses under their jurisdiction.

Permit Limitations and Monitoring Requirements apply to 001-A and 002-A as outlined in the Permit Part I.B and Part I.C

Parameter	Units	Discharge Limitations Maximum Concentrations			Monitoring Frequency	Sample Type
		30-Day Average	7-Day Average	Daily Max.		
APPLICABLE TO ALL DISCHARGES AS LISTED IN GENERAL PERMIT						
pH, (Minimum- Maximum) 00400	s.u.	NA	NA	6.5-9.0	Weekly	In-situ
Total Suspended Solids 00530	mg/l	30	45	NA	Weekly	Grab
Flow ¹ 50050	gpm	NA	NA	200	Weekly	Instantaneous or Continuous
Oil and Grease Visual 84066		NA	NA	NA	Weekly	Visual ²
Oil and Grease 03582	mg/l	NA	NA	10	Weekly	Grab ²
SITE SPECIFIC PARAMETERS						
Total Dissolved Solids ³ 70295	mg/l	Report	NA	Report	Monthly	Grab

¹ The maximum flow limit will be equal to twice the maximum flow rate provided in the permit application or subsequent modifications.

² If a visible sheen is observed, a grab sample shall be collected and analyzed for oil and grease.

³ Required for discharges to the Colorado River Basin

Certification is issued 6/5/2015 Effective 6/5/2015 Expiration Date: 8/31/2018

This certification under the permit requires that specific actions be performed at designated times. The certification holder is legally obligated to comply with all terms and conditions of the permit.

This certification was approved by:
Lillian Gonzalez, Unit Manager
Permits Section
Water Quality Control Division



Appendix D CDPS Reports

DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)

NAME: Grand County Water Sanitation Dist 1

ADDRESS: PO Box 3077
Winter Park, CO 80482

FACILITY: AUGMENTATION RESERVOIR 2 GRAND COUNTY

LOCATION: 77101 US 40
FRASER, CO 80442

ATTN: Bruce Hutchins, Dist Mgr

COG075141	001-A
PERMIT NUMBER	DISCHARGE NUMBER
MONITORING PERIOD	
MM/DD/YYYY	MM/DD/YYYY
06/05/2015	06/30/2015

DMR Mailing ZIP CODE: 80482

MINOR

Discharge to Fraser River

External Outfall

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
pH	SAMPLE MEASUREMENT	*****	*****	*****	7.67	*****	7.67	SU	0	1/7	INSITU
00400 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	6.5 MINIMUM	*****	9 MAXIMUM	SU		Weekly	INSITU
Solids, total suspended	SAMPLE MEASUREMENT	*****	*****	*****	*****	17	17	mg/L	0	1/7	GRAB
00530 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	30 30DA AVG	45 MX 7D AV	mg/L		Weekly	GRAB
Oil and grease	SAMPLE MEASUREMENT	*****	*****	*****	*****	*****	0	mg/L	0	CONT	0
03582 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	*****	10 INST MAX	mg/L		Contingent	GRAB
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT	*****	100	gal/min	*****	*****	*****	*****	0	1/7	INSTAN
50050 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	200 DAILY MX	gal/min	*****	*****	*****	*****		Weekly	INSTAN
Solids, total dissolved	SAMPLE MEASUREMENT	*****	*****	*****	*****	94	94	mg/L	0	1/30	GRAB
70295 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	Req. Mon. 30DA AVG	Req. Mon. DAILY MX	mg/L		Monthly	GRAB
Oil and grease visual	SAMPLE MEASUREMENT	*****	0	0	*****	*****	*****	*****	0	1/7	VISUAL
84066 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	Req. Mon. INST MAX	abst=0/prst=1	*****	*****	*****	*****		Weekly	VISUAL

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	TELEPHONE		DATE
		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT		
TYPED OR PRINTED		AREA Code	NUMBER	MM/DD/YYYY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

Oil & grease - see Note 2, pg 10.

DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)

NAME: Grand County Water Sanitation Dist 1
ADDRESS: PO Box 3077
 Winter Park, CO 80482

FACILITY: AUGMENTATION RESERVOIR 2 GRAND COUNTY

LOCATION: 77101 US 40
 FRASER, CO 80442

ATTN: Bruce Hutchins, Dist Mgr

COG075141	002-A
PERMIT NUMBER	DISCHARGE NUMBER

MONITORING PERIOD	
MM/DD/YYYY	MM/DD/YYYY
06/05/2015	06/30/2015

DMR Mailing ZIP CODE: 80482

MINOR

Discharge to Augmentation Pond 1

External Outfall

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
pH	SAMPLE MEASUREMENT	*****	*****	*****	7.18	*****	7.42	SU	0	1/7	INSITU
00400 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	6.5 MINIMUM	*****	9 MAXIMUM	SU		Weekly	INSITU
Solids, total suspended	SAMPLE MEASUREMENT	*****	*****	*****	*****	21.3	33	mg/L	0	1/7	GRAB
00530 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	30 30DA AVG	45 MX 7D AV	mg/L		Weekly	GRAB
Oil and grease	SAMPLE MEASUREMENT	*****	*****	*****	*****	*****	0	mg/L	0	CONT	0
03582 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	*****	10 INST MAX	mg/L		Contingent	GRAB
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT	*****	4.76	gal/min	*****	*****	*****	*****	0	1/7	INSTAN
50050 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	200 DAILY MX	gal/min	*****	*****	*****	*****		Weekly	INSTAN
Solids, total dissolved	SAMPLE MEASUREMENT	*****	*****	*****	*****	175	180	mg/L	0	2/30	GRAB
70295 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	Req. Mon. 30DA AVG	Req. Mon. DAILY MX	mg/L		Monthly	GRAB
Oil and grease visual	SAMPLE MEASUREMENT	*****	0	0	*****	*****	*****	*****	0	1/7	VISUAL
84066 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	Req. Mon. INST MAX	abst=0/prst=1	*****	*****	*****	*****		Weekly	VISUAL

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	TELEPHONE		DATE	
		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT			
		AREA Code	NUMBER	MM/DD/YYYY	
TYPED OR PRINTED					

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

Oil & grease - see Note 2, pg 10.

Sample collected 6/18/15 was received at the lab slightly above the allowable temperature at 11.9°C. The matter was discussed with Andrea Beebout @ CDPHE and is noted here.

DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)

NAME: Grand County Water Sanitation Dist 1
ADDRESS: PO Box 3077
 Winter Park, CO 80482

FACILITY: AUGMENTATION RESERVOIR 2 GRAND COUNTY

LOCATION: 77101 US 40
 FRASER, CO 80442

ATTN: Bruce Hutchins, Dist Mgr

COG075141	001-A
PERMIT NUMBER	DISCHARGE NUMBER
MONITORING PERIOD	
MM/DD/YYYY	MM/DD/YYYY
07/01/2015	07/31/2015

DMR Mailing ZIP CODE: 80482

MINOR

Discharge to Fraser River

External Outfall

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
pH	SAMPLE MEASUREMENT	*****	*****	*****	7.4	*****	7.6	SU	0	1/7	INSITU
00400 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	6.5 MINIMUM	*****	9 MAXIMUM	SU		Weekly	INSITU
Solids, total suspended	SAMPLE MEASUREMENT	*****	*****	*****	*****	294	1100	mg/L	2*	1/7	GRAB
00530 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	30 30DA AVG	45 MX 7D AV	mg/L		Weekly	GRAB
Oil and grease	SAMPLE MEASUREMENT	*****	*****	*****	*****	*****	0	mg/L	0	CONT	0
03582 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	*****	10 INST MAX	mg/L		Contingent	GRAB
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT	*****	100	gal/min	*****	*****	*****	*****	0	1/7	INSTAN
50050 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	200 DAILY MX	gal/min	*****	*****	*****	*****		Weekly	INSTAN
Solids, total dissolved	SAMPLE MEASUREMENT	*****	*****	*****	*****	200	200	mg/L	0	1/30	GRAB
70295 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	Req. Mon. 30DA AVG	Req. Mon. DAILY MX	mg/L		Monthly	GRAB
Oil and grease visual	SAMPLE MEASUREMENT	*****	0	0	*****	*****	*****	*****	0	1/7	VISUAL
84066 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	Req. Mon. INST MAX	abst=0/prst=1	*****	*****	*****	*****		Weekly	VISUAL

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	TELEPHONE		DATE
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT		AREA Code
				MM/DD/YYYY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

Oil & grease - see Note 2, pg 10.

*Single MX 7D AV exceedance and single 30DA AVG exceedance

DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)

NAME: Grand County Water Sanitation Dist 1
ADDRESS: PO Box 3077
 Winter Park, CO 80482

FACILITY: AUGMENTATION RESERVOIR 2 GRAND COUNTY

LOCATION: 77101 US 40
 FRASER, CO 80442

ATTN: Bruce Hutchins, Dist Mgr

COG075141	002-A
PERMIT NUMBER	DISCHARGE NUMBER
MONITORING PERIOD	
MM/DD/YYYY	MM/DD/YYYY
07/01/2015	07/31/2015

DMR Mailing ZIP CODE: 80482

MINOR

Discharge to Augmentation Pond 1

External Outfall

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
pH	SAMPLE MEASUREMENT	*****	*****	*****	7.0	*****	7.5	SU	0	1/7	INSITU
00400 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	6.5 MINIMUM	*****	9 MAXIMUM	SU		Weekly	INSITU
Solids, total suspended	SAMPLE MEASUREMENT	*****	*****	*****	*****	73	230	mg/L	2*	1/7	GRAB
00530 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	30 30DA AVG	45 MX 7D AV	mg/L		Weekly	GRAB
Oil and grease	SAMPLE MEASUREMENT	*****	*****	*****	*****	*****	0	mg/L	0	CONT	0
03582 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	*****	10 INST MAX	mg/L		Contingent	GRAB
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT	*****	100	gal/min	*****	*****	*****	*****	0	0/7**	INSTAN
50050 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	200 DAILY MX	gal/min	*****	*****	*****	*****		Weekly	INSTAN
Solids, total dissolved	SAMPLE MEASUREMENT	*****	*****	*****	*****	180	180	mg/L	0	1/30	GRAB
70295 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	Req. Mon. 30DA AVG	Req. Mon. DAILY MX	mg/L		Monthly	GRAB
Oil and grease visual	SAMPLE MEASUREMENT	*****	0	0	*****	*****	*****	*****	0	1/7	VISUAL
84066 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	Req. Mon. INST MAX	abst=0/prst=1	*****	*****	*****	*****		Weekly	VISUAL

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	TELEPHONE		DATE	
		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT			
				AREA Code	NUMBER
TYPED OR PRINTED					MM/DD/YYYY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

Oil & grease - see Note 2, pg 10.

*Single MX 7D AV exceedance and single 30DA AVG exceedance **Week 1 - 1/7, Week 2 - 0/7, Week 3 - 1/7, Week 4 - 1/7

DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)

NAME: Grand County Water Sanitation Dist 1
ADDRESS: PO Box 3077
 Winter Park, CO 80482

FACILITY: AUGMENTATION RESERVOIR 2 GRAND COUNTY

LOCATION: 77101 US 40
 FRASER, CO 80442

ATTN: Bruce Hutchins, Dist Mgr

COG075141	001-A
PERMIT NUMBER	DISCHARGE NUMBER
MONITORING PERIOD	
MM/DD/YYYY	MM/DD/YYYY
08/01/2015	08/31/2015

DMR Mailing ZIP CODE: 80482

MINOR

Discharge to Fraser River

External Outfall

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
pH	SAMPLE MEASUREMENT	*****	*****	*****	7.2	*****	7.4	SU	0	1/7	INSITU
00400 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	6.5 MINIMUM	*****	9 MAXIMUM	SU		Weekly	INSITU
Solids, total suspended	SAMPLE MEASUREMENT	*****	*****	*****	*****	149	390	mg/L	4*	1/7	GRAB
00530 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	30 30DA AVG	45 MX 7D AV	mg/L		Weekly	GRAB
Oil and grease	SAMPLE MEASUREMENT	*****	*****	*****	*****	*****	0	mg/L	0	CONT	0
03582 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	*****	10 INST MAX	mg/L		Contingent	GRAB
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT	*****	33	gal/min	*****	*****	*****	*****	0	1/7	INSTAN
50050 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	200 DAILY MX	gal/min	*****	*****	*****	*****		Weekly	INSTAN
Solids, total dissolved	SAMPLE MEASUREMENT	*****	*****	*****	*****	160	160	mg/L	0	1/30	GRAB
70295 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	Req. Mon. 30DA AVG	Req. Mon. DAILY MX	mg/L		Monthly	GRAB
Oil and grease visual	SAMPLE MEASUREMENT	*****	0	0	*****	*****	*****	*****	0	1/7	VISUAL
84066 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	Req. Mon. INST MAX	abst=0/prst=1	*****	*****	*****	*****		Weekly	VISUAL

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	TELEPHONE		DATE
		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT		
TYPED OR PRINTED		AREA Code	NUMBER	MM/DD/YYYY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

Oil & grease - see Note 2, pg 10. TSS sample collected 8/27/15 was received at the lab slightly above the allowable temperature at 9.6°C.

*Three MX 7D AV exceedances and single 30DA AVG exceedance

DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)

NAME: Grand County Water Sanitation Dist 1
ADDRESS: PO Box 3077
 Winter Park, CO 80482

FACILITY: AUGMENTATION RESERVOIR 2 GRAND COUNTY

LOCATION: 77101 US 40
 FRASER, CO 80442

ATTN: Bruce Hutchins, Dist Mgr

COG075141	002-A
PERMIT NUMBER	DISCHARGE NUMBER

MONITORING PERIOD	
MM/DD/YYYY	MM/DD/YYYY
08/01/2015	08/31/2015

DMR Mailing ZIP CODE: 80482

MINOR

Discharge to Augmentation Pond 1

External Outfall

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
pH	SAMPLE MEASUREMENT	*****	*****	*****	7.0	*****	10.4	SU	2	1/7	INSITU
00400 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	6.5 MINIMUM	*****	9 MAXIMUM	SU		Weekly	INSITU
Solids, total suspended	SAMPLE MEASUREMENT	*****	*****	*****	*****	25	99	mg/L	1	1/7	GRAB
00530 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	30 30DA AVG	45 MX 7D AV	mg/L		Weekly	GRAB
Oil and grease	SAMPLE MEASUREMENT	*****	*****	*****	*****	*****	0	mg/L	0	CONT	0
03582 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	*****	10 INST MAX	mg/L		Contingent	GRAB
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT	*****	30	gal/min	*****	*****	*****	*****	0	1/7	INSTAN
50050 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	200 DAILY MX	gal/min	*****	*****	*****	*****		Weekly	INSTAN
Solids, total dissolved	SAMPLE MEASUREMENT	*****	*****	*****	*****	170	170	mg/L	0	1/30	GRAB
70295 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	Req. Mon. 30DA AVG	Req. Mon. DAILY MX	mg/L		Monthly	GRAB
Oil and grease visual	SAMPLE MEASUREMENT	*****	0	0	*****	*****	*****	*****	0	1/7	VISUAL
84066 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	Req. Mon. INST MAX	abst=0/prst=1	*****	*****	*****	*****		Weekly	VISUAL

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	TELEPHONE		DATE
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT		AREA Code
				MM/DD/YYYY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

Oil & grease - see Note 2, pg 10. TSS sample collected 8/27/15 was received at the lab slightly above the allowable temperature at 9.6°C.

DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)

NAME: Grand County Water Sanitation Dist 1**ADDRESS:** PO Box 3077
Winter Park, CO 80482**FACILITY:** AUGMENTATION RESERVOIR 2 GRAND COUNTY**LOCATION:** 77101 US 40
FRASER, CO 80442**ATTN:** Bruce Hutchins, Dist Mgr

COG075141	001-A
PERMIT NUMBER	DISCHARGE NUMBER
MONITORING PERIOD	
MM/DD/YYYY	MM/DD/YYYY
09/01/2015	09/30/2015

DMR Mailing ZIP CODE: 80482

MINOR

Discharge to Fraser River

External Outfall

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
pH	SAMPLE MEASUREMENT	*****	*****	*****	7.4	*****	7.5	SU	0	0/7*	INSITU
00400 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	6.5 MINIMUM	*****	9 MAXIMUM	SU		Weekly	INSITU
Solids, total suspended	SAMPLE MEASUREMENT	*****	*****	*****	*****	10	11	mg/L	0	0/7*	GRAB
00530 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	30 30DA AVG	45 MX 7D AV	mg/L		Weekly	GRAB
Oil and grease	SAMPLE MEASUREMENT	*****	*****	*****	*****	*****	0	0	0	CONT	0
03582 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	*****	10 INST MAX	mg/L		Contingent	GRAB
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT	*****	14	gal/min	*****	*****	*****	*****	0	0/7*	INSTAN
50050 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	200 DAILY MX	gal/min	*****	*****	*****	*****		Weekly	INSTAN
Solids, total dissolved	SAMPLE MEASUREMENT	*****	*****	*****	*****	230	230	mg/L	0	1/30	GRAB
70295 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	Req. Mon. 30DA AVG	Req. Mon. DAILY MX	mg/L		Monthly	GRAB
Oil and grease visual	SAMPLE MEASUREMENT	*****	0	0	*****	*****	*****	*****	0	0/7*	VISUAL
84066 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	Req. Mon. INST MAX	abst=0/prst=1	*****	*****	*****	*****		Weekly	VISUAL

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	TELEPHONE		DATE
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT		
		AREA Code	NUMBER	MM/DD/YYYY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

Oil & grease - see Note 2, pg 10.

*No discharge Week 3 and Week 4; Week 1 - 1/7, Week 2 - 1/7, Week 3 - 0/7, Week 4 - 0/7

DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)

NAME: Grand County Water Sanitation Dist 1**ADDRESS:** PO Box 3077
Winter Park, CO 80482**FACILITY:** AUGMENTATION RESERVOIR 2 GRAND COUNTY**LOCATION:** 77101 US 40
FRASER, CO 80442**ATTN:** Bruce Hutchins, Dist Mgr

COG075141	002-A
PERMIT NUMBER	DISCHARGE NUMBER
MONITORING PERIOD	
MM/DD/YYYY	MM/DD/YYYY
09/01/2015	09/30/2015

DMR Mailing ZIP CODE: 80482

MINOR

Discharge to Augmentation Pond 1

External Outfall

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
pH	SAMPLE MEASUREMENT	*****	*****	*****	7.1	*****	7.4	SU	0	1/7	INSITU
00400 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	6.5 MINIMUM	*****	9 MAXIMUM	SU		Weekly	INSITU
Solids, total suspended	SAMPLE MEASUREMENT	*****	*****	*****	*****	90	260	mg/L	4**	1/7	GRAB
00530 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	30 30DA AVG	45 MX 7D AV	mg/L		Weekly	GRAB
Oil and grease	SAMPLE MEASUREMENT	*****	*****	*****	*****	*****	0	mg/L	0	CONT	0
03582 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	*****	10 INST MAX	mg/L		Contingent	GRAB
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT	*****	50	gal/min	*****	*****	*****	*****	0	1/7	INSTAN
50050 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	200 DAILY MX	gal/min	*****	*****	*****	*****		Weekly	INSTAN
Solids, total dissolved	SAMPLE MEASUREMENT	*****	*****	*****	*****	110	110	mg/L	0	1/30	GRAB
70295 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	Req. Mon. 30DA AVG	Req. Mon. DAILY MX	mg/L		Monthly	GRAB
Oil and grease visual	SAMPLE MEASUREMENT	*****	0	0	*****	*****	*****	*****	0	1/7	VISUAL
84066 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	Req. Mon. INST MAX	abst=0/prst=1	*****	*****	*****	*****		Weekly	VISUAL

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TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT		AREA Code
				MM/DD/YYYY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

Oil & grease - see Note 2, pg 10.

**Three MX 7D AV exceedances and single 30DA AVG exceedance

DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)

NAME: Grand County Water Sanitation Dist 1**ADDRESS:** PO Box 3077
Winter Park, CO 80482**FACILITY:** AUGMENTATION RESERVOIR 2 GRAND COUNTY**LOCATION:** 77101 US 40
FRASER, CO 80442**ATTN:** Bruce Hutchins, Dist Mgr

COG075141	001-A
PERMIT NUMBER	DISCHARGE NUMBER
MONITORING PERIOD	
MM/DD/YYYY	MM/DD/YYYY
10/01/2015	10/31/2015

DMR Mailing ZIP CODE: 80482

MINOR

Discharge to Fraser River

External Outfall

No Discharge ☒

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
pH	SAMPLE MEASUREMENT	*****	*****	*****		*****					
00400 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	6.5 MINIMUM	*****	9 MAXIMUM	SU		Weekly	INSITU
Solids, total suspended	SAMPLE MEASUREMENT	*****	*****	*****	*****						
00530 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	30 30DA AVG	45 MX 7D AV	mg/L		Weekly	GRAB
Oil and grease	SAMPLE MEASUREMENT	*****	*****	*****	*****	*****					
03582 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	*****	10 INST MAX	mg/L		Contingent	GRAB
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT	*****			*****	*****	*****	*****			
50050 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	200 DAILY MX	gal/min	*****	*****	*****	*****		Weekly	INSTAN
Solids, total dissolved	SAMPLE MEASUREMENT	*****	*****	*****	*****						
70295 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	Req. Mon. 30DA AVG	Req. Mon. DAILY MX	mg/L		Monthly	GRAB
Oil and grease visual	SAMPLE MEASUREMENT	*****			*****	*****	*****	*****			
84066 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	Req. Mon. INST MAX	abst=0/prst=1	*****	*****	*****	*****		Weekly	VISUAL

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TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT		
		AREA Code	NUMBER	MM/DD/YYYY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

Oil & grease - see Note 2, pg 10.

DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)

NAME: Grand County Water Sanitation Dist 1**ADDRESS:** PO Box 3077
Winter Park, CO 80482**FACILITY:** AUGMENTATION RESERVOIR 2 GRAND COUNTY**LOCATION:** 77101 US 40
FRASER, CO 80442**ATTN:** Bruce Hutchins, Dist Mgr

COG075141	002-A
PERMIT NUMBER	DISCHARGE NUMBER
MONITORING PERIOD	
MM/DD/YYYY	MM/DD/YYYY
10/01/2015	10/31/2015

DMR Mailing ZIP CODE: 80482

MINOR

Discharge to Augmentation Pond 1

External Outfall

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
pH	SAMPLE MEASUREMENT	*****	*****	*****	7.4	*****	9.3	SU	1	1/7	INSITU
00400 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	6.5 MINIMUM	*****	9 MAXIMUM	SU		Weekly	INSITU
Solids, total suspended	SAMPLE MEASUREMENT	*****	*****	*****	*****	707	3100	mg/L	5**	1/7	GRAB
00530 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	30 30DA AVG	45 MX 7D AV	mg/L		Weekly	GRAB
Oil and grease	SAMPLE MEASUREMENT	*****	*****	*****	*****	*****	0	mg/L	0	CONT	0
03582 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	*****	10 INST MAX	mg/L		Contingent	GRAB
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT	*****	50	gal/min	*****	*****	*****	*****	0	1/7	INSTAN
50050 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	200 DAILY MX	gal/min	*****	*****	*****	*****		Weekly	INSTAN
Solids, total dissolved	SAMPLE MEASUREMENT	*****	*****	*****	*****	190	190	mg/L	0	1/30	GRAB
70295 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	*****	*****	*****	Req. Mon. 30DA AVG	Req. Mon. DAILY MX	mg/L		Monthly	GRAB
Oil and grease visual	SAMPLE MEASUREMENT	*****	0	0	*****	*****	*****	*****	0	1/7	VISUAL
84066 1 0 Effluent Gross	PERMIT REQUIREMENT	*****	Req. Mon. INST MAX	abst=0/prst=1	*****	*****	*****	*****		Weekly	VISUAL

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TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT		AREA Code
				MM/DD/YYYY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

Oil & grease - see Note 2, pg 10. TSS sample collected 10/16/15 was received at the lab above the allowable temperature at 15.8°C.

**Four MX 7D AV exceedances and single 30DA AVG exceedance

Appendix F Weekly Meeting Minutes



Weekly Progress Meeting Minutes - Meeting 1 Grand County Water and Sanitation District No. 1 Reservoir 2 Enlarging and Lining Construction

Location Reservoir 2
Date June 18, 2015
Time 11:00 a.m.

Attendees

GCWSD No. 1
Bruce Hutchins, Manager

GEI Consultants
Jeremy Deuto, Project Manager

Tim Shenk Land Surveying, Inc.
Tim Shenk, Owner

Morrow and Sons
John Doll, Project Manager
Gary Morrow, Site Superintendent

Colorado SEO

General

GEI informed Morrow and GCWSD that the SEO has tentatively approved the construction documents for the regulated dam portion of the project. Official approval is forthcoming.

GEI noted that Morrow is utilizing both discharge points in approved in the discharge permit. This necessitates double the monitoring.

GCWSD requested that Morrow place a sign or fencing on the east side of Reservoir 1 to reduce civilian access to the site.

GCWSD will discuss with the Town of Fraser the possibility of opening the south side of Reservoir 1 to parking as the existing parking is now closed due to construction.

Morrow will check with the Chamber of Commerce to see if there are any planned events in the region that may impact construction and/or hauling activities.

Survey

Shenk has not completed the pre-survey of the existing ground within the project footprint. GEI reminded Morrow that the survey needs to be completed as the basis for the pay items.



Shenk indicated that the survey will be finalized as conditions permit, likely the first part of the week of June 22, 2015.

Schedule

See attached updated schedule provided by Morrow.

Reservoir deepening and west side (1:1 H:V) excavation likely to continue to mid-July.

Submittals

Morrow indicated that the revised and missing submittals are in progress.

GEI stated that submittals should be submitted electronically.

Liner Construction

Morrow proposed using 5/8- inch to ¾-inch minus material that has already been processed as Zone 1b material, rather than hauling material offsite, processing, and hauling back. GEI requested laboratory analysis on the material (gradation, atterbers, etc). Upon receipt, GEI will review the data and evaluate the proposed substitution. Additional modeling, word processing, and drafting will be necessary to update the project documents. Additionally, GEI stated that erosion protection zone will still be necessary and that the current Zone 1b material will be utilized for this. GEI stated that if the material can be utilized, the SEO will need to be involved and approve the substitution, as some of the material will replace Zone 1b in the stability buttress.

Morrow to forward GEI results of the laboratory testing upon completion.

GEI reminded Morrow that prepared bedrock foundation material within the footprint of the liner shall not be left exposed for an extended period (>1 day) or be utilized as a haul road. This does not apply to bedrock outside of the liner footprint.

Hauling

There have been no notable traffic issues as of yet.

Morrow to inquire with CDOT about obtaining a traffic control permit to reduce the speed through the impacted area.

May 2015							June 2015						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
3	4	5	6	7	1	2		1	2	3	4	5	6
10	11	12	13	14	15	16	7	8	9	10	11	12	13
17	18	19	20	21	22	23	14	15	16	17	18	19	20
24	25	26	27	28	29	30	21	22	23	24	25	26	27
31							28	29	30				

Shannon Shearer

June 2015							July 2015						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7	1	2	3	4	5	6	7
8	9	10	11	12	13	14	8	9	10	11	12	13	14
15	16	17	18	19	20	21	15	16	17	18	19	20	21
22	23	24	25	26	27	28	22	23	24	25	26	27	28
29	30						29	30	31				

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July 2015

July 2015							August 2015						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
5	6	7	8	9	10	11	2	3	4	5	6	7	8
12	13	14	15	16	17	18	9	10	11	12	13	14	15
19	20	21	22	23	24	25	16	17	18	19	20	21	22
26	27	28	29	30	31		23	24	25	26	27	28	29
							30	31					

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Jun 28	29	30	Jul 1	2	3	4
			Offsite haul Survey		**Holiday--Holiday--Holiday**	
5	6	7	8	9	10	11
			Off site Haul			
12	13	14	15	16	17	18
			Offsite haul Survey			
19	20	21	22	23	24	25
			Excavate placement Zone 1A Offsite haul excavate deepening materials Placement Zone 1B Survey			
26	27	28	29	30	31	Aug 1
			Offsite haul excavate deepening material Placement Zone 1A Placement Zone 1B Survey			

August 2015							September 2015						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
2	3	4	5	6	7	1	6	7	1	2	3	4	5
9	10	11	12	13	14	8	13	14	15	16	17	18	19
16	17	18	19	20	21	15	20	21	22	23	24	25	26
23	24	25	26	27	28	22	27	28	29	30			
30	31					29							

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September 2015						October 2015							
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7	1	2	3	4	5	6	7
8	9	10	11	12	13	14	8	9	10	11	12	13	14
15	16	17	18	19	20	21	15	16	17	18	19	20	21
22	23	24	25	26	27	28	22	23	24	25	26	27	28
29	30						29	30	31				

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October 2015							November 2015						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7	1	2	3	4	5	6	7
8	9	10	11	12	13	14	8	9	10	11	12	13	14
15	16	17	18	19	20	21	15	16	17	18	19	20	21
22	23	24	25	26	27	28	22	23	24	25	26	27	28
29	30	31					29	30					

1



Weekly Progress Meeting Minutes - Meeting 2 Grand County Water and Sanitation District No. 1 GCWSD #2 Enlarging and Lining Construction

Location GCWSD #2
Date June 25, 2015
Time 11:00 a.m.

Attendees

GCWSD No. 1
Bruce Hutchins, Manager

GEI Consultants
Jeremy Deuto, Project Manager

Tim Shenk Land Surveying, Inc.
Derek Howard, Surveyor

Morrow and Sons
John Doll, Project Manager
Gary Morrow, Site Superintendent

Colorado SEO

Ground Engineering, Inc
Steve Peters, Area Manager

General

All parties onsite agreed to cancel the scheduled 7-1-15 weekly meeting due to the short time between meetings and the 4th of July Holiday. The next weekly meeting will be held onsite 7-9-15 at 11:00 am.

Morrow has installed the access fence along the east access road of Reservoir 1. Morrow to add "danger construction area" signs at various locations to discourage access by the public.

The Town of Fraser will be opening the south side of Reservoir 1 to public parking.

Morrow is operating the Outfall #1 discharge pump approximately 0.5 hrs several times a day and all night. The Outfall #2 discharge pump is operating approximately 6hrs per day intermittently.

Survey

Existing conditions site survey is ongoing but not entirely complete at the time of the meeting.

Shenk has received the CAD file layers requested. The file has not been reviewed. *Update: Derek has reviewed the files and confirmed they are as requested.*



Shenk will continue laying out the 8624.0 point and 3:1 slopes along the SEO regulated portion of Reservoir 2.

Schedule

Reservoir deepening and west side (1:1 H:V) excavation likely to continue to mid-July.

Submittals

Morrow indicated that the revised and missing submittals are in progress and will likely be submitted 6-25-15 or 6-26-15.

Liner Construction

Morrow to forward GEI results of the laboratory testing conducted on the proposed alternate material upon completion, likely by the end of the day on 6-26-15. GEI will review.

GEI noted that, provided the material can meet project slope stability requirements, the proposed material could be utilized along the west side of the project where the SEO does not have jurisdiction. The SEO will need to approve the use of the alternate material within the Zone 1b stability buttress on the embankment between GCWSD #1 and GCWSD#2.

GEI reminded Morrow that any unsuitable material within newly excavated slopes will need to be removed and replaced. GEI onsite staff will make the call.

In areas where the existing slopes along the GCWSD #2 regulated portion embankment where the slope are less than 3:1 (H:V), the deficit needs to be filled in with Zone 1a material.

GEI discussed dewatering techniques and approved the use of the keyway as a dewatering trench, provided that any weathering or deterioration to the bedrock will need to be removed prior to filling. All water will need to be removed as well. Additionally, GEI stated that groundwater can be directed to flow along the Zone 1a/native material highwall to facilitate dewatering during construction.

Hauling

There have been no notable traffic issues as of yet. Traffic impacts increase significantly on Fridays, due to heavy weekend traffic. Morrow has reminded drivers to be patient and courteous.

Morrow has yet to inquire with CDOT about obtaining a traffic control permit to reduce the speed through the impacted area. A decision has not been made.

Morrow anticipates hiring 4 independent haul trucks in an effort to maintain haul consistency, and have a minimum of 4 trucks hauling at any given time. The maximum number of haul trucks is anticipated to be 10 (6 Morrow and 4 independent).

Approximately 9,000 cy of material has been hauled offsite as of 6-24-15.



Weekly Progress Meeting Minutes - Meeting 3 Grand County Water and Sanitation District No. 1 GCWSD #2 Enlarging and Lining Construction

Location GCWSD #2
Date July 9, 2015
Time 11:00 a.m.

Attendees

GCWSD No. 1
Bruce Hutchins, Manager

GEI Consultants
Jeremy Deuto, Project Manager
Ed Duerr Inc, Engineering Subconsultant

Tim Shenk Land Surveying, Inc.

Morrow and Sons
Gary Morrow, Site Superintendent

Colorado SEO

Ground Engineering, Inc

General

The weekly meeting scheduled for 7-1-15 was cancelled as previously discussed.

The Winter Park area received ~3.5 inches of rain between July 3 and July 6.

Jazz fest is occurring in Winter Park July 18 and July 19. This will likely increase traffic and possibly interest in the project. Morrow is reminded to be cautious and courteous when accessing US 40 from the site and vice versa.

Morrow has not received any complaints from the Public, but has received lots of questions. Morrow is reminded to direct all questions and complaints to Bruce Hutchins.

GEI reminded Morrow that bentonite bags stored onsite or at the Morrow yard needs to be covered and protected from precipitation. The bentonite needs to remain powdered and exposure to moisture will cause it to clump together, rendering it unusable on the project.

Survey



Schedule

Morrow to provide a revised 3 week look ahead. Update – Schedule is attached.

Liner construction likely to begin the first week in August.

Morrow to track days lost due to weather, and submit for a Contract Substantial Completion Date Change Order as the date gets closer, if necessary. Only full days lost will be considered.

Submittals

There are still many outstanding submittals. Morrow needs to get these submitted ASAP.

Liner Construction

Morrow is still conducting construction dewatering at both approved outfall locations.

When excavating a new sump location in the northern portion of the reservoir, Morrow encountered groundwater within the alluvial material. This will likely continue to occur as a result of the very wet year so far and this zone is at or below the Fraser River thalweg.

GEI will provide a decision on approval of the alternate material (Zone 2) by 7-16-15. Morrow to provide alternate pricing for material and placement is approved. Area considered is only in areas not regulated by the SEO. Approval from the SEO for use in the stability buttress (~Sta 5+50 through 7+50) will come later, if at all.

Morrow needs to let GEI know well in advance of the test mixing schedule so that GEI staff can get onsite observation planned.

Excavating and Hauling

Approximately 16,000 cy of material has been hauled offsite as of 7-8-15.

According to project surveys, approximately 8 feet of material remains to be removed in the northern portion of the reservoir.

Issues with County staff and material stockpiled within the Benson Pit have been addressed by GCWSD No.1 and Morrow. Morrow has offered to push material for the County on Fridays.

Bedrock was encountered in the sump excavated in the northern portion of the site. GEI observed the material and discussed the properties with Morrow. Morrow indicated that there was approximately 1 foot of loose weathered material overlying the firm bedrock. GEI stated that this is likely typical.

10 haul trucks are available to haul material off-site. Morrow will use the full allotment whenever possible.



Weekly Progress Meeting Minutes - Meeting 4 Grand County Water and Sanitation District No. 1 GCWSD #2 Enlarging and Lining Construction

Location GCWSD #2
Date July 16, 2015
Time 11:00 a.m.

Attendees

GCWSD No. 1

Tim Shenk Land Surveying, Inc.
Derek Howard, Surveyor

Colorado SEO

GEI Consultants

Jeremy Deuto, Project Manager
Ben Taylor, Field Engineer

Morrow and Sons

John Doll, Project Manager
Gary Morrow, Site Superintendent

Ground Engineering, Inc

Steve Peters, Area Manager

Schedule

Morrow plans to begin prepping for fill in approximately two weeks. They also would like to perform mix testing at that time which will be observed by the GEI field staff.

Morrow continues to track days lost due to weather. Last week there were no full days lost.

Liner Construction

Morrow asked if it would be acceptable to mix the zone fills at the Benson pit, noting that the flatter and larger area for mixing would be beneficial to the quality of the mixes. GEI is OK with mixing offsite.

Morrow plans to start liner construction in the northwest corner and work clockwise around the reservoir perimeter. GEI will inform the SEO that impact to the jurisdictional portion of the project will begin in approximately 2 weeks.

GEI informed Morrow that they may assume the existing embankments meet 95% compaction and are suitable to place fill on unless directed otherwise by GEI field staff. Examples of soils that may need to be removed, replaced and/or recompacted are loose alluvial soils and soil with visibly excessive organics.



Liner Construction (cont.)

GEI reminded Morrow to stair step the Zone 1A fill with the existing embankment material. If cobbles/boulders are encountered in existing embankment material, it is OK to step out and place fill around them. GEI field staff will approve and observe all step outs.

Morrow is still conducting construction dewatering at both approved outfall locations.

GEI approved the use of alternate material (Zone 2) between approximate station 0+00 to 5+00 and 22+50 to End. Morrow should provide GEI with alternate pricing for material and placement. Approval from the SEO for use in the stability buttress (approximate station 5+50 through 7+50) is pending.

Excavating and Hauling

In Morrow's excavation on the north end of the reservoir bedrock has been exposed and appears to be at approximate elevation 8604 which is 4ft higher than design elevation. It appears to drop off steeply to the northwest under unexcavated overburden. *Update: Survey points from Tim Shenk Land Surveying indicate that the elevation is closer to El. 8600. This elevation matches the reservoir bottom design elevation in the northeast corner.*

Morrow notes water is collecting on the surface of the excavated bedrock. GEI observed these areas and noted that most of the water appears to be draining from in-situ and excavated overburden.

Morrow said that the northwest dewatering pump is run an average of 5 hours per day and then continuously throughout the night (partially open). They noted that it is a self-priming pump and often draws down the water level in sump so that it pumps only a portion of its pumping rate capacity. GEI estimates the pump operates an average of 12 hours per day at 25% of full capacity.



Weekly Progress Meeting Minutes - Meeting 5 Grand County Water and Sanitation District No. 1 GCWSD #2 Enlarging and Lining Construction

Location GCWSD #2
Date July 23, 2015
Time 11:00 a.m.

Attendees

GCWSD No. 1
Bruce Hutchins, Manager

GEI Consultants
Jeremy Deuto, Project Manager

Tim Shenk Land Surveying, Inc.

Morrow and Sons
John Doll, Project Manager
Gary Morrow, Site Superintendent

Colorado SEO

Ground Engineering, Inc

Schedule

Last week there were no full days lost due to weather.

Test mixing will occur between 8-4-15 and 8-10-15.

GEI will contact Ground Engineering the week of 8-3-15 to discuss project timing.

General

GEI reminded all parties of the change in assigned staff. Ben Taylor will be the field engineer assigned to the project.

There have been no complaints from the public. An occasional fisherman parks or tries to park in the construction area. Morrow has been able to ask the fishermen to move with no problems.

Change Order #1 (haul road realignment) has been approved and GEI will send out the appropriate paperwork for signatures.

Morrow informed GCWSD No. 1 that there will be no unit price cost savings for incorporating Zone 2. Project savings will be in construction time.



Liner Construction

Morrow is still conducting construction dewatering at both approved outfall locations. Dewatering volume has remained relatively consistent.

GEI and Morrow discussed the current bedrock conditions/locations. In areas where unanticipated bedrock has been encountered the bottom of the reservoir will not be excavated any deeper, with the exception of weathered bedrock removal. As the project moves forward, Morrow may strip off loose and weathered bedrock in an effort to maximize storage space within the reservoir, as directed by GEI. Areas of loose and weathered bedrock may be stripped and incorporated into Zone 2 as necessary to facilitate construction and/or to gain additional storage space. The bottom liner portion of the project will be field fit during construction to match the current bedrock conditions. The keyway location will be field fit as well.

Morrow has relocated the 6 inch pump and is currently discharging into an unapproved outfall location. This location was not included in the GCWSD No. 1 construction dewatering permit. GEI informed Morrow that all dewatering discharges need to be through the approved outfalls, Outfall #1 and Outfall #2. Morrow indicated that the discharge point for this pump will be relocated to Outfall #1.

GEI informed Morrow that the construction dewatering pumping rate is limited to 100 gpm (up to a maximum of 200gpm) at any given point in time rather than as an average.

Morrow stated that the liner construction will begin on or around August 10, 2015. Offsite hauling will continue until this time.

Morrow indicated that they have altered the planned construction start location and sequencing. Construction will begin in the southwest corner of the reservoir, near station 5+00 and proceed to the north, upstation.

Excavating and Hauling

Morrow is mobilizing a large excavator (Volvo EI 480) to facilitate the excavation process.

Approximately 35,000cy of material has been hauled off as of July 22, 2015.

Location: Reservoir #2
Date: August 6, 2015
Time: 11:00 AM

Attendees

GCWSD #1

Bruce Hutchins, Manager

GEI Consultants

Ed Duerr, PE, Project Engineer

Tim Shenk Land Surveying, Inc.

Derek Howard, Surveyor

Morrow & Sons

John Doll, Project Manager

Gary Morrow, Site Superintendent

Schedule

A new schedule is attached. Morrow will continue excavating next week. They will try to develop a trench area to dewater the northwest corner of the reservoir, which has groundwater issues.

Construction Issues

As shown in the attached photos, groundwater is actively running into the excavation around the northwest end of the reservoir. Morrow is concerned that they are getting into an area that could be soupy and is within the existing groundwater table. They believe they are close to or at river level.

The plan is to develop a limited trench area to see if they can dewater the broader area and not have groundwater flowing across the bottom as it is now. If this does not work to dry out some of the area in question, Morrow will be asking the Engineers how to proceed in a manner that they can excavate and line the reservoir appropriately in the northwest portion of the excavation.

Morrow was in the process of bringing a large crusher on site, which was enroute during the meeting. The District got the proposal from Ground, which had not been sent to them prior, and signed and returned it.

Pay Request #3

Excavation quantities for Pay Request #3 are based on truck hauling numbers. It was decided that the quantity appeared to be reasonably close to actual, so Pay Request #3 was approved by the Engineer and District.

Photos are attached on the following pages:



West berm excavation overview.



Groundwater flowing in tread tracks at northwest corner



Water along toe of western berm area.



Close-up of water in tread tracks



Weekly Progress Meeting Minutes - Meeting 8 Grand County Water and Sanitation District No. 1 GCWSD #2 Enlarging and Lining Construction

Location GCWSD #2
Date August 13, 2015
Time 11:00 a.m.

Attendees

GCWSD No. 1

GEI Consultants

Ben Taylor, Field Engineer

Tim Shenk Land Surveying, Inc.

Morrow and Sons

John Doll, Project Manager

Colorado SEO

Gary Morrow, Site Superintendent

Ground Engineering, Inc

Steve Peters, Area Manager

Health & Safety

No health and safety issues or concerns last week.

Schedule

Morrow plans to begin mixing Zone 1A on Monday or Tuesday and begin placing Zone 1A fill on Wednesday August 19. The latest schedule is attached to these minutes.

Excavating and Hauling

Morrow is continuing to excavate along the west side of the reservoir. They reported that bedrock is approximately 4 feet deeper than anticipated between approximate stations 0+00 to 3+00.

Liner Construction

Morrow said that bedrock on the west side of the reservoir is approximately 4ft deeper than anticipated. Morrow asked GEI if the slopes should be constructed to elevations on design drawings or if they need to be constructed to bedrock. GEI said they would discuss and respond to Morrow. *Update: The 3:1 slopes on the west side are to be constructed on top of stripped bedrock unless the bedrock is deeper than El. 8596. In that case, the liner will extend from the toe of the 1:1 excavation towards the middle of the reservoir to the point where the bedrock rises up to El. 8596. The liner key will be constructed there so that the final grade of Zone 1A overlain by 1-foot of Zone 1B is El 8600.*



Morrow expressed concern the inflow rate of groundwater along the west side of the excavation and the difficulties the water may present to the placing of Zone 1A fill. At the time of the meeting, Morrow had yet to develop a dewatering trench in the northwest corner discussed in the Week 7 (8/6) meeting. GEI reiterated that Morrow should make the discussed additional dewatering efforts and evaluate the outcomes before GEI considers a re-design of the liner in the problem areas.

Dewatering

GEI reiterated that the CDPS discharge permit samples have been exceeding maximum levels for Total Suspended Solids (TSS) mainly in Outfall #1 in the northwest corner of the site. GEI requested that Morrow improve the settling/filtering properties of Outfall #1. Suggested improvements included constructing additional baffles in the existing hay bale box, adding a geotextile filter to the bale box outlet, and/or constructing an additional hay bale box. Morrow said they plan to make improvements the week of August 17.

August 2015

August 2015						
Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

September 2015						
Su	Mo	Tu	We	Th	Fr	Sa
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	Jul 26	27	28	29	30	31	Aug 1
7/26 - 31							Offsite haul excavate
8/2 - 7	2	3	4	5	6	7	8
		Offsite Haul Excavate deepening material					
				Survey			
8/9 - 14	9	10	11	12	13	14	15
		Process ZONE 1B material					
				Survey			
8/16 - 21	16	17	18	19	20	21	22
		Process ZONE 1B material					
				Start Placement 1A Import Actiity			
				Start Placement Zone 1B			
8/23 - 28	23	24	25	26	27	28	29
		Placement 1A Import Activity					
		Placement Zone 1B					
		Process ZONE 1B material					
8/30 - 9/4	30	31	Sep 1	2	3	4	5
		Placement 1A Import					
		Placement Zone 1B					
		Process ZONE 1B mate					

September 2015

Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	Aug 30	31	Sep 1	2	3	4	5
Aug 30 - Sep 5			Placement 1A Import Activity				
			Placement Zone 1B				
			Process ZONE 1B material				
			Survey				
	6	7	8	9	10	11	12
Sep 6 - 12		**Holiday--Holiday**	Placement 1A Import Activity				
			Placement Zone 1B				
			Process ZONE 1B material				
			Survey				
	13	14	15	16	17	18	19
Sep 13 - 19		Offsite haul excavate deepening material					
		Placement 1A Botton north end Import Activity					
		Placement Zone 1B					
		Survey					
	20	21	22	23	24	25	26
Sep 20 - 26		Offsite haul excavate deepening material					
		Placement 1A bottom north end Import Activity					
		Placement Zone 1B					
		Survey					
	27	28	29	30	Oct 1	2	3
Sep 27 - Oct 3		Zone 1B final grade compaction					

October 2015

October 2015							November 2015						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3	1	2	3	4	5	6	7
4	5	6	7	8	9	10	8	9	10	11	12	13	14
11	12	13	14	15	16	17	15	16	17	18	19	20	21
18	19	20	21	22	23	24	22	23	24	25	26	27	28
25	26	27	28	29	30	31	29	30					

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Sep 27 - Oct 3	Sep 27	28	29	30	Oct 1	2	3
					Zone 1B final grade compaction		
Oct 4 - 10	4	5	6	7	8	9	10
		Shaping service roads					
Oct 11 - 17		Zone 1B final grade					
	11	12	13	14	15	16	17
Oct 18 - 24		Zone 1B final grade			Completion		
		Partial De Mobilization			substancial clean up		
Oct 25 - 31	18	19	20	21	22	23	24
		Clean up for final completion					
	25	26	27	28	29	30	31
		Demobilizatin - clean up final					



Weekly Progress Meeting Minutes - Meeting 9 Grand County Water and Sanitation District No. 1 GCWSD #2 Enlarging and Lining Construction

Location GCWSD #2
Date August 20, 2015
Time 11:00 a.m.

Attendees

GCWSD No. 1
Bruce Hutchins, Manager

Tim Shenk Land Surveying, Inc.
Derek Howard, Surveyor

Colorado SEO

GEI Consultants
Jeremy Deuto, Project Manager
Ben Taylor, Field Engineer

Morrow and Sons
Gary Morrow, Site Superintendent

Ground Engineering, Inc
Steve Peters, Area Manager

Health & Safety

No health and safety issues or concerns last week.

Schedule

Morrow plans to begin placing Zone 1A fill on Tuesday August 25. GEI plans to start full-time construction observation starting Monday August 24.

Excavating and Hauling

Morrow is continuing to excavate along the west side of the reservoir. Some of the material is being processed into Zone 1B and some material is being hauled off-site.

Liner Construction

Morrow and GEI discussed phasing of Zone 1A placement and management of groundwater. GEI reiterated that the foundation needs to be clean bedrock, inspected and approved by GEI.

The gradation from latest batch of Zone 1A mixed at the south rim of Morrow's gravel pit only contained 27% fines, which is below the specified minimum of 30%. Morrow plans to mix a new batch Friday (8/21) of Zone 1A and Ground will take a gradation sample. Ground said they plan to have the results by end of Monday (8/24).



Morrow discussed moving the key out from the 1:1 slope so the excavator can be lined up with tracks parallel to the key trench. GEI gave a preliminary approval of this concept and will perform uplift calculations to check new key geometry.

Dewatering

Morrow said that the turbidity of discharge water spikes when excavating upstream of the 4-inch pump sump. Morrow proposed discharging water from the 4-inch pump into Reservoir 1. GEI and GCWSD are OK with this proposal.



Weekly Progress Meeting Minutes - Meeting 10 Grand County Water and Sanitation District No. 1 GCWSD #2 Enlarging and Lining Construction

Location GCWSD #2
Date August 27, 2015
Time 10:00 a.m.

Attendees

GCWSD No. 1

Tim Shenk Land Surveying, Inc.

Colorado SEO

GEI Consultants

Jeremy Deuto, Project Manager
Ben Taylor, Field Engineer

Morrow and Sons

John Doll, Project Manager
Gary Morrow, Site Superintendent

Ground Engineering, Inc

Health & Safety

No health and safety issues or concerns last week.

Schedule

Morrow began placing Zone 1A fill on Tuesday, August 25. GEI is currently performing full-time construction observation.

Excavating and Hauling

Morrow is continuing to excavate along the west side of the reservoir. Some of the material is being processed into Zone 1B and some material is being hauled off-site. As of August 26, Morrow had hauled approximately 46,000 CY of material offsite to the Grand County gravel pit.

Liner Construction

GEI and Morrow discussed methods of Zone 1A liner placement along the 1:1 slope. GEI is OK with a sectional placement if a general longitudinal slope is maintained, the dewatering ledge (3ft wide maximum) at the foot of the 1:1 is cleaned out before fill placement, and additional Zone 1A is placed to account for the 1 to 2 feet of fill become saturated by groundwater inflow and therefore not meeting compaction specifications.



GEI said that if a key 3 feet out from the 1:1 slope toe is used by Morrow that the dimensions of a Zone 1A “mound” on top of the key should be met according to the sketch emailed on August 26. GEI also reiterated the importance of bringing up Zone 1B fill to almost the same elevation as the in-place Zone 1A fill at the end of each day to prevent groundwater uplift on the Zone 1A fill.

GEI would prefer thinner lifts (approximately 6 inches) when compact Zone 1A fill with a smooth drum roller because a smooth drum will not achieve the same blending properties that a sheepsfoot roller would.

GEI reminded Morrow that organics in Zone 1A larger than rootlets and small twigs needs to be removed before compaction.

GEI clarified that anywhere in the reservoir where fill will not be placed excavations need only extend to the top of bedrock regardless of its condition.

GEI asked Morrow for some general survey shots of exposed bedrock surface to compare with expected depths in the design drawings.



Weekly Progress Meeting Minutes – Meeting 11 Grand County Water and Sanitation District No. 1 GCWSD #2 Enlarging and Lining Construction

Location GCWSD #2
Date September 3, 2015
Time 11:00 a.m.

Attendees

GCWSD No. 1

Tim Shenk Land Surveying, Inc.
Derek Howard, Surveyor

Colorado SEO

GEI Consultants

Jeremy Deuto, Project Manager
Ben Taylor, Field Engineer

Morrow and Sons

John Doll, Project Manager
Gary Morrow, Site Superintendent

Ground Engineering, Inc

Steve Peters, Area Manager

Health & Safety

No health and safety issues or concerns last week.

Schedule

Morrow plans to continue with liner construction through Friday September 4 and then resume work on Tuesday September 8.

Liner Construction

GEI said that the Zone 1A mix looks good. Based on the gradation results from Ground Engineering received September 2, the average fines content is right at the minimum of 30%. GEI recommended that Morrow increase the fines content slightly to have a buffer above the minimum. GEI reiterated that the Zone 1A mix must be homogeneous and if the GEI Field Engineer observes poorly mixed Zone 1A, then Morrow will need to adjust their means and methods of mixing.

GEI agreed that it will be Morrow's decision whether to start the bedrock key at elevations below 8596ft adjacent to the 1:1 or to bring the 3-foot-thick liner out from the 1:1 toe until it reaches bedrock at El. 8596 as shown in the contract drawings. The 1:1 slope needs to be extended to top of key in the first scenario or El. 8596 in the second.



Weekly Progress Meeting Minutes – Meeting 12 Grand County Water and Sanitation District No. 1 GCWSD #2 Enlarging and Lining Construction

Location GCWSD #2
Date September 10, 2015
Time 11:00 a.m.

Attendees

GCWSD No. 1

Tim Shenk Land Surveying, Inc.
Derek Howard, Surveyor

Colorado SEO

GEI Consultants

Jeremy Deuto, Project Manager
Ben Taylor, Field Engineer

Morrow and Sons

John Doll, Project Manager
Gary Morrow, Site Superintendent
Tim Johnson, Diamond Excavating Superintendent

Ground Engineering, Inc

Steve Peters, Area Manager

Health & Safety

No health and safety issues or concerns last week.

Schedule

Morrow is subcontracting Diamond Excavating to start liner construction on the existing 3:1 slopes. Morrow expects Diamond to mobilize on Tuesday, September 15. The latest schedule is attached to these minutes.

Liner Construction

Morrow indicated that Zone 1A and Zone 2 materials will be moisture conditioned at the Morrow Pit before being imported to the site to save time moisture conditioning on site. Morrow plans to start hauling Zone 1A and Zone 2 material directly to the areas of active construction to save time spent double handling materials. Zone 1A material may still be stockpiled when imported volumes exceed immediate volume demand for liner construction.



Morrow asked GEI if a non-vibratory sheepsfoot roller may be used for the liner construction on the 3:1 slopes. GEI is ok with this substitution provided project specifications for homogeneity of material and moisture and density are met. .

Morrow has reduced the volume of pit naturals in the Zone 1A mix from approximately 120CY to approximately 110CY per one bag of powdered bentonite in response to GEI's recommendation that Morrow increase the fines content of the Zone 1A material to avoid placing fill with a fines content below the specified minimum of 30%.

Slope Construction

Morrow asked for clarification on required bedrock preparation before fill may be placed. GEI reiterated that the bedrock surface needs to be relatively dry and solid before fill may be placed. Wet and weathered bedrock must be stripped. All bedrock is subject to GEI approval.

GEI said is it ok if the stability buttress on south side of reservoir is not completely built out to the dimensions on the contract drawings before Diamond Excavating may continue liner construction in other areas of the reservoir but that the stability buttress should be constructed up to the design elevation with at least half of the total fill volume at the time of liner placement.

September 2015

September 2015							October 2015						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
6	7	1	2	3	4	5	4	5	6	7	1	2	3
13	14	15	16	17	18	19	11	12	13	14	15	16	17
20	21	22	23	24	25	26	18	19	20	21	22	23	24
27	28	29	30				25	26	27	28	29	30	31

Aug 30 - Sep 5		Sep 6 - 12		Sep 13 - 19		Sep 20 - 26		Sep 27 - Oct 3	
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday			
Aug 30	31	Sep 1	2	3	4	5			
		Placement 1A Import Activity Station 4+00 to 20+00							
		Placement Zone 1B							
		Process ZONE 1B material							
		Survey							
6	7	8	9	10	11	12			
	Holiday--Holiday	Placement 1A Import Activity Station 4+00 to 20+00							
		Placement Zone 1B							
		Process ZONE 1B material							
		Survey							
13	14	15	16	17	18	19			
		Offsite Haul and excavate deepening material and Westside 1 to 1 material							
		Placement 1A Station 4+00 to 20+00 Import Activity And Key way cut							
		Placement Zone 1A & 1B 6+00 to 8+00							
		Survey							
20	21	22	23	24	25	26			
		Offsite haul excavate deepening material and Westside 1 to 1 material							
		Placement 1A bottom north end Import Activity and Key way cut							
		Placement Zone 1A & 1B 8+00 moving North							
		Survey							
27	28	29	30	Oct 1	2	3			
		Excavate 1 to 1 @ 1+00 to 19+00							
		Placement 1A & 1B 12+00 Moving North							

October 2015

October 2015							November 2015						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
4	5	6	7	8	1	2	1	2	3	4	5	6	7
11	12	13	14	15	16	17	8	9	10	11	12	13	14
18	19	20	21	22	23	24	15	16	17	18	19	20	21
25	26	27	28	29	30	31	22	23	24	25	26	27	28

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Sep 27	28	29	30	Oct 1	2	3
				Excavate 1 to 1 @ 1+00 to 19+00 Placement 1A & 1B 12+00 Moving North 8:00am Survey 8:30am		
4	5	6	7	8	9	10
				Placement 1A & 1B West 1:1 slope Placement 1A and 1B East and North slopes 3 to 1 Key way cut		
11	12	13	14	15	16	17
				Export final Deepening South Bottom Placement 1:1 Slope West Side Placement 1A and 1B East and North slopes 3 to 1 Key way cut		
18	19	20	21	22	23	24
				Complete 1A & 1B North side Export Final Deepening Material Remove Ramp & Complete Buttrass		
25	26	27	28	29	30	31
		Partial De Mobilization			Substantial Clean up	



Weekly Progress Meeting Minutes – Meeting 13 Grand County Water and Sanitation District No. 1 GCWSD #2 Enlarging and Lining Construction

Location GCWSD #2
Date September 17, 2015
Time 11:00 a.m.

Attendees

GCWSD No. 1
Bruce Hutchins, Project Manager
Tim Shenk Land Surveying, Inc.
Derek Howard, Surveyor

Colorado SEO

GEI Consultants
Jeremy Deuto, Project Manager
Ben Taylor, Field Engineer
Nate Jorgensen, Field Engineer

Morrow and Sons
John Doll, Project Manager
Gary Morrow, Site Superintendent

Ground Engineering, Inc

Health & Safety

The haul road along the west side of the reservoir has been closed to traffic due to excavation of the 1:1 slopes adjacent to the haul road.

Excavation

Morrow indicated that the haul off volume to date is slightly higher than the anticipated volume determined from the design drawings.

Liner Construction

GEI noted that groundwater infiltration will likely be very strong at the last area of the reservoir to be lined. GEI reiterated that the liner in this location will need to be tied in well with already placed liner to the east. GEI and Morrow agreed that extra Zone 1a may be needed to plug the inflow of groundwater in this location.

The reservoir outlet structure is sitting flush with the 3:1 cut for liner subgrade. Morrow has excavated approximately 2ft around the structure which will backfilled with Zone 1a. GEI agrees that Morrow will be paid for bottom of cut everywhere on the 3:1 slope.



Slope Construction

Morrow indicated that the CAT 815 sheepsfoot roller has been unable to climb the Zone 2 fill on a 3:1 slope. Morrow has instead used the 8-ft wide Dynapac sheepsfoot roller to compact Zone 2 fill being placed in the stability buttress on the south side. *Update: Starting 9/21, Morrow is building the stability buttress laterally which has allowed the 815 to compact Zone 2 in horizontal lifts.*

GEI noted the latest gradation analysis performed by Ground Engineering on a sample of placed Zone 1A contained 30.2% fines which is just above the minimum fines content. Morrow said they would increase the bentonite to native clayey sand ratio of the Zone 1A mix.

Staff gauge installation

GEI and GCWSD discussed staff gauge installation with Morrow. GEI prefers Morrow not build a wall-style staff gauge and instead install subgrade drilled concrete piers with a concrete and rebar Sonotube column built above the pier. GCWSD prefers that the staff gauge be installed next to the reservoir outlet structure.

Post-construction reservoir leak test

GEI discussed the 90-day leak test with GCWSD. GCWSD said they would find out more information about when they were planning to fill the reservoir.



Weekly Progress Meeting Minutes – Meeting 14 Grand County Water and Sanitation District No. 1 GCWSD #2 Enlarging and Lining Construction

Location GCWSD #2
Date September 24, 2015
Time 11:00 a.m.

Attendees

GCWSD No. 1
Bruce Hutchins, Project Manager

Tim Shenk Land Surveying, Inc.
Derek Howard, Surveyor

Colorado SEO

GEI Consultants
Jeremy Deuto, Project Manager
Ben Taylor, Field Engineer

Morrow and Sons
John Doll, Project Manager
Gary Morrow, Site Superintendent

Ground Engineering, Inc

Health & Safety

No health and safety issues or concerns this week.

Schedule

Morrow said they do not think they will meet the October 15th substantial completion date but that they anticipate meeting the final completion date of October 31st.

Liner Construction

Morrow said that they have resumed off-site moisture conditioning of Zone 1a and Zone 2.

Material Hauling

Morrow acknowledged the lack of trucks hauling material to the site is an issue. They indicated that additional trucks would be available starting Monday, Sept 28.



Staff gauge installation

GEI discussed preliminary plans for staff gauge installation with Morrow. GEI has submitted a preliminary design to the SEO for approval and will provide Morrow with the final design when approved.

Grouted rip-rap rundown channel

Morrow said they will resubmit the grout submittal for a 5000psi mix. GEI and Morrow discussed the proposed construction of the rundown channel. GEI reiterated that the channel does not need to be staked by a surveyor. It can be constructed to the dimensions in the contract drawings to the satisfaction of the GEI Field Engineer.



Weekly Progress Meeting Minutes – Meeting 15 Grand County Water and Sanitation District No. 1 GCWSD #2 Enlarging and Lining Construction

Location GCWSD #2
Date October 1, 2015
Time 11:00 a.m.

Attendees

GCWSD No. 1
Bruce Hutchins, Project Manager

Tim Shenk Land Surveying, Inc.

Colorado SEO

GEI Consultants
Jeremy Deuto, Project Manager
Ben Taylor, Field Engineer

Morrow and Sons
John Doll, Project Manager

Ground Engineering, Inc

Health & Safety

John Doll said that Gary Morrow is out of work for health reasons until at least next Monday (10/5).

Schedule

Morrow said the project will possibly run past the contract final completion date of October 31st. Because the most recent schedule provided by Morrow shows a project end date of October 31st, GCWSD requested that Morrow provide a realistic schedule with a revised completion date (see attached schedule). GCWSD said they would discuss possible liquidated damages with Morrow closer to October 31st.

Excavation

Morrow estimated the total haul off volume to date as 72,000 CY which is above the anticipated haul off volume of 61,000 CY. GEI will discuss with GCWSD options for further excavation from the reservoir floor. GEI asked Morrow to provide more as-built survey data points to help GEI determine actual volumes vs. design volumes.



Liner construction

Morrow said that they are running out of the native clayey sand stockpiles for Zone 1A mixing and will move to another stockpile southeast of the current mixing area. Morrow said that the test pits in this stockpile indicated that it contained similar soil to the native soil currently being used in the Zone 1A mix. GEI is OK with continuing to take gradations after bentonite is added and mixed unless the GEI Field Engineer visually determines the Zone 1A material is inconsistent with previous placed Zone 1A.

GEI noted that the most recent gradation results for Zone 1A contained 28.5% fines which is below the 30% minimum required in the contract specifications. Morrow said that they have decreased the volume of native clayey sand mixed with each bag of powdered bentonite by roughly 10%. *Update: Two gradations performed on samples collected on 9/30 indicated an average fines content of 32.1%.*

Staff gage installation

GEI distributed draft construction drawings to Morrow for staff gage installation. GEI will inform Morrow when the drawings are finalized and have been approved by the SEO.

Grouted rip-rap rundown channel

Morrow said they will bring a sample of the Type M riprap to the site for approval by the GEI Field Engineer because the supplying pit does not have a gradation for it. Morrow plans to construct the rundown channel at the end of next week.

October 2015							November 2015						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7	1	2	3	4	5	6	7
8	9	10	11	12	13	14	8	9	10	11	12	13	14
15	16	17	18	19	20	21	15	16	17	18	19	20	21
22	23	24	25	26	27	28	22	23	24	25	26	27	28
29	30	31					29	30					

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November 2015

November 2015							December 2015						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7	6	7	8	9	10	11	12
8	9	10	11	12	13	14	13	14	15	16	17	18	19
15	16	17	18	19	20	21	20	21	22	23	24	25	26
22	23	24	25	26	27	28	27	28	29	30	31		

Nov 1 - 7		Nov 8 - 14		Nov 15 - 21		Nov 22 - 28		Nov 29 - Dec 5	
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday			
Nov 1	2	3	4	5	6	7			
	Export Final Deepening								
	Placement 1:1 Slope West side 1A & 1B, Keyway cut								
8	9	10	11	12	13	14			
	Export Final Deepening								
15	16	17	18	19	20	21			
	Clean Up								
22	23	24	25	26	27	28			
29	30	Dec 1	2	3	4	5			



Weekly Progress Meeting Minutes – Meeting 16 Grand County Water and Sanitation District No. 1 GCWSD #2 Enlarging and Lining Construction

Location GCWSD #2
Date October 8, 2015
Time 11:00 a.m.

Attendees

GCWSD No. 1
Bruce Hutchins, Project Manager

GEI Consultants
Ben Taylor, Field Engineer

Tim Shenk Land Surveying, Inc.

Morrow and Sons
Tim Johnson (Diamond Excavating)

Colorado SEO

Ground Engineering, Inc
Steve Peters, Area Manager

Health & Safety

No health and safety issue or concerns this week.

Schedule

GCWSD asked GEI to request a number of full days lost due to weather from Morrow.

Liner construction

GEI noted that Morrow has moved to a new borrow pile of native clayey sand at the Zone 1A mixing area of Morrow's gravel pit. On Tuesday, October 6, GEI instructed the Ground Engineering field technician to collect a gradation analysis sample from the new borrow pile and from the latest batch of Zone 1A mix to check the fines content of the native material and also check if an adequate amount of powdered bentonite is being added to the mix. Ground said they plan to have the results available on Friday, October 9. *Update: The gradation analysis results for the native borrow and Zone 1A mix showed fines contents of 27.5% and 34.2% respectively. The Zone 1A mix meets specifications for minimum fines content (30%) and minimum bentonite added (2.5%).*

GEI noted that Morrow had previously indicated that there was an issue with their powdered bentonite supplier and the next shipment would not arrive until Friday (10/9) or Monday (10/12) which may delay mixing of Zone 1A. *Update: Powdered bentonite was delivered to the mixing area on Friday, October 9.*



Staff gage installation

GEI is preparing revised construction drawings reflecting the addition of a staff gage. *Update: GEI has sent revised drawings to Morrow and requested a cost estimate by the weekly meeting on Thursday, October 15.*

Grouted riprap rundown channel

Diamond said that the grout pour for the riprap rundown channel is scheduled for Tuesday, October 13 at 9am. *Update: The pour was moved to 11am on Tuesday.*



Weekly Progress Meeting Minutes – Meeting 17 Grand County Water and Sanitation District No. 1 GCWSD #2 Enlarging and Lining Construction

Location GCWSD #2
Date October 15, 2015
Time 11:00 a.m.

Attendees

GCWSD No. 1
Bruce Hutchins, Project Manager

Tim Shenk Land Surveying, Inc.
Derek Howard, Surveyor

Ground Engineering, Inc.
Steve Peters, Area Manager

GEI Consultants
Jeremy Deuto, Project Manager
Ben Taylor, Field Engineer

Morrow and Sons
John Doll, Project Manager
Gary Morrow, Superintendent

Health & Safety

No health and safety issues or concerns this week.

Schedule

Morrow provided an updated schedule (attached). The schedule shows liner completion anticipated during the first week of November. Morrow said they have estimated three full days of work lost due to weather. Morrow will submit a list of dates to GEI and GCWSD for approval of an adjustment of the contract substantial completion date of October 15, 2015.

GCWSD asked Morrow and GEI to discuss possible construction cost write-offs as an alternative to GCWSD deducting liquidated damages from contract payments to Morrow. GCWSD has asked for proposed write-offs before the GCWSD board meeting next Wednesday, October 21.

Liner construction

Morrow and GEI noted that groundwater has been less of an issue to liner construction on the 1:1 slope. Groundwater levels and infiltration rates appear to be dropping.



Morrow noted that they are preparing to move to new borrow piles of native clayey sand at Morrow's gravel pit. They have begun to investigate the piles to visually determine which piles have the highest clay content. GEI will look at the proposed borrow piles and may request gradation analyses if the Field Engineer determines that the soil visually appears to contain fewer fines than soil in previous borrow piles.

Staff gage installation

Morrow has provided GCWSD and GEI with a cost estimate for staff gage installation. Morrow plans to begin construction the week of October 19.

Grouted riprap rundown channel

The rundown channel was grouted on Tuesday, October 13. Ground Engineering performed on-site grout testing services and collected grout cylinders for compressive strength testing.

Excavation and Haul Off

GEI will observe test pits excavated by Morrow in the reservoir floor and develop a volume estimate of remaining material above bedrock, which is the design final grade for the reservoir floor.

October 2015							November 2015						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7	1	2	3	4	5	6	7
8	9	10	11	12	13	14	8	9	10	11	12	13	14
15	16	17	18	19	20	21	15	16	17	18	19	20	21
22	23	24	25	26	27	28	22	23	24	25	26	27	28
29	30	31					29	30					

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November 2015

November 2015							December 2015						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7	6	7	8	9	10	11	12
8	9	10	11	12	13	14	13	14	15	16	17	18	19
15	16	17	18	19	20	21	20	21	22	23	24	25	26
22	23	24	25	26	27	28	27	28	29	30	31		

Nov 1 - 7		Nov 8 - 14		Nov 15 - 21		Nov 22 - 28		Nov 29 - Dec 5	
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday			
Nov 1	2	3	4	5	6	7			
	Export Final Deepening								
	Final tie in North Quadrant 17+19								
	North Slope 1B Placement								
	Placement 1:1 Slope West side 1A & 1B								
8	9	10	11	12	13	14			
	Clean up								
	Export Final Deepening								
15	16	17	18	19	20	21			
	Clean Up								
22	23	24	25	26	27	28			
29	30	Dec 1	2	3	4	5			



Weekly Progress Meeting Minutes – Meeting 18 Grand County Water and Sanitation District No. 1 GCWSD #2 Enlarging and Lining Construction

Location GCWSD #2
Date October 28, 2015
Time 11:00 a.m.

Attendees

GCWSD No. 1
Bruce Hutchins, Project Manager

GEI Consultants
Jeremy Deuto, Project Manager (via phone)
Ben Taylor, Field Engineer

Morrow and Sons
John Doll, Project Manager
Gary Morrow, Superintendent

Health & Safety

No health and safety issues or concerns this week.

Schedule

Morrow said they believe they will still meet the extended final completion date of November 21 pending weather. Latest schedule (attached) shows liner placement completion by November 7. GCWSD asked GEI for an estimate of engineering costs through the end of construction so that GCWSD and Morrow can discuss dividing the costs. GEI will work on costs on Monday (11/2).

Slope construction

GEI noted that in accordance with the construction drawings, 6:1 slopes should be constructed at the toe of the 3:1 slopes between stations where the floor liner is constructed. Already constructed slopes that are shallower than 3:1 and have greater than 1 foot of Zone1B cover should be cut by Morrow to remove excess material.

Excavation and Haul Off

Based on test pits excavated on October 24, GEI estimated that approximately 2,300 CY of alluvial overburden still needs to be hauled offsite. There is also material on the southwest corner slopes currently being excavated (approximately 1,000 CY) and floor material that will be excavated from the northwest corner for construction of the last section of liner.

October 2015							November 2015						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
4	5	6	7	8	9	10	1	2	3	4	5	6	7
11	12	13	14	15	16	17	8	9	10	11	12	13	14
18	19	20	21	22	23	24	15	16	17	18	19	20	21
25	26	27	28	29	30	31	22	23	24	25	26	27	28
							29	30					

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November 2015							December 2015						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7			1	2	3	4	5
8	9	10	11	12	13	14	6	7	8	9	10	11	12
15	16	17	18	19	20	21	13	14	15	16	17	18	19
22	23	24	25	26	27	28	20	21	22	23	24	25	26
29	30						27	28	29	30	31		

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Weekly Progress Meeting Minutes – Meeting 19 Grand County Water and Sanitation District No. 1 GCWSD #2 Enlarging and Lining Construction

Location GCWSD #2
Date November 12, 2015
Time 1:00 p.m.

Attendees

GCWSD No. 1
Bruce Hutchins, Project Manager

Ground Engineering
Steve Peters, Area Manager

GEI Consultants
Jeremy Deuto, Project Manager
Ben Taylor, Field Engineer

Morrow and Sons
John Doll, Project Manager
Gary Morrow, Superintendent

Health & Safety

No health and safety issues or concerns this week.

Schedule

The pros and cons of a winter shutdown were discussed. The biggest cons included a June 6, 2016 deadline for GCWSD to receive a CWCC grant and the dewatering effort required by Morrow to resume construction in the spring. All parties concluded that it is in everybody's interest to continue with the push to finish construction in 2015 despite the complications caused by winter weather. GEI plans to commence the 90-day leak test soon because the low-permeability barrier is substantially complete.

Slope construction

GEI reiterated that frozen fill shall not be placed and that fill shall not be placed on a frozen fill surface. Frozen fill may be reused later if it is thoroughly thawed before being placed.

Morrow said they will check on the status of final survey data from Shenk for the already completed slopes and will forward the data to GEI for review.

Staff Gage Construction

Morrow is planning on a concrete pour at 1pm on Friday November 13, 2015. GEI will check the formwork and rebar placement and Ground will provide materials testing services for the concrete pour.



Weekly Progress Meeting Minutes – Meeting 20 Grand County Water and Sanitation District No. 1 GCWSD #2 Enlarging and Lining Construction

Location GCWSD No. 1 office
Date November 18, 2015
Time 11:00 a.m.

Attendees

GCWSD No. 1
Bruce Hutchins, Project Manager

Ground Engineering
Steve Peters, Area Manager

GEI Consultants
Jeremy Deuto, Project Manager
Ben Taylor, Field Engineer

Morrow and Sons
John Doll, Project Manager

Health & Safety

No health and safety issues or concerns this week.

Schedule

Morrow hopes to finish the Zone 1A fill above the stability buttress by the end of this week. Morrow said they plan to work from both ends of the west side to finalize the 3:1 slopes. Morrow anticipates approximately 50ft of progress per day depending on weather conditions which is roughly 15 days. After the slopes are complete, Morrow plans to start the final haul off of overburden material on the reservoir floor. Morrow said they will perform final cleanup on the reservoir rim next spring.

Slope construction

Ground said they will contact Morrow each day around noon to check if materials testing will be needed on that day. Steve plans to cover testing through the end of the project and will call in another technician as needed. GEI has some survey data from Shenk Surveying and GEI will use it check for overbuilt areas of 3:1 slopes and also calculate allowable seepage for the leak test.

Staff Gage Construction

Morrow said that Shenk will survey the staff gage pedestals on 11/19 or 11/20 so that Morrow can install the staff gages.



Weekly Progress Meeting Minutes – Meeting 21 Grand County Water and Sanitation District No. 1 GCWSD #2 Enlarging and Lining Construction

Location GCWSD #2
Date December 4, 2015
Time 11:00 a.m.

Attendees

GCWSD No. 1
Bruce Hutchins, Project Manager

GEI Consultants
Ben Taylor, Field Engineer

Ground Engineering
Steve Peters, Area Manager

Morrow and Sons
John Doll, Project Manager

Health & Safety

No health and safety issues or concerns this week.

Schedule

Morrow is finishing slope construction today. They plan to start the final reservoir floor excavation and haul off on Monday beginning at the north end of the reservoir. Morrow anticipates hauling off approximately 1,000 cubic yards per day, conditions permitting, which could mean finishing as early as the end of next week.

Slope construction

GCWSD is OK with leaving the haul ramp in the southwest corner of the reservoir in place if it does not affect total storage volume. GEI asked Morrow to provide survey data of the ramp so that GEI can check the volume displaced by the ramp.

GEI and Colorado SEO will be onsite next Wednesday (12/9) at 11am for final inspection of the jurisdictional section of the reservoir. GEI also plans to start the leak test next week.

Payment Applications

Morrow is preparing another payment application but both Morrow and GCWSD acknowledge that a supplemental application will likely be needed after the final survey is performed for the entire reservoir.



Weekly Progress Meeting Minutes – Meeting 22 Grand County Water and Sanitation District No. 1 GCWSD #2 Enlarging and Lining Construction

Location GCWSD No. 1 Office
Date February 3, 2016
Time 10:30 a.m.

Attendees

GCWSD No. 1
Bruce Hutchins, Project Manager

GEI Consultants
Jeremy Deuto, Project Manager
Ben Taylor, Field Engineer

Morrow and Sons
John Doll, Project Manager
Gary Morrow, Superintendent
Craig Morrow, Superintendent

Tim Shenk Land Surveying
Derrick Howard, Surveyor

Schedule

This is the final project meeting. Morrow has completed excavation of material from the floor of the reservoir and said they are confident that they are down to bedrock over the entire floor. Morrow has three pieces of equipment still on the reservoir floor and was waiting to demobilize them until after this meeting.

Reservoir Leak Test

GEI said the reservoir leak test is going well and that the current groundwater seepage rate into the reservoir is approximately 5 gallons per minute which is under the design criteria of approximately 10 gallons per minute.

Reservoir Storage Capacity

GEI said the calculated post-construction Normal High Water Level storage capacity is approximately 70 acre-feet based on the as-built survey data provided by Tim Shenk Land Surveying Inc. (TSLSI). This is less than the post-construction storage capacity of 79.2 acre-feet estimated during the design as shown on the elevation-area-capacity curve in Drawing No. G-2.

Update: A revised calculation of storage capacity using the August 2014 survey by TSLSI yielded an actual pre-construction storage capacity of 54.3 acre-feet (compared to the design estimate of 59.2 acre-feet). The current storage capacity of approximately 70 acre-feet is 15 acre-feet greater than pre-construction capacity (compared to a design estimated increase of 20 acre-feet above pre-construction capacity).



Factors that possibly contributed to a slightly smaller than anticipated increase in post-construction storage capacity include bedrock being located at higher elevations than assumed for the design (especially in the southern half of the reservoir) and constructed slopes that were slightly steeper than 3H:1V in some areas of the reservoir.

Haul off volume

Both GEI and TSLSI said they calculated a total excavation volume of approximately 71,500 bank cubic yards based on pre-construction contours and lowest excavation contours surveyed by TSLSI. Assuming a swell of 15% when excavated, the equivalent haul volume would be approximately 82,000 loose cubic yards. GEI estimates that approximately 11,000 loose cubic yards of excavated material remained onsite and was processed into Zone 1b. Therefore, the maximum volume available for haul off was approximately 71,000 loose cubic yards. This volume is approximately 25% less than the 96,000 loose cubic yards of hauled material estimated by Morrow based on truck counts.

Update: The quantity of offsite haul eligible for payment can be calculated using a mass balance of surveyed quantities. TSLSI calculated the total excavation volume as 71,280 bank cubic yards and the total fill volume as 48,270 bank cubic yards. Essentially all fill placed in the reservoir is composed of either Zone 1A or Zone 1b/Zone 2 materials. The volume of Zone 1a was estimated by TSLSI to be 21,800 bank cubic yards which means that the volume of Zone 1b/Zone 2 must be $48,270 - 21,800 = 26,470$ bank cubic yards.

Because the Zone 1b/Zone 2 materials were intended to be entirely derived and processed from soil excavated from the reservoir per contract specifications, this volume must be subtracted from the total excavation volume of 71,280 bank cubic yards. The net volume of 44,810 bank cubic yards is the volume of material eligible for payment under Bid Item No. 10 – Offsite Haul/Disposal.

Final Payment Application

GEI presented a table of excavation quantities. GEI and Morrow went through each bid item and discussed the differences in estimated design quantities and post-construction quantities calculated from TSLSI as-built drawings. All parties agreed that because the differences in quantities effectively resulted in offsetting costs, no change would be made to the contract price. Morrow has agreed to contribute approximately \$15,000 of an additional \$30,000 in engineering costs incurred by GCWSD and GEI due to Morrow's extension of the construction schedule beyond the contract final completion date. GCWSD indicated they plan to deduct Morrow's contribution from the final retainage.

Final retainage will be held by GCWSD until Morrow completes final site cleanup and demobilization in the spring.

Update: The volume of material eligible for payment under Bid Item No. 10 is 1,810 bank cubic yards more than the estimated design quantity of 43,000 bank cubic yards and, at a bid unit price of \$5.03/CY, would result in an amount owed to Morrow of \$9,104.

The volume of Zone 1b/Zone2 is 2,230 bank cubic yards less than the estimated design quantity of 28,700 bank cubic yards and, at a bid unit price of \$4.00/CY, would result in a credit to GCWSD of \$8,920.



Because Morrow has already received 100% of the scheduled value for Zone 1b/Zone 2 in previous pay applications they have effectively been overpaid \$8,920. If Morrow requests 100% payment of the scheduled value for Bid Item No. 10 on the final pay application (instead of 100% plus \$9,104), they will effectively credit \$9,104 to GCWSD which for practical purposes will cancel out the previous overpayment.

Haul off to Benson Pit

GCWSD asked that GEI estimate the actual volume of material hauled to Grand County's Benson pit using Morrow's truck numbers and the surveyed in-place volumes. GEI said they will provide GCWSD with a memo presenting the haul volume estimate and explaining calculations and assumptions.

Materials Testing

GCWSD asked GEI to find out the number of passed density tests and the number of failed density tests conducted by Ground Engineering. GCWSD indicated they may charge Morrow for the failed density tests.

Appendix G Materials Testing Reports

GROUND

ENGINEERING CONSULTANTS

GRADATION PROPERTIES

Project: **Reservior No. 2 Improvements**
Job Number: **15-2549** Date: August 8, 2015
Reported to: Grand County Water & Sanitation District #1
PO Box 3077
50 Vasquez Road
Winter Park, CO 80482
Attn: Mr. Bruce Hutchins

Sample Information

Sample Number: 1157
Sample Location: Morrow Pit
Aggregate Identification: Zone 1A Native
Date Sampled: 8/4/2015
Sampled By: GEI

Gradation Analysis

Sieve Size (opening)	Passing (%)
1 1/2"	
1"	
3/4"	100
1/2"	93
3/8"	87
#4	73
#8	61
#16	48
#30	36
#50	25
#100	18
#200	12.9

GROUND

ENGINEERING CONSULTANTS

GRADATION PROPERTIES

Project: **Reservior No. 2 Improvements**
Job Number: **15-2549** Date: August 8, 2015
Reported to: Grand County Water & Sanitation District #1
PO Box 3077
50 Vasquez Road
Winter Park, CO 80482
Attn: Mr. Bruce Hutchins

Sample Information

Sample Number: 1158
Sample Location: Morrow Pit
Aggregate Identification: Zone 1A w/ Bentonite
Date Sampled: 8/4/2015
Sampled By: GEI

Gradation Analysis

Sieve Size (opening)	Passing (%)
1 1/2"	
1"	
3/4"	100
1/2"	96
3/8"	89
#4	76
#8	66
#16	55
#30	44
#50	35
#100	27
#200	21.3

LABORATORY COMPACTION (PROCTOR) TEST REPORT

Curve No.: 1159

Project No.: 15-2549

Date: August 4, 2015

Project: Reservoir #2

Client: GCWSD#1

Location: Zone 1A with Bentonite

Sample Number: 1159

Remarks:

MATERIAL DESCRIPTION

Description: Clayey Sand

Classifications -

USCS: SC

AASHTO:

Nat. Moist. = 6.5 %

Sp.G. =

Liquid Limit =

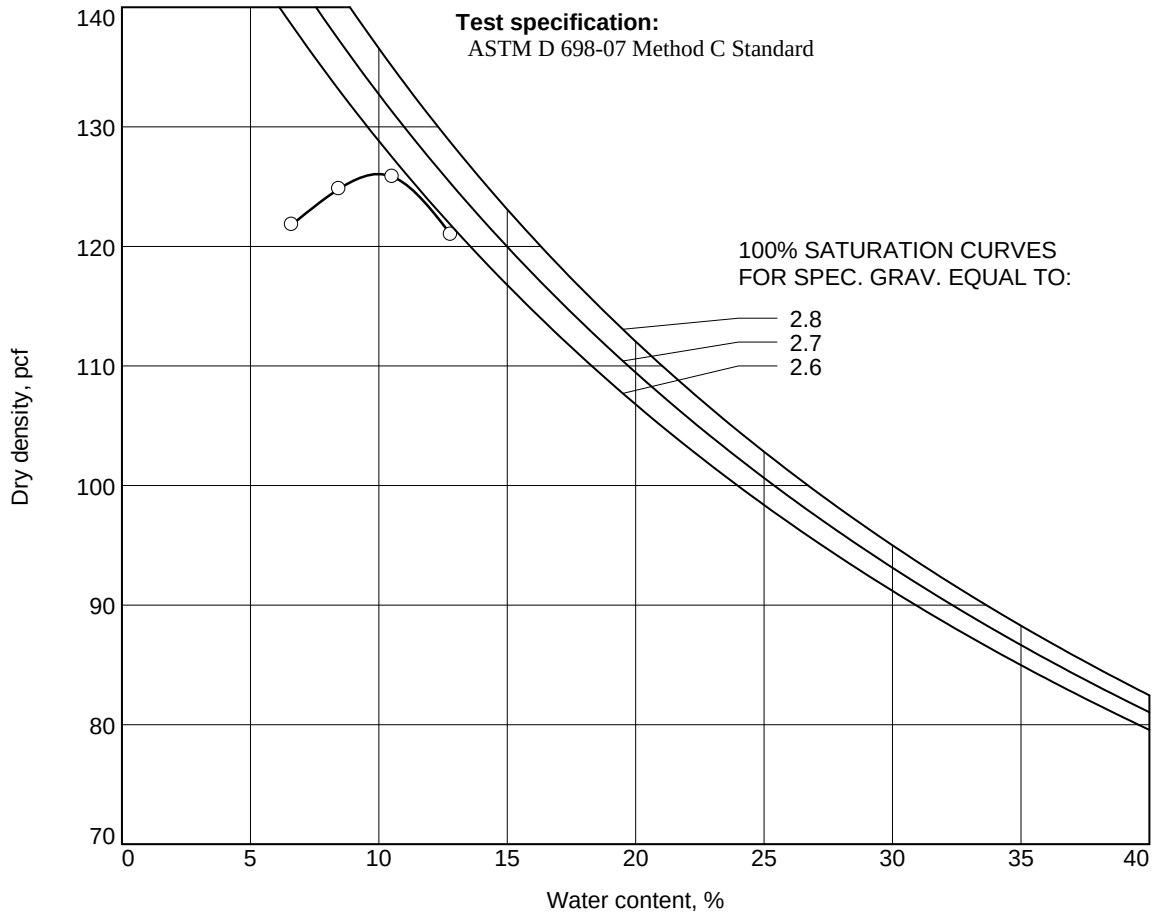
Plasticity Index =

% < No.200 =

TEST RESULTS

Maximum dry density = 126.1 pcf

Optimum moisture = 10.0 %



GROUND ENGINEERING CONSULTANTS, INC.

Figure

Tested By: PW Checked By: SP

LABORATORY COMPACTION (PROCTOR) TEST REPORT

Curve No.: 1160

Project No.: 15-2549

Date: August 4, 2015

Project: Reservoir #2

Client: GCWSD#1

Location: Zone 2

Sample Number: 1160

Remarks:

MATERIAL DESCRIPTION

Description: silty sand and gravel

Classifications -

USCS:

AASHTO:

Nat. Moist. =

Sp.G. =

Liquid Limit =

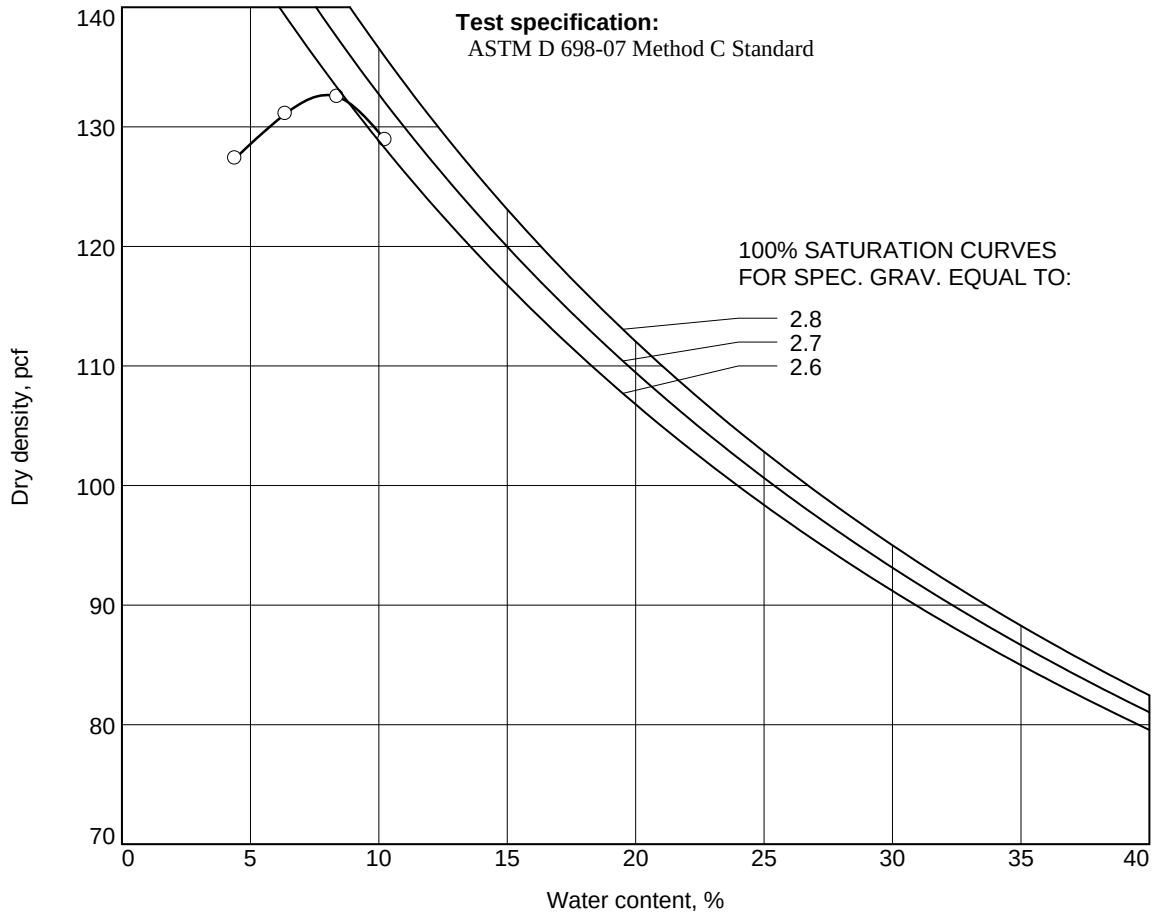
Plasticity Index =

% < No.200 =

TEST RESULTS

Maximum dry density = 132.7 pcf

Optimum moisture = 8.0 %



GROUND ENGINEERING CONSULTANTS, INC.

Figure

Tested By: PW Checked By: SP

Reservoir 2 Improvements

Job No: 15-2549

Date: August 13, 2015

General Comments

As scheduled, a representative arrived on-site to perform the below discussed services and we have the following comments.

A sample of the proposed Zone 1B material was collected and transported to the laboratory and prepared for testing. Test results will be forwarded upon completion.

Gary Morrow with Morrow and Sons was immediately notified of today's site visit.



Field Representative: Steve Peters

GROUND

ENGINEERING CONSULTANTS

GRADATION PROPERTIES

Project: **Reservior No. 2 Improvements**

Job Number: **15-2549**

Date: August 18, 2015

Reported to: Grand County Water & Sanitation District #1

PO Box 3077

50 Vasquez Road

Winter Park, CO 80482

Attn: Mr. Bruce Hutchins

Sample Information

Sample Number: 1161

Sample Location: Reservoir #2

Aggregate Identification: Zone 1B

Date Sampled: 8/13/2015

Sampled By: SP

Gradation Analysis

Sieve Size (opening)	Passing (%)
4"	100
3"	91
2 1/2"	85
2"	78
1 1/2"	68
1"	63
3/4"	58
1/2"	52
3/8"	43
#4	36
#8	34
#16	26
#30	18
#50	12
#100	9
#200	6.5

LABORATORY COMPACTION (PROCTOR) TEST REPORT

Curve No.: 1161

Project No.: 15-2549

Date: August 13, 2015

Project: Reservoir #2

Client: GCWSD#1

Location: Zone 1B

Sample Number: 1161

Remarks:

MATERIAL DESCRIPTION

Description: Clayey Sand and Gravel with Cobble

Classifications -

USCS: GW

AASHTO: A-1-b

Nat. Moist. = 5.2 %

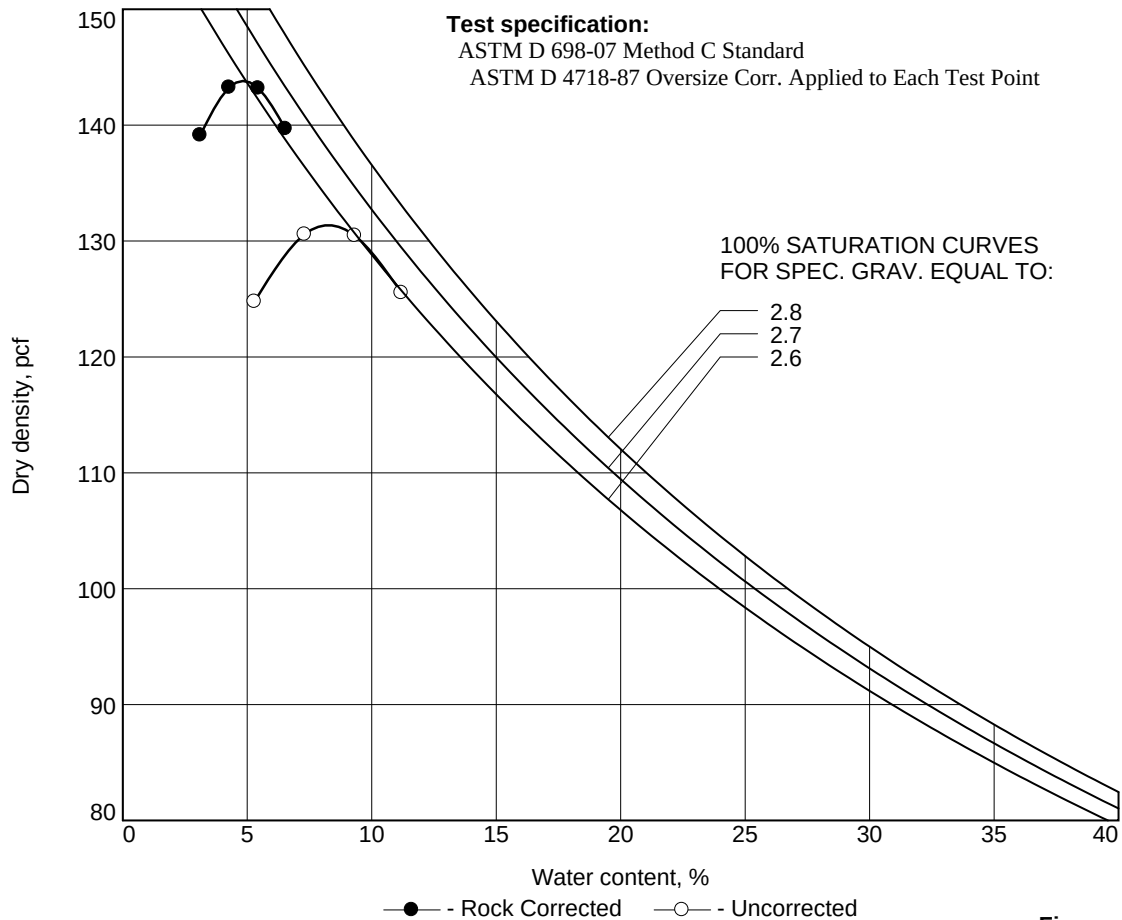
Sp.G. =

Liquid Limit =

Plasticity Index =

% < No.200 = 6.5 %

ROCK CORRECTED TEST RESULTS	UNCORRECTED
Maximum dry density = 143.8 pcf	131.4 pcf
Optimum moisture = 4.8 %	8.3 %



Figure

GROUND ENGINEERING CONSULTANTS, INC.

Tested By: PW Checked By: SP

GROUND

ENGINEERING CONSULTANTS

GRADATION PROPERTIES

Project: **Reservior No. 2 Improvements**
Job Number: **15-2549** Date: August 20, 2015
Reported to: Grand County Water & Sanitation District #1
PO Box 3077
50 Vasquez Road
Winter Park, CO 80482
Attn: Mr. Bruce Hutchins

Sample Information

Sample Number: 1162
Sample Location: Morrow Pit
Aggregate Identification: Zone 1A w/ Bentonite
Date Sampled: 8/18/2015
Sampled By: SP

Gradation Analysis

Sieve Size (opening)	Passing (%)
1 1/2"	
1"	
3/4"	100
1/2"	97
3/8"	94
#4	85
#8	73
#16	62
#30	51
#50	41
#100	33
#200	27.2

LABORATORY COMPACTION (PROCTOR) TEST REPORT

Curve No.: 1162

Project No.: 15-2549

Date: August 18, 2015

Project: Reservoir #2

Client: GCWSD#1

Location: Zone 1A with Bentonite

Sample Number: 1162

Remarks:

MATERIAL DESCRIPTION

Description: Clayey Sand

Classifications -

USCS: SC

AASHTO: A-2-6

Nat. Moist. = 7.4 %

Sp.G. =

Liquid Limit =

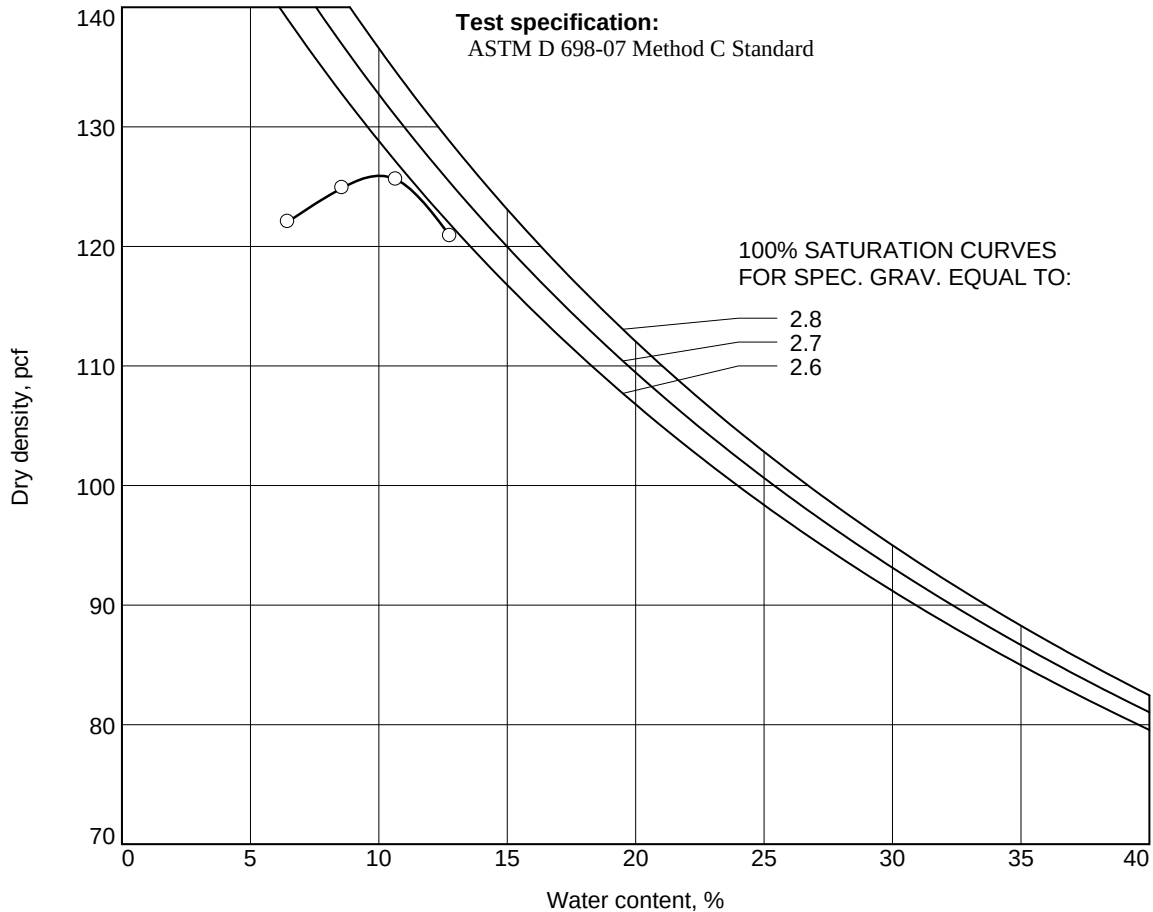
Plasticity Index =

% < No.200 = 27.2 %

TEST RESULTS

Maximum dry density = 125.9 pcf

Optimum moisture = 10.0 %



Figure

GROUND ENGINEERING CONSULTANTS, INC.

Tested By: SP Checked By: SP

GROUND

ENGINEERING CONSULTANTS

GRADATION PROPERTIES

Project: **Reservior No. 2 Improvements**

Job Number: **15-2549**

Date: August 24, 2015

Reported to: Grand County Water & Sanitation District #1

PO Box 3077

50 Vasquez Road

Winter Park, CO 80482

Attn: Mr. Bruce Hutchins

Sample Information

Sample Number: 1164

Sample Location: Morrow Pit - East Ridge

Aggregate Identification: Zone 1A w/ Bentonite

Date Sampled: 8/21/2015

Sampled By: SP

Gradation Analysis

Sieve Size (opening)	Passing (%)
1 1/2"	
1"	
3/4"	100
1/2"	99
3/8"	98
#4	91
#8	82
#16	70
#30	59
#50	48
#100	39
#200	31.8

LABORATORY COMPACTION (PROCTOR) TEST REPORT

Curve No.: 1164

Project No.: 15-2549

Date: 8/21/2015

Project: Reservoir #2

Client: GCWSD#1

Location: Zone 1A With Bentonite (East Ridge)

Sample Number: 1164

Remarks:

MATERIAL DESCRIPTION

Description: Clayey Sand

Classifications -

USCS: SC

AASHTO: A-2-6

Nat. Moist. = 10.4 %

Sp.G. =

Liquid Limit = 32

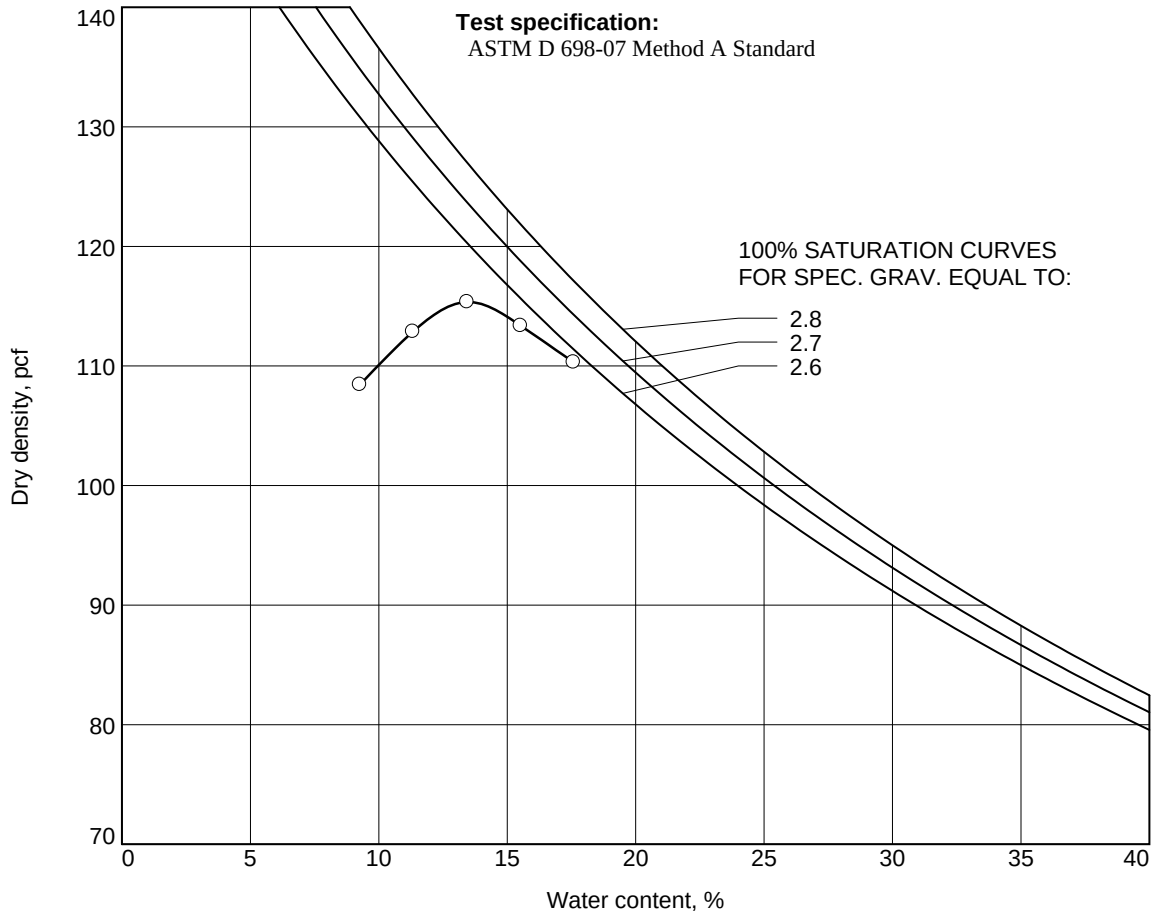
Plasticity Index = 14

% < No.200 = 31.8 %

TEST RESULTS

Maximum dry density = 115.4 pcf

Optimum moisture = 13.5 %



Figure

GROUND ENGINEERING CONSULTANTS, INC.

Tested By: PW Checked By: SP

Reservoir 2 Improvements

Soil Cover Report

Date: August 25, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 76

Standard Counts: 2410 / 626

No. of Samples Collected: None

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Steve Peters

Reservoir 2 Improvements

Date: August 25, 2015

Job Number: 15-2549

Report Type: Utility Backfill

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Loader, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Section B/C-4

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
1	Key at STA 4+15	RSG	123.5	112.9	9.4	115.4	13.5	97.8	Fail	Zone 1A
1.1	Key at STA 4+15 (Retest)	RSG	122.4	109.4	11.9	115.4	13.5	94.8	Fail	Zone 1A
2	STA 4+20, 30' Left	6' BG	137.8	129.0	6.8	143.8	4.8	89.7	Fail	Zone 1B
2.1	STA 4+20, 30' Left (Retest)	6' BG	142.8	136.5	4.6	143.8	4.8	95.0	Pass	Zone 1B
1.2	Key at STA 4+15 (Retest)	RSG	126.1	112.9	11.7	115.4	13.5	97.8	Pass	Zone 1A

Specifications: Min. 95 % Max. Dry Density and from -2 to +2 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Steve Peters

Comments: RSG = Rough Surface Grade
BG = Below Grade

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Reservoir 2 Improvements

Soil Cover Report

Date: August 26, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 76

Standard Counts: 2396 / 626

No. of Samples Collected: None

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Steve Peters

Reservoir 2 Improvements

Date: August 26, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Loader, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Section B/C-4

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
3	Key at STA 3+35	RSG	128.0	113.3	13.0	115.4	13.5	98.2	Pass	Zone 1A
4	STA 3+75, 25' Left	8' BG	127.1	113.9	11.6	115.4	13.5	98.7	Pass	Zone 1A
5	STA 4+05, 15' Left	5' BG	127.0	111.8	13.6	115.4	13.5	96.9	Pass	Zone 1A
6	STA 4+00, 25' Left	6' BG	143.4	137.4	4.4	143.8	4.8	95.5	Pass	Zone 1B

Specifications: Min. 95 % Max. Dry Density and from -2 to +2 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Steve Peters

Comments: RSG = Rough Surface Grade
BG = Below Grade

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Reservoir 2 Improvements

Soil Cover Report

Date: August 28, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 76

Standard Counts: 2408 / 631

No. of Samples Collected: 2

Lab Sample Location: Key at STA 3+15

Lab Sample Location: Zone 1A at STA 3+55

No. of Pages Attached: 1

Field Representative: Steve Peters

Reservoir 2 Improvements

Date: August 28, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Dean Morrow

Equipment Utilized: Excavator, Loader, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Section B/C-4

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
7	Key at STA 3+15	RSG	139.7	125.6	11.2	125.9	10.0	99.8	Pass	Zone 1A
8	STA 3+40, 20' Left	9' BG	126.7	113.1	12.0	115.4	13.5	98.0	Pass	Zone 1A
9	STA 3+55, 15' Left	6' BG	127.5	114.0	11.8	115.4	13.5	98.8	Pass	Zone 1A
10	STA 3+75, 15' Left	4' BG	127.0	113.6	11.8	115.4	13.5	98.4	Pass	Zone 1A
11	STA 3+90, 30' Left	3' BG	146.0	140.8	3.7	143.8	4.8	97.9	Pass	Zone 1B
12	STA 3+50, 25' Left	4' BG	140.9	135.6	3.9	143.8	4.8	94.3	Fail	Zone 1B
12.1	STA 3+50, 25' Left (Retest)	4' BG	142.6	137.1	4.0	143.8	4.8	95.3	Pass	Zone 1B
13	STA 3+45, 20' Left	5' BG	136.2	122.0	11.6	125.9	10.0	96.9	Pass	Zone 1A

Specifications: Min. 95 % Max. Dry Density and from -2 to +2 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Steve Peters

Comments: RSG = Rough Surface Grade
BG = Below Grade

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Reservoir 2 Improvements

Soil Cover Report

Date: September 1, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 47

Standard Counts: 2161 / 666

No. of Samples Collected: 0

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Parker Wells

Reservoir 2 Improvements

Date: September 1, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Loader, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Section B/C-4

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
14	STA 3+15, 20' Left	3' BG	137.0	122.5	11.8	125.9	10.0	97.3	Pass	Zone 1A
15	STA 2+95, 30' Left	7' BG	136.4	122.4	11.4	125.9	10.0	97.2	Pass	Zone 1A
16	STA 3+30, 15' Left	4' BG	144.8	138.2	4.8	143.8	4.8	96.1	Pass	Zone 1B
17	STA 3+25, 25' Left	5' BG	145.1	138.5	4.8	143.8	4.8	96.3	Pass	Zone 1B

Specifications: Min. 95 % Max. Dry Density and from -2 to 2 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Parker Wells

Comments:

Reservoir 2 Improvements

Soil Cover Report

Date: September 2, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 47

Standard Counts: 2173 / 669

No. of Samples Collected: 0

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Parker Wells

Date: September 2, 2015

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Section B/C-4

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -2 to 2 of Optimum Moisture Content

Standard Proctor Modified Proctor 

Field Technician: Parker Wells

Comments: RSG = Rough Surface Grade
BG = Below Grade

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Reservoir 2 Improvements

Soil Cover Report

Date: September 3, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 47

Standard Counts: 2179 / 677

No. of Samples Collected: 0

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Parker Wells

Reservoir 2 Improvements

Date: September 3, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Section B/C-4

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
20	Key @ STA 2+25	RSG	135.0	117.9	14.5	125.9	10.0	93.6	Fail	Zone 1A
20.1	Key @ STA 2+25 (Retest)	RSG	135.0	120.6	11.9	125.9	10.0	95.8	Pass	Zone 1A
21	Key @ STA 2+40	RSG	139.7	124.7	12.0	125.9	10.0	99.0	Pass	Zone 1A

Specifications: Min. 95 % Max. Dry Density and from -2 to 2 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Parker Wells

Comments: RSG = Rough Surface Grade

GRADATION PROPERTIES

Project: **Reservior No. 2 Improvements**
Job Number: **15-2549** Date: September 1, 2015
Reported to: Grand County Water & Sanitation District #1
PO Box 3077
50 Vasquez Road
Winter Park, CO 80482
Attn: Mr. Bruce Hutchins

Sample Information

Sample Number: 1165
Sample Location: Key at STA 3+15
Aggregate Identification: Zone 1A w/ Bentonite
Date Sampled: 8/28/2015
Sampled By: SP

Gradation Analysis

Sieve Size (opening)	Passing (%)
1 1/2"	
1"	100
3/4"	98
1/2"	94
3/8"	91
#4	84
#8	75
#16	64
#30	54
#50	45
#100	36
#200	29.1

GROUND

ENGINEERING CONSULTANTS

GRADATION PROPERTIES

Project: **Reservior No. 2 Improvements**
Job Number: **15-2549** Date: September 1, 2015
Reported to: Grand County Water & Sanitation District #1
PO Box 3077
50 Vasquez Road
Winter Park, CO 80482
Attn: Mr. Bruce Hutchins

Sample Information

Sample Number: 1166
Sample Location: STA 3+55
Aggregate Identification: Zone 1A w/ Bentonite
Date Sampled: 8/28/2015
Sampled By: SP

Gradation Analysis

Sieve Size (opening)	Passing (%)
1 1/2"	
1"	100
3/4"	98
1/2"	95
3/8"	92
#4	85
#8	76
#16	64
#30	55
#50	46
#100	37
#200	30.6

GRADATION PROPERTIES

Project: **Reservior No. 2 Improvements**
Job Number: **15-2549** Date: September 14, 2015
Reported to: Grand County Water & Sanitation District #1
PO Box 3077
50 Vasquez Road
Winter Park, CO 80482
Attn: Mr. Bruce Hutchins

Sample Information

Sample Number: 1170
Sample Location: Key at STA 1+90
Aggregate Identification: Zone 1A w/ Bentonite
Date Sampled: 9/10/2015
Sampled By: PW

Gradation Analysis

Sieve Size (opening)	Passing (%)
1 1/2"	
1"	100
3/4"	99
1/2"	97
3/8"	93
#4	86
#8	75
#16	64
#30	54
#50	45
#100	36
#200	30.2

COMPACTION TEST REPORT

Curve No.: 1170

Project No.: 15-2549

Date: September 10, 2015

Project: Reservoir #2

Client: GCWSD#1

Location: Zone 1A With Bentonite, Key at STA 1+90

Sample Number: 1170

Remarks:

MATERIAL DESCRIPTION

Description: Clayey Sand

Classifications -

USCS: SC

AASHTO: A-2-6

Nat. Moist. = 8.9 %

Sp.G. =

Liquid Limit = 31

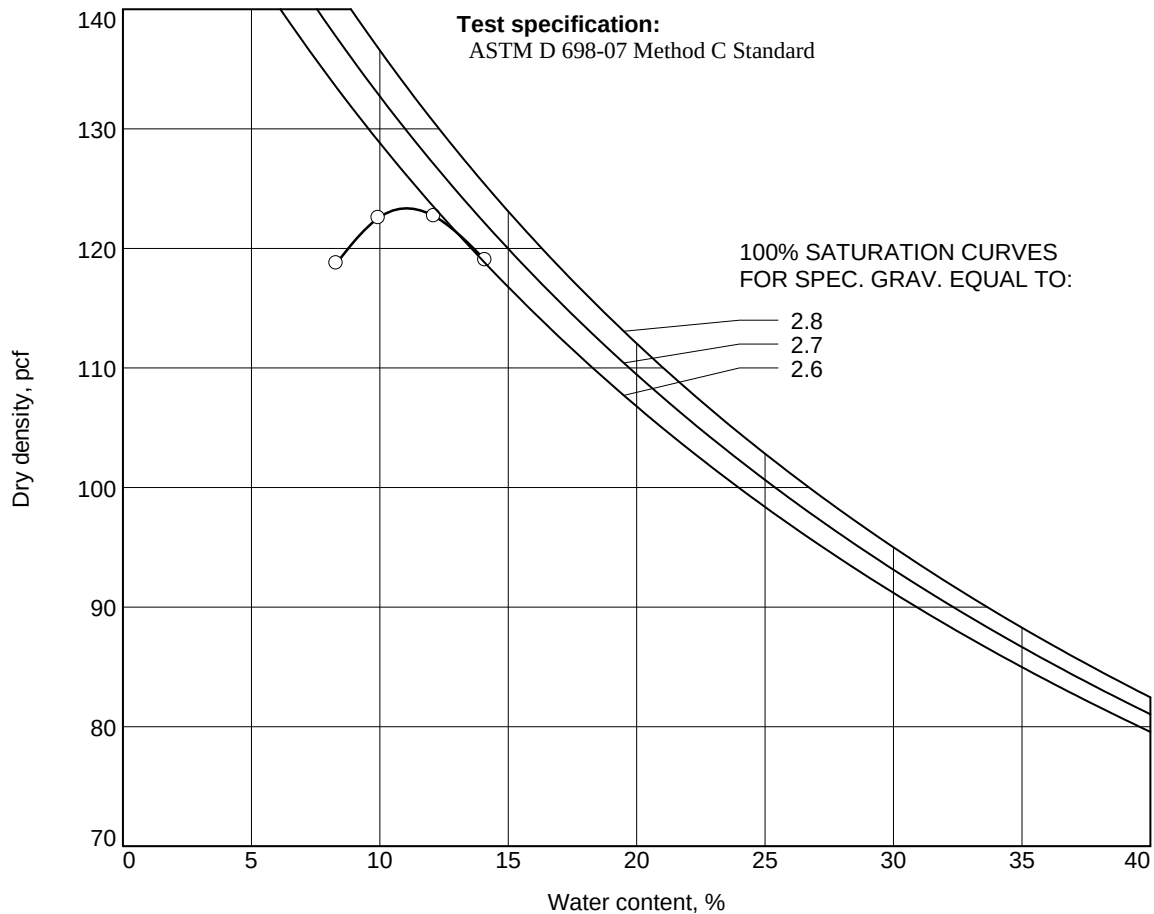
Plasticity Index = 13

% < No.200 = 30.2 %

TEST RESULTS

Maximum dry density = 123.4 pcf

Optimum moisture = 11.0 %



Figure

GROUND ENGINEERING CONSULTANTS, INC.

Tested By: PW Checked By: SP

Reservoir 2 Improvements

Soil Cover Report

Date: September 8, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 47

Standard Counts: 2174 / 673

No. of Samples Collected: 0

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Parker Wells

Reservoir 2 Improvements

Date: September 8, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Section B/C-4

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
22	STA 3+70, 10' L	2' BG	136.9	131.3	4.3	132.7	8.0	98.9	Fail	Zone 2
22.1	STA 3+70, 10' L (Retest)	2' BG	136.8	126.7	8.0	132.7	8.0	95.5	Pass	Zone 2
23	STA 2+60, 20' L	4' BG	131.5	126.0	4.4	132.7	8.0	95.0	Fail	Zone 2
23.1	STA 2+60, 20' L (Retest)	4' BG	136.4	127.8	6.7	132.7	8.0	96.3	Pass	Zone 2
24	STA 2+75, 25' L	5' BG	133.3	121.2	10.0	125.9	10.0	96.3	Pass	Zone 1A

Specifications: Min. 95 % Max. Dry Density and from -2 to 2 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Parker Wells

Comments: BG = Below Grade

Reservoir 2 Improvements

Soil Cover Report

Date: September 9, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 47

Standard Counts: 2159 / 672

No. of Samples Collected: 0

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Parker Wells

Reservoir 2 Improvements

Job Number: 15-2549

Rep. Notified: Gary Morrow

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Smooth Drum Compactor

Nuclear Soil Density and Moisture Content

Specifications: Min. 95 % Max. Dry Density and from -2 to 2 of Optimum Moisture Content

Modified Proctor 

Comments: BG = Below Grade

Reservoir 2 Improvements

Soil Cover Report

Date: September 10, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 47

Standard Counts: 2161 / 671

No. of Samples Collected: 1

Lab Sample Location: STA 1+90, Zone 1A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Parker Wells

Reservoir 2 Improvements

Date: September 10, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Section B/C-4

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
26	STA 2+20, 10' L	3' BG	126.8	114.0	11.2	125.9	10.0	90.5	Fail	Zone 1A
26.1	STA 2+20, 10' L (Retest)	3' BG	131.6	120.1	9.6	125.9	10.0	95.4	Pass	Zone 1A
27	Key @ STA 1+90	1' BG	135.4	123.3	9.8	125.9	10.0	97.9	Pass	Zone 1A
28	STA 2+50, 15' L	5' BG	131.0	123.9	5.7	132.7	8.0	93.4	Fail	Zone 2
28.1	STA 2+50, 15' L (Retest)	5' BG	134.1	126.4	6.1	132.7	8.0	95.3	Pass	Zone 2

Specifications: Min. 95 % Max. Dry Density and from -2 to 2 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Parker Wells

Comments: BG = Below Grade

Reservoir 2 Improvements

Soil Cover Report

Date: September 11, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 47

Standard Counts: 2162 / 666

No. of Samples Collected: 0

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Parker Wells

Reservoir 2 Improvements

Date: September 11, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Section B/C-4

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
29	STA 2+40, 5' L	2' BG	129.7	114.5	13.3	115.4	13.5	99.2	Pass	Zone 1A
30	STA 2+20, 10' L	3' BG	132.0	123.7	6.7	132.7	8.0	93.2	Fail	Zone 2
30.1	STA 2+20, 10' L (Retest)	3' BG	135.2	126.4	7.0	132.7	8.0	95.3	Pass	Zone 2
31	STA 2+50, 7' L	4' BG	131.3	121.1	8.4	132.7	8.0	91.3	Fail	Zone 2
31.1	STA 2+50, 7' L (Retest)	4' BG	138.5	127.4	8.7	132.7	8.0	96.0	Pass	Zone 2

Specifications: Min. 95 % Max. Dry Density and from -2 to 2 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Parker Wells

Comments: BG = Below Grade

Reservoir 2 Improvements

Soil Cover Report

Date: September 15, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 47

Standard Counts: 2161 / 674

No. of Samples Collected: 0

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Parker Wells

Reservoir 2 Improvements

Date: September 15, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Section B/C-4

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
35	STA 2+15, 20' L	3' BG	131.0	118.2	10.8	125.9	10.0	93.9	Fail	Zone 1A
35.1	STA 2+15, 20' L (Retest)	3' BG	132.6	120.0	10.5	125.9	10.0	95.3	Pass	Zone 1A
36	STA 2+15, 30' L	5' BG	137.8	128.7	7.1	132.7	8.0	97.0	Pass	Zone 2

Specifications: Min. 95 % Max. Dry Density and from -2 to 2 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Parker Wells

Comments: BG = Below Grade

Reservoir 2 Improvements

Soil Cover Report

Date: September 16, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 47

Standard Counts: 2167 / 672

No. of Samples Collected: 0

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Parker Wells

Reservoir 2 Improvements

Date: September 16, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Slope

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
37	STA 6+00, 25' L	6' BG	136.1	122.5	11.1	123.4	11.0	99.3	Pass	Zone 1A
38	STA 6+20, 30' L	7' BG	137.8	123.0	12.0	123.4	11.0	99.7	Pass	Zone 1A
39	STA 3+60, 10' L	3' BG	133.5	121.1	10.2	123.4	11.0	98.1	Pass	Zone 1A
40	STA 3+60, 15' L	2' BG	139.7	131.2	6.5	132.7	8.0	98.9	Pass	Zone 2

Specifications: Min. 95 % Max. Dry Density and from -2 to 2 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Parker Wells

Comments: BG = Below Grade

Reservoir 2 Improvements

Soil Cover Report

Date: September 17, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 47

Standard Counts: 2166 / 673

No. of Samples Collected: 0

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Parker Wells

Reservoir 2 Improvements

Date: September 17, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Slope

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
41	STA 6+85, 40' L	6' BG	138.6	122.9	12.8	123.4	11.0	99.6	Pass	Zone 1A
42	STA 6+95, 25' L	5' BG	138.5	123.4	12.2	123.4	11.0	100.0	Pass	Zone 1A
43	STA 5+90, 15' L	3' BG	132.4	119.7	10.6	132.7	8.0	90.2	Fail	Zone 2
43.1	STA 5+90, 15' L (Retest)	3' BG	136.0	126.5	7.5	132.7	8.0	95.3	Pass	Zone 2

Specifications: Min. 95 % Max. Dry Density and from -2 to 2 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Parker Wells

Comments: BG = Below Grade

Reservoir 2 Improvements

Soil Cover Report

Date: September 18, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☒ Yes ☐ No

Density / Moisture

Nuclear Gauge Number: 47

Standard Counts: 2186 / 671

No. of Samples Collected: 0

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Parker Wells

Reservoir 2 Improvements

Date: September 18, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Slope

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
44	STA 2+80, 10' L	3' BG	134.9	119.6	12.8	123.4	11.0	96.9	Pass	Zone 1A
45	STA 2+80, 5' L	2' BG	141.9	132.0	7.5	132.7	8.0	99.5	Pass	Zone 2
46	Key @ STA 8+80	1' BG	134.3	121.3	10.7	123.4	11.0	98.3	Pass	Zone 1A
47	Key @ STA 9+00	RSG	136.4	123.1	10.8	123.4	11.0	99.8	Pass	Zone 1A
48	STA 6+50, 15' L	2' BG	131.4	124.8	5.3	132.7	8.0	94.0	Fail	Zone 2
49	STA 6+30, 20' L	3' BG	130.3	122.5	6.4	132.7	8.0	92.3	Fail	Zone 2
50	STA 6+20, 20' L	3' BG	129.0	123.7	4.3	132.7	8.0	93.2	Fail	Zone 2
51	STA 6+20, 45' L	7' BG	135.3	127.4	6.2	132.7	8.0	96.0	Pass	Zone 2

Specifications: Min. 95 % Max. Dry Density and from -2 to 2 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Parker Wells

Comments: BG = Below Grade
RSG = Rough Surface Grade

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Reservoir 2 Improvements

Soil Cover Report

Date: September 21, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 47

Standard Counts: 2177 / 674

No. of Samples Collected: 0

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Parker Wells

Reservoir 2 Improvements

Date: September 21, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Slope

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
52	STA 8+55, 40' L	4' BG	135.9	123.2	10.3	123.4	11.0	99.8	Pass	Zone 1A
53	STA 8+80, 40' L	4' BG	133.5	120.4	10.9	123.4	11.0	97.6	Pass	Zone 1A
54	STA 8+80, 50' L	5' BG	132.3	118.4	11.7	123.4	11.0	95.9	Pass	Zone 1A
55	STA 9+10, 25' L	3' BG	137.9	123.1	12.0	123.4	11.0	99.8	Pass	Zone 1A

Specifications: Min. 95 % Max. Dry Density and from -2 to 2 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Parker Wells

Comments: BG = Below Grade

Reservoir 2 Improvements

Soil Cover Report

Date: September 22, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 47

Standard Counts: 2171 / 675

No. of Samples Collected: 0

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Parker Wells

Reservoir 2 Improvements

Date: September 22, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Smooth Drum Compactor, Water Truck

Area Represented: Slope

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
48.1	STA 6+50, 15' L (Retest)	2' BG	136.7	128.5	6.4	132.7	8.0	96.8	Pass	Zone 2
49.1	STA 6+30, 20' L (Retest)	3' BG	136.4	128.4	6.2	132.7	8.0	96.8	Pass	Zone 2
50.1	STA 6+20, 20' L (Retest)	3' BG	135.5	127.2	6.5	132.7	8.0	95.9	Pass	Zone 2
56	STA 8+90, 30' L	1' BG	137.0	123.3	11.1	123.4	11.0	99.9	Pass	Zone 1A

Specifications: Min. 95 % Max. Dry Density and from -2 to 2 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Parker Wells

Comments: BG = Below Grade

Reservoir 2 Improvements

Soil Cover Report

Date: September 23, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 21

Standard Counts: 2119 / 663

No. of Samples Collected: N/A

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Graham Basecke

Date: September 23, 2015

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Water Truck

Area Represented: Slope

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -2 to +2 of Optimum Moisture Content

Standard Proctor Modified Proctor 

Field Technician: Graham Basecke

Comments: RSG = Rough Surface Grade
BG=Below Grade

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Reservoir 2 Improvements

Soil Cover Report

Date: September 24, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 21

Standard Counts: 2115 / 666

No. of Samples Collected: 1

Lab Sample Location: STA 11+00, 80' L (Zone 1A)

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Graham Basecke

Reservoir 2 Improvements

Date: September 24, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Water Truck

Area Represented: Slope

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
60	STA 8+50, 25' L	RSG	148.6	142.6	4.2	143.8	4.8	99.2	Pass	Zone 1B
61	STA 11+00, 80' L	2'BG	134.0	120.0	11.7	123.4	11.0	97.2	Pass	Zone 1A

Specifications: Min. 95 % Max. Dry Density and from -2 to +2 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Graham Basecke

Comments: RSG = Rough Surface Grade
BG=Below Grade

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Reservoir 2 Improvements

Soil Cover Report

Date: September 25, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 21

Standard Counts: 2110/669

No. of Samples Collected: N/A

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Graham Basecke

Date: September 25, 2015

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Water Truck

Area Represented: Slope

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -1 to +3 of Optimum Moisture Content

Standard Proctor Modified Proctor 

Field Technician: Graham Basecke

Comments: BG=Below Grade

GRADATION PROPERTIES

Project: **Reservior No. 2 Improvements**
Job Number: **15-2549** Date: September 28, 2015
Reported to: Grand County Water & Sanitation District #1
PO Box 3077
50 Vasquez Road
Winter Park, CO 80482
Attn: Mr. Bruce Hutchins

Sample Information

Sample Number: 1179
Sample Location: STA 11+00, 80' L
Aggregate Identification: Zone 1A with Bentonite
Date Sampled: 9/24/2015
Sampled By: GB

Gradation Analysis

Sieve Size (opening)	Passing (%)
1 1/2"	
1"	100
3/4"	96
1/2"	94
3/8"	92
#4	85
#8	75
#16	63
#30	51
#50	42
#100	33
#200	28.5

GROUND

ENGINEERING CONSULTANTS

GRADATION PROPERTIES

Project: **Reservior No. 2 Improvements**
Job Number: **15-2549** Date: October 2, 2015
Reported to: Grand County Water & Sanitation District #1
PO Box 3077
50 Vasquez Road
Winter Park, CO 80482
Attn: Mr. Bruce Hutchins

Sample Information

Sample Number: 1181
Sample Location: Stockpile on-site
Aggregate Identification: Zone 1A with Bentonite
Date Sampled: 9/30/2015
Sampled By: GB

Gradation Analysis

Sieve Size (opening)	Passing (%)
1 1/2"	
1"	100
3/4"	97
1/2"	94
3/8"	89
#4	82
#8	70
#16	61
#30	52
#50	43
#100	36
#200	31.5

GROUND

ENGINEERING CONSULTANTS

GRADATION PROPERTIES

Project: **Reservior No. 2 Improvements**
Job Number: **15-2549** Date: October 2, 2015
Reported to: Grand County Water & Sanitation District #1
PO Box 3077
50 Vasquez Road
Winter Park, CO 80482
Attn: Mr. Bruce Hutchins

Sample Information

Sample Number: 1182
Sample Location: Stockpile on-site
Aggregate Identification: Zone 1A with Bentonite
Date Sampled: 9/30/2015
Sampled By: GB

Gradation Analysis

Sieve Size (opening)	Passing (%)
1 1/2"	
1"	100
3/4"	97
1/2"	94
3/8"	90
#4	84
#8	73
#16	62
#30	53
#50	45
#100	37
#200	32.8

Reservoir 2 Improvements

Soil Cover Report

Date: September 28, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 76

Standard Counts: 2393/629

No. of Samples Collected: N/A

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Graham Basecke

Reservoir 2 Improvements

Job Number: 15-2549

Rep. Notified: Gary Morrow

Rep. Notified: Gary Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Water Truck

Area Represented: Key from STA 11+25 to 11+75

Nuclear Soil Density and Moisture Content

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -1 to +3 of Optimum Moisture Content

Modified Proctor 

Comments: BG = Below Grade

Reservoir 2 Improvements

Soil Cover Report

Date: September 29, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 76

Standard Counts: 2374/634

No. of Samples Collected: N/A

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 2

Field Representative: Graham Basecke

Reservoir 2 Improvements

Job Number: 15-2549

Rep. Notified: Gary Morrow

Rep. Notified: Gary Morrow

Equipment Utilized: Loader, Excavator, Sheepsfoot Compactor, Water Truck

Area Represented: Slope

Nuclear Soil Density and Moisture Content

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -1 to +3 of Optimum Moisture Content

Standard Proctor Modified Proctor

Field Technician: Graham Basecke

Comments: BG = Below Grade

Reservoir 2 Improvements

Date: September 29, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Equipment Utilized: Loader, Excavator, Sheepsfoot Compactor, Water Truck

Area Represented: Slope

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
67	STA 9+00, 15'L	RSG	145.6	140.4	3.7	143.8	4.8	97.6	Pass	Zone 1B

Specifications: Min. 95 % Max. Dry Density and from -2 to +2 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Graham Basecke

Comments: RSG = Rough Surface Grade

Reservoir 2 Improvements

Soil Cover Report

Date: September 30, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 76

Standard Counts: 2309/624

No. of Samples Collected: 2

Lab Sample Location: Stockpile Zone 1A

Lab Sample Location: Stockpile Zone 1A

No. of Pages Attached: 1

Field Representative: Graham Basecke

Reservoir 2 Improvements

Job Number: 15-2549

Rep. Notified: Gary Morrow

Rep. Notified: Gary Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Water Truck

Area Represented: Top of Key

Nuclear Soil Density and Moisture Content

[illegible]Standard Proctor Modified Proctor 

Comments: RSG = Rough Surface Grade

Reservoir 2 Improvements

Soil Cover Report

Date: October 1, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 76

Standard Counts: 2407/629

No. of Samples Collected: N/A

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 2

Field Representative: Graham Basecke

Reservoir 2 Improvements

Job Number: 15-2549

Rep. Notified: Gary Morrow

Rep. Notified: Gary Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Water Truck

Nuclear Soil Density and Moisture Content

Specifications: Min. 95 % Max. Dry Density and from -1 to +3 of Optimum Moisture Content

Modified Proctor 

Comments: BG=Below Grade

Reservoir 2 Improvements

Date: October 1, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Water Truck

Area Represented: Slope and Key

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
72	STA 12+50, 20'L	RSG	144.2	136.8	5.4	143.8	4.8	95.1	Pass	Zone 1B

Specifications: Min. 95 % Max. Dry Density and from -2 to +2 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Graham Basecke

Comments: RSG = Rough Surface Grade

Reservoir 2 Improvements

Soil Cover Report

Date: October 2, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 76

Standard Counts: 2377/620

No. of Samples Collected: N/A

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Graham Basecke

Date: October 2, 2015

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Water Truck

Area Represented: Slope

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -1 to +3 of Optimum Moisture Content

Standard Proctor Modified Proctor 

Field Technician: Graham Basecke

Comments: BG=Below Grade

GROUND

ENGINEERING CONSULTANTS

GRADATION PROPERTIES

Project: **Reservior No. 2 Improvements**

Job Number: **15-2549**

Date: October 8, 2015

Reported to: Grand County Water & Sanitation District #1

PO Box 3077

50 Vasquez Road

Winter Park, CO 80482

Attn: Mr. Bruce Hutchins

Sample Information

Sample Number: 1186

Sample Location: Fraser Valley Gravel SE Stockpile

Aggregate Identification: Proposed Zone 1A without bentonite

Date Sampled: 10/6/2015

Sampled By: GB

Gradation Analysis

Sieve Size (opening)	Passing (%)
1 1/2"	
1"	100
3/4"	95
1/2"	91
3/8"	90
#4	82
#8	73
#16	61
#30	51
#50	42
#100	34
#200	27.5

GROUND

ENGINEERING CONSULTANTS

GRADATION PROPERTIES

Project: **Reservior No. 2 Improvements**
Job Number: **15-2549** Date: October 8, 2015
Reported to: Grand County Water & Sanitation District #1
PO Box 3077
50 Vasquez Road
Winter Park, CO 80482
Attn: Mr. Bruce Hutchins

Sample Information

Sample Number: 1187
Sample Location: Fraser Valley Gravel SE Stockpile
Aggregate Identification: Proposed Zone 1A with Bentonite
Date Sampled: 10/6/2015
Sampled By: GB

Gradation Analysis

Sieve Size (opening)	Passing (%)
1 1/2"	
1"	
3/4"	100
1/2"	97
3/8"	94
#4	87
#8	76
#16	66
#30	55
#50	47
#100	39
#200	34.2

Reservoir 2 Improvements

Soil Cover Report

Date: October 5, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 76

Standard Counts: 2390/626

No. of Samples Collected: N/A

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 2

Field Representative: Graham Basecke

Date: October 5, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Water Truck

Area Represented: Slope

Nuclear Soil Density and Moisture Content

Specifications: Min. 95 % Max. Dry Density and from -1 to +3 of Optimum Moisture Content

Standard Proctor Modified Proctor 

Field Technician: Graham Basecke

Comments: BG=Below Grade

Date: October 5, 2015

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Water Truck

Area Represented: Slope

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -2 to +2 of Optimum Moisture Content

Standard Proctor Modified Proctor 

Field Technician: Graham Basecke

Comments: RSG =Rough Surface Grade

Reservoir 2 Improvements

Soil Cover Report

Date: October 7, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 76

Standard Counts: 2377/630

No. of Samples Collected: N/A

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 2

Field Representative: Graham Basecke

Date: October 7, 2015

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Water Truck

Area Represented: Run-Down Channel and Slope

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -1 to +3 of Optimum Moisture Content

Standard Proctor Modified Proctor 

Field Technician: Graham Basecke

Comments: BG=Below Grade

Reservoir 2 Improvements

Job Number: 15-2549

Rep. Notified: Gary Morrow

Rep. Notified: Gary Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Water Truck

Area Represented: Run-Down Channel and Slope

Nuclear Soil Density and Moisture Content

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -2 to +2 of Optimum Moisture Content

Standard Proctor Modified Proctor

Field Technician: Graham Basecke

Comments: RSG = Rough Surface Grade

Reservoir 2 Improvements

Soil Cover Report

Date: October 8, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 76

Standard Counts: 2393/630

No. of Samples Collected: N/A

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 2

Field Representative: Graham Basecke

Date: October 8, 2015

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Water Truck

Area Represented: Slope and Key

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -1 to +3 of Optimum Moisture Content

Standard Proctor Modified Proctor 

Field Technician: Graham Basecke

Comments: BG=Below Grade

Reservoir 2 Improvements

Date: October 8, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Water Truck

Area Represented: Slope and Key

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
82	STA 2+25, 25'L	2'BG	138.5	130.3	6.3	132.7	8.0	98.2	Pass	Zone 2

Specifications: Min. 95 % Max. Dry Density and from -2 to +2 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Graham Basecke

Comments: BG=Below Grade

Reservoir 2 Improvements

Soil Cover Report

Date: October 9, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☒ Yes ☐ No

Density / Moisture

Nuclear Gauge Number: 76

Standard Counts: 2400/628

No. of Samples Collected: N/A

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Graham Basecke

Reservoir 2 Improvements

Date: October 9, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Water Truck

Area Represented: Slope

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
83	STA 0+90, 30'L	4'BG	130.4	115.8	12.6	123.4	11.0	93.8	Fail	Zone 1A
84	STA 0+50, 50'L	6'BG	133.8	119.4	12.1	123.4	11.0	96.8	Pass	Zone 1A

Specifications: Min. 95 % Max. Dry Density and from -1 to +3 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Graham Basecke

Comments: BG=Below Grade

Date: October 9, 2015

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Water Truck

Area Represented: Slope

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -2 to +2 of Optimum Moisture Content

Standard Proctor Modified Proctor 

Field Technician: Graham Basecke

Comments: BG=Below Grade

Reservoir 2 Improvements

Soil Cover Report

Date: October 10, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 76

Standard Counts: 2390/627

No. of Samples Collected: N/A

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Graham Basecke

Reservoir 2 Improvements

Date: October 10, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Water Truck

Area Represented: Slope and Key

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
83.1	STA 0+90, 30'L (Retest)	4'BG	129.9	117.7	10.4	123.4	11.0	95.4	Pass	Zone 1A
86	STA 1+75, 40'L	5'BG	136.9	120.4	13.7	123.4	11.0	97.6	Pass	Zone 1A
87	Key at STA 23+75	RSG	138.5	122.0	13.5	123.4	11.0	98.9	Pass	Zone 1A

Specifications: Min. 95 % Max. Dry Density and from -1 to +3 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Graham Basecke

Comments: RSG = Rough Surface Grade
BG=Below Grade

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Englewood, Commerce City, Loveland, Granby, Gypsum, Grand Junction, Casper

Date: October 10, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Water Truck

Area Represented: Slope and Key

Nuclear Soil Density and Moisture Content

Specifications: Min. 95 % Max. Dry Density and from -2 to +2 of Optimum Moisture Content

Standard Proctor Modified Proctor 

Field Technician: Graham Basecke

Comments: BG=Below Grade

Reservoir 2 Improvements

Concrete Cover Report

Date: October 13, 2015

Job Number: 15-2549

General Contractor: Morrow & Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform periodic concrete testing. The locations of each sample are approximate.

Comments or Photos:



	Yes	No	Not Applicable
Results within Specifications?	☒	☐	☐
Reinforcing Steel Checked?	☐	☐	☒
Subgrade Tested?	☒	☐	☐

Number of Cylinders Cast this Date: 5

Number of Pages Attached: 1

Field Representative: Graham Basecke

www.groundeng.com

Englewood, Commerce City, Loveland, Granby, Gypsum, Grand Junction, Casper

Reservoir 2 Improvements

Report Date: October 13, 2015

Job Number: 15-2549

Placement Date: October 13, 2015

General Contractor: Morrow & Sons

Rep. Notified: Gary Morrow

Placement Contractor: Morrow & Sons

Rep. Notified: Gary Morrow

Concrete Supplier: Everist Materials

Mix Identification: 350109G

Total Cubic Yards Placed: 30

Weather/Temp.: Sunny/64

Placement Method: Concrete Pump

Finish Method: Hand Finished

Item Number /Structure Type: Run-Down Channel

Placement Location: Run-Down Channel from STA 7+50 to 7+75

Specifications

Specified Strength (psi): 5,000

Air Content (%): 5-8

Slump (in.): 3-6

Temperature (°F): 50-90

Concrete Field Properties

Test No.	Sample Location	Truck Number	Ticket Number	Batch Time	Test Time	Slump/Spread C143 (inches)	Air Content C231 (%)	Conc. Temp. C1064 (°F)	Unit Weight C138 (pcf)	Water Added (gal.)
1	Run-Down Channel, STA 7+60	111	2001682	10:30a	11:20a	4	5.5	65	136.2	0

Compressive Strength Results (ASTM C39)

Cylinders Cast on Ticket Number: 2001682

Total Number of Cylinders Cast: 5

Laboratory ID: 398

Cylinder Diameter (in.)
Cross Sectional Area (sq. in.)
Maximum Load (lbs.)
Compressive Strength (psi)
Test Date
Test Age (days)
Fracture Type

10/20/15	11/10/15	11/10/15	11/10/15					
7	28	28	28	H				

Average 28-Day Compressive Strength (psi):

Field Technician: Graham Basecke

Comments:

Reservoir 2 Improvements

Soil Cover Report

Date: October 13, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 76

Standard Counts: 2406/629

No. of Samples Collected: N/A

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Graham Basecke

Date: October 13, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Water Truck

Area Represented: Slope and Key

Nuclear Soil Density and Moisture Content

Specifications: Min. 95 % Max. Dry Density and from -1 to +3 of Optimum Moisture Content

Standard Proctor Modified Proctor

Field Technician: Graham Basecke

Comments: RSG = Rough Surface Grade
BG=Below Grade

Date: October 13, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Water Truck

Area Represented: Slope and Key

Nuclear Soil Density and Moisture Content

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -2 to +2 of Optimum Moisture Content

Standard Proctor Modified Proctor

Field Technician: Graham Basecke

Comments: BG=Below Grade

Reservoir 2 Improvements

Soil Cover Report

Date: October 14, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 76

Standard Counts: 2415/628

No. of Samples Collected: N/A

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 2

Field Representative: Graham Basecke

Date: October 14, 2015

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Water Truck

Area Represented: Key and Slope

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -1 to +3 of Optimum Moisture Content

Standard Proctor Modified Proctor 

Field Technician: Graham Basecke

Comments: BG=Below Grade
RSG=Rough Surface Grade

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Englewood, Commerce City, Loveland, Granby, Gypsum, Grand Junction, Casper

Date: October 14, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Water Truck

Area Represented: Key and Slope

Nuclear Soil Density and Moisture Content

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -2 to +2 of Optimum Moisture Content

Standard Proctor Modified Proctor 

Field Technician: Graham Basecke

Comments: BG=Below Grade

Reservoir 2 Improvements

Soil Cover Report

Date: October 15, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 76

Standard Counts: 2420/621

No. of Samples Collected: N/A

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Graham Basecke

Date: October 15, 2015

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Water Truck

Area Represented: Key

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -1 to +3 of Optimum Moisture Content

Standard Proctor Modified Proctor 

Field Technician: Graham Basecke

Comments: RSG = Rough Surface Grade

Reservoir 2 Improvements

Soil Cover Report

Date: October 16, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 76

Standard Counts: 2397/632

No. of Samples Collected: N/A

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Graham Basecke

Date: October 16, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Water Truck

Area Represented: Slope

Nuclear Soil Density and Moisture Content

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -1 to +3 of Optimum Moisture Content

Standard Proctor Modified Proctor

Field Technician: Graham Basecke

Comments: BG=Below Grade

GRADATION PROPERTIES

Project: **Reservior No. 2 Improvements**
Job Number: **15-2549** Date: October 21, 2015
Reported to: Grand County Water & Sanitation District #1
PO Box 3077
50 Vasquez Road
Winter Park, CO 80482
Attn: Mr. Bruce Hutchins

Sample Information

Sample Number: 1193
Sample Location: On-Site Stockpile
Aggregate Identification: Zone 1A with Bentonite
Date Sampled: 10/19/2015
Sampled By: PW

Gradation Analysis

Sieve Size (opening)	Passing (%)
1 1/2"	
1"	
3/4"	
1/2"	100
3/8"	97
#4	94
#8	88
#16	80
#30	73
#50	67
#100	61
#200	56.2

COMPACTION TEST REPORT

Curve No.: 1193

Project No.: 15-2549

Date: October 19, 2015

Project: Reservoir #2

Client: GCWSD#1

Location: Zone 1A with Bentonite, on-site stockpile

Sample Number: 1193

Remarks:

MATERIAL DESCRIPTION

Description: sandy Clay

Classifications -

USCS: CL

AASHTO: A-6

Nat. Moist. = 18.6 %

Sp.G. =

Liquid Limit = 41

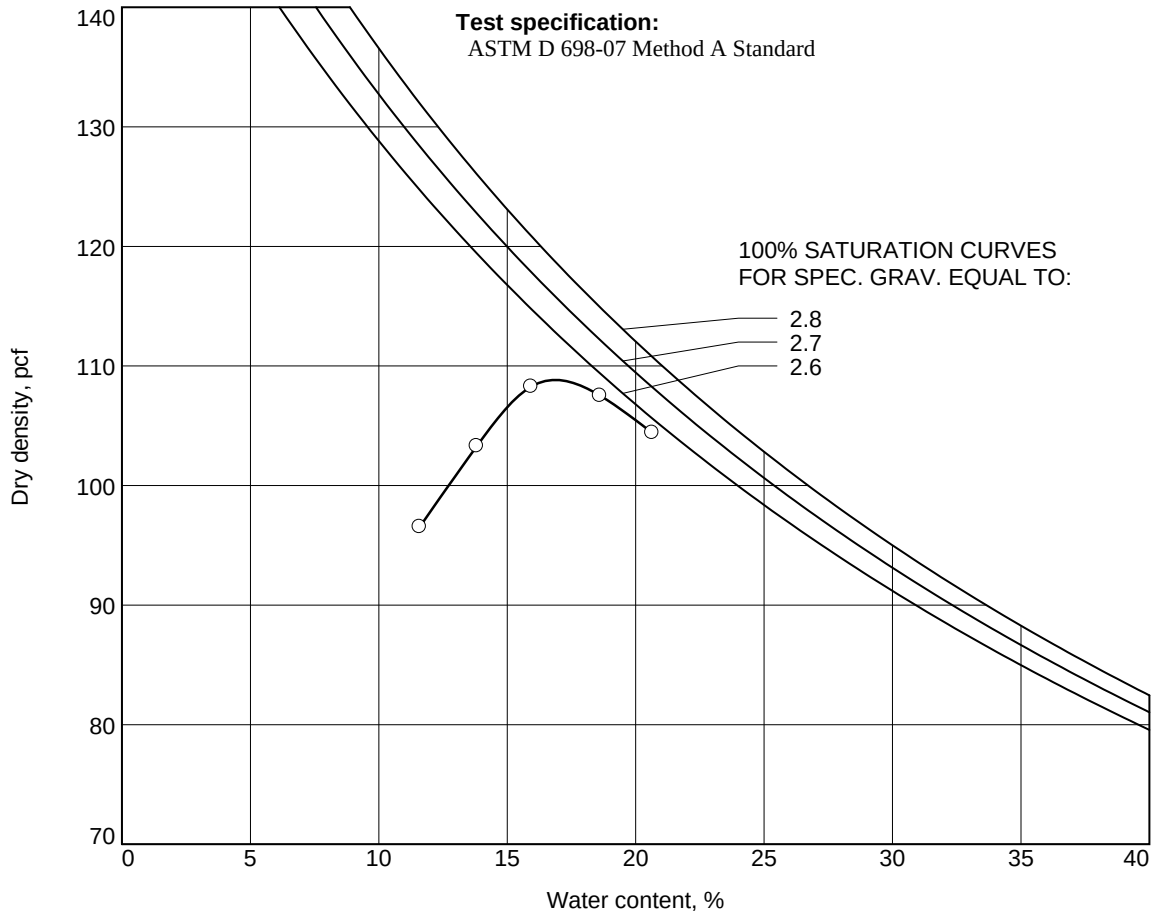
Plasticity Index = 26

% < No.200 = 56.2 %

TEST RESULTS

Maximum dry density = 108.8 pcf

Optimum moisture = 16.9 %



Figure

GROUND ENGINEERING CONSULTANTS, INC.

Tested By: PW Checked By: SP

Reservoir 2 Improvements

Soil Cover Report

Date: October 19, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 47

Standard Counts: 2165 / 676

No. of Samples Collected: 1

Lab Sample Location: Stockpile Zone 1A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Parker Wells

Reservoir 2 Improvements

Date: October 19, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Smooth Drum Compactor, Loader

Area Represented: Key and Slope

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
97	Key @ STA 18+75	RSG	123.9	110.4	12.2	123.4	11.0	89.5	Fail	Zone 1A
97.1	Key @ STA 18+75 (Retest)	RSG	133.8	118.6	12.8	123.4	11.0	96.1	Pass	Zone 1A
98	STA 16+00, 30' L	RSG	148.1	140.4	5.5	143.8	4.8	97.6	Pass	Zone 1B
99	STA 23+50, 20' L	4' BG	141.3	131.4	7.5	132.7	8.0	99.0	Pass	Zone 2
100	STA 23+50, 15' L	RSG	124.0	106.5	16.4	108.8	16.9	97.9	Pass	Zone 1A

Specifications: Min. 95 % Max. Dry Density and from -1 to +3 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Parker Wells

Comments: RSG = Rough Surface Grade
BG = Below Grade

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Englewood, Commerce City, Loveland, Granby, Gypsum, Grand Junction, Casper

County Road 804 Phases 2 and 3 Improvements

Soil Cover Report

Date: October 21, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 47

Standard Counts: 2152 / 660

No. of Samples Collected: 0

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Parker Wells

County Road 804 Phases 2 and 3 Improvements

Date: October 21, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Slope

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
101	STA 22+90, 25' L of CL	5' BG	139.1	129.9	7.1	132.7	8.0	97.9	Pass	Zone 2
102	STA 22+60, 15' L of CL	5' BG	127.2	111.8	13.8	115.4	13.5	96.9	Pass	Zone 1A
103	STA 22+30, 30' L of CL	2' BG	128.6	113.6	13.2	115.4	13.5	98.4	Pass	Zone 1A
104	STA 18+50, 40' L of CL	1' BG	132.5	114.2	16.0	115.4	13.5	99.0	Pass	Zone 1A

Specifications: Min. 95 % Max. Dry Density and from -1 to +3 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Parker Wells

Comments: BG = Below Grade

Reservoir 2 Improvements

Report Date: October 20, 2015

Job Number: 15-2549

Placement Date: October 13, 2015

General Contractor: Morrow & Sons

Rep. Notified: Gary Morrow

Placement Contractor: Morrow & Sons

Rep. Notified: Gary Morrow

Concrete Supplier: Everist Materials

Mix Identification: 350109G

Total Cubic Yards Placed: 30

Weather/Temp.: Sunny/64

Placement Method: Concrete Pump

Finish Method: Hand Finished

Item Number /Structure Type: Run-Down Channel

Placement Location: Run-Down Channel from STA 7+50 to 7+75

Specifications

Specified Strength (psi): 5,000

Air Content (%): 5-8

Slump (in.): 3-6

Temperature (°F): 50-90

Concrete Field Properties

Test No.	Sample Location	Truck Number	Ticket Number	Batch Time	Test Time	Slump/Spread C143 (inches)	Air Content C231 (%)	Conc. Temp. C1064 (°F)	Unit Weight C138 (pcf)	Water Added (gal.)
1	Run-Down Channel, STA 7+60	111	2001682	10:30a	11:20a	4	5.5	65	136.2	0

Compressive Strength Results (ASTM C39)

Cylinders Cast on Ticket Number: 2001682

Total Number of Cylinders Cast: 5

Laboratory ID: 398

Cylinder Diameter (in.)	4.00						
Cross Sectional Area (sq. in.)	12.57						
Maximum Load (lbs.)	54,801						
Compressive Strength (psi)	4,360						
Test Date	10/20/15	11/10/15	11/10/15	11/10/15			
Test Age (days)	7	28	28	28	H		
Fracture Type	T3						

Average 28-Day Compressive Strength (psi):

Field Technician: Graham Basecke

Comments:

Reservoir 2 Improvements

Soil Cover Report

Date: October 26, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 47

Standard Counts: 2165 / 667

No. of Samples Collected: 0

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Parker Wells

Reservoir 2 Improvements

Date: October 26, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Slope

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
105	STA 0+15, 15' Left	3' BG	140.6	132.0	6.5	132.7	8.0	99.5	Pass	Zone 2
106	STA 1+00, 10' Left	3' BG	121.9	105.2	15.9	108.8	16.9	96.7	Pass	Zone 1A

Specifications: Min. 95 % Max. Dry Density and from -2 to +3 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Parker Wells

Comments: BG = Below Grade

Reservoir 2 Improvements

Soil Cover Report

Date: October 27, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 47

Standard Counts: 2155 / 678

No. of Samples Collected: 0

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Parker Wells

Date: October 27, 2015

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Slope

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -1 to +3 of Optimum Moisture Content

Standard Proctor Modified Proctor 

Field Technician: Parker Wells

Comments: BG = Below Grade

Reservoir 2 Improvements

Soil Cover Report

Date: October 28, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 47

Standard Counts: 2165 / 669

No. of Samples Collected: 0

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Parker Wells

Date: October 28, 2015

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Slope

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -2 to +3 of Optimum Moisture Content

Standard Proctor Modified Proctor 

Field Technician: Parker Wells

Comments: BG = Below Grade

Reservoir 2 Improvements

Soil Cover Report

Date: October 29, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 47

Standard Counts: 2167 / 669

No. of Samples Collected: 0

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Parker Wells

Reservoir 2 Improvements

Date: October 29, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Slope

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
113	Key @ STA 21+50	2' BG	129.6	112.5	15.2	115.4	13.5	97.5	Pass	Zone 1A
114	STA 22+50, 15' Left	4' BG	128.2	111.1	15.4	115.4	13.5	96.3	Pass	Zone 1A
115	STA 22+50, 20' Left	5' BG	135.6	127.0	6.8	132.7	8.0	95.7	Pass	Zone 2
116	Key @ STA 4+30	RSG	129.8	114.7	13.2	115.4	13.5	99.4	Pass	Zone 1A
117	STA 4+40, 10' Left	2' BG	120.8	105.8	14.2	115.4	13.5	91.7	Fail	Zone 1A
117.1	STA 4+40, 10' Left (Retest)	2' BG	126.1	111.8	12.8	115.4	13.5	96.9	Pass	Zone 1A

Specifications: Min. 95 % Max. Dry Density and from -2 to +3 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Parker Wells

Comments: BG = Below Grade
RSG = Rough Surface Grade

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Englewood, Commerce City, Loveland, Granby, Gypsum, Grand Junction, Casper

Date: October 30, 2015

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Slope

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -2 to +3 of Optimum Moisture Content

Standard Proctor Modified Proctor 

Field Technician: Parker Wells

Comments: BG = Below Grade

Reservoir 2 Improvements

Soil Cover Report

Date: November 2, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 47

Standard Counts: 2161 / 675

No. of Samples Collected: 0

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Parker Wells

Reservoir 2 Improvements

Date: November 2, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Slope

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
120	STA 20+30, 35' Left	6' BG	122.8	107.9	13.8	108.8	16.9	99.2	Fail	Zone 1A
120.1	STA 20+30, 35' Left (Retest)	6' BG	125.0	107.7	16.1	108.8	16.9	99.0	Pass	Zone 1A
121	STA 20+70, 20' Left	5' BG	134.8	126.3	6.7	132.7	8.0	95.2	Pass	Zone 2
122	STA 18+00, 25' Left	RSG	142.6	137.4	3.8	143.8	4.8	95.5	Pass	Zone 1B

Specifications: Min. 95 % Max. Dry Density and from -2 to +3 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Parker Wells

Comments: BG = Below Grade

Reservoir 2 Improvements

Soil Cover Report

Date: November 3, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 47

Standard Counts: 2153 / 666

No. of Samples Collected: 0

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Parker Wells

Reservoir 2 Improvements

Date: November 3, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Slope

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
123	STA 18+70, 30' L	2' BG	126.6	109.9	15.2	115.4	13.5	95.2	Pass	Zone 1A
124	STA 19+80, 15' L	4' BG	128.3	111.6	15.0	115.4	13.5	96.7	Pass	Zone 1A
125	STA 5+00, 20' L	1' BG	134.9	119.1	13.3	123.4	11.0	96.5	Pass	Zone 1A

Specifications: Min. 95 % Max. Dry Density and from -1 to +3 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Parker Wells

Comments: BG = Below Grade

Reservoir 2 Improvements

Soil Cover Report

Date: November 2, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 47

Standard Counts: 2161 / 675

No. of Samples Collected: 0

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Parker Wells

Reservoir 2 Improvements

Date: November 2, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Slope

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
120	STA 20+30, 35' Left	6' BG	122.8	107.9	13.8	108.8	16.9	99.2	Fail	Zone 1A
120.1	STA 20+30, 35' Left (Retest)	6' BG	125.0	107.7	16.1	108.8	16.9	99.0	Pass	Zone 1A
121	STA 20+70, 20' Left	5' BG	134.8	126.3	6.7	132.7	8.0	95.2	Pass	Zone 2
122	STA 18+00, 25' Left	RSG	142.6	137.4	3.8	143.8	4.8	95.5	Pass	Zone 1B

Specifications: Min. 95 % Max. Dry Density and from -2 to +3 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Parker Wells

Comments: BG = Below Grade

Reservoir 2 Improvements

Soil Cover Report

Date: November 3, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 47

Standard Counts: 2153 / 666

No. of Samples Collected: 0

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Parker Wells

Reservoir 2 Improvements

Date: November 3, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Slope

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
123	STA 18+70, 30' L	2' BG	126.6	109.9	15.2	115.4	13.5	95.2	Pass	Zone 1A
124	STA 19+80, 15' L	4' BG	128.3	111.6	15.0	115.4	13.5	96.7	Pass	Zone 1A
125	STA 5+00, 20' L	1' BG	134.9	119.1	13.3	123.4	11.0	96.5	Pass	Zone 1A

Specifications: Min. 95 % Max. Dry Density and from -1 to +3 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Parker Wells

Comments: BG = Below Grade

Reservoir 2 Improvements

Soil Cover Report

Date: November 9, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☒ Yes ☐ No

Density / Moisture

Nuclear Gauge Number: 47

Standard Counts: 2140 / 679

No. of Samples Collected: 0

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Parker Wells

Reservoir 2 Improvements

Job Number: 15-2549

Rep. Notified: Gary Morrow

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Slope

Nuclear Soil Density and Moisture Content

[illegible]Standard Proctor Modified Proctor 

Comments: BG = Below Grade

Reservoir 2 Improvements

Soil Cover Report

Date: November 10, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 47

Standard Counts: 2140 / 671

No. of Samples Collected: 0

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Parker Wells

Date: November 10, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Slope

Nuclear Soil Density and Moisture Content

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -2 to +2 of Optimum Moisture Content

Standard Proctor Modified Proctor 

Field Technician: Parker Wells

Comments: BG = Below Grade

Reservoir 2 Improvements

Soil Cover Report

Date: November 13, 2015

Job Number: 15-2549

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 47

Standard Counts: 2163 / 668

No. of Samples Collected: 0

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Parker Wells

Date: November 13, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Morrow and Sons

Rep. Notified: Gary Morrow

Earthwork Contractor: Morrow and Sons

Rep. Notified: Craig Morrow

Equipment Utilized: Excavator, Sheepsfoot Compactor, Smooth Drum Compactor

Area Represented: Slope

Nuclear Soil Density and Moisture Content

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -2 to 2 of Optimum Moisture Content

Standard Proctor Modified Proctor 

Field Technician: Parker Wells

Comments: BG = Below Grade

Reservoir 2 Improvements

Soil Cover Report

Date: November 19, 2015

Job Number: 15-2549

General Contractor: Everist

Rep. Notified: Craig Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 82

Standard Counts: 2355 / 680

No. of Samples Collected: None

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 2

Field Representative: Steve Peters

Date: November 19, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Everist

Rep. Notified: Craig Morrow

Earthwork Contractor: Everist

Rep. Notified: Craig Morrow

Equipment Utilized: Loader, Dozer, Sheepsfoot Compactor

Area Represented: Buttress

Nuclear Soil Density and Moisture Content

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -1 to +3 of Optimum Moisture Content

Standard Proctor Modified Proctor 

Field Technician: Steve Peters

Comments: BG = Below Grade

Reservoir 2 Improvements

Job Number: 15-2549

Rep. Notified: Craig Morrow

Rep. Notified: Craig Morrow

Equipment Utilized: Loader, Dozer, Sheepsfoot Compactor

Area Represented: Buttress

Nuclear Soil Density and Moisture Content

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -2 to +2 of Optimum Moisture Content

Standard Proctor Modified Proctor 

Field Technician: Steve Peters

Comments: RSG = Rough Surface Grade

Reservoir 2 Improvements

Soil Cover Report

Date: November 20, 2015

Job Number: 15-2549

General Contractor: Everist

Rep. Notified: Gary Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 82

Standard Counts: 2359 / 684

No. of Samples Collected: None

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 2

Field Representative: Steve Peters

Date: November 20, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Everist

Rep. Notified: Gary Morrow

Earthwork Contractor: Everist

Rep. Notified: Dean Morrow

Equipment Utilized: Loader, Dozer, Sheepsfoot Compactor

Area Represented: Slope

Nuclear Soil Density and Moisture Content

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -2 to +2 of Optimum Moisture Content

Standard Proctor Modified Proctor 

Field Technician: Steve Peters

Comments: RSG = Rough Surface Grade
BG = Below Grade

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Englewood, Commerce City, Loveland, Granby, Gypsum, Grand Junction, Casper

Date: November 20, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Everist

Rep. Notified: Gary Morrow

Earthwork Contractor: Everist

Rep. Notified: Dean Morrow

Equipment Utilized: Loader, Dozer, Sheepsfoot Compactor

Area Represented: Slope

Nuclear Soil Density and Moisture Content

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -1 to +3 of Optimum Moisture Content

Standard Proctor Modified Proctor 

Field Technician: Steve Peters

Comments: BG = Below Grade

Reservoir 2 Improvements

Soil Cover Report

Date: December 1, 2015

Job Number: 15-2549

General Contractor: Everist

Rep. Notified: Craig Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 82

Standard Counts: 2352 / 684

No. of Samples Collected: None

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 2

Field Representative: Steve Peters

Reservoir 2 Improvements

Job Number: 15-2549

Rep. Notified: Craig Morrow

Rep. Notified: Dean Morrow

Equipment Utilized: Loaders, Dozers

Area Represented: Slope

Nuclear Soil Density and Moisture Content

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -1 to +3 of Optimum Moisture Content

Modified Proctor 

Comments: BG = Below Grade

Reservoir 2 Improvements

Date: December 1, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Everist

Rep. Notified: Craig Morrow

Earthwork Contractor: Everist

Rep. Notified: Dean Morrow

Equipment Utilized: Loaders, Dozers

Area Represented: Slope

Nuclear Soil Density and Moisture Content

Test No.	Test Location	Elevation (feet)	Field Wet Density (pcf)	Field Dry Density (pcf)	Field Moisture Content (%)	Proctor Max Dry Density (pcf)	Proctor Optimum Moisture (%)	Compaction (%)	Pass or Fail	Soil Type
139	STA 21+75, 30' Left	1' BG	138.2	129.4	6.8	132.7	8.0	97.5	Pass	Zone 2
140	STA 1+50, 12' Left	1' BG	133.8	123.7	8.2	132.7	8.0	93.2	Fail	Zone 2
140.1	STA 1+50, 12' Left (Retest)	1' BG	140.1	130.1	7.7	132.7	8.0	98.0	Pass	Zone 2
141	STA 21+60, 20' Left	RSG	146.2	139.8	4.6	143.8	4.8	97.2	Pass	Zone 1B
142	STA 1+70, 40' Left	RSG	140.1	133.2	5.2	143.8	4.8	92.6	Fail	Zone 1B
142.1	STA 1+70, 40' Left (Retest)	RSG	143.9	136.7	5.3	143.8	4.8	95.1	Pass	Zone 1B

Specifications: Min. 95 % Max. Dry Density and from -2 to +2 of Optimum Moisture Content

Standard Proctor ☒

Modified Proctor ☐

Field Technician: Steve Peters

Comments: BG = Below Grade
RSG = Rough Surface Grade

www.groundeng.com

Englewood, Commerce City, Loveland, Granby, Gypsum, Grand Junction, Casper

Reservoir 2 Improvements

Soil Cover Report

Date: December 2, 2015

Job Number: 15-2549

General Contractor: Everist

Rep. Notified: Craig Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 82

Standard Counts: 2349 / 682

No. of Samples Collected: None

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 1

Field Representative: Steve Peters

Date: December 2, 2015

Report Type: Embankment

General Contractor: Everist

Rep. Notified: Craig Morrow

Earthwork Contractor: Everist

Rep. Notified: Dean Morrow

Equipment Utilized: Loader, Dozer

Area Represented: Slope

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -2 to +2 of Optimum Moisture Content

Standard Proctor Modified Proctor 

Field Technician: Steve Peters

Comments: BG = Below Grade
RSG = Rough Surface Grade

Reservoir 2 Improvements

Soil Cover Report

Date: December 3, 2015

Job Number: 15-2549

General Contractor: Everist

Rep. Notified: Craig Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 82

Standard Counts: 2353 / 683

No. of Samples Collected: None

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 2

Field Representative: Steve Peters

Date: December 3, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Everist

Rep. Notified: Craig Morrow

Earthwork Contractor: Everist

Rep. Notified: Craig Morrow

Equipment Utilized: Loader, Dozer

Area Represented: Slope

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -1 to +3 of Optimum Moisture Content

Standard Proctor Modified Proctor 

Field Technician: Steve Peters

Comments: BG = Below Grade

Date: December 3, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Everist

Rep. Notified: Craig Morrow

Earthwork Contractor: Everist

Rep. Notified: Craig Morrow

Equipment Utilized: Loader, Dozer

Area Represented: Slope

Nuclear Soil Density and Moisture Content

Specifications: Min. 95 % Max. Dry Density and from -2 to +2 of Optimum Moisture Content

Standard Proctor Modified Proctor 

Field Technician: Steve Peters

Comments: BG = Below Grade
RSG = Rough Surface Grade

Reservoir 2 Improvements

Soil Cover Report

Date: December 4, 2015

Job Number: 15-2549

General Contractor: Everist

Rep. Notified: Craig Morrow

As scheduled, a representative visited the project site to perform soil moisture and density testing and/or obtain samples for laboratory testing. The locations and elevations of each test are approximate. The results reported represent the material at each test location at the time of testing.

Comments or Photos:



Outstanding Discrepancies Reported this Date? ☐ Yes ☒ No

Density / Moisture

Nuclear Gauge Number: 82

Standard Counts: 2350 / 684

No. of Samples Collected: None

Lab Sample Location: N/A

Lab Sample Location: N/A

No. of Pages Attached: 2

Field Representative: Steve Peters

Reservoir 2 Improvements

Job Number: 15-2549

Rep. Notified: Craig Morrow

Rep. Notified: Dean Morrow

Equipment Utilized: Loader, Dozer

Area Represented: Slope

Nuclear Soil Density and Moisture Content

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -1 to +3 of Optimum Moisture Content

Standard Proctor Modified Proctor 

Field Technician: Steve Peters

Comments: BG = Below Grade

Date: December 4, 2015

Job Number: 15-2549

Report Type: Embankment

General Contractor: Everist

Rep. Notified: Craig Morrow

Earthwork Contractor: Everist

Rep. Notified: Dean Morrow

Equipment Utilized: Loader, Dozer

Area Represented: Slope

Nuclear Soil Density and Moisture Content

[illegible]

Specifications: Min. 95 % Max. Dry Density and from -2 to +2 of Optimum Moisture Content

Standard Proctor Modified Proctor

Field Technician: Steve Peters

Comments: BG = Below Grade
RSG = Rough Surface Grade

Reservoir 2 Improvements

Report Date: November 10, 2015

Job Number: 15-2549

Placement Date: October 13, 2015

General Contractor: Morrow & Sons

Rep. Notified: Gary Morrow

Placement Contractor: Morrow & Sons

Rep. Notified: Gary Morrow

Concrete Supplier: Everist Materials

Mix Identification: 350109G

Total Cubic Yards Placed: 30

Weather/Temp.: Sunny/64

Placement Method: Concrete Pump

Finish Method: Hand Finished

Item Number /Structure Type: Run-Down Channel

Placement Location: Run-Down Channel from STA 7+50 to 7+75

Specifications

Specified Strength (psi): 5,000

Air Content (%): 5-8

Slump (in.): 3-6

Temperature (°F): 50-90

Concrete Field Properties

Test No.	Sample Location	Truck Number	Ticket Number	Batch Time	Test Time	Slump/Spread C143 (inches)	Air Content C231 (%)	Conc. Temp. C1064 (°F)	Unit Weight C138 (pcf)	Water Added (gal.)
1	Run-Down Channel, STA 7+60	111	2001682	10:30a	11:20a	4	5.5	65	136.2	0

Compressive Strength Results (ASTM C39)

Cylinders Cast on Ticket Number: 2001682

Total Number of Cylinders Cast: 5

Laboratory ID: 398

Cylinder Diameter (in.)	4.00	4.00	4.00	4.00			
Cross Sectional Area (sq. in.)	12.57	12.57	12.57	12.57			
Maximum Load (lbs.)	54,801	70,561	71,280	69,734			
Compressive Strength (psi)	4,360	5,610	5,670	5,550			
Test Date	10/20/15	11/10/15	11/10/15	11/10/15			
Test Age (days)	7	28	28	28	Discard		
Fracture Type	T3	T2	T3	T6			

Average 28-Day Compressive Strength (psi): 5,610

Field Technician: Graham Basecke

Comments:

Reservoir 2 Improvements

Concrete Cover Report

Date: November 13, 2015

Job Number: 15-2549

General Contractor: Morrow & Sons

Rep. Notified: Craig Morrow

As scheduled, a representative visited the project site to perform periodic concrete testing. The locations of each sample are approximate.

Comments or Photos:



	Yes	No	Not Applicable
Results within Specifications?	☒	☐	☐
Reinforcing Steel Checked?	☐	☒	☐
Subgrade Tested?	☐	☐	☒

Number of Cylinders Cast this Date: 4

Number of Pages Attached: 1

Field Representative: Parker Wells

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Englewood, Commerce City, Loveland, Granby, Gypsum, Grand Junction, Casper

Reservoir 2 Improvements

Report Date: November 20, 2015

Job Number: 15-2549

Placement Date: November 13, 2015

General Contractor: Morrow & Sons

Rep. Notified: Craig Morrow

Placement Contractor: J. T. Kopp Construction

Rep. Notified: Jack Kopp

Concrete Supplier: Everist Materials

Mix Identification: 645109D

Total Cubic Yards Placed: 3

Weather/Temp.: 50 / sunny

Placement Method: Excavator Bucket

Finish Method:

Item Number /Structure Type: Staff Gauge Piers

Placement Location: STA 9+40, 20', 35', 50' L

Specifications

Specified Strength (psi): 4,000

Air Content (%): 4.5 +/-1

Slump (in.): 2-4

Temperature (°F): 50-90

Concrete Field Properties

Test No.	Sample Location	Truck Number	Ticket Number	Batch Time	Test Time	Slump/ Spread C143 (inches)	Air Content C231 (%)	Conc. Temp. C1064 (°F)	Unit Weight C138 (pcf)	Water Added (gal.)
2	Pier at STA 9+40, 35' L	99	2001834	12:17 PM	1:30 PM	3	3.5	59	144.0	0

Compressive Strength Results (ASTM C39)

Cylinders Cast on Ticket Number: 2001834

Total Number of Cylinders Cast: 4

Laboratory ID: 403

Cylinder Diameter (in.)	4.00				
Cross Sectional Area (sq. in.)	12.57				
Maximum Load (lbs.)	61,455				
Compressive Strength (psi)	4,890				
Test Date	11/20/15	12/11/15	12/11/15	12/11/15	
Test Age (days)	7	28	28	28	
Fracture Type	T3				

Average 28-Day Compressive Strength (psi):

Field Technician: Parker Wells

Comments:

Reservoir 2 Improvements

Report Date: December 11, 2015

Job Number: 15-2549

Placement Date: November 13, 2015

General Contractor: Morrow & Sons

Rep. Notified: Craig Morrow

Placement Contractor: J. T. Kopp Construction

Rep. Notified: Jack Kopp

Concrete Supplier: Everist Materials

Mix Identification: 645109D

Total Cubic Yards Placed: 3

Weather/Temp.: 50 / sunny

Placement Method: Excavator Bucket

Finish Method:

Item Number /Structure Type: Staff Gauge Piers

Placement Location: STA 9+40, 20', 35', 50' L

Specifications

Specified Strength (psi): 4,000

Air Content (%): 4.5 +/-1

Slump (in.): 2-4

Temperature (°F): 50-90

Concrete Field Properties

Test No.	Sample Location	Truck Number	Ticket Number	Batch Time	Test Time	Slump/Spread C143 (inches)	Air Content C231 (%)	Conc. Temp. C1064 (°F)	Unit Weight C138 (pcf)	Water Added (gal.)
2	Pier at STA 9+40, 35' L	99	2001834	12:17 PM	1:30 PM	3	3.5	59	144.0	0

Compressive Strength Results (ASTM C39)

Cylinders Cast on Ticket Number: 2001834

Total Number of Cylinders Cast: 4

Laboratory ID: 403

Cylinder Diameter (in.)	4.00	4.00	4.00	4.00
Cross Sectional Area (sq. in.)	12.57	12.57	12.57	12.57
Maximum Load (lbs.)	61,455	80,298	82,175	79,538
Compressive Strength (psi)	4,890	6,390	6,540	6,330
Test Date	11/20/15	12/11/15	12/11/15	12/11/15
Test Age (days)	7	28	28	28
Fracture Type	T3	T2	T3	T3

Average 28-Day Compressive Strength (psi): 6,420

Field Technician: Parker Wells

Comments:

Appendix H Volume Calculations by Tim Shenk Land Surveying

VOLUME CALCULATIONS

RESERVOIR #2 IMPROVEMENTS
GRAND COUNTY WATER AND SANITATION DISTRICT #1
WATER DIVISION 5, WATER DISTRICT 51
FRASER, COLORADO

2/5/2016

TIM SHENK
LAND SURVEYING INC.
P.O. BOX 1670
GRANBY, CO 80446
(970) 887-1046



volume by triangulation - exc to top of 1a
Volumes by Triangulation (Prisms) Thu Feb 04 14:31:50 2016
Existing Surface: \\Server-2015\d\server\surv\WORK\2014
jobs\14083\2015\FIELD\dh\ASBUILT 2015\TSLs TOPO 2015-2016 LOWEST EXCAVATION.tin
Final Surface: \\Server-2015\d\server\surv\WORK\2014
jobs\14083\2015\FIELD\dh\ASBUILT 2015\TSLs TOPO 2015-2016 TOP OF 1A.tin

Cut volume: 14.63 C.Y.
Fill volume: 21,797.37 C.Y.

Area in Cut : 1,132.4 S.F., 0.03 Acres
Area in Fill: 139,718.8 S.F., 3.21 Acres
Total inclusion area: 140,851.3 S.F., 3.23 Acres
Total exclusion area: 120,568.1 S.F., 2.77 Acres

Average Fill Depth: 4.21 feet
Cut to Fill ratio: 0.00
Import Volume: 21,782.7 C.Y.
Elevation Change To Reach Balance: -4.176
Volume Change Per .1 ft: 521.7 C.Y.

Cut (C.Y.) / Area (acres): 4.53
Fill (C.Y.) / Area (acres): 6741.11

Max Cut: 1.515 at 6073.046,5741.745
Max Fill: 14.706 at 6229.609,5611.344



volume by triangulation - top of 1a to final grade
Volumes by Triangulation (Prisms) Thu Feb 04 14:34:35 2016
Existing Surface: \\Server-2015\d\server\surv\WORK\2014
jobs\14083\2015\FIELD\dh\ASBUILT 2015\TSL5 TOPO 2015-2016 TOP OF 1A.tin
Final Surface: \\Server-2015\d\server\surv\WORK\2014
jobs\14083\2015\FIELD\dh\ASBUILT 2015\TSL5 TOPO 2015-2016 FINISHED GRADE.tin

Cut volume: 7.35 C.Y.
Fill volume: 18,640.83 C.Y.

Area in Cut : 1,334.9 S.F., 0.03 Acres
Area in Fill: 141,833.6 S.F., 3.26 Acres
Total inclusion area: 143,168.5 S.F., 3.29 Acres
Total exclusion area: 120,568.1 S.F., 2.77 Acres

Average Fill Depth: 3.55 feet
Cut to Fill ratio: 0.00
Import Volume: 18,633.5 C.Y.
Elevation Change To Reach Balance: -3.514
Volume Change Per .1 ft: 530.3 C.Y.

Cut (C.Y.) / Area (acres): 2.23
Fill (C.Y.) / Area (acres): 5671.60

Max Cut: 1.306 at 6271.956,5620.792
Max Fill: 18.102 at 5399.958,5932.230



volume by triangulation - exc to precon
Volumes by Triangulation (Prisms) Thu Jan 21 11:16:15 2016
Existing Surface: \\Server-2015\d\server\surv\WORK\2014
jobs\14083\2015\FIELD\dh\ASBUILT 2015\TSLs TOPO 2015-2016 LOWEST EXCAVATION.tin
Final Surface: \\Server-2015\d\server\surv\WORK\2014
jobs\14083\2015\FIELD\dh\ASBUILT 2015\TSLs TOPO 2015-2016 PRE-CONSTRUCTION.tin

Cut volume: 161.70 C.Y.
Fill volume: 71,284.82 C.Y.

Area in Cut : 14,765.6 S.F., 0.34 Acres
Area in Fill: 252,025.5 S.F., 5.79 Acres
Total inclusion area: 268,128.5 S.F., 6.16 Acres

Average Cut Depth: 0.30 feet
Average Fill Depth: 7.64 feet
Cut to Fill ratio: 0.00
Import Volume: 71,123.1 C.Y.
Elevation Change To Reach Balance: -7.162
Volume Change Per .1 ft: 993.1 C.Y.

Cut (C.Y.) / Area (acres): 26.27
Fill (C.Y.) / Area (acres): 11580.89

Max Cut: 2.776 at 6147.268,5413.126
Max Fill: 26.087 at 5390.998,5944.852



volume by triangulation - exc to final grade
Volumes by Triangulation (Prisms) Thu Jan 21 11:19:11 2016
Existing Surface: \\Server-2015\d\server\surv\WORK\2014
jobs\14083\2015\FIELD\dh\ASBUILT 2015\TSLs TOPO 2015-2016 LOWEST EXCAVATION.tin
Final Surface: \\Server-2015\d\server\surv\WORK\2014
jobs\14083\2015\FIELD\dh\ASBUILT 2015\TSLs TOPO 2015-2016 FINISHED GRADE.tin

Cut volume: 35.96 C.Y.
Fill volume: 48,268.54 C.Y.

Area in Cut : 5,566.1 S.F., 0.13 Acres
Area in Fill: 203,991.4 S.F., 4.68 Acres
Area exactly in daylight: 58,571.1 S.F., 1.34 Acres
Total inclusion area: 268,128.5 S.F., 6.16 Acres

Average Cut Depth: 0.17 feet
Average Fill Depth: 6.39 feet
Cut to Fill ratio: 0.00
Import Volume: 48,232.6 C.Y.
Elevation Change To Reach Balance: -4.857
Volume Change Per .1 ft: 993.1 C.Y.

Cut (C.Y.) / Area (acres): 5.84
Fill (C.Y.) / Area (acres): 7841.68

Max Cut: 0.871 at 5752.916, 5741.533
Max Fill: 27.829 at 5390.998, 5944.852



volume by triangulation - final to precon
Volumes by Triangulation (Prisms) Thu Jan 21 11:21:08 2016
Existing Surface: \\Server-2015\d\server\surv\WORK\2014
jobs\14083\2015\FIELD\dh\ASBUILT 2015\TSLs TOPO 2015-2016 FINISHED GRADE.tin
Final Surface: \\Server-2015\d\server\surv\WORK\2014
jobs\14083\2015\FIELD\dh\ASBUILT 2015\TSLs TOPO 2015-2016 PRE-CONSTRUCTION.tin

Cut volume: 11,941.07 C.Y.
Fill volume: 34,278.86 C.Y.

Area in Cut : 140,642.4 S.F., 3.23 Acres
Area in Fill: 170,460.0 S.F., 3.91 Acres
Total inclusion area: 311,102.4 S.F., 7.14 Acres

Average Cut Depth: 2.29 feet
Average Fill Depth: 5.43 feet
Cut to Fill ratio: 0.35
Import Volume: 22,337.8 C.Y.
Elevation Change To Reach Balance: -1.939
Volume Change Per .1 ft: 1,152.2 C.Y.

Cut (C.Y.) / Area (acres): 1671.97
Fill (C.Y.) / Area (acres): 4799.66

Max Cut: 7.968 at 6115.241,5472.533
Max Fill: 10.789 at 5781.789,5715.165



Appendix I Lining Approval Letter



COLORADO

Division of Water Resources

Department of Natural Resources

Water Division 5 - Main Office

P.O. Box 396

Glenwood Springs, CO 81602

March 30, 2016

Jeremy Deuto, P.E., P.G.
Project Manager/Geotechnical Engineer
GEI Consultants, Inc.
2625 Redwing Road, Suite 370
Fort Collins, CO 80526

Re: GCWSD #2

Dear Jeremy:

The purpose of this letter is to approve the lining of the above referenced gravel pit. This approval is based on the information you provided under cover letters dated December 8, 2015, and March 17, 2016 as well as the site inspection conducted on December 9, 2015. The estimated pit inflows from precipitation and groundwater and outflows evaporation indicate that **this pit has been lined to the design standard** referenced in the August 1999 State Engineer Guidelines for Lining Criteria for Gravel Pits. **Meeting the design standard requires that all water inflows and outflows for this pond must be accounted for on a monthly basis.**

Please call me if you have any questions.

Sincerely,

Jana Miller, P.E.
Water Resource Engineer

CC: Kyle Whitaker, Assistant Division Engineer
Neal Misbach, Water Commissioner
Sue Avre, Water Commissioner





COLORADO
Division of Water Resources
Department of Natural Resources

Dam Safety Branch

July 12, 2016

Mr. Bruce Hutchins
Grand County Water and Sanitation District
50 Vasquez Road
PO Box 3077
Winter Park, CO 80482
bhutchins@gcws1.com

VIA EMAIL

**When replying, please refer to:
GCWSD #2 DAM, DAMID 510210
Water Division 5, Water District 51
Construction File No. C-1903A**

SUBJECT: Acceptance of Construction

Dear Mr. Hutchins,

A final inspection of construction at the referenced dam was conducted on December 9, 2015, by Dana Miller of the Dam Safety Branch to confirm that this project had been completed as approved. Subsequent to that inspection, on July 5, 2016, we received acceptable final construction documents in accordance with Rule 10 of the State of Colorado Rules and Regulations for Dam Safety and Dam Construction (2-CCR 402-1; January 2007).

The project consisted of enlarging (via reservoir area excavation) and lining the dam and reservoir to increase available storage and reduce the volume of water lost to seepage. Based on observations during the final construction inspection and our review of the above mentioned documents, we believe the project has been satisfactorily completed in general accordance with the approved plans and specifications. Therefore, the project is accepted for full use when water is physically and legally available.

The completion of this rehabilitation project resulted in an increased crest width from 8 to 12 feet in areas, a consistent 3:1 upstream slope, and the addition of a stability berm along the south side. The reservoir area was also excavated up to 8 feet in areas. The dam has a jurisdictional height of 18 feet and a crest length of 1600 feet. The reservoir created by the dam covers approximately 5 acres and now has a normal storage capacity of 70 acre-feet.

The State Engineer, by providing this construction acceptance does not assume responsibility for any unsafe condition of the subject dam. The sole responsibility for the safety of this dam



Mr. Bruce Hutchins
GCWSD #2 Dam - Construction Acceptance
DAMID 510210, Construction File No. C-1903A
July 12, 2016
Page 2 of 2

rests with the reservoir owner and operator, who should take every step necessary to prevent damages caused by leakage or overflow of waters from the reservoir or floods resulting from a failure of the dam. Therefore, it is in the owner's best interest to operate and maintain the facility in a manner such that the safety of the dam and the general public are not jeopardized. We are enclosing a copy of Rules 12 and 15 of the Rules and Regulations for your reference and use. These rules pertain to general maintenance items and the owner's responsibilities, respectively.

If you have any questions, please do not hesitate to contact Dana Miller in our Steamboat Springs Office at 970-879-0272, ext. 6414. Thank you for these recent improvements to your dam.

Sincerely,

William T. McCormick III, P.E., P.G.
Chief, Dam Safety Branch
for, Deputy State Engineer

Enc: Copies of Rule 12 and 15 of the "Rules and Regulations for Dam Safety and Dam Construction"

cc: Alan Martellaro, Division Engineer
Susan Avre, WD 51 Water Commissioner
Dana Miller, Dam Safety Engineer
Jeremy Franz, Design Review Engineer
Neal Misbach, Division 5 Lead Water Commissioner
Chad Masching, GEI Consultants, cmasching@geiconsultants.com



Reservoir No. 2 Enlarging and Lining Project

Construction File No.: C-1903A

Water Division 5, Water District 51

Dam ID Number: 510210

Grand County, Colorado

Approved on this ____ day of _____, 2015

State Engineer

By: _____

William T. McCormick III
CO P.E. 29127, Chief – Dam Safety Branch

By: _____

Date: April 3, 2015

Engineer: Chad Masching
GEI Consultants, Inc.
4601 DTC Boulevard, Suite 900
Denver, Colorado 80237

SPECIFICATION INDEX

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31 23 16 Excavation
31 23 19 Dewatering
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SECTION 00 01 00
NOTICE TO BIDDERS

Pursuant to the "Notice of Pre-Qualification of Bidders" published in the Middle Park Times on September 6, 2014, sealed Proposals in single endorsed, "Grand County Water and Sanitation District No. 1 Reservoir No. 2 Enlarging and Lining Project", will be received by the District offices until 11:00 AM local time on October 8, 2014, at which time and place, bids will be publicly opened and read aloud in the presence of bidders or their duly authorized representatives. The contract documents will be available on or after September 6, 2014 and a mandatory pre-bid meeting will be held at 5:00 PM September 16, at the District office followed by a site visit.

Only general contractors who have satisfactorily fulfilled the **minimum** requirements of a Contractor's Pre-Qualification Form to the satisfaction of the District by September 16, 2014, and **attended the mandatory pre-bid meeting**, will be allowed to bid on the proposed project. All determinations made by the ENGINEER and District regarding pre-qualification are final and not appealable. All sub-contractors performing tasks below will also be pre-qualified, and will be required to submit pre-qualification forms at the pre-bid meeting. While sub-contractors will not be required to attend the pre-bid meeting, attendance is encouraged.

Drawings, specifications, and forms for preparing bids may be obtained at no charge via email in PDF format from GEI Consultants, Inc., contact Jeremy Deuto at 303-264-1018(o) or 303-775-2063(c) on or after September 6, 2014. A non-refundable deposit of Thirty Dollars (\$30.00) will be required for each set provided at the mandatory at the pre-bid meeting.

Checks shall be made payable to GEI Consultants, Inc.

All bids must be accompanied by a certified check payable to the Grand County Water and Sanitation District No. 1 in an amount of at least five percent (5%) of the Bid, drawn on a bank which is a member of the Federal Reserve System or a Bidder's Bond in like amount. The check or bond will be retained by the District as liquidated damages if the successful bidder refuses or fails to timely enter into a Contract and provide a Performance, Payment and Maintenance Bond in accordance with his bid when notified of the award.

The extent of the work is approximately as follows:

1. Excavate materials within the reservoir footprint to the lines and grades shown.
2. Process required volume of imported materials to U.S. 0.5" or smaller, blend with 2.5% bentonite, place and compact as shown on the Construction Drawings.
3. Place blended material to the lines and grades shown and haul remaining material off-site to the Grand County Benson Pit.
4. Furnish and install HDPE piping as shown on the Construction Drawings.
5. Furnish all site work, temporary facilities, miscellaneous labor, materials, and equipment to provide a complete project as shown on the Drawings and Specifications.

Bids may not be withdrawn for a period of forty-five (45) days after the time fixed for opening them. The District reserves the right to waive irregularities, to waive technical defects accordingly as the

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best interest of the District may be served, may reject any and all bids and shall award the contract to the lowest pre-qualified and **responsible** bidder as determined by the District.

If the bid exceeds the District's budget and the District cannot successfully negotiate a modified contract price with the lowest responsible bidder, the District reserves the right to negotiate with other bidders.

BY ORDER OF THE GRAND COUNTY WATER AND SANITATION DISTRICT NO. 1

PO Box 3077, 50 Vasquez Street, Winter Park, CO 80482

Phone: 970-726-5583, Fax: 970-726-5636

END OF SECTION

**SECTION 00 02 00
INSTRUCTIONS TO BIDDERS**

1.1 CONTRACT DOCUMENTS

A. Attached hereto and bound herein and all made a part and parcel hereof and herein referred to as the “Contract Documents” and/or “Contract” are copies of:

1. Notice to Bidders	8. Notice to Proceed
2. Instructions to Bidders	9. Proposal and Bid Schedule
3. Bid Bond	10. Drawings
4. Performance, Payment and Maintenance Bond	11. General Conditions and Special Conditions
5. Contract	12. Technical Specifications
6. Certificate of Incorporation	13. Addenda
7. Notice of Award	14. Certificate of Insurance (to be provided by CONTRACTOR)

B. Each bidder shall thoroughly examine and be familiar with the Contract Documents. Submission of the Bid shall constitute acknowledgment upon which the District may rely that the bidder has thoroughly examined and is familiar with the Contract Documents. Failure or neglect of a bidder to examine any of the Contract Documents shall in no way relieve him from any obligation with respect to the Bid or to the Contract Documents. No claim for additional compensation will be allowed which is based upon a lack of knowledge of the work.

C. Any discrepancies within or between any of the Contract Documents shall be brought to the immediate attention of the ENGINEER for resolution.

1.2 DEFINITIONS

- A. OWNER (District) – The Grand County Water and Sanitation District No. 1, as represented by one of its Officers or other duly authorized representatives, entering into the Contract to have the work covered by these specifications done in accordance therewith.
- B. BIDDER – Each or any of the Persons, partnerships, Associations or Corporations making proposals for the performance of the work covered by these specifications.
- C. CONTRACTOR – The Person, Firm, Association or Corporation entering into the Contract for the performance of the work covered in these specifications.
- D. ENGINEER – GEI Consultants, Inc. (GEI), and their contracted sub-consultants for this project.

E. ENGINEER's AGENT – Employees or subcontractors of GEI providing service relative to the Contract.

F. Other items are defined in the General Conditions and Contract Specifications.

1.3 PROPOSALS

A. Bids shall be made upon the unit price and/or lump sum item form therefore furnished herein with all items properly filled out. Numerals shall be written in ink and the signature of all persons signing shall be in longhand. Amounts stated in words shall have control over figures. The complete proposal shall be without inter-lineation, alteration or erasure.

B. No modification or alternate proposals shall be considered, except as specifically called for in the proposal or provided elsewhere herein.

C. No oral or emailed or facsimile transmitted proposals or modifications shall be considered.

D. A certified check or bid bond, as described in the Notice to Bidders, must accompany each bid.

1.4 WITHDRAWAL, AWARD OR REJECTION OF BIDS

Bids may be withdrawn by the bidder prior to, but not after, the hour set for the opening of the bids. The Contract will be awarded to the lowest responsible bidder complying with the conditions of the "Notice to Bidders" and this "Instructions to Bidders," provided the bid is reasonable and it is to the best interest of the OWNER to accept it. The bidder to whom the award is made will be notified in writing at the earliest possible date. The OWNER, however, reserves the right to reject any and all bids and to waive any informality in bids received whenever such rejection or waiver is to the interest of the OWNER. An unbalanced proposal also may be grounds for rejection; that is, each item of work in the schedule should also carry its own proportion of the cost. The OWNER also reserves the right to reject the bid of a bidder who has previously failed to perform properly or complete on time, any contracts of a similar nature or the bid of a bidder who is not in a position to perform the contract, or actively prosecute the work to completion. The OWNER expressly reserves the right to determine whether or not a bidder is a "qualified bidder and a responsible bidder" under the terms of this paragraph and the decision of the OWNER concerning the same shall be final and conclusive.

1.5 INTERPRETATIONS

Each request for interpretation of any of the Contract Documents shall be made in writing and addressed to the ENGINEER. Each person making the request shall be fully responsible for its delivery to the ENGINEER. If the point in question is not clearly and fully set forth, a written bulletin of instructions of Addendum will be mailed or delivered to each person obtaining a set of forms for preparing bids as provided in the proposal. Oral instructions, interpretations, or representations shall not be binding upon the OWNER.

1.6 SUBSTITUTIONS FOR PATENTED AND SPECIFIED ARTICLES

Any patented or specific article or process mentioned by name in the drawings or specifications are for the purpose of facilitating descriptions and shall be deemed to be followed by the words "or approved equivalent". Any substitute article or process offered by the CONTRACTOR may be used when authorized in writing by the ENGINEER if, in the opinion of the ENGINEER, it is equivalent to the patented or specific article; however, if it is not equivalent, the CONTRACTOR must furnish the article or process specified or one that, in the opinion of the ENGINEER, it is equivalent thereto. The bidder shall list the type, manufacturer and other pertinent information on the specific articles he proposes to incorporate into the work if other than as specified in the specifications and on which his proposal is based. When the successful bidder fails to furnish said list, award will be made on the basis of furnishing the articles called for in the specifications.

1.7 LAWS

- A. Bidders shall familiarize themselves with the provisions of the laws and/or requirements of the Town, County, State and Federal Jurisdictions in which the work is performed pertaining to the character of the work to be undertaken and shall comply therewith.
- B. It is the Bidder's responsibility to familiarize themselves and comply with the latest OSHA rules and regulations applicable to this projects(s). Said rules and regulations can be found in the Federal Register, Vol. 54., No. 209, Part II Department of Labor, 29CFR Part 1926 Occupational Safety and Health Standards - Excavation: Final Rule. Other OSHA rules may apply. Failure to list OSHA rules and regulations in these specifications does not waive the CONTRACTOR's responsibility for compliance with said rules.

1.8 BIDDERS INTEREST IN MORE THAN ONE BID

If more than one bid be offered by any party, by or in the name of his or their clerk, partner, or any other person, all such bidders shall be rejected. This shall not prevent a bidder from submitting alternative bids when called for, nor from quoting different prices

on different qualities of material or different conditions of delivery. A party who has quoted prices on materials to a bidder is not thereby disqualified from quoting prices to other bidders or from submitting a bid directly for the materials or work, as a subcontractor.

1.9 AWARD OF CONTRACT

All Checks or Bidders' Bonds shall be held until award of the Unit Price and/or Lump Sum Item Contract or after a lapse of forty-five (45) days from the opening of bids. The Unit Price and/or Lump Sum Item Contract will be awarded within forty-five (45) days after the opening of bids unless all bids are rejected or a longer period of time is stated in the Notice to Bidders. The successful bidder shall be required to execute the Contract and Performance, Payment and Maintenance Bond and furnish the required Certificates of Insurance within ten (10) days of date of the Notice of Award to him. Said Certificates of Insurance shall name as additional insureds the ENGINEER and its subcontractors, OWNER, Town, or other jurisdiction in which the work is performed, and any other party deemed necessary by the OWNER. The check or bidders' bond shall be returned upon completion of the Performance, Payment and Maintenance Bond.

1.10 INSPECTION OF SITE

The site of the work is within the boundaries of the Town of Fraser. Bidders must attend the pre-bid meeting on September 16, 2014 at 5:00 PM at the District office with a site visit to follow. This project must be contained within the limits of the allowable construction area as shown on the Drawings. Specific site conditions and constraints will be discussed and reviewed during the required walk through meeting.

BIDDER'S REPRESENTATION

By the act of submitting a bid for the proposed contract, the Bidder represents that:

1. The Bidder and all subcontractors the Bidder intends to use have carefully and thoroughly reviewed the drawings, specifications and other construction contract documents and have found them complete and free from ambiguities and sufficient for the purpose intended; further that,
2. The Bidder and all workmen, employees and subcontractors the Bidder intends to use are skilled and experienced in the type of construction represented by the construction contract documents bid upon; further that,
3. Neither the Bidder nor any of the Bidder's employees, agents, intended suppliers or subcontractors have relied upon any verbal representations, allegedly authorized or unauthorized from the OWNER, or the OWNER's employees or agents including architects, engineers or consultants, in assembling the bid figure; and further that,
4. The Unit Price and/or Lump Sum Item bid figure is based solely upon the construction contract documents and properly issued written addenda and not upon any other written representation.

_____ (CONTRACTOR) has read and understands the Instruction to Bidders, has visited and is familiar with the site and its conditions, and has reviewed the drawings and specifications to his level of comfort for preparing his bid for this project.

By: _____

Title: _____

Date: _____

END OF SECTION

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SECTION 00 04 00
PROPOSAL AND BID SCHEDULE
Grand County Water and Sanitation District No. 1
RESERVOIR NO. 2 ENLARGING AND LINING PROJECT

The undersigned hereby proposes and agrees to enter into and perform the Contract attached hereto, of which this Unit Price and/or lump Sum Item Proposal forms a part, and shall do the construction therein described, on the terms and conditions therein described and set forth, and furnish all labor, equipment, materials, tools, transportation, services, and incidentals to complete said construction in strict conformity with the Drawings, the Specifications, and all the Contract Documents including any Addenda to any part thereof, which the undersigned proposes to execute only the quantity required to complete the project at the lump sum/unit price set opposite each item.

The undersigned has examined the location of the proposed work and is familiar with the Drawings, Specifications, and all Contract Documents related thereto, and the local conditions including surface and sub-surface conditions at the project site and has included in this bid a sum to cover the cost of all items necessary to complete the Contract. The making of a bid creates a conclusive presumption that all things and actions required by this Proposal have been done by the CONTRACTOR and constitutes a declaration by the CONTRACTOR to that effect. The undersigned certifies further that the Bidder has the technical ability and experience to perform the Work at the total price set forth in this Proposal.

The undersigned has checked carefully all submitted figures and understands that the OWNER will not be responsible for any errors or omissions on the part of the undersigned in making his bid, or in his failing to obtain, before bid, a proper interpretation from the ENGINEER of any inconsistencies or ambiguities in any of the Contract Documents. The undersigned also acknowledges that this Proposal and its items and quantities therein are approximate and based on the current information available; and, therefore, may not reflect the final quantities and/or items used to complete the Work.

Enclosed, find a certified check, drawn on a bank which is a member of the Federal Reserve System, in the sum of _____ (\$_____), made payable to the OWNER, or a Bidders Bond of like amount, and executed by an approved surety company. Said check or bond is given as a guarantee that the bidder will enter into the Contract and Performance, Payment and Maintenance Bond on the forms attached hereto, if awarded the Work, and the amount thereof represents the agreed liquidated damages that the OWNER will sustain if the Bidder fails or refuses, for a period of ten days after the Notice of Award, to enter into said Contract, in which event said check or bond shall be immediately paid to and retained by the OWNER as payment of said liquidated damages and not as a penalty.

Unless otherwise required by law, or a longer period of time is stated in the Notice to Bidders, the undersigned agrees that the OWNER has the right to hold all bids received for a period of forty-five (45) days after date of opening thereof.

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The following addenda have been received, signed, and are hereto attached:

GRAND COUNTY WATER AND SANITATION DISTRICT NO. 1
BID SCHEDULE: RESERVOIR NO. 2 ENLARGING AND LINING PROJECT

Table 1
Bid Schedule
Grand County Water and Sanitation District No. 1
Reservoir 2 Improvements

	Item	Quantity	Unit	Unit Price	Extension
	Reservoir Rehabilitation				
1	Shaping Existing Reservoir Slopes to 3:1(H:V)	1	LS	\$	\$
2	Excavation	33,000	CY	\$	\$
3	Keyway Excavation	2,000	LF	\$	\$
4	Foundation Preparation	2,500	CY	\$	\$
5	Zone 1a	18,700	CY	\$	\$
6	Zone 1b	28,700	CY	\$	\$
7	Riprap Rundown Channel	100	CY	\$	\$
8	Riprap Spillway Protection	15	CY	\$	\$
	Reservoir Deepening				
9	Excavation	43,000	CY	\$	\$
10	Offsite Haul/Disposal	43,000	CY	\$	\$
11	Mobilization/Demobilization	1	LS	\$	\$
12	Dewatering	1	LS	\$	\$

LS=Lump Sum
CY=Cubic Yards
LF=Linear Feet
EA=Each

**GRAND COUNTY WATER AND SANITATION DISTRICT NO. 1
RESERVOIR NO. 2 ENLARGING AND LINING PROJECT
TOTAL BID (sum of items 1 through 12)**

\$ _____

Bidder acknowledges that quantities are not guaranteed and final payment will be based on the actual quantities determined, as provided for in the Contract Documents.

The undersigned hereby proposes and agrees to complete all the work described in the above Bid, complete in place and ready for operation by the substantial completion date to be determined upon issuance of Notice to Proceed.

CONTRACTOR _____
BY _____

DATE _____

If Bidder is:

An Individual

By _____ (SEAL)
(Individual's name)

(Signature)

Telephone number: _____

A Partnership

By _____ (SEAL)
(Partnership name)

By _____ / _____
(Name/Title of partner)

(Signature of partner)

Telephone number: _____

A Corporation

By _____ (SEAL)
(Corporate name)

By _____
(Name/Title of authorized officer)

(Signature of authorized officer)

Telephone number: _____

END OF SECTION

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**SECTION 00 04 30
BID BOND**

KNOW ALL MEN BY THESE PRESENTS, THAT _____,
as CONTRACTOR, and _____, as Surety, are held and firmly bound
unto the _____, (hereinafter called 'OWNER') in the penal sum of
_____ Dollars(\$_____) lawful money of the
United States, for payment of which sum, well and truly to be made, we bind ourselves, our heirs,
executors, administrators, successors, and assigns, jointly and severally by these presents.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH THAT whereas the
CONTRACTOR has submitted the accompanying bid, dated _____

WHEREAS, the OWNER has required the CONTRACTOR to furnish either a Certified Check,
equivalent to not less than five percent (5%) of the amount of said bid or a Bid Bond in the like
amount, conditioned that in event of failure to execute the proposed Contract and the Performance,
Payment and Maintenance Bond within the time specified if the Contract is awarded to him that said
sum to be paid immediately to the OWNER as liquidated damages and not as a penalty for the
CONTRACTOR's failure to perform.

NOW, THEREFORE, if the CONTRACTOR shall, within the time period specified therein,
and on the attached prescribed forms presented to him for signature, enter into a written Contract
with the OWNER, in accordance with his bid as accepted, and shall provide a Certificate of
Insurance and a Performance, Payment and Maintenance Bond with good and sufficient surety, or
sureties, as may be required upon the forms prescribed by the OWNER for the faithful performance
and the proper fulfillment of said Contract, or in the event of the withdrawal of said bid within the
time specified, or upon the payment of the OWNER of the sum determined upon herein as liquidated
damages, and not as a penalty in the event of the failure of the CONTRACTOR to enter into said
Contract and shall provide a Certificate of Insurance, and a Performance, Payment and Maintenance
Bond within the time specified, then this obligation shall be void and of no effect, otherwise to
remain in full force and effect.

IN WITNESS WHEREOF, the above bounden parties have executed this instrument under
their several seals this _____ day of _____, 20____, the name and corporate seal of
each corporate party being affixed hereto and these presents duly signed by its undersigned
representatives pursuant to the authority of its governing board.

CONTRACTOR

ADDRESS

BY: _____

ATTEST: _____

SURETY

ADDRESS

BY: _____

ATTEST: _____

Attorney-in-Fact

END OF SECTION

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**SECTION 00 04 50
BIDDER QUALIFICATIONS**

PROJECT: Grand County Water and Sanitation District No. 1 – Reservoir No. 2 Enlarging and Lining Project

PART 1 GENERAL

1.1 COMPANY INFORMATION

The BIDDER is required to complete this form in its entirety and submit it at or by 2 PM of the day of the Pre-Bid Site Meeting. Any Bid received without the completed form already submitted as noted will be considered non-responsive.

A. NAME, ADDRESS, AND GENERAL QUALIFICATIONS

1. Name of Bidder:

2. Permanent main office address:

3. When organized (Month and year):

4. If a corporation, where incorporated:

5. General character of work performed:

6. Number of years in business under present trade name

B. CONTRACTOR'S LICENSE

1. License type:

2. License number:

3. License class:

4. City, County and State:

1.2 RELEVANT PROJECT EXPERIENCE

List a minimum of three (3) projects of \$500,000 or more with similar installations and construction experience that were completed within the last 5 years by the General Contractor. Projects shall include water and/or wastewater ponds or reservoirs with clay or bentonite liners, HDPE butt fused pipelines, grouted riprap construction, and other relevant project experience. Provide a list of each OWNER, OWNER's phone number, address, project cost, date of installation, and size.

Owner, Address, Phone		Project Description	Contract Amount, Dollars

1.3 PROPOSED PROJECT MANAGEMENT PERSONNEL

List the key project staff including project manager and superintendent proposed to perform work on this project for the General Contractor. Attach resumes and recent project experience for all listed personnel.

Personnel	Position or Role	Years Experience	Academic Degrees or Certifications	Professional Registrations or Certifications

1.4 PENDING LEGAL LIABILITIES

Are any lawsuits pending against you or your firm at this time? _____

If yes, describe _____

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION**3.1 AUTHORIZATION TO VERIFY INFORMATION**

The undersigned hereby authorizes and requests any person, firm or corporation to furnish any information requested by the OWNER in verification of this Statement of Bidder's Qualifications.

By (Signature and Title): _____
Date _____

END OF SECTION

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**SECTION 00 05 10
NOTICE OF AWARD**_____,
20____

TO: _____

The OWNER, having duly considered the Unit Price and/or Lump Sum Item Proposal submitted on _____, 20__, for the work covered by the Contract Documents entitled "Grand County Water and Sanitation District No. 1 – Reservoir No. 2 Enlarging and Lining Project" in the amount of _____ Dollars (\$_____), and it appearing that your Proposal is fair, equitable and to the best interest of the OWNER, the said Proposal is hereby accepted at the Unit Price and/or Lump Sum Item bid prices contained therein.

In accordance with the terms of the Contract Documents, you are required to execute the Contract and Performance, Payment and Maintenance Bond in three counterparts within ten (10) consecutive days from and including the date of this Notice of Award.

In addition, you are required to furnish at the said time three Certificates of Insurance evidencing compliance with the requirements for insurance as stated in the Contract Documents.

The Bid Security submitted with your Proposal will be returned upon execution of the Contract, furnishing of the required Performance, Payment and Maintenance Bond and Certificates of Insurance within the time limit specified. In the event that you should fail to execute the Contract agreement and Performance, Payment and Maintenance Bond within the time limit specified, said Security will be retained by the OWNER as liquidated damages and not as a penalty for the delay and extra work caused thereby.

Grand County Water & Sanitation District No.1

By: _____

Title: _____

END OF SECTION

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**SECTION 00 05 20
CONTRACT**

THIS CONTRACT, made and entered into this ____ day of _____ 2015, by and between the Grand County Water and Sanitation District No. 1, hereinafter in the Contract Documents called the "OWNER", and _____.

(1) A Corporation organized and existing under the laws of the State of _____.

(2) A Partnership consisting of _____.

(3) An individual trading as _____,
of the City and State of _____.

hereinafter in the Contract Documents called the "CONTRACTOR".

WITNESSETH: That the OWNER and the CONTRACTOR, for the considerations hereinafter named, mutually agree as follows:

ARTICLE 1

STATEMENT OF WORK: For and in consideration of the unit and/or lump sum prices for the various items of work as set forth in the Bid Proposal heretofore submitted by the CONTRACTOR, said CONTRACTOR shall furnish all necessary business administration, superintendence, labor, equipment and material, and perform complete and deliver to the OWNER, to the OWNER's satisfaction, under the direction of the ENGINEER, free from all liens, claims and demands of any kind for material, equipment, supplies, services, labor taxes and damage to property or persons, in full compliance with the Contract Documents and in strict accordance with the terms thereof, all of which are made a part hereof by reference herein, are designated as follows:

(1) Notice to Bidders (2) Instructions to Bidders and Bidder's Representation(s) (3) Bid Bond Form (4) Performance, Payment and Maintenance Bond (5) Contract (6) Certificate of Incorporation (7) Notice of Award (8) Notice to Proceed (9) Proposal and Bid Schedule (10) Drawings (11) General Conditions and Special Conditions (12) Technical Specifications (13) Addenda (See Proposal) (14) Certificates of Insurance

The above named Documents shall be binding and effective and form a part hereof as if attached hereto or fully set out herein, and each detail shall be equally binding whether it appears in one, some, or all of the Contract Documents.

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ARTICLE 2

PERFORMANCE, PAYMENT AND MAINTENANCE BOND: The CONTRACTOR of the second part furnishes concurrently herewith a Performance, Payment and Maintenance Bond in the amount of the total Contract price, as required by the Contract Documents, such Bond being attached hereto. The Performance, Payment and Maintenance Bond shall guarantee all material and workmanship furnished by the CONTRACTOR for a period of two (2) years after the date of final inspection and acceptance by the OWNER.

ARTICLE 3

TIME OF COMPLETION: The CONTRACTOR shall proceed with due diligence and care and shall maintain the necessary personnel, materials and equipment on the job to complete the work on time. Delivery of all materials shall be complete in accordance with the Contract Documents by the date indicated in the Notice to Proceed, and liquidated damages, not as a penalty, the sum of five hundred dollars (\$500.00) per day will be deducted from the amount due the CONTRACTOR for the performance of the Contract for each day thereafter which is required to complete the work called for by the Contract due to the impossibility of determining the actual damages for delay. Extension of the completion date will be allowed only in accordance with provisions of the Contract Documents.

ARTICLE 4

COST OF CONSTRUCTION: The CONTRACTOR agrees to complete the work shown and described in the Unit Price and/or Lump Sum Item Proposal which consists of the Bid Schedule for the Grand County Water and Sanitation District No. 1, Reservoir No. 2 Enlarging & Lining Project, in the amount not to exceed _____ Dollars (\$_____). Payment shall be made in monthly installments subject to the retainage described herein, based on the ENGINEER's determination of the amount and value of the work completed during the month in accordance with the specifications and final payment shall be made by the OWNER to the CONTRACTOR after delivery and acceptance by the ENGINEER and thirty days of compliance with the final payment requirements contained in Colo. Rev. Stat. §38-26-107, as amended. The final construction cost may not reflect the original contract amount and may increase or decrease based on the total quantity of each item or number of items used to complete the project or schedules awarded subject to strict compliance with the field order and change order process contained in this Contract.

ARTICLE 5

ASSIGNMENT: CONTRACTOR shall not at any time assign any interest in the contract or the other Contract Documents to any person or entity without the prior written consent of the OWNER. The terms of this Contract shall inure to and be binding upon the permitted successors and assigns of the parties hereto.

ARTICLE 6

AMENDMENT: The Contract may be amended from time to time by written agreement between the parties hereto. No amendment, modification or alteration of the Contract shall be binding upon the parties hereto unless the same is in writing and approved by the duly authorized representatives of each party hereto.

ARTICLE 7

SEVERABILITY: If any term, section or other provision of the Contract shall, for any reason, be held to be invalid or unenforceable, the invalidity or unenforceability of such terms, section or other provision shall not affect any of the remaining provisions of this Contract.

ARTICLE 8

WAIVER: No waiver by either party of any right, term or condition of this Contract shall be deemed or construed as a waiver or any other rights, term or condition, nor shall a waiver of any breach hereof be deemed to constitute a waiver of any subsequent breach, whether of the same or of a different provision of this Contract.

ARTICLE 9

REMEDIES: None of the remedies provided to either party under this Contract shall be required to be exhausted or exercised as a prerequisite to resort to any further relief to which such party may then be entitled. Every obligation assumed by, or imposed upon, either party hereto shall be enforceable by any appropriate action, petition or proceeding at law or in equity. In addition to any other remedies provided by law, this Contract shall be specifically enforceable by either party. The Contract shall be construed in accordance with the laws of the State of Colorado, and particularly those relating to governmental contracts with exclusive venue and jurisdiction in Grand County District Court.

The amount of money appropriated by the OWNER is equal to or in excess of the Contract amount. The OWNER will not issue any work order or directive requiring additional compensable work to be performed, which work causes the aggregate amount payable under the Contract to exceed the amount appropriated for the original contract, unless the CONTRACTOR is given written assurance by the OWNER that lawful appropriations to cover the costs of additional work have been made or unless such work is covered under a remedy-granting provision in the Contract.

ARTICLE 10

COUNTERPARTS: This Contract may be executed in multiple counterparts, each of which shall constitute an original, but all of which shall constitute one and the same document.

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ARTICLE 11

ENTIRETY: This Contract constitutes the entire agreement between the parties concerning the subject matter herein, and all prior negotiations, representations, contracts, understandings or agreements pertaining to such matters are merged into, and superseded by, this Contract.

IN WITNESS WHEREOF, the parties hereto have executed this contract in two (2) counterparts, as of this day and year herein above set forth.

(SEAL)

By: _____

ATTEST:

By: _____

Title: _____

(SEAL)

GRAND COUNTY WATER AND
SANITATION DISTRICT NO. 1

By: _____

ATTEST:

By: _____

Title: _____

NOTE: Certification of Incorporation shall be executed if CONTRACTOR is a Corporation.

ILLEGAL ALIEN PROVISIONS REQUIRED IN ALL PUBLIC CONTRACTS FOR SERVICES BY C.R.S. 8-17.5-101 ET SEQ.**VERSION IN EFFECT AFTER 5-13-08**

[Note: Use of "CONTRACTOR" and "OWNER" or alternative terms to be determined based on type and circumstances of each agreement]

Illegal Aliens. By its signature on this Contract, CONTRACTOR certifies that, as of the time of its signature, it does not knowingly employ or contract with any illegal alien who will perform work under this Contract and that, in order to confirm the employment eligibility of all employees who are newly hired for employment to perform work under this Contract, CONTRACTOR will participate in the e-verify program or department program, as defined in C.R.S. 8-17.5-101. CONTRACTOR agrees that it shall not knowingly employ or contract with any illegal alien to perform work under this Contract; and that it shall not enter into a contract with a subcontractor that fails to certify to CONTRACTOR that the subcontractor shall not knowingly employ or contract with any illegal alien to perform work under this contract. CONTRACTOR has confirmed the employment eligibility of all employees who are newly hired for employment to perform work under this Contract through participation in either the e-verify program or department program, as defined in C.R.S. 8-17.5-101. CONTRACTOR shall not use the e-verify program or department program procedures to undertake preemployment screening of job applicants while work under this Contract is being performed. If CONTRACTOR obtains actual knowledge that a subcontractor performing work under this Contract knowingly employs or contracts with an illegal alien, CONTRACTOR shall: (1) notify the subcontractor and OWNER within three days that CONTRACTOR has actual knowledge that the subcontractor is employing or contracting with an illegal alien; and (2) terminate the subcontract with the subcontractor if, within three days of receiving the notice required herein, the subcontractor does not stop employing or contracting with the illegal alien; except that CONTRACTOR shall not terminate the contract with the subcontractor if during such three days the subcontractor provides information to establish that the subcontractor has not knowingly employed or contracted with an illegal alien. CONTRACTOR shall comply with any reasonable request by the Colorado Department of Labor and Employment made in the course of an investigation that the Department is undertaking pursuant to the authority established in C.R.S. 8-17.5-101(5). If CONTRACTOR violates a provision of this paragraph, OWNER may terminate this Contract for breach of contract. If the Contract is so terminated, CONTRACTOR shall be liable for actual and consequential damages to OWNER. CONTRACTOR understands that, in the event of such a termination, OWNER is required to notify the office of the Colorado Secretary of State.

Name: _____

Signature: _____

Title: _____

Company: _____

Date: _____

END OF SECTION

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**SECTION 00 05 50
NOTICE TO PROCEED**

_____, 2015

TO: _____

Your are hereby authorized to proceed on this date, _____, 2015, or within seven (7) consecutive calendar days hereafter, with a substantial completion date of _____ and with the work covered by the Contract Documents titled and numbered Grand County Water and Sanitation District No. 1, Reservoir No. 2 Enlarging and Lining Project for the sum of _____ Dollars (\$_____). You are to notify the ENGINEER 48 hours before starting work.

No.1

Grand County Water and Sanitation District

By: _____

Title: _____

END OF SECTION

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SECTION 00 06 10
PERFORMANCE, PAYMENT AND MAINTENANCE BOND

KNOW ALL MEN BY THESE PRESENTS, That we, the undersigned of _____

hereinafter referred to as the "CONTRACTOR", and _____
a Corporation organized under the laws of the State of Colorado and authorized to transact business in the State of Colorado as Surety, are held and firmly bound unto the Grand County Water and Sanitation District No.1, a Quasi-Municipal Corporation of the State of Colorado, hereinafter referred to as "OWNER", in the penal sum of _____ Dollars (\$_____), lawful money of the United States of America, for the payment of which sum well and truly to be made, we bind ourselves and our heirs, executors, administrators, successors, and assigns, jointly and severally by these presents.

THE CONDITIONS OF THE FOREGOING OBLIGATION IS SUCH THAT:

WHEREAS, the above bounden CONTRACTOR has, on the ____ day of _____, 2015, entered into a written Contract with the aforesaid OWNER for the Grand County Water and Sanitation District No. 1, Reservoir No. 2 Enlarging and Lining Project, which shall include furnishing all materials, equipment, tools, superintendence, and other facilities and accessories, for the construction of certain improvements as designated, defined and described in the said Contract and the conditions thereof, and in accordance with the specifications and plans therefore; a copy of said Contract being attached hereto and made a part hereof.

NOW, THEREFORE, if the said CONTRACTOR shall and will, in all particulars, well, duly and faithfully observe, perform and abide by each and every covenant, condition, and part, of the said Contract, and the Conditions, Specifications, Plans and other Contract Documents thereto attached or, by reference, made a part thereof, according to the true intent and meaning in each case, then this obligation shall be and become null and void; otherwise it shall remain in full force and effect.

This obligation shall be in full force and effect for the full guarantee period provided in the specifications contained in said contract.

PROVIDED FURTHER, that if the said CONTRACTOR or his or her subcontractor fails to duly pay for any labor, materials, team hire, sustenance, provisions, provender, gasoline, lubricating oils, fuel oils, greases, coal, or any other supplies or materials used or consumed by such CONTRACTOR or his, their, or its subcontractors in performance of the work contracted to be done or fails to pay any person who supplies laborers, rental machinery, tools or equipment, the Surety will pay the same together with interest as provided by law:

PROVIDED FURTHER, that the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the Contract, or the work to be performed thereunder, or the specifications accompanying the same, shall in anyway affect its obligation on this bond and it does hereby waive notice of any change, extension of time, alteration, or addition to the terms of the contract, or to the work or to the specifications.

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PROVIDED FURTHER, that the said Surety, for value received, hereby stipulates and agrees that it will indemnify and save harmless the said OWNER to the extent of any and all payments in connection with the carrying out of said Contract which said OWNER may be required to make under the law by any reason of such failure or default by the said CONTRACTOR and any such CONTRACTOR including interest, costs, and attorney fees.

PROVIDED FURTHER, that the Said Surety and CONTRACTOR shall protect, defend, indemnify and save harmless the OWNER and the OWNER's officers, including its engineers and their employees providing service agents, servants, and employees relative to herein called the "OWNER", as well as any entity or individual listed in this paragraph, contract from and against all claims and actions, based upon or arising out of injuries or death of persons or damage to property caused by, or sustained, in connection with this Contract or by conditions created thereby, and on request of the OWNER will assume the defense of any claim or action brought against the OWNER except for the negligent acts of the OWNER.

PROVIDED FURTHER, that such bond shall be duly executed by a qualified corporate surety, conditioned upon the faithful performance of the contract and, in addition, shall provide that, if the CONTRACTOR or his or her subcontractor fails to duly pay for any labor, materials, team hire, maintenance provisions, provender, or other supplies used or consumed by such CONTRACTOR or his or her subcontractor in performance of the work contracted to be done or fails to pay any person who supplies laborers, rental machinery, tools or equipment, all amounts due as the result of the use of such laborers, machinery, exceeding the sum specified in the bond together with interest at the rate of eight percent per annum. Unless such bond is executed, delivered, and filed, no claim in favor of the CONTRACTOR arising under such contract shall be audited, allowed, or paid. A certified or cashier's check or bank money order made payable to the officer designated by the governing body of the contracting local government may be accepted in lieu of a bond.

IN TESTIMONY WHEREOF, the said CONTRACTOR has hereunto set his hand, and the said Surety has caused these presents to be executed in its name, and its corporate seal to be hereunto affixed, by its attorney-in-fact authorized on this ____ day of _____, 2015.

(SEAL)

CONTRACTOR

ATTEST:

By:_____

SECRETARY

(SEAL)

SURETY COMPANY

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By: _____
ATTORNEY-IN-FACT

By: _____
STATE REPRESENTATIVE

(Accompanying this bond with Attorney-in-Fact's authority form the Surety Company certified to include the date of the bond.)

END OF SECTION

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**SECTION 00 06 20
CERTIFICATE OF INCORPORATION**

(To be filled in when Contract is executed in behalf of a Corporation)

STATE OF _____
COUNTY OF _____

On this _____ day of _____, 20____, before me appeared _____
to me personally known, who, being by me duly sworn, did say that he is _____
_____ of _____ and that the seal
affixed to said instrument is the corporate seal of said corporation, and that said instrument was
signed and sealed in behalf of the said corporation by authority of its board of directors, and said _____
_____, acknowledged said instrument to be the free act and deed of
said corporation.

WITNESS MY HAND AND NOTARIAL SEAL the day and year in this certificate
first above written.

NOTARY PUBLIC

ADDRESS

My Commission Expires _____

END OF SECTION

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SECTION 00 06 40
ADVERTISEMENT FOR FINAL PAYMENT

_____, 20__

TO: _____

You are hereby notified that the following advertisement for Final Settlement of Work appeared at least twice in a newspaper of general circulation dated _____ 20__.

"After thirty (30) days from _____, 20__, _____ OWNER, will pay to _____ CONTRACTOR, the full balance due on the Grand County Water and Sanitation District No. 1, Reservoir No. 2 Enlarging and Lining Project. All persons having claims for labor, materials, team hire, sustenance, provisions, provender, or other supplies used or consumed by such CONTRACTOR or his subcontractor in or about the performance of the work contracted to be done or that supplies rental machinery, tools or equipment furnished under this Contract, who shall not have been paid therefore, shall present the same to the OWNER in writing and verified prior to date specified above, or the OWNER shall be free of all liabilities for attempting to obtain payment to such persons by the CONTRACTOR."

Subject to the terms of the Contract Documents a Final Payment Check is attached hereto in the amount of _____ (\$_____).

Acceptance of which the CONTRACTOR thereby warrants that all persons doing work upon or furnishing materials for work under this contract have been paid in full. Failure to sign, approve and return one copy of this form, or to protest, within ten (10) days constitutes proof of approval and acceptance by the CONTRACTOR of the final amount due under the Contract.

Grand County Water and Sanitation District No. 1

By: _____

The final amount paid and the terms and conditions set forth herein and in the Contract Documents are approved and accepted.

CONTRACTOR:

By: _____

END OF SECTION

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**SECTION 00 07 00
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PART 1 GENERAL**1.1 COLORADO STATE ENGINEER'S OFFICE**

GCWSD No. 1 Reservoir No. 2 is a low hazard dam under the jurisdiction of the Colorado State Engineer – Dam Safety Division (SEO). As such, the SEO rules and Regulations for Dam Safety and Dam Construction apply to all phases of this project. The plans and/or specifications cannot be significantly changed without prior written approval of the State Engineer in accordance with Rule 9.1.8. Reservoir No. 2 construction shall not be considered complete until the State Engineer has accepted the construction in writing.

1.2 DRAWINGS AND SPECIFICATIONS

The ENGINEER will furnish to the CONTRACTOR, free of charge, copies of all drawings and specifications reasonably necessary for the execution of the work. They are the property of the OWNER to be held by the ENGINEER on behalf of the OWNER and are to be returned to the ENGINEER, upon request, at the completion of the work. In case of any discrepancy in the Contract Documents, Special Conditions shall govern over both specifications and drawings. Specifications shall govern over drawings and computed or written dimensions shall govern over scaled dimensions. In the event of discovery of discrepancies or any type of error whatsoever in the specifications, plans and drawings, the CONTRACTOR shall not adjust them, save at his own risk and expense, but shall immediately request in writing, and the ENGINEER shall give in writing, an interpretation of the intent of the Contract, which interpretation shall govern. If the CONTRACTOR, as the work progresses, finds any discrepancies between the drawings and physical conditions, it shall be his duty to immediately inform the ENGINEER in writing. The ENGINEER shall promptly interpret the intent of the Contract and, in its sole judgment may recommend in writing, authorize the CONTRACTOR to proceed under a Change Order to the extent allowed herein or as an authorized extra. Any work done after such discovery, until authorized, will be done at the CONTRACTOR's risk.

1.3 CONSTRUCTION REVIEW

The OWNER's designated representative will be responsible for supervising the implementation of the contract and to represent the OWNER in all matters and questions arising under the Contract. The OWNER or the ENGINEER will periodically observe the construction of all work covered by this Contract. The OWNER or the ENGINEER, on behalf of the OWNER, shall be authorized to determine the amount or quantities of the several items of work which are to be paid for under this Contract; to order changes within the scope of the Contract and to render decisions on any questions which may arise relative to the execution of the work covered by this Contract. OWNER shall have authority to suspend the work, wholly or in part, until every question at issue can be resolved by the OWNER or the ENGINEER. The CONTRACTOR shall not suspend any portion of the work nor resume suspended work without the written authority of the OWNER. No extension of time of completion of the work will be granted because of delays caused by suspension hereunder. Neither the review by the OWNER nor the ENGINEER, nor any order or certificate by the OWNER or the ENGINEER, nor any order by the OWNER for the payment of money, nor any payment for, or acceptance of, any work by the OWNER nor the

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extension of time, shall operate as a waiver of any provisions of the Contract, or of any power reserved herein to the OWNER, or any right to damage herein provided; nor shall any waiver of any breach of the Contract be held to be a waiver of any other or subsequent breach.

Neither OWNER's authority to act under the Contract Documents nor any decision made by ENGINEER in good faith either to exercise or not exercise such authority shall give rise to any duty or responsibility of the ENGINEER to the CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization performing any of the Work, or to any surety for any of them.

Whenever in the Contract Documents the terms "as ordered", "as directed", or the adjectives "reasonable", "suitable", "acceptable", "proper" or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review or judgment of ENGINEER as to the Work, it is intended that such requirement, direction, review or judgment will be solely to evaluate the Work for compliance with the Contract Documents. The use of any such term or adjective shall not be effective to assign to ENGINEER any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility for the project. Specifically:

The OWNER and the ENGINEER will not be responsible for CONTRACTOR's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, and ENGINEER will not be responsible for CONTRACTOR's failure to perform or furnish the Work in accordance with the Contract Documents.

The OWNER and the ENGINEER will not be responsible for the acts or omissions of CONTRACTOR or any Subcontractor, any Supplier, or of any other person or organization performing or furnishing any of the Work.

All material and workmanship (if not otherwise provided by the specifications) shall be subject to review, examination and test by the OWNER's agents at any and all times during manufacture and/or construction and at any and all places where such manufacture and/or construction is carried on. The OWNER shall have the right to reject defective material and workmanship or require its correction. Rejected workmanship shall be satisfactorily corrected, at the CONTRACTOR's expense and the CONTRACTOR shall promptly segregate and remove such rejected material from the premises, also at the CONTRACTOR's expense.

The CONTRACTOR shall furnish promptly and without additional charge, all reasonable facilities, labor and material necessary for proper and convenient observation and for any third party inspection or test that may be required by the OWNER. All inspection and tests by the OWNER shall be performed in such a manner as not to delay the work unnecessarily. Special, full size and performance tests shall be as set forth in the specifications. If at any time observations or tests are delayed by reason of the failure of the CONTRACTOR to have the material and workmanship ready for such observations and tests, the CONTRACTOR shall be charged with any additional cost of observations and tests resultant from such delay.

Should it be considered necessary or advisable by the OWNER or at any time before final acceptance of the entire work to make examinations of completed work, by removing or tearing out of any part or parts of the same, the CONTRACTOR shall, on request, promptly furnish all necessary facilities, labor, or material to accomplish such inspection. If any such work is found to be defective in any material respect, due to fault of the CONTRACTOR or his Sub-contractors, he shall defray all expense of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the actual cost of labor or material necessarily involved in the examination and replacement, plus fifteen (15%) percent will be allowed the CONTRACTOR and he will, in addition, if completion of the work has been delayed thereby, be granted a suitable extension of time on account of the additional work involved.

The source of supply of the materials shall be submitted to the OWNER for review before delivery is started. Only materials conforming to the requirements of these specifications as reviewed by the OWNER shall be used in the work. All material proposed to be used may be tested at any time during their preparation for use. If after testing, it is found that sources of supply do not furnish a uniform product, or if the products from any source prove unacceptable at any time, the CONTRACTOR shall furnish materials from another reviewed source. No material which after review has in any way become unfit for use shall be used in the work. The CONTRACTOR shall notify the OWNER in writing a sufficient time in advance of the manufacture or production of materials to be supplied by him under this contract, to enable the OWNER to arrange for mill and factory inspection and testing of same if desire. The failure of the OWNER to require mill inspection will not relieve the CONTRACTOR from responsibility for any defect or damage resultant from use of such materials. No materials shipped by the CONTRACTOR from the factory prior to having satisfactorily passed upon such testing and inspection by factory or the OWNER's designated representative, or prior to the receipt of notice from said OWNER that such testing and inspection will not be required, shall be incorporated in the work. The CONTRACTOR, at his expense, shall furnish to the OWNER, six certified copies of all required factory and mill test reports. No permission given by the OWNER to use any particular method or equipment shall be so construed as to relieve the CONTRACTOR from furnishing other methods or equipment when those in use prove unsatisfactory to the OWNER, or as to bind the OWNER to accept work which does not comply with the Contract.

Periodic observation of the work in progress by the OWNER or the ENGINEER will be done whenever the CONTRACTOR is performing work that requires review as determined by the OWNER. The normal working time shall be during a regular 5-day, 40-hour work week, Monday through Friday. If the CONTRACTOR elects to work more than 40 hours per week and observation is required during this overtime work as determined by the OWNER, the OWNER shall be paid by the CONTRACTOR at the rate as specified herein for all review time required over the normal 5-day, 40-hour week. If the OWNER or his authorized representative is called to the job site to address problems created by the CONTRACTOR, he will be paid by the CONTRACTOR at the same rate as for overtime review as stated above.

1.4 MEETINGS

A. Progress Meetings

1. Meet with OWNER and ENGINEER at the job site once per week during construction to discuss Work progress. Location and time of meeting shall be coordinated at the preconstruction conference. CONTRACTOR shall give verbal reports of the following items.
 - a. Progress of construction
 - b. Project schedule, including a detailed projection of activities for the next 2 weeks
 - c. Status of submittals
 - d. Status of progress payments
 - e. Any conflicts, discrepancies, or other difficulties requiring solution
2. The progress meetings shall be attended by the following people:
 - a. OWNER's representative (invited).
 - b. CONTRACTOR's resident superintendent or approved substitute (attendance mandatory)
 - c. ENGINEER's representative (attendance mandatory).
 - d. Subcontractor's whom CONTRACTOR, ENGINEER, or OWNER request to attend.
 - e. Others as appropriate
3. Biweekly, the representative assigned to this project shall be included in the progress meeting via conference call. The SEO representative shall be apprised of project status and schedule to facilitate project inspections by the SEO, as appropriate.

B. Special Meetings

1. Meet with OWNER and ENGINEER, when requested, to discuss technical issues, construction planning, construction schedule, and contract administration.
2. Special meetings shall be attended by the following people:
 - a. CONTRACTOR's resident superintendent or approved substitute (invited).
 - b. OWNER's representative (attendance mandatory).
 - c. ENGINEER's representative (attendance mandatory).
 - d. Others as appropriate.

1.5 STAKING OUT THE WORK

At the beginning of the construction or as the work progresses, the CONTRACTOR shall stake the work and set bench marks. The CONTRACTOR shall notify the ENGINEER at least 40 hours in advance of any staking, not including Saturdays, Sundays and Holidays. For Water Lines: line only will be staked unless official grade differs from the existing grade, in which case line and grade will be staked. For Sewer and Drain Lines: line and grade will be staked. For Structures: four comers and a permanent bench mark will be set.

Any additional surveying or re-surveying shall be done by the CONTRACTOR or by the ENGINEER at the CONTRACTOR's expense. Bench marks and survey stakes shall be preserved by the CONTRACTOR and in case of their destruction, or removal by him, his employees, or others, they shall be replaced by the ENGINEER at the CONTRACTOR's expense and his Sureties shall be liable therefore. The CONTRACTOR shall pay the ENGINEER for re-setting the lost survey stakes or bench marks at the rate of 1 V2 the overtime inspection rate specified herein. The CONTRACTOR shall be responsible for elevations used in computing his bid.

1.6 QUANTITIES AND UNIT PRICES

It is expressly provided that the quantities noted and summarized in the proposal are approximations for comparing bids only and no claim shall be made against the OWNER or his ENGINEER for excess or deficiency therein, whether actual or relative. The CONTRACTOR is responsible for computing his own bid quantities unless otherwise provided in the Contract. Payment at the prices agreed upon will be made for the completed work and will cover materials, supplies, labor, tools, machinery and all other expenditures incidental to satisfactory compliance with the Contract, unless otherwise specifically provided.

Once the project commences, the quantities for each item may vary and/or a line item may be deleted due to changing or unknown field conditions with no additional cost to the OWNER.

1.7 RIGHTS-OF-WAY AND ROADS

The OWNER will provide rights-of-way and easements as shown on the plans for construction purposes. Any additional land actually needed by the CONTRACTOR for the performance of the work, proper location of his plant and equipment, or the storage of materials and supplies for the work, shall be furnished by the CONTRACTOR. No CONTRACTOR shall have exclusive occupancy of rights-of-way acquired by the OWNER over other CONTRACTORS engaged in work for the OWNER. When the territory of one CONTRACTOR is the necessary means or convenient means of access for the execution of another contract, such privilege of access or any other reasonable privilege shall be granted to the CONTRACTOR to the extent, amount, in the manner and at times necessary. No joint occupancy or use of the territory shall be made the basis of any claim for delay or damages. Any work done in improving, repairing or maintaining the rights-of-way, access road, and any County roads or State highways in the performance of the work under this Contract, shall be done at the CONTRACTOR or CONTRACTORS' expense.

1.8 EXISTING UTILITIES

In performing the work under the Contract, the CONTRACTOR shall take the necessary action, including making arrangements with the OWNERS or Operators of existing power, telephone lines, gas, water, sewer and other utilities or installations that may be encountered whether privately or publicly owned to prevent interference with the conditions, operations and maintenance, all in a manner satisfactory to the ENGINEER, as well as to the OWNERS, or Operators of the respective utilities. Relocation or repair of utilities encountered, even though not shown on the plans, shall be the responsibility of the CONTRACTOR. The cost of the above measures, including maintaining of guards, watchmen, signals, barricades and temporary structures, making any necessary repairs and other cooperative or corrective work shall be borne by the CONTRACTOR and shall be included in the prices bid in the Proposal for the related items of work. Neither the OWNER nor the ENGINEER shall be responsible to the CONTRACTOR for the existence of utilities not shown on the plans or drawings and the CONTRACTOR remains obligated under this paragraph for all hidden utilities.

1.9 SUSPENSION FOR CLIMATIC CONDITIONS

The OWNER may order the CONTRACTOR to suspend any work that may be subject to damage due to climatic conditions and an extension of time will be granted therefore. Failure of the OWNER to suspend work due to climatic conditions does not relieve the CONTRACTOR of responsibility for work damaged by climatic conditions. At the discretion of the OWNER, an extension of time may be granted on account of any unusual weather conditions that would impede the work.

1.10 PERMITS AND RESPONSIBILITY FOR WORK

The CONTRACTOR shall, at his own expense and within the Contract price, without additional cost to the OWNER, obtain all required licenses and permits and shall be responsible for any and all damage of any type whatsoever to persons or property that may occur as a result of his fault or negligence in connection with securing the permits and the prosecution of the work, or the fault or negligence of any of his agents, subcontractors, servants, or employees in connection therewith, and the CONTRACTOR shall further be responsible for any damage whatsoever to materials or to completed portions of the work and structures until the contract be entirely completed and be finally accepted by the OWNER. Upon completion of the Contract, the work shall be delivered to the OWNER, complete and undamaged and free of any and all claims whatsoever for payment for labor, materials, equipment, use of equipment, taxes, or resulting from sub-contractor or from damage to other persons or their property. No final payment under this Contract shall in any event be made unless there has been full compliance with the terms thereof.

All work or material which has been rejected shall be remedied or removed and replaced in an acceptable manner and no compensation shall be allowed the CONTRACTOR for such removal and replacement. Any work done beyond the lines and grades shown on the drawings, except as herein provided, will be considered as unauthorized and will not be measured or paid for. Rejected or unauthorized work may be ordered removed at the CONTRACTOR's expense.

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Should the CONTRACTOR fail to promptly comply with any order of the OWNER or the ENGINEER as OWNER's agent made under the provisions of this paragraph, the OWNER shall have the authority to cause defective work or material to be removed or remedied, and replaced, and to deduct the cost from any money due or to become due the CONTRACTOR. The CONTRACTOR and his Surety shall be jointly responsible for a period of two years following the final acceptance of all work performed under this Contract for the satisfactory repair and/or replacement of all work, material and equipment which become defective during the period: providing, the defects result directly or indirectly from faulty workmanship or negligence by the CONTRACTOR, or from faulty material, faulty manufacturing, faulty erection, or improper handling of materials and equipment furnished and/or installed by the CONTRACTOR. The CONTRACTOR shall not refuse to guarantee his workmanship because of anything herein specified; the fact that a proposal is submitted is in fact the acceptance of the responsibility of guarantee of all work and materials to be furnished by the CONTRACTOR.

1.11 EMPLOYMENT OF LABOR

Eight (8) hours actual work in any calendar day shall constitute a lawful days work under this Contract, but this shall not be construed as a limit or restriction upon the time of service of any employees of the CONTRACTOR; provided, however, this Contract shall not be construed to relieve the CONTRACTOR from compliance with, and the CONTRACTOR shall in all respects, obey and hold the OWNER harmless from any violation of all laws and lawful rules and regulations, both of the State of Colorado and the United States, relating to the Workmen's Compensation, Unemployment Compensation, Social Security, and all other expense and conditions of employment under this Contract. The CONTRACTOR shall not employ any person undergoing sentence of imprisonment at hard labor.

1.12 SUPERINTENDENCE, COOPERATION OF CONTRACTOR AND OTHER CONTRACTS

The CONTRACTOR shall, at his expense within the Contract price, keep on the work during its progress competent foremen, or superintendent and any necessary assistants, all satisfactory to the OWNER. Each phase of construction may require a foreman as determined by the OWNER. The foreman or superintendent shall represent the CONTRACTOR in his absence and all directions given him shall be binding as if given to the CONTRACTOR. If the successful bidder be a partnership or corporation it shall, in writing to the OWNER, authorize the foreman, superintendent, or other designated parties to bind the CONTRACTOR in dealings with representatives of the OWNER in problems arising on the job during construction. Failure of partnership or corporation to furnish written designated authority shall not relieve them of said responsibilities for undesignated foreman and superintendent. Superintendence shall be furnished irrespective of the amount of work being performed.

Any person employed on the work who is deemed incompetent, careless, insubordinate, or otherwise objectionable, by his acts, shall at once be removed from the work and shall not be reemployed except by written permission from the OWNER. Should the CONTRACTOR at any time during the progress of the work fail to maintain sufficient progress called for in these

specifications, the OWNER may direct the CONTRACTOR to augment equipment and working forces by whatever amount deemed necessary, no additional payment will be made therefore.

Until written acceptance of the work by the OWNER, the CONTRACTOR shall be in charge and shall take every necessary precaution to prevent damage to any part thereof by the action of the elements or from any other cause. The CONTRACTOR shall rebuild, repair, or restore and make good all injuries or damages to any portion of the work occasioned by any of the above causes before its completion and acceptance, and shall bear the expense thereof. In case of suspension of the work from any cause whatsoever, the CONTRACTOR shall be responsible for all materials and shall properly store them if necessary on the rights-of-way belonging to, or leased by, the OWNER.

The OWNER may award such other contracts for additional work as it deems necessary and the CONTRACTOR under this Contract, shall fully cooperate with any such other CONTRACTORS and insofar as possible, carefully arrange his own work to correspond with that required under such other contracts and insofar as possible, follow the direction of the ENGINEER in connection therewith. The CONTRACTOR under this Contract shall not commit, nor allow the commission of, any act which will interfere with the performance of completion of work by any such other CONTRACTOR.

1.13 SUBCONTRACTS

The CONTRACTOR shall, as soon as practicable after the execution of the Contract Documents, notify the ENGINEER, in writing, the name and address of each subcontractor proposed for the work, giving the branch of work covered and the date and total price of the sub-contract and shall not employ any sub-contractor that the ENGINEER may within a reasonable time object to as incompetent or unfit, or who has failed to satisfactorily complete other contracts for any OWNER. The CONTRACTOR agrees that he is as fully responsible to the OWNER for the acts and omissions of his sub-contractors, and of persons either directly or indirectly employed by them, as he is for the acts of omissions of persons directly employed by him. Before beginning work, the subcontractor, if requested by the ENGINEER, must file with the ENGINEER, satisfactory certificates, in duplicate, showing evidence of insurance as set forth in paragraph 121. Nothing contained in the Contract Documents shall create any contractual relation between any sub-contractor and the OWNER or OWNER's agents.

1.14 DRAWINGS AND DATA TO BE FURNISHED BY THE CONTRACTOR

Before beginning manufacture of any part of the work covered in these specifications, the CONTRACTOR shall submit to the ENGINEER, five copies each of all reinforcement steel drawings, shop drawings, details and erection diagrams or un-detailed work necessary to supplement the Contract drawings. The shop drawings for all fabricated items shall show clearly the layouts and the details thereof. Any manufacturing done before review of the drawings will be at the CONTRACTOR's risk. The ENGINEER shall have the right to require the CONTRACTOR to make any change in the drawings which may be necessary, in the opinion of the ENGINEER, to make the finished work conform to the requirements and intent of these specifications and without additional cost to the OWNER. If found to be in general conformance

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with the design concept, one set of such prints will be marked as having been reviewed. If changes or corrections are necessary, one set will be returned with such changes or corrections noted. The CONTRACTOR shall re-submit corrected or changed prints if called for by the ENGINEER. Review of the CONTRACTOR's drawings relate only to general conformity with the Contract and shall not be held to relieve the CONTRACTOR of any part of the CONTRACTOR's responsibility to meet all of the requirements of these specifications. The CONTRACTOR and not the OWNER or the ENGINEER, shall be responsible for the errors or omissions of all drawings he submits.

1.15 SAMPLES AND TESTS

In the absence of direct reference, the sampling and testing of materials will be done in accordance with the current accepted methods approved by the American Society for Testing Materials. The CONTRACTOR shall cooperate with the ENGINEER in the collecting and forwarding of samples and in all cases shall furnish the required samples without charge. No material shall be incorporated in the work until test of samples have been made and the material found to be in accordance with the requirements of the specifications, as certified by the ENGINEER. The cost of all tests including defective, sub-standard or unsuited material shall be paid for by the CONTRACTOR unless otherwise specifically herein provided.

1.16 MATERIALS AND WORKMANSHIP

Unless otherwise specifically provided in the specifications, all workmanship, equipment, material and articles incorporated in the work covered by this Contract shall be of the best grade of their respective kinds required for the purpose set forth. Where equipment, materials or articles are referred to in the specifications as "equivalent to" any particular standard, the ENGINEER shall, in writing, decide the question of equivalence. The CONTRACTOR shall furnish to the ENGINEER for his review, the name of the manufacturer of machinery, mechanical and other equipment which he contemplates incorporating in the work, together with their performance history, capacities and other pertinent information. When required by the specifications, or when called for by the ENGINEER, the CONTRACTOR shall furnish the ENGINEER for review, full information concerning the materials or articles which he contemplates incorporating in the work. Samples of materials shall be submitted for review when so requested. Equipment, materials and articles installed or used without such review shall be at the risk of subsequent rejection at the CONTRACTOR's expense.

1.17 DEVIATIONS ALLOWED

All work shall conform to the lines, grades, cross-sections and dimensions shown on the approved drawings or described in the specifications. Deviations from the design drawings and working drawings as may be required by the exigencies of construction, will in all cases, be determined by the ENGINEER and authorized in writing. If the ENGINEER deems it inexpedient to correct work injured or done in an unauthorized manner, an equitable deduction from the Contract price of the work done will be made by him subject to the approval of the OWNER.

1.18 PATENTS AND/OR COPYRIGHTS

The CONTRACTOR shall hold and save the OWNER, its officers, agents, servants and employees harmless from liability of any nature of kind, including costs and expenses for or on account of, any kind of copyrighted composition, secret process, patented or unpatented invention, article, machine or appliance manufactured or used in the performance of this Contract, including their use by the OWNER, unless otherwise specifically stipulated in this Contract. Any expense incurred on account of this provision shall be included in the price bid in the Proposal on the items involved and no further compensation shall be allowed.

1.19 TERMINATION

This Contract may be terminated in whole or in part in writing by either party in the event of substantial failure by the other party to fulfill its obligations under this Contract through no fault of the terminating party; provided that no such termination may be effected unless the other party is given (1) not less than ten (10) days written notice (delivered by certified mail, return receipt requested) of intent to terminate; and (2) an opportunity for consultation with the terminating party prior to termination.

1.19.1 TERMINATION FOR CONVENIENCE

OWNER may for its own convenience terminate work under the Contract in whole or in part at any time by written notice to the CONTRACTOR. Such notice shall state the extent and effective date of such termination and on the effective date thereof the CONTRACTOR will, as and to the extent directed, stop work under the Contract and the placement of further orders or subcontracts under the Contract, terminate work under order and Subcontracts under the Contract, and take any necessary action to protect property in the CONTRACTOR's possession in which OWNER has or may acquire an interest. CONTRACTOR also shall promptly supply OWNER with copies of all outstanding orders for materials, equipment and services, and shall take such action relative to such orders as may be directed by OWNER.

In the event of such termination, OWNER shall pay to the CONTRACTOR, (1) its direct costs (excluding overhead) for all work done in conformity with the Contract to the effective date of such termination and (2) other costs pertaining to the work which the CONTRACTOR may incur as a result of such termination, all as approved by OWNER plus 10% of such costs (excluding costs under (2) above) for overhead and profit, provided, however, that in no event shall the total amount to be paid under the Section 117 .1 plus payments previously made, exceed the lesser of (a) the total aggregate Contract price specified in the Contract; or (b) that proportion of the aggregate total Contract price specified in the date of termination bears to the entire work to be performed hereunder. Any payment under this Section 117 .1 shall be made upon the expiration of the period within which liens may be filed under the laws of the State of Colorado, subject, however, to withholding by OWNER for the reasons and in the manner provided in those provisions pertaining to withholding of payments for liens.

1.19.2 TERMINATION FOR DEFAULT

OWNER shall have the right to terminate the employment of the CONTRACTOR after giving ten (10) days written notice of the termination to the CONTRACTOR in the event of any default by the CONTRACTOR. In the event of such termination, OWNER may take possession of the work and of all materials, tools and equipment thereon and may finish the work by whatever method and means he may select. It shall be considered a default by the CONTRACTOR whenever he shall:

- A. Disregard or violate provisions of the Contract Documents or OWNER's or OWNER's instruction, or fail to prosecute the work according to the agreement Schedule of Completion, including extensions thereof;
- B. Fail to provide a qualified representative, competent workmen or subcontractors, or proper materials, or fail to make prompt payment therefore; or

(3). Fail to submit a completion schedule within ten (10) days after notification to provide completion schedule.

Upon termination of the Contract by OWNER for default by the CONTRACTOR, no further payments shall be due to the CONTRACTOR, no further payments shall be due to the Trade CONTRACTOR until the work is completed. If the unpaid balance of the Contract Amount shall exceed the cost of completing the work including all overhead costs, the excess shall be paid to the CONTRACTOR. If the cost of completing the work shall exceed the unpaid balance, the CONTRACTOR shall pay the difference to OWNER. The Cost incurred by OWNER is herein provided, and the damage incurred through the CONTRACTOR's default, shall be approved by the ENGINEER and certified by OWNER.

The provisions of Section 117 .1 shall not apply in the event of default of the CONTRACTOR; provided, however, that the provisions of Section 117 .1 shall apply in the event of substantial failure by OWNER to fulfill its obligations under this Agreement.

1.20 PRESERVATION AND PROTECTION OF PROPERTY

The CONTRACTOR shall be responsible for the preservation of all private or public property along and adjacent to the work and shall take all necessary precautions to prevent damage or injury thereto. Such preservation and protection shall include but not be limited to, trees, stone walls, fences, mail boxes, monuments, irrigation ditches, driveways, road access culverts, underground pipelines and structures. Such preservation and protection shall apply to all underground pipelines and utilities whether public, private or individually owned that are in or adjacent to the right-of-way. When direct or indirect damage is done to public or private property on account of the act, omission, neglect or misconduct in the prosecution or non-prosecution of the work on the part of the CONTRACTOR, such property shall be restored by the CONTRACTOR at the CONTRACTOR's expense to a condition similar or equivalent to that which existed before such damage or injury was done. The CONTRACTOR shall be responsible

for making all arrangements at his own expense for moving and operating equipment at temporary crossings of telephone and transmission lines, railroad tracks, irrigation ditches and pipelines.

1.21 ACCIDENT PREVENTION

The Federal and State Laws relating to the public must be strictly observed by the CONTRACTOR at all times. The CONTRACTOR shall provide, at his own expense, barricades, guard rails, warning signs, lights, signal devices, gates, fences, surfacing, temporary bridges and culverts and watchmen and shall take all necessary precautions for the protection of the work and safety of the public. The face of all barricades facing approaching traffic shall be painted alternate six inch bands of black and white; such bands shall be placed diagonally from lower left to upper right. All barricades and obstructions shall be illuminated at night and all lights for this purpose shall be kept burning from sunset to sunrise. No road shall be closed to the public by the CONTRACTOR except by the expressed permission of the proper public authorities having jurisdiction over the public roads to be closed. The CONTRACTOR shall be responsible for obtaining this permission, but shall have the cooperation of the OWNER when such cooperation is necessary for the prosecution of his work.

Storage of materials in the vicinity of the public or private roads and on the OWNER's property shall be handled so as to cause as little obstruction to public and private travel as is necessary. Directional and detour signs at street intersections shall be such as to avoid as much as possible "dead ends" and "turn around" inconvenience to the public.

Machinery and equipment, and other hazards, shall be taken care of in accordance with the safety provisions of the "Manual of Accident Prevention in Construction" of the Associated General Contractors of America, to the extent that such provisions are not inconsistent with local applicable laws and regulations.

1.22 INDEMNIFICATION

CONTRACTOR agrees to indemnify and hold harmless the OWNER, its officers, employees, agents, their insurers, and ENGINEER, its officers, employees, agents and insurers from and against all liability, claims, and demands, on account of injury, loss, or damage, including without limitation claims arising from bodily injury, personal injury, sickness, disease, death, property loss or damage, or any other loss of any kind whatsoever, which arise out of or are in any manner connected with this Contract, if such injury, loss, or damage is caused in whole or in part by, or is claimed to be caused in whole or in part by, the act, omission, error, professional error, mistake, negligence, or other fault of the CONTRACTOR, any subcontractor to the CONTRACTOR, or any officer, employee, representative of the CONTRACTOR, or which arise out of any worker's compensation claim of any employee of the CONTRACTOR or of any employee of any subcontractor to the CONTRACTOR. CONTRACTOR agrees to investigate, handle, respond to, and to provide defense for and defend against, any such liability, claims or demands at the sole expense of the CONTRACTOR, or at the option of the OWNER, agrees to pay the OWNER or reimburse the OWNER for the defense costs incurred by the OWNER in connection with, any such liability, claims, or demands. CONTRACTOR also agrees to bear all

other costs and expenses related thereto, including court costs and attorney fees, whether or not any such liability, claims or demands alleged are groundless, false, or fraudulent.

1.23 INSURANCE

CONTRACTOR agrees to obtain and maintain during the life of this Contract, a policy or policies of insurance against all liability, claims, demands, and other obligations assumed by CONTRACTOR pursuant to Section 120 above. Such insurance shall be in addition to any other insurance requirements imposed by this Contract or by law. CONTRACTOR shall not be relieved of any liability, claims, demands, or other obligations assumed pursuant to Section 120 above, by reason of its failure to obtain and maintain during the life of this Contract insurance in sufficient amounts, durations, or types.

CONTRACTOR shall obtain and maintain during the life of this Contract, and shall cause any subcontractor to obtain and maintain during the life of this Contract the minimum insurance coverage listed below. Such coverage shall be obtained and maintained with forms and insurers acceptable to the OWNER. All coverage shall be continuously maintained to cover all liability, claims, demands, and other obligations assumed by CONTRACTOR pursuant to Section 120 above. In the case of a claims-made policy, the necessary retroactive dates and extended reporting periods shall be procured to maintain such continuous coverage.

Worker's Compensation Insurance to cover obligations imposed by applicable laws for any employee engaged in the performance of the work under this contract, and Employers Liability Insurance with minimum limits of \$600,000 each accident, \$600,000 disease-policy limit, and \$600,000 disease-each employee.

General Public Liability Insurance to be written with a limit of liability of not less than \$1,000,000 for all damages arising out of bodily injury, personal injury (including coverage for employee and contractual acts), including death, at any time resulting there from, sustained by any one person and not less than \$3,000,000 for all damages arising out of bodily injury, including death, at any time resulting there from, sustained by two or more persons in any one accident. This policy shall also include coverage for blanket contractual and independent CONTRACTOR risks.

When explosives are necessary, the CONTRACTOR shall provide separate specific coverage in the General Public Liability and Property Damage Insurance to a limit of liability of not less than \$3,000,000 for all property damage and bodily injury, including death, arising from use of explosives. This separate coverage shall be evidenced by a certificate of insurance naming the OWNER, the Engineer, the Town or other jurisdiction in which the work is performed, any and all adjacent landowners, and any other party deemed necessary by the OWNER, or as referenced in the Award of Contract under the Instructions to Bidders.

The limits of General Public Liability Insurance for broad form property damage (including products and completed operations) shall be not less than \$1,000,000 for all damages arising out of injury to or destruction of property in any one accident and not less than \$3,000,000 for all

damages arising out of injury to, or destruction of property, including OWNER's property during the policy period.

The General Public Liability Insurance policy shall include coverage for explosion, collapse, and underground hazards. The policy shall contain a severability of interests provision.

Protective Liability and Property Damage insurance covering the liability of the OWNER, including any officer or agent of said OWNER with respect to all operations under the Contract by the CONTRACTOR or his sub-contractors. The limits of the OWNER's Protective Liability Policy, to be provided by the CONTRACTOR, as described in this Article 121 INSURANCE shall be increased to the same limits as described above for the CONTRACTOR's General Public Liability Insurance.

Comprehensive Automobile Liability Insurance with minimum combined single limits for bodily injury and property damage of not less than \$1,000,000 each occurrence and \$1,000,000 aggregate with respect to each of CONTRACTOR's owned hired, and non-owned vehicles assigned to or used in performance of the services. The policy shall contain a severability of interests provision. If CONTRACTOR has no owned automobiles, the requirements of this paragraph shall be met by each employee of the CONTRACTOR providing services to the OWNER under this contract.

All Insurance Policies and Certificates of Insurance issued for this project shall name as additional insured(s), the OWNER, whether private or governmental, the OWNER's officers and employees, the municipality in which the work occurs, and the ENGINEER, being the firm of Merrick & Company, Inc., its agents and employees, and any other person(s), company(ies), or entity(ies) deemed necessary by the OWNER. The CONTRACTOR shall be solely responsible for any deductible losses under any policy required herein.

The insurance provided by the CONTRACTOR shall be primary to insurance carried by the OWNER, the ENGINEER and all other additional insureds, and the principal defense of any claims resulting from the CONTRACTOR's obligations under the contract shall rest with the CONTRACTOR's Insurer.

1.23.1 CERTIFICATES OF INSURANCE

The certificate of insurance provided by the CONTRACTOR shall be completed by the CONTRACTOR's insurance agent as evidence that policies providing the required coverages, conditions, and minimum limits are in full force and effect, and shall be reviewed and approved by OWNER prior to commencement of the contract. No other form of certificate shall be used. The certificate shall identify this Contract and shall provide that the coverages afforded under the policies shall not be cancelled, terminated or materially changed until at least 30 days prior written notice has been given to OWNER. The Certificate shall name the OWNER, GEI Consultants, Inc. and its associates, and other reasonable entities, as requested by the ENGINEER, as additional insureds at no additional cost to OWNER. The completed certificate of insurance shall be sent to: OWNER c/o GEI Consultants, Inc.

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Denver, Colorado 80237

Failure on the part of the CONTRACTOR to procure or maintain policies providing the required coverages, conditions, and minimum limits shall constitute a material breach of contract upon which OWNER may immediately terminate this contract, or at its discretion OWNER may procure or renew any such policy or any extended reporting period thereto and may pay any and all premiums in connection therewith, and all monies so paid by OWNER shall be repaid by CONTRACTOR to OWNER upon demand, or OWNER may offset the cost of the premiums against any monies due to CONTRACTOR from OWNER.

OWNER reserves the right to request and receive a certified copy of any policy and any endorsement thereto.

The parties hereto understand and agree that OWNER is relying on, and does not waive or intend to waive by any provision of this contract, the monetary limitations (presently \$600,000 per occurrence) or any other rights, immunities, and protections provided by the Colorado Governmental Immunity Act, 24-10-101 et seq., 10 C.R.S., as from time to time amended, or otherwise available to OWNER, its officers, its employees, or its agents.

1.24 COMMENCEMENT, PROSECUTION AND COMPLETION OF WORK

The CONTRACTOR shall begin within ten (10) calendar days after receipt of written notice to proceed. If the completion date is not specified by the ENGINEER, the CONTRACTOR shall in the proposal, state the date on which he will have completed all work covered by this Contract. The completion date will, upon acceptance of the Contract, become binding upon the CONTRACTOR and his failure to complete all work within the time specified in his Proposal will subject him to the damages under the Contract for delays and damages. The CONTRACTOR shall at all times during the continuance of the Contract, prosecute the work with such forces and equipment, and by such methods of operations as in the judgment of the ENGINEER are sufficient to complete the work within the specified time. The Construction progress shall at all times be subject to the approval of the ENGINEER.

If requested by the ENGINEER, the CONTRACTOR shall provide the ENGINEER with a written Completion Schedule, showing detailed start and finish dates for all phases of the Construction Program. CONTRACTOR shall be given ten (10) calendar days to deliver such schedule.

1.25 CONSTRUCTION PROGRAM

Within ten (10) calendar days after date of receipt of Notice to Proceed, the CONTRACTOR shall for information purposes furnish the ENGINEER a complete construction program showing in detail his proposed program of operation, which construction program shall provide for orderly performance of the work. The Construction program shall be in such form and in such detail, as to properly show the sequence of operations and the period of time required for

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completion of the work under each item of the schedule. Revised construction programs shall be submitted at intervals of not more than one month and in addition thereto, the CONTRACTOR shall immediately advise the ENGINEER of any proposed change in his construction program.

1.25.1 WORK RULES

CONTRACTOR shall perform all work hereunder in keeping with the rules and regulations that the OWNER may promulgate at any time for the safe, orderly, and efficient conduct of all operations.

The OWNER shall have the right to require of CONTRACTOR the immediate removal from the Project of any employee of Contract or of its subcontractors who, in the discretion of the OWNER, is not qualified to perform the work assigned to him or is guilty of improper conduct.

Nothing contained in the Contract shall constitute CONTRACTOR as being an employee of the OWNER, ENGINEER, or their authorized representatives, nor shall any employment relationship between the OWNER and CONTRACTOR be created by the terms hereof.

CONTRACTOR is responsible for the safety of any of its materials, tools, possessions, and rented items stored on the job site and for protection of the Project, and shall hold the OWNER, ENGINEER, or their authorized representatives harmless from any damages or loss incurred thereto.

1.26 SANITATION

The OWNER may establish sanitary and police rules and regulations for all forces employed under this Contract, and if the CONTRACTOR fails to enforce these rules, the OWNER may enforce them at the expense of the CONTRACTOR. Sanitary conveniences must comply with the Town, County and State Health Department Regulations.

1.27 CLEANING UP

Upon completion of the work, the CONTRACTOR shall, at his or its expense, remove from the vicinity of the work, all plant, buildings, rubbish, unused materials, concrete forms and other like material, belonging to him or used under his direction during construction, and in the event of his failure to do so, the same may be removed by the OWNER and the CONTRACTOR, his Surety or Sureties, shall be liable for the cost thereof. Also during the construction of the work, the site, partially finished structures, and material stockpiles shall be kept in a reasonable state of order and cleanliness. If at any time during the construction, inspection of any portion of the work is hampered by rubbish, unused material, old forms and other like material, the same shall be removed by the CONTRACTOR, or by the OWNER at the CONTRACTOR's expense, if the situation is not remedied within a reasonable length of time.

1.28 TAXES

CONTRACTOR shall pay all sales, consumer, use and other similar taxes required to be paid by him.

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OWNER is exempt from Colorado State sales and use taxes. Accordingly, taxes from which OWNER is exempt shall not be included in the Agreement Price. OWNER shall, upon request, furnish CONTRACTOR with a copy of its certificate of tax exemption. CONTRACTOR and Subcontractors shall apply to the Colorado Department of Revenue, Sales Tax Division, for an Exemption Certificate, and purchase the materials tax free. Pursuant to Subsection 39-26-114(1)(a)(xix), C.R.S., CONTRACTOR and Subcontractors shall be liable for exempt taxes paid due to failure to apply for Exemption Certificates or for failure to use said Certificates.

1.29 USE OF COMPLETED PORTIONS

The OWNER shall have the right to take possession of and use any completed portions of the work, notwithstanding the time for completing the entire work or such portions as may not have expired; but such taking possession and use shall not be deemed an acceptance of any work not completed in accordance with the Contract Documents. If such prior use increases the cost of, or delays the work, the CONTRACTOR shall be entitled to such extra compensation or extension of time, or both, as the ENGINEER may determine.

1.30 CHANGES AND EXTRAS

If, in the construction it becomes necessary to change or add to the work covered by these specifications, in order to complete the contract and the material or labor involved, if such change is not included in the unit or lump sum prices of the Contract, but forms an inseparable part of the work to be done under this Contract and the delay involved in asking for and advertising for bids and the letting of a new contract therefore might result in damage, injury to or impairment of the plant, work, system, or other property belonging to the OWNER, the OWNER through the ENGINEER may, at its discretion, declare an emergency and require the CONTRACTOR to proceed with such alterations and additions. All such work performed under such written changes or alterations shall be executed under all of the conditions of the original Contract. Extension of time to complete the Contract because of delays due to changes and extra work shall be allowed on a reasonable basis. The CONTRACTOR shall receive no extra compensation for the performance of any work he considers outside the Contract price unless such extra work or change order has been approved by the OWNER and issued in writing by the ENGINEER. If the CONTRACTOR performs work he considers outside the Contract and the ENGINEER will not issue changes thereon, he must notify the ENGINEER of his intent of claim before performing the work so that the ENGINEER can check the extra work and within ten (10) days after completion of said work, the CONTRACTOR shall file a written claim in duplicate with the ENGINEER setting forth the basis of the claim and the cost of the work as though it had been allowed by the ENGINEER on a cost-plus basis as set forth in these specifications. Said claim will be presented to the OWNER and the disposition of the OWNER will be final and binding on the CONTRACTOR. The OWNER will not consider extra claims by the CONTRACTOR submitted after thirty (30) days have elapsed from the completion of the work and in no event after completion and final inspection as determined by the ENGINEER.

The basis for issuing change orders is extra items or items not included in the original contract that are pertinent to the work covered by the contract.

The amount of increase or decrease in price allowed for changes and extras shall be arrived at as follows: 1) Unit prices as set forth by the CONTRACTOR or used by the CONTRACTOR in making his bid. 2) When unit prices are not available, the ENGINEER and the CONTRACTOR may agree on unit or lump sum prices subject to the approval of the OWNER. 3) If unit prices are not available and agreement on a price cannot be reached, then the work shall be done on a Cost-Plus Basis which shall be the cost invoiced to the CONTRACTOR for materials plus 15%; and the CONTRACTOR's standard hourly rates for labor and equipment submitted at the time of Contract Award. The labor and equipment rates shall include salaries, overhead, benefits, and profit. The standard rate schedule may be negotiated at the time of Contract among the OWNER, ENGINEER, and CONTRACTOR. Before beginning cost-plus work, the ENGINEER shall approve the men, material, and equipment and estimated maximum hours of men and equipment to be used. Anything used other than approved by the ENGINEER, shall be at the CONTRACTOR's expense.

1.31 DELAYS AND DAMAGES

If the CONTRACTOR refuses or fails to prosecute the work, or any separable part thereof, with such diligence as will insure its completion within the time

specified in the Proposal, or any written extension thereof, or fails to complete said work within such time, the OWNER may, after fifteen (15) days written notice to the CONTRACTOR and his Sureties, terminate his right to proceed with the work or such part of the work which has been delayed. In such event, the OWNER may take over the work and prosecute the same to completion, by Contract or otherwise and the CONTRACTOR and his Sureties shall be liable to the OWNER for any cost in excess of the Contract price occasioned the OWNER thereby. If the CONTRACTOR's right to proceed is so terminated, the OWNER may take possession of and utilize in completing the work, such materials, appliances and plants as may be on the site of the work and necessary therefore. If the OWNER does not terminate the right of the CONTRACTOR to proceed, the CONTRACTOR shall continue the work; in which event it will be impossible to determine the actual damages for the delay and in lieu thereof the CONTRACTOR shall pay the OWNER as fixed, agreed and liquidated damages for each calendar day of delay until the work is completed or accepted, the amount as set forth in the specifications or accompanying documents and the CONTRACTOR and his Surety or Sureties shall be liable for the amount thereof; provided that the right of the CONTRACTOR to proceed shall not be terminated or the CONTRACTOR charged with liquidated damages because of any delays in the completion of the work due to unforeseeable cause beyond the control and without the fault or negligence of the CONTRACTOR, including, but not restricted to, acts of God, or of a public enemy, acts of the OWNER, acts of another CONTRACTOR in the performance of a separate contract with the OWNER, floods, epidemics, strikes, freight embargoes, or unusually severe weather; the CONTRACTOR shall, within two (2) days from the beginning of any such delay, notify the ENGINEER, in writing, of the cause of delays. The ENGINEER shall ascertain the facts and extent of any such delays and may, in writing, extend the time for completion of the work when in his judgment the facts as determined by him justify such extension. Such findings of fact thereon by the ENGINEER shall be final, conclusive and binding on the parties hereto, provided however, that the CONTRACTOR may, within fifteen (15) days of such decision, in writing, appeal to the OWNER. The OWNER shall hold a hearing and take evidence from both

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the CONTRACTOR and the ENGINEER and make a determination of the issue. Such a determination by the OWNER as to the facts of delay and right to time of extension, if any, shall be final and conclusive upon the parties and there shall be no appeal from such decision.

1.32 PROTESTS

The ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Claims, disputes and other matters relating to the acceptability of the Work or the interpretation of the requirements of the Contract Documents pertaining to the performance and furnishing of the Work and Claims in respect of changes in the Contract Price or Contract Time will be referred initially to ENGINEER in writing with a request for a formal decision in accordance with this paragraph, which ENGINEER will render in writing within a reasonable time. Written notice of each claim, dispute and other matter will be delivered by the claimant to ENGINEER and the other party to the Agreement promptly (but in no event later than ten days) after the occurrence of the event giving rise thereto, and written supporting data will be submitted to ENGINEER and the other party within fifteen days after such occurrence unless ENGINEER allows as additional period of time to ascertain more accurate data in support of the claim.

When functioning as interpreter and judge, ENGINEER will not show partiality to OWNER or CONTRACTOR and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by ENGINEER with respect to any such claim, dispute or other matter will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such claim, dispute or other matter.

If the CONTRACTOR considers any work demanded of him to be outside the requirements of the Contract, or considers any record or ruling of the ENGINEER or of the inspector to be unfair, he shall immediately upon such work being demanded, or such record or ruling being made, ask in writing for written instructions or decisions, whereupon he shall proceed without delay to perform the work or to conform to the record or ruling, and within ten (10) days after date of receipt of the written instructions or decisions, he shall file a written protest with the ENGINEER, stating clearly and in detail, the basis of his objections. Except for such protest or objections as are made of record in the manner herein specified, and within the time limit stated, the records, rulings, instructions or decisions of the ENGINEER shall be final and conclusive. Instructions and decisions of the ENGINEER contained in letters to the CONTRACTOR and letters transmitting drawings to the CONTRACTOR shall be considered as written instructions or decisions, subject to protest or objections as herein provided. The ENGINEER shall ascertain the facts of all written protests and objections as submitted by the CONTRACTOR and answer the protest or objection based upon his findings. Such findings by the ENGINEER will be final, conclusive and binding on the parties hereto, provided, however, that the CONTRACTOR may, within thirty (30) days of such decision, in writing, appeal to the OWNER. The OWNER shall hold a hearing and take evidence from both the CONTRACTOR and the ENGINEER and make a determination of the issue. Such a determination by the OWNER as to the facts of the protest or objection shall be final and conclusive upon all parties, and there shall be no appeal from such a decision.

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1.33 PAYMENT TO THE CONTRACTOR

Monthly partial payments will be made by the OWNER based on the ENGINEER's estimate of the amount and value of the work completed during the month. Five (5) percent of the monthly payment will be withheld until completion of work, final inspection, acceptance and advertisement is made. For municipal and Governmental OWNERS, retainage will be withheld in accordance with CRS 24-91-103. In making up the monthly estimate, the ENGINEER will give full credit for material delivered to the site, but not incorporated in the work and acceptable preparatory work. No credit will be given for material used but not permanently incorporated in the work. The paid invoice value of the functional equipment delivered but not incorporated in the work will be allowed in the ENGINEER's estimate. Equipment shall be considered incorporated only after it is permanently placed and all electrical, mechanical, plumbing and accessory connections have been made and equipment tested. The monthly estimates will be made on all work completed at a given date to be set by the OWNER within ten (10) days before or after the last day of the calendar month, and partial payment will be made within thirty (30) days thereafter, provided there are no claims filed with the OWNER or by the OWNER against the CONTRACTOR. The making of a partial payment does not constitute acceptance on the part of the OWNER, or of the ENGINEER, of any part of the equipment furnished or work completed that might later prove to be unacceptable, but is considered only as payment on account.

At least twenty days before each progress payment is scheduled (but not more often than once a month), CONTRACTOR shall submit to ENGINEER for review an Application for Payment filled out and signed by CONTRACTOR covering the work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. The form for the Application for Payment shall be as prescribed by the ENGINEER. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice or other documentation warranting that OWNER has received the materials and equipment free and clear of all liens, charges, security interests and encumbrances and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect OWNER's interest therein, all of which will be satisfactory to OWNER.

The CONTRACTOR warrants and guarantees that title to all Work, materials and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to OWNER no later than the time of payment, of that particular Application for Payment, free and clear of all Liens.

The ENGINEER's recommendation of any payment requested in an Application for Payment will constitute a representation by the ENGINEER to the OWNER, based on the ENGINEER's on-site periodic observations of the work in progress as an experienced and qualified design professional and on the ENGINEER's review of the Application for Payment and the accompanying data and schedules that the Work has progressed to the point indicated; that, to the best of ENGINEER's knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning

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whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work, and to any other qualifications stated in the recommendation); and that the CONTRACTOR is entitled to payment of the amount recommended. However, by recommending any such payment the ENGINEER will not thereby be deemed to have represented that exhaustive or continuous on-site inspections have been made to check the quality or the quantity of the Work beyond the responsibilities specifically assigned to the ENGINEER in the Contract Documents or that there may not be other matters or issues between the parties that might entitle the CONTRACTOR to be paid additionally by the OWNER or the OWNER to withhold payment to the CONTRACTOR.

The ENGINEER may refuse to recommend the whole or any part of any payment if, in the ENGINEER's opinion, it would be incorrect to make such representations to the OWNER; the ENGINEER may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended, to such extent as may be necessary in the ENGINEER's opinion to protect the OWNER from loss because:

- a. the Work is defective, or completed Work has been damaged requiring correction or replacement.
- b. the Contract Price has been reduced by Written Amendment or Contract Modification.
- c. the OWNER has been required to correct defective Work or Complete Work.

The OWNER may refuse to make payment of the full amount recommended by the ENGINEER because claims have been made against the OWNER on account of the CONTRACTOR's performance or furnishing of the Work or Liens have been filed in connection with the Work or there are other items entitling the OWNER to a set-off against the amount recommended, but the OWNER must give the CONTRACTOR immediate written notice (with a copy to the ENGINEER) stating the reasons for such action.

The monthly partial payments may be withheld by the OWNER if - (a) defective work is not remedied, (b) claims filed or reasonable evidence indicating probable filing of claims by a third party or parties against the CONTRACTOR concerning the work or this Contract, (c) failure of CONTRACTOR to make payments properly for all labor, materials and services for the work of this Contract, (d) reasonable doubt by the OWNER or ENGINEER that the Contract can be completed for the balance due on the Contract, (e) any evidence of damage to persons or property not completely resolved to the OWNER's satisfaction or (f) any evidence of violation or failure to comply with the provisions of this Contract.

After complete satisfactory evidence has been submitted by the CONTRACTOR to the OWNER that the grounds for withholding the payments are removed, the partial payments withheld will be made. If the grounds may be removed or partially removed by the OWNER paying the amount due or a portion of the amount due the CONTRACTOR to a third party, as determined by judicial action or stipulation of the parties, then the OWNER may make such payments. The CONTRACTOR shall be financially responsible within the Contract price without additional cost

to the OWNER for any interest upon such withheld funds which should be found due the claimant by such judicial action or agreement of the parties. The OWNER may require the CONTRACTOR to file a sworn statement setting forth that all claims for work and labor performed and for all materials furnished or equipment rented under said Contract have been and are paid for the entire period of time for which payment is to be made before making the payment. If the OWNER is a District or municipal entity, they shall require the filing of the sworn statement prior to the release of each monthly partial payment and cash contract modification.

All material and work for which partial payment is made by the OWNER shall thereupon become the sole property of the OWNER; however, it is expressly agreed that this provision shall not operate or be construed, until final payment and acceptance of the entire job, as relieving the CONTRACTOR from complete responsibility for any and all injuries or damage to materials and work as heretofore set forth in this Contract upon which payments may have been made or the restoration of any such damaged construction, nor shall this clause operate or be construed as a waiver of the right of the OWNER to require fulfillment of each and every one the terms of this Contract.

Upon completion of the work under this Contract, before the CONTRACTOR shall receive or be paid for the work based upon the ENGINEER's final estimate, there shall be published by the OWNER in a newspaper of general circulation distributed within the area and posted upon the completed work itself, a notice that the OWNER is ready to accept on a certain date, such completed work according to the plans and specifications and rules set forth in the Contract, and further stating that the CONTRACTOR has applied for a final settlement under this Contract, and that not less than thirty (30) days after first publication, on a certain date, the OWNER will pay to the CONTRACTOR, the full balance due under this Contract and all persons having claims for labor, services or material furnished the CONTRACTOR, who shall not have been paid therefore, shall present the same to the OWNER, in writing, and verified, prior to said date specified, or the OWNER shall be free of all liability for attempting to obtain payment to such persons by the CONTRACTOR. Nothing herein contained shall operate or be construed in any way as relieving the CONTRACTOR and his Sureties upon the CONTRACTOR's Bond from any claim or claims for work or labor done or materials, services or supplies or other commodities furnished to the CONTRACTOR in the execution of this Contract, whether or not the same be presented to the OWNER prior to final payment in accordance herewith.

1.34 SURVEYS

All lines, grades and elevations will be established and furnished by the ENGINEER. The ENGINEER shall have a representative to stake out the work; the CONTRACTOR shall furnish all line stakes and all hubs or hardwood pegs to stake out water lines, sewer lines, and structures to line and grade. The CONTRACTOR shall furnish any and all assistance to the inspector for setting necessary lines and grades. When necessary, the CONTRACTOR's operation shall be suspended to permit the staking of the work, but such stoppage will be as brief as possible and the CONTRACTOR shall be allowed no extra payment therefore. All costs in connection with furnishing stakes and personnel to perform the work covered in this item shall be included in the applicable unit or lump sum price bid in the schedule for the item in which the survey work occurs.

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1.35 LIQUIDATED DAMAGES

If the project described herein is not completed within the time allotted, the OWNER will incur damages in the form of, but not limited to, additional professional fees, and the potential for additional costs for other contracts providing facilities related to this work. For these damages, the sum of \$500.00 per day shall be assessed against the CONTRACTOR for each calendar day delay beyond the date fixed for completion as shown in the Contract Documents.

1.36 LIEN WAIVERS

The project shall be advertised for final payment. The OWNER shall require lien waivers from the CONTRACTOR for material on monthly payments and lien waivers on all labor and material before final inspections and release of retainage.

1.37 THE DRAWINGS

Bound herewith or furnished separately and made a part of these specifications are the Project Drawings showing the detailed work to be completed. The Drawings indicate the approximate locations of pipelines and facilities and are schematic in nature. Existing utilities are shown based on the best current information.

1.38 DEFINITIONS

Wherever used in these Contract Documents the following terms shall have the meanings indicated.

Contract Documents : The General Conditions, Notice of Award, Notice of Prequalification of Bidders, Notice to Bidders, Notice to Proceed, Instructions to Bidders, Proposal and Bid Schedule, Drawings, Bid Bond, Technical Specifications, Performance, Payment and Maintenance Bond, Addenda, Certificate of Insurance (to be provided by CONTRACTOR), Contract, Certificate of Incorporation, Change Orders, Field Orders, and ENGINEER's written clarifications.

Contractor – The person, firm or corporation with whom the OWNER has entered into the Contract for the performance of the Work covered in these specifications.

Engineer – Identified individual or individuals representing GEI Consultants, Inc. including their associates and sub-consultants working on this project under contract to GEI Consultants, Inc.

Owner – The Grand County Water and Sanitation District No. 1, with whom the CONTRACTOR has entered into the Contract to perform the Work covered by the Contract Documents.

Proposal – The bid or offer of the bidder submitted on the prescribed form setting forth the prices to perform the Work covered by the Contract Documents.

Work – The entire completed construction or the various separately identifiable parts thereof required to be performed under the Contract Documents. Work includes and is the result of

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performing or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all as required by the Contract Documents.

END OF SECTION

**SECTION 00 08 30
HEALTH AND SAFETY**

PART 1 GENERAL

1.1 SCOPE

Affirmative duty to comply with safety regulations, safety criteria, site conditions, safety and health regulations for construction, Occupational Safety and Health Administration (OSHA), requirements for a written Health and Safety Plan.

1.2 REFERENCES

The following reference documents are a part of this Section as specified and modified.

29 CFR	Contract Work Hours and Safety Standards Act, Section 107, U.S. Department of Labor, Labor Building, 14th and Constitution Avenue N.W., Washington, DC 20013
29CFR 1910	OSHA Process Safety Management of Highly Hazardous Chemicals; Explosives, and Blasting Agents
29 CFR 1926	Construction Industry Standards, Occupational Safety and Health Administration, U. S. Department of Labor
IFC 2003	International Fire Code, Chapter 14, Fire Safety During Construction and Demolition

1.3 OCCUPATIONAL SAFETY AND HEALTH REGULATIONS

CONTRACTOR has the affirmative duty to comply with all Occupational Safety and Health Administration (OSHA) regulations and remedy all identified OSHA violations. CONTRACTOR shall designate a competent person responsible for identifying existing or predictable hazards at the site, providing required safety instruction for Subcontractors and employees, and of immediately taking precautionary measures when necessary. Daily inspections of the work site, including excavations, adjacent areas and protective systems, shall be the sole responsibility of CONTRACTOR. CONTRACTOR shall indemnify OWNER against any failure of CONTRACTOR to fully comply with OSHA regulations.

1.4 HEALTH AND SAFETY PLANNING & TRAINING

A. CONTRACTOR is solely responsible for all Health and Safety Planning addressing all pertinent issues, including but not limited to the following items, with its staff:

1. Accountabilities & responsibilities for managers, supervisors, and employees
2. Safety and health orientation program for new hires and new supervisors
3. Periodic safety and health performance appraisals for all employees
4. Hazard recognition and control

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5. Procedures to ensure that employees follow safety rules
6. Hearing conservation
7. Respiratory protection
8. Employee training, fitness testing, and medical certification of fitness for work
9. Hazard communication
10. Fire Protection and Prevention
11. Substance abuse program
12. Emergency Procedures, First aid and CPR training and certifications
13. Site safety/health meetings for employees, new hires and subcontractors
14. Accident reports and documentation of cause and corrective measures taken
15. Statistical summary of accidents and injuries and lost work days
16. Employee training in use, inspection, and maintenance of personal protective equipment
17. Routine inspections on operating equipment (cranes, forklifts, loaders, etc.) and certification records for maintenance of operating equipment

1.5 CONTRACTOR RESPONSIBLE FOR SAFETY

CONTRACTOR shall bear sole responsibility for initiating, maintaining and supervising all safety precautions and programs in connection with the Work and for safe job site conditions during the Project, including the safety of all persons who may enter on the job site for any reason and the security of all property located on the job site throughout the course of the Project.

A. SAFETY OFFICER

CONTRACTOR shall designate a responsible employee as a Safety Officer at the site who shall establish and oversee safety procedures and measures to prevent accidents. This person shall be CONTRACTOR's superintendent unless otherwise designated in writing by CONTRACTOR to OWNER.

B. PREVENTION OF DAMAGE, INJURY OR LOSS

CONTRACTOR's duties and responsibilities for health and safety shall continue until all the Work is completed and final payment has been made. CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to all employees on the Work or other persons who may be affected thereby.

C. BARRICADES AND SIGNS

The CONTRACTOR shall provide, erect and maintain all necessary barricades, signs, signals and lights to protect the Work and the safety of the public. CONTRACTOR shall comply with the provisions of the prevailing traffic code and supporting ordinances enacted by the Town of Fraser (Town). All barricades, signs and obstructions erected by the CONTRACTOR shall be illuminated at night and all devices for this purpose shall be kept burning from sunset to sunrise meeting Town and CDPT requirements. The CONTRACTOR's responsibility for necessary barricades, signs, and lights shall not cease until Final Acceptance of the Project.

D. SANITARY FACILITIES

The CONTRACTOR shall provide and maintain sanitary accommodations for the use of employees in compliance with the Town, and the Colorado Department of Public Health and Environment.

E. HAZARD COMMUNICATION PROGRAM

CONTRACTOR shall be responsible for coordinating any exchange of material safety data sheets (MSDS) or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

F. PERSONAL PROTECTIVE EQUIPMENT

For work involving harmful substances, work in places emitting gases, vapors or dust, work in areas with potential contamination with pathogens or other harmful agents, provide workers with personal protective equipment such as protective clothing, goggles and respiratory equipment. When working on aerial locations or elevated platforms, use fall protection systems such as safety belts, harnesses, etc. Hard hats are mandatory at all times on the job site.

G. PREVENTION OF EXPLOSIONS OR FIRES

Where vapors of flammable substances, combustible gases, or combustible dust exist, implement measures such as ventilation and dust containment to prevent explosions or fires due to vapors, gases or dusts. Where there is potential of ignition or explosion due to contact between different types of substances, store them separately.

Dispose of rags soaked with solvents, oil, or other flammable substances by drying prior to storage in a non-combustible container with lid. Do not use equipment that produces sparks or arcs, or that reach a high temperature or perform welding, cutting or other operations using open flame at places where combustible dust, flammable substances, or hazardous substances exist.

H. CONSTRUCTION EQUIPMENT AND MACHINERY

When using vehicle-type construction machinery (such as bulldozers, tractor shovels, loaders, cranes) conform to maximum load and stability limits and take measures to prevent overturning or falling of the construction machinery. When lifting or hoisting construction materials, take measures to prevent falling of the load and overturning or collapse of the construction machinery. Prevent employees from entering work areas where construction machinery in operation has potential to strike employees. Where there are risks of falling of rocks or debris, provide the construction machinery with head guards. For operation in unlit enclosures, provide vehicle-type construction machinery with head lamps. When an equipment operator leaves the operator's seat of the machinery, set working devices such as a bucket, ripper, etc. onto the ground and prevent uncontrolled travel of the machine by cutting off the engine and setting the emergency brake. When using any vehicle-type construction machinery, workers shall not ride on any place other than the operator's seat.

1.6 EXPLOSIVES

Use of explosives shall not be permitted for the prosecution of the Work.

1.7 SMOKING PROHIBITED

Environmental tobacco smoke is classified as a Group A carcinogen by the Environmental Protection Agency. The Project site shall be maintained as a smoke free workplace to ensure a healthy work environment. CONTRACTOR shall notify employees, subcontractors and vendors that smoking is prohibited except within designated smoking areas. With prior consent of OWNER, CONTRACTOR may establish a designated smoking area for his employees located outside of OWNER's facilities and areas under construction. In each designated smoking area established by CONTRACTOR, post a smoking sign and provide portable fire extinguishers.

1.8 HAZARDOUS ENVIRONMENTAL CONDITIONS

A. RELIANCE BY CONTRACTOR ON TECHNICAL DOCUMENTS

Potentially Hazardous Environmental Conditions, other than existing buried power lines along the pipeline corridor, are not identified at the worksite. CONTRACTOR may not rely upon or make any Claim against OWNER, ENGINEER or any of ENGINEER's Consultants with respect to:

1. The completeness of such technical data for CONTRACTOR's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction employed by CONTRACTOR and safety precautions and programs incident thereto.
2. Other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings

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3. Any CONTRACTOR interpretation of or conclusion drawn from any technical data or any such other data, interpretations, opinions or information.

B. RESPONSIBILITY FOR HAZARDOUS ENVIRONMENTAL CONDITIONS

CONTRACTOR shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. CONTRACTOR shall be responsible for a Hazardous Environmental Condition created by its execution of the Work.

C. OWNER TO EVALUATE HAZARDOUS ENVIRONMENTAL CONDITIONS

OWNER shall promptly consult with ENGINEER concerning the necessity for OWNER to retain a qualified expert to evaluate such condition or take corrective action, if any. CONTRACTOR shall not resume Work in any affected area until after OWNER has obtained any required permits related thereto and delivered to CONTRACTOR written notice specifying:

1. Any affected area that is or has been rendered safe for the resumption of Work
2. Any special conditions under which such Work may be resumed safely.

PART 2 PRODUCTS

2.1 SECURE STORAGE

- A. All potentially harmful chemicals, fuels, paints, etc. that remain onsite during night time and weekend time must be securely looked up in a vandal proof container or trailer.

2.2 JOB SITE FIRE BOX

- A. When working in forested areas, the CONTRACTOR shall furnish and maintain in a serviceable condition a fire box for its personnel to be used only for suppressing forest fires. This box with the tools will be kept sealed and available within the immediate working area of the crew. Each fire box will have in a serviceable condition, the following minimum items:
 1. 5 round point (0 or larger) shovels
 2. 2 double bitted axes
 3. 2 backpack pumps
 4. 3 pulaskis

2.3 FIRE EXTINGUISHER AND TOOLS ON EQUIPMENT

- A. When working in forested areas, each internal combustion engine including tractors, trucks, yarders, loaders, welders, generators, stationary engines, or comparable powered equipment shall be provided with at least the following:
1. One fire extinguisher, at least 5#ABC with an Underwriters Laboratory (UL) rating of 3A – 40BC, or greater.
 2. One shovel, sharp, size 0 or larger, round-pointed with an overall length of at least 48 inches.
 3. One axe, sharp, double bit 3½#, or one sharp Pulaski.

PART 3 EXECUTION

3.1 SAFETY AND HEALTH REGULATIONS

Comply with Safety and Health Regulations for Construction under Section 107 of the Contract Work Hours and Safety Standards Act, Title 29, CFR. Comply with the provisions of the Federal Occupational Safety and Health Act, as amended.

3.2 COOPERATION WITH PUBLIC SAFETY AGENCIES

Comply with all applicable laws, ordinances, rules, regulations and orders of any public agency having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Notify owners of adjacent property and utilities when prosecution of the Work may affect them.

3.3 SAFETY OF TEMPORARY ACCESS

Provide and maintain in a safe condition temporary approaches, crossings, or intersections with roads and highways including roadway approaches and structures of such crossings.

3.4 RESPONSE TO HAZARDOUS ENVIRONMENTAL CONDITIONS

If CONTRACTOR encounters or creates a Hazardous Environmental Condition, immediately:

1. Secure or otherwise isolate such hazard
2. Stop all Work in any area affected by such hazard (except for emergency response)
3. Notify OWNER and ENGINEER (and promptly thereafter confirm such notice in writing).

END OF SECTION

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**SECTION 00 08 40
INSURANCE REQUIREMENTS**

PART 1 GENERAL

1.1 SCOPE

Requirements for insurance including minimum acceptable limits of insurance coverage, Additional Insured parties, and deductibles.

1.2 INSURANCE COVERAGE

A. INSURANCE CERTIFICATES

CONTRACTOR shall purchase and maintain general liability and other insurance during the entire term of this Agreement. CONTRACTOR shall not commence work until all required insurance has been obtained and insurance certificates have been provided to the OWNER and the State. All certificates of insurance shall state that 45 days written notice will be given to the OWNER and to the State prior to cancellation or change of the policy. Policies shall also specify that the insurance provided by the CONTRACTOR will be considered primary and not contributory to any other insurance available to the OWNER, the State, or the ENGINEER. All insurance policies in any way related to this project and contract shall include clauses stating that each carrier shall waive all rights of recover, under subrogation or otherwise, against the OWNER or the State, its agencies, institutions, organizations, officers, agents, employees, and volunteers.

B. WORKER'S COMPENSATION AND EMPLOYER LIABILITY INSURANCE

The CONTRACTOR shall take out and maintain during the life of this contract the applicable statutory Worker's Compensation Insurance with an insurance company authorized to write such insurance and in the applicable state covering all employees, and in the case of any work sublet, the CONTRACTOR shall require the subcontractor similarly to provide statutory Worker's Compensation Insurance for the latter's employees. The CONTRACTOR maintain Employer's Liability Insurance with an insurance company authorized to write such insurance in all states where the CONTRACTOR will have employees located in the performance of this contract and the CONTRACTOR shall require each subcontractor similarly to maintain Employer's Liability Insurance on its employees. The Employer's Liability Insurance shall also cover all of the OWNER's employees acting within the course and scope of their employment with regard to this project and contract.

C. COMMERCIAL GENERAL LIABILITY INSURANCE

The CONTRACTOR shall maintain Public Liability Insurance, written on ISO occurrence from CG 00 01 10/93 or equivalent covering premises operations, fire

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damage independent contractors, products and completed operations, blanket Grantual liability, personal injury and advertising liability. Also to protect against claims for damages resulting from (1) bodily injury, including wrongful death, and property damage, which may arise from operations under this contract whether such operations be by the CONTRACTOR or any subcontractor or anyone directly or indirectly employed by either of them. Coverage shall be provided under a Commercial General Liability form of policy. The property damage coverage shall include a Broad Form Property Damage Endorsement. Contractual Liability coverage shall be included. Products Liability and/or Completed Operations coverage shall be provided for at least two (2) years following substantial completion of the work.

D. AUTOMOBILE LIABILITY INSURANCE

The CONTRACTOR shall maintain comprehensive Automobile Liability Insurance to protect against claims for damages resulting from (1) bodily injury, including wrongful death, and (2) property damage, which may arise from the operations of any owned, hired, or non-owned motor vehicles used by or for work in any capacity in connection with the carrying out of this contract.

E. OWNER'S PROTECTIVE LIABILITY

Provide OWNER's Protective Liability insurance shall be in the name of the OWNER, maintained in force for the duration of the contract by CONTRACTOR. Policy shall protect against any and all claims, and liabilities for injury to or death of persons, or damage to property caused in whole or in part by, or alleged to have been caused in whole or in part by, the negligent acts or omissions of CONTRACTOR, CONTRACTOR's agents, employees, or subcontractors, in connection with or resulting from the operations performed under the terms of the agreement.

F. EXCESS LIABILITY

Provide Excess Liability insurance to protect the CONTRACTOR against all claims in excess of the limits provided under the Commercial Automobile Liability and the Commercial General Liability.

G. EXPLOSION, COLLAPSE AND UNDERGROUND INSURANCE

If the contract requires any Work involving blasting, excavating, tunneling, or other underground work, the liability coverage shall include Standard Blasting or Explosion Coverage, Standard Collapse Coverage and Standard Underground Coverage, commonly referred to as X.C.U. property damage liability coverage.

H. PROPERTY INSURANCE

Provide "all risk" insurance for physical loss and property damage including theft, vandalism and malicious mischief, collapse and water damage. CONTRACTOR

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shall maintain builder's risk insurance written in completed value form to protect CONTRACTOR, OWNER, the State, and ENGINEER against risks of damage to buildings, structures, and materials and equipment not otherwise covered under other insurance. Builder's risk insurance shall include coverage for perils of fire and lightning, the perils included in the standard extended coverage endorsement, and the perils of vandalism and malicious mischief. The insurance limits shall be not less than the value of the Work at completion.

1.3 INSURANCE COVERAGE LIMITS

The minimum acceptable limits of insurance shall be as follows:

1. Worker's Compensation	Statutory
2. Employer's Liability	\$500,000 each accident
	\$500,000 disease - each employee
	\$500,000 disease - Policy Limit
3. Commercial General Liability Bodily Injury & Property Damage	Combined Single Limit: \$1,000,000 each occurrence \$1,000,000 Aggregate/Products/Completed Operations
4. Commercial Automobile Liability: Bodily Injury & Property Damage	Combined: \$ 1,000,000 each occurrence Aggregate: \$ 1,000,000
5. Excess Liability Policy X.C.U. Property Damage	\$ 1,000,000 each occurrence \$ 1,000,000 each occurrence
6. OWNER's Protective Liability Insurance	\$ 1,000,000
7. Builder's Risk Property Insurance	Value of the Work at completion
8. Umbrella liability policy	\$ 3,000,000

1.4 OWNER, STATE, AND ENGINEER ADDITIONAL INSURED

CONTRACTOR shall name OWNER, the State, and ENGINEER as Additional Insured under its Commercial General Liability insurance and Automobile Liability Insurance policies, and shall furnish proof of the same by delivery of a current and valid Certificate of Insurance.

1.5 PARTIAL UTILIZATION - PROPERTY INSURANCE

OWNER may occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work. Such use or occupancy shall not be cause for cancellation or lapse the property insurance prior to Final Completion of all the Work.

1.6 ACCEPTANCE OF INSURANCE

If the coverage or other provisions of the insurance purchased and maintained by CONTRACTOR do not comply with the Contract Documents, OWNER will notify CONTRACTOR in writing within ten (10) days delivery of insurance certificates to OWNER. OWNER and CONTRACTOR will each provide to the other such additional information in respect of insurance provided by him as the other may reasonably request. If OWNER does not notify CONTRACTOR of non-compliance with the Contract Documents within the time specified, insurance purchased by the CONTRACTOR shall be considered acceptable.

1.7 DEDUCTIBLES

No insurance coverages required to be provided by CONTRACTOR shall have a deductible greater than \$1,000 or as reasonably approved by OWNER.

PART 2 PRODUCTS (NOT USED)**PART 3 EXECUTION**

Certificates of all insurances cited above shall be provided at the signing of the Contract.

END OF SECTION

**SECTION 01 01 00
SUMMARY OF WORK**

PART 1 GENERAL

1.1 SUMMARY OF WORK

The Work to be performed in strict accordance with all of the Contract Documents consists of the following:

- A. Excavate materials within the reservoir footprint to the lines and grades shown.
- B. Import and process required volume of materials to U.S. 0.5" or smaller, blend with 2.5% bentonite, place and compact as shown on the construction plans.
- C. Place blended material as to the lines and grades shown and haul remaining material off-site to the Grand County Benson Pit.
- D. Furnish and install HDPE piping as shown on Drawings.
- E. Modify or replace existing riprap and grouted riprap erosion protection as shown in the Drawings.
- F. Furnish all site work, temporary facilities, miscellaneous labor, materials, and equipment to provide a complete project as shown on the plans and specifications.

1.2 TIME FOR COMMENCING AND COMPLETION

- A. Authorization for mobilization shall be the same as authorization of Notice-to-Proceed.
- B. The Work shall be substantially complete, including all testing, start-up, site work, and clean-up, by the date indicated in the Notice to Proceed.

1.3 SOIL INFORMATION

- A. Localized soils are expected to be alluvial soils, river cobbles, and occasionally larger boulders. Bedrock underlying the site is classified as the Troublesome Formation usually observed to be siltstone/claystone. At the time of excavation, OWNER's Representative will review soil conditions for conformance with this description.
- B. A soils report is included in the attachments to the specifications.

1.4 RECORD DRAWINGS

- A. CONTRACTOR shall maintain one neatly and legibly marked set of the Drawings indicating the As-Constructed locations, configurations, and elevations of the constructed work as per Section 01 07 75 – Project Closeout. Marking of the

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Drawings shall be kept current and shall be done at the time the material and equipment are installed. These drawings shall be available to OWNER upon request.

- B. As-Constructed surveys of the work shall be submitted as per Section 01 07 75 – Project Closeout.

1.5 WORK SEQUENCE AND CONSTRUCTION SCHEDULE

- A. Determination of the sequence of work shall be the responsibility of CONTRACTOR except as otherwise designated below.
- B. Work sequencing must address the requirements of the Contract Documents as well as any special requirements provided by OWNER. Work may not occur during weekends or holidays unless specific written permission is granted by OWNER.
- C. Work hours outside of the normal 8am to 5pm schedule must be approved by OWNER.
- D. CONTRACTOR shall submit a project schedule, per District Standard Specification 01330 and this Section, to OWNER within 10 days of the Notice of Award and prior to mobilization. This schedule will depict how CONTRACTOR will schedule and sequence the work in order to complete the project within the allotted time. CONTRACTOR shall continue to update this schedule weekly for project progress meetings.
- E. CONTRACTOR shall supply temporary facilities for general dewatering to divert water around or out of the area of construction as needed and to the approval of the OWNER and ENGINEER.

1.6 MOBILIZATION

- A. Mobilization on the site shall after receipt of the Notice to Proceed, and shall include, but not be limited to, the following items:
 - 1. Moving on to the site all plant and equipment required.
 - 2. Installing temporary construction utilities and facilities.
 - 3. Installing orange warning fencing, silt fencing, straw bales, and other drainage/erosion controls.
 - 4. Setting up CONTRACTOR's work and storage areas.
 - 5. Obtaining all required permits.
 - 6. Posting all OSHA and or State required notices. Establishment of safety programs.

- B. Prior to commencement of Mobilization and construction, CONTRACTOR shall fulfill the following:
1. 48-hour advanced written notice of intent to commence mobilization and construction shall be provided to OWNER stating date and time of commencement.
 2. A pre-construction conference is to be held and attended by, but not limited to, OWNER, ENGINEER, CONTRACTOR, CONTRACTOR's superintendent assigned to the project, and representatives of other entities affected by the proposed construction.
 3. Provide to OWNER photographs showing original conditions of the construction site and all important features existing prior to construction commencement.
 4. Provide to OWNER requests for dates that CONTRACTOR will require OWNER survey controls.

1.7 DEMOBILIZATION & CLOSEOUT

- A. Completion of all project closeout items including provision of all submittals, warranties, test results, site grading, and finalization of all punch list items.
- B. Demobilization shall include moving off the site of all plant equipment and surplus materials, final grading and dressing of the project area, and final cleanup.

1.8 CONTRACTOR SUBMITTALS

- A. The Preliminary Construction Schedule is required prior to mobilization and within ten days of the Notice of Award.
- B. CONTRACTOR shall not need to acquire a building permit.
- C. A complete list of submittals within 5 days of the Notice of Award. All final submittals prior to demobilization. Submittals shall comply with District Standard 01330.

1.9 CONSTRUCTION OBSERVATION

- A. Observation of construction will be performed by OWNER and its representatives. CONTRACTOR shall be responsible for notifying OWNER and ENGINEER at all critical points and before covering up any of the Work.

1.10 OSHA STANDARDS

- A. CONTRACTOR shall be bound by the latest provisions of Subpart F, Section 1926, of the OSHA Safety and Health Standards for Construction.

1.11 PROPOSAL, DRAWINGS, AND SPECIFICATIONS

- A. The Proposal lists the Unit Price and Lump Sum items for the Work defined by the Drawings and Specifications herein attached. CONTRACTOR shall be aware that the Proposal Items are assumed to be all inclusive as described and that ancillary labor, materials, and equipment should be included in the item price to provide to OWNER complete and ready for use items as part of the Work. The sum of the items required in the course of completing the Work specified herein should provide a physically completed project, as well as fulfill the intent of the project, as described in the specifications and as shown on the Drawings. CONTRACTOR shall also be aware and acknowledge in quoting prices listed in the Proposal for the project, that all items may not be used in completing the project and that for the items used, the final quantity of each used item may vary from the approximated quantity listed in CONTRACTOR's Bid Schedule.
- B. The Drawings are bound herewith and furnished separately and are made a part of these specifications and show the detailed work to be completed. The Drawings herewith indicate approximate routing of proposed pipelines and facilities and schematically show the Work to be completed. Existing utilities are shown based on the best current information. Final staking may not reflect exactly the Drawings, and staking changes due to existing utilities and conditions do not constitute design changes and are not extras or change orders except for the additional fittings, pipe, valves, etc. required to complete the Work. These additional fittings, pipe, valves, etc. will be paid according to the unit price as bid therefore in the Proposal.
- C. The specifications furnished and bound herewith are separated into several Divisions, generally according to the Construction Specifications Institute (CSI). The Specifications provide the technical and general guidelines governing the progress of the Work for the project.
- D. Drawings shall govern over Specifications and computed or written dimensions shall govern over scaled dimensions.
- E. The latest version of the Grand County Water and Sanitation District No. 1 Engineering Standards (District Standards) will be considered part of the Contract Documents for the Work.
- F. In the event of discovery of discrepancies or any type of error whatsoever in the Specifications, Drawings and/or District Standards, CONTRACTOR shall not adjust them, save at his own risk and expense, but shall immediately require in writing an interpretation of the intent of the Contract Documents from OWNER, which interpretation shall govern. If CONTRACTOR, as the Work progresses, finds any discrepancies between the Drawings and physical conditions, CONTRACTOR shall immediately inform OWNER in writing. OWNER shall promptly interpret the intent of the Contract and, in its sole judgment, authorize CONTRACTOR to proceed to the extent allowed herein and in accordance with the Contract documents.

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1.12 CWCB GRANT

CONTRACTOR shall acknowledge that a portion of this project is funded through a grant between the OWNER and the Colorado Water Conservation Board (CWCB). As such, the CONTRACTOR shall meet the CWCB grant requirements with regard to insurances and other aspects of the project.

PART 2 PRODUCTS**2.1 MATERIALS**

- A. All permanent materials shall be new, of good quality, and shall be transported and handled to the Manufacturer's recommendations and to the requirements of the Contract Documents.
- B. Temporary chain link fencing, security fencing, traffic control items, sanitary facilities, and other OWNER-approved temporary facilities can be used materials in good condition.

PART 3 EXECUTION

Not Used.

END OF SECTION

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**SECTION 01 01 10
ENVIRONMENTAL PROTECTION PROCEDURES**

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Furnish all labor, materials and equipment and perform all work required for the prevention of environmental pollution in conformance with applicable laws and regulations, during and as the result of construction operations under these Contract Documents.
- B. For the purpose of this Specification, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic and/or recreational purposes. Such pollution includes, but is not limited to, eroded soils, refuse, garbage, cement, concrete, sanitary waste, industrial waste, oil and other petroleum products, mineral salts and spirits, and thermal pollution.
- C. The control of environmental pollution requires consideration of air, water, and land, and involves management of noise and solid waste, as well as other pollutants.
- D. All phases of sedimentation and erosion control for construction within Town limits shall comply with the Town of Fraser Standards and be subject to the approval of the Town and the District. Construction activities shall meet County or State Highway requirements as required. Provide erosion control measures such as diversion channels, sedimentation or filtration systems, berms, staked straw bales, straw wattles, silt fencing, seeding, mulching, or other special surface treatments as required to prevent erosion and runoff into existing waterways and storm water system. Place all erosion control measures in an area prior to any construction activity in that area.
- E. These Specifications are intended to ensure that construction is achieved with a minimum of disturbance to the existing ecosystem. It is the CONTRACTOR's responsibility to determine the specific construction techniques to minimize disturbance.
- F. Construction equipment shall be maintained and tuned at the manufacturers' recommended intervals and to the recommended specification to minimize exhaust emissions. Vehicles and equipment that show excessive emissions of exhaust gases shall not be operated until corrective measures, repairs or adjustments are made.
- G. Construction equipment idling will be minimized when not in use. No vehicle or piece of equipment shall be idled for more than 30 minutes.

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1.2 APPLICABLE REGULATIONS

- A. Comply with all applicable Federal, State, and local laws and regulations concerning environmental pollution control and abatement.

1.3 NOTIFICATIONS

- A. Should the District, its representative, the Town's representative, the County's representative, or any State or Federal agency responsible for verification of certain aspects of the environmental protection requirements notify the CONTRACTOR of any non-compliance with requirements, the CONTRACTOR shall immediately take corrective action. Such notice, when delivered to the CONTRACTOR or its authorized representative at the site of the Work, shall be deemed sufficient for the purpose. If the CONTRACTOR fails or refuses to comply promptly, the District may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the CONTRACTOR unless it is later determined that the CONTRACTOR was in compliance.

1.4 CHEMICALS

- A. All approved chemicals used during project construction or furnished for project operation, whether disinfectant, polymer, reactant or of other classification, shall show approval of either the U.S. Environmental Protection Agency or the U.S. Department of Agriculture. Use of all such chemicals and disposal of residues shall be in strict accordance with the printed instructions of the manufacturer.
- B. Storage and handling of flammable and combustible materials, provisions for fire prevention, and control of dust shall be in accordance with the latest applicable OSHA requirements.
- C. The CONTRACTOR shall submit Material Safety Data Sheets (MSDS) for any hazardous material proposed to be utilized in the construction of the Work. The CONTRACTOR shall follow the information on the MSDS to assure safe use, handling, storage and environmentally acceptable disposal of the material used.
- D. All chemicals stored in drums or tanks on site shall be provided with secondary containment facilities meeting Federal, State and local laws, ordinances, regulations and permit conditions. All spigots shall be positioned so that secondary containment facilities catch any drips.

1.5 PETROLEUM BASED PRODUCTS AND SPILLS

- A. All waste petroleum based products shall be contained in sealed containers and disposed of at approved recycling facilities, and, if not recyclable, shall be disposed of at an approved dumpsite. Any spills shall be promptly cleaned up and waste,

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spillage, and contaminated materials disposed of at an approved dumpsite. Proof that a spill is cleaned up adequately shall be done to the satisfaction of the District and to the requirements of the appropriate regulatory authority. The CONTRACTOR shall comply with applicable Federal, State and local laws, orders, regulations, permit conditions, and water quality standards concerning the control and abatement of water pollution. When laws are inconsistent, the more stringent shall apply. Violations of these applicable laws and regulations may result in the District stopping all work on site. All costs resulting from this work stoppage shall be the responsibility of the CONTRACTOR.

- B. All petroleum based products stored in drums or tanks on site shall be provided with secondary containment facilities meeting Federal and local laws, ordinances, regulations and permit conditions. All spigots shall be positioned so that secondary containment facilities catch any drips.

1.6 REFERENCES

- A. Occupational Safety and Health Administration (OSHA)

- 1. Safety and Health Standards for Construction

- B. Colorado State Division of Labor

1.7 SUBMITTALS

- A. CONTRACTOR shall submit to the District an environmental plan for dealing with hazardous materials and related items for approval.
- B. CONTRACTOR shall include erosion control plans, details, and notes, as required by the Town's Standards and Specifications for Design and Construction, with submitted construction plans.

PART 2 PRODUCTS

2.1 EROSION CONTROL

- A. All natural products used for erosion control shall be certified weed-free.

2.2 TRASH CONTROL

- A. Dumpsters located near wooded areas shall be bear-proof.

PART 3 EXECUTION**3.1 EROSION CONTROL**

- A. Within Town limits, provide erosion control measures meeting the Town's Standards for Construction per approved construction drawings.
- B. Meet County, and/or State requirements when applicable.

3.2 PROTECTION OF STREAMS

- A. Prevent damage to any stream from pollution by debris, sediment or other material, or from the manipulation of equipment and/or materials in or near such streams. Water that has been used for washing or processing, or that contains oils or sediments that will reduce the quality of the water in the stream, shall not be directly returned to the stream. Such waters shall be properly disposed of off-site or through a plan submitted and approved in writing by the DISTRICT that meets all Federal, State, and local laws, ordinances, and requirements.
- B. Do not discharge water from dewatering operations directly into any live or intermittent stream, channel, wetlands, surface water, sanitary sewer, or storm sewer. Water from dewatering operations shall be treated by filtration, settling basins, or other approved method to reduce the amount of sediment contained in the water to allowable levels and disposed of by methods approved in writing by the District and the Town.

3.3 PROTECTION OF LAND RESOURCES

- A. Land resources within the project boundaries and outside the limits of permanent Work shall be restored to a condition, after completion of construction, that will appear to be natural and not detract from the appearance of the project to the approval of the District and to the approval of the applicable Local, State, County, Federal, and/or private property owner. Confine all construction activities to areas shown on the Drawings.
- B. Outside of areas requiring earthwork for the construction of the new facilities, the CONTRACTOR shall not deface, injure, or destroy trees or shrubs, nor remove or cut them without prior approval. No ropes, cables, or guys shall be fastened to or attached to any existing trees for anchorage.
- C. Where trees may possibly be defaced, bruised, injured, or otherwise damaged by the CONTRACTOR's equipment and operations, protect such trees by placing boards or similar protection around them. Monuments and markers shall be protected similarly before beginning operations near them.
- D. Any trees or other landscape feature scarred or damaged by the CONTRACTOR's equipment or operations shall be restored to its original condition.

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1. All scars made on trees by equipment, construction operations, or by the removal of limbs larger than 1-inch in diameter shall be coated as soon as possible with an approved tree wound dressing. All trimming or pruning shall be performed in an approved manner by experienced professionals with saws or pruning shears. Tree trimming with axes will not be permitted.
 2. Climbing ropes shall be used where necessary for safety. Trees that are to remain, either within or outside established clearing limits, that are subsequently damaged by the CONTRACTOR and are beyond saving in the opinion of the OWNER, shall be immediately removed and replaced.
 3. All tree stumps shall be cut below the ground surface or removed. Removed stumps shall be hauled away or mulched and used on site.
- E. Dispose of all debris and excess material to federal, state, and local standards and outside wetland or floodplain areas, in an environmentally sound manner.

3.4 PROTECTION OF AIR QUALITY

- A. Burning. The use of burning at the construction site for the disposal of refuse and debris will not be permitted.
- B. Wind erosion control shall be in accordance with the Town's Standards and Specifications for Design and Construction, and/or other applicable standards when outside Town limits, or in areas under multiple jurisdictions.

3.5 RUBBISH CONTROL

- A. During the progress of the Work, the CONTRACTOR shall keep the site of the Work and other areas used by it in a neat and clean condition, and free from any accumulation of rubbish. The CONTRACTOR should be aware that the site is in an area prone to high winds. The CONTRACTOR shall dispose of all rubbish and waste materials of any nature occurring at the Work site. Disposal of all rubbish and surplus materials shall be off the site of construction in accordance with local codes and ordinances governing locations and methods of disposal, and in conformance with all applicable safety laws.
- B. The construction site shall be cleaned up each night before leaving. Tools and equipment shall be securely stored and locked down. Materials should also be staked, stored, and secured in a tidy manner.

3.6 MAINTENANCE OF EXISTING FACILITIES DURING CONSTRUCTION

- A. During the work, maintain all facilities necessary for the proper operation of the existing water and wastewater systems to the approval of the District.

- B. Other facilities and utilities, including, but not limited to, electrical power service, roadways, trail systems, remote restrooms, and the like shall be maintained in their existing condition and remain accessible throughout performance of the Work.
- C. Down time for any portion of the existing water and wastewater facilities shall be eliminated during weekends and holidays unless otherwise approved by the District.

3.7 NOISE CONTROL

- A. Minimize noises caused by construction operations. The CONTRACTOR shall comply with the requirements of the applicable local laws, permit conditions, and regulations concerning the prevention, control, and abatement of excessive noise.

3.8 NOXIOUS WEED CONTROLS

- A. Noxious weeds exist within the area and every means must be employed to avoid noxious weed proliferation and spreading. Bare areas not being actively worked on shall be mulched as a temporary weed preventative and erosion control.
- B. All landscaping materials, straw bales, seed, mulch, and the like shall be certified to be weed free.
- C. All construction vehicles and equipment shall be brought onsite in a clean condition and free from mud and vegetation carryover from other construction sites.

END OF SECTION

**SECTION 01 01 40
WORK RESTRICTIONS**

PART 1 GENERAL

1.1 PRIVATE AND PUBLIC LAND

- A. Do not enter or occupy private or public lands outside of easements and public rights-of-way, except by written permission of the landowner or controlling authority. Provide a copy of written authorization to the District if such entry is specifically for construction of facilities that will be transferred to the District.
- B. Construction within public and private lands may be restricted by additional conditions. It is the responsibility of the CONTRACTOR to be aware of and strictly follow any restrictions and/or permit conditions on these properties.

1.2 FACILITY LOCATIONS

- A. When in public roadways and rights-of-way within the Town limits, meet the requirements of the Town's Standards and Specifications for Design and Construction for location of new utilities. Outside Town limits, meet the requirements of the appropriate jurisdictional authority.
- B. Locate proposed utilities and facilities as indicated on the approved Drawings unless directed otherwise by the District. The District reserves the right to make such modifications in locations as may be found desirable to avoid interference with existing structures or for other reasons.

1.3 OPEN EXCAVATIONS

- A. Meet the requirements of the Town's Standards and Specifications for Design and Construction for open excavations.
- B. Adequately safeguard all open excavations by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons and damage to property. Provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workers. Bridges provided for access during construction shall be removed when no longer required.
- C. Take precautions to prevent injury to the public due to open trenches. All trenches, excavated material, equipment, or other obstacles that could be dangerous to the public shall be well lighted at night.
- D. When within boundaries of other agencies or landowner who have jurisdictional control, meet all requirements of those agencies or jurisdictions.

1.4 TEST PITS

- A. Excavate and backfill test pits for the purpose of locating underground utilities or structures in advance of construction at the direction of the District. Backfill test pits immediately after their purpose has been satisfied. Restore and maintain the surface in a manner satisfactory to the District and the Town.
- B. All backfill shall meet the Town's Standards and Specifications for Design and Construction.

1.5 CARE AND PROTECTION OF PROPERTY

- A. Protect all public and private property and use every precaution necessary to prevent damage thereto. If any direct, or indirect, damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the CONTRACTOR, restore such property to a condition similar or equal to that existing before the damage was done, or make good the damage in other manner acceptable to the District and the Town at the sole expense of the CONTRACTOR.

1.6 PROTECTION AND RELOCATION OF EXISTING STRUCTURES AND UTILITIES

- A. CONTRACTOR shall assume full responsibility for the protection of all buildings, structures, and utilities, public or private, including poles, signs, services to buildings, utilities in the street, gas pipes, water pipes, hydrants, sewers, drains and electric and telephone cables. CONTRACTOR is responsible for all damage done to such utilities.
- B. The CONTRACTOR shall bear responsibility for obtaining locations of underground structures and utilities including existing water and sewer services, telephone lines, and other utilities. The CONTRACTOR is responsible for scheduling utility locates through the Colorado Utility Notification Center at 1-800-922-1987 prior to commencing construction.
- C. The District will provide assistance to the CONTRACTOR in determining the location of existing water and sewer lines related to the project.
- D. Notify utility owner(s) (both above ground and underground facilities) prior to proceeding with excavations whenever such work is within 20 feet of any existing utility.
- E. Notify utility owner if utility is damaged by the CONTRACTOR's operations. Repair damaged utility only with written authorization. Provide District a copy of every written authorization.

- F. Use granular bedding material to rebed utilities exposed below mid-diameter. Extend granular bedding material to the limits of the trench excavation and a minimum of two feet beyond each side of the exposed utility.

1.7 PROTECTION OF ARCHAEOLOGICAL SITES AND ARTIFACTS

- A. Should the CONTRACTOR identify any archaeological sites or should the CONTRACTOR locate any artifacts, the CONTRACTOR shall immediately stop all activity in the area of the site or artifact. The CONTRACTOR shall immediately notify the District, the Town and the Colorado Historical Society.

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**SECTION 01 02 00
MEASUREMENT AND PAYMENT**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. This section describes criteria and basis for measurement and payment of quantities furnished/installed by CONTRACTOR under this contract for the work unless otherwise specified in individual sections of these specifications.

1.2 QUANTITIES AND BID PRICES

- A. It is expressly provided that the quantities noted and summarized in the Proposal are approximations for evaluating bids only and no claim shall be made against OWNER or ENGINEER for excess or deficiency therein, whether actual or relative. Quantities and measurements, supplied or placed during performance of the Work will be verified by OWNER or his ENGINEER to determine payment. CONTRACTOR is responsible for computing all quantities, unless otherwise provided in the Contract. Payment at the prices agreed upon will be made for the completed work as specified and will cover materials, supplies, labor, tools, machinery and all other expenditures incidental to satisfactory compliance with the Contract Documents, unless otherwise specifically provided.
- B. Once the project commences, the quantities for each item may vary and/or a line item may be changed or be deleted due to changing or unknown field conditions with no additional cost to OWNER.
- C. If the actual work requires greater or lesser quantities than those indicated in the Proposal, CONTRACTOR shall provide the required quantities at the unit/lump sum prices bid in the Proposal.
- D. CONTRACTOR shall make no claim for damages, anticipated profits, restocking charges or otherwise due to any differences between the amounts of Work actually performed and materials actually furnished, and the estimated quantities listed.

1.3 TOTAL BID PRICE

- A. Work not specifically mentioned or set forth as an item for payment, but required to fully construct or provide a pay item, shall be considered a subsidiary obligation of CONTRACTOR and shall be provided by CONTRACTOR as part of the individual item and included in its price or in the overall cost of the work with no additional cost to OWNER.
- B. CONTRACTOR shall, in bidding this work as a Unit and/or Lump Sum Contract, be aware and accept the fact that the Total Final Contract Price may vary in

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accordance with the final quantities used to complete the Work in accordance with the Contract Documents, and CONTRACTOR shall make no claim for damages, anticipated profits, or otherwise due to the difference in the final contract price and the initial bid price total.

- C. CONTRACTOR shall, in bidding this work as a Unit and/or Lump Sum items, be aware and acknowledge that the Contract for the Work is NOT a Lump Sum Contract.

1.4 MEASUREMENT OF QUANTITIES

- A. Volumes will be measured via Auto-CAD Digital Terrain Model (DTM). Surfaces will be created from site survey data.
 - 1. Measurement will be made from the limit of the neat lines shown on the Drawings or to the approval limits of excavation.
- B. Measurement by Area – Measured by square dimensions using mean length and depth, width or radius as applicable.
- C. Linear Measurements
 - 1. Measured by linear dimension at the item centerline or mean chord.
 - 2. Based on a horizontal projection of the actual length except where specified as a vertical measurement.
- D. Perform a baseline preconstruction survey after reservoir dewatering. Provide DTM electronically to OWNER.
- E. Perform surveys, field measurement and calculations to measure installed quantities for all Unit Price pay items in conformance with the list of pay items as Unit Price Pay Items.
- F. Notify OWNER in advance, and obtain OWNER witness of daily field measurement for work performed under Unit Price Pay Items.
- G. Include backup data and calculations with application for payment.
- H. Measurement by the CONTRACTOR is subject to review, verification, and approval by the OWNER.
- I. Round to the nearest whole unit for pay quantities.

1.5 PAYMENT – EXCAVATION AND BACKFILL

- A. No payment will be made for excavation or backfill of unapproved excavation below the required foundation surface as shown or established in the field by the ENGINEER. This applies to excavations such as haul road cuts or access ramps made for the CONTRACTOR's convenience.
- B. Payment for Borrow Excavation: No separate payment will be made for Borrow excavation. Excavation utilized as borrow for fill or backfill placed in designated fill areas is considered incidental to other items of Work.
- C. Payment for excavation to remove damaged subgrade material that has become desiccated, softened, eroded or otherwise disturbed by exposure to the elements or the CONTRACTOR's operations will be made only when approved by the OWNER or ENGINEER in advance of performing excavation.

1.6 PAYMENT FOR UNIT PRICE ITEMS

- A. Unit Price Work:
 - 1. Reflect unit price quantity and price breakdown from the Schedule of Contract Items and Prices in the Bid Proposal.
 - 2. Estimated quantities shown on the Bid Proposal are approximate and are given only for a comparison of bids. OWNER does not either expressly or by implication warrant that the actual quantities will correspond to the estimated quantities. OWNER reserves the right to increase or decrease the amount of work performed under unit price items, or to omit work altogether. No adjustments in contract unit prices will be made except as provided in the General Conditions.
- B. Final payment for Work governed by unit prices will be made based on the actual measurements and quantities accepted by the OWNER, multiplied by the unit price for Work that is incorporated in or made necessary by the Work.
- C. Payment for unit price items covers all Work necessary to complete the items listed as Unit Price Pay Items.

1.7 PAYMENT FOR LUMP SUM ITEMS

- A. Payment for lump sum work will be made in accordance with the accepted Schedule of Values.
- B. An unbalanced or front-end loaded schedule will not be acceptable.
- C. Payment for lump sum work covers all work required to complete the work as shown or specified that is not covered under the unit price items.

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- D. Summation of the complete Schedule of Values will equal the Contract Price for the lump sum item.
- 1.8 PROGRESS PAYMENTS
- A. Submit progress payments monthly, in accordance with requirements of the General Conditions.
 - B. Include accepted schedule of values for each portion of Work and the unit price breakdown for Work to be paid on unit price basis, and allowances.
 - C. Preparation:
 - 1. List each Change Order and Written Amendment executed prior to date of payment request as separate line items.
- 1.9 DEFECT ASSESSMENT
- A. Replace the Work, or portions of the Work, not conforming to specified requirements as determined by the ENGINEER at CONTRACTOR's sole cost.
 - B. If, in the opinion of the ENGINEER, it is not practical to remove and replace the Work, the ENGINEER will direct one of the following remedies:
 - 1. The defective Work may remain, but the unit sum/price will be adjusted to a new unit sum/price at the discretion of the ENGINEER.
 - 2. The defective Work will be partially repaired to the satisfaction of the ENGINEER, and the unit sum/price will be adjusted to a new unit sum/price at the discretion of the ENGINEER.
 - C. The individual specification sections may modify these options or may identify a specific formula or percentage sum/price reduction.
 - D. The authority of the ENGINEER to assess the defect and identify payment adjustment, is final.
- 1.10 NONPAYMENT FOR REJECTED OR UNUSED ITEMS
- A. Payment will not be made for the following:
 - 1. Materials excavated and/or placed beyond the Design Lines shown on the Drawings, except as specifically required by the ENGINEER.
 - 2. Loading, hauling, and disposing of rejected material.
 - 3. Quantities of material wasted or disposed of in a manner not called for under Contract Documents.

4. Rejected loads of material, including material rejected after it has been placed by reason of failure of CONTRACTOR to conform to provisions of Contract Documents.
5. Material not unloaded from transporting vehicle.
6. Defective work not accepted by OWNER.
7. Material remaining on hand after completion of Work.

1.11 MEASUREMENT AND PAYMENT OF BID ITEMS

A. Refer to Section 01 11 00: Summary of Work, for work scope.

B. Measurement and payment provisions for bid items shall be as follows:

1. Mobilization/Demobilization/Restoration

- a. Mobilization/Demobilization will not be measured for payment.
- b. Payment for mobilization, demobilization, preparatory work, and restoration will be made at the lump sum price bid in the schedule for Mobilization/Demobilization. The price shall include all costs for movement of personnel, equipment, supplies, buildings, plants, and other facilities to the project site; any necessary costs of acquisition of equipment, including purchase and mobilization expense; traffic control; on-site temporary access roads; temporary utilities and construction water supply; survey costs; cleanup and disposal of waste materials; demobilization; bonds and insurance costs; and any other work and operations which must be performed or costs that must be incurred incidental to the initiation of meaningful work at the site and for which payment is not otherwise provided for under this Contract.

2. Excavation

- a. Excavating and stockpiling existing clean sand and gravel will be measured for payment in cubic yards of clean sand and gravel excavated, processed if necessary, and stockpiled, at a location approved by the OWNER. Clean sand and gravel will be measured in the stockpile by the project surveyor.
- b. Payment to the CONTRACTOR for all work to excavate and stockpile clean sand and gravel shall be paid for at the unit price per cubic yard bid in Item 2, Excavation.
- c. There is no separate pay item for dewatering.

3. Foundation and keyway preparation and excavation

- a. Payment to the CONTRACTOR shall be made on a percentage of work completed basis. The price shall include all labor, equipment, and materials for excavating and removing remaining sand and gravel, wash material, and approximately the upper 1-foot of the weathered bedrock and excavating the cut-off key to the widths and depths shown on the Drawings, including but not limited to excavating, hauling, and shaping the foundation, and all items shown or implied in the Construction Drawings or Contract Documents.
- b. Unsuitable foundation areas shall be excavated and removed as directed by the ENGINEER.
- c. Approved foundation and keyway areas shall be surveyed by the project surveyor prior to slope liner fill placement.
- d. The price shall include all labor, equipment, and materials during foundation preparation and excavation, and related appurtenances for dewatering and handling water in the area of work including but not limited to dewatering pumps, piping, trenching sump pits, backfill, detention, discharge, and other facilities shown or implied in the Construction Documents.

4. Zone 1a Embankment

- a. Zone 1a liner will be measured on compacted in place cubic yard basis, based on survey by the CONTRACTOR.
- b. Payment to the CONTRACTOR shall include all labor, equipment, and materials necessary to complete the Zone 1a liner including but not limited to Bid Item 21, moisture conditioning, borrowing, hauling, screening, importing and blending bentonite, placing, compacting, shaping, and all other items shown or implied on the Contract Documents.
- c. Zone 1a Liner material shall be bid under Item 5, Zone 1a.

5. Zone 1b Embankment

- a. Zone 1b liner will be measured on compacted in place cubic yard basis, based on survey by the CONTRACTOR.
- b. Payment to the CONTRACTOR shall include all labor, equipment, and materials necessary to complete the roadway fill slope liner including but not limited to moisture conditioning, borrowing, hauling, placing, compacting, shaping, and all other items shown or implied on the Contract Documents.
- c. Zone 1b liner material shall be bid under Item 6, Zone 1b.
- d. There is no separate pay item for dewatering.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

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**SECTION 01 03 30
SUBMITTALS****PART 1 GENERAL****1.1 SCOPE**

- A. Submittals covered by these requirements include, when applicable, project and construction schedules, manufacturers' information, shop drawings, test procedures, test results, samples, requests for substitutions, operation and maintenance manuals, record drawings, and miscellaneous work-related submittals.
- B. Submittals shall also include construction drawings, reinforcing steel details, right-of-way documentation, survey documentation, water demand and Single Family Equivalent (SFE) documentation as applicable to the project.

1.2 RESPONSIBILITIES

- A. The CONTRACTOR shall be responsible for the accuracy and completeness of the information contained in each submittal and shall assure that the material, equipment or method of work shall be as described in the submittal. The CONTRACTOR shall verify that all features of all products conform to the specified requirements. Submittal documents shall be clearly edited to indicate only those items, models, or series of equipment, which are being submitted for review. All extraneous materials shall be crossed out or otherwise obliterated.
- B. The CONTRACTOR shall coordinate the scheduling of submittals to avoid work delays.

PART 2 SUBMITTAL MATERIALS**2.1 CONSTRUCTION DRAWINGS**

- A. Construction drawings shall be provided to the District for all proposed improvements that will become the property of the District upon completion. Construction drawings shall also include right-of-way and/or easement documentation, equipment schedules, lists, calculations for water demand and other items as appropriate.
- B. Construction drawings must be reviewed and approved, and all necessary right-of-way and/or easement provisions must be in place to the District's satisfaction before construction can commence.

2.2 PROJECT SCHEDULE

- A. A project schedule shall be submitted with construction plans and shall include the overall schedule for permitting, easement acquisition, and a general time frame anticipated for construction.
- B. The CONTRACTOR shall update this schedule as conditions warrant.

2.3 CONSTRUCTION SCHEDULE

- A. A detailed construction schedule shall be submitted 5 working days prior to the start of construction and maintained in accordance with this section.
- B. The CONTRACTOR shall provide a graphic construction schedule prepared by the critical path method or other approved method. The schedule shall be prepared from estimates of the required duration and sequence for each item of work.
- C. The project schedule shall depict all significant construction activities and all items of work listed in the bid. The dependencies between activities shall be indicated so that it may be established what effect the progress of any one activity has on the schedule.
- D. Time for completion, specific dates for construction activities, and sequencing requirements shall be shown on the schedule. Activities making up the critical path shall be identified.
- E. The schedule duration of each activity shall be based on the work being performed during the normal 40-hour workweek with allowances made for legal holidays and normal weather conditions, unless otherwise agreed upon with the District.

2.4 MANUFACTURER'S OR PRODUCT DATA

- A. Manufacturer's data shall include, but not be limited to, cut sheets, brochures, model number identification, and standard published manufacturer's material specifying the quality, make-up, application and materials of fabrication for the specified products.
- B. This data shall also include product or material samples when specified or when deemed appropriate by the CONTRACTOR and/or the District.

2.5 TESTING AND TEST REPORTS

- A. The CONTRACTOR shall notify the District not less than 7 working days prior to the date that the equipment installation(s) and/or other materials or portions of the Work will be ready for inspection and testing.
- B. Test certification shall be provided, and signed by the responsible party, to the satisfaction of the District at the completion of the test. It shall include the following:

1. Date of report, name, address, telephone number and signatures of individuals performing the test or inspection and of individuals issuing the report.
2. Project name and contract number, when appropriate.
3. Dates, times, temperature, weather conditions, and locations of tests and inspections.
4. Identify the work or product by specification section and test or inspection method.
5. Complete inspection or test data, results of test, interpretation of test results, compliance with the Contract Documents, and recommendations regarding re-testing.
6. Backfill compaction and concrete testing is to be completed by a District approved laboratory at the sole expense of the CONTRACTOR. Testing shall be completed on a timely basis so as to not delay construction work. Results shall be tabulated and provided to the District in a timely manner.

2.6 SHOP DRAWINGS

- A. Shop drawings shall accompany product data submittals as required in the individual specification sections herein.
- B. Shop drawings shall adequately provide the dimensions and layout of equipment and shall include plan and elevation views, blow-up drawings to depict all key components and materials, sections to depict how parts fit together and function, and other details as required to provide full detail of the equipment and its component parts.
- C. Shop drawings may also be required, in detailed and/or schematic form, for equipment or other mechanical systems.
- D. For underground piping, shop drawings shall include a layout drawing showing all applicable fittings, valves, vaults, manholes, and other relevant appurtenances.
- E. Shop drawings shall not fulfill the requirements for record drawings but may be included with record drawings when applicable.

2.7 ENGINEERED PRODUCTS

- A. Products requiring professional engineering design and/or certification shall include Form 01330-B: Professional Engineer Certification Form and shall be stamped by a professional engineer with valid registration in the State of Colorado. Such stamp shall be consistent with the rules and regulations of the state governing professional engineering registration. The form is provided at the end of this section.

2.8 OPERATION AND MAINTENANCE MANUALS

- A. If applicable, a system operation and maintenance manual, or series of manuals, shall be developed which covers the overall system operations and each piece of mechanical equipment specified within this contract.
- B. The CONTRACTOR shall submit the manuals in three-ring or other District approved binders. Formatting shall be 8½" x 11" size, well indexed and including the following information:
 - 1. CONTRACTOR's names, addresses, and telephone numbers.
 - 2. Alphabetical list of all system components with the name and address and 24-hour phone number of the company responsible for servicing each item during the first year of operation.
 - 3. Guarantees and warranties of all equipment whenever applicable.
 - 4. All data applicable to the installed equipment including, but not limited to: shop drawings, installation instructions, lubrication instructions, wiring diagrams, operating instructions, start-up procedures, shut-down procedures, trouble-shooting and repair guides, emergency guidelines, spare part and supply lists, vendors, and other relevant information.
- C. Operation and maintenance manuals shall be provided prior to project closeout and acceptance by the District.

2.9 RECORD DRAWINGS

- A. Record drawings are defined as a neatly and legibly marked set of construction drawings showing the final location of piping, manholes, mechanical equipment, electrical equipment, and other related systems. Record drawings shall also include additional documents such as equipment schedules, lists, drawings, and electrical and instrumentation diagrams.
- B. Unless otherwise specified, record drawings shall be full size and maintained in a clean, dry, and legible condition. Record documents shall not be used for construction purposes and shall be available for review by the District during normal working hours at the CONTRACTOR's field office. At the completion of the Work, all record drawings shall be submitted to the District.
- C. Record drawings shall depict all easements and properties transferred to the District as well as all existing easements and rights-of-way boundaries.
- D. Record drawings shall be provided for all water and sanitary sewer improvements that connect to, but are not part of, the District's systems.

- E. All record drawings shall be provided to the District prior to project closeout and acceptance by the District.

2.10 WARRANTIES

- A. All applicable warranty documents shall be assigned and delivered to the District after all terms for project closeout have been met.
- B. The CONTRACTOR shall provide a materials and labor warranty for all project improvements including, but not limited to all facilities, backfill, compaction, landscaping, and erosion control.
- C. All equipment and system warranties shall be presented to the District prior to project closeout and acceptance by the District. All warranties shall be in the District's name.

PART 3 EXECUTION

3.1 SUBMITTALS

- A. The CONTRACTOR shall submit 5 copies of all submittals to the District for review and comment unless otherwise agreed upon with the District.
- B. Unless otherwise specified, within 14 calendar days after receipt of a submittal for review and comment, the District shall review the submittal and return 2 marked-up copies to the CONTRACTOR. The returned submittal shall indicate one of the following actions:
 - 1. If the review indicates that the material, equipment or work method complies with the Contract Documents, submittal copies will be marked "NO EXCEPTIONS TAKEN." In this event, the CONTRACTOR may begin to implement the work method or incorporate the material or equipment covered by the submittal.
 - 2. If the review indicates limited corrections are required, copies will be marked "MAKE CORRECTIONS NOTED." The CONTRACTOR may begin implementing the work method or incorporating the material and equipment covered by the submittal in accordance with the noted corrections. Where submittal information will be incorporated in O&M data, a corrected copy shall be provided.
 - 3. If the review reveals that the submittal is insufficient or contains incorrect data, copies will be marked "AMEND AND RESUBMIT." Except at his own risk, the CONTRACTOR shall not undertake work covered by this submittal until it has been revised, resubmitted and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."

4. If the review indicates that the material, equipment, or work method does not comply with the Contract Documents, copies of the submittal will be marked "REJECTED - DEVELOP REPLACEMENT." Submittals with deviations which have not been identified clearly may be rejected. Except at his own risk, the CONTRACTOR shall not undertake the work covered by such submittals until a new submittal is made and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."
5. If the review reveals that the submittal is substantially incomplete and/or missing information which was required to be provided, the submittal will be marked "INCOMPLETE, NOT REVIEWED". This review action indicates that additional information is required and that a re-submittal will be necessary before review can begin.

3.2 TRANSMITTAL PROCEDURE

- A. Submittals shall be accompanied by Form 01330-A: Transmittal Submittal provided at the end of this section. A separate form shall be used for each specific item, class of material, equipment, or other items specified. All appropriate equipment numbers shall be identified on the submittal form. Submittals for various items shall be made with a single form when the items taken together constitute a manufacturer's package or are so functionally related that expediency indicates checking or review of the group or package as a whole.
- B. A unique number, sequentially assigned, shall be noted on the transmittal form accompanying each item submitted. Original submittal numbers shall have the following format: "XXX"; where "XXX" is the sequential number assigned by the CONTRACTOR. Re-submittals shall have the following format: "XXX-Y"; where "XXX" is the originally assigned submittal number and "Y" is a sequential letter assigned for re-submittals, i.e., A, B, or C being the 1st, 2nd, and 3rd re-submittals, respectively.

3.3 DEVIATION FROM CONTRACT

- A. If the CONTRACTOR proposes to provide material, equipment, or method of work which deviates from the Contract Documents, he shall indicate so under "deviations" on the transmittal form accompanying the submittal copies.

3.4 SUBMITTAL COMPLETENESS

- A. Submittals which do not have all the information required to be submitted, including deviations, are not acceptable and will be returned without review.

3.5 REVIEW PROCEDURE

- A. Submittals are specified for those features and characteristics of materials, equipment, and methods of operation which can be selected based on the CONTRACTOR's

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judgment of their conformance to the specified requirements. Other features and characteristics are specified in a manner which enables the CONTRACTOR to determine acceptable options without submittals. The review procedure is based on the CONTRACTOR's guarantee that all features and characteristics not requiring submittals conform as specified. Review shall not extend to means, methods, techniques, sequences or procedures of construction, or to verifying quantities, dimensions, weights or gages, or fabrication processes (except where specifically indicated or required by the Contract Documents) or to safety precautions or programs incident thereto. Review of a separate item, as such, will not indicate approval of the assembly in which the item functions.

3.6 EFFECT OF REVIEW OF CONTRACTOR'S SUBMITTALS

- A. Review of contract drawings, methods of work, or information regarding materials or equipment the CONTRACTOR proposes to provide, shall not relieve the CONTRACTOR of his responsibility for errors therein and shall not be regarded as an assumption of risks or liability by the District or its representatives, or by any officer or employee thereof, and the CONTRACTOR shall have no claim under the contract on account of the failure, or partial failure, of the method of work, material, or equipment so reviewed.
- B. A mark of "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED" shall mean that the District and its representatives have no objection to the CONTRACTOR using the plan or method of work proposed, or providing the materials or equipment proposed. The District and its representatives, however, do not assume or create any risks or liability for the District and/or its representatives by these marks.

3.7 PROJECT AND CONSTRUCTION SCHEDULES

- A. The project schedule shall be submitted with the construction plans submittal and resubmitted if it is changed.
- B. The construction schedule shall be submitted 5 working days before construction begins and updated throughout the course of construction.

3.8 PROJECT STATUS UPDATE

- A. Project status meetings shall be held each week throughout the construction schedule, unless otherwise approved by the District.

FORM 01330-A: SUBMITTAL TRANSMITTAL

Submittal No.: _____ Description: _____ Section: _____

PROJECT:	Routing	Sent	Received
Grand County Water & Sanitation District No. 1 Reservoir No. 2 Enlarging & Lining Project	Contractor to District Rep.		
Contractor:	District Rep. To Contractor		

The following submittals sent: _____ Attached _____ Under separate cover via _____

Remarks: _____

Item	Copies	Date	Description	Review action ^a	Reviewer initials	Review comments attached

Note: NET = No exceptions taken; MCN = Make corrections noted; A&R = Amend and resubmit; R = Rejected
 -- (Attach additional sheets if necessary.)

CONTRACTOR certifies that the material or equipment contained in this submittal meets all the requirements specified, including coordination with all related work, except for the following deviations.

<u>Item</u>	<u>Deviation</u>
_____	_____
_____	_____
_____	_____
_____	_____

Certified by: _____
 Contractor's Signature

 Date

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FORM 01330-B: PROFESSIONAL ENGINEER CERTIFICATION FORM

The undersigned certifies that he/she is a professional engineer registered in the State of Colorado and that he/she has been employed by (name and address of CONTRACTOR) _____

to design _____

in accordance with Specification Section _____ for the _____ Project.

The undersigned further certifies that he/she has performed the design of _____,

and that said design is in conformance with all applicable local, state, and federal codes, rules, and regulations, and that his/her signature and P.E. stamp have been affixed to all calculations and drawings used in, and resulting from, the design. Also, affix stamp in space provided below.

The undersigned hereby agrees to make all original design drawings and calculations available to the District's Representative within seven days following written request.

P.E. Name

Signature

Address

Stamp

Contractor's Name

Date

Signature

Title

Address

END OF SECTION

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**SECTION 01 03 70
REQUESTS FOR INTERPRETATION**

PART 1 GENERAL

1.1 GENERAL

The CONTRACTOR shall prepare and submit Requests For Interpretation (RFI) to obtain clarifications to the Contract Documents. All requests shall be in writing using the form on the following page. The CONTRACTOR may fax, deliver or mail the RFI to the ENGINEER. RFI's will not be accepted from sub-contractors or suppliers.

If the information can be found in the Contract Documents, it will be indicated in the RFI and returned to the CONTRACTOR. The ENGINEER's time for preparing responses to RFI's that are self-evident in the Contract Documents will be charged to the CONTRACTOR.

The ENGINEER's review of the RFI will be conducted with reasonable promptness while allowing sufficient time in the ENGINEER's judgment to permit adequate review.

1.2 RELATED WORK:

None.

PART 2 NOT USED

PART 3 EXECUTION

3.1 GENERAL

All RFI's shall be numbered sequentially starting with No. 001. The CONTRACTOR shall maintain a log of all RFI's submitted including at a minimum the date of submittal, subject and receipt of response from the ENGINEER. An electronic copy of the following form will be provided to the CONTRACTOR.

END OF SECTION

TO: GEI Consultants, Inc.
CLIENT: Grand County Water and Sanitation District No. 1
PROJECT: Reservoir No. 2 Enlarging and Lining Project

REQUEST			
Date:		Reference:	
Drawing No.:		Specification Section No.:	
Date Response Required:			
Attachments:			
Contractor:		Submitted by:	

RESPONSE			
Date:			
GEI Consultants, Inc.	By:		Reviewed by:

SECTION 01 04 20 REFERENCES

PART 1 GENERAL

1.1 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of other requirements of the Specifications, all Work specified herein shall meet the requirements of applicable codes and the applicable requirements of the following referenced documents:

1. References herein to “ASTM” shall mean the American Society for Testing and Materials.
2. References herein to “ACI” shall mean the American Concrete Institute.
3. References herein to “OSHA Regulations for Construction” shall mean **Title 29, Part 1926, Construction Safety and Health Regulations for Construction**, Code of Federal Regulations (CFR), including all changes and amendments thereto.
4. References herein to “OSHA Standards” shall mean **Title 29, Part 1910, Occupational Safety and Health Standards**, Code of Federal Regulations, including all changes and amendments thereto.
5. References to “Standard Specifications” or “SSPWC” shall mean the **Standard Specifications for Public Works Construction**, 1994 Edition.

1.2 REGULATIONS RELATED TO HAZARDOUS MATERIALS

A. All Work included in the Contract Documents, regardless if shown or not, shall comply with all EPA, OSHA, RCRA, NFPA, and any other Laws and Regulations governing the storage and conveyance of hazardous materials, including petroleum products.

1.3 ABBREVIATIONS

A. Abbreviations used throughout the Specifications and the organization or document represented are:

AA	Aluminum Association
AAMA	Architectural Aluminum Manufacturer's Association
AASHTO	American Association of State Highway Transportation Officials
ACI	American Concrete Institute
ADM	Arrow Diagramming Method
AGA	American Gas Association
AGCA	Association of General Contractors of America

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AIA	American Institute of Architects
AIEE	American Institute of Electrical Engineers
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ALSC	American Lumber Standards Committee
AMCA	Air Moving and Conditioning Association, Inc.
AMA	American Materials Association
ANSI	American National Standards Institute
APA	American Plywood Association (formerly DFPA)
APHA	American Public Health Association
ARI	Air-Conditioning and Refrigeration Institute
ASA	American Standards Association (now USAS)
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWPA	American Wood Preserver's Association
AWWA	American Water Works Association
CFR	Code of Federal Regulations
CPM	Critical Path Method
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standards of U.S. Department of Standards
CSI	Construction Specifications Institute
DFPA	Douglas Fir Plywood Association (now APA)
EPA	Environmental Protection Agency
FAR	Federal Acquisition Regulations
FGMA	Flat Glass Marketing Association
FML	Factory Mutual Laboratories
FS	Federal Specifications
HVAC	Heating, Ventilating, and Air Conditioning
IBR	Institute of Boiler and Radiator Manufacturers
MBMA	Metal Building Manufacturer's Association
MLA	Metal Lath Association
MSHA	Mine Safety and Health Administration
NAAMM	National Association of Architectural Metal Manufacturers
NBC	National Building Code
NBFU	National Bureau of Fire Underwriters
NBS	National Bureau of Standards
NCMA	National Concrete Masonry Association
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NFPS	National Forest Products Association
NPC	National Plumbing Code

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NPDES	National Pollutant Discharge Elimination System
NRMCA	National Ready Mixed Concrete Association
NSF	National Sanitation Foundation
NWMA	National Woodwork Manufacturing Association
OSHA	Occupational Safety and Health Administration, U.S. Department of Labor
PCA	Portland Cement Association
PDM	Precedence Diagramming Method
PEI	Porcelain Enamel Institute
SBI	Steel Boiler Institute
SCPI	Structural Clay Products Institute
SDI	Steel Deck Institute
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SPCC	Spill Prevention Control and Countermeasure
SPI	Steel Products Institute
SPR	Simplified Practice Recommendation
SSPC	Steel Structures Painting Council
TCA	Tile Council of America
UBC	Uniform Building Code
UL	Underwriters Laboratories
UPC	Uniform Plumbing Code
USAS	United States of America Standards (formerly ASA)
USBR	U.S. Bureau of Reclamation
USCOE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WPCF	Water Pollution Control Federation
WWPA	Western Wood Products Association

B. Additional abbreviations, if any, will be defined as they appear in the Specifications.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

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**SECTION 01 04 50
QUALITY CONTROL**

PART 1 GENERAL

The ENGINEER will monitor the quality of construction as specified in Rule 9 of the SEO Rules and Regulations for Dam Safety and Dam Construction. The ENGINEER is responsible for the quality of construction, compliance with approved design and specifications, preparation of necessary documentation for the State Engineer's review and approval of all construction change orders and preparation of the project completion documents required in Rule 10.

1.1 CONTRACTOR QUALITY CONTROL

- A. CONTRACTOR's Testing Responsibilities:
1. Material property tests for all earthwork items from off-site sources. Testing requirements are listed in individual Specification sections.
 2. Tests on items manufactured or fabricated off-site.
 3. Field quality control tests to control CONTRACTOR fill placement operations.
- B. Earthwork quality control testing schedule shall be as outlined in the individual Specification sections.
- C. Perform all other testing and certifications as outlined in these Specifications.

1.2 OWNER ACCEPTANCE TESTING

- A. OWNER's Testing Responsibilities (ENGINEER will perform these tests on behalf of OWNER):
1. Additional tests of earthwork materials from off-site sources to check CONTRACTOR's data and as a basis for acceptance of Work, as determined appropriate by ENGINEER.
 2. Testing and observation of excavations and bearing surfaces for the embankments and appurtenant structures.
 3. Field testing and visual observation of in-place earthwork materials.
 4. Laboratory testing of earthwork materials.
 5. Performing quality control observations and tests, and preparing and/or obtaining test specimens, including cylinders, for all cast-in-place concrete materials and grout for embedded materials, during placement.

6. Observation and testing of on-site borrow areas.
- B. Unless otherwise indicated, results of all completed tests by ENGINEER will be available to CONTRACTOR at ENGINEER's site office by the end of the next working day following completion of the tests.
 - C. ENGINEER may perform additional laboratory tests on earthwork materials obtained from off-site sources; and on concrete aggregate gradation and quality, cement, admixtures, water and any other constituent or test as deemed necessary by ENGINEER to check CONTRACTOR's test results and verify continued compliance with Specification requirements. If additional testing by OWNER is required, CONTRACTOR shall provide representative samples to ENGINEER from off-site stockpiles or storage bin(s) for testing at no additional cost to OWNER or ENGINEER. ENGINEER reserves the right to sample materials at the source of production.
 - D. ENGINEER will perform acceptance testing on the in-place earthwork materials and concrete as described in the Specification sections.
 - E. ENGINEER will perform observations of the exposed excavations using surveyed topographic maps and sections provided by CONTRACTOR. CONTRACTOR shall provide access for ENGINEER's personnel to perform observations. CONTRACTOR shall allow a reasonable period of time in CONTRACTOR's schedule for ENGINEER's observation of exposed excavations.
 - F. CONTRACTOR shall provide ENGINEER a Concrete Placement Form with the upper checkout items completed prior to every concrete placement. ENGINEER will then complete the Concrete Placement Form(s), as appropriate for each element of conventional concrete work. A blank placement form is included in this section for CONTRACTOR's use.
 - G. ENGINEER will perform observations of all waterstop and waterstop field joint work. CONTRACTOR shall provide no less than 24 hours notice for scheduling these observations.
 - H. Final acceptance of the Work will be based on a review of the acceptance tests, as well as on visual observation made by ENGINEER of CONTRACTOR's work, including any work effort required to complete the project in compliance with these Contract Documents and the quality level required by ENGINEER's design.

1.3 TESTING STANDARDS

A. Earthwork quality control testing:

1. Compaction - ASTM D 698 or ASTM D 1557
2. Moisture Content, Oven Method - ASTM D 2216
3. Specific Gravity - ASTM D 854
4. Field Density, Sand Cone Method (plus one-point compaction and moisture content) - ASTM D 1556
5. Field Density, Drive Cylinder Method (plus one-point compaction and moisture content) - ASTM D 2937
6. Field Density, Nuclear Gage Method (plus one-point compaction and moisture content) - ASTM D 2922
7. Maximum Index Density – ASTM D 4253
8. Minimum Index Density – ASTM D 4254
9. Moisture Content, Nuclear Gage Method - ASTM D 3017
10. Particle Size Analysis - ASTM D 422
11. Liquid Limit, Plastic Limit, and Plasticity Index - ASTM D 4318
12. Resistance to Degradation - ASTM C 131
13. Sodium Sulfate Soundness - ASTM C 88

- B. The percent compaction requirements for earthwork will be evaluated as follows: The in-place density as compacted by CONTRACTOR will be determined by the field density test using the sand-cone method or the nuclear gage method. The maximum dry density of the fill at the location of the in-place density test will be estimated using one-point compaction tests and full-curve compaction tests (family of curves) of representative fill materials. Both the one-point compaction tests and the full-curve compaction tests will be performed according to ASTM D 698 or ASTM D 1557, as appropriate. The one-point compaction data will be used in conjunction with the representative compaction curves to estimate the maximum dry density of the compacted fill at the location of the in-place density test. The percent compaction in-place will be calculated as the ratio (in percent) of the in-place dry density of the compacted fill at the location of the in-place density test to the estimated maximum dry density of the material.

- C. Other test requirements as described in individual Specification sections.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

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**SECTION 01 05 00
TEMPORARY FACILITIES AND CONTROLS**

PART 1 GENERAL

1.1 GENERAL

- A. Construction facilities and temporary controls include those items necessary for performance of the Work that are not part of the permanent construction.

1.2 SUBMITTALS

A. Shop Drawings:

1. Plan for site access. The plan shall include permits and approvals, as warranted, for secondary site access roads.
2. Plan for on-site security.
3. Plan for staging and stockpile areas.
4. Plan for obtaining water and delivering water to the necessary construction areas.
5. Plan for sedimentation and erosion control.
6. Implementation or control plans for meeting the requirements of OWNER-obtained permits as described in Section 01 05 75: Project Permits and Environmental Controls.
7. Plan for temporary construction facilities
 - a. Temporary access roads and haul roads; including routes, cross sections, and drainage provisions.
 - b. Staging areas; including field office layouts (OWNER, ENGINEER, and CONTRACTOR), parking areas, and storage yard layout.
 - c. Temporary fences and barriers.

B. Administrative:

1. Copies of permits obtained by CONTRACTOR.
2. CONTRACTOR Health and Safety Plan.
3. Proposed off-site waste disposal facility.

1.3 MOBILIZATION AND PREPARATORY WORK

- A. For the purposes of providing for expenses incidental to the initiation of construction and of discouraging unbalanced bidding, a single lump sum item has been included in the bidding schedule to provide for payment for mobilization and preparatory work. The item for payment for mobilization and preparatory work is intended to compensate CONTRACTOR for operations including, but not limited to, the following items:
1. Obtaining project permits.
 2. Moving equipment, supplies, and incidentals to the site.
 3. Establishing field offices, buildings, plants, and other facilities at the site.
 4. Installing temporary utilities at the site.
 5. Having CONTRACTOR's superintendent at the site full time.
- B. All facilities, plants, and equipment that are established at, or brought to, the project site shall be deemed to be subject to the provisions of this paragraph unless OWNER specifically provides otherwise in writing for a particular item or items. CONTRACTOR shall be solely responsible for the adequacy, efficiency, use, protection, maintenance, repair, and preservation of all facilities, plants, and equipment. No facilities, plants, or equipment shall be dismantled or removed from the work site prior to completion of the Work under the contract without the written permission of OWNER.

PART 2 PRODUCTS**PART 3 EXECUTION****3.1 TEMPORARY UTILITIES**

- A. Power
1. Schedule and provide electrical drop with power company or provide onsite power generating equipment as needed.
- B. Water
1. Provide and maintain adequate supplies of drinking water for CONTRACTOR personnel.

C. Sanitary Facilities

1. Provide and maintain suitable, weather-tight, painted, sanitary toilet facilities for all work persons during the construction period. When toilet facilities are no longer required, promptly remove from site. Disinfect and clean or treat the area as required.
2. Keep all toilet facilities serviced, clean, and supplied with toilet paper at all times.

D. Lighting

1. Provide temporary lighting to meet applicable safety requirements to allow erection, application, or installation of materials, and observation and inspection of the Work.

3.2 FIELD OFFICES

- A. Prepare for adequate space for field office facilities as needed.

3.3 CONSTRUCTION ACCESS ROAD

- A. Construction access into the site shall be from U.S Highway 40.
- B. Access roads constructed on-site shall be constructed within the limits of site disturbance.
- C. Maintain drainage ways. Install culverts to allow water to pass without disturbing the roadway.

3.4. PROTECTION OF EXISTING ROADS

- A. Obtain all permits required by Town of Fraser, CDOT, Grand County and all other applicable public agencies during construction unless specifically provided by the OWNER. Meet all permit requirements.
- B. Repair damage to public roads as required by the applicable public agency.

3.5 CONTRACTOR PARKING AREAS

- A. Parking for the employees of CONTRACTOR and for OWNER and ENGINEER personnel will be allowed in the staging and stockpile areas.

3.6 STAGING AREA

- A. Establish trailer, shop and/or field office in the staging area.
- B. Stockpile equipment, supplies, imported earthfill materials, and other materials incidental to the construction in the staging or stockpile areas or other areas approved by ENGINEER.
- C. Fence all staging areas.

3.7 STOCKPILE AREAS

- A. All earthfill and other construction materials shall be stockpiled in CONTRACTOR staging area or borrow areas, or other areas approved by ENGINEER.

3.8 BORROW AREAS

- A. None expected on this project.

3.9 WEATHER PROTECTION

- A. Provide protection against weather to maintain all materials, apparatus, fixtures, and work free from damage whether in shipment, in storage, or in place.
- B. Do not perform wet work when temperature is below 35°F or is forecast to be below 35°F within the ensuing 48 hours, except when work is properly protected and sufficient heat is provided.
- C. When heat is required for proper weather protection, provide temporary enclosures of work and acceptable means to provide sufficient heat to maintain a temperature of not less than 50°F. Provide higher temperatures when required by these Specifications.

3.10 SITE SECURITY

- A. Provide adequate security for protection of OWNER's, ENGINEER's, and CONTRACTOR's property, equipment, and facilities.
- B. All existing and temporary gates and fences shall be secured and locked during non-working hours. Provide padlocks at all gates. All gates shall be double padlocked to allow OWNER and ENGINEER access to the site without disturbing CONTRACTOR's locks.

3.11 OPERATIONS AND STORAGE AREAS

- A. Do not enter on or occupy with men, tools, equipment, or material any ground outside areas shown on the Drawings without the written consent of the OWNER of such ground.
- B. Other contractors and employees or agents of OWNER may for all necessary purposes enter upon the Work and premises used by CONTRACTOR. Conduct work so as not to impede unnecessarily any work being done by others on or adjacent to the site.

3.12 SAFETY

A. Safety and Health

- 1. CONTRACTOR shall have sole responsibility for construction site safety in accordance with the provisions of the General Conditions.
- 2. Maintain an accurate record of, and report to OWNER, all cases of death, occupational diseases, or traumatic injury to employees or the public, and property damage.

3.13 CLEANUP AND DISPOSAL OF WASTE MATERIALS

A. SCOPE

- 1. The cleanup and disposal of waste materials and rubbish shall be in accordance with these Specifications and applicable Laws and Regulations. Should a conflict exist in the requirements for cleanup and disposal of waste materials, the most stringent requirement shall apply.

B. CLEANUP

- 1. Keep work and storage areas free from accumulations of waste materials and rubbish, and before completing the Work, remove all plant and storage facilities, buildings, including concrete footings and slabs, rubbish, unused materials, concrete forms, and other materials that are not a part of the permanent Work.
- 2. Upon completion of the Work, and following removal of construction facilities and required cleanup, work areas shall be regraded, reclaimed, and left in a neat manner conforming to the natural appearance of the landscape.

C. DISPOSAL OF WASTE MATERIALS

- 1. Waste materials, including but not restricted to, cleared and grubbed vegetation, refuse, garbage, sanitary wastes, chemical additives, industrial wastes, oil, and

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other petroleum products, shall be disposed of by CONTRACTOR by removal from the construction area. Dispose of material in an appropriate off-site waste disposal facility.

2. Burning of cleared vegetation and waste materials shall not be permitted.
3. Disposal of unsuitable or waste excavated earth materials shall be off site.

END OF SECTION

SECTION 01 05 75
PROJECT PERMITS AND ENVIRONMENTAL CONTROLS

PART 1 GENERAL

1.1 WORK INCLUDES

- A. Project Permits
- B. Abatement of Air Pollution
- C. Abatement of Noise Pollution
- D. Abatement of Water Pollution
- E. Landscape Preservation
- F. Preservation Of Trees and Shrubs
- G. Preservation Of Historical And Archaeological Data
- H. Protection of Endangered Species

1.2 SUBMITTALS

A. Shop Drawings:

1. Copies of all necessary State and local permits required to complete the Work. Submit prior to beginning related portions of the Work.
2. Water Quality Management Plan containing, as a minimum, the following information:
 - a. Name of the person who will implement and carrying out the plan.
 - b. Precautions that will be taken to avoid discharge or accidental spills of oil or wastewater into river, stream, watercourse, or lake.
 - c. Methods and facilities for handling and treating wastewater, including locations for evaporation or settling ponds, treatment facilities, and discharge points. Estimates of the amount of wastewater that may be handled and treated at each location.
 - d. Methods and facilities for preventing or controlling runoff and erosion for construction sites, during and after construction, including:
 - i. Access roads
 - ii. Stockpile and waste areas
 - iii. Construction plant and equipment yards
 - iv. All excavated surfaces
 - v. Other impacted areas
 - e. Sequence and schedule for installation and removal of facilities.
 - f. f. Relate the methods, facilities, and descriptions above to the conditions of required permits.

1.3 PROJECT PERMITS & LICENSES

- A. OWNER will obtain design approval from the Colorado State Engineer's office. CONTRACTOR shall become familiar with any special requirements of the State Engineer's office and shall proceed in accordance with those requirements.
- B. OWNER will obtain a Town of Fraser Building Permit for construction of the Project. CONTRACTOR is responsible for complying with all OWNER-obtained permits.
- C. CONTRACTOR is responsible for obtaining and complying with all other state and local permits required for the Work. Such permits may include, but are not limited to, the following:
 - 1. Discharge permit.
 - 2. NPDES Construction Storm Water Discharge Permit (CDPHE).
 - 3. Right-of-way uses, driveway, haul or special use permits from state and local transportation agencies.
 - 4. Local contractor's construction license.
- D. CONTRACTOR shall bear the responsibility of obtaining, through OWNER, clarification of any and all permit requirements.
- E. No work shall proceed that is in violation of any permit or guideline requirements.
- F. Representatives of permitting agencies for any of the required project permits may periodically visit the work site. Any and all concerns addressed to CONTRACTOR by these agency representatives shall be immediately conveyed to OWNER or ENGINEER. No work considered by the agency representatives to be a violation of permit requirements or guidelines shall continue until the issue is resolved and OWNER has provided permission to CONTRACTOR to continue the task in question, within proper restraints or guidelines.
- G. CONTRACTOR shall fulfill permit obligations without any additional cost to OWNER.

1.4 STORAGE OF FUEL ON SITE

- A. If the aggregate storage of oil at the Site is over 1,320 gallons or a single container has a capacity in excess of 660 gallons, prepare a Spill Prevention Control and Countermeasure (SPCC) plan. The plan shall be prepared and certified by a Registered Professional Engineer registered in the State of Colorado.
- B. All oil storage tanks shall be placed at least 20 feet from streams, flowing or dry watercourses, lakes, wetlands, reservoirs, and any other water source, and the area surrounding the tanks shall be diked to contain more than 1-1/2 times the volume of

the largest tank, or more than half the volume of all tanks within the diked area, whichever is greater. Underground storage tanks will not be allowed.

1.5 ABATEMENT OF AIR POLLUTION

- A. Abatement of air pollution shall be performed in accordance with the requirements of the Air Pollution Emission Permit and applicable Laws and Regulations concerning the prevention and control of air pollution. Use such methods and devices as are reasonably available to prevent, control, and otherwise minimize atmospheric emissions or discharges of air contaminants.
- B. Burning of cleared materials, combustible construction materials, and rubbish will not be allowed.
- C. Apply a dust-preventive treatment or periodically water access and haul roads to prevent dust.

1.6 ABATEMENT OF NOISE POLLUTION

- A. Abatement of noise pollution shall be performed in accordance with applicable Laws and Regulations regarding the prevention, control, and abatement of harmful noise levels.

1.7 ABATEMENT OF WATER POLLUTION

- A. Abatement of water pollution shall be performed in accordance with the requirements of the Stormwater Discharge Permit, Erosion and Sediment Control Plan, and Stream Diversion Plan.
- B. Excavated materials or other construction materials shall not be stockpiled or wasted near or on streambanks, lake shorelines, or other watercourse perimeters where they can be washed away by high water or storm runoff, or can in any way encroach upon the watercourse itself.
- C. Include prevention measures to control silting and erosion, and to intercept and settle any runoff of sediment-laden waters. Refer to the Erosion and Sediment Control Plan requirements in Section 02 03 70: Erosion Protection and Sediment Control. Wastewater from general construction activities, such as drain water collection, drilling, grouting, or other construction operations, shall not enter flowing or dry watercourses without the use of approved turbidity control methods. All such wastewaters discharged shall contain the least concentration of settleable material possible, and shall meet all conditions of the National Pollutant Discharge Elimination System (NPDES) Section 402 permit.

1.8 LANDSCAPE PRESERVATION

- A. Preserve the natural landscape, and conduct operations so as to prevent unnecessary destruction, scarring, or defacing of the natural surroundings in the vicinity of the Work. Movement of crews and equipment within the rights-of-way and over routes provided for access to the Work shall be performed in a manner to prevent damage to grazing land, crops, or property. When no longer required, restore construction roads to original contours and make impassable to vehicular traffic.

1.9 PRESERVATION OF TREES AND SHRUBS

- A. Preserve and protect existing vegetation not required or otherwise authorized to be removed. Vegetation shall be protected from damage or injury caused by CONTRACTOR construction operations, personnel, or equipment by the use of protective barriers or other methods. Removal of existing vegetation not specifically required to be removed will require prior approval by ENGINEER.

1.10 PRESERVATION OF HISTORICAL AND ARCHAEOLOGICAL DATA

- A. Should CONTRACTOR, or any of CONTRACTOR's employees, or parties operating or associated with CONTRACTOR, in the performance of this Contract discover evidence of possible scientific, prehistorical, historical, or archeological data, immediately cease work at that location and notify ENGINEER, giving the location and nature of the findings. Forward written confirmation to OWNER within 2 days. Exercise care so as not to disturb or damage artifacts or fossils uncovered during excavation operations, and provide such cooperation and assistance as may be necessary to preserve the findings for removal or other disposition by OWNER.
- B. Where appropriate by reason of discovery, ENGINEER may order delays in the time of performance or changes in the Work, or both. If such delays or changes are ordered, an equitable adjustment will be made in the Contract in accordance with the applicable clauses of the Contract.

1.11 PROTECTION OF ENDANGERED SPECIES

- A. There are no known endangered species at the Site.
- B. Where appropriate by reason of a discovery, ENGINEER may order delays in time of performance or changes in the Work, or both. If such delays, or changes, or both, are ordered, the time of performance and Contract Price will be adjusted in accordance with the applicable clauses in the Contract.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTUION

Not Used

END OF SECTION

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**SECTION 01 07 75
PROJECT CLOSEOUT**

PART 1 GENERAL

1.1 SUBMITTALS

A. Administrative:

1. Record Drawings
2. Operating and Maintenance Instructions

1.2 FINAL INSPECTION

- A. Request a final review in writing at least ten (10) calendar days prior to the anticipated date of completion.
- B. Perform final review with CONTRACTOR, OWNER, ENGINEER, and a representative of the Colorado State Engineer's Office.
- C. Work will not be considered ready for final review until all Work has been completed, and CONTRACTOR has certified that all items are properly operating and in compliance with all Contract terms and conditions. CONTRACTOR or his project supervisor shall be at the Site during the final inspection.

1.3 RECORD DRAWINGS

- A. Submit the record copy of the drawing set that was maintained at the site during construction.

1.4 FINAL CONDITIONS SURVEY

- A. Perform survey of completed construction for embankments and appurtenant structures. Survey to 1-foot contours. Plot final survey at 1" = 100'.
- B. Perform survey of the Reservoir 2 slopes and bottom and beyond a 25' perimeter of top of slope. Survey to 1-foot contours. Plot final survey at 1" = 100'.
- C. Provide electronic DTM data.

1.5 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. Submit three (3) final copies of all operating and maintenance instructions for all equipment, instrumentation, and systems that require adjustment, servicing, and

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attention for proper operation. Include all information necessary to provide for proper operating conditions. Use simple, non-technical language where possible. Provide all necessary diagrams, schematics, etc., required by repairmen. Point out any hazards likely to occur in operation of equipment to avoid improper operation of any equipment that might result in damage or danger to equipment, building, or personnel. Instruction manuals shall be submitted to ENGINEER at the same time the request for final inspection is made.

- B. Submit copies of all maintenance and operating information in bound form as a "Manual of Operating Instructions" with items grouped by sections of Work. Append each manual with name, address, telephone number of CONTRACTOR, Subcontractor, and companies or individuals providing service for equipment used.

1.6 TRAINING

- A. Provide competent personnel to meet with OWNER and ENGINEER to fully explain and familiarize OWNER personnel with all equipment and its operation and maintenance.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

**SECTION 02 01 00
SITE PREPARATION**

PART 1 GENERAL

1.1 WORK INCLUDES

- A. Clearing, grubbing, and stripping within CONTRACTOR work area.
- B. Disposal of clearing and grubbing debris offsite.
- C. Salvaging and stockpiling topsoil from stripping for use in site reclamation.

1.2 DEFINITIONS

- A. Clearing: Removing, hauling, and disposing of all trees, shrubs, grasses, weeds, debris, trash, rubble, downed timber, branches, and other above-ground materials.
- B. Grubbing: Removal of vegetation and other organic matter including stumps, buried logs, and roots greater than 2 inches diameter to a depth of 6 inches below subgrade.
- C. Stripping: Removal of topsoil remaining after applicable clearing and grubbing is completed.

1.3 SUBMITTALS

- A. Shop Drawings: Drawings clearly showing the following:
 - 1. Clearing, grubbing, and stripping areas.
 - 2. Topsoil stockpile location.
 - 3. Debris stockpile location.

1.4 SCHEDULING AND SEQUENCING

- A. Prepare site only after erosion and sediment controls are in place.

PART 2 PRODUCTS

Not Used.

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PART 3 EXECUTION**3.1 GENERAL**

- A. Verify that existing plant life and features designated to remain or to be protected are tagged or identified. Do not injure or remove vegetation that is not designated for removal.

3.2 PROTECTION

- A. Protect any trees, plant growth, and features not requiring removal for the Work.
- B. Protect benchmarks and survey monuments from damage or displacement. Repair or replace all benchmarks and survey monuments damaged during clearing and grubbing.
- C. Maintain protection until all work in the vicinity of the work being protected has been completed.
- D. Restrict construction activities to those areas within the limits of construction designated on the Drawings, within public rights-of-ways, and within easements provided by the OWNER. Adjacent properties and improvements thereon, public or private, which become damaged by construction activities shall be promptly restored to their original condition, to the full satisfaction of the property OWNER.

3.3 LIMITS

- A. Clear, grub, and strip only those areas actually needed for temporary stockpiles, required excavation, designated fill areas, and site improvements within the following limits, but not to extend beyond the limits of the CONTRACTOR work area:
 - 1. Excavation Areas: Clear, grub, and strip area of excavation plus 5 feet beyond top of cut slopes.
 - 2. Temporary Fill/Stockpile Areas: Clear fill area plus 20 feet beyond toe of fill.
 - 3. Structures: Clear, grub, and strip structure area plus 15 feet outside of new structures.
- B. Remove rubbish, trash, and junk from entire area within Limits of CONTRACTOR Work Area.

3.4 STRIPPING

- A. Do not strip until after clearing and grubbing.
- B. Minimum stripping depth = 6 inches. Do not remove subsoil with topsoil.

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- C. Stockpile strippings that meet the requirements for topsoil defined in Section 02 50 00: SITE RECLAMATION.

3.5 DISPOSAL

- A. Dispose of all clearing and grubbing debris and unsuitable stripped topsoil material off site in accordance with Section 01 50 00: TEMPORARY FACILITIES AND CONTROLS.

END OF SECTION

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**SECTION 02 21 00
SURVEYS****PART 1 GENERAL****1.1 WORK INCLUDES**

- A. Pre-construction survey after reservoir dewatering.
- B. Layout surveys required for the control and completion of the work.
- C. Quantity surveys to compute quantities of work performed.
- D. Record surveys necessary for ENGINEER to produce Record Drawings.
- E. Survey shall include the following: existing (pre-construction) site, topography, post excavation with Zone 1a/1b foundation and keyway prepared, finished reservoir.

1.2 SUBMITTALS

- A. Administrative:
 - 1. Survey Control Plan – A complete plan for the surveying required to lay out the work, including methods and time tables for establishing lines and grades.
 - 2. Surveyor Qualifications – Resumes of qualifying experience for the Professional Land Surveyor who will be responsible for the supervision and direction of all of CONTRACTOR's survey work.
 - 3. Quantity Surveys – Accompanying progress payment requests, submit a copy of applicable quantity survey notes and computations and an itemized statement for work performed or placed during the progress period measured on the basis of surveying.
 - 4. Survey Books – Within 2 days of completing and reducing notes for a survey or portion of survey, submit a copy of such notes. Within 2 days of completing a field survey book, submit a copy of the original field survey book.
 - 5. Daily Notes – If requested by ENGINEER, submit a copy of the workday's survey notes at the conclusion of that workday.
 - 6. Pre-construction Survey – Within one week of mobilization and prior to excavation submit drawings in hard copy (22 by 34 inches), and electronically (AutoCAD 2010 or higher), for all record survey data collected at the site, maximum scale of 1 inch = 50 feet.

7. Record Survey – Within one week of substantial completion of the work, submit drawings in hard copy (22 by 34 inches), and electronically (AutoCAD 2010 or higher), for all record survey data collected at the site, maximum scale of 1 inch = 50 feet.

1.3 QUALIFICATIONS

- A. Survey work shall be under the supervision and direction of a Professional Land Surveyor who is registered in the State of Colorado and has a minimum of 2 years responsible charge of construction surveys for construction similar in nature to that required by this contract. Maintain sufficient qualified personnel to perform required surveying work. All survey work performed by CONTRACTOR shall be subject to field and office review by ENGINEER.

1.4 ACCURACY

- A. Degree of accuracy shall be of an order high enough to satisfy tolerances specified for the work and the following:
 1. Pumped outlet access road: Alignment of tangents and curves shall be within 0.1 foot.
 2. Structure points shall be set within 0.01 foot, except where installation or operation considerations require tighter tolerances.
 3. Earthwork shall be within 0.1 foot vertical of locations shown on the Drawings.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 LAYOUT OF WORK

- A. The CONTRACTOR shall establish primary control for establishing lines and grades required for the work. Primary control consists of control points in the vicinity of the work as described and indicated on the Drawings.
- B. Preserve and maintain primary control points. Primary control points damaged or destroyed by CONTRACTOR may be reestablished by ENGINEER, and the expense of reestablishment will be deducted from amounts due, or to become due, to CONTRACTOR.

- C. Use CONTRACTOR-established primary control points to establish all lines and grades necessary to control the Work.
- D. Establish, place, and replace as required, such additional monuments, control points, survey stakes, markers, and other controls as may be necessary for control, intermediate checks, and guidance of construction operations.

3.2 CONTRACTOR SURVEYS

A. Quantity Surveys

- 1. Perform such surveys and computations as necessary to determine quantities of work performed or placed during each progress payment period, and perform all surveys necessary for ENGINEER to determine final quantities of work in place.
- 2. Notify ENGINEER at least 24 hours before performing a survey and, unless specifically waived, surveys shall be performed in the presence of an authorized representative of ENGINEER.

B. Layout Surveys:

- 1. Pumped outlet access road: alignment staking - Each 100 feet on tangent; each 50 feet on curves.
- 2. Slope staking - Each 50 feet on tangent; each 25 feet on curves; restake every 10 feet in elevation.
- 3. Structure - Stake out structures; checks prior to and during construction.

C. Record Survey

- 1. Survey the “as-built” locations (horizontal coordinates and elevations) of:
 - a. Centerline of all piping and utility lines.
 - b. Centerline and finished grades of permanent access roads.
 - c. Corner points of all above and below grade structures.
 - d. Finished reservoir grades to at least 10 feet beyond impacted area.
 - e. Edge of slab or structure.

3.3 RECORDS

- A. Record survey data in accordance with recognized professional surveying standards. Original field notes, computations, and other surveying data shall be recorded in standard survey field books. Notes or data not in accordance with standard formats will be rejected. Illegible notes or data, or erasures on any page of a field book will be considered sufficient cause for rejection of part or all of the field book. Rejection

of part or all of a field book may necessitate resurveying. Corrections by ruling or lining out errors will be accepted.

END OF SECTION

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SECTION 02 37 00
EROSION PROTECTION AND SEDIMENT CONTROL

PART 1 GENERAL

1.1 WORK INCLUDES

- A. Designing, installing, and maintaining erosion protection and sediment control to comply with all local, state, and federal regulations.

1.2 REFERENCES

- A. Urban Drainage and Flood Control District's *Urban Storm Drainage Criteria Manual* (UDFCD Manual), latest edition.

1.3 DEFINITIONS

- A. Sediment and Erosion Control devices as defined herein shall mean silt fences, hay bales, sandbag cofferdams, sediment ponds, sediment traps, turbidity curtain, or other devices required to limit soil erosion, limit sediment transport, and to protect streams and drainageways from erosion and sediment damage.

1.4 SUBMITTALS

A. Administrative Submittals:

1. Erosion Protection and Sediment Control Plan (EPSCP), prepared and stamped by a Colorado Registered Professional Engineer.
2. Submit EPSCP within 10 days after NTP.
3. Submit copies of EPSCP for review and approval to ENGINEER.
4. The EPSCP shall meet the requirements of the UDFCD Manual. The plan shall include, at a minimum, the following information:
 - a. Facilities, products, and procedures to meet the requirements of erosion protection and sediment control regulations.
 - b. Procedure and installation details of constructing all required erosion protection and sediment control facilities.
 - c. Procedures and schedule to inspect, maintain, monitor, and repair erosion protection and sediment control facilities.
 - d. Product data of proposed materials to be used to control erosion and sediment.
 - e. Drawings that clearly show erosion and sediment control measures to be used for each stage of construction.
 - f. Schedule of removal of sediment and erosion control devices.

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1.5 SEQUENCING AND SCHEDULING

- A. The EPSCP must be submitted and approved by ENGINEER and regulatory agencies prior to issuance of grading permit(s) for the project, as required in Section 01 41 26: PROJECT PERMITS AND ENVIRONMENTAL CONTROLS.

PART 2 PRODUCTS

2.1 EROSION CONTROL DEVICES

- A. The following products may be required to satisfy regulatory requirements:

1. Silt barriers:

- a. Could include hay bales, silt fences, and other similar temporary soil sediment barriers for the purpose of intercepting and detaining sediment from disturbed areas during construction. Silt barriers shall be firmly anchored into the ground.
- b. Silt fences:
 - i. Consisting of fabric and posts suitable for sedimentation control application.
 - ii. UV protected fabric.
 - iii. Toe-in at least 6 inches to prevent silt-laden runoff water from running beneath the fence and over the ground surface.
- c. Hay bales:
 - i. Consisting of hay or straw stacked and staked in place with at least 2 stakes per bale.
 - ii. Toe-in bales at least 6 inches.
 - iii. Wire tie stakes to provide additional stability.
- d. Erosion control blankets and logs:
 - i. Material shall be excelsior or straw; anchorages as recommended by manufacturer
 - ii. Photo-degradable material so that it will naturally degrade and deteriorate in its entirety.

2. Erosion and sediment control blankets and geosynthetics that satisfy the requirements of the Colorado Health Department or other requirements of the State of Colorado.

3. Sediment and evaporation ponds:

- a. Designed to retain runoff and promote sediment settlement.
- b. Formed by partial excavation and/or constructed embankment or other construction method.

4. Drainage channels:

- a. Designed to provide for controlled collection and routing of sediment-laden water.
- b. Designed to minimize overtopping and erosion.

PART 3 EXECUTION

3.1 PREPARATION

- A. Identify required lines, levels, contours, and datums for the construction of erosion control facilities.

3.2 SEDIMENT AND EROSION CONTROL

- A. Install sediment and erosion controls prior to work involving site clearing, stripping and stockpiling topsoil, excavation, and earthwork.
- B. Maintain and repair sediment and erosion controls during course of construction.

3.3 RIPRAP

- A. Place riprap for erosion control so that pieces of different sizes are intermixed to eliminate segregation.

3.4 REMOVAL OF TEMPORARY FACILITIES

- A. Do not remove erosion control facilities without written approval from ENGINEER.
- B. All erosion control facilities will be the property of CONTRACTOR, and shall be removed and disposed offsite after all Work is complete.
- C. Remove and dispose sediments collected in the sediment control systems in accordance with Section 01 50 00: TEMPORARY FACILITIES AND CONTROLS.

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**SECTION 02 50 00
SITE RECLAMATION**

PART 1 GENERAL

1.1 WORK INCLUDES

- A. Reclaiming disturbed areas within the limits of site disturbance. Disturbed areas include:
 - 1. Staging areas and temporary access and haul roads above normal pool in the reservoir or downstream of the embankment crest.
 - 2. Areas disturbed as a result of the installation of the erosion and sediment control measures.
 - 3. Areas disturbed for the construction of the Work.
 - 4. Areas of borrow, if above normal pool in the reservoir or downstream of the embankment crest.

1.2 DEFINITIONS

- A. Reclaiming disturbed areas shall mean regrading, applying seed and mulch, and maintaining all seeded areas.

1.3 PROTECTION

- A. Areas outside the limits of site disturbance shall be protected from damage by the CONTRACTOR. Any disturbance of vegetation or native ground outside of the limits of site disturbance shown on the drawings shall be reclaimed by the CONTRACTOR at no additional expense to the OWNER.

1.4 RELATED SECTIONS

- A. Section 31 11 00: Clearing and Grubbing
- B. Section 31 23 16: Excavation
- C. Section 31 23 23: Fill and Backfill

1.5 SUBMITTALS

- A. Shop Drawings:
 - 1. Plans showing sequence and limits of site reclamation.
 - 2. Seed mixtures and product label information.

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B. Samples:

1. All seed and mulch materials shall be inspected and approved by the ENGINEER.

1.6 PROTECTION

- A. Protect from damage areas outside the approved limits of site disturbance.
- B. Reclaim any disturbance of vegetation or native ground outside of the limits of site disturbance.
- C. Pay the cost of any fines incurred by OWNER due to work being performed by CONTRACTOR outside the limits of site disturbance.

PART 2 PRODUCTS**2.1 TOPSOIL**

- A. Topsoil shall be as defined in Section 31 23 23: FILL AND BACKFILL.
- B. Topsoil shall not contain toxic materials harmful to grass growth.

2.2 SEED

- A. Grass seed shall be from the same or previous year's crop. When available, certified weed free seed will be provided. All seed will be free of prohibited noxious weeds (as defined by the State of Colorado), and will contain no greater than 1 percent other weeds.
1. All sites will be seeded with the following mixture, as recommended by Grand County:

Table 1: Seed Mix

% Species	Common Name
25	Sender Wheatgrass "San Luis"
25	Arizona Fescue
15	Indian Ricegrass "Rimrock"
10	Western Wheatgrass
10	Blue Grama
6	Sandberg's Bluegrass
4	Little Bluestern
3	Junegrass
1.5	Mountain Muhly
0.5	Thurber's Fescue

2. All application rates are based on pure, live seed (PLS).

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3. Seed shall be furnished and delivered premixed in the indicated proportions. Seed bag tags, or the equivalent, shall be provided for each delivery of seed. Tags shall show the guaranteed percentages of purity, weed content, germination, net weight, date of seed testing, and date of shipment. Tags will be provided to the ENGINEER for review and approval prior to seed application.

2.3 MULCH

- A. Straw mulch shall be inspected and bound with twine as regulated by the Weed Free Forage Act, CRS Title 35, Article 27.5 and administered by the Colorado Department of Agriculture. Mulch shall be accompanied by a certificate of compliance as defined in the rules and regulations of the aforementioned Act.

PART 3 EXECUTION

3.1 GENERAL

- A. The general order of execution shall be:
 1. Seedbed preparation
 2. Seed application
 3. Mulch application
- B. Seeding shall be accomplished between September 1 and November 30 or as approved by ENGINEER. No seeding shall take place when soils are frozen or excessively wet or dry.
- C. Grade all areas to drain. The maximum slope steepness shall be 3H:1V unless otherwise shown on the Drawings or approved in writing by ENGINEER.
- D. Remove all CONTRACTOR's equipment, debris, office, temporary fences or gates, and all other CONTRACTOR's properties in accordance with Section 01 50 00: Temporary Facilities And Controls.

3.2 SEEDBED PREPARATION

- A. Eliminate uneven areas and low spots. Remove debris, roots, branches and stones in excess of 3-inch size.
- B. Grade final surface of the topsoil to a relatively smooth surface using mechanical or hand raked methods. There shall not be any localized low spots that will allow water to accumulate.
- C. Scarify subgrade soil to a depth of 4 to 6 inches.

3.3 SEED APPLICATION

- A. Drill seed ½ to 1 inch deep following the contour. In areas that cannot be drilled, broadcast seed at 1.5 times the application rate and cover ½ to 1 inch deep with a harrow or drag bar. Apply seed within 10 days following soil preparation.

3.4 MULCH APPLICATION

- A. A uniform depth of certified weed free straw mulch will be applied to all seeded areas. Mulch shall be applied at the rate of 2,000 lbs./acre.

3.5 MAINTENANCE AND PROVISIONAL ACCEPTANCE

- A. Keep all seeded areas in good condition, reseeding and mulching if and when necessary until a good, healthy, uniform growth is established over the entire area seeded and shall maintain these areas in an approved condition until provisional acceptance.
- B. Prevent washouts by an approved method. Any washout which occurs shall be regraded and reseeded at no additional expense to OWNER. Maintain seeded area until vegetation is established.
- C. The OWNER or ENGINEER will inspect all work for provisional acceptance at the end of the 8-week maintenance period, upon the written request of the CONTRACTOR, received at least 10 days before the anticipated date of inspection.
- D. An area will be considered to be satisfactorily reclaimed when:
 - 1. Soil erosion resulting from the operation has been stabilized.
 - 2. A vegetative cover at least equal to that present prior to disturbance and a plant species composition at least as desirable as that present prior to disturbance has been established.
- E. The OWNER or ENGINEER will determine whether maintenance shall continue in any area or manner.
- F. After all necessary corrective work and clean-up has been completed, the OWNER will certify in writing the provisional acceptance. The CONTRACTOR's responsibility for maintenance shall cease on receipt of provisional acceptance.

3.6 GUARANTEE PERIOD AND FINAL ACCEPTANCE

- A. All seeded areas shall be guaranteed by the CONTRACTOR for not less than 1 full year from the time of final project acceptance.

- B. At the end of the guarantee period, inspection will be made by the OWNER or ENGINEER upon written request submitted by the CONTRACTOR at least 10 days before the anticipated date. Areas not demonstrating satisfactory reclamations as outlined above, as determined by the OWNER or ENGINEER, shall be renovated, reseeded, and maintained meeting all requirements as specified herein.
- C. After all necessary corrective work has been completed, the OWNER will provide final acceptance in writing.

END OF SECTION

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SECTION 03 03 00
CAST-IN-PLACE CONCRETE AND GROUT

PART 1 GENERAL

1.1 WORK INCLUDES

- A. The Contractor shall furnish all labor, tools, and equipment for the construction of plain and reinforced concrete as shown on the Contract Drawings and herein specified. The Contractor shall strictly adhere to ACI 301.
- B. Steel and fiber reinforcement for reinforced concrete are included in this section.

1.2 RELATED SECTIONS

- A. Section 31 23 23 – Fill and Backfill

1.3 SUBMITTALS

- A. Submit product data for admixtures, evaporative retardant films, curing compounds, form release agents, ready mix concrete designs, form ties, bonding agents, grouts, and coatings.
- B. Submit materials reports for cement and mill test reports for steel reinforcement for all structural concrete.
- C. QUALITY CONTROL

- 1. Contractor shall provide quality control for all concrete placements including air entrainment, temperature, slump and cylinders for compressive strength testing at 7 and 28 days. At least four cylinders shall be prepared for each pour for subsequent compressive strength testing.
- 2. Use adequately skilled workers in the placement of all concrete and verify dimensions and steel reinforcement placement.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cement
 - 1. Cement shall be air-entrained Portland Cement in accordance with ASTM C-175, Type II-A and ASTM C-260.

B. Aggregate

1. Fine Aggregate: Fine aggregate shall consist of hard, strong, durable particles to the provisions of the Standard Specifications for Concrete Aggregates, ASTM Designation C-33.
2. Coarse Aggregate: Coarse aggregate shall conform to the provisions of Standard Specifications for Concrete Aggregates, ASTM Designation C-33.

C. Water

1. Water shall be clean and free of injurious amounts of oils, acids, alkalis, salts, organic materials, or other substances that may be deleterious to concrete or steel. Mixing water for prestressed concrete or for concrete which will contain aluminum embedment, including that portion of the mixing water contributed in the form of free moisture on the aggregates, shall not contain deleterious amounts of chloride ion.
2. Unless otherwise permitted or specified, the concrete shall be proportioned and produced to have a slump of four (4) inches or less if consolidation is by vibration. The slump shall be determined by the "Standard Test Method for Slump of Hydraulic Cement Concrete" ASTM C-143.

D. Admixtures

1. Admixtures to be used in concrete shall be subject to prior acceptance by the ENGINEER or DISTRICT Representative. The admixture shall maintain the same composition and performance throughout the work as the product used in the concrete proportioned established in accordance with ACI 211. Admixtures containing chloride ions shall not be used in prestressed concrete or concrete containing aluminum embedments.
2. Air Entrainment: An air entrainment agent shall be used in all concrete. The agent used shall conform to ASTM Designation C-260. The amount of air entraining agent used in each concrete mix shall be such as will effect the entrainment of the percentage of air shown in the following tabulation in the concrete as discharged from the mixer at the point of placement.

Maximum Size of Coarse Aggregate (inches)	Total Air, Percent By Volume, of Concrete
3/8-inch	6.5 ± 1
3/4-inch	6.0 ± 1
1-1/2 inches	4.5 ± 1

3. Water Reducing, Set-Controlling Admixture: The Contractor shall use a water-reducing, set controlling concrete. A water-reducing admixture shall be used in

all concrete and shall conform to ASTM Designation C-494, specifically Types A, B, C, D, and E.

4. Finely Divided Mineral Admixtures: Mineral admixtures shall be limited to fly ash conforming to ASTM Specification C-618, Type F.

E. Batching

1. Measuring and batching of materials shall be done at a batching plant.
2. Portland Cement: Either sacked or bulk cement may be used. No fraction of a sack of cement shall be used in a batch of concrete unless the cement is weighed. Bulk cement shall be weighed on scales separate and distinct from the aggregate hopper or hoppers. Batching shall be such that the accuracy of batching shall be plus or minus one percent of the required weight.
3. Water: Unless water is to be weighed, the water-measuring equipment shall include an auxiliary tank from which the measuring tank shall be filled. In lieu of the volume method, the Contractor will be permitted to use a water metering device.
4. Aggregates: Aggregates shall be handled from stockpiles or other sources to the batching plant in such a manner as to secure a uniform grading of the material. Aggregates that have become segregated, or mixed with earth or foreign material, shall not be used. Batching shall be so conducted as to result in the weights of material required for each type aggregate within a tolerance of two percent (2%).

F. Transporting

1. Truck agitator shall be loaded not to exceed the manufacturer's guaranteed capacity. They shall maintain the mixed concrete in a thoroughly mixed and uniform mass during hauling.
2. No additional mixing water shall be incorporated into the concrete during hauling or after arrival at the delivery point, unless ordered by the DISTRICT representative. If additional water is to be incorporated into the concrete, the drum shall be revolved not less than 30 revolutions at mixing speed after the water is added and before discharge is commenced. The CONTRACTOR shall furnish a water measuring device in good working condition, mounted on each transit mix truck, for measuring the water added to the mix on the site by the DISTRICT.
3. Each load of ready mixed concrete delivered at the job site shall be accompanied by the ticket showing volume of concrete, the weight of cement in pounds and the total weight of all ingredients in pounds. The ticket shall also show the time of day at which the materials were batched and the reading of the revolution counter at the

time the truck mixer is charged. The ticket shall be delivered to the DISTRICT representative.

G. Compressive Strength

1. Structural Concrete: Structural concrete compressive strength requirements consist of a minimum strength which must be obtained before various loads or stresses are applied to the concrete and, for concrete designated by strength, a minimum strength at the age of 28 days. Concrete shall have a minimum compression strength of 4,000 psi at 28 days.
 - a. Sampling and curing shall be in accordance with ASTM C-192, and testing shall be in accordance with ASTM C-39. Slump shall be between 2" and 4" when placed.
2. Testing: Concrete testing shall be done by a qualified independent testing laboratory as approved by DISTRICT. Make 4 cylinders for each pour.

H. Grout or Dry Pack

1. Grout shall be composed of Portland Cement, sand, and water proportioned and mixed as specified in this section. Grout shall be furnished and placed via tremie pipe or grout tubes approved by the ENGINEER in anchor bores, recesses and holes, on surfaces, under structural members, and at other locations specified in these specifications.
2. The maximum size of sand shall not be larger than $\frac{1}{2}$ the size of the recess, holes or spaces where the grout is to be placed. The grout shall contain only enough water to permit placing and packing.
3. Concrete areas to be in contact with the grout shall be cleaned of all loose or foreign material that would in any way prevent bond between the grout and the concrete surfaces and shall be kept thoroughly moistened with water for a period of not less than 24 hours immediately prior to placing grout.
4. The grout shall completely fill and shall be tightly packed into recesses and holes, on surfaces, under structural members, and at other locations specified. After placing, all surfaces or grout shall be cured by methods provided in Part 3, 3.05 "Curing and Protection," for a period of not less than 3 days.
5. Keyways, spaces between structural members, holes, spaces under structural members, and other locations where grout could escape shall be grout-tight before placing grout. No load shall be allowed on grout that has been in place less than 72 hours unless otherwise permitted by the DISTRICT or its Representative.
6. All improperly cured or otherwise defective grout shall be removed and replaced by the Contractor at his expense.

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I. Reinforcement

1. Use new deformed steel reinforcement in accordance with ASTM D 615, Grade 60.

PART 3 EXECUTION**3.1 FORMS**

- A. The concrete forms shall be constructed to the lines and dimensions as shown on the detailed drawings and shall be of acceptable material and adequately braced and tied to support all of the loads and pressures of the wet concrete without distortion or leaks, and which will produce a smooth, even surface.
- B. The form facing material shall produce a smooth, hard, uniform texture on the concrete. It may be plywood, tempered concrete- form-grade hardboard, metal, plastic, paper, or other approved material capable of producing the desired finish. The arrangement of the facing material shall be orderly and symmetrical, with the number of seams kept to the practical minimum. It shall be supported by studs or other backing capable of preventing excessive deflection. Material with raised grain, torn surfaces, worn edges, patches, dents, or other defects which will impair the texture of the concrete shall not be used. Tie holes and defects shall be patched. All fins shall be completely removed.
- C. Drawings showing the general design and dimensions for forms for structures need not be submitted to the DISTRICT for acceptance unless the DISTRICT so requests such submittal. Design and construction shall be in accordance with "Recommended Practice for Concrete Formwork" (ACI 347), and "Formwork" (ACI 301, Chapter 4).
- D. Before concrete is placed, the surface of the forms shall be oiled with a commercial form oil that will effectively prevent sticking of the concrete to the forms and will not stain the concrete. All bond breaking materials or processes shall be used only after acceptance by the ENGINEER or DISTRICT Representative. Care shall be taken in applying form oil to avoid contact with reinforcement steel. Embedded material which becomes coated with form oil shall be thoroughly cleaned or replaced at the expense of the Contractor. Supporting forms and shores shall not be removed from beams, floors, and walls until these structural units are strong enough to support their own weight and any approved superimposed load which at no time shall exceed the design live load. When the forms are stripped, there shall be no excessive deflection or distortion and no evidence of damage to the concrete, due either to removal of support or the stripping operation. Removal time of forms shall be determined by the ENGINEER or DISTRICT Representative.

3.2 REINFORCEMENT INSTALLATION

- A. Install steel reinforcement as shown on the Drawings to a tolerance of plus or minus ¼ inch from the dimensions shown, secure and tie as necessary.
- B. Surface condition of reinforcement: Before placing concrete, clean reinforcement of loose rust and other substances which would impair bond with concrete. Remove rust by vigorous rubbing with burlap cloth or wire brushing.
- C. Splice reinforcing bars and welded wire fabric by lapping and securely wiring together. Splices at locations other than those indicated are subject to the concurrence of the ENGINEER and shall conform, if permitted, to the requirements of ACI 318. Do not use mechanical splices.

3.3 PLACEMENT

- A. Prior to pouring the concrete or grout, the Contractor shall remove all trash, pieces of wood, or other debris, and shall wet areas in which concrete or grout is to be poured prior to concrete or grout placement.
- B. Placement shall conform to ACI 301, Chapter 8 “Placing,” ACI 306 “Recommended Practice for Cold Weather Concreting,” and ACI 305 “Recommended Practice for Hot Weather Concreting.” No concrete shall be placed until all formwork, reinforcement, installation of parts to be embedded, bracing of forms, and preparation of surfaces involved in the placing have been approved by the DISTRICT/Representative. No concrete shall be placed in water, except with the written permission of the ENGINEER; the method of depositing the concrete shall be subject to his approval. All surfaces of forms and embedded materials that have become encrusted with dried grout or grout from concrete previously placed shall be cleaned of all such grout or grout before the surrounding or adjacent concrete is placed. Immediately before placing concrete, all surfaces upon or against which the concrete is to be placed shall be free from standing water, mud, debris, or loose materials. The surfaces of absorptive materials against or upon which concrete is placed shall be moistened thoroughly so that moisture will not be drawn from the freshly placed concrete. The concrete shall be placed by equipment which will prevent segregation or loss of ingredients. The stream of concrete shall not be allowed to separate by permitting it to fall freely over rods, spacers, or other embedded materials.
- C. Install grout for riprap where required with a tremie pipe or with a chute and vibrator such that all voids are filled in the lower 2/3 of the riprap thickness. Avoid grout splatter on the tops of riprap.
- D. Concrete shall be poured in continuous layers of approximately 12 inches and the total elapsed time between placing of successive layers shall not exceed 30 minutes.

E. All wood blocking, spreaders, and screens shall be removed as the concrete is poured and before the concrete sets.

F. Form oil shall be approved for potable water applications.

3.4 CONSTRUCTION JOINTS

A. There shall be no construction joints in the anchor blocks.

3.5 CURING AND PROTECTION

A. Beginning immediately after placement, concrete shall be protected from premature drying, excessively hot or cold temperatures, and mechanical injury, and shall be maintained with minimal moisture loss at a relatively constant temperature for the period necessary for hydration of the cement and hardening of the concrete. The materials and methods of curing shall be subject to acceptance by the DISTRICT's Representative.

B. For concrete surfaces not in contact with forms, one of the following procedures shall be applied immediately after completion of placement and finishing:

1. Ponding or continuous sprinkling.
2. Application of absorptive mats or fabric kept continuously wet.
3. Application of sand kept continuously wet.
4. Continuous application of steam (not exceeding 150° F or mist spray).
5. Application of waterproof sheet materials, conforming to "Specifications for Waterproof Sheet Materials for Curing Concrete" (ASTM C-171).
6. Application of other moisture retaining covering as accepted.
7. Application of a curing compound conforming to "Specifications for Liquid Membrane Forming Compounds for Curing Concrete" (ASTM C-309) and approved for potable water applications. The compound shall be applied in accordance with the recommendations of the manufacturer immediately after any water sheen which may develop after finishing has disappeared from the concrete surface. It shall not be used on any surface against which additional concrete or other material is to be bonded unless it is proven that the curing compound will not prevent bond, or unless positive measures are taken to remove it completely from areas to receive bonded applications.
8. Moisture loss from surfaces placed against wooden forms or metal forms exposed to heating by the sun shall be minimized by keeping the forms wet until they can

be safely removed. After form removal, the concrete shall be cured until the end of the curing time by one of the previously described curing methods.

9. Curing shall be continued for at least 7 days in the case of all concrete except high-early strength concrete for which the period shall be at least 3 days. Alternatively, if tests are made of cylinders kept adjacent to the structure and cured by the same methods, moisture retention measures may be terminated when the average compressive strength has reached 70% of the specified concrete strength.
- C. Cold Weather: When the mean daily outdoor temperature is less than 40° F, the temperature of the concrete shall be maintained between 50 and 70° for the required curing period. When necessary, arrangements for heating, covering, insulation, or housing the concrete work shall be made in advance of placement and shall be adequate to maintain the required temperature without injury due to concentration of heat. Combustion heaters shall not be used during the first 24 hours unless precautions are taken to prevent exposure of the concrete to exhaust gases which contain carbon dioxide.
- D. Hot Weather: When necessary, provision for windbreaks, shading, fog spraying, sprinkling, ponding, or wet covering with a light colored material shall be made in advance of placement, and such protective measures shall be taken as quickly as concrete hardening and finishing operations will allow.
- E. Rate of Temperature Change: Changes in temperature of the air immediately adjacent to the concrete during and immediately following the curing period shall be kept as uniform as possible and shall not exceed 5° F in any 1 hour or 50° F in any 24 hour period.
- F. Protection from Mechanical Injury: During the curing period, the concrete shall be protected from damaging mechanical disturbances, such as load stresses, heavy shock, and excessive vibration. All finished concrete surfaces shall be protected from damage by construction equipment, materials, or methods, by application of curing procedures, and by rain or running water. Self supporting structures shall not be loaded in such a way as to overstress the concrete.

3.6 REPAIR OF SURFACE DEFECTS

- A. Surface defects, including tie holes, unless otherwise specified by the Contract Documents, shall be repaired immediately after form removal.
- B. Repair of Defective Areas: All honeycombed and other defective concrete shall be removed down to sound concrete. If chipping is necessary, the edges shall be perpendicular to the surface or slightly undercut. No feather edges will be permitted. The area to be patched and an area at least 6" wide surrounding it shall be dampened to prevent absorption of water from the patching grout. A bonding grout shall be

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- prepared using a mix of approximately 1 part cement to 1 part fine sand passing a No. 30 mesh sieve, mixed to the consistency of thick cream, and then well brushed into the surface.
- C. The patching mixture shall be made of the same materials and of approximately the same proportions as used for the concrete, except that the coarse aggregate shall be omitted and the grout shall consist of not more than 1 part cement and 2-1/2 parts sand by loose volume. White Portland Cement shall be substituted for a part of the gray Portland Cement on exposed concrete in order to produce a color matching the color of the surrounding concrete, as determined by a trial patch. The quantity of mixing water shall be no more than necessary for handling and placing. The patching grout shall be mixed in advance and allowed to stand with frequent manipulation with a trowel, without addition of water, until it has reached the stiffest consistency that will permit placing.
 - D. After surface water has evaporated from the area to be patched, the bond coat shall be well brushed into the surface. When the bond coat begins to lose the water sheen, the premixed patching grout shall be applied. The grout shall be thoroughly consolidated into place and struck off so as to leave the patch slightly higher than the surrounding surface. To permit initial shrinkage, it shall be left undisturbed for at least 1 hour before being finally finished. The patched area shall be kept damp for 7 days. Metal tools shall not be used in finishing a patch in a formed wall which will be exposed.
 - E. Tie Holes: After being cleaned and thoroughly dampened, the tie holes shall be filled solid with patching grout.
 - F. Proprietary Materials: If permitted or required, proprietary compounds for adhesion or as patching ingredients may be used in lieu of or in addition to the foregoing patching procedures. Such compounds shall be used in accordance with the manufacturer's recommendations.

3.7 FINISHING OF FORMED SURFACES

- A. Immediately after removing the forms, the form ties shall be cut back 3/4" from the surface and patched with 1:2 cement-sand grout. All honeycombs, voids, and other defects shall be so patched. The surfaces shall then be thoroughly wetted and rubbed with a No. 16 Carborundum stone or equal abrasive brining the surface to a paste. The rubbing shall be continued sufficiently to remove all form marks and projections, producing a smooth, dense surface without pits or irregularities. After setting sufficiently, the surface shall then be rubbed with a No. 30 Carborundum stone until the entire surface is of a smooth texture and uniform in color. Only exposed surfaces in habitable areas need be rubbed. Surfaces to be waterproofed or hidden from view shall be patched, but not rubbed.

3.8 PATCHING

- A. The total patched area shall not exceed two square feet in each 1,000 square feet of surface. This is in addition to form tie patches.
- B. Any patches shall closely match the color and texture of surrounding surfaces. The mix formula for patching grout shall be determined by trial to obtain a good color match with the concrete when both patch and concrete are cured and dry. After initial set, surfaces and patches shall be dressed manually to obtain the same texture as surrounding surfaces.

END OF SECTION

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**SECTION 03 06 01
GROUT****PART 1 GENERAL****1.1 WORK INCLUDES**

A. The following grout types:

1. Lean grout

1.2 REFERENCES

A. The following is a list of standards that may be referenced in this section:

1. American Society for Testing and Materials (ASTM):
 - a. ASTM C 109 – Test Method for Compressive Strength of Hydraulic Cement Mortars (using 2-in or 50mm Cube Specimens)
 - b. ASTM C 579 – Test Methods for Compressive Strength of Chemical-Resistant Mortars and Monolithic Surfacing
 - c. ASTM C 1107 – Standard Specification for Packaged Dry, Hydraulic Cement Grout (Non-shrink)
 - d. ASTM C 939 – Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method)
 - e. ASTM C 827 – Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures
 - f. ASTM C 531 – Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, and Monolithic Surfacing
 - g. ASTM C 1181 – Test Method for Compressive Creep of Chemical-Resistant Polymer Machinery Grouts
2. American National Standards Institute (ANSI):
 - a. ANSI/ASTM D 1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
 - b. ANSI/ASTM D 1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

1.3 SUBMITTALS

A. Shop Drawings:

1. Product data of all grouts.

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B. Administrative:

1. Manufacturer's instructions.

C. Quality Control:

1. Manufacturer's Written Instructions:

- a. Cement-water ratio of grout topping.
- b. Mixing of grout.

2. Manufacturer's Certificate of Compliance:

- a. Grout free from chlorides and other corrosion-causing chemicals.
- b. Non-shrink grout properties verifying expansion at 3 or 14 days will not exceed the 28-day expansion and non-shrink properties are not based on gas or gypsum expansion.

PART 2 PRODUCTS**2.1 CEMENT**

- A. Cement for grout shall conform to the requirements of Section 03 33 00: CAST-IN-PLACE CONCRETE.

2.2 LEAN GROUT

- A. Minimum 28-day compressive strength of 7,000 psi, when mixed at a fluid consistency.
- B. Meet the requirements of ASTM C 1107, Grade C, when tested using the amount of water needed to achieve the following properties:
 1. Fluid consistency (20 to 30 seconds) per ASTM C 939.
 2. At temperatures of 45, 70, and 90°F.
 3. The grout when tested shall not bleed or segregate at maximum allowed water.
- C. Fluid grout shall pass through the flow cone, with a continuous flow, 1 hour after mixing.
- D. Grout shall be pretested per the specified grout test requirements.
- E. Masterflow 938 by Master Builders, or equal.

PART 3 EXECUTION**3.1 GENERAL**

- A. Grout shall not be placed until base concrete or masonry has attained its design strength, unless authorized by ENGINEER.
- B. When cementitious grouts are used on concrete surfaces, the concrete surface shall be saturated with water for 24 hours prior to placement. Upon completion of saturation period excess water shall be removed. Concrete substrate shall not be wet prior to placement of grouts.
- C. Except for cement-bentonite grout in piezometers, all surfaces that will be in contact with grout shall be free of grease, oil, dirt, loose rust, curing compounds, laitance, loose concrete, and other deleterious materials.

3.2 GROUTING PROCEDURES**A. General:**

- 1. All mixing, surface preparation, handling, placing, consolidation, curing, and other means of execution for prepackaged grouts shall be done according to the instructions and recommendations of the manufacturer.

3.3 CONSOLIDATION

- A. Grout shall be placed in such a manner, for the consistency necessary for each application, so as to assure that the space to be grouted is completely filled.

3.4 CURING

- A. Grout should be cured according to the manufacturer's recommendations.
- B. Temperature of the foundation plate, supporting concrete foundation, and the grout should be maintained between 40°F and 90°F during grouting, and for a minimum of 24 hours afterward. Machinery and baseplates will cool at low temperatures or heat up at hot temperatures or in the sun more rapidly than the grout and should be avoided during the curing period.
- C. Cement based grout should be protected from extreme drying conditions by covering all exposed grout surfaces with continually wetted burlap for a minimum of 3 days. Immediately after the moist curing period, two coats of a curing compound shall be applied.

END OF SECTION

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**SECTION 31 11 00
CLEARING AND GRUBBING**

PART 1 GENERAL

1.1 WORK INCLUDES

- A. Removal of all surface debris and vegetation from the limits of site disturbance shown on the drawings.
- B. The general work areas that require site clearing includes:
 - 1. CONTRACTOR staging and stockpile areas
 - 2. Borrow areas
 - 3. Footprint of Zone 1a, Zone 1b and pumped outlet road and pad.
- C. Dispose of cleared vegetation and debris.
- D. Protection of existing structures.

1.2 DEFINITIONS

- A. Site Clearing as defined herein shall mean the removal, hauling, and disposal of surface debris and vegetation from the limits of site disturbance shown on the drawings.

1.3 VERIFICATION

- A. The CONTRACTOR shall verify with the ENGINEER prior to initiating any clearing operations in that area. Unauthorized clearing will not be entitled for payment.

1.4 RELATED SECTIONS

- A. Section 01 41 26: Project Permits and Environmental Controls
- B. Section 01 50 00: Temporary Facilities and Controls
- C. Section 31 23 16: Excavation

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION**3.1 PROTECTION**

- A. The CONTRACTOR shall protect any features designated to remain as final landscaping. The CONTRACTOR shall remove only those trees and plant growth required to be removed, as determined by the ENGINEER. The CONTRACTOR shall be liable for damage to protected vegetation and other features which are damaged by clearing operations.
- B. The CONTRACTOR shall protect bench marks and survey monuments from damage or displacement. Any bench marks or survey monuments damaged during clearing by the CONTRACTOR will be repaired or replaced by the OWNER, and the costs will be back-charged to the CONTRACTOR.

3.2 CLEARING

- A. The CONTRACTOR shall remove all vegetation, deadwood, rocks larger than one foot in diameter, and other surface debris from the entire area within the limits of site disturbance shown on the drawings, except for those features designated to be protected.

3.3 GRUBBING

- A. Grubbing shall mean the removal of stumps, main root balls, and root systems so that no vegetative matter remains in the area below the embankment, appurtenant structures, or in the embankment fill materials.
- B. Tree trunks and stumps shall be removed by excavation, including removal of trunk, stump, rootball and all roots greater than ½ inch in diameter.
- C. Fill and compact the void from tree trunk and stump removal with similar soil and compaction as the adjacent soil.

3.4 REMOVAL AND DISPOSAL

- A. In accordance with Section 01 50 00: Temporary Facilities and Controls.

3.5 MAINTENANCE OF CLEARED AREAS

- A. The CONTRACTOR shall be responsible for maintaining cleared work areas in a condition free from additional vegetation growth for the duration of the project. Use of herbicides to discourage plant growth shall not be allowed. The CONTRACTOR shall be compensated for clearing each work area only once. If weed and brush growth require additional clearing, this shall be performed solely at the CONTRACTOR's expense.

END OF SECTION

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**SECTION 31 14 00
STRIPPING****PART 1 GENERAL****1.1 WORK INCLUDES**

- A. Removing grass, weeds, and topsoil within the limits of site disturbance, and at the CONTRACTOR staging and stockpile area.
- B. Removing muck in the reservoir area within the limits of site disturbance.
- C. Stockpiling topsoil to be replaced in the dam, staging and stockpile area, and for reclaiming disturbed areas.
- D. Disposing excess topsoil not needed for construction.
- E. Disposing muck.

1.2 PROTECTION

- A. Protect existing trees, shrubs, and other vegetation as shown on the drawings. Refer to Section 01 41 26: Project Permits and Environmental Controls.
- B. Protect existing benchmarks to remain, as shown on the Drawings. Refer to Section 31 23 16: Excavation.

1.3 RELATED SECTIONS

- A. Section 01 05 75: Project Permits and Environmental Controls
- B. Section 02 50 00: Site Reclamation
- C. Section 31 11 00: Clearing and Grubbing
- D. Section 31 23 16: Excavation
- E. Section 31 23 23: Fill and Backfill

1.4 DEFINITIONS

- A. Topsoil: Topsoil stripped from the site in the top 12 inches from the existing ground surface.
- B. Muck: Muck shall be soft and saturated material stripped from the existing ground surface within the reservoir area below the existing normal reservoir elevation

10944.0. Stripping below the top 12 inches may be required, as determined by the ENGINEER.

PART 2 PRODUCTS

2.1 TOPSOIL

A. Material as defined in subparagraph 1.4.A of this section.

2.2 MUCK

A. Material as defined in subparagraph 1.4.B of this Section.

PART 3 EXECUTION

3.1 STRIPPING AND STOCKPLING TOPSOIL

- A. Strip topsoil in the CONTRACTOR staging and stockpile area. Stripping depth may exceed 12 inches, as determined by the ENGINEER.
- B. Strip topsoil within the limit of site disturbance above the reservoir normal pool and in the downstream toe area of the dam.
- C. Stockpile topsoil at the staging and stockpile area. Stockpile height shall not exceed 8 feet. Protect stockpiled topsoil from wind and water erosion.
- D. Do not dispose any topsoil until reclamation of disturbed area is completed, and there is excess material.

3.2 STRIPPING MUCK

- A. Strip muck in the reservoir area.
- B. Muck shall be disposed of in the on-site disposal area, in accordance with Section 01 50 00: Temporary Facilities and Controls.

END OF SECTION

**SECTION 31 23 13
SUBGRADE PREPARATION**

PART 1 GENERAL

1.1 WORK INCLUDES

- A. Preparing the finished excavated surface for placement of overlying fill or structures.
- B. Protection of subgrade until placement of overlying fill, backfill, or structures.

1.2 DEFINITIONS

- A. Refer to applicable definitions of Section 31 23 16: EXCAVATION and Section 31 23 23: FILL AND BACKFILL.
- B. Prepared Foundation: Subgrade surface after completion of foundation preparation activities as specified prior to placement of overlying fill, backfill, or structure.
- C. Structure Foundation: Finished excavated surface, after subgrade preparation, upon which a structure will be placed. Approximate structure foundation elevations are shown on the Drawings; actual elevations will be determined by ENGINEER based on the material encountered.
- D. Subgrade: Ground surface after completion of required clearing, grubbing, stripping, and excavation prior to subgrade preparation, placement of overlying fill, or placement of a structure.
- E. Temporary Cover: Native material left in place over final foundation subgrade to protect subgrade from damage by wetting, drying, freezing, erosion, and physical disturbance by construction equipment traffic and personnel until the time of final subgrade excavation and preparation.

1.3 QUALITY CONTROL

- A. ENGINEER will conduct visual inspection of the excavated surface before placement of fill or concrete. Provide 72 hours notice to ENGINEER when final excavation is to be completed for a particular area so that ENGINEER can make arrangements for visual inspection.
- B. Notify ENGINEER immediately when excavation has reached the designated subgrade elevation.
- C. Notify ENGINEER immediately when soft, loose, or wet subgrade zones are detected.

1.4 SEQUENCING AND SCHEDULING

- A. Perform foundation preparation only when subgrade is unfrozen and free of ice, snow, and standing water.
- B. Perform foundation preparation only during daylight hours.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 GENERAL

- A. Shape excavation to produce a uniform and regular profile with no abrupt changes in slope, sharp projections, steps, overhangs, or benches except as shown on the Drawings or as approved by ENGINEER.
- B. Preserve the subgrade below and beyond the lines of excavation in the soundest possible condition. Repair any damage from CONTRACTOR's operations, including fracturing of material beyond the required excavation lines, as approved by ENGINEER.
- C. Keep subgrade free of ponded water and deleterious materials.
- D. Do not use sections of prepared foundation as haul roads. Protect prepared foundation from traffic.
- E. Maintain prepared foundation in finished condition until overlying fill, backfill, or structure is placed.
- F. Fill shall be placed on approved foundation within 24 hours of approval, or sooner as directed by ENGINEER.

3.2 PREPARED FOUNDATIONS ON SOIL

- A. Subgrade Compaction: Perform in accordance with requirements of Section 31 23 23: FILL AND BACKFILL.
- B. Correction for Soft or Loose Subgrade: Where subgrade cannot be compacted as specified, or in areas identified by ENGINEER that display yielding or excessive rutting during construction activities, adjust moisture content and recompact, or overexcavate as specified in Section 31 23 16: Excavation, and replace overexcavated material as specified in Section 31 23 23: Fill and Backfill.
- C. Remove exposed soil that is desiccated, frozen, or otherwise disturbed, to the satisfaction of ENGINEER, prior to placing overlying or adjacent fill, backfill or concrete.

3.3 PREPARED FOUNDATIONS ON BEDROCK

- A. The weathered bedrock shall be stripped to an approximate depth of 1 foot below the Zone 1a/Zone 1b contact with the bedrock, as directed by the ENGINEER. Care should be taken not to dislodge slabs of bedrock during the foundation stripping process that increase the stripping depth beyond the 1' limit.

The entire foundation shall be moisture-conditioned and rolled with a sheepsfoot compactor prior to the first lift of soil, as directed by the ENGINEER. A smooth drum roller shall not be used. If foundation preparation activities damage the bedrock, the ENGINEER may require modifications to the foundation preparation.

3.4 KEYWAY TRENCH

The Keyway Trench shall extend at least 3' below the foundation after the top 1' of weathered bedrock is removed. Ripping of the bedrock will likely be necessary. The ENGINEER may require deeper keyway excavation in areas where sandstone and/or excessive groundwater seepage is observed.

END OF SECTION

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**SECTION 31 23 16
EXCAVATION****PART 1 GENERAL****1.1 WORK INCLUDES**

- A. Excavation for removing the alluvial material within the reservoir footprint
- B. Excavation for constructing the grouted rip rap interconnect rundown channel.
- C. Other excavation incidental to the work as specified herein and shown on the drawings.
- D. Excavation necessary for all other parts of Work.
- E. Disposal of all excavated materials that are not suitable for construction.

1.2 DEFINITIONS

- A. Refer to applicable definitions in Section 31 23 13: SUBGRADE PREPARATION and 31 23 23: FILL AND BACKFILL.
- B. Import material
 - 1. Imported material that meets project specifications for Zone 1a import.
- C. Borrow and Stockpile Areas:
 - 1. Designated onsite areas that are sources of material for fill and backfill.
- D. Unsuitable Subgrade or Foundation Soils: Soils that display yielding, excessive rutting, excessive water content, or have desiccated; soft clays, loose sands, and open or narrowly graded gravels.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Import and Borrow Development Plan: Include the following information as a minimum:
 - a. Methods and sequencing of importation.
 - b. Methods and sequencing of excavation in the various excavation areas.
 - c. Numbers, types and sizes of equipment proposed to perform excavations, hauling, processing, and borrow and stockpile development.
 - d. Anticipated difficulties and proposed resolutions.

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- e. Conceptual plans and sections showing sloping or shoring of temporary slopes as necessary for construction.
- f. Proposed locations of stockpiled imported and/or excavated material.

B. Administrative:

- 1. Copy of any excavation permit(s) required by law.

C. Quality Control:

- 1. Survey notes, cross sections, and topographic maps of the original ground surface prior to stripping or excavation. Extend survey coverage at least 50 horizontal feet beyond the limits of excavation and fill. Additional surveys in accordance with the requirements of Section 31 23 13: SUBGRADE PREPARATION.

1.4 QUALITY CONTROL

- A. Provide adequate survey control to avoid unauthorized excavation.
- B. Engineer will conduct visual observations of the bottom of excavations below embankment or structures. Provide 48-hour notice to Engineer when final excavation for each Work area requiring excavation will be ready to observe.

1.5 EXCAVATION SAFETY

- A. CONTRACTOR is solely responsible for making all excavations in a safe manner. Provide appropriate measures (sloping, benching or other methods) to prevent slope instability, protect adjacent Work, and ensure the safety of all people on the work site.
- B. Install and maintain sloping, benching and other slope stabilization measures as required by Laws and Regulations.

1.6 WEATHER LIMITATIONS

- A. Material excavated when frozen or when air temperature is less than 32°F shall not be used as fill or backfill until CONTRACTOR can demonstrate that the material is completely thawed.
- B. Material excavated during inclement weather shall not be used as fill or backfill until after material is within the specified moisture content range for proper compaction.

1.7 SEQUENCING AND SCHEDULING

- A. Conform to applicable requirements of Section 31 23 19: Dewatering prior to initiating excavation and maintain work area in a dewatered state throughout the period of excavation so excavations are completed in the dry.

- B. Coordinate final foundation excavation with related Work in Section 31 23 13: SUBGRADE PREPARATION.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 GENERAL

- A. Complete all required excavations regardless of the type, nature, or condition of the materials encountered unless specifically directed otherwise in writing from ENGINEER.
- B. Excavate to lines, grades, and dimensions shown and as necessary to accomplish Work. Excavate to within tolerance of plus or minus 0.1 foot except where dimensions or grades are shown or specified as maximum or minimum. Allow for forms, working space, topsoil, slope protection, riprap and similar items where applicable. Trim to neat lines where concrete is to be deposited against earth.
- C. Do not excavate to beyond the lines and grades shown without written authorization of ENGINEER. Backfill over-excavated structure foundations with concrete. Backfill all other over-excavated areas with required overlying fill or backfill material. Notify ENGINEER of all over-excavations prior to placing any backfill.
- D. Perform all excavations in the dry. If moisture conditioning is required for planned fill materials, keep water application to the minimum necessary to prevent subgrade or foundation damage due to over watering.
- E. Selectively excavate, handle, haul, stockpile and process import and borrow materials as necessary to yield suitable types and sufficient quantities of the various fill and backfill materials required for construction of the Work.

3.2 FINAL EXCAVATION FOR STRUCTURE FOUNDATIONS

- A. Take all necessary precautions to preserve the material below and beyond the established lines of all excavation in the soundest possible condition. Repair damage to foundation material beyond the required excavation lines due to frost, wetting, drying, erosion, physical disturbance, ineffective dewatering, or CONTRACTOR's operations free of charge to the OWNER.

3.3 PERMANENT EXCAVATION SLOPES

- A. Shape, trim, and finish cut slopes to conform with lines, grades, and cross sections shown, with proper allowance for topsoil or slope protection.

- B. Remove stones and rock that exceed 3-inch diameter and that are loose and may roll down slope. Remove exposed roots from cut slopes. Notify ENGINEER of exposed roots greater than 1 inch in diameter in required excavations.
- C. Round tops of cut slopes in soil to not less than a 6-foot radius, provided such rounding does not extend offsite or outside easements and right-of-ways, or adversely impact existing facilities, adjacent property, or completed Work.

3.4 STOCKPILING EXCAVATED OR IMPORTED MATERIAL

- A. When necessary, stockpile excavated or imported material that is suitable for use as Zone 1a/
Zone 1b material separate from waste material until material is needed.
- B. Stockpile existing riprap on the upstream slope of the dam separately to be replaced after liner system construction.
- C. Confine stockpiles to within approved areas.
- D. Do not stockpile excavated or imported material adjacent to trenches and other excavations. Provide a minimum of 10 feet between the toe of stockpile slopes and the edge of excavations.
- E. Do not stockpile excavated or imported materials near or over existing facilities, adjacent property, or completed Work, if weight of stockpiled material could induce settlement.

3.5 OVEREXCAVATION OF UNSUITABLE FOUNDATION SOILS

- A. Remove unsuitable foundation materials. Excavate down to the top of suitable foundation material as determined by ENGINEER. Backfill the excavated area using materials and placement procedures for the materials that are to be placed above the excavated area in accordance with Section 31 23 23: FILL AND BACKFILL.

3.6 DISPOSAL OF UNSUITABLE AND EXCESS EXCAVATION OR IMPORTATION

- A. Dispose of unsuitable or excessive excavated materials onsite in designated waste areas or as approved by ENGINEER.
- B. Moisture content of excavated or imported materials alone shall not be reason for wasting material. Moisten or dry material to the specified moisture content and use in permanent construction as specified in Section 31 23 23: FILL AND BACKFILL.
- C. Remove from excavated or imported material and dispose of debris including organic matter, trash, and refuse as specified in Section 01 05 00: TEMPORARY FACILITIES AND CONTROLS.

END OF SECTION

31 23 16-5

**SECTION 31 23 19
DEWATERING****PART 1 GENERAL****1.1 WORK INCLUDES**

- A. Provide all materials and labor to install and maintain all dewatering sumps, including pumps, piping, sump pits and backfill, and other facilities for the control, collection, and disposal of groundwater for the proper construction of all contract work.
- B. Provide all materials and labor to install and maintain all temporary observation wells.
- C. Maintain the foundations and other parts of the work free from water as required for constructing each part of the work.
- D. Comply with all applicable environmental protection laws and requirements in operation of the dewatering system.
- E. Remove all components of dewatering system, if required, after dewatering is complete.

1.2 RELATED SECTIONS

- A. Section 01 05 75: Project Permits and Environmental Controls
- B. Section 31 23 16: Excavation
- C. Section 31 23 23: Fill and Backfill
- D. Section 31 25 13: Erosion Control

1.3 DATA AVAILABLE

- A. Subsurface conditions, including groundwater conditions, are contained in the Geotechnical Appendix of the Design Report. A copy of the Geotechnical Appendix is available to the CONTRACTOR upon request.
- B. The subsurface conditions from the test borings apply only to the locations of the borings and at the times of the explorations. The subsurface conditions elsewhere at the site and at the time of construction may be different.

1.4 SUBMITTALS

- A. The CONTRACTOR shall submit a dewatering plan to the ENGINEER for review and acceptance at least 7 calendar days prior to foundation excavation activity. The plan shall include details regarding the types of various dewatering facilities and design calculations, if necessary, required to substantiate the dewatering plan. If the CONTRACTOR purchases, rents, installs, or mobilizes to the site any elements of the dewatering system prior to the ENGINEER's acceptance of the submittal, he does so at his own risk, and will not be due any additional compensation from the OWNER if such elements are not subsequently used for the work.
- B. The CONTRACTOR shall submit the proposed locations of the temporary observations wells.
- C. Acceptance by the ENGINEER of the dewatering system proposed by the CONTRACTOR will only be with respect to the basic principles of the methods the CONTRACTOR intends to employ. Approval by the ENGINEER does not relieve the CONTRACTOR of the full responsibility for the adequacy of the dewatering system.

PART 2 PRODUCTS

PART 3 EXECUTION

3.1 GENERAL

- A. The CONTRACTOR shall review the available subsurface data for the project site. It shall be the CONTRACTOR's responsibility to evaluate the subsurface conditions at the project site with respect to required dewatering facilities, including any additional groundwater monitoring data obtained by the CONTRACTOR.
- B. The CONTRACTOR shall, at all times during construction, provide ample means and devices to remove promptly and dispose of properly all water entering excavations and keep the bottoms of the excavations firm and free of standing water until the structures to be built therein are completed and/or the backfill to be placed therein has been placed. The pumping and dewatering operations shall be carried out in such a manner that no disturbance to the bearing soil or to soil supporting any other work will result from the dewatering operations. Discharged water may be piped downstream after silt removal. The dewatering discharge shall not cause siltation or other negative environmental impact on natural waterways or other property; such discharge shall be in accordance with applicable federal, state, and local regulations. At dewatering discharge locations, hay-bale, silt barriers or other control measures, as approved by the ENGINEER, shall be installed to control and prevent siltation. Refer to Section 01 05 75: Project Permits and Environmental Controls; and Section 31 25 13: Erosion Control.

- C. The dewatering system shall be operated continuously as necessary to prevent flotation of partially completed structures or other work.

3.2 DEWATERING REQUIREMENTS

- A. Design, furnish, install, maintain, and operate a dewatering system which shall prevent loss of fines, boiling, quick conditions, or softening of foundation strata and maintain stability of bottoms of excavations so that every phase of the work can be performed in the dry. The dewatering operations shall be such that the bottoms of all excavations shall be kept at all times firm, and in all respects acceptable to the ENGINEER as good foundation.

3.3 INSTALLATION AND OPERATION

- A. The location of every element of the dewatering system shall be such that interference with excavation and construction activity is minimized. Locations shall be subject to approval by the ENGINEER.
- B. When the dewatering system does not meet the specified requirements, and as a consequence loosening or disturbance of the foundations strata, instability of the slopes or damage to the foundations or structures occur, the CONTRACTOR shall supply all materials, labor, and perform all work for restoration of foundations soil, fill soils, slopes, foundations, or structures, to the satisfaction of the ENGINEER, at no cost to the OWNER.

END OF SECTION

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**SECTION 31 23 23
FILL AND BACKFILL**

PART 1 GENERAL

1.1 WORK INCLUDES

- A. Importing, processing, and furnishing Zone 1a.
- B. Borrowing and placing Zone 1b.
- C. Furnishing and placing riprap.
- D. Furnishing and placing riprap bedding.
- E. Furnishing and placing road surfacing.

1.2 RELATED SECTIONS

- A. Section 01 03 30: Submittal
- B. Section 01 04 50: Quality Control
- C. Section 02 21 00: Surveys
- D. Section 02 50 00: Site Reclamation
- E. Section 31 23 13: Subgrade Preparation
- F. Section 31 23 16: Excavation
- G. Section 31 23 19: Dewatering

1.3 REFERENCES

- A. ASTM (American Society for Testing and Materials)
 - 1. ASTM D 422: Test Method for Particle-Size Analysis of Soils.
 - 2. ASTM D 4318: Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soil.
 - 3. ASTM D 854: Standard Test Method for Specific Gravity of Soils.
 - 4. ASTM D 1556: Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method.
 - 5. ASTM D 6938: Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (shallow depth).
 - 6. ASTM D 698: Standard Test Methods for Laboratory Compaction Characteristics of Soils Using Standard Effort.
 - 7. ASTM D 2216: Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.

8. ASTM D 2488: Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).
 9. ASTM D4253: Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
 10. ASTM D4254: Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
- B. Colorado State Department of Transportation, Standard Specifications for Road and Bridge Construction, 2011.

1.4 TESTS

- A. The CONTRACTOR shall perform tests of prepared earthwork materials in accordance with Section 01 40 00: QUALITY CONTROL AND QUALITY ASSURANCE.
- B. The ENGINEER will perform tests on stockpiled Zone 1a and Zone 1b material and in-place density and moisture contents in accordance with Section 01 40 00: QUALITY CONTROL AND QUALITY ASSURANCE.

1.5 SUBMITTALS

- A. The CONTRACTOR shall submit all earthwork test data as required in Section 01 40 00: QUALITY CONTROL AND QUALITY ASSURANCE.
- B. The CONTRACTOR shall submit an Import and Borrow Development Plan in accordance with Section 01 03 30: SUBMITTAL. The plan shall include the following information:
 1. Schedule of import activities.
 2. Schedule of on-site borrow activities.
 3. Locations of proposed stockpiles.
 4. Proposed method of processing import and borrow materials.
- C. The CONTRACTOR shall submit a processing plan for creating the Zone 1a material.

1.6 DEFINITIONS

- A. Optimum water content – that moisture content which will result in a maximum dry unit weight of the soil when subjected to the ASTM D 698 compaction test.

- B. Percent compaction – Percent compaction is defined as follows:

$$\text{Percent compaction} = \frac{(\gamma_d)_{IP}}{(\gamma_d)_{\max}} \times 100\%$$

where

$(\gamma_d)_{IP}$ = the in-place dry density of a particular soil

$(\gamma_d)_{\max}$ = the maximum dry density of that same soil, determined by compaction test according to ASTM D 698 procedures.

- C. Coverage – One coverage is defined as the requirement of successive trips of a piece of compaction equipment, which by means of sufficient overlap, will ensure a complete coverage of the entire surface of the layer by the equipment.
- D. Fines: Material passing the No. 200 sieve as determined in accordance with ASTM D422.
- E. Lift: Loose (uncompacted) layer of material.
- F. Completed Course: A course or layer that is ready for next layer or next phase of Work.
- G. Deleterious Materials: Organic matter, trash, rubbish, debris, oversize materials, and soluble materials.

PART 2 PRODUCTS

2.1 BENTONITE

- A. Bentonite used in preparing Zone 1a shall be pulverized (powdered) premium grade sodium cation montmorillonite and shall meet the most current API Standard 13.4. The bentonite shall be ground to have 100 percent passing the No. 200 sieve.

2.2 IMPORTED CLAY MATERIAL

- A. Clay material will be imported from the Morrow and Sons pit. Use imported material similar to what was submitted for approval in fall 2014 and that meets the specifications listed in the following table.

2.3 ZONE 1A

- A. Zone 1a shall be a mixture of imported clay, with a maximum particle size of 0.5" inches, processed with 2.5% powdered bentonite. Zone 1a shall be free of peat and other organic materials, debris, and trash.

- B. Excavated embankment and foundation soil materials that meet the requirements provided in the table below are acceptable as Zone 1a after processing with 2.5% powdered bentonite.
- C. Zone 1a fill shall be stockpiled, tested, and approved before it can be used in the embankment and slope fill.
- D. Moisture-conditioning of Zone 1a shall be performed in the stockpiles. Placed Zone 1a material not meeting moisture specifications may be re-worked in the fill.
- E. Take care not to contaminate Zone 1a with other fills and in-situ material.

2.4 ZONE 1B

- A. Processed borrow from the reservoir excavation consisting of well-graded gravelly sand, and well-graded sandy gravel, having a maximum particle size of 6 inches, and free of deleterious materials.
- B. Allowable USCS classifications: SP, SW, SM, GW, GP, GP-GC, GP-GM having a maximum of 20 percent fines.
- C. Blend adequately during placement such that the compacted material forms a uniform, homogeneous, very stiff or dense, compacted fill.
- D. Remove cobbles, boulders, and other particles larger than 6 inches.

Construction Zone	Unified Soils Class and Requirements	Minimum Placement Compaction Requirements	Testing Requirements	Minimum Testing Interval
Import Material ⁽¹⁾	Maximum particle size = 0.5" Liquid Limit Min = 35 Max = 50 30-90 % passing 200 sieve No more than 40% retained on No. 4 sieve USCS- CL	95% of ASTM D698	Density by nuclear gage, ASTM D2922 Gradation, -200 sieve, ASTM D8913 Atterberg limits, ASTM D424	Each 1,000 yds ³ Each 10,000 yds ³ Each 10,000 yds ³

⁽¹⁾ Before blending with 2.5% bentonite by weight

Construction Zone	Unified Soils Class and Requirements	Minimum Placement Compaction Requirements	Testing Requirements	Minimum Testing Interval
Zone 1A	Maximum particle size = 0.5" Liquid Limit Min = 35 Max = 50 30-90 % passing 200 sieve No more than 40% retained on No. 4 sieve USCS- CL Contain minimum 2.5% powdered bentonite by weight	95% of ASTM D698	Density by nuclear gage, ASTM D2922 Gradation, -200 sieve, ASTM D8913 Atterberg limits, ASTM D424	Each 1,000 yds ³ Each 10,000 yds ³ Each 10,000 yds ³

Construction Zone	Unified Soils Class and Requirements	Minimum Placement Compaction Requirements	Testing Requirements	Minimum Testing Interval
Zone 1B	SP, SW, SM, GW, GP, GP-GC, GP-GM ≥ 20% passing the No. 200 sieve Maximum particle size = 6"	95% of ASTM D698	Density by nuclear gage, ASTM D2922 -200 sieve, ASTM D1140 Atterberg limits, ASTM D424	Each 1,000 yds ³ Each 10,000 yds ³ Each 10,000 yds ³

2.5 TYPE M RIPRAP

- A. Unless otherwise noted, riprap shall be sound, angular and durable rock meeting the soundness and durability requirements of Colorado Standard Specifications for Road and Bridge Construction, 2011, Section 506: Riprap, and shall be graded as follows:

Typical Stones (inches)	Percent Smaller by Weight
21	70 – 100
18	50 – 70
12	35 – 50
4	2 – 10

- B. The specified riprap has an average size (d50) of 12 inches, and is locally known as Type M riprap.
- C. A maximum of 50 percent flat and elongated stones are allowed. The ratio of greatest dimension to the least dimension of each stone shall be a maximum of 3.

2.6 RIPRAP BEDDING

- A. Riprap bedding shall be free-draining, sound and durable cobbles and gravels or manufactured crushed rock meeting the soundness and durability requirements of Colorado State Department of Transportation, Standard Specifications for Road and Bridge Construction, 2011, Section 703.09, Filter Material, Class A, and shall conform to the following grading requirements:

U. S. Standard Sieve	Percent Passing by Weight
3 inch	90 - 100
3/4 inch	20 - 90
No. 4	0 - 20
No. 200	0 - 3

2.7 ROAD SURFACING

- A. Processed from the designated borrow areas, within the specified gradation limits, and free from deleterious substances.
- B. Free-draining, sound, durable, angular gravel meeting the requirements of CDOT Section 703.03 Class 1, and conforming to the following grading requirements:

U.S. Standard Sieve Size	Percent Passing by Weight
2½-inch	100
2-inch	95-100
No. 4	30-65
No. 200	3-15

2.8 TOPSOIL

- A. Topsoil shall be surface materials stripped and stockpiled in accordance with Section 31 14 00: STRIPPING.

PART 3 EXECUTION

3.1 GENERAL

- A. Prior to initiating any work covered by this section, the CONTRACTOR shall become thoroughly familiar with all site features, the site conditions, and all portions of the work in this section.
- B. Do not perform any earthwork as specified in this section in any specific work area until all clearing work have been completed in that area. Clearing shall be in accordance with Section 31 11 00: CLEARING AND GRUBBING.

3.2 FOUNDATION PREPARATION

- A. The CONTRACTOR shall not place materials until the foundation has been suitably prepared, dewatered, and approved by the ENGINEER.
- B. Do not prepare foundation when temperatures could result in frozen ground conditions.
- C. The foundation for Zone 1a and Zone 1b shall be moisture-conditioned and rolled with a sheepsfoot compactor as directed by the ENGINEER before placing the first lift of Zone 1a or Zone 1b fill.
- D. The foundation for riprap shall be thoroughly scarified to a depth of 8", moisture-conditioned and rolled with a sheepsfoot compactor as directed by the ENGINEER before placing the first lift of riprap.
- E. Where the natural foundation subgrade under embankment fill or stability berm fill is found to contain frozen or natural soft areas, as determined by the ENGINEER, frozen or soft materials shall be excavated and backfilled with embankment fill or stability berm fill.
- F. Where the natural foundation subgrade is loosened or disturbed by the CONTRACTOR, the CONTRACTOR shall proof-roll the loosened or disturbed subgrade at the direction of the ENGINEER at no additional cost to the OWNER.

3.3 SPECIAL COMPACTION

- A. Special compaction shall be required in the following locations:
 - 1. In tight, restricted, or steep areas not accessible by larger rollers.
 - 2. Within two (2) feet around new or protected existing concrete structures.
 - 3. Over pipes.
- B. Special compaction of embankment fill shall be in accordance with paragraph 3-5.A of this section.
- C. Specially compacted fills shall be compacted in maximum four inch loose lifts.
- D. Compaction equipment used in special compaction areas shall be small rollers, walk-behind roller, vibratory plate, or other small compactor as approved by the ENGINEER.

3.4 COMPACTION EQUIPMENT

- A. Compaction equipment for road surfacing shall consist of self-propelled vibratory rollers and vibratory plate compactors. Vibratory rollers shall be approved by the ENGINEER and shall have a minimum static weight of 1,800 pounds per foot of compaction drum length, a minimum dynamic force of 8,000 pounds per foot of compaction drum length, and an applied force of not less than 3,000 pounds per foot of compaction drum length.
- B. It is anticipated that vibratory plate compactors will be required for special compaction and in tight, restricted or steep areas not accessible by vibratory rollers. Vibratory plate compactors shall be approved by the ENGINEER and shall have a minimum static weight of 270 pounds and a minimum dynamic force of 1,000 pounds.
- C. Smooth rollers will not be allowed for the compaction of Zone 1a and Zone 1b fill. Compaction equipment for embankment fill shall be a sheepsfoot roller or tamping roller or approved equal. The weight of each roller shall not be less than 4,000 pounds per foot of drum length. Compaction equipment for Zone 1a and Zone 1b fill shall be approved by the ENGINEER.
- D. It is anticipated that smaller rollers may be required for special compaction and in tight, restricted, or steep areas not accessible by larger rollers. Smaller rollers shall be approved by the ENGINEER.
- E. Disking Equipment: Use disking equipment to break up, blend, or moisture condition materials as needed. Disc shall have a minimum of two gangs hooked together in tandem and shall be sized to penetrate a minimum fill lift of 8 inches. The disc shall be equipped with self-cleaning scrapers to prevent the accumulation of materials between and on the discs. Maintain serrations at all times in such condition as to provide efficient breaking and blending of the materials. In no case, however, shall the depth of the disc serrations be allowed to wear down to less than 50 percent of their depth when new, prior to being restored, and replaced. The disking equipment shall be such that adjustments can be made in the depth of penetration and the angle of cut from the towing vehicle without dismounting the vehicle.

3.5 MOISTURE/DENSITY REQUIREMENTS

- A. Zone 1a and Zone 1b fill shall be compacted in place to at least 95 percent of the maximum dry density and within minus one (1) percent and plus three (3) percent of the optimum water content, when tested in accordance with ASTM D698.
- B. Road surfacing shall be compacted with a minimum of four (4) coverages of an approved compactor. There are no moisture requirements for road surfacing.

- C. No moisture or density requirements will be required for drain gravel, riprap, riprap bedding, and topsoil.
- D. The ENGINEER will inform the CONTRACTOR when the placement moisture content and percent compaction do not meet the specifications, and the CONTRACTOR shall immediately make adjustments in procedures as necessary to obtain the specified results.
- E. Materials not meeting the specified moisture content and percent compaction shall be reworked until approved results are obtained. Reworking may include removal, rehandling, reconditioning, rerolling, or combinations of these procedures. The CONTRACTOR shall not be entitled to additional compensation above the prices bid in the schedule by reason of any work required to achieve the placement moisture content and percent compaction in these specifications.

3.6 PLACING ZONE 1A AND ZONE 1B

- A. Place Zone 1a and Zone 1b fill as shown on the drawings in layers with a maximum loose lift thickness of 8 inches before compaction, and in accordance with the moisture and density requirements in paragraph 3.5.A.
- B. Prior to placing Zone 1a and Zone 1b fill on or against the surfaces of previously placed earthfill materials, all previously placed materials which have become soft or loose, which contain erosion channels or cracks, or are excessively dry shall be reworked by removing, replacing, or recompacting as directed by the ENGINEER. No separate payment will be made for placing, reworking, removing, replacing, or recompacting previously placed soft or loose Zone 1a and Zone 1b material.
- C. Distribute the Zone 1a and Zone 1b fill such that it is free from lenses, pockets, streaks, lumps, or layers of material differing substantially in texture, gradation, or moisture content from the surrounding material so as to form as homogeneous layer of material as practical. The ENGINEER reserves the right to designate the locations for placement of each load of material in the Zone 1a and Zone 1b fill.
- D. In any separate portion of the areas where Zone 1a and Zone 1b fill is being placed, construct each layer continuously and approximately horizontal for the width and length of such portion at the elevation of the layer. Incline each layer slightly from the horizontal to provide drainage of surface water.
- E. Do not place Zone 1a and Zone 1b fill when the fill or the foundation on which it would be placed is frozen. Stop fill placement temporarily during unsuitable weather conditions, as directed by the ENGINEER.
- F. The CONTRACTOR shall be permitted to construct separate sections of the Keyway Trench and Zone 1a and Zone 1b, subject to the approval of the

ENGINEER. Construction of the Keyway Trench and embankment shall be subject to the following conditions:

1. Longitudinal bonding surfaces (surfaces parallel to the centerline crest of embankment) between previously constructed Zone 1a and Zone 1b and Zone 1a and Zone 1b to be constructed shall not be steeper than 2:1 horizontal to vertical. Longitudinal bonding surfaces between cuts in the existing native ground shall be clear of erosional rills and good bonding surface prepared such that compaction equipment can effectively compact placed material with an overlap of at least one-half the thickness of the loose lift being placed.
2. At any cross-section, the difference in elevation between adjacent zones of the Zone 1a and Zone 1b shall not be greater than 3.0'.
3. Transverse bonding surfaces (surfaces perpendicular to the centerline crest of Zone 1a and Zone 1b) shall not be steeper than 4:1 horizontal to vertical.
4. During construction of new earthfill, the CONTRACTOR shall adequately prepare the surface of previously constructed Zone 1a and Zone 1b, original embankment and transverse slopes by benching and/or scarifying in a manner acceptable to the ENGINEER to satisfactorily bond the new fill to the existing fill.

3.7 PLACING RIPRAP AND RIPRAP BEDDING

- A. Place riprap and riprap bedding at the locations, thicknesses, lines, and grades shown on the drawings.
- B. Compaction of riprap bedding will not be required; however, riprap bedding shall be spread in such a manner as to form a smooth, uniform layer under the riprap.
- C. Compaction of riprap will not be required. Riprap shall be placed with smaller rock fragments used to fill in the voids between larger rock fragments in such a manner as to form a smooth, uniform, well graded layer of riprap that is stable and not susceptible to sliding. Riprap shall also be placed to form smooth transitions to embankment slopes, channel slopes, and channel side slopes. No distinct horizontal, vertical or angular joints, will be allowed in the riprap that would reduce interlocking capability of the riprap.
- D. Grouting of riprap shall conform to Section 03 30 00: CAST IN-PLACE CONCRETE.

3.8 BACKFILL FOR STRUCTURES

- A. Backfill materials under structures and against structural walls shall include riprap bedding, Zone 1a and Zone 1b fill, as shown on the Drawings.

- B. Special compaction for backfill against structures is required as shown on the Drawings. Refer to paragraph 3.3 of this section. Heavy equipment shall not be allowed in the special compaction zone.
- C. Backfill against structures with uniform fill on both sides shall be placed in a uniform manner such that no unbalanced loading will occur against the structures.
- D. No backfill shall be placed against structures until all forms have been removed and the placement of backfill against the structures has been approved by the ENGINEER.

3.9 PLACING BACKFILL FOR OVEREXCAVATION

- A. Authorized overexcavation shall be backfilled with embankment fill in accordance with the requirements in this section.

3.10 TOLERANCES

- A. All earthwork except riprap shall be finished to within an allowable tolerance of plus or minus 0.10 foot from the grades shown on the drawings.
- B. Construct the riprap within a tolerance of 3 inches above and 1 inch below the neat lines shown on the Drawing.

END OF SECTION

**SECTION 31 25 13
EROSION CONTROL**

PART 1 GENERAL

1.1 WORK INCLUDES

- A. Construct, maintain, and remove temporary drainage facilities as necessary to control surface water runoff, groundwater seepage, dewatering system discharges, and stream flows at the construction site so that water from these sources does not disturb the constructed facilities or cause erosion of the existing topography.
- B. Furnish all materials and labor to construct silt fences, to place hay bales, and to construct other sediment control methods required for prevention of water pollution.
- C. Maintain and remove silt fences, hay bales, and sediment controls.

1.2 RELATED SECTIONS

- A. Section 01 03 30: Submittal
- B. Section 01 05 75: Project Permits and Environmental Controls
- C. Section 31 23 16: Excavation
- D. Section 31 23 19: Dewatering
- E. Section 31 23 23: Fill and Backfill

1.3 SUBMITTALS

- A. At least 7 calendar days prior to beginning of any site clearing, stripping, excavation, stockpiling, or earthwork, submit a plan to the ENGINEER for review, comment, and acceptance, showing the CONTRACTOR's methods for control of surface water runoff. The plan shall also address sediment and erosion control as required by Federal, state, and local laws regarding prevention of water pollution.
- B. In the plan, address as a minimum, the following issues:
 - 1. Sequence of construction of temporary drainage facilities relative to other construction activities.
 - 2. Provisions for limiting sedimentation or other water quality effects downstream.
 - 3. Sequence for removal of temporary drainage facilities.

PART 2 PRODUCTS**2.1 SILT FENCES**

- A. Silt fences for sediment control shall consist of fabric and posts suitable for sedimentation control application. Silt fence fabric shall be UV (ultra-violet) protected. Silt fence shall be toed-in by at least two feet to prevent silt-laden runoff water from running beneath the fence and over the ground surface. Submit product data and method of fence construction for review and approval.

2.2 HAY BALES

- A. Hay bales shall consist of hay or straw stacked and staked in place. Wire shall be tied to stakes to provide additional stability. Provide method of hay bale installation for review and approval.

PART 3 EXECUTION**3.1 SEDIMENT AND EROSION CONTROL**

- A. Install sediment and erosion controls prior to work involving site clearing and excavation.
- B. Maintain and repair sediment and erosion controls during course of construction, as required.

3.2 REMOVAL OF TEMPORARY FACILITIES

- A. Do not remove silt fences, hay bales or sediment ponds without written approval from the ENGINEER.
- B. Silt fence and hay bales will be the property of the CONTRACTOR, and shall be removed offsite after all work is complete.
- C. Remove and dispose the sediments collected in the sediment control systems in onsite disposal area.

END OF SECTION

Reservoir No. 2 Enlarging and Lining Project

Construction File No.: C-1903A

Water Division 5, Water District 51

Dam ID Number: 510210

Grand County, Colorado

Approved on this ____ day of _____, 2015

State Engineer

By: _____

William T. McCormick III
CO P.E. 29127, Chief – Dam Safety Branch

By: _____

Date: April 3, 2015

Engineer: Chad Masching
GEI Consultants, Inc.
4601 DTC Boulevard, Suite 900
Denver, Colorado 80237

SPECIFICATION INDEX

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**SECTION 00 01 00
NOTICE TO BIDDERS**

Pursuant to the "Notice of Pre-Qualification of Bidders" published in the Middle Park Times on September 6, 2014, sealed Proposals in single endorsed, "Grand County Water and Sanitation District No. 1 Reservoir No. 2 Enlarging and Lining Project", will be received by the District offices until 11:00 AM local time on October 8, 2014, at which time and place, bids will be publicly opened and read aloud in the presence of bidders or their duly authorized representatives. The contract documents will be available on or after September 6, 2014 and a mandatory pre-bid meeting will be held at 5:00 PM September 16, at the District office followed by a site visit.

Only general contractors who have satisfactorily fulfilled the **minimum** requirements of a Contractor's Pre-Qualification Form to the satisfaction of the District by September 16, 2014, and **attended the mandatory pre-bid meeting**, will be allowed to bid on the proposed project. All determinations made by the ENGINEER and District regarding pre-qualification are final and not appealable. All sub-contractors performing tasks below will also be pre-qualified, and will be required to submit pre-qualification forms at the pre-bid meeting. While sub-contractors will not be required to attend the pre-bid meeting, attendance is encouraged.

Drawings, specifications, and forms for preparing bids may be obtained at no charge via email in PDF format from GEI Consultants, Inc., contact Jeremy Deuto at 303-264-1018(o) or 303-775-2063(c) on or after September 6, 2014. A non-refundable deposit of Thirty Dollars (\$30.00) will be required for each set provided at the mandatory at the pre-bid meeting.

Checks shall be made payable to GEI Consultants, Inc.

All bids must be accompanied by a certified check payable to the Grand County Water and Sanitation District No. 1 in an amount of at least five percent (5%) of the Bid, drawn on a bank which is a member of the Federal Reserve System or a Bidder's Bond in like amount. The check or bond will be retained by the District as liquidated damages if the successful bidder refuses or fails to timely enter into a Contract and provide a Performance, Payment and Maintenance Bond in accordance with his bid when notified of the award.

The extent of the work is approximately as follows:

1. Excavate materials within the reservoir footprint to the lines and grades shown.
2. Process required volume of imported materials to U.S. 0.5" or smaller, blend with 2.5% bentonite, place and compact as shown on the Construction Drawings.
3. Place blended material to the lines and grades shown and haul remaining material off-site to the Grand County Benson Pit.
4. Furnish and install HDPE piping as shown on the Construction Drawings.
5. Furnish all site work, temporary facilities, miscellaneous labor, materials, and equipment to provide a complete project as shown on the Drawings and Specifications.

Bids may not be withdrawn for a period of forty-five (45) days after the time fixed for opening them. The District reserves the right to waive irregularities, to waive technical defects accordingly as the

00 01 00-1

best interest of the District may be served, may reject any and all bids and shall award the contract to the lowest pre-qualified and **responsible** bidder as determined by the District.

If the bid exceeds the District's budget and the District cannot successfully negotiate a modified contract price with the lowest responsible bidder, the District reserves the right to negotiate with other bidders.

BY ORDER OF THE GRAND COUNTY WATER AND SANITATION DISTRICT NO. 1

PO Box 3077, 50 Vasquez Street, Winter Park, CO 80482

Phone: 970-726-5583, Fax: 970-726-5636

END OF SECTION

**SECTION 00 02 00
INSTRUCTIONS TO BIDDERS**

1.1 CONTRACT DOCUMENTS

A. Attached hereto and bound herein and all made a part and parcel hereof and herein referred to as the “Contract Documents” and/or “Contract” are copies of:

1. Notice to Bidders	8. Notice to Proceed
2. Instructions to Bidders	9. Proposal and Bid Schedule
3. Bid Bond	10. Drawings
4. Performance, Payment and Maintenance Bond	11. General Conditions and Special Conditions
5. Contract	12. Technical Specifications
6. Certificate of Incorporation	13. Addenda
7. Notice of Award	14. Certificate of Insurance (to be provided by CONTRACTOR)

B. Each bidder shall thoroughly examine and be familiar with the Contract Documents. Submission of the Bid shall constitute acknowledgment upon which the District may rely that the bidder has thoroughly examined and is familiar with the Contract Documents. Failure or neglect of a bidder to examine any of the Contract Documents shall in no way relieve him from any obligation with respect to the Bid or to the Contract Documents. No claim for additional compensation will be allowed which is based upon a lack of knowledge of the work.

C. Any discrepancies within or between any of the Contract Documents shall be brought to the immediate attention of the ENGINEER for resolution.

1.2 DEFINITIONS

- A. OWNER (District) – The Grand County Water and Sanitation District No. 1, as represented by one of its Officers or other duly authorized representatives, entering into the Contract to have the work covered by these specifications done in accordance therewith.
- B. BIDDER – Each or any of the Persons, partnerships, Associations or Corporations making proposals for the performance of the work covered by these specifications.
- C. CONTRACTOR – The Person, Firm, Association or Corporation entering into the Contract for the performance of the work covered in these specifications.
- D. ENGINEER – GEI Consultants, Inc. (GEI), and their contracted sub-consultants for this project.

E. ENGINEER's AGENT – Employees or subcontractors of GEI providing service relative to the Contract.

F. Other items are defined in the General Conditions and Contract Specifications.

1.3 PROPOSALS

A. Bids shall be made upon the unit price and/or lump sum item form therefore furnished herein with all items properly filled out. Numerals shall be written in ink and the signature of all persons signing shall be in longhand. Amounts stated in words shall have control over figures. The complete proposal shall be without inter-lineation, alteration or erasure.

B. No modification or alternate proposals shall be considered, except as specifically called for in the proposal or provided elsewhere herein.

C. No oral or emailed or facsimile transmitted proposals or modifications shall be considered.

D. A certified check or bid bond, as described in the Notice to Bidders, must accompany each bid.

1.4 WITHDRAWAL, AWARD OR REJECTION OF BIDS

Bids may be withdrawn by the bidder prior to, but not after, the hour set for the opening of the bids. The Contract will be awarded to the lowest responsible bidder complying with the conditions of the "Notice to Bidders" and this "Instructions to Bidders," provided the bid is reasonable and it is to the best interest of the OWNER to accept it. The bidder to whom the award is made will be notified in writing at the earliest possible date. The OWNER, however, reserves the right to reject any and all bids and to waive any informality in bids received whenever such rejection or waiver is to the interest of the OWNER. An unbalanced proposal also may be grounds for rejection; that is, each item of work in the schedule should also carry its own proportion of the cost. The OWNER also reserves the right to reject the bid of a bidder who has previously failed to perform properly or complete on time, any contracts of a similar nature or the bid of a bidder who is not in a position to perform the contract, or actively prosecute the work to completion. The OWNER expressly reserves the right to determine whether or not a bidder is a "qualified bidder and a responsible bidder" under the terms of this paragraph and the decision of the OWNER concerning the same shall be final and conclusive.

1.5 INTERPRETATIONS

Each request for interpretation of any of the Contract Documents shall be made in writing and addressed to the ENGINEER. Each person making the request shall be fully responsible for its delivery to the ENGINEER. If the point in question is not clearly and fully set forth, a written bulletin of instructions of Addendum will be mailed or delivered to each person obtaining a set of forms for preparing bids as provided in the proposal. Oral instructions, interpretations, or representations shall not be binding upon the OWNER.

1.6 SUBSTITUTIONS FOR PATENTED AND SPECIFIED ARTICLES

Any patented or specific article or process mentioned by name in the drawings or specifications are for the purpose of facilitating descriptions and shall be deemed to be followed by the words "or approved equivalent". Any substitute article or process offered by the CONTRACTOR may be used when authorized in writing by the ENGINEER if, in the opinion of the ENGINEER, it is equivalent to the patented or specific article; however, if it is not equivalent, the CONTRACTOR must furnish the article or process specified or one that, in the opinion of the ENGINEER, it is equivalent thereto. The bidder shall list the type, manufacturer and other pertinent information on the specific articles he proposes to incorporate into the work if other than as specified in the specifications and on which his proposal is based. When the successful bidder fails to furnish said list, award will be made on the basis of furnishing the articles called for in the specifications.

1.7 LAWS

- A. Bidders shall familiarize themselves with the provisions of the laws and/or requirements of the Town, County, State and Federal Jurisdictions in which the work is performed pertaining to the character of the work to be undertaken and shall comply therewith.
- B. It is the Bidder's responsibility to familiarize themselves and comply with the latest OSHA rules and regulations applicable to this projects(s). Said rules and regulations can be found in the Federal Register, Vol. 54., No. 209, Part II Department of Labor, 29CFR Part 1926 Occupational Safety and Health Standards - Excavation: Final Rule. Other OSHA rules may apply. Failure to list OSHA rules and regulations in these specifications does not waive the CONTRACTOR's responsibility for compliance with said rules.

1.8 BIDDERS INTEREST IN MORE THAN ONE BID

If more than one bid be offered by any party, by or in the name of his or their clerk, partner, or any other person, all such bidders shall be rejected. This shall not prevent a bidder from submitting alternative bids when called for, nor from quoting different prices

on different qualities of material or different conditions of delivery. A party who has quoted prices on materials to a bidder is not thereby disqualified from quoting prices to other bidders or from submitting a bid directly for the materials or work, as a subcontractor.

1.9 AWARD OF CONTRACT

All Checks or Bidders' Bonds shall be held until award of the Unit Price and/or Lump Sum Item Contract or after a lapse of forty-five (45) days from the opening of bids. The Unit Price and/or Lump Sum Item Contract will be awarded within forty-five (45) days after the opening of bids unless all bids are rejected or a longer period of time is stated in the Notice to Bidders. The successful bidder shall be required to execute the Contract and Performance, Payment and Maintenance Bond and furnish the required Certificates of Insurance within ten (10) days of date of the Notice of Award to him. Said Certificates of Insurance shall name as additional insureds the ENGINEER and its subcontractors, OWNER, Town, or other jurisdiction in which the work is performed, and any other party deemed necessary by the OWNER. The check or bidders' bond shall be returned upon completion of the Performance, Payment and Maintenance Bond.

1.10 INSPECTION OF SITE

The site of the work is within the boundaries of the Town of Fraser. Bidders must attend the pre-bid meeting on September 16, 2014 at 5:00 PM at the District office with a site visit to follow. This project must be contained within the limits of the allowable construction area as shown on the Drawings. Specific site conditions and constraints will be discussed and reviewed during the required walk through meeting.

BIDDER'S REPRESENTATION

By the act of submitting a bid for the proposed contract, the Bidder represents that:

1. The Bidder and all subcontractors the Bidder intends to use have carefully and thoroughly reviewed the drawings, specifications and other construction contract documents and have found them complete and free from ambiguities and sufficient for the purpose intended; further that,
2. The Bidder and all workmen, employees and subcontractors the Bidder intends to use are skilled and experienced in the type of construction represented by the construction contract documents bid upon; further that,
3. Neither the Bidder nor any of the Bidder's employees, agents, intended suppliers or subcontractors have relied upon any verbal representations, allegedly authorized or unauthorized from the OWNER, or the OWNER's employees or agents including architects, engineers or consultants, in assembling the bid figure; and further that,
4. The Unit Price and/or Lump Sum Item bid figure is based solely upon the construction contract documents and properly issued written addenda and not upon any other written representation.

_____ (CONTRACTOR) has read and understands the Instruction to Bidders, has visited and is familiar with the site and its conditions, and has reviewed the drawings and specifications to his level of comfort for preparing his bid for this project.

By: _____

Title: _____

Date: _____

END OF SECTION

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SECTION 00 04 00
PROPOSAL AND BID SCHEDULE
Grand County Water and Sanitation District No. 1
RESERVOIR NO. 2 ENLARGING AND LINING PROJECT

The undersigned hereby proposes and agrees to enter into and perform the Contract attached hereto, of which this Unit Price and/or lump Sum Item Proposal forms a part, and shall do the construction therein described, on the terms and conditions therein described and set forth, and furnish all labor, equipment, materials, tools, transportation, services, and incidentals to complete said construction in strict conformity with the Drawings, the Specifications, and all the Contract Documents including any Addenda to any part thereof, which the undersigned proposes to execute only the quantity required to complete the project at the lump sum/unit price set opposite each item.

The undersigned has examined the location of the proposed work and is familiar with the Drawings, Specifications, and all Contract Documents related thereto, and the local conditions including surface and sub-surface conditions at the project site and has included in this bid a sum to cover the cost of all items necessary to complete the Contract. The making of a bid creates a conclusive presumption that all things and actions required by this Proposal have been done by the CONTRACTOR and constitutes a declaration by the CONTRACTOR to that effect. The undersigned certifies further that the Bidder has the technical ability and experience to perform the Work at the total price set forth in this Proposal.

The undersigned has checked carefully all submitted figures and understands that the OWNER will not be responsible for any errors or omissions on the part of the undersigned in making his bid, or in his failing to obtain, before bid, a proper interpretation from the ENGINEER of any inconsistencies or ambiguities in any of the Contract Documents. The undersigned also acknowledges that this Proposal and its items and quantities therein are approximate and based on the current information available; and, therefore, may not reflect the final quantities and/or items used to complete the Work.

Enclosed, find a certified check, drawn on a bank which is a member of the Federal Reserve System, in the sum of _____ (\$_____), made payable to the OWNER, or a Bidders Bond of like amount, and executed by an approved surety company. Said check or bond is given as a guarantee that the bidder will enter into the Contract and Performance, Payment and Maintenance Bond on the forms attached hereto, if awarded the Work, and the amount thereof represents the agreed liquidated damages that the OWNER will sustain if the Bidder fails or refuses, for a period of ten days after the Notice of Award, to enter into said Contract, in which event said check or bond shall be immediately paid to and retained by the OWNER as payment of said liquidated damages and not as a penalty.

Unless otherwise required by law, or a longer period of time is stated in the Notice to Bidders, the undersigned agrees that the OWNER has the right to hold all bids received for a period of forty-five (45) days after date of opening thereof.

00 04 00-1

The following addenda have been received, signed, and are hereto attached:

GRAND COUNTY WATER AND SANITATION DISTRICT NO. 1
BID SCHEDULE: RESERVOIR NO. 2 ENLARGING AND LINING PROJECT

Table 1
Bid Schedule
Grand County Water and Sanitation District No. 1
Reservoir 2 Improvements

	Item	Quantity	Unit	Unit Price	Extension
	Reservoir Rehabilitation				
1	Shaping Existing Reservoir Slopes to 3:1(H:V)	1	LS	\$	\$
2	Excavation	33,000	CY	\$	\$
3	Keyway Excavation	2,000	LF	\$	\$
4	Foundation Preparation	2,500	CY	\$	\$
5	Zone 1a	18,700	CY	\$	\$
6	Zone 1b	28,700	CY	\$	\$
7	Riprap Rundown Channel	100	CY	\$	\$
8	Riprap Spillway Protection	15	CY	\$	\$
	Reservoir Deepening				
9	Excavation	43,000	CY	\$	\$
10	Offsite Haul/Disposal	43,000	CY	\$	\$
11	Mobilization/Demobilization	1	LS	\$	\$
12	Dewatering	1	LS	\$	\$

LS=Lump Sum
CY=Cubic Yards
LF=Linear Feet
EA=Each

**GRAND COUNTY WATER AND SANITATION DISTRICT NO. 1
RESERVOIR NO. 2 ENLARGING AND LINING PROJECT
TOTAL BID (sum of items 1 through 12)**

\$ _____

Bidder acknowledges that quantities are not guaranteed and final payment will be based on the actual quantities determined, as provided for in the Contract Documents.

The undersigned hereby proposes and agrees to complete all the work described in the above Bid, complete in place and ready for operation by the substantial completion date to be determined upon issuance of Notice to Proceed.

CONTRACTOR _____
BY _____

DATE _____

If Bidder is:

An Individual

By _____ (SEAL)
(Individual's name)

(Signature)

Telephone number: _____

A Partnership

By _____ (SEAL)
(Partnership name)

By _____ / _____
(Name/Title of partner)

(Signature of partner)

Telephone number: _____

A Corporation

By _____ (SEAL)
(Corporate name)

By _____
(Name/Title of authorized officer)

(Signature of authorized officer)

Telephone number: _____

END OF SECTION

00 04 00-4

**SECTION 00 04 30
BID BOND**

KNOW ALL MEN BY THESE PRESENTS, THAT _____,
as CONTRACTOR, and _____, as Surety, are held and firmly bound
unto the _____, (hereinafter called 'OWNER') in the penal sum of
_____ Dollars(\$_____) lawful money of the
United States, for payment of which sum, well and truly to be made, we bind ourselves, our heirs,
executors, administrators, successors, and assigns, jointly and severally by these presents.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH THAT whereas the
CONTRACTOR has submitted the accompanying bid, dated _____

WHEREAS, the OWNER has required the CONTRACTOR to furnish either a Certified Check,
equivalent to not less than five percent (5%) of the amount of said bid or a Bid Bond in the like
amount, conditioned that in event of failure to execute the proposed Contract and the Performance,
Payment and Maintenance Bond within the time specified if the Contract is awarded to him that said
sum to be paid immediately to the OWNER as liquidated damages and not as a penalty for the
CONTRACTOR's failure to perform.

NOW, THEREFORE, if the CONTRACTOR shall, within the time period specified therein,
and on the attached prescribed forms presented to him for signature, enter into a written Contract
with the OWNER, in accordance with his bid as accepted, and shall provide a Certificate of
Insurance and a Performance, Payment and Maintenance Bond with good and sufficient surety, or
sureties, as may be required upon the forms prescribed by the OWNER for the faithful performance
and the proper fulfillment of said Contract, or in the event of the withdrawal of said bid within the
time specified, or upon the payment of the OWNER of the sum determined upon herein as liquidated
damages, and not as a penalty in the event of the failure of the CONTRACTOR to enter into said
Contract and shall provide a Certificate of Insurance, and a Performance, Payment and Maintenance
Bond within the time specified, then this obligation shall be void and of no effect, otherwise to
remain in full force and effect.

IN WITNESS WHEREOF, the above bounden parties have executed this instrument under
their several seals this _____ day of _____, 20____, the name and corporate seal of
each corporate party being affixed hereto and these presents duly signed by its undersigned
representatives pursuant to the authority of its governing board.

CONTRACTOR

ADDRESS

BY: _____

ATTEST: _____

SURETY

ADDRESS

BY: _____

ATTEST: _____

Attorney-in-Fact

END OF SECTION

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**SECTION 00 04 50
BIDDER QUALIFICATIONS**

PROJECT: Grand County Water and Sanitation District No. 1 – Reservoir No. 2 Enlarging and Lining Project

PART 1 GENERAL

1.1 COMPANY INFORMATION

The BIDDER is required to complete this form in its entirety and submit it at or by 2 PM of the day of the Pre-Bid Site Meeting. Any Bid received without the completed form already submitted as noted will be considered non-responsive.

A. NAME, ADDRESS, AND GENERAL QUALIFICATIONS

1. Name of Bidder:

2. Permanent main office address:

3. When organized (Month and year):

4. If a corporation, where incorporated:

5. General character of work performed:

6. Number of years in business under present trade name

B. CONTRACTOR'S LICENSE

1. License type:

2. License number:

3. License class:

4. City, County and State:

1.2 RELEVANT PROJECT EXPERIENCE

List a minimum of three (3) projects of \$500,000 or more with similar installations and construction experience that were completed within the last 5 years by the General Contractor. Projects shall include water and/or wastewater ponds or reservoirs with clay or bentonite liners, HDPE butt fused pipelines, grouted riprap construction, and other relevant project experience. Provide a list of each OWNER, OWNER's phone number, address, project cost, date of installation, and size.

Owner, Address, Phone		Project Description	Contract Amount, Dollars

1.3 PROPOSED PROJECT MANAGEMENT PERSONNEL

List the key project staff including project manager and superintendent proposed to perform work on this project for the General Contractor. Attach resumes and recent project experience for all listed personnel.

Personnel	Position or Role	Years Experience	Academic Degrees or Certifications	Professional Registrations or Certifications

1.4 PENDING LEGAL LIABILITIES

Are any lawsuits pending against you or your firm at this time? _____

If yes, describe _____

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION**3.1 AUTHORIZATION TO VERIFY INFORMATION**

The undersigned hereby authorizes and requests any person, firm or corporation to furnish any information requested by the OWNER in verification of this Statement of Bidder's Qualifications.

By (Signature and Title): _____
Date _____

END OF SECTION

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00 04 50-4

**SECTION 00 05 10
NOTICE OF AWARD**

_____,
20____

TO: _____

The OWNER, having duly considered the Unit Price and/or Lump Sum Item Proposal submitted on _____, 20__, for the work covered by the Contract Documents entitled "Grand County Water and Sanitation District No. 1 – Reservoir No. 2 Enlarging and Lining Project" in the amount of _____ Dollars (\$_____), and it appearing that your Proposal is fair, equitable and to the best interest of the OWNER, the said Proposal is hereby accepted at the Unit Price and/or Lump Sum Item bid prices contained therein.

In accordance with the terms of the Contract Documents, you are required to execute the Contract and Performance, Payment and Maintenance Bond in three counterparts within ten (10) consecutive days from and including the date of this Notice of Award.

In addition, you are required to furnish at the said time three Certificates of Insurance evidencing compliance with the requirements for insurance as stated in the Contract Documents.

The Bid Security submitted with your Proposal will be returned upon execution of the Contract, furnishing of the required Performance, Payment and Maintenance Bond and Certificates of Insurance within the time limit specified. In the event that you should fail to execute the Contract agreement and Performance, Payment and Maintenance Bond within the time limit specified, said Security will be retained by the OWNER as liquidated damages and not as a penalty for the delay and extra work caused thereby.

Grand County Water & Sanitation District No.1

By: _____

Title: _____

END OF SECTION

00 05 10-1

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00 05 10-2

**SECTION 00 05 20
CONTRACT**

THIS CONTRACT, made and entered into this ____ day of _____ 2015, by and between the Grand County Water and Sanitation District No. 1, hereinafter in the Contract Documents called the "OWNER", and _____.

(1) A Corporation organized and existing under the laws of the State of _____.

(2) A Partnership consisting of _____.

(3) An individual trading as _____,
of the City and State of _____.

hereinafter in the Contract Documents called the "CONTRACTOR".

WITNESSETH: That the OWNER and the CONTRACTOR, for the considerations hereinafter named, mutually agree as follows:

ARTICLE 1

STATEMENT OF WORK: For and in consideration of the unit and/or lump sum prices for the various items of work as set forth in the Bid Proposal heretofore submitted by the CONTRACTOR, said CONTRACTOR shall furnish all necessary business administration, superintendence, labor, equipment and material, and perform complete and deliver to the OWNER, to the OWNER's satisfaction, under the direction of the ENGINEER, free from all liens, claims and demands of any kind for material, equipment, supplies, services, labor taxes and damage to property or persons, in full compliance with the Contract Documents and in strict accordance with the terms thereof, all of which are made a part hereof by reference herein, are designated as follows:

(1) Notice to Bidders (2) Instructions to Bidders and Bidder's Representation(s) (3) Bid Bond Form (4) Performance, Payment and Maintenance Bond (5) Contract (6) Certificate of Incorporation (7) Notice of Award (8) Notice to Proceed (9) Proposal and Bid Schedule (10) Drawings (11) General Conditions and Special Conditions (12) Technical Specifications (13) Addenda (See Proposal) (14) Certificates of Insurance

The above named Documents shall be binding and effective and form a part hereof as if attached hereto or fully set out herein, and each detail shall be equally binding whether it appears in one, some, or all of the Contract Documents.

ARTICLE 2

PERFORMANCE, PAYMENT AND MAINTENANCE BOND: The CONTRACTOR of the second part furnishes concurrently herewith a Performance, Payment and Maintenance Bond in the amount of the total Contract price, as required by the Contract Documents, such Bond being attached hereto. The Performance, Payment and Maintenance Bond shall guarantee all material and workmanship furnished by the CONTRACTOR for a period of two (2) years after the date of final inspection and acceptance by the OWNER.

ARTICLE 3

TIME OF COMPLETION: The CONTRACTOR shall proceed with due diligence and care and shall maintain the necessary personnel, materials and equipment on the job to complete the work on time. Delivery of all materials shall be complete in accordance with the Contract Documents by the date indicated in the Notice to Proceed, and liquidated damages, not as a penalty, the sum of five hundred dollars (\$500.00) per day will be deducted from the amount due the CONTRACTOR for the performance of the Contract for each day thereafter which is required to complete the work called for by the Contract due to the impossibility of determining the actual damages for delay. Extension of the completion date will be allowed only in accordance with provisions of the Contract Documents.

ARTICLE 4

COST OF CONSTRUCTION: The CONTRACTOR agrees to complete the work shown and described in the Unit Price and/or Lump Sum Item Proposal which consists of the Bid Schedule for the Grand County Water and Sanitation District No. 1, Reservoir No. 2 Enlarging & Lining Project, in the amount not to exceed _____ Dollars (\$_____). Payment shall be made in monthly installments subject to the retainage described herein, based on the ENGINEER's determination of the amount and value of the work completed during the month in accordance with the specifications and final payment shall be made by the OWNER to the CONTRACTOR after delivery and acceptance by the ENGINEER and thirty days of compliance with the final payment requirements contained in Colo. Rev. Stat. §38-26-107, as amended. The final construction cost may not reflect the original contract amount and may increase or decrease based on the total quantity of each item or number of items used to complete the project or schedules awarded subject to strict compliance with the field order and change order process contained in this Contract.

ARTICLE 5

ASSIGNMENT: CONTRACTOR shall not at any time assign any interest in the contract or the other Contract Documents to any person or entity without the prior written consent of the OWNER. The terms of this Contract shall inure to and be binding upon the permitted successors and assigns of the parties hereto.

ARTICLE 6

AMENDMENT: The Contract may be amended from time to time by written agreement between the parties hereto. No amendment, modification or alteration of the Contract shall be binding upon the parties hereto unless the same is in writing and approved by the duly authorized representatives of each party hereto.

ARTICLE 7

SEVERABILITY: If any term, section or other provision of the Contract shall, for any reason, be held to be invalid or unenforceable, the invalidity or unenforceability of such terms, section or other provision shall not affect any of the remaining provisions of this Contract.

ARTICLE 8

WAIVER: No waiver by either party of any right, term or condition of this Contract shall be deemed or construed as a waiver or any other rights, term or condition, nor shall a waiver of any breach hereof be deemed to constitute a waiver of any subsequent breach, whether of the same or of a different provision of this Contract.

ARTICLE 9

REMEDIES: None of the remedies provided to either party under this Contract shall be required to be exhausted or exercised as a prerequisite to resort to any further relief to which such party may then be entitled. Every obligation assumed by, or imposed upon, either party hereto shall be enforceable by any appropriate action, petition or proceeding at law or in equity. In addition to any other remedies provided by law, this Contract shall be specifically enforceable by either party. The Contract shall be construed in accordance with the laws of the State of Colorado, and particularly those relating to governmental contracts with exclusive venue and jurisdiction in Grand County District Court.

The amount of money appropriated by the OWNER is equal to or in excess of the Contract amount. The OWNER will not issue any work order or directive requiring additional compensable work to be performed, which work causes the aggregate amount payable under the Contract to exceed the amount appropriated for the original contract, unless the CONTRACTOR is given written assurance by the OWNER that lawful appropriations to cover the costs of additional work have been made or unless such work is covered under a remedy-granting provision in the Contract.

ARTICLE 10

COUNTERPARTS: This Contract may be executed in multiple counterparts, each of which shall constitute an original, but all of which shall constitute one and the same document.

00 05 20-3

ARTICLE 11

ENTIRETY: This Contract constitutes the entire agreement between the parties concerning the subject matter herein, and all prior negotiations, representations, contracts, understandings or agreements pertaining to such matters are merged into, and superseded by, this Contract.

IN WITNESS WHEREOF, the parties hereto have executed this contract in two (2) counterparts, as of this day and year herein above set forth.

(SEAL)

By: _____

ATTEST:

By: _____

Title: _____

(SEAL)

GRAND COUNTY WATER AND
SANITATION DISTRICT NO. 1

By: _____

ATTEST:

By: _____

Title: _____

NOTE: Certification of Incorporation shall be executed if CONTRACTOR is a Corporation.

00 05 20-4

ILLEGAL ALIEN PROVISIONS REQUIRED IN ALL PUBLIC CONTRACTS FOR SERVICES BY C.R.S. 8-17.5-101 ET SEQ.**VERSION IN EFFECT AFTER 5-13-08**

[Note: Use of "CONTRACTOR" and "OWNER" or alternative terms to be determined based on type and circumstances of each agreement]

Illegal Aliens. By its signature on this Contract, CONTRACTOR certifies that, as of the time of its signature, it does not knowingly employ or contract with any illegal alien who will perform work under this Contract and that, in order to confirm the employment eligibility of all employees who are newly hired for employment to perform work under this Contract, CONTRACTOR will participate in the e-verify program or department program, as defined in C.R.S. 8-17.5-101. CONTRACTOR agrees that it shall not knowingly employ or contract with any illegal alien to perform work under this Contract; and that it shall not enter into a contract with a subcontractor that fails to certify to CONTRACTOR that the subcontractor shall not knowingly employ or contract with any illegal alien to perform work under this contract. CONTRACTOR has confirmed the employment eligibility of all employees who are newly hired for employment to perform work under this Contract through participation in either the e-verify program or department program, as defined in C.R.S. 8-17.5-101. CONTRACTOR shall not use the e-verify program or department program procedures to undertake preemployment screening of job applicants while work under this Contract is being performed. If CONTRACTOR obtains actual knowledge that a subcontractor performing work under this Contract knowingly employs or contracts with an illegal alien, CONTRACTOR shall: (1) notify the subcontractor and OWNER within three days that CONTRACTOR has actual knowledge that the subcontractor is employing or contracting with an illegal alien; and (2) terminate the subcontract with the subcontractor if, within three days of receiving the notice required herein, the subcontractor does not stop employing or contracting with the illegal alien; except that CONTRACTOR shall not terminate the contract with the subcontractor if during such three days the subcontractor provides information to establish that the subcontractor has not knowingly employed or contracted with an illegal alien. CONTRACTOR shall comply with any reasonable request by the Colorado Department of Labor and Employment made in the course of an investigation that the Department is undertaking pursuant to the authority established in C.R.S. 8-17.5-101(5). If CONTRACTOR violates a provision of this paragraph, OWNER may terminate this Contract for breach of contract. If the Contract is so terminated, CONTRACTOR shall be liable for actual and consequential damages to OWNER. CONTRACTOR understands that, in the event of such a termination, OWNER is required to notify the office of the Colorado Secretary of State.

Name: _____

Signature: _____

Title: _____

Company: _____

Date: _____

END OF SECTION

00 05 20-5

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00 05 20-6

**SECTION 00 05 50
NOTICE TO PROCEED**

_____, 2015

TO: _____

Your are hereby authorized to proceed on this date, _____, 2015, or within seven (7) consecutive calendar days hereafter, with a substantial completion date of _____ and with the work covered by the Contract Documents titled and numbered Grand County Water and Sanitation District No. 1, Reservoir No. 2 Enlarging and Lining Project for the sum of _____ Dollars (\$_____). You are to notify the ENGINEER 48 hours before starting work.

No.1

Grand County Water and Sanitation District

By: _____

Title: _____

END OF SECTION

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SECTION 00 06 10
PERFORMANCE, PAYMENT AND MAINTENANCE BOND

KNOW ALL MEN BY THESE PRESENTS, That we, the undersigned of _____

hereinafter referred to as the "CONTRACTOR", and _____
a Corporation organized under the laws of the State of Colorado and authorized to transact business in the State of Colorado as Surety, are held and firmly bound unto the Grand County Water and Sanitation District No.1, a Quasi-Municipal Corporation of the State of Colorado, hereinafter referred to as "OWNER", in the penal sum of _____ Dollars (\$_____), lawful money of the United States of America, for the payment of which sum well and truly to be made, we bind ourselves and our heirs, executors, administrators, successors, and assigns, jointly and severally by these presents.

THE CONDITIONS OF THE FOREGOING OBLIGATION IS SUCH THAT:

WHEREAS, the above bounden CONTRACTOR has, on the ____ day of _____, 2015, entered into a written Contract with the aforesaid OWNER for the Grand County Water and Sanitation District No. 1, Reservoir No. 2 Enlarging and Lining Project, which shall include furnishing all materials, equipment, tools, superintendence, and other facilities and accessories, for the construction of certain improvements as designated, defined and described in the said Contract and the conditions thereof, and in accordance with the specifications and plans therefore; a copy of said Contract being attached hereto and made a part hereof.

NOW, THEREFORE, if the said CONTRACTOR shall and will, in all particulars, well, duly and faithfully observe, perform and abide by each and every covenant, condition, and part, of the said Contract, and the Conditions, Specifications, Plans and other Contract Documents thereto attached or, by reference, made a part thereof, according to the true intent and meaning in each case, then this obligation shall be and become null and void; otherwise it shall remain in full force and effect.

This obligation shall be in full force and effect for the full guarantee period provided in the specifications contained in said contract.

PROVIDED FURTHER, that if the said CONTRACTOR or his or her subcontractor fails to duly pay for any labor, materials, team hire, sustenance, provisions, provender, gasoline, lubricating oils, fuel oils, greases, coal, or any other supplies or materials used or consumed by such CONTRACTOR or his, their, or its subcontractors in performance of the work contracted to be done or fails to pay any person who supplies laborers, rental machinery, tools or equipment, the Surety will pay the same together with interest as provided by law:

PROVIDED FURTHER, that the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the Contract, or the work to be performed thereunder, or the specifications accompanying the same, shall in anyway affect its obligation on this bond and it does hereby waive notice of any change, extension of time, alteration, or addition to the terms of the contract, or to the work or to the specifications.

00 06 10-1

PROVIDED FURTHER, that the said Surety, for value received, hereby stipulates and agrees that it will indemnify and save harmless the said OWNER to the extent of any and all payments in connection with the carrying out of said Contract which said OWNER may be required to make under the law by any reason of such failure or default by the said CONTRACTOR and any such CONTRACTOR including interest, costs, and attorney fees.

PROVIDED FURTHER, that the Said Surety and CONTRACTOR shall protect, defend, indemnify and save harmless the OWNER and the OWNER's officers, including its engineers and their employees providing service agents, servants, and employees relative to herein called the "OWNER", as well as any entity or individual listed in this paragraph, contract from and against all claims and actions, based upon or arising out of injuries or death of persons or damage to property caused by, or sustained, in connection with this Contract or by conditions created thereby, and on request of the OWNER will assume the defense of any claim or action brought against the OWNER except for the negligent acts of the OWNER.

PROVIDED FURTHER, that such bond shall be duly executed by a qualified corporate surety, conditioned upon the faithful performance of the contract and, in addition, shall provide that, if the CONTRACTOR or his or her subcontractor fails to duly pay for any labor, materials, team hire, maintenance provisions, provender, or other supplies used or consumed by such CONTRACTOR or his or her subcontractor in performance of the work contracted to be done or fails to pay any person who supplies laborers, rental machinery, tools or equipment, all amounts due as the result of the use of such laborers, machinery, exceeding the sum specified in the bond together with interest at the rate of eight percent per annum. Unless such bond is executed, delivered, and filed, no claim in favor of the CONTRACTOR arising under such contract shall be audited, allowed, or paid. A certified or cashier's check or bank money order made payable to the officer designated by the governing body of the contracting local government may be accepted in lieu of a bond.

IN TESTIMONY WHEREOF, the said CONTRACTOR has hereunto set his hand, and the said Surety has caused these presents to be executed in its name, and its corporate seal to be hereunto affixed, by its attorney-in-fact authorized on this ____ day of _____, 2015.

(SEAL)

CONTRACTOR

ATTEST:

By:_____

SECRETARY

(SEAL)

SURETY COMPANY

00 06 10-2

By: _____
ATTORNEY-IN-FACT

By: _____
STATE REPRESENTATIVE

(Accompanying this bond with Attorney-in-Fact's authority form the Surety Company certified to include the date of the bond.)

END OF SECTION

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00 06 10-4

SECTION 00 06 20
CERTIFICATE OF INCORPORATION

(To be filled in when Contract is executed in behalf of a Corporation)

STATE OF _____
COUNTY OF _____

On this _____ day of _____, 20____, before me appeared _____
to me personally known, who, being by me duly sworn, did say that he is _____
_____ of _____ and that the seal
affixed to said instrument is the corporate seal of said corporation, and that said instrument was
signed and sealed in behalf of the said corporation by authority of its board of directors, and said _____
_____, acknowledged said instrument to be the free act and deed of
said corporation.

WITNESS MY HAND AND NOTARIAL SEAL the day and year in this certificate
first above written.

NOTARY PUBLIC

ADDRESS

My Commission Expires _____

END OF SECTION

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00 06 20-2

SECTION 00 06 40
ADVERTISEMENT FOR FINAL PAYMENT

_____, 20__

TO: _____

You are hereby notified that the following advertisement for Final Settlement of Work appeared at least twice in a newspaper of general circulation dated _____ 20__.

"After thirty (30) days from _____, 20__, _____ OWNER, will pay to _____ CONTRACTOR, the full balance due on the Grand County Water and Sanitation District No. 1, Reservoir No. 2 Enlarging and Lining Project. All persons having claims for labor, materials, team hire, sustenance, provisions, provender, or other supplies used or consumed by such CONTRACTOR or his subcontractor in or about the performance of the work contracted to be done or that supplies rental machinery, tools or equipment furnished under this Contract, who shall not have been paid therefore, shall present the same to the OWNER in writing and verified prior to date specified above, or the OWNER shall be free of all liabilities for attempting to obtain payment to such persons by the CONTRACTOR."

Subject to the terms of the Contract Documents a Final Payment Check is attached hereto in the amount of _____ (\$_____).

Acceptance of which the CONTRACTOR thereby warrants that all persons doing work upon or furnishing materials for work under this contract have been paid in full. Failure to sign, approve and return one copy of this form, or to protest, within ten (10) days constitutes proof of approval and acceptance by the CONTRACTOR of the final amount due under the Contract.

Grand County Water and Sanitation District No. 1

By: _____

The final amount paid and the terms and conditions set forth herein and in the Contract Documents are approved and accepted.

CONTRACTOR:

By: _____

END OF SECTION

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**SECTION 00 07 00
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PART 1 GENERAL**1.1 COLORADO STATE ENGINEER'S OFFICE**

GCWSD No. 1 Reservoir No. 2 is a low hazard dam under the jurisdiction of the Colorado State Engineer – Dam Safety Division (SEO). As such, the SEO rules and Regulations for Dam Safety and Dam Construction apply to all phases of this project. The plans and/or specifications cannot be significantly changed without prior written approval of the State Engineer in accordance with Rule 9.1.8. Reservoir No. 2 construction shall not be considered complete until the State Engineer has accepted the construction in writing.

1.2 DRAWINGS AND SPECIFICATIONS

The ENGINEER will furnish to the CONTRACTOR, free of charge, copies of all drawings and specifications reasonably necessary for the execution of the work. They are the property of the OWNER to be held by the ENGINEER on behalf of the OWNER and are to be returned to the ENGINEER, upon request, at the completion of the work. In case of any discrepancy in the Contract Documents, Special Conditions shall govern over both specifications and drawings. Specifications shall govern over drawings and computed or written dimensions shall govern over scaled dimensions. In the event of discovery of discrepancies or any type of error whatsoever in the specifications, plans and drawings, the CONTRACTOR shall not adjust them, save at his own risk and expense, but shall immediately request in writing, and the ENGINEER shall give in writing, an interpretation of the intent of the Contract, which interpretation shall govern. If the CONTRACTOR, as the work progresses, finds any discrepancies between the drawings and physical conditions, it shall be his duty to immediately inform the ENGINEER in writing. The ENGINEER shall promptly interpret the intent of the Contract and, in its sole judgment may recommend in writing, authorize the CONTRACTOR to proceed under a Change Order to the extent allowed herein or as an authorized extra. Any work done after such discovery, until authorized, will be done at the CONTRACTOR's risk.

1.3 CONSTRUCTION REVIEW

The OWNER's designated representative will be responsible for supervising the implementation of the contract and to represent the OWNER in all matters and questions arising under the Contract. The OWNER or the ENGINEER will periodically observe the construction of all work covered by this Contract. The OWNER or the ENGINEER, on behalf of the OWNER, shall be authorized to determine the amount or quantities of the several items of work which are to be paid for under this Contract; to order changes within the scope of the Contract and to render decisions on any questions which may arise relative to the execution of the work covered by this Contract. OWNER shall have authority to suspend the work, wholly or in part, until every question at issue can be resolved by the OWNER or the ENGINEER. The CONTRACTOR shall not suspend any portion of the work nor resume suspended work without the written authority of the OWNER. No extension of time of completion of the work will be granted because of delays caused by suspension hereunder. Neither the review by the OWNER nor the ENGINEER, nor any order or certificate by the OWNER or the ENGINEER, nor any order by the OWNER for the payment of money, nor any payment for, or acceptance of, any work by the OWNER nor the

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extension of time, shall operate as a waiver of any provisions of the Contract, or of any power reserved herein to the OWNER, or any right to damage herein provided; nor shall any waiver of any breach of the Contract be held to be a waiver of any other or subsequent breach.

Neither OWNER's authority to act under the Contract Documents nor any decision made by ENGINEER in good faith either to exercise or not exercise such authority shall give rise to any duty or responsibility of the ENGINEER to the CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization performing any of the Work, or to any surety for any of them.

Whenever in the Contract Documents the terms "as ordered", "as directed", or the adjectives "reasonable", "suitable", "acceptable", "proper" or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review or judgment of ENGINEER as to the Work, it is intended that such requirement, direction, review or judgment will be solely to evaluate the Work for compliance with the Contract Documents. The use of any such term or adjective shall not be effective to assign to ENGINEER any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility for the project. Specifically:

The OWNER and the ENGINEER will not be responsible for CONTRACTOR's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, and ENGINEER will not be responsible for CONTRACTOR's failure to perform or furnish the Work in accordance with the Contract Documents.

The OWNER and the ENGINEER will not be responsible for the acts or omissions of CONTRACTOR or any Subcontractor, any Supplier, or of any other person or organization performing or furnishing any of the Work.

All material and workmanship (if not otherwise provided by the specifications) shall be subject to review, examination and test by the OWNER's agents at any and all times during manufacture and/or construction and at any and all places where such manufacture and/or construction is carried on. The OWNER shall have the right to reject defective material and workmanship or require its correction. Rejected workmanship shall be satisfactorily corrected, at the CONTRACTOR's expense and the CONTRACTOR shall promptly segregate and remove such rejected material from the premises, also at the CONTRACTOR's expense.

The CONTRACTOR shall furnish promptly and without additional charge, all reasonable facilities, labor and material necessary for proper and convenient observation and for any third party inspection or test that may be required by the OWNER. All inspection and tests by the OWNER shall be performed in such a manner as not to delay the work unnecessarily. Special, full size and performance tests shall be as set forth in the specifications. If at any time observations or tests are delayed by reason of the failure of the CONTRACTOR to have the material and workmanship ready for such observations and tests, the CONTRACTOR shall be charged with any additional cost of observations and tests resultant from such delay.

Should it be considered necessary or advisable by the OWNER or at any time before final acceptance of the entire work to make examinations of completed work, by removing or tearing out of any part or parts of the same, the CONTRACTOR shall, on request, promptly furnish all necessary facilities, labor, or material to accomplish such inspection. If any such work is found to be defective in any material respect, due to fault of the CONTRACTOR or his Sub-contractors, he shall defray all expense of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the actual cost of labor or material necessarily involved in the examination and replacement, plus fifteen (15%) percent will be allowed the CONTRACTOR and he will, in addition, if completion of the work has been delayed thereby, be granted a suitable extension of time on account of the additional work involved.

The source of supply of the materials shall be submitted to the OWNER for review before delivery is started. Only materials conforming to the requirements of these specifications as reviewed by the OWNER shall be used in the work. All material proposed to be used may be tested at any time during their preparation for use. If after testing, it is found that sources of supply do not furnish a uniform product, or if the products from any source prove unacceptable at any time, the CONTRACTOR shall furnish materials from another reviewed source. No material which after review has in any way become unfit for use shall be used in the work. The CONTRACTOR shall notify the OWNER in writing a sufficient time in advance of the manufacture or production of materials to be supplied by him under this contract, to enable the OWNER to arrange for mill and factory inspection and testing of same if desire. The failure of the OWNER to require mill inspection will not relieve the CONTRACTOR from responsibility for any defect or damage resultant from use of such materials. No materials shipped by the CONTRACTOR from the factory prior to having satisfactorily passed upon such testing and inspection by factory or the OWNER's designated representative, or prior to the receipt of notice from said OWNER that such testing and inspection will not be required, shall be incorporated in the work. The CONTRACTOR, at his expense, shall furnish to the OWNER, six certified copies of all required factory and mill test reports. No permission given by the OWNER to use any particular method or equipment shall be so construed as to relieve the CONTRACTOR from furnishing other methods or equipment when those in use prove unsatisfactory to the OWNER, or as to bind the OWNER to accept work which does not comply with the Contract.

Periodic observation of the work in progress by the OWNER or the ENGINEER will be done whenever the CONTRACTOR is performing work that requires review as determined by the OWNER. The normal working time shall be during a regular 5-day, 40-hour work week, Monday through Friday. If the CONTRACTOR elects to work more than 40 hours per week and observation is required during this overtime work as determined by the OWNER, the OWNER shall be paid by the CONTRACTOR at the rate as specified herein for all review time required over the normal 5-day, 40-hour week. If the OWNER or his authorized representative is called to the job site to address problems created by the CONTRACTOR, he will be paid by the CONTRACTOR at the same rate as for overtime review as stated above.

1.4 MEETINGS

A. Progress Meetings

1. Meet with OWNER and ENGINEER at the job site once per week during construction to discuss Work progress. Location and time of meeting shall be coordinated at the preconstruction conference. CONTRACTOR shall give verbal reports of the following items.
 - a. Progress of construction
 - b. Project schedule, including a detailed projection of activities for the next 2 weeks
 - c. Status of submittals
 - d. Status of progress payments
 - e. Any conflicts, discrepancies, or other difficulties requiring solution
2. The progress meetings shall be attended by the following people:
 - a. OWNER's representative (invited).
 - b. CONTRACTOR's resident superintendent or approved substitute (attendance mandatory)
 - c. ENGINEER's representative (attendance mandatory).
 - d. Subcontractor's whom CONTRACTOR, ENGINEER, or OWNER request to attend.
 - e. Others as appropriate
3. Biweekly, the representative assigned to this project shall be included in the progress meeting via conference call. The SEO representative shall be apprised of project status and schedule to facilitate project inspections by the SEO, as appropriate.

B. Special Meetings

1. Meet with OWNER and ENGINEER, when requested, to discuss technical issues, construction planning, construction schedule, and contract administration.
2. Special meetings shall be attended by the following people:
 - a. CONTRACTOR's resident superintendent or approved substitute (invited).
 - b. OWNER's representative (attendance mandatory).
 - c. ENGINEER's representative (attendance mandatory).
 - d. Others as appropriate.

1.5 STAKING OUT THE WORK

At the beginning of the construction or as the work progresses, the CONTRACTOR shall stake the work and set bench marks. The CONTRACTOR shall notify the ENGINEER at least 40 hours in advance of any staking, not including Saturdays, Sundays and Holidays. For Water Lines: line only will be staked unless official grade differs from the existing grade, in which case line and grade will be staked. For Sewer and Drain Lines: line and grade will be staked. For Structures: four comers and a permanent bench mark will be set.

Any additional surveying or re-surveying shall be done by the CONTRACTOR or by the ENGINEER at the CONTRACTOR's expense. Bench marks and survey stakes shall be preserved by the CONTRACTOR and in case of their destruction, or removal by him, his employees, or others, they shall be replaced by the ENGINEER at the CONTRACTOR's expense and his Sureties shall be liable therefore. The CONTRACTOR shall pay the ENGINEER for re-setting the lost survey stakes or bench marks at the rate of 1 V2 the overtime inspection rate specified herein. The CONTRACTOR shall be responsible for elevations used in computing his bid.

1.6 QUANTITIES AND UNIT PRICES

It is expressly provided that the quantities noted and summarized in the proposal are approximations for comparing bids only and no claim shall be made against the OWNER or his ENGINEER for excess or deficiency therein, whether actual or relative. The CONTRACTOR is responsible for computing his own bid quantities unless otherwise provided in the Contract. Payment at the prices agreed upon will be made for the completed work and will cover materials, supplies, labor, tools, machinery and all other expenditures incidental to satisfactory compliance with the Contract, unless otherwise specifically provided.

Once the project commences, the quantities for each item may vary and/or a line item may be deleted due to changing or unknown field conditions with no additional cost to the OWNER.

1.7 RIGHTS-OF-WAY AND ROADS

The OWNER will provide rights-of-way and easements as shown on the plans for construction purposes. Any additional land actually needed by the CONTRACTOR for the performance of the work, proper location of his plant and equipment, or the storage of materials and supplies for the work, shall be furnished by the CONTRACTOR. No CONTRACTOR shall have exclusive occupancy of rights-of-way acquired by the OWNER over other CONTRACTORS engaged in work for the OWNER. When the territory of one CONTRACTOR is the necessary means or convenient means of access for the execution of another contract, such privilege of access or any other reasonable privilege shall be granted to the CONTRACTOR to the extent, amount, in the manner and at times necessary. No joint occupancy or use of the territory shall be made the basis of any claim for delay or damages. Any work done in improving, repairing or maintaining the rights-of-way, access road, and any County roads or State highways in the performance of the work under this Contract, shall be done at the CONTRACTOR or CONTRACTORS' expense.

1.8 EXISTING UTILITIES

In performing the work under the Contract, the CONTRACTOR shall take the necessary action, including making arrangements with the OWNERS or Operators of existing power, telephone lines, gas, water, sewer and other utilities or installations that may be encountered whether privately or publicly owned to prevent interference with the conditions, operations and maintenance, all in a manner satisfactory to the ENGINEER, as well as to the OWNERS, or Operators of the respective utilities. Relocation or repair of utilities encountered, even though not shown on the plans, shall be the responsibility of the CONTRACTOR. The cost of the above measures, including maintaining of guards, watchmen, signals, barricades and temporary structures, making any necessary repairs and other cooperative or corrective work shall be borne by the CONTRACTOR and shall be included in the prices bid in the Proposal for the related items of work. Neither the OWNER nor the ENGINEER shall be responsible to the CONTRACTOR for the existence of utilities not shown on the plans or drawings and the CONTRACTOR remains obligated under this paragraph for all hidden utilities.

1.9 SUSPENSION FOR CLIMATIC CONDITIONS

The OWNER may order the CONTRACTOR to suspend any work that may be subject to damage due to climatic conditions and an extension of time will be granted therefore. Failure of the OWNER to suspend work due to climatic conditions does not relieve the CONTRACTOR of responsibility for work damaged by climatic conditions. At the discretion of the OWNER, an extension of time may be granted on account of any unusual weather conditions that would impede the work.

1.10 PERMITS AND RESPONSIBILITY FOR WORK

The CONTRACTOR shall, at his own expense and within the Contract price, without additional cost to the OWNER, obtain all required licenses and permits and shall be responsible for any and all damage of any type whatsoever to persons or property that may occur as a result of his fault or negligence in connection with securing the permits and the prosecution of the work, or the fault or negligence of any of his agents, subcontractors, servants, or employees in connection therewith, and the CONTRACTOR shall further be responsible for any damage whatsoever to materials or to completed portions of the work and structures until the contract be entirely completed and be finally accepted by the OWNER. Upon completion of the Contract, the work shall be delivered to the OWNER, complete and undamaged and free of any and all claims whatsoever for payment for labor, materials, equipment, use of equipment, taxes, or resulting from sub-contractor or from damage to other persons or their property. No final payment under this Contract shall in any event be made unless there has been full compliance with the terms thereof.

All work or material which has been rejected shall be remedied or removed and replaced in an acceptable manner and no compensation shall be allowed the CONTRACTOR for such removal and replacement. Any work done beyond the lines and grades shown on the drawings, except as herein provided, will be considered as unauthorized and will not be measured or paid for. Rejected or unauthorized work may be ordered removed at the CONTRACTOR's expense.

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Should the CONTRACTOR fail to promptly comply with any order of the OWNER or the ENGINEER as OWNER's agent made under the provisions of this paragraph, the OWNER shall have the authority to cause defective work or material to be removed or remedied, and replaced, and to deduct the cost from any money due or to become due the CONTRACTOR. The CONTRACTOR and his Surety shall be jointly responsible for a period of two years following the final acceptance of all work performed under this Contract for the satisfactory repair and/or replacement of all work, material and equipment which become defective during the period: providing, the defects result directly or indirectly from faulty workmanship or negligence by the CONTRACTOR, or from faulty material, faulty manufacturing, faulty erection, or improper handling of materials and equipment furnished and/or installed by the CONTRACTOR. The CONTRACTOR shall not refuse to guarantee his workmanship because of anything herein specified; the fact that a proposal is submitted is in fact the acceptance of the responsibility of guarantee of all work and materials to be furnished by the CONTRACTOR.

1.11 EMPLOYMENT OF LABOR

Eight (8) hours actual work in any calendar day shall constitute a lawful days work under this Contract, but this shall not be construed as a limit or restriction upon the time of service of any employees of the CONTRACTOR; provided, however, this Contract shall not be construed to relieve the CONTRACTOR from compliance with, and the CONTRACTOR shall in all respects, obey and hold the OWNER harmless from any violation of all laws and lawful rules and regulations, both of the State of Colorado and the United States, relating to the Workmen's Compensation, Unemployment Compensation, Social Security, and all other expense and conditions of employment under this Contract. The CONTRACTOR shall not employ any person undergoing sentence of imprisonment at hard labor.

1.12 SUPERINTENDENCE, COOPERATION OF CONTRACTOR AND OTHER CONTRACTS

The CONTRACTOR shall, at his expense within the Contract price, keep on the work during its progress competent foremen, or superintendent and any necessary assistants, all satisfactory to the OWNER. Each phase of construction may require a foreman as determined by the OWNER. The foreman or superintendent shall represent the CONTRACTOR in his absence and all directions given him shall be binding as if given to the CONTRACTOR. If the successful bidder be a partnership or corporation it shall, in writing to the OWNER, authorize the foreman, superintendent, or other designated parties to bind the CONTRACTOR in dealings with representatives of the OWNER in problems arising on the job during construction. Failure of partnership or corporation to furnish written designated authority shall not relieve them of said responsibilities for undesignated foreman and superintendent. Superintendence shall be furnished irrespective of the amount of work being performed.

Any person employed on the work who is deemed incompetent, careless, insubordinate, or otherwise objectionable, by his acts, shall at once be removed from the work and shall not be reemployed except by written permission from the OWNER. Should the CONTRACTOR at any time during the progress of the work fail to maintain sufficient progress called for in these

specifications, the OWNER may direct the CONTRACTOR to augment equipment and working forces by whatever amount deemed necessary, no additional payment will be made therefore.

Until written acceptance of the work by the OWNER, the CONTRACTOR shall be in charge and shall take every necessary precaution to prevent damage to any part thereof by the action of the elements or from any other cause. The CONTRACTOR shall rebuild, repair, or restore and make good all injuries or damages to any portion of the work occasioned by any of the above causes before its completion and acceptance, and shall bear the expense thereof. In case of suspension of the work from any cause whatsoever, the CONTRACTOR shall be responsible for all materials and shall properly store them if necessary on the rights-of-way belonging to, or leased by, the OWNER.

The OWNER may award such other contracts for additional work as it deems necessary and the CONTRACTOR under this Contract, shall fully cooperate with any such other CONTRACTORS and insofar as possible, carefully arrange his own work to correspond with that required under such other contracts and insofar as possible, follow the direction of the ENGINEER in connection therewith. The CONTRACTOR under this Contract shall not commit, nor allow the commission of, any act which will interfere with the performance of completion of work by any such other CONTRACTOR.

1.13 SUBCONTRACTS

The CONTRACTOR shall, as soon as practicable after the execution of the Contract Documents, notify the ENGINEER, in writing, the name and address of each subcontractor proposed for the work, giving the branch of work covered and the date and total price of the sub-contract and shall not employ any sub-contractor that the ENGINEER may within a reasonable time object to as incompetent or unfit, or who has failed to satisfactorily complete other contracts for any OWNER. The CONTRACTOR agrees that he is as fully responsible to the OWNER for the acts and omissions of his sub-contractors, and of persons either directly or indirectly employed by them, as he is for the acts of omissions of persons directly employed by him. Before beginning work, the subcontractor, if requested by the ENGINEER, must file with the ENGINEER, satisfactory certificates, in duplicate, showing evidence of insurance as set forth in paragraph 121. Nothing contained in the Contract Documents shall create any contractual relation between any sub-contractor and the OWNER or OWNER's agents.

1.14 DRAWINGS AND DATA TO BE FURNISHED BY THE CONTRACTOR

Before beginning manufacture of any part of the work covered in these specifications, the CONTRACTOR shall submit to the ENGINEER, five copies each of all reinforcement steel drawings, shop drawings, details and erection diagrams or un-detailed work necessary to supplement the Contract drawings. The shop drawings for all fabricated items shall show clearly the layouts and the details thereof. Any manufacturing done before review of the drawings will be at the CONTRACTOR's risk. The ENGINEER shall have the right to require the CONTRACTOR to make any change in the drawings which may be necessary, in the opinion of the ENGINEER, to make the finished work conform to the requirements and intent of these specifications and without additional cost to the OWNER. If found to be in general conformance

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with the design concept, one set of such prints will be marked as having been reviewed. If changes or corrections are necessary, one set will be returned with such changes or corrections noted. The CONTRACTOR shall re-submit corrected or changed prints if called for by the ENGINEER. Review of the CONTRACTOR's drawings relate only to general conformity with the Contract and shall not be held to relieve the CONTRACTOR of any part of the CONTRACTOR's responsibility to meet all of the requirements of these specifications. The CONTRACTOR and not the OWNER or the ENGINEER, shall be responsible for the errors or omissions of all drawings he submits.

1.15 SAMPLES AND TESTS

In the absence of direct reference, the sampling and testing of materials will be done in accordance with the current accepted methods approved by the American Society for Testing Materials. The CONTRACTOR shall cooperate with the ENGINEER in the collecting and forwarding of samples and in all cases shall furnish the required samples without charge. No material shall be incorporated in the work until test of samples have been made and the material found to be in accordance with the requirements of the specifications, as certified by the ENGINEER. The cost of all tests including defective, sub-standard or unsuited material shall be paid for by the CONTRACTOR unless otherwise specifically herein provided.

1.16 MATERIALS AND WORKMANSHIP

Unless otherwise specifically provided in the specifications, all workmanship, equipment, material and articles incorporated in the work covered by this Contract shall be of the best grade of their respective kinds required for the purpose set forth. Where equipment, materials or articles are referred to in the specifications as "equivalent to" any particular standard, the ENGINEER shall, in writing, decide the question of equivalence. The CONTRACTOR shall furnish to the ENGINEER for his review, the name of the manufacturer of machinery, mechanical and other equipment which he contemplates incorporating in the work, together with their performance history, capacities and other pertinent information. When required by the specifications, or when called for by the ENGINEER, the CONTRACTOR shall furnish the ENGINEER for review, full information concerning the materials or articles which he contemplates incorporating in the work. Samples of materials shall be submitted for review when so requested. Equipment, materials and articles installed or used without such review shall be at the risk of subsequent rejection at the CONTRACTOR's expense.

1.17 DEVIATIONS ALLOWED

All work shall conform to the lines, grades, cross-sections and dimensions shown on the approved drawings or described in the specifications. Deviations from the design drawings and working drawings as may be required by the exigencies of construction, will in all cases, be determined by the ENGINEER and authorized in writing. If the ENGINEER deems it inexpedient to correct work injured or done in an unauthorized manner, an equitable deduction from the Contract price of the work done will be made by him subject to the approval of the OWNER.

1.18 PATENTS AND/OR COPYRIGHTS

The CONTRACTOR shall hold and save the OWNER, its officers, agents, servants and employees harmless from liability of any nature of kind, including costs and expenses for or on account of, any kind of copyrighted composition, secret process, patented or unpatented invention, article, machine or appliance manufactured or used in the performance of this Contract, including their use by the OWNER, unless otherwise specifically stipulated in this Contract. Any expense incurred on account of this provision shall be included in the price bid in the Proposal on the items involved and no further compensation shall be allowed.

1.19 TERMINATION

This Contract may be terminated in whole or in part in writing by either party in the event of substantial failure by the other party to fulfill its obligations under this Contract through no fault of the terminating party; provided that no such termination may be effected unless the other party is given (1) not less than ten (10) days written notice (delivered by certified mail, return receipt requested) of intent to terminate; and (2) an opportunity for consultation with the terminating party prior to termination.

1.19.1 TERMINATION FOR CONVENIENCE

OWNER may for its own convenience terminate work under the Contract in whole or in part at any time by written notice to the CONTRACTOR. Such notice shall state the extent and effective date of such termination and on the effective date thereof the CONTRACTOR will, as and to the extent directed, stop work under the Contract and the placement of further orders or subcontracts under the Contract, terminate work under order and Subcontracts under the Contract, and take any necessary action to protect property in the CONTRACTOR's possession in which OWNER has or may acquire an interest. CONTRACTOR also shall promptly supply OWNER with copies of all outstanding orders for materials, equipment and services, and shall take such action relative to such orders as may be directed by OWNER.

In the event of such termination, OWNER shall pay to the CONTRACTOR, (1) its direct costs (excluding overhead) for all work done in conformity with the Contract to the effective date of such termination and (2) other costs pertaining to the work which the CONTRACTOR may incur as a result of such termination, all as approved by OWNER plus 10% of such costs (excluding costs under (2) above) for overhead and profit, provided, however, that in no event shall the total amount to be paid under the Section 117 .1 plus payments previously made, exceed the lesser of (a) the total aggregate Contract price specified in the Contract; or (b) that proportion of the aggregate total Contract price specified in the date of termination bears to the entire work to be performed hereunder. Any payment under this Section 117 .1 shall be made upon the expiration of the period within which liens may be filed under the laws of the State of Colorado, subject, however, to withholding by OWNER for the reasons and in the manner provided in those provisions pertaining to withholding of payments for liens.

1.19.2 TERMINATION FOR DEFAULT

OWNER shall have the right to terminate the employment of the CONTRACTOR after giving ten (10) days written notice of the termination to the CONTRACTOR in the event of any default by the CONTRACTOR. In the event of such termination, OWNER may take possession of the work and of all materials, tools and equipment thereon and may finish the work by whatever method and means he may select. It shall be considered a default by the CONTRACTOR whenever he shall:

- A. Disregard or violate provisions of the Contract Documents or OWNER's or OWNER's instruction, or fail to prosecute the work according to the agreement Schedule of Completion, including extensions thereof;
- B. Fail to provide a qualified representative, competent workmen or subcontractors, or proper materials, or fail to make prompt payment therefore; or

(3). Fail to submit a completion schedule within ten (10) days after notification to provide completion schedule.

Upon termination of the Contract by OWNER for default by the CONTRACTOR, no further payments shall be due to the CONTRACTOR, no further payments shall be due to the Trade CONTRACTOR until the work is completed. If the unpaid balance of the Contract Amount shall exceed the cost of completing the work including all overhead costs, the excess shall be paid to the CONTRACTOR. If the cost of completing the work shall exceed the unpaid balance, the CONTRACTOR shall pay the difference to OWNER. The Cost incurred by OWNER is herein provided, and the damage incurred through the CONTRACTOR's default, shall be approved by the ENGINEER and certified by OWNER.

The provisions of Section 117 .1 shall not apply in the event of default of the CONTRACTOR; provided, however, that the provisions of Section 117 .1 shall apply in the event of substantial failure by OWNER to fulfill its obligations under this Agreement.

1.20 PRESERVATION AND PROTECTION OF PROPERTY

The CONTRACTOR shall be responsible for the preservation of all private or public property along and adjacent to the work and shall take all necessary precautions to prevent damage or injury thereto. Such preservation and protection shall include but not be limited to, trees, stone walls, fences, mail boxes, monuments, irrigation ditches, driveways, road access culverts, underground pipelines and structures. Such preservation and protection shall apply to all underground pipelines and utilities whether public, private or individually owned that are in or adjacent to the right-of-way. When direct or indirect damage is done to public or private property on account of the act, omission, neglect or misconduct in the prosecution or non-prosecution of the work on the part of the CONTRACTOR, such property shall be restored by the CONTRACTOR at the CONTRACTOR's expense to a condition similar or equivalent to that which existed before such damage or injury was done. The CONTRACTOR shall be responsible

for making all arrangements at his own expense for moving and operating equipment at temporary crossings of telephone and transmission lines, railroad tracks, irrigation ditches and pipelines.

1.21 ACCIDENT PREVENTION

The Federal and State Laws relating to the public must be strictly observed by the CONTRACTOR at all times. The CONTRACTOR shall provide, at his own expense, barricades, guard rails, warning signs, lights, signal devices, gates, fences, surfacing, temporary bridges and culverts and watchmen and shall take all necessary precautions for the protection of the work and safety of the public. The face of all barricades facing approaching traffic shall be painted alternate six inch bands of black and white; such bands shall be placed diagonally from lower left to upper right. All barricades and obstructions shall be illuminated at night and all lights for this purpose shall be kept burning from sunset to sunrise. No road shall be closed to the public by the CONTRACTOR except by the expressed permission of the proper public authorities having jurisdiction over the public roads to be closed. The CONTRACTOR shall be responsible for obtaining this permission, but shall have the cooperation of the OWNER when such cooperation is necessary for the prosecution of his work.

Storage of materials in the vicinity of the public or private roads and on the OWNER's property shall be handled so as to cause as little obstruction to public and private travel as is necessary. Directional and detour signs at street intersections shall be such as to avoid as much as possible "dead ends" and "turn around" inconvenience to the public.

Machinery and equipment, and other hazards, shall be taken care of in accordance with the safety provisions of the "Manual of Accident Prevention in Construction" of the Associated General Contractors of America, to the extent that such provisions are not inconsistent with local applicable laws and regulations.

1.22 INDEMNIFICATION

CONTRACTOR agrees to indemnify and hold harmless the OWNER, its officers, employees, agents, their insurers, and ENGINEER, its officers, employees, agents and insurers from and against all liability, claims, and demands, on account of injury, loss, or damage, including without limitation claims arising from bodily injury, personal injury, sickness, disease, death, property loss or damage, or any other loss of any kind whatsoever, which arise out of or are in any manner connected with this Contract, if such injury, loss, or damage is caused in whole or in part by, or is claimed to be caused in whole or in part by, the act, omission, error, professional error, mistake, negligence, or other fault of the CONTRACTOR, any subcontractor to the CONTRACTOR, or any officer, employee, representative of the CONTRACTOR, or which arise out of any worker's compensation claim of any employee of the CONTRACTOR or of any employee of any subcontractor to the CONTRACTOR. CONTRACTOR agrees to investigate, handle, respond to, and to provide defense for and defend against, any such liability, claims or demands at the sole expense of the CONTRACTOR, or at the option of the OWNER, agrees to pay the OWNER or reimburse the OWNER for the defense costs incurred by the OWNER in connection with, any such liability, claims, or demands. CONTRACTOR also agrees to bear all

other costs and expenses related thereto, including court costs and attorney fees, whether or not any such liability, claims or demands alleged are groundless, false, or fraudulent.

1.23 INSURANCE

CONTRACTOR agrees to obtain and maintain during the life of this Contract, a policy or policies of insurance against all liability, claims, demands, and other obligations assumed by CONTRACTOR pursuant to Section 120 above. Such insurance shall be in addition to any other insurance requirements imposed by this Contract or by law. CONTRACTOR shall not be relieved of any liability, claims, demands, or other obligations assumed pursuant to Section 120 above, by reason of its failure to obtain and maintain during the life of this Contract insurance in sufficient amounts, durations, or types.

CONTRACTOR shall obtain and maintain during the life of this Contract, and shall cause any subcontractor to obtain and maintain during the life of this Contract the minimum insurance coverage listed below. Such coverage shall be obtained and maintained with forms and insurers acceptable to the OWNER. All coverage shall be continuously maintained to cover all liability, claims, demands, and other obligations assumed by CONTRACTOR pursuant to Section 120 above. In the case of a claims-made policy, the necessary retroactive dates and extended reporting periods shall be procured to maintain such continuous coverage.

Worker's Compensation Insurance to cover obligations imposed by applicable laws for any employee engaged in the performance of the work under this contract, and Employers Liability Insurance with minimum limits of \$600,000 each accident, \$600,000 disease-policy limit, and \$600,000 disease-each employee.

General Public Liability Insurance to be written with a limit of liability of not less than \$1,000,000 for all damages arising out of bodily injury, personal injury (including coverage for employee and contractual acts), including death, at any time resulting there from, sustained by any one person and not less than \$3,000,000 for all damages arising out of bodily injury, including death, at any time resulting there from, sustained by two or more persons in any one accident. This policy shall also include coverage for blanket contractual and independent CONTRACTOR risks.

When explosives are necessary, the CONTRACTOR shall provide separate specific coverage in the General Public Liability and Property Damage Insurance to a limit of liability of not less than \$3,000,000 for all property damage and bodily injury, including death, arising from use of explosives. This separate coverage shall be evidenced by a certificate of insurance naming the OWNER, the Engineer, the Town or other jurisdiction in which the work is performed, any and all adjacent landowners, and any other party deemed necessary by the OWNER, or as referenced in the Award of Contract under the Instructions to Bidders.

The limits of General Public Liability Insurance for broad form property damage (including products and completed operations) shall be not less than \$1,000,000 for all damages arising out of injury to or destruction of property in any one accident and not less than \$3,000,000 for all

damages arising out of injury to, or destruction of property, including OWNER's property during the policy period.

The General Public Liability Insurance policy shall include coverage for explosion, collapse, and underground hazards. The policy shall contain a severability of interests provision.

Protective Liability and Property Damage insurance covering the liability of the OWNER, including any officer or agent of said OWNER with respect to all operations under the Contract by the CONTRACTOR or his sub-contractors. The limits of the OWNER's Protective Liability Policy, to be provided by the CONTRACTOR, as described in this Article 121 INSURANCE shall be increased to the same limits as described above for the CONTRACTOR's General Public Liability Insurance.

Comprehensive Automobile Liability Insurance with minimum combined single limits for bodily injury and property damage of not less than \$1,000,000 each occurrence and \$1,000,000 aggregate with respect to each of CONTRACTOR's owned hired, and non-owned vehicles assigned to or used in performance of the services. The policy shall contain a severability of interests provision. If CONTRACTOR has no owned automobiles, the requirements of this paragraph shall be met by each employee of the CONTRACTOR providing services to the OWNER under this contract.

All Insurance Policies and Certificates of Insurance issued for this project shall name as additional insured(s), the OWNER, whether private or governmental, the OWNER's officers and employees, the municipality in which the work occurs, and the ENGINEER, being the firm of Merrick & Company, Inc., its agents and employees, and any other person(s), company(ies), or entity(ies) deemed necessary by the OWNER. The CONTRACTOR shall be solely responsible for any deductible losses under any policy required herein.

The insurance provided by the CONTRACTOR shall be primary to insurance carried by the OWNER, the ENGINEER and all other additional insureds, and the principal defense of any claims resulting from the CONTRACTOR's obligations under the contract shall rest with the CONTRACTOR's Insurer.

1.23.1 CERTIFICATES OF INSURANCE

The certificate of insurance provided by the CONTRACTOR shall be completed by the CONTRACTOR's insurance agent as evidence that policies providing the required coverages, conditions, and minimum limits are in full force and effect, and shall be reviewed and approved by OWNER prior to commencement of the contract. No other form of certificate shall be used. The certificate shall identify this Contract and shall provide that the coverages afforded under the policies shall not be cancelled, terminated or materially changed until at least 30 days prior written notice has been given to OWNER. The Certificate shall name the OWNER, GEI Consultants, Inc. and its associates, and other reasonable entities, as requested by the ENGINEER, as additional insureds at no additional cost to OWNER. The completed certificate of insurance shall be sent to: OWNER c/o GEI Consultants, Inc.

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Denver, Colorado 80237

Failure on the part of the CONTRACTOR to procure or maintain policies providing the required coverages, conditions, and minimum limits shall constitute a material breach of contract upon which OWNER may immediately terminate this contract, or at its discretion OWNER may procure or renew any such policy or any extended reporting period thereto and may pay any and all premiums in connection therewith, and all monies so paid by OWNER shall be repaid by CONTRACTOR to OWNER upon demand, or OWNER may offset the cost of the premiums against any monies due to CONTRACTOR from OWNER.

OWNER reserves the right to request and receive a certified copy of any policy and any endorsement thereto.

The parties hereto understand and agree that OWNER is relying on, and does not waive or intend to waive by any provision of this contract, the monetary limitations (presently \$600,000 per occurrence) or any other rights, immunities, and protections provided by the Colorado Governmental Immunity Act, 24-10-101 et seq., 10 C.R.S., as from time to time amended, or otherwise available to OWNER, its officers, its employees, or its agents.

1.24 COMMENCEMENT, PROSECUTION AND COMPLETION OF WORK

The CONTRACTOR shall begin within ten (10) calendar days after receipt of written notice to proceed. If the completion date is not specified by the ENGINEER, the CONTRACTOR shall in the proposal, state the date on which he will have completed all work covered by this Contract. The completion date will, upon acceptance of the Contract, become binding upon the CONTRACTOR and his failure to complete all work within the time specified in his Proposal will subject him to the damages under the Contract for delays and damages. The CONTRACTOR shall at all times during the continuance of the Contract, prosecute the work with such forces and equipment, and by such methods of operations as in the judgment of the ENGINEER are sufficient to complete the work within the specified time. The Construction progress shall at all times be subject to the approval of the ENGINEER.

If requested by the ENGINEER, the CONTRACTOR shall provide the ENGINEER with a written Completion Schedule, showing detailed start and finish dates for all phases of the Construction Program. CONTRACTOR shall be given ten (10) calendar days to deliver such schedule.

1.25 CONSTRUCTION PROGRAM

Within ten (10) calendar days after date of receipt of Notice to Proceed, the CONTRACTOR shall for information purposes furnish the ENGINEER a complete construction program showing in detail his proposed program of operation, which construction program shall provide for orderly performance of the work. The Construction program shall be in such form and in such detail, as to properly show the sequence of operations and the period of time required for

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completion of the work under each item of the schedule. Revised construction programs shall be submitted at intervals of not more than one month and in addition thereto, the CONTRACTOR shall immediately advise the ENGINEER of any proposed change in his construction program.

1.25.1 WORK RULES

CONTRACTOR shall perform all work hereunder in keeping with the rules and regulations that the OWNER may promulgate at any time for the safe, orderly, and efficient conduct of all operations.

The OWNER shall have the right to require of CONTRACTOR the immediate removal from the Project of any employee of Contract or of its subcontractors who, in the discretion of the OWNER, is not qualified to perform the work assigned to him or is guilty of improper conduct.

Nothing contained in the Contract shall constitute CONTRACTOR as being an employee of the OWNER, ENGINEER, or their authorized representatives, nor shall any employment relationship between the OWNER and CONTRACTOR be created by the terms hereof.

CONTRACTOR is responsible for the safety of any of its materials, tools, possessions, and rented items stored on the job site and for protection of the Project, and shall hold the OWNER, ENGINEER, or their authorized representatives harmless from any damages or loss incurred thereto.

1.26 SANITATION

The OWNER may establish sanitary and police rules and regulations for all forces employed under this Contract, and if the CONTRACTOR fails to enforce these rules, the OWNER may enforce them at the expense of the CONTRACTOR. Sanitary conveniences must comply with the Town, County and State Health Department Regulations.

1.27 CLEANING UP

Upon completion of the work, the CONTRACTOR shall, at his or its expense, remove from the vicinity of the work, all plant, buildings, rubbish, unused materials, concrete forms and other like material, belonging to him or used under his direction during construction, and in the event of his failure to do so, the same may be removed by the OWNER and the CONTRACTOR, his Surety or Sureties, shall be liable for the cost thereof. Also during the construction of the work, the site, partially finished structures, and material stockpiles shall be kept in a reasonable state of order and cleanliness. If at any time during the construction, inspection of any portion of the work is hampered by rubbish, unused material, old forms and other like material, the same shall be removed by the CONTRACTOR, or by the OWNER at the CONTRACTOR's expense, if the situation is not remedied within a reasonable length of time.

1.28 TAXES

CONTRACTOR shall pay all sales, consumer, use and other similar taxes required to be paid by him.

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OWNER is exempt from Colorado State sales and use taxes. Accordingly, taxes from which OWNER is exempt shall not be included in the Agreement Price. OWNER shall, upon request, furnish CONTRACTOR with a copy of its certificate of tax exemption. CONTRACTOR and Subcontractors shall apply to the Colorado Department of Revenue, Sales Tax Division, for an Exemption Certificate, and purchase the materials tax free. Pursuant to Subsection 39-26-114(1)(a)(xix), C.R.S., CONTRACTOR and Subcontractors shall be liable for exempt taxes paid due to failure to apply for Exemption Certificates or for failure to use said Certificates.

1.29 USE OF COMPLETED PORTIONS

The OWNER shall have the right to take possession of and use any completed portions of the work, notwithstanding the time for completing the entire work or such portions as may not have expired; but such taking possession and use shall not be deemed an acceptance of any work not completed in accordance with the Contract Documents. If such prior use increases the cost of, or delays the work, the CONTRACTOR shall be entitled to such extra compensation or extension of time, or both, as the ENGINEER may determine.

1.30 CHANGES AND EXTRAS

If, in the construction it becomes necessary to change or add to the work covered by these specifications, in order to complete the contract and the material or labor involved, if such change is not included in the unit or lump sum prices of the Contract, but forms an inseparable part of the work to be done under this Contract and the delay involved in asking for and advertising for bids and the letting of a new contract therefore might result in damage, injury to or impairment of the plant, work, system, or other property belonging to the OWNER, the OWNER through the ENGINEER may, at its discretion, declare an emergency and require the CONTRACTOR to proceed with such alterations and additions. All such work performed under such written changes or alterations shall be executed under all of the conditions of the original Contract. Extension of time to complete the Contract because of delays due to changes and extra work shall be allowed on a reasonable basis. The CONTRACTOR shall receive no extra compensation for the performance of any work he considers outside the Contract price unless such extra work or change order has been approved by the OWNER and issued in writing by the ENGINEER. If the CONTRACTOR performs work he considers outside the Contract and the ENGINEER will not issue changes thereon, he must notify the ENGINEER of his intent of claim before performing the work so that the ENGINEER can check the extra work and within ten (10) days after completion of said work, the CONTRACTOR shall file a written claim in duplicate with the ENGINEER setting forth the basis of the claim and the cost of the work as though it had been allowed by the ENGINEER on a cost-plus basis as set forth in these specifications. Said claim will be presented to the OWNER and the disposition of the OWNER will be final and binding on the CONTRACTOR. The OWNER will not consider extra claims by the CONTRACTOR submitted after thirty (30) days have elapsed from the completion of the work and in no event after completion and final inspection as determined by the ENGINEER.

The basis for issuing change orders is extra items or items not included in the original contract that are pertinent to the work covered by the contract.

The amount of increase or decrease in price allowed for changes and extras shall be arrived at as follows: 1) Unit prices as set forth by the CONTRACTOR or used by the CONTRACTOR in making his bid. 2) When unit prices are not available, the ENGINEER and the CONTRACTOR may agree on unit or lump sum prices subject to the approval of the OWNER. 3) If unit prices are not available and agreement on a price cannot be reached, then the work shall be done on a Cost-Plus Basis which shall be the cost invoiced to the CONTRACTOR for materials plus 15%; and the CONTRACTOR's standard hourly rates for labor and equipment submitted at the time of Contract Award. The labor and equipment rates shall include salaries, overhead, benefits, and profit. The standard rate schedule may be negotiated at the time of Contract among the OWNER, ENGINEER, and CONTRACTOR. Before beginning cost-plus work, the ENGINEER shall approve the men, material, and equipment and estimated maximum hours of men and equipment to be used. Anything used other than approved by the ENGINEER, shall be at the CONTRACTOR's expense.

1.31 DELAYS AND DAMAGES

If the CONTRACTOR refuses or fails to prosecute the work, or any separable part thereof, with such diligence as will insure its completion within the time

specified in the Proposal, or any written extension thereof, or fails to complete said work within such time, the OWNER may, after fifteen (15) days written notice to the CONTRACTOR and his Sureties, terminate his right to proceed with the work or such part of the work which has been delayed. In such event, the OWNER may take over the work and prosecute the same to completion, by Contract or otherwise and the CONTRACTOR and his Sureties shall be liable to the OWNER for any cost in excess of the Contract price occasioned the OWNER thereby. If the CONTRACTOR's right to proceed is so terminated, the OWNER may take possession of and utilize in completing the work, such materials, appliances and plants as may be on the site of the work and necessary therefore. If the OWNER does not terminate the right of the CONTRACTOR to proceed, the CONTRACTOR shall continue the work; in which event it will be impossible to determine the actual damages for the delay and in lieu thereof the CONTRACTOR shall pay the OWNER as fixed, agreed and liquidated damages for each calendar day of delay until the work is completed or accepted, the amount as set forth in the specifications or accompanying documents and the CONTRACTOR and his Surety or Sureties shall be liable for the amount thereof; provided that the right of the CONTRACTOR to proceed shall not be terminated or the CONTRACTOR charged with liquidated damages because of any delays in the completion of the work due to unforeseeable cause beyond the control and without the fault or negligence of the CONTRACTOR, including, but not restricted to, acts of God, or of a public enemy, acts of the OWNER, acts of another CONTRACTOR in the performance of a separate contract with the OWNER, floods, epidemics, strikes, freight embargoes, or unusually severe weather; the CONTRACTOR shall, within two (2) days from the beginning of any such delay, notify the ENGINEER, in writing, of the cause of delays. The ENGINEER shall ascertain the facts and extent of any such delays and may, in writing, extend the time for completion of the work when in his judgment the facts as determined by him justify such extension. Such findings of fact thereon by the ENGINEER shall be final, conclusive and binding on the parties hereto, provided however, that the CONTRACTOR may, within fifteen (15) days of such decision, in writing, appeal to the OWNER. The OWNER shall hold a hearing and take evidence from both

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the CONTRACTOR and the ENGINEER and make a determination of the issue. Such a determination by the OWNER as to the facts of delay and right to time of extension, if any, shall be final and conclusive upon the parties and there shall be no appeal from such decision.

1.32 PROTESTS

The ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Claims, disputes and other matters relating to the acceptability of the Work or the interpretation of the requirements of the Contract Documents pertaining to the performance and furnishing of the Work and Claims in respect of changes in the Contract Price or Contract Time will be referred initially to ENGINEER in writing with a request for a formal decision in accordance with this paragraph, which ENGINEER will render in writing within a reasonable time. Written notice of each claim, dispute and other matter will be delivered by the claimant to ENGINEER and the other party to the Agreement promptly (but in no event later than ten days) after the occurrence of the event giving rise thereto, and written supporting data will be submitted to ENGINEER and the other party within fifteen days after such occurrence unless ENGINEER allows as additional period of time to ascertain more accurate data in support of the claim.

When functioning as interpreter and judge, ENGINEER will not show partiality to OWNER or CONTRACTOR and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by ENGINEER with respect to any such claim, dispute or other matter will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such claim, dispute or other matter.

If the CONTRACTOR considers any work demanded of him to be outside the requirements of the Contract, or considers any record or ruling of the ENGINEER or of the inspector to be unfair, he shall immediately upon such work being demanded, or such record or ruling being made, ask in writing for written instructions or decisions, whereupon he shall proceed without delay to perform the work or to conform to the record or ruling, and within ten (10) days after date of receipt of the written instructions or decisions, he shall file a written protest with the ENGINEER, stating clearly and in detail, the basis of his objections. Except for such protest or objections as are made of record in the manner herein specified, and within the time limit stated, the records, rulings, instructions or decisions of the ENGINEER shall be final and conclusive. Instructions and decisions of the ENGINEER contained in letters to the CONTRACTOR and letters transmitting drawings to the CONTRACTOR shall be considered as written instructions or decisions, subject to protest or objections as herein provided. The ENGINEER shall ascertain the facts of all written protests and objections as submitted by the CONTRACTOR and answer the protest or objection based upon his findings. Such findings by the ENGINEER will be final, conclusive and binding on the parties hereto, provided, however, that the CONTRACTOR may, within thirty (30) days of such decision, in writing, appeal to the OWNER. The OWNER shall hold a hearing and take evidence from both the CONTRACTOR and the ENGINEER and make a determination of the issue. Such a determination by the OWNER as to the facts of the protest or objection shall be final and conclusive upon all parties, and there shall be no appeal from such a decision.

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1.33 PAYMENT TO THE CONTRACTOR

Monthly partial payments will be made by the OWNER based on the ENGINEER's estimate of the amount and value of the work completed during the month. Five (5) percent of the monthly payment will be withheld until completion of work, final inspection, acceptance and advertisement is made. For municipal and Governmental OWNERS, retainage will be withheld in accordance with CRS 24-91-103. In making up the monthly estimate, the ENGINEER will give full credit for material delivered to the site, but not incorporated in the work and acceptable preparatory work. No credit will be given for material used but not permanently incorporated in the work. The paid invoice value of the functional equipment delivered but not incorporated in the work will be allowed in the ENGINEER's estimate. Equipment shall be considered incorporated only after it is permanently placed and all electrical, mechanical, plumbing and accessory connections have been made and equipment tested. The monthly estimates will be made on all work completed at a given date to be set by the OWNER within ten (10) days before or after the last day of the calendar month, and partial payment will be made within thirty (30) days thereafter, provided there are no claims filed with the OWNER or by the OWNER against the CONTRACTOR. The making of a partial payment does not constitute acceptance on the part of the OWNER, or of the ENGINEER, of any part of the equipment furnished or work completed that might later prove to be unacceptable, but is considered only as payment on account.

At least twenty days before each progress payment is scheduled (but not more often than once a month), CONTRACTOR shall submit to ENGINEER for review an Application for Payment filled out and signed by CONTRACTOR covering the work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. The form for the Application for Payment shall be as prescribed by the ENGINEER. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice or other documentation warranting that OWNER has received the materials and equipment free and clear of all liens, charges, security interests and encumbrances and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect OWNER's interest therein, all of which will be satisfactory to OWNER.

The CONTRACTOR warrants and guarantees that title to all Work, materials and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to OWNER no later than the time of payment, of that particular Application for Payment, free and clear of all Liens.

The ENGINEER's recommendation of any payment requested in an Application for Payment will constitute a representation by the ENGINEER to the OWNER, based on the ENGINEER's on-site periodic observations of the work in progress as an experienced and qualified design professional and on the ENGINEER's review of the Application for Payment and the accompanying data and schedules that the Work has progressed to the point indicated; that, to the best of ENGINEER's knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning

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whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work, and to any other qualifications stated in the recommendation); and that the CONTRACTOR is entitled to payment of the amount recommended. However, by recommending any such payment the ENGINEER will not thereby be deemed to have represented that exhaustive or continuous on-site inspections have been made to check the quality or the quantity of the Work beyond the responsibilities specifically assigned to the ENGINEER in the Contract Documents or that there may not be other matters or issues between the parties that might entitle the CONTRACTOR to be paid additionally by the OWNER or the OWNER to withhold payment to the CONTRACTOR.

The ENGINEER may refuse to recommend the whole or any part of any payment if, in the ENGINEER's opinion, it would be incorrect to make such representations to the OWNER; the ENGINEER may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended, to such extent as may be necessary in the ENGINEER's opinion to protect the OWNER from loss because:

- a. the Work is defective, or completed Work has been damaged requiring correction or replacement.
- b. the Contract Price has been reduced by Written Amendment or Contract Modification.
- c. the OWNER has been required to correct defective Work or Complete Work.

The OWNER may refuse to make payment of the full amount recommended by the ENGINEER because claims have been made against the OWNER on account of the CONTRACTOR's performance or furnishing of the Work or Liens have been filed in connection with the Work or there are other items entitling the OWNER to a set-off against the amount recommended, but the OWNER must give the CONTRACTOR immediate written notice (with a copy to the ENGINEER) stating the reasons for such action.

The monthly partial payments may be withheld by the OWNER if - (a) defective work is not remedied, (b) claims filed or reasonable evidence indicating probable filing of claims by a third party or parties against the CONTRACTOR concerning the work or this Contract, (c) failure of CONTRACTOR to make payments properly for all labor, materials and services for the work of this Contract, (d) reasonable doubt by the OWNER or ENGINEER that the Contract can be completed for the balance due on the Contract, (e) any evidence of damage to persons or property not completely resolved to the OWNER's satisfaction or (f) any evidence of violation or failure to comply with the provisions of this Contract.

After complete satisfactory evidence has been submitted by the CONTRACTOR to the OWNER that the grounds for withholding the payments are removed, the partial payments withheld will be made. If the grounds may be removed or partially removed by the OWNER paying the amount due or a portion of the amount due the CONTRACTOR to a third party, as determined by judicial action or stipulation of the parties, then the OWNER may make such payments. The CONTRACTOR shall be financially responsible within the Contract price without additional cost

to the OWNER for any interest upon such withheld funds which should be found due the claimant by such judicial action or agreement of the parties. The OWNER may require the CONTRACTOR to file a sworn statement setting forth that all claims for work and labor performed and for all materials furnished or equipment rented under said Contract have been and are paid for the entire period of time for which payment is to be made before making the payment. If the OWNER is a District or municipal entity, they shall require the filing of the sworn statement prior to the release of each monthly partial payment and cash contract modification.

All material and work for which partial payment is made by the OWNER shall thereupon become the sole property of the OWNER; however, it is expressly agreed that this provision shall not operate or be construed, until final payment and acceptance of the entire job, as relieving the CONTRACTOR from complete responsibility for any and all injuries or damage to materials and work as heretofore set forth in this Contract upon which payments may have been made or the restoration of any such damaged construction, nor shall this clause operate or be construed as a waiver of the right of the OWNER to require fulfillment of each and every one the terms of this Contract.

Upon completion of the work under this Contract, before the CONTRACTOR shall receive or be paid for the work based upon the ENGINEER's final estimate, there shall be published by the OWNER in a newspaper of general circulation distributed within the area and posted upon the completed work itself, a notice that the OWNER is ready to accept on a certain date, such completed work according to the plans and specifications and rules set forth in the Contract, and further stating that the CONTRACTOR has applied for a final settlement under this Contract, and that not less than thirty (30) days after first publication, on a certain date, the OWNER will pay to the CONTRACTOR, the full balance due under this Contract and all persons having claims for labor, services or material furnished the CONTRACTOR, who shall not have been paid therefore, shall present the same to the OWNER, in writing, and verified, prior to said date specified, or the OWNER shall be free of all liability for attempting to obtain payment to such persons by the CONTRACTOR. Nothing herein contained shall operate or be construed in any way as relieving the CONTRACTOR and his Sureties upon the CONTRACTOR's Bond from any claim or claims for work or labor done or materials, services or supplies or other commodities furnished to the CONTRACTOR in the execution of this Contract, whether or not the same be presented to the OWNER prior to final payment in accordance herewith.

1.34 SURVEYS

All lines, grades and elevations will be established and furnished by the ENGINEER. The ENGINEER shall have a representative to stake out the work; the CONTRACTOR shall furnish all line stakes and all hubs or hardwood pegs to stake out water lines, sewer lines, and structures to line and grade. The CONTRACTOR shall furnish any and all assistance to the inspector for setting necessary lines and grades. When necessary, the CONTRACTOR's operation shall be suspended to permit the staking of the work, but such stoppage will be as brief as possible and the CONTRACTOR shall be allowed no extra payment therefore. All costs in connection with furnishing stakes and personnel to perform the work covered in this item shall be included in the applicable unit or lump sum price bid in the schedule for the item in which the survey work occurs.

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1.35 LIQUIDATED DAMAGES

If the project described herein is not completed within the time allotted, the OWNER will incur damages in the form of, but not limited to, additional professional fees, and the potential for additional costs for other contracts providing facilities related to this work. For these damages, the sum of \$500.00 per day shall be assessed against the CONTRACTOR for each calendar day delay beyond the date fixed for completion as shown in the Contract Documents.

1.36 LIEN WAIVERS

The project shall be advertised for final payment. The OWNER shall require lien waivers from the CONTRACTOR for material on monthly payments and lien waivers on all labor and material before final inspections and release of retainage.

1.37 THE DRAWINGS

Bound herewith or furnished separately and made a part of these specifications are the Project Drawings showing the detailed work to be completed. The Drawings indicate the approximate locations of pipelines and facilities and are schematic in nature. Existing utilities are shown based on the best current information.

1.38 DEFINITIONS

Wherever used in these Contract Documents the following terms shall have the meanings indicated.

Contract Documents : The General Conditions, Notice of Award, Notice of Prequalification of Bidders, Notice to Bidders, Notice to Proceed, Instructions to Bidders, Proposal and Bid Schedule, Drawings, Bid Bond, Technical Specifications, Performance, Payment and Maintenance Bond, Addenda, Certificate of Insurance (to be provided by CONTRACTOR), Contract, Certificate of Incorporation, Change Orders, Field Orders, and ENGINEER's written clarifications.

Contractor – The person, firm or corporation with whom the OWNER has entered into the Contract for the performance of the Work covered in these specifications.

Engineer – Identified individual or individuals representing GEI Consultants, Inc. including their associates and sub-consultants working on this project under contract to GEI Consultants, Inc.

Owner – The Grand County Water and Sanitation District No. 1, with whom the CONTRACTOR has entered into the Contract to perform the Work covered by the Contract Documents.

Proposal – The bid or offer of the bidder submitted on the prescribed form setting forth the prices to perform the Work covered by the Contract Documents.

Work – The entire completed construction or the various separately identifiable parts thereof required to be performed under the Contract Documents. Work includes and is the result of

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performing or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all as required by the Contract Documents.

END OF SECTION

**SECTION 00 08 30
HEALTH AND SAFETY**

PART 1 GENERAL

1.1 SCOPE

Affirmative duty to comply with safety regulations, safety criteria, site conditions, safety and health regulations for construction, Occupational Safety and Health Administration (OSHA), requirements for a written Health and Safety Plan.

1.2 REFERENCES

The following reference documents are a part of this Section as specified and modified.

29 CFR	Contract Work Hours and Safety Standards Act, Section 107, U.S. Department of Labor, Labor Building, 14th and Constitution Avenue N.W., Washington, DC 20013
29CFR 1910	OSHA Process Safety Management of Highly Hazardous Chemicals; Explosives, and Blasting Agents
29 CFR 1926	Construction Industry Standards, Occupational Safety and Health Administration, U. S. Department of Labor
IFC 2003	International Fire Code, Chapter 14, Fire Safety During Construction and Demolition

1.3 OCCUPATIONAL SAFETY AND HEALTH REGULATIONS

CONTRACTOR has the affirmative duty to comply with all Occupational Safety and Health Administration (OSHA) regulations and remedy all identified OSHA violations. CONTRACTOR shall designate a competent person responsible for identifying existing or predictable hazards at the site, providing required safety instruction for Subcontractors and employees, and of immediately taking precautionary measures when necessary. Daily inspections of the work site, including excavations, adjacent areas and protective systems, shall be the sole responsibility of CONTRACTOR. CONTRACTOR shall indemnify OWNER against any failure of CONTRACTOR to fully comply with OSHA regulations.

1.4 HEALTH AND SAFETY PLANNING & TRAINING

A. CONTRACTOR is solely responsible for all Health and Safety Planning addressing all pertinent issues, including but not limited to the following items, with its staff:

1. Accountabilities & responsibilities for managers, supervisors, and employees
2. Safety and health orientation program for new hires and new supervisors
3. Periodic safety and health performance appraisals for all employees
4. Hazard recognition and control

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5. Procedures to ensure that employees follow safety rules
6. Hearing conservation
7. Respiratory protection
8. Employee training, fitness testing, and medical certification of fitness for work
9. Hazard communication
10. Fire Protection and Prevention
11. Substance abuse program
12. Emergency Procedures, First aid and CPR training and certifications
13. Site safety/health meetings for employees, new hires and subcontractors
14. Accident reports and documentation of cause and corrective measures taken
15. Statistical summary of accidents and injuries and lost work days
16. Employee training in use, inspection, and maintenance of personal protective equipment
17. Routine inspections on operating equipment (cranes, forklifts, loaders, etc.) and certification records for maintenance of operating equipment

1.5 CONTRACTOR RESPONSIBLE FOR SAFETY

CONTRACTOR shall bear sole responsibility for initiating, maintaining and supervising all safety precautions and programs in connection with the Work and for safe job site conditions during the Project, including the safety of all persons who may enter on the job site for any reason and the security of all property located on the job site throughout the course of the Project.

A. SAFETY OFFICER

CONTRACTOR shall designate a responsible employee as a Safety Officer at the site who shall establish and oversee safety procedures and measures to prevent accidents. This person shall be CONTRACTOR's superintendent unless otherwise designated in writing by CONTRACTOR to OWNER.

B. PREVENTION OF DAMAGE, INJURY OR LOSS

CONTRACTOR's duties and responsibilities for health and safety shall continue until all the Work is completed and final payment has been made. CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to all employees on the Work or other persons who may be affected thereby.

C. BARRICADES AND SIGNS

The CONTRACTOR shall provide, erect and maintain all necessary barricades, signs, signals and lights to protect the Work and the safety of the public. CONTRACTOR shall comply with the provisions of the prevailing traffic code and supporting ordinances enacted by the Town of Fraser (Town). All barricades, signs and obstructions erected by the CONTRACTOR shall be illuminated at night and all devices for this purpose shall be kept burning from sunset to sunrise meeting Town and CDPT requirements. The CONTRACTOR's responsibility for necessary barricades, signs, and lights shall not cease until Final Acceptance of the Project.

D. SANITARY FACILITIES

The CONTRACTOR shall provide and maintain sanitary accommodations for the use of employees in compliance with the Town, and the Colorado Department of Public Health and Environment.

E. HAZARD COMMUNICATION PROGRAM

CONTRACTOR shall be responsible for coordinating any exchange of material safety data sheets (MSDS) or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

F. PERSONAL PROTECTIVE EQUIPMENT

For work involving harmful substances, work in places emitting gases, vapors or dust, work in areas with potential contamination with pathogens or other harmful agents, provide workers with personal protective equipment such as protective clothing, goggles and respiratory equipment. When working on aerial locations or elevated platforms, use fall protection systems such as safety belts, harnesses, etc. Hard hats are mandatory at all times on the job site.

G. PREVENTION OF EXPLOSIONS OR FIRES

Where vapors of flammable substances, combustible gases, or combustible dust exist, implement measures such as ventilation and dust containment to prevent explosions or fires due to vapors, gases or dusts. Where there is potential of ignition or explosion due to contact between different types of substances, store them separately.

Dispose of rags soaked with solvents, oil, or other flammable substances by drying prior to storage in a non-combustible container with lid. Do not use equipment that produces sparks or arcs, or that reach a high temperature or perform welding, cutting or other operations using open flame at places where combustible dust, flammable substances, or hazardous substances exist.

H. CONSTRUCTION EQUIPMENT AND MACHINERY

When using vehicle-type construction machinery (such as bulldozers, tractor shovels, loaders, cranes) conform to maximum load and stability limits and take measures to prevent overturning or falling of the construction machinery. When lifting or hoisting construction materials, take measures to prevent falling of the load and overturning or collapse of the construction machinery. Prevent employees from entering work areas where construction machinery in operation has potential to strike employees. Where there are risks of falling of rocks or debris, provide the construction machinery with head guards. For operation in unlit enclosures, provide vehicle-type construction machinery with head lamps. When an equipment operator leaves the operator's seat of the machinery, set working devices such as a bucket, ripper, etc. onto the ground and prevent uncontrolled travel of the machine by cutting off the engine and setting the emergency brake. When using any vehicle-type construction machinery, workers shall not ride on any place other than the operator's seat.

1.6 EXPLOSIVES

Use of explosives shall not be permitted for the prosecution of the Work.

1.7 SMOKING PROHIBITED

Environmental tobacco smoke is classified as a Group A carcinogen by the Environmental Protection Agency. The Project site shall be maintained as a smoke free workplace to ensure a healthy work environment. CONTRACTOR shall notify employees, subcontractors and vendors that smoking is prohibited except within designated smoking areas. With prior consent of OWNER, CONTRACTOR may establish a designated smoking area for his employees located outside of OWNER's facilities and areas under construction. In each designated smoking area established by CONTRACTOR, post a smoking sign and provide portable fire extinguishers.

1.8 HAZARDOUS ENVIRONMENTAL CONDITIONS

A. RELIANCE BY CONTRACTOR ON TECHNICAL DOCUMENTS

Potentially Hazardous Environmental Conditions, other than existing buried power lines along the pipeline corridor, are not identified at the worksite. CONTRACTOR may not rely upon or make any Claim against OWNER, ENGINEER or any of ENGINEER's Consultants with respect to:

1. The completeness of such technical data for CONTRACTOR's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction employed by CONTRACTOR and safety precautions and programs incident thereto.
2. Other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings

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3. Any CONTRACTOR interpretation of or conclusion drawn from any technical data or any such other data, interpretations, opinions or information.

B. RESPONSIBILITY FOR HAZARDOUS ENVIRONMENTAL CONDITIONS

CONTRACTOR shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. CONTRACTOR shall be responsible for a Hazardous Environmental Condition created by its execution of the Work.

C. OWNER TO EVALUATE HAZARDOUS ENVIRONMENTAL CONDITIONS

OWNER shall promptly consult with ENGINEER concerning the necessity for OWNER to retain a qualified expert to evaluate such condition or take corrective action, if any. CONTRACTOR shall not resume Work in any affected area until after OWNER has obtained any required permits related thereto and delivered to CONTRACTOR written notice specifying:

1. Any affected area that is or has been rendered safe for the resumption of Work
2. Any special conditions under which such Work may be resumed safely.

PART 2 PRODUCTS

2.1 SECURE STORAGE

- A. All potentially harmful chemicals, fuels, paints, etc. that remain onsite during night time and weekend time must be securely looked up in a vandal proof container or trailer.

2.2 JOB SITE FIRE BOX

- A. When working in forested areas, the CONTRACTOR shall furnish and maintain in a serviceable condition a fire box for its personnel to be used only for suppressing forest fires. This box with the tools will be kept sealed and available within the immediate working area of the crew. Each fire box will have in a serviceable condition, the following minimum items:
 1. 5 round point (0 or larger) shovels
 2. 2 double bitted axes
 3. 2 backpack pumps
 4. 3 pulaskis

2.3 FIRE EXTINGUISHER AND TOOLS ON EQUIPMENT

- A. When working in forested areas, each internal combustion engine including tractors, trucks, yarders, loaders, welders, generators, stationary engines, or comparable powered equipment shall be provided with at least the following:
1. One fire extinguisher, at least 5#ABC with an Underwriters Laboratory (UL) rating of 3A – 40BC, or greater.
 2. One shovel, sharp, size 0 or larger, round-pointed with an overall length of at least 48 inches.
 3. One axe, sharp, double bit 3½#, or one sharp Pulaski.

PART 3 EXECUTION

3.1 SAFETY AND HEALTH REGULATIONS

Comply with Safety and Health Regulations for Construction under Section 107 of the Contract Work Hours and Safety Standards Act, Title 29, CFR. Comply with the provisions of the Federal Occupational Safety and Health Act, as amended.

3.2 COOPERATION WITH PUBLIC SAFETY AGENCIES

Comply with all applicable laws, ordinances, rules, regulations and orders of any public agency having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Notify owners of adjacent property and utilities when prosecution of the Work may affect them.

3.3 SAFETY OF TEMPORARY ACCESS

Provide and maintain in a safe condition temporary approaches, crossings, or intersections with roads and highways including roadway approaches and structures of such crossings.

3.4 RESPONSE TO HAZARDOUS ENVIRONMENTAL CONDITIONS

If CONTRACTOR encounters or creates a Hazardous Environmental Condition, immediately:

1. Secure or otherwise isolate such hazard
2. Stop all Work in any area affected by such hazard (except for emergency response)
3. Notify OWNER and ENGINEER (and promptly thereafter confirm such notice in writing).

END OF SECTION

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**SECTION 00 08 40
INSURANCE REQUIREMENTS**

PART 1 GENERAL

1.1 SCOPE

Requirements for insurance including minimum acceptable limits of insurance coverage, Additional Insured parties, and deductibles.

1.2 INSURANCE COVERAGE

A. INSURANCE CERTIFICATES

CONTRACTOR shall purchase and maintain general liability and other insurance during the entire term of this Agreement. CONTRACTOR shall not commence work until all required insurance has been obtained and insurance certificates have been provided to the OWNER and the State. All certificates of insurance shall state that 45 days written notice will be given to the OWNER and to the State prior to cancellation or change of the policy. Policies shall also specify that the insurance provided by the CONTRACTOR will be considered primary and not contributory to any other insurance available to the OWNER, the State, or the ENGINEER. All insurance policies in any way related to this project and contract shall include clauses stating that each carrier shall waive all rights of recover, under subrogation or otherwise, against the OWNER or the State, its agencies, institutions, organizations, officers, agents, employees, and volunteers.

B. WORKER'S COMPENSATION AND EMPLOYER LIABILITY INSURANCE

The CONTRACTOR shall take out and maintain during the life of this contract the applicable statutory Worker's Compensation Insurance with an insurance company authorized to write such insurance and in the applicable state covering all employees, and in the case of any work sublet, the CONTRACTOR shall require the subcontractor similarly to provide statutory Worker's Compensation Insurance for the latter's employees. The CONTRACTOR maintain Employer's Liability Insurance with an insurance company authorized to write such insurance in all states where the CONTRACTOR will have employees located in the performance of this contract and the CONTRACTOR shall require each subcontractor similarly to maintain Employer's Liability Insurance on its employees. The Employer's Liability Insurance shall also cover all of the OWNER's employees acting within the course and scope of their employment with regard to this project and contract.

C. COMMERCIAL GENERAL LIABILITY INSURANCE

The CONTRACTOR shall maintain Public Liability Insurance, written on ISO occurrence from CG 00 01 10/93 or equivalent covering premises operations, fire

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damage independent contractors, products and completed operations, blanket Grantual liability, personal injury and advertising liability. Also to protect against claims for damages resulting from (1) bodily injury, including wrongful death, and property damage, which may arise from operations under this contract whether such operations be by the CONTRACTOR or any subcontractor or anyone directly or indirectly employed by either of them. Coverage shall be provided under a Commercial General Liability form of policy. The property damage coverage shall include a Broad Form Property Damage Endorsement. Contractual Liability coverage shall be included. Products Liability and/or Completed Operations coverage shall be provided for at least two (2) years following substantial completion of the work.

D. AUTOMOBILE LIABILITY INSURANCE

The CONTRACTOR shall maintain comprehensive Automobile Liability Insurance to protect against claims for damages resulting from (1) bodily injury, including wrongful death, and (2) property damage, which may arise from the operations of any owned, hired, or non-owned motor vehicles used by or for work in any capacity in connection with the carrying out of this contract.

E. OWNER'S PROTECTIVE LIABILITY

Provide OWNER's Protective Liability insurance shall be in the name of the OWNER, maintained in force for the duration of the contract by CONTRACTOR. Policy shall protect against any and all claims, and liabilities for injury to or death of persons, or damage to property caused in whole or in part by, or alleged to have been caused in whole or in part by, the negligent acts or omissions of CONTRACTOR, CONTRACTOR's agents, employees, or subcontractors, in connection with or resulting from the operations performed under the terms of the agreement.

F. EXCESS LIABILITY

Provide Excess Liability insurance to protect the CONTRACTOR against all claims in excess of the limits provided under the Commercial Automobile Liability and the Commercial General Liability.

G. EXPLOSION, COLLAPSE AND UNDERGROUND INSURANCE

If the contract requires any Work involving blasting, excavating, tunneling, or other underground work, the liability coverage shall include Standard Blasting or Explosion Coverage, Standard Collapse Coverage and Standard Underground Coverage, commonly referred to as X.C.U. property damage liability coverage.

H. PROPERTY INSURANCE

Provide "all risk" insurance for physical loss and property damage including theft, vandalism and malicious mischief, collapse and water damage. CONTRACTOR

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shall maintain builder's risk insurance written in completed value form to protect CONTRACTOR, OWNER, the State, and ENGINEER against risks of damage to buildings, structures, and materials and equipment not otherwise covered under other insurance. Builder's risk insurance shall include coverage for perils of fire and lightning, the perils included in the standard extended coverage endorsement, and the perils of vandalism and malicious mischief. The insurance limits shall be not less than the value of the Work at completion.

1.3 INSURANCE COVERAGE LIMITS

The minimum acceptable limits of insurance shall be as follows:

1. Worker's Compensation	Statutory
2. Employer's Liability	\$500,000 each accident
	\$500,000 disease - each employee
	\$500,000 disease - Policy Limit
3. Commercial General Liability Bodily Injury & Property Damage	Combined Single Limit: \$1,000,000 each occurrence \$1,000,000 Aggregate/Products/Completed Operations
4. Commercial Automobile Liability: Bodily Injury & Property Damage	Combined: \$ 1,000,000 each occurrence Aggregate: \$ 1,000,000
5. Excess Liability Policy X.C.U. Property Damage	\$ 1,000,000 each occurrence \$ 1,000,000 each occurrence
6. OWNER's Protective Liability Insurance	\$ 1,000,000
7. Builder's Risk Property Insurance	Value of the Work at completion
8. Umbrella liability policy	\$ 3,000,000

1.4 OWNER, STATE, AND ENGINEER ADDITIONAL INSURED

CONTRACTOR shall name OWNER, the State, and ENGINEER as Additional Insured under its Commercial General Liability insurance and Automobile Liability Insurance policies, and shall furnish proof of the same by delivery of a current and valid Certificate of Insurance.

1.5 PARTIAL UTILIZATION - PROPERTY INSURANCE

OWNER may occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work. Such use or occupancy shall not be cause for cancellation or lapse the property insurance prior to Final Completion of all the Work.

1.6 ACCEPTANCE OF INSURANCE

If the coverage or other provisions of the insurance purchased and maintained by CONTRACTOR do not comply with the Contract Documents, OWNER will notify CONTRACTOR in writing within ten (10) days delivery of insurance certificates to OWNER. OWNER and CONTRACTOR will each provide to the other such additional information in respect of insurance provided by him as the other may reasonably request. If OWNER does not notify CONTRACTOR of non-compliance with the Contract Documents within the time specified, insurance purchased by the CONTRACTOR shall be considered acceptable.

1.7 DEDUCTIBLES

No insurance coverages required to be provided by CONTRACTOR shall have a deductible greater than \$1,000 or as reasonably approved by OWNER.

PART 2 PRODUCTS (NOT USED)**PART 3 EXECUTION**

Certificates of all insurances cited above shall be provided at the signing of the Contract.

END OF SECTION

**SECTION 01 01 00
SUMMARY OF WORK**

PART 1 GENERAL

1.1 SUMMARY OF WORK

The Work to be performed in strict accordance with all of the Contract Documents consists of the following:

- A. Excavate materials within the reservoir footprint to the lines and grades shown.
- B. Import and process required volume of materials to U.S. 0.5" or smaller, blend with 2.5% bentonite, place and compact as shown on the construction plans.
- C. Place blended material as to the lines and grades shown and haul remaining material off-site to the Grand County Benson Pit.
- D. Furnish and install HDPE piping as shown on Drawings.
- E. Modify or replace existing riprap and grouted riprap erosion protection as shown in the Drawings.
- F. Furnish all site work, temporary facilities, miscellaneous labor, materials, and equipment to provide a complete project as shown on the plans and specifications.

1.2 TIME FOR COMMENCING AND COMPLETION

- A. Authorization for mobilization shall be the same as authorization of Notice-to-Proceed.
- B. The Work shall be substantially complete, including all testing, start-up, site work, and clean-up, by the date indicated in the Notice to Proceed.

1.3 SOIL INFORMATION

- A. Localized soils are expected to be alluvial soils, river cobbles, and occasionally larger boulders. Bedrock underlying the site is classified as the Troublesome Formation usually observed to be siltstone/claystone. At the time of excavation, OWNER's Representative will review soil conditions for conformance with this description.
- B. A soils report is included in the attachments to the specifications.

1.4 RECORD DRAWINGS

- A. CONTRACTOR shall maintain one neatly and legibly marked set of the Drawings indicating the As-Constructed locations, configurations, and elevations of the constructed work as per Section 01 07 75 – Project Closeout. Marking of the

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Drawings shall be kept current and shall be done at the time the material and equipment are installed. These drawings shall be available to OWNER upon request.

- B. As-Constructed surveys of the work shall be submitted as per Section 01 07 75 – Project Closeout.

1.5 WORK SEQUENCE AND CONSTRUCTION SCHEDULE

- A. Determination of the sequence of work shall be the responsibility of CONTRACTOR except as otherwise designated below.
- B. Work sequencing must address the requirements of the Contract Documents as well as any special requirements provided by OWNER. Work may not occur during weekends or holidays unless specific written permission is granted by OWNER.
- C. Work hours outside of the normal 8am to 5pm schedule must be approved by OWNER.
- D. CONTRACTOR shall submit a project schedule, per District Standard Specification 01330 and this Section, to OWNER within 10 days of the Notice of Award and prior to mobilization. This schedule will depict how CONTRACTOR will schedule and sequence the work in order to complete the project within the allotted time. CONTRACTOR shall continue to update this schedule weekly for project progress meetings.
- E. CONTRACTOR shall supply temporary facilities for general dewatering to divert water around or out of the area of construction as needed and to the approval of the OWNER and ENGINEER.

1.6 MOBILIZATION

- A. Mobilization on the site shall after receipt of the Notice to Proceed, and shall include, but not be limited to, the following items:
 - 1. Moving on to the site all plant and equipment required.
 - 2. Installing temporary construction utilities and facilities.
 - 3. Installing orange warning fencing, silt fencing, straw bales, and other drainage/erosion controls.
 - 4. Setting up CONTRACTOR's work and storage areas.
 - 5. Obtaining all required permits.
 - 6. Posting all OSHA and or State required notices. Establishment of safety programs.

- B. Prior to commencement of Mobilization and construction, CONTRACTOR shall fulfill the following:
1. 48-hour advanced written notice of intent to commence mobilization and construction shall be provided to OWNER stating date and time of commencement.
 2. A pre-construction conference is to be held and attended by, but not limited to, OWNER, ENGINEER, CONTRACTOR, CONTRACTOR's superintendent assigned to the project, and representatives of other entities affected by the proposed construction.
 3. Provide to OWNER photographs showing original conditions of the construction site and all important features existing prior to construction commencement.
 4. Provide to OWNER requests for dates that CONTRACTOR will require OWNER survey controls.

1.7 DEMOBILIZATION & CLOSEOUT

- A. Completion of all project closeout items including provision of all submittals, warranties, test results, site grading, and finalization of all punch list items.
- B. Demobilization shall include moving off the site of all plant equipment and surplus materials, final grading and dressing of the project area, and final cleanup.

1.8 CONTRACTOR SUBMITTALS

- A. The Preliminary Construction Schedule is required prior to mobilization and within ten days of the Notice of Award.
- B. CONTRACTOR shall not need to acquire a building permit.
- C. A complete list of submittals within 5 days of the Notice of Award. All final submittals prior to demobilization. Submittals shall comply with District Standard 01330.

1.9 CONSTRUCTION OBSERVATION

- A. Observation of construction will be performed by OWNER and its representatives. CONTRACTOR shall be responsible for notifying OWNER and ENGINEER at all critical points and before covering up any of the Work.

1.10 OSHA STANDARDS

- A. CONTRACTOR shall be bound by the latest provisions of Subpart F, Section 1926, of the OSHA Safety and Health Standards for Construction.

1.11 PROPOSAL, DRAWINGS, AND SPECIFICATIONS

- A. The Proposal lists the Unit Price and Lump Sum items for the Work defined by the Drawings and Specifications herein attached. CONTRACTOR shall be aware that the Proposal Items are assumed to be all inclusive as described and that ancillary labor, materials, and equipment should be included in the item price to provide to OWNER complete and ready for use items as part of the Work. The sum of the items required in the course of completing the Work specified herein should provide a physically completed project, as well as fulfill the intent of the project, as described in the specifications and as shown on the Drawings. CONTRACTOR shall also be aware and acknowledge in quoting prices listed in the Proposal for the project, that all items may not be used in completing the project and that for the items used, the final quantity of each used item may vary from the approximated quantity listed in CONTRACTOR's Bid Schedule.
- B. The Drawings are bound herewith and furnished separately and are made a part of these specifications and show the detailed work to be completed. The Drawings herewith indicate approximate routing of proposed pipelines and facilities and schematically show the Work to be completed. Existing utilities are shown based on the best current information. Final staking may not reflect exactly the Drawings, and staking changes due to existing utilities and conditions do not constitute design changes and are not extras or change orders except for the additional fittings, pipe, valves, etc. required to complete the Work. These additional fittings, pipe, valves, etc. will be paid according to the unit price as bid therefore in the Proposal.
- C. The specifications furnished and bound herewith are separated into several Divisions, generally according to the Construction Specifications Institute (CSI). The Specifications provide the technical and general guidelines governing the progress of the Work for the project.
- D. Drawings shall govern over Specifications and computed or written dimensions shall govern over scaled dimensions.
- E. The latest version of the Grand County Water and Sanitation District No. 1 Engineering Standards (District Standards) will be considered part of the Contract Documents for the Work.
- F. In the event of discovery of discrepancies or any type of error whatsoever in the Specifications, Drawings and/or District Standards, CONTRACTOR shall not adjust them, save at his own risk and expense, but shall immediately require in writing an interpretation of the intent of the Contract Documents from OWNER, which interpretation shall govern. If CONTRACTOR, as the Work progresses, finds any discrepancies between the Drawings and physical conditions, CONTRACTOR shall immediately inform OWNER in writing. OWNER shall promptly interpret the intent of the Contract and, in its sole judgment, authorize CONTRACTOR to proceed to the extent allowed herein and in accordance with the Contract documents.

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1.12 CWCB GRANT

CONTRACTOR shall acknowledge that a portion of this project is funded through a grant between the OWNER and the Colorado Water Conservation Board (CWCB). As such, the CONTRACTOR shall meet the CWCB grant requirements with regard to insurances and other aspects of the project.

PART 2 PRODUCTS**2.1 MATERIALS**

- A. All permanent materials shall be new, of good quality, and shall be transported and handled to the Manufacturer's recommendations and to the requirements of the Contract Documents.
- B. Temporary chain link fencing, security fencing, traffic control items, sanitary facilities, and other OWNER-approved temporary facilities can be used materials in good condition.

PART 3 EXECUTION

Not Used.

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**SECTION 01 01 10
ENVIRONMENTAL PROTECTION PROCEDURES**

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Furnish all labor, materials and equipment and perform all work required for the prevention of environmental pollution in conformance with applicable laws and regulations, during and as the result of construction operations under these Contract Documents.
- B. For the purpose of this Specification, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic and/or recreational purposes. Such pollution includes, but is not limited to, eroded soils, refuse, garbage, cement, concrete, sanitary waste, industrial waste, oil and other petroleum products, mineral salts and spirits, and thermal pollution.
- C. The control of environmental pollution requires consideration of air, water, and land, and involves management of noise and solid waste, as well as other pollutants.
- D. All phases of sedimentation and erosion control for construction within Town limits shall comply with the Town of Fraser Standards and be subject to the approval of the Town and the District. Construction activities shall meet County or State Highway requirements as required. Provide erosion control measures such as diversion channels, sedimentation or filtration systems, berms, staked straw bales, straw wattles, silt fencing, seeding, mulching, or other special surface treatments as required to prevent erosion and runoff into existing waterways and storm water system. Place all erosion control measures in an area prior to any construction activity in that area.
- E. These Specifications are intended to ensure that construction is achieved with a minimum of disturbance to the existing ecosystem. It is the CONTRACTOR's responsibility to determine the specific construction techniques to minimize disturbance.
- F. Construction equipment shall be maintained and tuned at the manufacturers' recommended intervals and to the recommended specification to minimize exhaust emissions. Vehicles and equipment that show excessive emissions of exhaust gases shall not be operated until corrective measures, repairs or adjustments are made.
- G. Construction equipment idling will be minimized when not in use. No vehicle or piece of equipment shall be idled for more than 30 minutes.

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1.2 APPLICABLE REGULATIONS

- A. Comply with all applicable Federal, State, and local laws and regulations concerning environmental pollution control and abatement.

1.3 NOTIFICATIONS

- A. Should the District, its representative, the Town's representative, the County's representative, or any State or Federal agency responsible for verification of certain aspects of the environmental protection requirements notify the CONTRACTOR of any non-compliance with requirements, the CONTRACTOR shall immediately take corrective action. Such notice, when delivered to the CONTRACTOR or its authorized representative at the site of the Work, shall be deemed sufficient for the purpose. If the CONTRACTOR fails or refuses to comply promptly, the District may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the CONTRACTOR unless it is later determined that the CONTRACTOR was in compliance.

1.4 CHEMICALS

- A. All approved chemicals used during project construction or furnished for project operation, whether disinfectant, polymer, reactant or of other classification, shall show approval of either the U.S. Environmental Protection Agency or the U.S. Department of Agriculture. Use of all such chemicals and disposal of residues shall be in strict accordance with the printed instructions of the manufacturer.
- B. Storage and handling of flammable and combustible materials, provisions for fire prevention, and control of dust shall be in accordance with the latest applicable OSHA requirements.
- C. The CONTRACTOR shall submit Material Safety Data Sheets (MSDS) for any hazardous material proposed to be utilized in the construction of the Work. The CONTRACTOR shall follow the information on the MSDS to assure safe use, handling, storage and environmentally acceptable disposal of the material used.
- D. All chemicals stored in drums or tanks on site shall be provided with secondary containment facilities meeting Federal, State and local laws, ordinances, regulations and permit conditions. All spigots shall be positioned so that secondary containment facilities catch any drips.

1.5 PETROLEUM BASED PRODUCTS AND SPILLS

- A. All waste petroleum based products shall be contained in sealed containers and disposed of at approved recycling facilities, and, if not recyclable, shall be disposed of at an approved dumpsite. Any spills shall be promptly cleaned up and waste,

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spillage, and contaminated materials disposed of at an approved dumpsite. Proof that a spill is cleaned up adequately shall be done to the satisfaction of the District and to the requirements of the appropriate regulatory authority. The CONTRACTOR shall comply with applicable Federal, State and local laws, orders, regulations, permit conditions, and water quality standards concerning the control and abatement of water pollution. When laws are inconsistent, the more stringent shall apply. Violations of these applicable laws and regulations may result in the District stopping all work on site. All costs resulting from this work stoppage shall be the responsibility of the CONTRACTOR.

- B. All petroleum based products stored in drums or tanks on site shall be provided with secondary containment facilities meeting Federal and local laws, ordinances, regulations and permit conditions. All spigots shall be positioned so that secondary containment facilities catch any drips.

1.6 REFERENCES

- A. Occupational Safety and Health Administration (OSHA)

- 1. Safety and Health Standards for Construction

- B. Colorado State Division of Labor

1.7 SUBMITTALS

- A. CONTRACTOR shall submit to the District an environmental plan for dealing with hazardous materials and related items for approval.
- B. CONTRACTOR shall include erosion control plans, details, and notes, as required by the Town's Standards and Specifications for Design and Construction, with submitted construction plans.

PART 2 PRODUCTS

2.1 EROSION CONTROL

- A. All natural products used for erosion control shall be certified weed-free.

2.2 TRASH CONTROL

- A. Dumpsters located near wooded areas shall be bear-proof.

PART 3 EXECUTION**3.1 EROSION CONTROL**

- A. Within Town limits, provide erosion control measures meeting the Town's Standards for Construction per approved construction drawings.
- B. Meet County, and/or State requirements when applicable.

3.2 PROTECTION OF STREAMS

- A. Prevent damage to any stream from pollution by debris, sediment or other material, or from the manipulation of equipment and/or materials in or near such streams. Water that has been used for washing or processing, or that contains oils or sediments that will reduce the quality of the water in the stream, shall not be directly returned to the stream. Such waters shall be properly disposed of off-site or through a plan submitted and approved in writing by the DISTRICT that meets all Federal, State, and local laws, ordinances, and requirements.
- B. Do not discharge water from dewatering operations directly into any live or intermittent stream, channel, wetlands, surface water, sanitary sewer, or storm sewer. Water from dewatering operations shall be treated by filtration, settling basins, or other approved method to reduce the amount of sediment contained in the water to allowable levels and disposed of by methods approved in writing by the District and the Town.

3.3 PROTECTION OF LAND RESOURCES

- A. Land resources within the project boundaries and outside the limits of permanent Work shall be restored to a condition, after completion of construction, that will appear to be natural and not detract from the appearance of the project to the approval of the District and to the approval of the applicable Local, State, County, Federal, and/or private property owner. Confine all construction activities to areas shown on the Drawings.
- B. Outside of areas requiring earthwork for the construction of the new facilities, the CONTRACTOR shall not deface, injure, or destroy trees or shrubs, nor remove or cut them without prior approval. No ropes, cables, or guys shall be fastened to or attached to any existing trees for anchorage.
- C. Where trees may possibly be defaced, bruised, injured, or otherwise damaged by the CONTRACTOR's equipment and operations, protect such trees by placing boards or similar protection around them. Monuments and markers shall be protected similarly before beginning operations near them.
- D. Any trees or other landscape feature scarred or damaged by the CONTRACTOR's equipment or operations shall be restored to its original condition.

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1. All scars made on trees by equipment, construction operations, or by the removal of limbs larger than 1-inch in diameter shall be coated as soon as possible with an approved tree wound dressing. All trimming or pruning shall be performed in an approved manner by experienced professionals with saws or pruning shears. Tree trimming with axes will not be permitted.
 2. Climbing ropes shall be used where necessary for safety. Trees that are to remain, either within or outside established clearing limits, that are subsequently damaged by the CONTRACTOR and are beyond saving in the opinion of the OWNER, shall be immediately removed and replaced.
 3. All tree stumps shall be cut below the ground surface or removed. Removed stumps shall be hauled away or mulched and used on site.
- E. Dispose of all debris and excess material to federal, state, and local standards and outside wetland or floodplain areas, in an environmentally sound manner.

3.4 PROTECTION OF AIR QUALITY

- A. Burning. The use of burning at the construction site for the disposal of refuse and debris will not be permitted.
- B. Wind erosion control shall be in accordance with the Town's Standards and Specifications for Design and Construction, and/or other applicable standards when outside Town limits, or in areas under multiple jurisdictions.

3.5 RUBBISH CONTROL

- A. During the progress of the Work, the CONTRACTOR shall keep the site of the Work and other areas used by it in a neat and clean condition, and free from any accumulation of rubbish. The CONTRACTOR should be aware that the site is in an area prone to high winds. The CONTRACTOR shall dispose of all rubbish and waste materials of any nature occurring at the Work site. Disposal of all rubbish and surplus materials shall be off the site of construction in accordance with local codes and ordinances governing locations and methods of disposal, and in conformance with all applicable safety laws.
- B. The construction site shall be cleaned up each night before leaving. Tools and equipment shall be securely stored and locked down. Materials should also be staked, stored, and secured in a tidy manner.

3.6 MAINTENANCE OF EXISTING FACILITIES DURING CONSTRUCTION

- A. During the work, maintain all facilities necessary for the proper operation of the existing water and wastewater systems to the approval of the District.

- B. Other facilities and utilities, including, but not limited to, electrical power service, roadways, trail systems, remote restrooms, and the like shall be maintained in their existing condition and remain accessible throughout performance of the Work.
- C. Down time for any portion of the existing water and wastewater facilities shall be eliminated during weekends and holidays unless otherwise approved by the District.

3.7 NOISE CONTROL

- A. Minimize noises caused by construction operations. The CONTRACTOR shall comply with the requirements of the applicable local laws, permit conditions, and regulations concerning the prevention, control, and abatement of excessive noise.

3.8 NOXIOUS WEED CONTROLS

- A. Noxious weeds exist within the area and every means must be employed to avoid noxious weed proliferation and spreading. Bare areas not being actively worked on shall be mulched as a temporary weed preventative and erosion control.
- B. All landscaping materials, straw bales, seed, mulch, and the like shall be certified to be weed free.
- C. All construction vehicles and equipment shall be brought onsite in a clean condition and free from mud and vegetation carryover from other construction sites.

END OF SECTION

**SECTION 01 01 40
WORK RESTRICTIONS**

PART 1 GENERAL

1.1 PRIVATE AND PUBLIC LAND

- A. Do not enter or occupy private or public lands outside of easements and public rights-of-way, except by written permission of the landowner or controlling authority. Provide a copy of written authorization to the District if such entry is specifically for construction of facilities that will be transferred to the District.
- B. Construction within public and private lands may be restricted by additional conditions. It is the responsibility of the CONTRACTOR to be aware of and strictly follow any restrictions and/or permit conditions on these properties.

1.2 FACILITY LOCATIONS

- A. When in public roadways and rights-of-way within the Town limits, meet the requirements of the Town's Standards and Specifications for Design and Construction for location of new utilities. Outside Town limits, meet the requirements of the appropriate jurisdictional authority.
- B. Locate proposed utilities and facilities as indicated on the approved Drawings unless directed otherwise by the District. The District reserves the right to make such modifications in locations as may be found desirable to avoid interference with existing structures or for other reasons.

1.3 OPEN EXCAVATIONS

- A. Meet the requirements of the Town's Standards and Specifications for Design and Construction for open excavations.
- B. Adequately safeguard all open excavations by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons and damage to property. Provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workers. Bridges provided for access during construction shall be removed when no longer required.
- C. Take precautions to prevent injury to the public due to open trenches. All trenches, excavated material, equipment, or other obstacles that could be dangerous to the public shall be well lighted at night.
- D. When within boundaries of other agencies or landowner who have jurisdictional control, meet all requirements of those agencies or jurisdictions.

1.4 TEST PITS

- A. Excavate and backfill test pits for the purpose of locating underground utilities or structures in advance of construction at the direction of the District. Backfill test pits immediately after their purpose has been satisfied. Restore and maintain the surface in a manner satisfactory to the District and the Town.
- B. All backfill shall meet the Town's Standards and Specifications for Design and Construction.

1.5 CARE AND PROTECTION OF PROPERTY

- A. Protect all public and private property and use every precaution necessary to prevent damage thereto. If any direct, or indirect, damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the CONTRACTOR, restore such property to a condition similar or equal to that existing before the damage was done, or make good the damage in other manner acceptable to the District and the Town at the sole expense of the CONTRACTOR.

1.6 PROTECTION AND RELOCATION OF EXISTING STRUCTURES AND UTILITIES

- A. CONTRACTOR shall assume full responsibility for the protection of all buildings, structures, and utilities, public or private, including poles, signs, services to buildings, utilities in the street, gas pipes, water pipes, hydrants, sewers, drains and electric and telephone cables. CONTRACTOR is responsible for all damage done to such utilities.
- B. The CONTRACTOR shall bear responsibility for obtaining locations of underground structures and utilities including existing water and sewer services, telephone lines, and other utilities. The CONTRACTOR is responsible for scheduling utility locates through the Colorado Utility Notification Center at 1-800-922-1987 prior to commencing construction.
- C. The District will provide assistance to the CONTRACTOR in determining the location of existing water and sewer lines related to the project.
- D. Notify utility owner(s) (both above ground and underground facilities) prior to proceeding with excavations whenever such work is within 20 feet of any existing utility.
- E. Notify utility owner if utility is damaged by the CONTRACTOR's operations. Repair damaged utility only with written authorization. Provide District a copy of every written authorization.

- F. Use granular bedding material to rebed utilities exposed below mid-diameter. Extend granular bedding material to the limits of the trench excavation and a minimum of two feet beyond each side of the exposed utility.

1.7 PROTECTION OF ARCHAEOLOGICAL SITES AND ARTIFACTS

- A. Should the CONTRACTOR identify any archaeological sites or should the CONTRACTOR locate any artifacts, the CONTRACTOR shall immediately stop all activity in the area of the site or artifact. The CONTRACTOR shall immediately notify the District, the Town and the Colorado Historical Society.

END OF SECTION

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**SECTION 01 02 00
MEASUREMENT AND PAYMENT**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. This section describes criteria and basis for measurement and payment of quantities furnished/installed by CONTRACTOR under this contract for the work unless otherwise specified in individual sections of these specifications.

1.2 QUANTITIES AND BID PRICES

- A. It is expressly provided that the quantities noted and summarized in the Proposal are approximations for evaluating bids only and no claim shall be made against OWNER or ENGINEER for excess or deficiency therein, whether actual or relative. Quantities and measurements, supplied or placed during performance of the Work will be verified by OWNER or his ENGINEER to determine payment. CONTRACTOR is responsible for computing all quantities, unless otherwise provided in the Contract. Payment at the prices agreed upon will be made for the completed work as specified and will cover materials, supplies, labor, tools, machinery and all other expenditures incidental to satisfactory compliance with the Contract Documents, unless otherwise specifically provided.
- B. Once the project commences, the quantities for each item may vary and/or a line item may be changed or be deleted due to changing or unknown field conditions with no additional cost to OWNER.
- C. If the actual work requires greater or lesser quantities than those indicated in the Proposal, CONTRACTOR shall provide the required quantities at the unit/lump sum prices bid in the Proposal.
- D. CONTRACTOR shall make no claim for damages, anticipated profits, restocking charges or otherwise due to any differences between the amounts of Work actually performed and materials actually furnished, and the estimated quantities listed.

1.3 TOTAL BID PRICE

- A. Work not specifically mentioned or set forth as an item for payment, but required to fully construct or provide a pay item, shall be considered a subsidiary obligation of CONTRACTOR and shall be provided by CONTRACTOR as part of the individual item and included in its price or in the overall cost of the work with no additional cost to OWNER.
- B. CONTRACTOR shall, in bidding this work as a Unit and/or Lump Sum Contract, be aware and accept the fact that the Total Final Contract Price may vary in

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accordance with the final quantities used to complete the Work in accordance with the Contract Documents, and CONTRACTOR shall make no claim for damages, anticipated profits, or otherwise due to the difference in the final contract price and the initial bid price total.

- C. CONTRACTOR shall, in bidding this work as a Unit and/or Lump Sum items, be aware and acknowledge that the Contract for the Work is NOT a Lump Sum Contract.

1.4 MEASUREMENT OF QUANTITIES

- A. Volumes will be measured via Auto-CAD Digital Terrain Model (DTM). Surfaces will be created from site survey data.
 - 1. Measurement will be made from the limit of the neat lines shown on the Drawings or to the approval limits of excavation.
- B. Measurement by Area – Measured by square dimensions using mean length and depth, width or radius as applicable.
- C. Linear Measurements
 - 1. Measured by linear dimension at the item centerline or mean chord.
 - 2. Based on a horizontal projection of the actual length except where specified as a vertical measurement.
- D. Perform a baseline preconstruction survey after reservoir dewatering. Provide DTM electronically to OWNER.
- E. Perform surveys, field measurement and calculations to measure installed quantities for all Unit Price pay items in conformance with the list of pay items as Unit Price Pay Items.
- F. Notify OWNER in advance, and obtain OWNER witness of daily field measurement for work performed under Unit Price Pay Items.
- G. Include backup data and calculations with application for payment.
- H. Measurement by the CONTRACTOR is subject to review, verification, and approval by the OWNER.
- I. Round to the nearest whole unit for pay quantities.

1.5 PAYMENT – EXCAVATION AND BACKFILL

- A. No payment will be made for excavation or backfill of unapproved excavation below the required foundation surface as shown or established in the field by the ENGINEER. This applies to excavations such as haul road cuts or access ramps made for the CONTRACTOR's convenience.
- B. Payment for Borrow Excavation: No separate payment will be made for Borrow excavation. Excavation utilized as borrow for fill or backfill placed in designated fill areas is considered incidental to other items of Work.
- C. Payment for excavation to remove damaged subgrade material that has become desiccated, softened, eroded or otherwise disturbed by exposure to the elements or the CONTRACTOR's operations will be made only when approved by the OWNER or ENGINEER in advance of performing excavation.

1.6 PAYMENT FOR UNIT PRICE ITEMS

- A. Unit Price Work:
 - 1. Reflect unit price quantity and price breakdown from the Schedule of Contract Items and Prices in the Bid Proposal.
 - 2. Estimated quantities shown on the Bid Proposal are approximate and are given only for a comparison of bids. OWNER does not either expressly or by implication warrant that the actual quantities will correspond to the estimated quantities. OWNER reserves the right to increase or decrease the amount of work performed under unit price items, or to omit work altogether. No adjustments in contract unit prices will be made except as provided in the General Conditions.
- B. Final payment for Work governed by unit prices will be made based on the actual measurements and quantities accepted by the OWNER, multiplied by the unit price for Work that is incorporated in or made necessary by the Work.
- C. Payment for unit price items covers all Work necessary to complete the items listed as Unit Price Pay Items.

1.7 PAYMENT FOR LUMP SUM ITEMS

- A. Payment for lump sum work will be made in accordance with the accepted Schedule of Values.
- B. An unbalanced or front-end loaded schedule will not be acceptable.
- C. Payment for lump sum work covers all work required to complete the work as shown or specified that is not covered under the unit price items.

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- D. Summation of the complete Schedule of Values will equal the Contract Price for the lump sum item.

1.8 PROGRESS PAYMENTS

- A. Submit progress payments monthly, in accordance with requirements of the General Conditions.
- B. Include accepted schedule of values for each portion of Work and the unit price breakdown for Work to be paid on unit price basis, and allowances.
- C. Preparation:
 - 1. List each Change Order and Written Amendment executed prior to date of payment request as separate line items.

1.9 DEFECT ASSESSMENT

- A. Replace the Work, or portions of the Work, not conforming to specified requirements as determined by the ENGINEER at CONTRACTOR's sole cost.
- B. If, in the opinion of the ENGINEER, it is not practical to remove and replace the Work, the ENGINEER will direct one of the following remedies:
 - 1. The defective Work may remain, but the unit sum/price will be adjusted to a new unit sum/price at the discretion of the ENGINEER.
 - 2. The defective Work will be partially repaired to the satisfaction of the ENGINEER, and the unit sum/price will be adjusted to a new unit sum/price at the discretion of the ENGINEER.
- C. The individual specification sections may modify these options or may identify a specific formula or percentage sum/price reduction.
- D. The authority of the ENGINEER to assess the defect and identify payment adjustment, is final.

1.10 NONPAYMENT FOR REJECTED OR UNUSED ITEMS

- A. Payment will not be made for the following:
 - 1. Materials excavated and/or placed beyond the Design Lines shown on the Drawings, except as specifically required by the ENGINEER.
 - 2. Loading, hauling, and disposing of rejected material.
 - 3. Quantities of material wasted or disposed of in a manner not called for under Contract Documents.

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4. Rejected loads of material, including material rejected after it has been placed by reason of failure of CONTRACTOR to conform to provisions of Contract Documents.
5. Material not unloaded from transporting vehicle.
6. Defective work not accepted by OWNER.
7. Material remaining on hand after completion of Work.

1.11 MEASUREMENT AND PAYMENT OF BID ITEMS

A. Refer to Section 01 11 00: Summary of Work, for work scope.

B. Measurement and payment provisions for bid items shall be as follows:

1. Mobilization/Demobilization/Restoration

- a. Mobilization/Demobilization will not be measured for payment.
- b. Payment for mobilization, demobilization, preparatory work, and restoration will be made at the lump sum price bid in the schedule for Mobilization/Demobilization. The price shall include all costs for movement of personnel, equipment, supplies, buildings, plants, and other facilities to the project site; any necessary costs of acquisition of equipment, including purchase and mobilization expense; traffic control; on-site temporary access roads; temporary utilities and construction water supply; survey costs; cleanup and disposal of waste materials; demobilization; bonds and insurance costs; and any other work and operations which must be performed or costs that must be incurred incidental to the initiation of meaningful work at the site and for which payment is not otherwise provided for under this Contract.

2. Excavation

- a. Excavating and stockpiling existing clean sand and gravel will be measured for payment in cubic yards of clean sand and gravel excavated, processed if necessary, and stockpiled, at a location approved by the OWNER. Clean sand and gravel will be measured in the stockpile by the project surveyor.
- b. Payment to the CONTRACTOR for all work to excavate and stockpile clean sand and gravel shall be paid for at the unit price per cubic yard bid in Item 2, Excavation.
- c. There is no separate pay item for dewatering.

3. Foundation and keyway preparation and excavation

- a. Payment to the CONTRACTOR shall be made on a percentage of work completed basis. The price shall include all labor, equipment, and materials for excavating and removing remaining sand and gravel, wash material, and approximately the upper 1-foot of the weathered bedrock and excavating the cut-off key to the widths and depths shown on the Drawings, including but not limited to excavating, hauling, and shaping the foundation, and all items shown or implied in the Construction Drawings or Contract Documents.
- b. Unsuitable foundation areas shall be excavated and removed as directed by the ENGINEER.
- c. Approved foundation and keyway areas shall be surveyed by the project surveyor prior to slope liner fill placement.
- d. The price shall include all labor, equipment, and materials during foundation preparation and excavation, and related appurtenances for dewatering and handling water in the area of work including but not limited to dewatering pumps, piping, trenching sump pits, backfill, detention, discharge, and other facilities shown or implied in the Construction Documents.

4. Zone 1a Embankment

- a. Zone 1a liner will be measured on compacted in place cubic yard basis, based on survey by the CONTRACTOR.
- b. Payment to the CONTRACTOR shall include all labor, equipment, and materials necessary to complete the Zone 1a liner including but not limited to Bid Item 21, moisture conditioning, borrowing, hauling, screening, importing and blending bentonite, placing, compacting, shaping, and all other items shown or implied on the Contract Documents.
- c. Zone 1a Liner material shall be bid under Item 5, Zone 1a.

5. Zone 1b Embankment

- a. Zone 1b liner will be measured on compacted in place cubic yard basis, based on survey by the CONTRACTOR.
- b. Payment to the CONTRACTOR shall include all labor, equipment, and materials necessary to complete the roadway fill slope liner including but not limited to moisture conditioning, borrowing, hauling, placing, compacting, shaping, and all other items shown or implied on the Contract Documents.
- c. Zone 1b liner material shall be bid under Item 6, Zone 1b.
- d. There is no separate pay item for dewatering.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

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**SECTION 01 03 30
SUBMITTALS****PART 1 GENERAL****1.1 SCOPE**

- A. Submittals covered by these requirements include, when applicable, project and construction schedules, manufacturers' information, shop drawings, test procedures, test results, samples, requests for substitutions, operation and maintenance manuals, record drawings, and miscellaneous work-related submittals.
- B. Submittals shall also include construction drawings, reinforcing steel details, right-of-way documentation, survey documentation, water demand and Single Family Equivalent (SFE) documentation as applicable to the project.

1.2 RESPONSIBILITIES

- A. The CONTRACTOR shall be responsible for the accuracy and completeness of the information contained in each submittal and shall assure that the material, equipment or method of work shall be as described in the submittal. The CONTRACTOR shall verify that all features of all products conform to the specified requirements. Submittal documents shall be clearly edited to indicate only those items, models, or series of equipment, which are being submitted for review. All extraneous materials shall be crossed out or otherwise obliterated.
- B. The CONTRACTOR shall coordinate the scheduling of submittals to avoid work delays.

PART 2 SUBMITTAL MATERIALS**2.1 CONSTRUCTION DRAWINGS**

- A. Construction drawings shall be provided to the District for all proposed improvements that will become the property of the District upon completion. Construction drawings shall also include right-of-way and/or easement documentation, equipment schedules, lists, calculations for water demand and other items as appropriate.
- B. Construction drawings must be reviewed and approved, and all necessary right-of-way and/or easement provisions must be in place to the District's satisfaction before construction can commence.

2.2 PROJECT SCHEDULE

- A. A project schedule shall be submitted with construction plans and shall include the overall schedule for permitting, easement acquisition, and a general time frame anticipated for construction.
- B. The CONTRACTOR shall update this schedule as conditions warrant.

2.3 CONSTRUCTION SCHEDULE

- A. A detailed construction schedule shall be submitted 5 working days prior to the start of construction and maintained in accordance with this section.
- B. The CONTRACTOR shall provide a graphic construction schedule prepared by the critical path method or other approved method. The schedule shall be prepared from estimates of the required duration and sequence for each item of work.
- C. The project schedule shall depict all significant construction activities and all items of work listed in the bid. The dependencies between activities shall be indicated so that it may be established what effect the progress of any one activity has on the schedule.
- D. Time for completion, specific dates for construction activities, and sequencing requirements shall be shown on the schedule. Activities making up the critical path shall be identified.
- E. The schedule duration of each activity shall be based on the work being performed during the normal 40-hour workweek with allowances made for legal holidays and normal weather conditions, unless otherwise agreed upon with the District.

2.4 MANUFACTURER'S OR PRODUCT DATA

- A. Manufacturer's data shall include, but not be limited to, cut sheets, brochures, model number identification, and standard published manufacturer's material specifying the quality, make-up, application and materials of fabrication for the specified products.
- B. This data shall also include product or material samples when specified or when deemed appropriate by the CONTRACTOR and/or the District.

2.5 TESTING AND TEST REPORTS

- A. The CONTRACTOR shall notify the District not less than 7 working days prior to the date that the equipment installation(s) and/or other materials or portions of the Work will be ready for inspection and testing.
- B. Test certification shall be provided, and signed by the responsible party, to the satisfaction of the District at the completion of the test. It shall include the following:

1. Date of report, name, address, telephone number and signatures of individuals performing the test or inspection and of individuals issuing the report.
2. Project name and contract number, when appropriate.
3. Dates, times, temperature, weather conditions, and locations of tests and inspections.
4. Identify the work or product by specification section and test or inspection method.
5. Complete inspection or test data, results of test, interpretation of test results, compliance with the Contract Documents, and recommendations regarding re-testing.
6. Backfill compaction and concrete testing is to be completed by a District approved laboratory at the sole expense of the CONTRACTOR. Testing shall be completed on a timely basis so as to not delay construction work. Results shall be tabulated and provided to the District in a timely manner.

2.6 SHOP DRAWINGS

- A. Shop drawings shall accompany product data submittals as required in the individual specification sections herein.
- B. Shop drawings shall adequately provide the dimensions and layout of equipment and shall include plan and elevation views, blow-up drawings to depict all key components and materials, sections to depict how parts fit together and function, and other details as required to provide full detail of the equipment and its component parts.
- C. Shop drawings may also be required, in detailed and/or schematic form, for equipment or other mechanical systems.
- D. For underground piping, shop drawings shall include a layout drawing showing all applicable fittings, valves, vaults, manholes, and other relevant appurtenances.
- E. Shop drawings shall not fulfill the requirements for record drawings but may be included with record drawings when applicable.

2.7 ENGINEERED PRODUCTS

- A. Products requiring professional engineering design and/or certification shall include Form 01330-B: Professional Engineer Certification Form and shall be stamped by a professional engineer with valid registration in the State of Colorado. Such stamp shall be consistent with the rules and regulations of the state governing professional engineering registration. The form is provided at the end of this section.

2.8 OPERATION AND MAINTENANCE MANUALS

- A. If applicable, a system operation and maintenance manual, or series of manuals, shall be developed which covers the overall system operations and each piece of mechanical equipment specified within this contract.
- B. The CONTRACTOR shall submit the manuals in three-ring or other District approved binders. Formatting shall be 8½" x 11" size, well indexed and including the following information:
 - 1. CONTRACTOR's names, addresses, and telephone numbers.
 - 2. Alphabetical list of all system components with the name and address and 24-hour phone number of the company responsible for servicing each item during the first year of operation.
 - 3. Guarantees and warranties of all equipment whenever applicable.
 - 4. All data applicable to the installed equipment including, but not limited to: shop drawings, installation instructions, lubrication instructions, wiring diagrams, operating instructions, start-up procedures, shut-down procedures, trouble-shooting and repair guides, emergency guidelines, spare part and supply lists, vendors, and other relevant information.
- C. Operation and maintenance manuals shall be provided prior to project closeout and acceptance by the District.

2.9 RECORD DRAWINGS

- A. Record drawings are defined as a neatly and legibly marked set of construction drawings showing the final location of piping, manholes, mechanical equipment, electrical equipment, and other related systems. Record drawings shall also include additional documents such as equipment schedules, lists, drawings, and electrical and instrumentation diagrams.
- B. Unless otherwise specified, record drawings shall be full size and maintained in a clean, dry, and legible condition. Record documents shall not be used for construction purposes and shall be available for review by the District during normal working hours at the CONTRACTOR's field office. At the completion of the Work, all record drawings shall be submitted to the District.
- C. Record drawings shall depict all easements and properties transferred to the District as well as all existing easements and rights-of-way boundaries.
- D. Record drawings shall be provided for all water and sanitary sewer improvements that connect to, but are not part of, the District's systems.

- E. All record drawings shall be provided to the District prior to project closeout and acceptance by the District.

2.10 WARRANTIES

- A. All applicable warranty documents shall be assigned and delivered to the District after all terms for project closeout have been met.
- B. The CONTRACTOR shall provide a materials and labor warranty for all project improvements including, but not limited to all facilities, backfill, compaction, landscaping, and erosion control.
- C. All equipment and system warranties shall be presented to the District prior to project closeout and acceptance by the District. All warranties shall be in the District's name.

PART 3 EXECUTION

3.1 SUBMITTALS

- A. The CONTRACTOR shall submit 5 copies of all submittals to the District for review and comment unless otherwise agreed upon with the District.
- B. Unless otherwise specified, within 14 calendar days after receipt of a submittal for review and comment, the District shall review the submittal and return 2 marked-up copies to the CONTRACTOR. The returned submittal shall indicate one of the following actions:
 - 1. If the review indicates that the material, equipment or work method complies with the Contract Documents, submittal copies will be marked "NO EXCEPTIONS TAKEN." In this event, the CONTRACTOR may begin to implement the work method or incorporate the material or equipment covered by the submittal.
 - 2. If the review indicates limited corrections are required, copies will be marked "MAKE CORRECTIONS NOTED." The CONTRACTOR may begin implementing the work method or incorporating the material and equipment covered by the submittal in accordance with the noted corrections. Where submittal information will be incorporated in O&M data, a corrected copy shall be provided.
 - 3. If the review reveals that the submittal is insufficient or contains incorrect data, copies will be marked "AMEND AND RESUBMIT." Except at his own risk, the CONTRACTOR shall not undertake work covered by this submittal until it has been revised, resubmitted and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."

4. If the review indicates that the material, equipment, or work method does not comply with the Contract Documents, copies of the submittal will be marked "REJECTED - DEVELOP REPLACEMENT." Submittals with deviations which have not been identified clearly may be rejected. Except at his own risk, the CONTRACTOR shall not undertake the work covered by such submittals until a new submittal is made and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."
5. If the review reveals that the submittal is substantially incomplete and/or missing information which was required to be provided, the submittal will be marked "INCOMPLETE, NOT REVIEWED". This review action indicates that additional information is required and that a re-submittal will be necessary before review can begin.

3.2 TRANSMITTAL PROCEDURE

- A. Submittals shall be accompanied by Form 01330-A: Transmittal Submittal provided at the end of this section. A separate form shall be used for each specific item, class of material, equipment, or other items specified. All appropriate equipment numbers shall be identified on the submittal form. Submittals for various items shall be made with a single form when the items taken together constitute a manufacturer's package or are so functionally related that expediency indicates checking or review of the group or package as a whole.
- B. A unique number, sequentially assigned, shall be noted on the transmittal form accompanying each item submitted. Original submittal numbers shall have the following format: "XXX"; where "XXX" is the sequential number assigned by the CONTRACTOR. Re-submittals shall have the following format: "XXX-Y"; where "XXX" is the originally assigned submittal number and "Y" is a sequential letter assigned for re-submittals, i.e., A, B, or C being the 1st, 2nd, and 3rd re-submittals, respectively.

3.3 DEVIATION FROM CONTRACT

- A. If the CONTRACTOR proposes to provide material, equipment, or method of work which deviates from the Contract Documents, he shall indicate so under "deviations" on the transmittal form accompanying the submittal copies.

3.4 SUBMITTAL COMPLETENESS

- A. Submittals which do not have all the information required to be submitted, including deviations, are not acceptable and will be returned without review.

3.5 REVIEW PROCEDURE

- A. Submittals are specified for those features and characteristics of materials, equipment, and methods of operation which can be selected based on the CONTRACTOR's

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judgment of their conformance to the specified requirements. Other features and characteristics are specified in a manner which enables the CONTRACTOR to determine acceptable options without submittals. The review procedure is based on the CONTRACTOR's guarantee that all features and characteristics not requiring submittals conform as specified. Review shall not extend to means, methods, techniques, sequences or procedures of construction, or to verifying quantities, dimensions, weights or gages, or fabrication processes (except where specifically indicated or required by the Contract Documents) or to safety precautions or programs incident thereto. Review of a separate item, as such, will not indicate approval of the assembly in which the item functions.

3.6 EFFECT OF REVIEW OF CONTRACTOR'S SUBMITTALS

- A. Review of contract drawings, methods of work, or information regarding materials or equipment the CONTRACTOR proposes to provide, shall not relieve the CONTRACTOR of his responsibility for errors therein and shall not be regarded as an assumption of risks or liability by the District or its representatives, or by any officer or employee thereof, and the CONTRACTOR shall have no claim under the contract on account of the failure, or partial failure, of the method of work, material, or equipment so reviewed.
- B. A mark of "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED" shall mean that the District and its representatives have no objection to the CONTRACTOR using the plan or method of work proposed, or providing the materials or equipment proposed. The District and its representatives, however, do not assume or create any risks or liability for the District and/or its representatives by these marks.

3.7 PROJECT AND CONSTRUCTION SCHEDULES

- A. The project schedule shall be submitted with the construction plans submittal and resubmitted if it is changed.
- B. The construction schedule shall be submitted 5 working days before construction begins and updated throughout the course of construction.

3.8 PROJECT STATUS UPDATE

- A. Project status meetings shall be held each week throughout the construction schedule, unless otherwise approved by the District.

FORM 01330-A: SUBMITTAL TRANSMITTAL

Submittal No.: _____ Description: _____ Section: _____

PROJECT:	Routing	Sent	Received
Grand County Water & Sanitation District No. 1 Reservoir No. 2 Enlarging & Lining Project	Contractor to District Rep.		
Contractor:	District Rep. To Contractor		

The following submittals sent: _____ Attached _____ Under separate cover via _____

Remarks: _____

Item	Copies	Date	Description	Review action ^a	Reviewer initials	Review comments attached

Note: NET = No exceptions taken; MCN = Make corrections noted; A&R = Amend and resubmit; R = Rejected
 -- (Attach additional sheets if necessary.)

CONTRACTOR certifies that the material or equipment contained in this submittal meets all the requirements specified, including coordination with all related work, except for the following deviations.

<u>Item</u>	<u>Deviation</u>
_____	_____
_____	_____
_____	_____
_____	_____

Certified by: _____
 Contractor's Signature

 Date

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FORM 01330-B: PROFESSIONAL ENGINEER CERTIFICATION FORM

The undersigned certifies that he/she is a professional engineer registered in the State of Colorado and that he/she has been employed by (name and address of CONTRACTOR) _____

to design _____

in accordance with Specification Section _____ for the _____ Project.

The undersigned further certifies that he/she has performed the design of _____,

and that said design is in conformance with all applicable local, state, and federal codes, rules, and regulations, and that his/her signature and P.E. stamp have been affixed to all calculations and drawings used in, and resulting from, the design. Also, affix stamp in space provided below.

The undersigned hereby agrees to make all original design drawings and calculations available to the District's Representative within seven days following written request.

P.E. Name

Signature

Address

Stamp

Contractor's Name

Date

Signature

Title

Address

END OF SECTION

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**SECTION 01 03 70
REQUESTS FOR INTERPRETATION**

PART 1 GENERAL

1.1 GENERAL

The CONTRACTOR shall prepare and submit Requests For Interpretation (RFI) to obtain clarifications to the Contract Documents. All requests shall be in writing using the form on the following page. The CONTRACTOR may fax, deliver or mail the RFI to the ENGINEER. RFI's will not be accepted from sub-contractors or suppliers.

If the information can be found in the Contract Documents, it will be indicated in the RFI and returned to the CONTRACTOR. The ENGINEER's time for preparing responses to RFI's that are self-evident in the Contract Documents will be charged to the CONTRACTOR.

The ENGINEER's review of the RFI will be conducted with reasonable promptness while allowing sufficient time in the ENGINEER's judgment to permit adequate review.

1.2 RELATED WORK:

None.

PART 2 NOT USED

PART 3 EXECUTION

3.1 GENERAL

All RFI's shall be numbered sequentially starting with No. 001. The CONTRACTOR shall maintain a log of all RFI's submitted including at a minimum the date of submittal, subject and receipt of response from the ENGINEER. An electronic copy of the following form will be provided to the CONTRACTOR.

END OF SECTION

TO: GEI Consultants, Inc.
CLIENT: Grand County Water and Sanitation District No. 1
PROJECT: Reservoir No. 2 Enlarging and Lining Project

REQUEST			
Date:		Reference:	
Drawing No.:		Specification Section No.:	
Date Response Required:			
Attachments:			
Contractor:		Submitted by:	

RESPONSE			
Date:			
GEI Consultants, Inc.	By:		Reviewed by:

SECTION 01 04 20
REFERENCES**PART 1 GENERAL****1.1 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS**

A. Without limiting the generality of other requirements of the Specifications, all Work specified herein shall meet the requirements of applicable codes and the applicable requirements of the following referenced documents:

1. References herein to “ASTM” shall mean the American Society for Testing and Materials.
2. References herein to “ACI” shall mean the American Concrete Institute.
3. References herein to “OSHA Regulations for Construction” shall mean **Title 29, Part 1926, Construction Safety and Health Regulations for Construction**, Code of Federal Regulations (CFR), including all changes and amendments thereto.
4. References herein to “OSHA Standards” shall mean **Title 29, Part 1910, Occupational Safety and Health Standards**, Code of Federal Regulations, including all changes and amendments thereto.
5. References to “Standard Specifications” or “SSPWC” shall mean the **Standard Specifications for Public Works Construction**, 1994 Edition.

1.2 REGULATIONS RELATED TO HAZARDOUS MATERIALS

A. All Work included in the Contract Documents, regardless if shown or not, shall comply with all EPA, OSHA, RCRA, NFPA, and any other Laws and Regulations governing the storage and conveyance of hazardous materials, including petroleum products.

1.3 ABBREVIATIONS

A. Abbreviations used throughout the Specifications and the organization or document represented are:

AA	Aluminum Association
AAMA	Architectural Aluminum Manufacturer's Association
AASHTO	American Association of State Highway Transportation Officials
ACI	American Concrete Institute
ADM	Arrow Diagramming Method
AGA	American Gas Association
AGCA	Association of General Contractors of America

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AIA	American Institute of Architects
AIEE	American Institute of Electrical Engineers
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ALSC	American Lumber Standards Committee
AMCA	Air Moving and Conditioning Association, Inc.
AMA	American Materials Association
ANSI	American National Standards Institute
APA	American Plywood Association (formerly DFPA)
APHA	American Public Health Association
ARI	Air-Conditioning and Refrigeration Institute
ASA	American Standards Association (now USAS)
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWPA	American Wood Preserver's Association
AWWA	American Water Works Association
CFR	Code of Federal Regulations
CPM	Critical Path Method
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standards of U.S. Department of Standards
CSI	Construction Specifications Institute
DFPA	Douglas Fir Plywood Association (now APA)
EPA	Environmental Protection Agency
FAR	Federal Acquisition Regulations
FGMA	Flat Glass Marketing Association
FML	Factory Mutual Laboratories
FS	Federal Specifications
HVAC	Heating, Ventilating, and Air Conditioning
IBR	Institute of Boiler and Radiator Manufacturers
MBMA	Metal Building Manufacturer's Association
MLA	Metal Lath Association
MSHA	Mine Safety and Health Administration
NAAMM	National Association of Architectural Metal Manufacturers
NBC	National Building Code
NBFU	National Bureau of Fire Underwriters
NBS	National Bureau of Standards
NCMA	National Concrete Masonry Association
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NFPS	National Forest Products Association
NPC	National Plumbing Code

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NPDES	National Pollutant Discharge Elimination System
NRMCA	National Ready Mixed Concrete Association
NSF	National Sanitation Foundation
NWMA	National Woodwork Manufacturing Association
OSHA	Occupational Safety and Health Administration, U.S. Department of Labor
PCA	Portland Cement Association
PDM	Precedence Diagramming Method
PEI	Porcelain Enamel Institute
SBI	Steel Boiler Institute
SCPI	Structural Clay Products Institute
SDI	Steel Deck Institute
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SPCC	Spill Prevention Control and Countermeasure
SPI	Steel Products Institute
SPR	Simplified Practice Recommendation
SSPC	Steel Structures Painting Council
TCA	Tile Council of America
UBC	Uniform Building Code
UL	Underwriters Laboratories
UPC	Uniform Plumbing Code
USAS	United States of America Standards (formerly ASA)
USBR	U.S. Bureau of Reclamation
USCOE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WPCF	Water Pollution Control Federation
WWPA	Western Wood Products Association

B. Additional abbreviations, if any, will be defined as they appear in the Specifications.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

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**SECTION 01 04 50
QUALITY CONTROL**

PART 1 GENERAL

The ENGINEER will monitor the quality of construction as specified in Rule 9 of the SEO Rules and Regulations for Dam Safety and Dam Construction. The ENGINEER is responsible for the quality of construction, compliance with approved design and specifications, preparation of necessary documentation for the State Engineer's review and approval of all construction change orders and preparation of the project completion documents required in Rule 10.

1.1 CONTRACTOR QUALITY CONTROL

- A. CONTRACTOR's Testing Responsibilities:
1. Material property tests for all earthwork items from off-site sources. Testing requirements are listed in individual Specification sections.
 2. Tests on items manufactured or fabricated off-site.
 3. Field quality control tests to control CONTRACTOR fill placement operations.
- B. Earthwork quality control testing schedule shall be as outlined in the individual Specification sections.
- C. Perform all other testing and certifications as outlined in these Specifications.

1.2 OWNER ACCEPTANCE TESTING

- A. OWNER's Testing Responsibilities (ENGINEER will perform these tests on behalf of OWNER):
1. Additional tests of earthwork materials from off-site sources to check CONTRACTOR's data and as a basis for acceptance of Work, as determined appropriate by ENGINEER.
 2. Testing and observation of excavations and bearing surfaces for the embankments and appurtenant structures.
 3. Field testing and visual observation of in-place earthwork materials.
 4. Laboratory testing of earthwork materials.
 5. Performing quality control observations and tests, and preparing and/or obtaining test specimens, including cylinders, for all cast-in-place concrete materials and grout for embedded materials, during placement.

6. Observation and testing of on-site borrow areas.
- B. Unless otherwise indicated, results of all completed tests by ENGINEER will be available to CONTRACTOR at ENGINEER's site office by the end of the next working day following completion of the tests.
 - C. ENGINEER may perform additional laboratory tests on earthwork materials obtained from off-site sources; and on concrete aggregate gradation and quality, cement, admixtures, water and any other constituent or test as deemed necessary by ENGINEER to check CONTRACTOR's test results and verify continued compliance with Specification requirements. If additional testing by OWNER is required, CONTRACTOR shall provide representative samples to ENGINEER from off-site stockpiles or storage bin(s) for testing at no additional cost to OWNER or ENGINEER. ENGINEER reserves the right to sample materials at the source of production.
 - D. ENGINEER will perform acceptance testing on the in-place earthwork materials and concrete as described in the Specification sections.
 - E. ENGINEER will perform observations of the exposed excavations using surveyed topographic maps and sections provided by CONTRACTOR. CONTRACTOR shall provide access for ENGINEER's personnel to perform observations. CONTRACTOR shall allow a reasonable period of time in CONTRACTOR's schedule for ENGINEER's observation of exposed excavations.
 - F. CONTRACTOR shall provide ENGINEER a Concrete Placement Form with the upper checkout items completed prior to every concrete placement. ENGINEER will then complete the Concrete Placement Form(s), as appropriate for each element of conventional concrete work. A blank placement form is included in this section for CONTRACTOR's use.
 - G. ENGINEER will perform observations of all waterstop and waterstop field joint work. CONTRACTOR shall provide no less than 24 hours notice for scheduling these observations.
 - H. Final acceptance of the Work will be based on a review of the acceptance tests, as well as on visual observation made by ENGINEER of CONTRACTOR's work, including any work effort required to complete the project in compliance with these Contract Documents and the quality level required by ENGINEER's design.

1.3 TESTING STANDARDS

A. Earthwork quality control testing:

1. Compaction - ASTM D 698 or ASTM D 1557
2. Moisture Content, Oven Method - ASTM D 2216
3. Specific Gravity - ASTM D 854
4. Field Density, Sand Cone Method (plus one-point compaction and moisture content) - ASTM D 1556
5. Field Density, Drive Cylinder Method (plus one-point compaction and moisture content) - ASTM D 2937
6. Field Density, Nuclear Gage Method (plus one-point compaction and moisture content) - ASTM D 2922
7. Maximum Index Density – ASTM D 4253
8. Minimum Index Density – ASTM D 4254
9. Moisture Content, Nuclear Gage Method - ASTM D 3017
10. Particle Size Analysis - ASTM D 422
11. Liquid Limit, Plastic Limit, and Plasticity Index - ASTM D 4318
12. Resistance to Degradation - ASTM C 131
13. Sodium Sulfate Soundness - ASTM C 88

- B. The percent compaction requirements for earthwork will be evaluated as follows: The in-place density as compacted by CONTRACTOR will be determined by the field density test using the sand-cone method or the nuclear gage method. The maximum dry density of the fill at the location of the in-place density test will be estimated using one-point compaction tests and full-curve compaction tests (family of curves) of representative fill materials. Both the one-point compaction tests and the full-curve compaction tests will be performed according to ASTM D 698 or ASTM D 1557, as appropriate. The one-point compaction data will be used in conjunction with the representative compaction curves to estimate the maximum dry density of the compacted fill at the location of the in-place density test. The percent compaction in-place will be calculated as the ratio (in percent) of the in-place dry density of the compacted fill at the location of the in-place density test to the estimated maximum dry density of the material.

- C. Other test requirements as described in individual Specification sections.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

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**SECTION 01 05 00
TEMPORARY FACILITIES AND CONTROLS**

PART 1 GENERAL

1.1 GENERAL

- A. Construction facilities and temporary controls include those items necessary for performance of the Work that are not part of the permanent construction.

1.2 SUBMITTALS

A. Shop Drawings:

1. Plan for site access. The plan shall include permits and approvals, as warranted, for secondary site access roads.
2. Plan for on-site security.
3. Plan for staging and stockpile areas.
4. Plan for obtaining water and delivering water to the necessary construction areas.
5. Plan for sedimentation and erosion control.
6. Implementation or control plans for meeting the requirements of OWNER-obtained permits as described in Section 01 05 75: Project Permits and Environmental Controls.
7. Plan for temporary construction facilities
 - a. Temporary access roads and haul roads; including routes, cross sections, and drainage provisions.
 - b. Staging areas; including field office layouts (OWNER, ENGINEER, and CONTRACTOR), parking areas, and storage yard layout.
 - c. Temporary fences and barriers.

B. Administrative:

1. Copies of permits obtained by CONTRACTOR.
2. CONTRACTOR Health and Safety Plan.
3. Proposed off-site waste disposal facility.

1.3 MOBILIZATION AND PREPARATORY WORK

- A. For the purposes of providing for expenses incidental to the initiation of construction and of discouraging unbalanced bidding, a single lump sum item has been included in the bidding schedule to provide for payment for mobilization and preparatory work. The item for payment for mobilization and preparatory work is intended to compensate CONTRACTOR for operations including, but not limited to, the following items:
1. Obtaining project permits.
 2. Moving equipment, supplies, and incidentals to the site.
 3. Establishing field offices, buildings, plants, and other facilities at the site.
 4. Installing temporary utilities at the site.
 5. Having CONTRACTOR's superintendent at the site full time.
- B. All facilities, plants, and equipment that are established at, or brought to, the project site shall be deemed to be subject to the provisions of this paragraph unless OWNER specifically provides otherwise in writing for a particular item or items. CONTRACTOR shall be solely responsible for the adequacy, efficiency, use, protection, maintenance, repair, and preservation of all facilities, plants, and equipment. No facilities, plants, or equipment shall be dismantled or removed from the work site prior to completion of the Work under the contract without the written permission of OWNER.

PART 2 PRODUCTS**PART 3 EXECUTION****3.1 TEMPORARY UTILITIES****A. Power**

1. Schedule and provide electrical drop with power company or provide onsite power generating equipment as needed.

B. Water

1. Provide and maintain adequate supplies of drinking water for CONTRACTOR personnel.

C. Sanitary Facilities

1. Provide and maintain suitable, weather-tight, painted, sanitary toilet facilities for all work persons during the construction period. When toilet facilities are no longer required, promptly remove from site. Disinfect and clean or treat the area as required.
2. Keep all toilet facilities serviced, clean, and supplied with toilet paper at all times.

D. Lighting

1. Provide temporary lighting to meet applicable safety requirements to allow erection, application, or installation of materials, and observation and inspection of the Work.

3.2 FIELD OFFICES

- A. Prepare for adequate space for field office facilities as needed.

3.3 CONSTRUCTION ACCESS ROAD

- A. Construction access into the site shall be from U.S Highway 40.
- B. Access roads constructed on-site shall be constructed within the limits of site disturbance.
- C. Maintain drainage ways. Install culverts to allow water to pass without disturbing the roadway.

3.4. PROTECTION OF EXISTING ROADS

- A. Obtain all permits required by Town of Fraser, CDOT, Grand County and all other applicable public agencies during construction unless specifically provided by the OWNER. Meet all permit requirements.
- B. Repair damage to public roads as required by the applicable public agency.

3.5 CONTRACTOR PARKING AREAS

- A. Parking for the employees of CONTRACTOR and for OWNER and ENGINEER personnel will be allowed in the staging and stockpile areas.

3.6 STAGING AREA

- A. Establish trailer, shop and/or field office in the staging area.
- B. Stockpile equipment, supplies, imported earthfill materials, and other materials incidental to the construction in the staging or stockpile areas or other areas approved by ENGINEER.
- C. Fence all staging areas.

3.7 STOCKPILE AREAS

- A. All earthfill and other construction materials shall be stockpiled in CONTRACTOR staging area or borrow areas, or other areas approved by ENGINEER.

3.8 BORROW AREAS

- A. None expected on this project.

3.9 WEATHER PROTECTION

- A. Provide protection against weather to maintain all materials, apparatus, fixtures, and work free from damage whether in shipment, in storage, or in place.
- B. Do not perform wet work when temperature is below 35°F or is forecast to be below 35°F within the ensuing 48 hours, except when work is properly protected and sufficient heat is provided.
- C. When heat is required for proper weather protection, provide temporary enclosures of work and acceptable means to provide sufficient heat to maintain a temperature of not less than 50°F. Provide higher temperatures when required by these Specifications.

3.10 SITE SECURITY

- A. Provide adequate security for protection of OWNER's, ENGINEER's, and CONTRACTOR's property, equipment, and facilities.
- B. All existing and temporary gates and fences shall be secured and locked during non-working hours. Provide padlocks at all gates. All gates shall be double padlocked to allow OWNER and ENGINEER access to the site without disturbing CONTRACTOR's locks.

3.11 OPERATIONS AND STORAGE AREAS

- A. Do not enter on or occupy with men, tools, equipment, or material any ground outside areas shown on the Drawings without the written consent of the OWNER of such ground.
- B. Other contractors and employees or agents of OWNER may for all necessary purposes enter upon the Work and premises used by CONTRACTOR. Conduct work so as not to impede unnecessarily any work being done by others on or adjacent to the site.

3.12 SAFETY

A. Safety and Health

- 1. CONTRACTOR shall have sole responsibility for construction site safety in accordance with the provisions of the General Conditions.
- 2. Maintain an accurate record of, and report to OWNER, all cases of death, occupational diseases, or traumatic injury to employees or the public, and property damage.

3.13 CLEANUP AND DISPOSAL OF WASTE MATERIALS

A. SCOPE

- 1. The cleanup and disposal of waste materials and rubbish shall be in accordance with these Specifications and applicable Laws and Regulations. Should a conflict exist in the requirements for cleanup and disposal of waste materials, the most stringent requirement shall apply.

B. CLEANUP

- 1. Keep work and storage areas free from accumulations of waste materials and rubbish, and before completing the Work, remove all plant and storage facilities, buildings, including concrete footings and slabs, rubbish, unused materials, concrete forms, and other materials that are not a part of the permanent Work.
- 2. Upon completion of the Work, and following removal of construction facilities and required cleanup, work areas shall be regraded, reclaimed, and left in a neat manner conforming to the natural appearance of the landscape.

C. DISPOSAL OF WASTE MATERIALS

- 1. Waste materials, including but not restricted to, cleared and grubbed vegetation, refuse, garbage, sanitary wastes, chemical additives, industrial wastes, oil, and

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other petroleum products, shall be disposed of by CONTRACTOR by removal from the construction area. Dispose of material in an appropriate off-site waste disposal facility.

2. Burning of cleared vegetation and waste materials shall not be permitted.
3. Disposal of unsuitable or waste excavated earth materials shall be off site.

END OF SECTION

SECTION 01 05 75
PROJECT PERMITS AND ENVIRONMENTAL CONTROLS

PART 1 GENERAL

1.1 WORK INCLUDES

- A. Project Permits
- B. Abatement of Air Pollution
- C. Abatement of Noise Pollution
- D. Abatement of Water Pollution
- E. Landscape Preservation
- F. Preservation Of Trees and Shrubs
- G. Preservation Of Historical And Archaeological Data
- H. Protection of Endangered Species

1.2 SUBMITTALS

A. Shop Drawings:

1. Copies of all necessary State and local permits required to complete the Work. Submit prior to beginning related portions of the Work.
2. Water Quality Management Plan containing, as a minimum, the following information:
 - a. Name of the person who will implement and carrying out the plan.
 - b. Precautions that will be taken to avoid discharge or accidental spills of oil or wastewater into river, stream, watercourse, or lake.
 - c. Methods and facilities for handling and treating wastewater, including locations for evaporation or settling ponds, treatment facilities, and discharge points. Estimates of the amount of wastewater that may be handled and treated at each location.
 - d. Methods and facilities for preventing or controlling runoff and erosion for construction sites, during and after construction, including:
 - i. Access roads
 - ii. Stockpile and waste areas
 - iii. Construction plant and equipment yards
 - iv. All excavated surfaces
 - v. Other impacted areas
 - e. Sequence and schedule for installation and removal of facilities.
 - f. f. Relate the methods, facilities, and descriptions above to the conditions of required permits.

1.3 PROJECT PERMITS & LICENSES

- A. OWNER will obtain design approval from the Colorado State Engineer's office. CONTRACTOR shall become familiar with any special requirements of the State Engineer's office and shall proceed in accordance with those requirements.
- B. OWNER will obtain a Town of Fraser Building Permit for construction of the Project. CONTRACTOR is responsible for complying with all OWNER-obtained permits.
- C. CONTRACTOR is responsible for obtaining and complying with all other state and local permits required for the Work. Such permits may include, but are not limited to, the following:
 - 1. Discharge permit.
 - 2. NPDES Construction Storm Water Discharge Permit (CDPHE).
 - 3. Right-of-way uses, driveway, haul or special use permits from state and local transportation agencies.
 - 4. Local contractor's construction license.
- D. CONTRACTOR shall bear the responsibility of obtaining, through OWNER, clarification of any and all permit requirements.
- E. No work shall proceed that is in violation of any permit or guideline requirements.
- F. Representatives of permitting agencies for any of the required project permits may periodically visit the work site. Any and all concerns addressed to CONTRACTOR by these agency representatives shall be immediately conveyed to OWNER or ENGINEER. No work considered by the agency representatives to be a violation of permit requirements or guidelines shall continue until the issue is resolved and OWNER has provided permission to CONTRACTOR to continue the task in question, within proper restraints or guidelines.
- G. CONTRACTOR shall fulfill permit obligations without any additional cost to OWNER.

1.4 STORAGE OF FUEL ON SITE

- A. If the aggregate storage of oil at the Site is over 1,320 gallons or a single container has a capacity in excess of 660 gallons, prepare a Spill Prevention Control and Countermeasure (SPCC) plan. The plan shall be prepared and certified by a Registered Professional Engineer registered in the State of Colorado.
- B. All oil storage tanks shall be placed at least 20 feet from streams, flowing or dry watercourses, lakes, wetlands, reservoirs, and any other water source, and the area surrounding the tanks shall be diked to contain more than 1-1/2 times the volume of

the largest tank, or more than half the volume of all tanks within the diked area, whichever is greater. Underground storage tanks will not be allowed.

1.5 ABATEMENT OF AIR POLLUTION

- A. Abatement of air pollution shall be performed in accordance with the requirements of the Air Pollution Emission Permit and applicable Laws and Regulations concerning the prevention and control of air pollution. Use such methods and devices as are reasonably available to prevent, control, and otherwise minimize atmospheric emissions or discharges of air contaminants.
- B. Burning of cleared materials, combustible construction materials, and rubbish will not be allowed.
- C. Apply a dust-preventive treatment or periodically water access and haul roads to prevent dust.

1.6 ABATEMENT OF NOISE POLLUTION

- A. Abatement of noise pollution shall be performed in accordance with applicable Laws and Regulations regarding the prevention, control, and abatement of harmful noise levels.

1.7 ABATEMENT OF WATER POLLUTION

- A. Abatement of water pollution shall be performed in accordance with the requirements of the Stormwater Discharge Permit, Erosion and Sediment Control Plan, and Stream Diversion Plan.
- B. Excavated materials or other construction materials shall not be stockpiled or wasted near or on streambanks, lake shorelines, or other watercourse perimeters where they can be washed away by high water or storm runoff, or can in any way encroach upon the watercourse itself.
- C. Include prevention measures to control silting and erosion, and to intercept and settle any runoff of sediment-laden waters. Refer to the Erosion and Sediment Control Plan requirements in Section 02 03 70: Erosion Protection and Sediment Control. Wastewater from general construction activities, such as drain water collection, drilling, grouting, or other construction operations, shall not enter flowing or dry watercourses without the use of approved turbidity control methods. All such wastewaters discharged shall contain the least concentration of settleable material possible, and shall meet all conditions of the National Pollutant Discharge Elimination System (NPDES) Section 402 permit.

1.8 LANDSCAPE PRESERVATION

- A. Preserve the natural landscape, and conduct operations so as to prevent unnecessary destruction, scarring, or defacing of the natural surroundings in the vicinity of the Work. Movement of crews and equipment within the rights-of-way and over routes provided for access to the Work shall be performed in a manner to prevent damage to grazing land, crops, or property. When no longer required, restore construction roads to original contours and make impassable to vehicular traffic.

1.9 PRESERVATION OF TREES AND SHRUBS

- A. Preserve and protect existing vegetation not required or otherwise authorized to be removed. Vegetation shall be protected from damage or injury caused by CONTRACTOR construction operations, personnel, or equipment by the use of protective barriers or other methods. Removal of existing vegetation not specifically required to be removed will require prior approval by ENGINEER.

1.10 PRESERVATION OF HISTORICAL AND ARCHAEOLOGICAL DATA

- A. Should CONTRACTOR, or any of CONTRACTOR's employees, or parties operating or associated with CONTRACTOR, in the performance of this Contract discover evidence of possible scientific, prehistorical, historical, or archeological data, immediately cease work at that location and notify ENGINEER, giving the location and nature of the findings. Forward written confirmation to OWNER within 2 days. Exercise care so as not to disturb or damage artifacts or fossils uncovered during excavation operations, and provide such cooperation and assistance as may be necessary to preserve the findings for removal or other disposition by OWNER.
- B. Where appropriate by reason of discovery, ENGINEER may order delays in the time of performance or changes in the Work, or both. If such delays or changes are ordered, an equitable adjustment will be made in the Contract in accordance with the applicable clauses of the Contract.

1.11 PROTECTION OF ENDANGERED SPECIES

- A. There are no known endangered species at the Site.
- B. Where appropriate by reason of a discovery, ENGINEER may order delays in time of performance or changes in the Work, or both. If such delays, or changes, or both, are ordered, the time of performance and Contract Price will be adjusted in accordance with the applicable clauses in the Contract.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTUION

Not Used

END OF SECTION

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**SECTION 01 07 75
PROJECT CLOSEOUT**

PART 1 GENERAL

1.1 SUBMITTALS

A. Administrative:

1. Record Drawings
2. Operating and Maintenance Instructions

1.2 FINAL INSPECTION

- A. Request a final review in writing at least ten (10) calendar days prior to the anticipated date of completion.
- B. Perform final review with CONTRACTOR, OWNER, ENGINEER, and a representative of the Colorado State Engineer's Office.
- C. Work will not be considered ready for final review until all Work has been completed, and CONTRACTOR has certified that all items are properly operating and in compliance with all Contract terms and conditions. CONTRACTOR or his project supervisor shall be at the Site during the final inspection.

1.3 RECORD DRAWINGS

- A. Submit the record copy of the drawing set that was maintained at the site during construction.

1.4 FINAL CONDITIONS SURVEY

- A. Perform survey of completed construction for embankments and appurtenant structures. Survey to 1-foot contours. Plot final survey at 1" = 100'.
- B. Perform survey of the Reservoir 2 slopes and bottom and beyond a 25' perimeter of top of slope. Survey to 1-foot contours. Plot final survey at 1" = 100'.
- C. Provide electronic DTM data.

1.5 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. Submit three (3) final copies of all operating and maintenance instructions for all equipment, instrumentation, and systems that require adjustment, servicing, and

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attention for proper operation. Include all information necessary to provide for proper operating conditions. Use simple, non-technical language where possible. Provide all necessary diagrams, schematics, etc., required by repairmen. Point out any hazards likely to occur in operation of equipment to avoid improper operation of any equipment that might result in damage or danger to equipment, building, or personnel. Instruction manuals shall be submitted to ENGINEER at the same time the request for final inspection is made.

- B. Submit copies of all maintenance and operating information in bound form as a "Manual of Operating Instructions" with items grouped by sections of Work. Append each manual with name, address, telephone number of CONTRACTOR, Subcontractor, and companies or individuals providing service for equipment used.

1.6 TRAINING

- A. Provide competent personnel to meet with OWNER and ENGINEER to fully explain and familiarize OWNER personnel with all equipment and its operation and maintenance.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

**SECTION 02 01 00
SITE PREPARATION**

PART 1 GENERAL

1.1 WORK INCLUDES

- A. Clearing, grubbing, and stripping within CONTRACTOR work area.
- B. Disposal of clearing and grubbing debris offsite.
- C. Salvaging and stockpiling topsoil from stripping for use in site reclamation.

1.2 DEFINITIONS

- A. Clearing: Removing, hauling, and disposing of all trees, shrubs, grasses, weeds, debris, trash, rubble, downed timber, branches, and other above-ground materials.
- B. Grubbing: Removal of vegetation and other organic matter including stumps, buried logs, and roots greater than 2 inches diameter to a depth of 6 inches below subgrade.
- C. Stripping: Removal of topsoil remaining after applicable clearing and grubbing is completed.

1.3 SUBMITTALS

- A. Shop Drawings: Drawings clearly showing the following:
 - 1. Clearing, grubbing, and stripping areas.
 - 2. Topsoil stockpile location.
 - 3. Debris stockpile location.

1.4 SCHEDULING AND SEQUENCING

- A. Prepare site only after erosion and sediment controls are in place.

PART 2 PRODUCTS

Not Used.

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PART 3 EXECUTION**3.1 GENERAL**

- A. Verify that existing plant life and features designated to remain or to be protected are tagged or identified. Do not injure or remove vegetation that is not designated for removal.

3.2 PROTECTION

- A. Protect any trees, plant growth, and features not requiring removal for the Work.
- B. Protect benchmarks and survey monuments from damage or displacement. Repair or replace all benchmarks and survey monuments damaged during clearing and grubbing.
- C. Maintain protection until all work in the vicinity of the work being protected has been completed.
- D. Restrict construction activities to those areas within the limits of construction designated on the Drawings, within public rights-of-ways, and within easements provided by the OWNER. Adjacent properties and improvements thereon, public or private, which become damaged by construction activities shall be promptly restored to their original condition, to the full satisfaction of the property OWNER.

3.3 LIMITS

- A. Clear, grub, and strip only those areas actually needed for temporary stockpiles, required excavation, designated fill areas, and site improvements within the following limits, but not to extend beyond the limits of the CONTRACTOR work area:
 - 1. Excavation Areas: Clear, grub, and strip area of excavation plus 5 feet beyond top of cut slopes.
 - 2. Temporary Fill/Stockpile Areas: Clear fill area plus 20 feet beyond toe of fill.
 - 3. Structures: Clear, grub, and strip structure area plus 15 feet outside of new structures.
- B. Remove rubbish, trash, and junk from entire area within Limits of CONTRACTOR Work Area.

3.4 STRIPPING

- A. Do not strip until after clearing and grubbing.
- B. Minimum stripping depth = 6 inches. Do not remove subsoil with topsoil.

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- C. Stockpile strippings that meet the requirements for topsoil defined in Section 02 50 00: SITE RECLAMATION.

3.5 DISPOSAL

- A. Dispose of all clearing and grubbing debris and unsuitable stripped topsoil material off site in accordance with Section 01 50 00: TEMPORARY FACILITIES AND CONTROLS.

END OF SECTION

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**SECTION 02 21 00
SURVEYS****PART 1 GENERAL****1.1 WORK INCLUDES**

- A. Pre-construction survey after reservoir dewatering.
- B. Layout surveys required for the control and completion of the work.
- C. Quantity surveys to compute quantities of work performed.
- D. Record surveys necessary for ENGINEER to produce Record Drawings.
- E. Survey shall include the following: existing (pre-construction) site, topography, post excavation with Zone 1a/1b foundation and keyway prepared, finished reservoir.

1.2 SUBMITTALS

- A. Administrative:
 - 1. Survey Control Plan – A complete plan for the surveying required to lay out the work, including methods and time tables for establishing lines and grades.
 - 2. Surveyor Qualifications – Resumes of qualifying experience for the Professional Land Surveyor who will be responsible for the supervision and direction of all of CONTRACTOR's survey work.
 - 3. Quantity Surveys – Accompanying progress payment requests, submit a copy of applicable quantity survey notes and computations and an itemized statement for work performed or placed during the progress period measured on the basis of surveying.
 - 4. Survey Books – Within 2 days of completing and reducing notes for a survey or portion of survey, submit a copy of such notes. Within 2 days of completing a field survey book, submit a copy of the original field survey book.
 - 5. Daily Notes – If requested by ENGINEER, submit a copy of the workday's survey notes at the conclusion of that workday.
 - 6. Pre-construction Survey – Within one week of mobilization and prior to excavation submit drawings in hard copy (22 by 34 inches), and electronically (AutoCAD 2010 or higher), for all record survey data collected at the site, maximum scale of 1 inch = 50 feet.

7. Record Survey – Within one week of substantial completion of the work, submit drawings in hard copy (22 by 34 inches), and electronically (AutoCAD 2010 or higher), for all record survey data collected at the site, maximum scale of 1 inch = 50 feet.

1.3 QUALIFICATIONS

- A. Survey work shall be under the supervision and direction of a Professional Land Surveyor who is registered in the State of Colorado and has a minimum of 2 years responsible charge of construction surveys for construction similar in nature to that required by this contract. Maintain sufficient qualified personnel to perform required surveying work. All survey work performed by CONTRACTOR shall be subject to field and office review by ENGINEER.

1.4 ACCURACY

- A. Degree of accuracy shall be of an order high enough to satisfy tolerances specified for the work and the following:
 1. Pumped outlet access road: Alignment of tangents and curves shall be within 0.1 foot.
 2. Structure points shall be set within 0.01 foot, except where installation or operation considerations require tighter tolerances.
 3. Earthwork shall be within 0.1 foot vertical of locations shown on the Drawings.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 LAYOUT OF WORK

- A. The CONTRACTOR shall establish primary control for establishing lines and grades required for the work. Primary control consists of control points in the vicinity of the work as described and indicated on the Drawings.
- B. Preserve and maintain primary control points. Primary control points damaged or destroyed by CONTRACTOR may be reestablished by ENGINEER, and the expense of reestablishment will be deducted from amounts due, or to become due, to CONTRACTOR.

- C. Use CONTRACTOR-established primary control points to establish all lines and grades necessary to control the Work.
- D. Establish, place, and replace as required, such additional monuments, control points, survey stakes, markers, and other controls as may be necessary for control, intermediate checks, and guidance of construction operations.

3.2 CONTRACTOR SURVEYS

A. Quantity Surveys

- 1. Perform such surveys and computations as necessary to determine quantities of work performed or placed during each progress payment period, and perform all surveys necessary for ENGINEER to determine final quantities of work in place.
- 2. Notify ENGINEER at least 24 hours before performing a survey and, unless specifically waived, surveys shall be performed in the presence of an authorized representative of ENGINEER.

B. Layout Surveys:

- 1. Pumped outlet access road: alignment staking - Each 100 feet on tangent; each 50 feet on curves.
- 2. Slope staking - Each 50 feet on tangent; each 25 feet on curves; restake every 10 feet in elevation.
- 3. Structure - Stake out structures; checks prior to and during construction.

C. Record Survey

- 1. Survey the “as-built” locations (horizontal coordinates and elevations) of:
 - a. Centerline of all piping and utility lines.
 - b. Centerline and finished grades of permanent access roads.
 - c. Corner points of all above and below grade structures.
 - d. Finished reservoir grades to at least 10 feet beyond impacted area.
 - e. Edge of slab or structure.

3.3 RECORDS

- A. Record survey data in accordance with recognized professional surveying standards. Original field notes, computations, and other surveying data shall be recorded in standard survey field books. Notes or data not in accordance with standard formats will be rejected. Illegible notes or data, or erasures on any page of a field book will be considered sufficient cause for rejection of part or all of the field book. Rejection

of part or all of a field book may necessitate resurveying. Corrections by ruling or lining out errors will be accepted.

END OF SECTION

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SECTION 02 37 00
EROSION PROTECTION AND SEDIMENT CONTROL

PART 1 GENERAL

1.1 WORK INCLUDES

- A. Designing, installing, and maintaining erosion protection and sediment control to comply with all local, state, and federal regulations.

1.2 REFERENCES

- A. Urban Drainage and Flood Control District's *Urban Storm Drainage Criteria Manual* (UDFCD Manual), latest edition.

1.3 DEFINITIONS

- A. Sediment and Erosion Control devices as defined herein shall mean silt fences, hay bales, sandbag cofferdams, sediment ponds, sediment traps, turbidity curtain, or other devices required to limit soil erosion, limit sediment transport, and to protect streams and drainageways from erosion and sediment damage.

1.4 SUBMITTALS

A. Administrative Submittals:

1. Erosion Protection and Sediment Control Plan (EPSCP), prepared and stamped by a Colorado Registered Professional Engineer.
2. Submit EPSCP within 10 days after NTP.
3. Submit copies of EPSCP for review and approval to ENGINEER.
4. The EPSCP shall meet the requirements of the UDFCD Manual. The plan shall include, at a minimum, the following information:
 - a. Facilities, products, and procedures to meet the requirements of erosion protection and sediment control regulations.
 - b. Procedure and installation details of constructing all required erosion protection and sediment control facilities.
 - c. Procedures and schedule to inspect, maintain, monitor, and repair erosion protection and sediment control facilities.
 - d. Product data of proposed materials to be used to control erosion and sediment.
 - e. Drawings that clearly show erosion and sediment control measures to be used for each stage of construction.
 - f. Schedule of removal of sediment and erosion control devices.

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1.5 SEQUENCING AND SCHEDULING

- A. The EPSCP must be submitted and approved by ENGINEER and regulatory agencies prior to issuance of grading permit(s) for the project, as required in Section 01 41 26: PROJECT PERMITS AND ENVIRONMENTAL CONTROLS.

PART 2 PRODUCTS

2.1 EROSION CONTROL DEVICES

- A. The following products may be required to satisfy regulatory requirements:

1. Silt barriers:

- a. Could include hay bales, silt fences, and other similar temporary soil sediment barriers for the purpose of intercepting and detaining sediment from disturbed areas during construction. Silt barriers shall be firmly anchored into the ground.
- b. Silt fences:
 - i. Consisting of fabric and posts suitable for sedimentation control application.
 - ii. UV protected fabric.
 - iii. Toe-in at least 6 inches to prevent silt-laden runoff water from running beneath the fence and over the ground surface.
- c. Hay bales:
 - i. Consisting of hay or straw stacked and staked in place with at least 2 stakes per bale.
 - ii. Toe-in bales at least 6 inches.
 - iii. Wire tie stakes to provide additional stability.
- d. Erosion control blankets and logs:
 - i. Material shall be excelsior or straw; anchorages as recommended by manufacturer
 - ii. Photo-degradable material so that it will naturally degrade and deteriorate in its entirety.

2. Erosion and sediment control blankets and geosynthetics that satisfy the requirements of the Colorado Health Department or other requirements of the State of Colorado.

3. Sediment and evaporation ponds:

- a. Designed to retain runoff and promote sediment settlement.
- b. Formed by partial excavation and/or constructed embankment or other construction method.

4. Drainage channels:

- a. Designed to provide for controlled collection and routing of sediment-laden water.
- b. Designed to minimize overtopping and erosion.

PART 3 EXECUTION

3.1 PREPARATION

- A. Identify required lines, levels, contours, and datums for the construction of erosion control facilities.

3.2 SEDIMENT AND EROSION CONTROL

- A. Install sediment and erosion controls prior to work involving site clearing, stripping and stockpiling topsoil, excavation, and earthwork.
- B. Maintain and repair sediment and erosion controls during course of construction.

3.3 RIPRAP

- A. Place riprap for erosion control so that pieces of different sizes are intermixed to eliminate segregation.

3.4 REMOVAL OF TEMPORARY FACILITIES

- A. Do not remove erosion control facilities without written approval from ENGINEER.
- B. All erosion control facilities will be the property of CONTRACTOR, and shall be removed and disposed offsite after all Work is complete.
- C. Remove and dispose sediments collected in the sediment control systems in accordance with Section 01 50 00: TEMPORARY FACILITIES AND CONTROLS.

END OF SECTION

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**SECTION 02 50 00
SITE RECLAMATION**

PART 1 GENERAL

1.1 WORK INCLUDES

- A. Reclaiming disturbed areas within the limits of site disturbance. Disturbed areas include:
 - 1. Staging areas and temporary access and haul roads above normal pool in the reservoir or downstream of the embankment crest.
 - 2. Areas disturbed as a result of the installation of the erosion and sediment control measures.
 - 3. Areas disturbed for the construction of the Work.
 - 4. Areas of borrow, if above normal pool in the reservoir or downstream of the embankment crest.

1.2 DEFINITIONS

- A. Reclaiming disturbed areas shall mean regrading, applying seed and mulch, and maintaining all seeded areas.

1.3 PROTECTION

- A. Areas outside the limits of site disturbance shall be protected from damage by the CONTRACTOR. Any disturbance of vegetation or native ground outside of the limits of site disturbance shown on the drawings shall be reclaimed by the CONTRACTOR at no additional expense to the OWNER.

1.4 RELATED SECTIONS

- A. Section 31 11 00: Clearing and Grubbing
- B. Section 31 23 16: Excavation
- C. Section 31 23 23: Fill and Backfill

1.5 SUBMITTALS

- A. Shop Drawings:
 - 1. Plans showing sequence and limits of site reclamation.
 - 2. Seed mixtures and product label information.

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B. Samples:

1. All seed and mulch materials shall be inspected and approved by the ENGINEER.

1.6 PROTECTION

- A. Protect from damage areas outside the approved limits of site disturbance.
- B. Reclaim any disturbance of vegetation or native ground outside of the limits of site disturbance.
- C. Pay the cost of any fines incurred by OWNER due to work being performed by CONTRACTOR outside the limits of site disturbance.

PART 2 PRODUCTS**2.1 TOPSOIL**

- A. Topsoil shall be as defined in Section 31 23 23: FILL AND BACKFILL.
- B. Topsoil shall not contain toxic materials harmful to grass growth.

2.2 SEED

- A. Grass seed shall be from the same or previous year's crop. When available, certified weed free seed will be provided. All seed will be free of prohibited noxious weeds (as defined by the State of Colorado), and will contain no greater than 1 percent other weeds.
1. All sites will be seeded with the following mixture, as recommended by Grand County:

Table 1: Seed Mix

% Species	Common Name
25	Sender Wheatgrass "San Luis"
25	Arizona Fescue
15	Indian Ricegrass "Rimrock"
10	Western Wheatgrass
10	Blue Grama
6	Sandberg's Bluegrass
4	Little Bluestern
3	Junegrass
1.5	Mountain Muhly
0.5	Thurber's Fescue

2. All application rates are based on pure, live seed (PLS).

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3. Seed shall be furnished and delivered premixed in the indicated proportions. Seed bag tags, or the equivalent, shall be provided for each delivery of seed. Tags shall show the guaranteed percentages of purity, weed content, germination, net weight, date of seed testing, and date of shipment. Tags will be provided to the ENGINEER for review and approval prior to seed application.

2.3 MULCH

- A. Straw mulch shall be inspected and bound with twine as regulated by the Weed Free Forage Act, CRS Title 35, Article 27.5 and administered by the Colorado Department of Agriculture. Mulch shall be accompanied by a certificate of compliance as defined in the rules and regulations of the aforementioned Act.

PART 3 EXECUTION

3.1 GENERAL

- A. The general order of execution shall be:
 1. Seedbed preparation
 2. Seed application
 3. Mulch application
- B. Seeding shall be accomplished between September 1 and November 30 or as approved by ENGINEER. No seeding shall take place when soils are frozen or excessively wet or dry.
- C. Grade all areas to drain. The maximum slope steepness shall be 3H:1V unless otherwise shown on the Drawings or approved in writing by ENGINEER.
- D. Remove all CONTRACTOR's equipment, debris, office, temporary fences or gates, and all other CONTRACTOR's properties in accordance with Section 01 50 00: Temporary Facilities And Controls.

3.2 SEEDBED PREPARATION

- A. Eliminate uneven areas and low spots. Remove debris, roots, branches and stones in excess of 3-inch size.
- B. Grade final surface of the topsoil to a relatively smooth surface using mechanical or hand raked methods. There shall not be any localized low spots that will allow water to accumulate.
- C. Scarify subgrade soil to a depth of 4 to 6 inches.

3.3 SEED APPLICATION

- A. Drill seed ½ to 1 inch deep following the contour. In areas that cannot be drilled, broadcast seed at 1.5 times the application rate and cover ½ to 1 inch deep with a harrow or drag bar. Apply seed within 10 days following soil preparation.

3.4 MULCH APPLICATION

- A. A uniform depth of certified weed free straw mulch will be applied to all seeded areas. Mulch shall be applied at the rate of 2,000 lbs./acre.

3.5 MAINTENANCE AND PROVISIONAL ACCEPTANCE

- A. Keep all seeded areas in good condition, reseeding and mulching if and when necessary until a good, healthy, uniform growth is established over the entire area seeded and shall maintain these areas in an approved condition until provisional acceptance.
- B. Prevent washouts by an approved method. Any washout which occurs shall be regraded and reseeded at no additional expense to OWNER. Maintain seeded area until vegetation is established.
- C. The OWNER or ENGINEER will inspect all work for provisional acceptance at the end of the 8-week maintenance period, upon the written request of the CONTRACTOR, received at least 10 days before the anticipated date of inspection.
- D. An area will be considered to be satisfactorily reclaimed when:
 - 1. Soil erosion resulting from the operation has been stabilized.
 - 2. A vegetative cover at least equal to that present prior to disturbance and a plant species composition at least as desirable as that present prior to disturbance has been established.
- E. The OWNER or ENGINEER will determine whether maintenance shall continue in any area or manner.
- F. After all necessary corrective work and clean-up has been completed, the OWNER will certify in writing the provisional acceptance. The CONTRACTOR's responsibility for maintenance shall cease on receipt of provisional acceptance.

3.6 GUARANTEE PERIOD AND FINAL ACCEPTANCE

- A. All seeded areas shall be guaranteed by the CONTRACTOR for not less than 1 full year from the time of final project acceptance.

- B. At the end of the guarantee period, inspection will be made by the OWNER or ENGINEER upon written request submitted by the CONTRACTOR at least 10 days before the anticipated date. Areas not demonstrating satisfactory reclamations as outlined above, as determined by the OWNER or ENGINEER, shall be renovated, reseeded, and maintained meeting all requirements as specified herein.
- C. After all necessary corrective work has been completed, the OWNER will provide final acceptance in writing.

END OF SECTION

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SECTION 03 03 00
CAST-IN-PLACE CONCRETE AND GROUT

PART 1 GENERAL

1.1 WORK INCLUDES

- A. The Contractor shall furnish all labor, tools, and equipment for the construction of plain and reinforced concrete as shown on the Contract Drawings and herein specified. The Contractor shall strictly adhere to ACI 301.
- B. Steel and fiber reinforcement for reinforced concrete are included in this section.

1.2 RELATED SECTIONS

- A. Section 31 23 23 – Fill and Backfill

1.3 SUBMITTALS

- A. Submit product data for admixtures, evaporative retardant films, curing compounds, form release agents, ready mix concrete designs, form ties, bonding agents, grouts, and coatings.
- B. Submit materials reports for cement and mill test reports for steel reinforcement for all structural concrete.
- C. QUALITY CONTROL

- 1. Contractor shall provide quality control for all concrete placements including air entrainment, temperature, slump and cylinders for compressive strength testing at 7 and 28 days. At least four cylinders shall be prepared for each pour for subsequent compressive strength testing.
- 2. Use adequately skilled workers in the placement of all concrete and verify dimensions and steel reinforcement placement.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cement
 - 1. Cement shall be air-entrained Portland Cement in accordance with ASTM C-175, Type II-A and ASTM C-260.

B. Aggregate

1. Fine Aggregate: Fine aggregate shall consist of hard, strong, durable particles to the provisions of the Standard Specifications for Concrete Aggregates, ASTM Designation C-33.
2. Coarse Aggregate: Coarse aggregate shall conform to the provisions of Standard Specifications for Concrete Aggregates, ASTM Designation C-33.

C. Water

1. Water shall be clean and free of injurious amounts of oils, acids, alkalis, salts, organic materials, or other substances that may be deleterious to concrete or steel. Mixing water for prestressed concrete or for concrete which will contain aluminum embedment, including that portion of the mixing water contributed in the form of free moisture on the aggregates, shall not contain deleterious amounts of chloride ion.
2. Unless otherwise permitted or specified, the concrete shall be proportioned and produced to have a slump of four (4) inches or less if consolidation is by vibration. The slump shall be determined by the "Standard Test Method for Slump of Hydraulic Cement Concrete" ASTM C-143.

D. Admixtures

1. Admixtures to be used in concrete shall be subject to prior acceptance by the ENGINEER or DISTRICT Representative. The admixture shall maintain the same composition and performance throughout the work as the product used in the concrete proportioned established in accordance with ACI 211. Admixtures containing chloride ions shall not be used in prestressed concrete or concrete containing aluminum embedments.
2. Air Entrainment: An air entrainment agent shall be used in all concrete. The agent used shall conform to ASTM Designation C-260. The amount of air entraining agent used in each concrete mix shall be such as will effect the entrainment of the percentage of air shown in the following tabulation in the concrete as discharged from the mixer at the point of placement.

Maximum Size of Coarse Aggregate (inches)	Total Air, Percent By Volume, of Concrete
3/8-inch	6.5 ± 1
3/4-inch	6.0 ± 1
1-1/2 inches	4.5 ± 1

3. Water Reducing, Set-Controlling Admixture: The Contractor shall use a water-reducing, set controlling concrete. A water-reducing admixture shall be used in

all concrete and shall conform to ASTM Designation C-494, specifically Types A, B, C, D, and E.

4. Finely Divided Mineral Admixtures: Mineral admixtures shall be limited to fly ash conforming to ASTM Specification C-618, Type F.

E. Batching

1. Measuring and batching of materials shall be done at a batching plant.
2. Portland Cement: Either sacked or bulk cement may be used. No fraction of a sack of cement shall be used in a batch of concrete unless the cement is weighed. Bulk cement shall be weighed on scales separate and distinct from the aggregate hopper or hoppers. Batching shall be such that the accuracy of batching shall be plus or minus one percent of the required weight.
3. Water: Unless water is to be weighed, the water-measuring equipment shall include an auxiliary tank from which the measuring tank shall be filled. In lieu of the volume method, the Contractor will be permitted to use a water metering device.
4. Aggregates: Aggregates shall be handled from stockpiles or other sources to the batching plant in such a manner as to secure a uniform grading of the material. Aggregates that have become segregated, or mixed with earth or foreign material, shall not be used. Batching shall be so conducted as to result in the weights of material required for each type aggregate within a tolerance of two percent (2%).

F. Transporting

1. Truck agitator shall be loaded not to exceed the manufacturer's guaranteed capacity. They shall maintain the mixed concrete in a thoroughly mixed and uniform mass during hauling.
2. No additional mixing water shall be incorporated into the concrete during hauling or after arrival at the delivery point, unless ordered by the DISTRICT representative. If additional water is to be incorporated into the concrete, the drum shall be revolved not less than 30 revolutions at mixing speed after the water is added and before discharge is commenced. The CONTRACTOR shall furnish a water measuring device in good working condition, mounted on each transit mix truck, for measuring the water added to the mix on the site by the DISTRICT.
3. Each load of ready mixed concrete delivered at the job site shall be accompanied by the ticket showing volume of concrete, the weight of cement in pounds and the total weight of all ingredients in pounds. The ticket shall also show the time of day at which the materials were batched and the reading of the revolution counter at the

time the truck mixer is charged. The ticket shall be delivered to the DISTRICT representative.

G. Compressive Strength

1. Structural Concrete: Structural concrete compressive strength requirements consist of a minimum strength which must be obtained before various loads or stresses are applied to the concrete and, for concrete designated by strength, a minimum strength at the age of 28 days. Concrete shall have a minimum compression strength of 4,000 psi at 28 days.
 - a. Sampling and curing shall be in accordance with ASTM C-192, and testing shall be in accordance with ASTM C-39. Slump shall be between 2" and 4" when placed.
2. Testing: Concrete testing shall be done by a qualified independent testing laboratory as approved by DISTRICT. Make 4 cylinders for each pour.

H. Grout or Dry Pack

1. Grout shall be composed of Portland Cement, sand, and water proportioned and mixed as specified in this section. Grout shall be furnished and placed via tremie pipe or grout tubes approved by the ENGINEER in anchor bores, recesses and holes, on surfaces, under structural members, and at other locations specified in these specifications.
2. The maximum size of sand shall not be larger than $\frac{1}{2}$ the size of the recess, holes or spaces where the grout is to be placed. The grout shall contain only enough water to permit placing and packing.
3. Concrete areas to be in contact with the grout shall be cleaned of all loose or foreign material that would in any way prevent bond between the grout and the concrete surfaces and shall be kept thoroughly moistened with water for a period of not less than 24 hours immediately prior to placing grout.
4. The grout shall completely fill and shall be tightly packed into recesses and holes, on surfaces, under structural members, and at other locations specified. After placing, all surfaces or grout shall be cured by methods provided in Part 3, 3.05 "Curing and Protection," for a period of not less than 3 days.
5. Keyways, spaces between structural members, holes, spaces under structural members, and other locations where grout could escape shall be grout-tight before placing grout. No load shall be allowed on grout that has been in place less than 72 hours unless otherwise permitted by the DISTRICT or its Representative.
6. All improperly cured or otherwise defective grout shall be removed and replaced by the Contractor at his expense.

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I. Reinforcement

1. Use new deformed steel reinforcement in accordance with ASTM D 615, Grade 60.

PART 3 EXECUTION**3.1 FORMS**

- A. The concrete forms shall be constructed to the lines and dimensions as shown on the detailed drawings and shall be of acceptable material and adequately braced and tied to support all of the loads and pressures of the wet concrete without distortion or leaks, and which will produce a smooth, even surface.
- B. The form facing material shall produce a smooth, hard, uniform texture on the concrete. It may be plywood, tempered concrete- form-grade hardboard, metal, plastic, paper, or other approved material capable of producing the desired finish. The arrangement of the facing material shall be orderly and symmetrical, with the number of seams kept to the practical minimum. It shall be supported by studs or other backing capable of preventing excessive deflection. Material with raised grain, torn surfaces, worn edges, patches, dents, or other defects which will impair the texture of the concrete shall not be used. Tie holes and defects shall be patched. All fins shall be completely removed.
- C. Drawings showing the general design and dimensions for forms for structures need not be submitted to the DISTRICT for acceptance unless the DISTRICT so requests such submittal. Design and construction shall be in accordance with "Recommended Practice for Concrete Formwork" (ACI 347), and "Formwork" (ACI 301, Chapter 4).
- D. Before concrete is placed, the surface of the forms shall be oiled with a commercial form oil that will effectively prevent sticking of the concrete to the forms and will not stain the concrete. All bond breaking materials or processes shall be used only after acceptance by the ENGINEER or DISTRICT Representative. Care shall be taken in applying form oil to avoid contact with reinforcement steel. Embedded material which becomes coated with form oil shall be thoroughly cleaned or replaced at the expense of the Contractor. Supporting forms and shores shall not be removed from beams, floors, and walls until these structural units are strong enough to support their own weight and any approved superimposed load which at no time shall exceed the design live load. When the forms are stripped, there shall be no excessive deflection or distortion and no evidence of damage to the concrete, due either to removal of support or the stripping operation. Removal time of forms shall be determined by the ENGINEER or DISTRICT Representative.

3.2 REINFORCEMENT INSTALLATION

- A. Install steel reinforcement as shown on the Drawings to a tolerance of plus or minus $\frac{1}{4}$ inch from the dimensions shown, secure and tie as necessary.
- B. Surface condition of reinforcement: Before placing concrete, clean reinforcement of loose rust and other substances which would impair bond with concrete. Remove rust by vigorous rubbing with burlap cloth or wire brushing.
- C. Splice reinforcing bars and welded wire fabric by lapping and securely wiring together. Splices at locations other than those indicated are subject to the concurrence of the ENGINEER and shall conform, if permitted, to the requirements of ACI 318. Do not use mechanical splices.

3.3 PLACEMENT

- A. Prior to pouring the concrete or grout, the Contractor shall remove all trash, pieces of wood, or other debris, and shall wet areas in which concrete or grout is to be poured prior to concrete or grout placement.
- B. Placement shall conform to ACI 301, Chapter 8 "Placing," ACI 306 "Recommended Practice for Cold Weather Concreting," and ACI 305 "Recommended Practice for Hot Weather Concreting." No concrete shall be placed until all formwork, reinforcement, installation of parts to be embedded, bracing of forms, and preparation of surfaces involved in the placing have been approved by the DISTRICT/Representative. No concrete shall be placed in water, except with the written permission of the ENGINEER; the method of depositing the concrete shall be subject to his approval. All surfaces of forms and embedded materials that have become encrusted with dried grout or grout from concrete previously placed shall be cleaned of all such grout or grout before the surrounding or adjacent concrete is placed. Immediately before placing concrete, all surfaces upon or against which the concrete is to be placed shall be free from standing water, mud, debris, or loose materials. The surfaces of absorptive materials against or upon which concrete is placed shall be moistened thoroughly so that moisture will not be drawn from the freshly placed concrete. The concrete shall be placed by equipment which will prevent segregation or loss of ingredients. The stream of concrete shall not be allowed to separate by permitting it to fall freely over rods, spacers, or other embedded materials.
- C. Install grout for riprap where required with a tremie pipe or with a chute and vibrator such that all voids are filled in the lower $\frac{2}{3}$ of the riprap thickness. Avoid grout splatter on the tops of riprap.
- D. Concrete shall be poured in continuous layers of approximately 12 inches and the total elapsed time between placing of successive layers shall not exceed 30 minutes.

E. All wood blocking, spreaders, and screens shall be removed as the concrete is poured and before the concrete sets.

F. Form oil shall be approved for potable water applications.

3.4 CONSTRUCTION JOINTS

A. There shall be no construction joints in the anchor blocks.

3.5 CURING AND PROTECTION

A. Beginning immediately after placement, concrete shall be protected from premature drying, excessively hot or cold temperatures, and mechanical injury, and shall be maintained with minimal moisture loss at a relatively constant temperature for the period necessary for hydration of the cement and hardening of the concrete. The materials and methods of curing shall be subject to acceptance by the DISTRICT's Representative.

B. For concrete surfaces not in contact with forms, one of the following procedures shall be applied immediately after completion of placement and finishing:

1. Ponding or continuous sprinkling.
2. Application of absorptive mats or fabric kept continuously wet.
3. Application of sand kept continuously wet.
4. Continuous application of steam (not exceeding 150° F or mist spray).
5. Application of waterproof sheet materials, conforming to "Specifications for Waterproof Sheet Materials for Curing Concrete" (ASTM C-171).
6. Application of other moisture retaining covering as accepted.
7. Application of a curing compound conforming to "Specifications for Liquid Membrane Forming Compounds for Curing Concrete" (ASTM C-309) and approved for potable water applications. The compound shall be applied in accordance with the recommendations of the manufacturer immediately after any water sheen which may develop after finishing has disappeared from the concrete surface. It shall not be used on any surface against which additional concrete or other material is to be bonded unless it is proven that the curing compound will not prevent bond, or unless positive measures are taken to remove it completely from areas to receive bonded applications.
8. Moisture loss from surfaces placed against wooden forms or metal forms exposed to heating by the sun shall be minimized by keeping the forms wet until they can

be safely removed. After form removal, the concrete shall be cured until the end of the curing time by one of the previously described curing methods.

9. Curing shall be continued for at least 7 days in the case of all concrete except high-early strength concrete for which the period shall be at least 3 days. Alternatively, if tests are made of cylinders kept adjacent to the structure and cured by the same methods, moisture retention measures may be terminated when the average compressive strength has reached 70% of the specified concrete strength.
- C. Cold Weather: When the mean daily outdoor temperature is less than 40° F, the temperature of the concrete shall be maintained between 50 and 70° for the required curing period. When necessary, arrangements for heating, covering, insulation, or housing the concrete work shall be made in advance of placement and shall be adequate to maintain the required temperature without injury due to concentration of heat. Combustion heaters shall not be used during the first 24 hours unless precautions are taken to prevent exposure of the concrete to exhaust gases which contain carbon dioxide.
- D. Hot Weather: When necessary, provision for windbreaks, shading, fog spraying, sprinkling, ponding, or wet covering with a light colored material shall be made in advance of placement, and such protective measures shall be taken as quickly as concrete hardening and finishing operations will allow.
- E. Rate of Temperature Change: Changes in temperature of the air immediately adjacent to the concrete during and immediately following the curing period shall be kept as uniform as possible and shall not exceed 5° F in any 1 hour or 50° F in any 24 hour period.
- F. Protection from Mechanical Injury: During the curing period, the concrete shall be protected from damaging mechanical disturbances, such as load stresses, heavy shock, and excessive vibration. All finished concrete surfaces shall be protected from damage by construction equipment, materials, or methods, by application of curing procedures, and by rain or running water. Self supporting structures shall not be loaded in such a way as to overstress the concrete.

3.6 REPAIR OF SURFACE DEFECTS

- A. Surface defects, including tie holes, unless otherwise specified by the Contract Documents, shall be repaired immediately after form removal.
- B. Repair of Defective Areas: All honeycombed and other defective concrete shall be removed down to sound concrete. If chipping is necessary, the edges shall be perpendicular to the surface or slightly undercut. No feather edges will be permitted. The area to be patched and an area at least 6" wide surrounding it shall be dampened to prevent absorption of water from the patching grout. A bonding grout shall be

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- prepared using a mix of approximately 1 part cement to 1 part fine sand passing a No. 30 mesh sieve, mixed to the consistency of thick cream, and then well brushed into the surface.
- C. The patching mixture shall be made of the same materials and of approximately the same proportions as used for the concrete, except that the coarse aggregate shall be omitted and the grout shall consist of not more than 1 part cement and 2-1/2 parts sand by loose volume. White Portland Cement shall be substituted for a part of the gray Portland Cement on exposed concrete in order to produce a color matching the color of the surrounding concrete, as determined by a trial patch. The quantity of mixing water shall be no more than necessary for handling and placing. The patching grout shall be mixed in advance and allowed to stand with frequent manipulation with a trowel, without addition of water, until it has reached the stiffest consistency that will permit placing.
 - D. After surface water has evaporated from the area to be patched, the bond coat shall be well brushed into the surface. When the bond coat begins to lose the water sheen, the premixed patching grout shall be applied. The grout shall be thoroughly consolidated into place and struck off so as to leave the patch slightly higher than the surrounding surface. To permit initial shrinkage, it shall be left undisturbed for at least 1 hour before being finally finished. The patched area shall be kept damp for 7 days. Metal tools shall not be used in finishing a patch in a formed wall which will be exposed.
 - E. Tie Holes: After being cleaned and thoroughly dampened, the tie holes shall be filled solid with patching grout.
 - F. Proprietary Materials: If permitted or required, proprietary compounds for adhesion or as patching ingredients may be used in lieu of or in addition to the foregoing patching procedures. Such compounds shall be used in accordance with the manufacturer's recommendations.

3.7 FINISHING OF FORMED SURFACES

- A. Immediately after removing the forms, the form ties shall be cut back 3/4" from the surface and patched with 1:2 cement-sand grout. All honeycombs, voids, and other defects shall be so patched. The surfaces shall then be thoroughly wetted and rubbed with a No. 16 Carborundum stone or equal abrasive brining the surface to a paste. The rubbing shall be continued sufficiently to remove all form marks and projections, producing a smooth, dense surface without pits or irregularities. After setting sufficiently, the surface shall then be rubbed with a No. 30 Carborundum stone until the entire surface is of a smooth texture and uniform in color. Only exposed surfaces in habitable areas need be rubbed. Surfaces to be waterproofed or hidden from view shall be patched, but not rubbed.

3.8 PATCHING

- A. The total patched area shall not exceed two square feet in each 1,000 square feet of surface. This is in addition to form tie patches.
- B. Any patches shall closely match the color and texture of surrounding surfaces. The mix formula for patching grout shall be determined by trial to obtain a good color match with the concrete when both patch and concrete are cured and dry. After initial set, surfaces and patches shall be dressed manually to obtain the same texture as surrounding surfaces.

END OF SECTION

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**SECTION 03 06 01
GROUT****PART 1 GENERAL****1.1 WORK INCLUDES**

A. The following grout types:

1. Lean grout

1.2 REFERENCES

A. The following is a list of standards that may be referenced in this section:

1. American Society for Testing and Materials (ASTM):
 - a. ASTM C 109 – Test Method for Compressive Strength of Hydraulic Cement Mortars (using 2-in or 50mm Cube Specimens)
 - b. ASTM C 579 – Test Methods for Compressive Strength of Chemical-Resistant Mortars and Monolithic Surfacing
 - c. ASTM C 1107 – Standard Specification for Packaged Dry, Hydraulic Cement Grout (Non-shrink)
 - d. ASTM C 939 – Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method)
 - e. ASTM C 827 – Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures
 - f. ASTM C 531 – Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, and Monolithic Surfacing
 - g. ASTM C 1181 – Test Method for Compressive Creep of Chemical-Resistant Polymer Machinery Grouts
2. American National Standards Institute (ANSI):
 - a. ANSI/ASTM D 1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
 - b. ANSI/ASTM D 1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

1.3 SUBMITTALS

A. Shop Drawings:

1. Product data of all grouts.

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B. Administrative:

1. Manufacturer's instructions.

C. Quality Control:

1. Manufacturer's Written Instructions:

- a. Cement-water ratio of grout topping.
- b. Mixing of grout.

2. Manufacturer's Certificate of Compliance:

- a. Grout free from chlorides and other corrosion-causing chemicals.
- b. Non-shrink grout properties verifying expansion at 3 or 14 days will not exceed the 28-day expansion and non-shrink properties are not based on gas or gypsum expansion.

PART 2 PRODUCTS**2.1 CEMENT**

- A. Cement for grout shall conform to the requirements of Section 03 33 00: CAST-IN-PLACE CONCRETE.

2.2 LEAN GROUT

- A. Minimum 28-day compressive strength of 7,000 psi, when mixed at a fluid consistency.
- B. Meet the requirements of ASTM C 1107, Grade C, when tested using the amount of water needed to achieve the following properties:
 1. Fluid consistency (20 to 30 seconds) per ASTM C 939.
 2. At temperatures of 45, 70, and 90°F.
 3. The grout when tested shall not bleed or segregate at maximum allowed water.
- C. Fluid grout shall pass through the flow cone, with a continuous flow, 1 hour after mixing.
- D. Grout shall be pretested per the specified grout test requirements.
- E. Masterflow 938 by Master Builders, or equal.

PART 3 EXECUTION**3.1 GENERAL**

- A. Grout shall not be placed until base concrete or masonry has attained its design strength, unless authorized by ENGINEER.
- B. When cementitious grouts are used on concrete surfaces, the concrete surface shall be saturated with water for 24 hours prior to placement. Upon completion of saturation period excess water shall be removed. Concrete substrate shall not be wet prior to placement of grouts.
- C. Except for cement-bentonite grout in piezometers, all surfaces that will be in contact with grout shall be free of grease, oil, dirt, loose rust, curing compounds, laitance, loose concrete, and other deleterious materials.

3.2 GROUTING PROCEDURES**A. General:**

- 1. All mixing, surface preparation, handling, placing, consolidation, curing, and other means of execution for prepackaged grouts shall be done according to the instructions and recommendations of the manufacturer.

3.3 CONSOLIDATION

- A. Grout shall be placed in such a manner, for the consistency necessary for each application, so as to assure that the space to be grouted is completely filled.

3.4 CURING

- A. Grout should be cured according to the manufacturer's recommendations.
- B. Temperature of the foundation plate, supporting concrete foundation, and the grout should be maintained between 40°F and 90°F during grouting, and for a minimum of 24 hours afterward. Machinery and baseplates will cool at low temperatures or heat up at hot temperatures or in the sun more rapidly than the grout and should be avoided during the curing period.
- C. Cement based grout should be protected from extreme drying conditions by covering all exposed grout surfaces with continually wetted burlap for a minimum of 3 days. Immediately after the moist curing period, two coats of a curing compound shall be applied.

END OF SECTION

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**SECTION 31 11 00
CLEARING AND GRUBBING**

PART 1 GENERAL

1.1 WORK INCLUDES

- A. Removal of all surface debris and vegetation from the limits of site disturbance shown on the drawings.
- B. The general work areas that require site clearing includes:
 - 1. CONTRACTOR staging and stockpile areas
 - 2. Borrow areas
 - 3. Footprint of Zone 1a, Zone 1b and pumped outlet road and pad.
- C. Dispose of cleared vegetation and debris.
- D. Protection of existing structures.

1.2 DEFINITIONS

- A. Site Clearing as defined herein shall mean the removal, hauling, and disposal of surface debris and vegetation from the limits of site disturbance shown on the drawings.

1.3 VERIFICATION

- A. The CONTRACTOR shall verify with the ENGINEER prior to initiating any clearing operations in that area. Unauthorized clearing will not be entitled for payment.

1.4 RELATED SECTIONS

- A. Section 01 41 26: Project Permits and Environmental Controls
- B. Section 01 50 00: Temporary Facilities and Controls
- C. Section 31 23 16: Excavation

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION**3.1 PROTECTION**

- A. The CONTRACTOR shall protect any features designated to remain as final landscaping. The CONTRACTOR shall remove only those trees and plant growth required to be removed, as determined by the ENGINEER. The CONTRACTOR shall be liable for damage to protected vegetation and other features which are damaged by clearing operations.
- B. The CONTRACTOR shall protect bench marks and survey monuments from damage or displacement. Any bench marks or survey monuments damaged during clearing by the CONTRACTOR will be repaired or replaced by the OWNER, and the costs will be back-charged to the CONTRACTOR.

3.2 CLEARING

- A. The CONTRACTOR shall remove all vegetation, deadwood, rocks larger than one foot in diameter, and other surface debris from the entire area within the limits of site disturbance shown on the drawings, except for those features designated to be protected.

3.3 GRUBBING

- A. Grubbing shall mean the removal of stumps, main root balls, and root systems so that no vegetative matter remains in the area below the embankment, appurtenant structures, or in the embankment fill materials.
- B. Tree trunks and stumps shall be removed by excavation, including removal of trunk, stump, rootball and all roots greater than ½ inch in diameter.
- C. Fill and compact the void from tree trunk and stump removal with similar soil and compaction as the adjacent soil.

3.4 REMOVAL AND DISPOSAL

- A. In accordance with Section 01 50 00: Temporary Facilities and Controls.

3.5 MAINTENANCE OF CLEARED AREAS

- A. The CONTRACTOR shall be responsible for maintaining cleared work areas in a condition free from additional vegetation growth for the duration of the project. Use of herbicides to discourage plant growth shall not be allowed. The CONTRACTOR shall be compensated for clearing each work area only once. If weed and brush growth require additional clearing, this shall be performed solely at the CONTRACTOR's expense.

END OF SECTION

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**SECTION 31 14 00
STRIPPING****PART 1 GENERAL****1.1 WORK INCLUDES**

- A. Removing grass, weeds, and topsoil within the limits of site disturbance, and at the CONTRACTOR staging and stockpile area.
- B. Removing muck in the reservoir area within the limits of site disturbance.
- C. Stockpiling topsoil to be replaced in the dam, staging and stockpile area, and for reclaiming disturbed areas.
- D. Disposing excess topsoil not needed for construction.
- E. Disposing muck.

1.2 PROTECTION

- A. Protect existing trees, shrubs, and other vegetation as shown on the drawings. Refer to Section 01 41 26: Project Permits and Environmental Controls.
- B. Protect existing benchmarks to remain, as shown on the Drawings. Refer to Section 31 23 16: Excavation.

1.3 RELATED SECTIONS

- A. Section 01 05 75: Project Permits and Environmental Controls
- B. Section 02 50 00: Site Reclamation
- C. Section 31 11 00: Clearing and Grubbing
- D. Section 31 23 16: Excavation
- E. Section 31 23 23: Fill and Backfill

1.4 DEFINITIONS

- A. Topsoil: Topsoil stripped from the site in the top 12 inches from the existing ground surface.
- B. Muck: Muck shall be soft and saturated material stripped from the existing ground surface within the reservoir area below the existing normal reservoir elevation

10944.0. Stripping below the top 12 inches may be required, as determined by the ENGINEER.

PART 2 PRODUCTS

2.1 TOPSOIL

A. Material as defined in subparagraph 1.4.A of this section.

2.2 MUCK

A. Material as defined in subparagraph 1.4.B of this Section.

PART 3 EXECUTION

3.1 STRIPPING AND STOCKPLING TOPSOIL

- A. Strip topsoil in the CONTRACTOR staging and stockpile area. Stripping depth may exceed 12 inches, as determined by the ENGINEER.
- B. Strip topsoil within the limit of site disturbance above the reservoir normal pool and in the downstream toe area of the dam.
- C. Stockpile topsoil at the staging and stockpile area. Stockpile height shall not exceed 8 feet. Protect stockpiled topsoil from wind and water erosion.
- D. Do not dispose any topsoil until reclamation of disturbed area is completed, and there is excess material.

3.2 STRIPPING MUCK

- A. Strip muck in the reservoir area.
- B. Muck shall be disposed of in the on-site disposal area, in accordance with Section 01 50 00: Temporary Facilities and Controls.

END OF SECTION

**SECTION 31 23 13
SUBGRADE PREPARATION**

PART 1 GENERAL

1.1 WORK INCLUDES

- A. Preparing the finished excavated surface for placement of overlying fill or structures.
- B. Protection of subgrade until placement of overlying fill, backfill, or structures.

1.2 DEFINITIONS

- A. Refer to applicable definitions of Section 31 23 16: EXCAVATION and Section 31 23 23: FILL AND BACKFILL.
- B. Prepared Foundation: Subgrade surface after completion of foundation preparation activities as specified prior to placement of overlying fill, backfill, or structure.
- C. Structure Foundation: Finished excavated surface, after subgrade preparation, upon which a structure will be placed. Approximate structure foundation elevations are shown on the Drawings; actual elevations will be determined by ENGINEER based on the material encountered.
- D. Subgrade: Ground surface after completion of required clearing, grubbing, stripping, and excavation prior to subgrade preparation, placement of overlying fill, or placement of a structure.
- E. Temporary Cover: Native material left in place over final foundation subgrade to protect subgrade from damage by wetting, drying, freezing, erosion, and physical disturbance by construction equipment traffic and personnel until the time of final subgrade excavation and preparation.

1.3 QUALITY CONTROL

- A. ENGINEER will conduct visual inspection of the excavated surface before placement of fill or concrete. Provide 72 hours notice to ENGINEER when final excavation is to be completed for a particular area so that ENGINEER can make arrangements for visual inspection.
- B. Notify ENGINEER immediately when excavation has reached the designated subgrade elevation.
- C. Notify ENGINEER immediately when soft, loose, or wet subgrade zones are detected.

1.4 SEQUENCING AND SCHEDULING

- A. Perform foundation preparation only when subgrade is unfrozen and free of ice, snow, and standing water.
- B. Perform foundation preparation only during daylight hours.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION**3.1 GENERAL**

- A. Shape excavation to produce a uniform and regular profile with no abrupt changes in slope, sharp projections, steps, overhangs, or benches except as shown on the Drawings or as approved by ENGINEER.
- B. Preserve the subgrade below and beyond the lines of excavation in the soundest possible condition. Repair any damage from CONTRACTOR's operations, including fracturing of material beyond the required excavation lines, as approved by ENGINEER.
- C. Keep subgrade free of ponded water and deleterious materials.
- D. Do not use sections of prepared foundation as haul roads. Protect prepared foundation from traffic.
- E. Maintain prepared foundation in finished condition until overlying fill, backfill, or structure is placed.
- F. Fill shall be placed on approved foundation within 24 hours of approval, or sooner as directed by ENGINEER.

3.2 PREPARED FOUNDATIONS ON SOIL

- A. Subgrade Compaction: Perform in accordance with requirements of Section 31 23 23: FILL AND BACKFILL.
- B. Correction for Soft or Loose Subgrade: Where subgrade cannot be compacted as specified, or in areas identified by ENGINEER that display yielding or excessive rutting during construction activities, adjust moisture content and recompact, or overexcavate as specified in Section 31 23 16: Excavation, and replace overexcavated material as specified in Section 31 23 23: Fill and Backfill.
- C. Remove exposed soil that is desiccated, frozen, or otherwise disturbed, to the satisfaction of ENGINEER, prior to placing overlying or adjacent fill, backfill or concrete.

3.3 PREPARED FOUNDATIONS ON BEDROCK

- A. The weathered bedrock shall be stripped to an approximate depth of 1 foot below the Zone 1a/Zone 1b contact with the bedrock, as directed by the ENGINEER. Care should be taken not to dislodge slabs of bedrock during the foundation stripping process that increase the stripping depth beyond the 1' limit.

The entire foundation shall be moisture-conditioned and rolled with a sheepsfoot compactor prior to the first lift of soil, as directed by the ENGINEER. A smooth drum roller shall not be used. If foundation preparation activities damage the bedrock, the ENGINEER may require modifications to the foundation preparation.

3.4 KEYWAY TRENCH

The Keyway Trench shall extend at least 3' below the foundation after the top 1' of weathered bedrock is removed. Ripping of the bedrock will likely be necessary. The ENGINEER may require deeper keyway excavation in areas where sandstone and/or excessive groundwater seepage is observed.

END OF SECTION

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**SECTION 31 23 16
EXCAVATION****PART 1 GENERAL****1.1 WORK INCLUDES**

- A. Excavation for removing the alluvial material within the reservoir footprint
- B. Excavation for constructing the grouted rip rap interconnect rundown channel.
- C. Other excavation incidental to the work as specified herein and shown on the drawings.
- D. Excavation necessary for all other parts of Work.
- E. Disposal of all excavated materials that are not suitable for construction.

1.2 DEFINITIONS

- A. Refer to applicable definitions in Section 31 23 13: SUBGRADE PREPARATION and 31 23 23: FILL AND BACKFILL.
- B. Import material
 - 1. Imported material that meets project specifications for Zone 1a import.
- C. Borrow and Stockpile Areas:
 - 1. Designated onsite areas that are sources of material for fill and backfill.
- D. Unsuitable Subgrade or Foundation Soils: Soils that display yielding, excessive rutting, excessive water content, or have desiccated; soft clays, loose sands, and open or narrowly graded gravels.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Import and Borrow Development Plan: Include the following information as a minimum:
 - a. Methods and sequencing of importation.
 - b. Methods and sequencing of excavation in the various excavation areas.
 - c. Numbers, types and sizes of equipment proposed to perform excavations, hauling, processing, and borrow and stockpile development.
 - d. Anticipated difficulties and proposed resolutions.

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- e. Conceptual plans and sections showing sloping or shoring of temporary slopes as necessary for construction.
- f. Proposed locations of stockpiled imported and/or excavated material.

B. Administrative:

- 1. Copy of any excavation permit(s) required by law.

C. Quality Control:

- 1. Survey notes, cross sections, and topographic maps of the original ground surface prior to stripping or excavation. Extend survey coverage at least 50 horizontal feet beyond the limits of excavation and fill. Additional surveys in accordance with the requirements of Section 31 23 13: SUBGRADE PREPARATION.

1.4 QUALITY CONTROL

- A. Provide adequate survey control to avoid unauthorized excavation.
- B. Engineer will conduct visual observations of the bottom of excavations below embankment or structures. Provide 48-hour notice to Engineer when final excavation for each Work area requiring excavation will be ready to observe.

1.5 EXCAVATION SAFETY

- A. CONTRACTOR is solely responsible for making all excavations in a safe manner. Provide appropriate measures (sloping, benching or other methods) to prevent slope instability, protect adjacent Work, and ensure the safety of all people on the work site.
- B. Install and maintain sloping, benching and other slope stabilization measures as required by Laws and Regulations.

1.6 WEATHER LIMITATIONS

- A. Material excavated when frozen or when air temperature is less than 32°F shall not be used as fill or backfill until CONTRACTOR can demonstrate that the material is completely thawed.
- B. Material excavated during inclement weather shall not be used as fill or backfill until after material is within the specified moisture content range for proper compaction.

1.7 SEQUENCING AND SCHEDULING

- A. Conform to applicable requirements of Section 31 23 19: Dewatering prior to initiating excavation and maintain work area in a dewatered state throughout the period of excavation so excavations are completed in the dry.

- B. Coordinate final foundation excavation with related Work in Section 31 23 13: SUBGRADE PREPARATION.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 GENERAL

- A. Complete all required excavations regardless of the type, nature, or condition of the materials encountered unless specifically directed otherwise in writing from ENGINEER.
- B. Excavate to lines, grades, and dimensions shown and as necessary to accomplish Work. Excavate to within tolerance of plus or minus 0.1 foot except where dimensions or grades are shown or specified as maximum or minimum. Allow for forms, working space, topsoil, slope protection, riprap and similar items where applicable. Trim to neat lines where concrete is to be deposited against earth.
- C. Do not excavate to beyond the lines and grades shown without written authorization of ENGINEER. Backfill over-excavated structure foundations with concrete. Backfill all other over-excavated areas with required overlying fill or backfill material. Notify ENGINEER of all over-excavations prior to placing any backfill.
- D. Perform all excavations in the dry. If moisture conditioning is required for planned fill materials, keep water application to the minimum necessary to prevent subgrade or foundation damage due to over watering.
- E. Selectively excavate, handle, haul, stockpile and process import and borrow materials as necessary to yield suitable types and sufficient quantities of the various fill and backfill materials required for construction of the Work.

3.2 FINAL EXCAVATION FOR STRUCTURE FOUNDATIONS

- A. Take all necessary precautions to preserve the material below and beyond the established lines of all excavation in the soundest possible condition. Repair damage to foundation material beyond the required excavation lines due to frost, wetting, drying, erosion, physical disturbance, ineffective dewatering, or CONTRACTOR's operations free of charge to the OWNER.

3.3 PERMANENT EXCAVATION SLOPES

- A. Shape, trim, and finish cut slopes to conform with lines, grades, and cross sections shown, with proper allowance for topsoil or slope protection.

- B. Remove stones and rock that exceed 3-inch diameter and that are loose and may roll down slope. Remove exposed roots from cut slopes. Notify ENGINEER of exposed roots greater than 1 inch in diameter in required excavations.
- C. Round tops of cut slopes in soil to not less than a 6-foot radius, provided such rounding does not extend offsite or outside easements and right-of-ways, or adversely impact existing facilities, adjacent property, or completed Work.

3.4 STOCKPILING EXCAVATED OR IMPORTED MATERIAL

- A. When necessary, stockpile excavated or imported material that is suitable for use as Zone 1a/
Zone 1b material separate from waste material until material is needed.
- B. Stockpile existing riprap on the upstream slope of the dam separately to be replaced after liner system construction.
- C. Confine stockpiles to within approved areas.
- D. Do not stockpile excavated or imported material adjacent to trenches and other excavations. Provide a minimum of 10 feet between the toe of stockpile slopes and the edge of excavations.
- E. Do not stockpile excavated or imported materials near or over existing facilities, adjacent property, or completed Work, if weight of stockpiled material could induce settlement.

3.5 OVEREXCAVATION OF UNSUITABLE FOUNDATION SOILS

- A. Remove unsuitable foundation materials. Excavate down to the top of suitable foundation material as determined by ENGINEER. Backfill the excavated area using materials and placement procedures for the materials that are to be placed above the excavated area in accordance with Section 31 23 23: FILL AND BACKFILL.

3.6 DISPOSAL OF UNSUITABLE AND EXCESS EXCAVATION OR IMPORTATION

- A. Dispose of unsuitable or excessive excavated materials onsite in designated waste areas or as approved by ENGINEER.
- B. Moisture content of excavated or imported materials alone shall not be reason for wasting material. Moisten or dry material to the specified moisture content and use in permanent construction as specified in Section 31 23 23: FILL AND BACKFILL.
- C. Remove from excavated or imported material and dispose of debris including organic matter, trash, and refuse as specified in Section 01 05 00: TEMPORARY FACILITIES AND CONTROLS.

END OF SECTION

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**SECTION 31 23 19
DEWATERING****PART 1 GENERAL****1.1 WORK INCLUDES**

- A. Provide all materials and labor to install and maintain all dewatering sumps, including pumps, piping, sump pits and backfill, and other facilities for the control, collection, and disposal of groundwater for the proper construction of all contract work.
- B. Provide all materials and labor to install and maintain all temporary observation wells.
- C. Maintain the foundations and other parts of the work free from water as required for constructing each part of the work.
- D. Comply with all applicable environmental protection laws and requirements in operation of the dewatering system.
- E. Remove all components of dewatering system, if required, after dewatering is complete.

1.2 RELATED SECTIONS

- A. Section 01 05 75: Project Permits and Environmental Controls
- B. Section 31 23 16: Excavation
- C. Section 31 23 23: Fill and Backfill
- D. Section 31 25 13: Erosion Control

1.3 DATA AVAILABLE

- A. Subsurface conditions, including groundwater conditions, are contained in the Geotechnical Appendix of the Design Report. A copy of the Geotechnical Appendix is available to the CONTRACTOR upon request.
- B. The subsurface conditions from the test borings apply only to the locations of the borings and at the times of the explorations. The subsurface conditions elsewhere at the site and at the time of construction may be different.

1.4 SUBMITTALS

- A. The CONTRACTOR shall submit a dewatering plan to the ENGINEER for review and acceptance at least 7 calendar days prior to foundation excavation activity. The plan shall include details regarding the types of various dewatering facilities and design calculations, if necessary, required to substantiate the dewatering plan. If the CONTRACTOR purchases, rents, installs, or mobilizes to the site any elements of the dewatering system prior to the ENGINEER's acceptance of the submittal, he does so at his own risk, and will not be due any additional compensation from the OWNER if such elements are not subsequently used for the work.
- B. The CONTRACTOR shall submit the proposed locations of the temporary observations wells.
- C. Acceptance by the ENGINEER of the dewatering system proposed by the CONTRACTOR will only be with respect to the basic principles of the methods the CONTRACTOR intends to employ. Approval by the ENGINEER does not relieve the CONTRACTOR of the full responsibility for the adequacy of the dewatering system.

PART 2 PRODUCTS

PART 3 EXECUTION

3.1 GENERAL

- A. The CONTRACTOR shall review the available subsurface data for the project site. It shall be the CONTRACTOR's responsibility to evaluate the subsurface conditions at the project site with respect to required dewatering facilities, including any additional groundwater monitoring data obtained by the CONTRACTOR.
- B. The CONTRACTOR shall, at all times during construction, provide ample means and devices to remove promptly and dispose of properly all water entering excavations and keep the bottoms of the excavations firm and free of standing water until the structures to be built therein are completed and/or the backfill to be placed therein has been placed. The pumping and dewatering operations shall be carried out in such a manner that no disturbance to the bearing soil or to soil supporting any other work will result from the dewatering operations. Discharged water may be piped downstream after silt removal. The dewatering discharge shall not cause siltation or other negative environmental impact on natural waterways or other property; such discharge shall be in accordance with applicable federal, state, and local regulations. At dewatering discharge locations, hay-bale, silt barriers or other control measures, as approved by the ENGINEER, shall be installed to control and prevent siltation. Refer to Section 01 05 75: Project Permits and Environmental Controls; and Section 31 25 13: Erosion Control.

- C. The dewatering system shall be operated continuously as necessary to prevent flotation of partially completed structures or other work.

3.2 DEWATERING REQUIREMENTS

- A. Design, furnish, install, maintain, and operate a dewatering system which shall prevent loss of fines, boiling, quick conditions, or softening of foundation strata and maintain stability of bottoms of excavations so that every phase of the work can be performed in the dry. The dewatering operations shall be such that the bottoms of all excavations shall be kept at all times firm, and in all respects acceptable to the ENGINEER as good foundation.

3.3 INSTALLATION AND OPERATION

- A. The location of every element of the dewatering system shall be such that interference with excavation and construction activity is minimized. Locations shall be subject to approval by the ENGINEER.
- B. When the dewatering system does not meet the specified requirements, and as a consequence loosening or disturbance of the foundations strata, instability of the slopes or damage to the foundations or structures occur, the CONTRACTOR shall supply all materials, labor, and perform all work for restoration of foundations soil, fill soils, slopes, foundations, or structures, to the satisfaction of the ENGINEER, at no cost to the OWNER.

END OF SECTION

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**SECTION 31 23 23
FILL AND BACKFILL**

PART 1 GENERAL

1.1 WORK INCLUDES

- A. Importing, processing, and furnishing Zone 1a.
- B. Borrowing and placing Zone 1b.
- C. Furnishing and placing riprap.
- D. Furnishing and placing riprap bedding.
- E. Furnishing and placing road surfacing.

1.2 RELATED SECTIONS

- A. Section 01 03 30: Submittal
- B. Section 01 04 50: Quality Control
- C. Section 02 21 00: Surveys
- D. Section 02 50 00: Site Reclamation
- E. Section 31 23 13: Subgrade Preparation
- F. Section 31 23 16: Excavation
- G. Section 31 23 19: Dewatering

1.3 REFERENCES

- A. ASTM (American Society for Testing and Materials)
 - 1. ASTM D 422: Test Method for Particle-Size Analysis of Soils.
 - 2. ASTM D 4318: Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soil.
 - 3. ASTM D 854: Standard Test Method for Specific Gravity of Soils.
 - 4. ASTM D 1556: Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method.
 - 5. ASTM D 6938: Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (shallow depth).
 - 6. ASTM D 698: Standard Test Methods for Laboratory Compaction Characteristics of Soils Using Standard Effort.
 - 7. ASTM D 2216: Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.

8. ASTM D 2488: Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).
 9. ASTM D4253: Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
 10. ASTM D4254: Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
- B. Colorado State Department of Transportation, Standard Specifications for Road and Bridge Construction, 2011.

1.4 TESTS

- A. The CONTRACTOR shall perform tests of prepared earthwork materials in accordance with Section 01 40 00: QUALITY CONTROL AND QUALITY ASSURANCE.
- B. The ENGINEER will perform tests on stockpiled Zone 1a and Zone 1b material and in-place density and moisture contents in accordance with Section 01 40 00: QUALITY CONTROL AND QUALITY ASSURANCE.

1.5 SUBMITTALS

- A. The CONTRACTOR shall submit all earthwork test data as required in Section 01 40 00: QUALITY CONTROL AND QUALITY ASSURANCE.
- B. The CONTRACTOR shall submit an Import and Borrow Development Plan in accordance with Section 01 03 30: SUBMITTAL. The plan shall include the following information:
 1. Schedule of import activities.
 2. Schedule of on-site borrow activities.
 3. Locations of proposed stockpiles.
 4. Proposed method of processing import and borrow materials.
- C. The CONTRACTOR shall submit a processing plan for creating the Zone 1a material.

1.6 DEFINITIONS

- A. Optimum water content – that moisture content which will result in a maximum dry unit weight of the soil when subjected to the ASTM D 698 compaction test.

- B. Percent compaction – Percent compaction is defined as follows:

$$\text{Percent compaction} = \frac{(\gamma_d)_{IP}}{(\gamma_d)_{\max}} \times 100\%$$

where

$(\gamma_d)_{IP}$ = the in-place dry density of a particular soil

$(\gamma_d)_{\max}$ = the maximum dry density of that same soil, determined by compaction test according to ASTM D 698 procedures.

- C. Coverage – One coverage is defined as the requirement of successive trips of a piece of compaction equipment, which by means of sufficient overlap, will ensure a complete coverage of the entire surface of the layer by the equipment.
- D. Fines: Material passing the No. 200 sieve as determined in accordance with ASTM D422.
- E. Lift: Loose (uncompacted) layer of material.
- F. Completed Course: A course or layer that is ready for next layer or next phase of Work.
- G. Deleterious Materials: Organic matter, trash, rubbish, debris, oversize materials, and soluble materials.

PART 2 PRODUCTS

2.1 BENTONITE

- A. Bentonite used in preparing Zone 1a shall be pulverized (powdered) premium grade sodium cation montmorillonite and shall meet the most current API Standard 13.4. The bentonite shall be ground to have 100 percent passing the No. 200 sieve.

2.2 IMPORTED CLAY MATERIAL

- A. Clay material will be imported from the Morrow and Sons pit. Use imported material similar to what was submitted for approval in fall 2014 and that meets the specifications listed in the following table.

2.3 ZONE 1A

- A. Zone 1a shall be a mixture of imported clay, with a maximum particle size of 0.5" inches, processed with 2.5% powdered bentonite. Zone 1a shall be free of peat and other organic materials, debris, and trash.

- B. Excavated embankment and foundation soil materials that meet the requirements provided in the table below are acceptable as Zone 1a after processing with 2.5% powdered bentonite.
- C. Zone 1a fill shall be stockpiled, tested, and approved before it can be used in the embankment and slope fill.
- D. Moisture-conditioning of Zone 1a shall be performed in the stockpiles. Placed Zone 1a material not meeting moisture specifications may be re-worked in the fill.
- E. Take care not to contaminate Zone 1a with other fills and in-situ material.

2.4 ZONE 1B

- A. Processed borrow from the reservoir excavation consisting of well-graded gravelly sand, and well-graded sandy gravel, having a maximum particle size of 6 inches, and free of deleterious materials.
- B. Allowable USCS classifications: SP, SW, SM, GW, GP, GP-GC, GP-GM having a maximum of 20 percent fines.
- C. Blend adequately during placement such that the compacted material forms a uniform, homogeneous, very stiff or dense, compacted fill.
- D. Remove cobbles, boulders, and other particles larger than 6 inches.

Construction Zone	Unified Soils Class and Requirements	Minimum Placement Compaction Requirements	Testing Requirements	Minimum Testing Interval
Import Material ⁽¹⁾	Maximum particle size = 0.5" Liquid Limit Min = 35 Max = 50 30-90 % passing 200 sieve No more than 40% retained on No. 4 sieve USCS- CL	95% of ASTM D698	Density by nuclear gage, ASTM D2922 Gradation, -200 sieve, ASTM D8913 Atterberg limits, ASTM D424	Each 1,000 yds ³ Each 10,000 yds ³ Each 10,000 yds ³

⁽¹⁾ Before blending with 2.5% bentonite by weight

Construction Zone	Unified Soils Class and Requirements	Minimum Placement Compaction Requirements	Testing Requirements	Minimum Testing Interval
Zone 1A	Maximum particle size = 0.5" Liquid Limit Min = 35 Max = 50 30-90 % passing 200 sieve No more than 40% retained on No. 4 sieve USCS- CL Contain minimum 2.5% powdered bentonite by weight	95% of ASTM D698	Density by nuclear gage, ASTM D2922 Gradation, -200 sieve, ASTM D8913 Atterberg limits, ASTM D424	Each 1,000 yds ³ Each 10,000 yds ³ Each 10,000 yds ³

Construction Zone	Unified Soils Class and Requirements	Minimum Placement Compaction Requirements	Testing Requirements	Minimum Testing Interval
Zone 1B	SP, SW, SM, GW, GP, GP-GC, GP-GM ≥ 20% passing the No. 200 sieve Maximum particle size = 6"	95% of ASTM D698	Density by nuclear gage, ASTM D2922 -200 sieve, ASTM D1140 Atterberg limits, ASTM D424	Each 1,000 yds ³ Each 10,000 yds ³ Each 10,000 yds ³

2.5 TYPE M RIPRAP

- A. Unless otherwise noted, riprap shall be sound, angular and durable rock meeting the soundness and durability requirements of Colorado Standard Specifications for Road and Bridge Construction, 2011, Section 506: Riprap, and shall be graded as follows:

Typical Stones (inches)	Percent Smaller by Weight
21	70 – 100
18	50 – 70
12	35 – 50
4	2 – 10

- B. The specified riprap has an average size (d50) of 12 inches, and is locally known as Type M riprap.
- C. A maximum of 50 percent flat and elongated stones are allowed. The ratio of greatest dimension to the least dimension of each stone shall be a maximum of 3.

2.6 RIPRAP BEDDING

- A. Riprap bedding shall be free-draining, sound and durable cobbles and gravels or manufactured crushed rock meeting the soundness and durability requirements of Colorado State Department of Transportation, Standard Specifications for Road and Bridge Construction, 2011, Section 703.09, Filter Material, Class A, and shall conform to the following grading requirements:

U. S. Standard Sieve	Percent Passing by Weight
3 inch	90 - 100
3/4 inch	20 - 90
No. 4	0 - 20
No. 200	0 - 3

2.7 ROAD SURFACING

- A. Processed from the designated borrow areas, within the specified gradation limits, and free from deleterious substances.
- B. Free-draining, sound, durable, angular gravel meeting the requirements of CDOT Section 703.03 Class 1, and conforming to the following grading requirements:

U.S. Standard Sieve Size	Percent Passing by Weight
2½-inch	100
2-inch	95-100
No. 4	30-65
No. 200	3-15

2.8 TOPSOIL

- A. Topsoil shall be surface materials stripped and stockpiled in accordance with Section 31 14 00: STRIPPING.

PART 3 EXECUTION

3.1 GENERAL

- A. Prior to initiating any work covered by this section, the CONTRACTOR shall become thoroughly familiar with all site features, the site conditions, and all portions of the work in this section.
- B. Do not perform any earthwork as specified in this section in any specific work area until all clearing work have been completed in that area. Clearing shall be in accordance with Section 31 11 00: CLEARING AND GRUBBING.

3.2 FOUNDATION PREPARATION

- A. The CONTRACTOR shall not place materials until the foundation has been suitably prepared, dewatered, and approved by the ENGINEER.
- B. Do not prepare foundation when temperatures could result in frozen ground conditions.
- C. The foundation for Zone 1a and Zone 1b shall be moisture-conditioned and rolled with a sheepsfoot compactor as directed by the ENGINEER before placing the first lift of Zone 1a or Zone 1b fill.
- D. The foundation for riprap shall be thoroughly scarified to a depth of 8", moisture-conditioned and rolled with a sheepsfoot compactor as directed by the ENGINEER before placing the first lift of riprap.
- E. Where the natural foundation subgrade under embankment fill or stability berm fill is found to contain frozen or natural soft areas, as determined by the ENGINEER, frozen or soft materials shall be excavated and backfilled with embankment fill or stability berm fill.
- F. Where the natural foundation subgrade is loosened or disturbed by the CONTRACTOR, the CONTRACTOR shall proof-roll the loosened or disturbed subgrade at the direction of the ENGINEER at no additional cost to the OWNER.

3.3 SPECIAL COMPACTION

- A. Special compaction shall be required in the following locations:
 - 1. In tight, restricted, or steep areas not accessible by larger rollers.
 - 2. Within two (2) feet around new or protected existing concrete structures.
 - 3. Over pipes.
- B. Special compaction of embankment fill shall be in accordance with paragraph 3-5.A of this section.
- C. Specially compacted fills shall be compacted in maximum four inch loose lifts.
- D. Compaction equipment used in special compaction areas shall be small rollers, walk-behind roller, vibratory plate, or other small compactor as approved by the ENGINEER.

3.4 COMPACTION EQUIPMENT

- A. Compaction equipment for road surfacing shall consist of self-propelled vibratory rollers and vibratory plate compactors. Vibratory rollers shall be approved by the ENGINEER and shall have a minimum static weight of 1,800 pounds per foot of compaction drum length, a minimum dynamic force of 8,000 pounds per foot of compaction drum length, and an applied force of not less than 3,000 pounds per foot of compaction drum length.
- B. It is anticipated that vibratory plate compactors will be required for special compaction and in tight, restricted or steep areas not accessible by vibratory rollers. Vibratory plate compactors shall be approved by the ENGINEER and shall have a minimum static weight of 270 pounds and a minimum dynamic force of 1,000 pounds.
- C. Smooth rollers will not be allowed for the compaction of Zone 1a and Zone 1b fill. Compaction equipment for embankment fill shall be a sheepsfoot roller or tamping roller or approved equal. The weight of each roller shall not be less than 4,000 pounds per foot of drum length. Compaction equipment for Zone 1a and Zone 1b fill shall be approved by the ENGINEER.
- D. It is anticipated that smaller rollers may be required for special compaction and in tight, restricted, or steep areas not accessible by larger rollers. Smaller rollers shall be approved by the ENGINEER.
- E. Disking Equipment: Use disking equipment to break up, blend, or moisture condition materials as needed. Disc shall have a minimum of two gangs hooked together in tandem and shall be sized to penetrate a minimum fill lift of 8 inches. The disc shall be equipped with self-cleaning scrapers to prevent the accumulation of materials between and on the discs. Maintain serrations at all times in such condition as to provide efficient breaking and blending of the materials. In no case, however, shall the depth of the disc serrations be allowed to wear down to less than 50 percent of their depth when new, prior to being restored, and replaced. The disking equipment shall be such that adjustments can be made in the depth of penetration and the angle of cut from the towing vehicle without dismounting the vehicle.

3.5 MOISTURE/DENSITY REQUIREMENTS

- A. Zone 1a and Zone 1b fill shall be compacted in place to at least 95 percent of the maximum dry density and within minus one (1) percent and plus three (3) percent of the optimum water content, when tested in accordance with ASTM D698.
- B. Road surfacing shall be compacted with a minimum of four (4) coverages of an approved compactor. There are no moisture requirements for road surfacing.

- C. No moisture or density requirements will be required for drain gravel, riprap, riprap bedding, and topsoil.
- D. The ENGINEER will inform the CONTRACTOR when the placement moisture content and percent compaction do not meet the specifications, and the CONTRACTOR shall immediately make adjustments in procedures as necessary to obtain the specified results.
- E. Materials not meeting the specified moisture content and percent compaction shall be reworked until approved results are obtained. Reworking may include removal, rehandling, reconditioning, rerolling, or combinations of these procedures. The CONTRACTOR shall not be entitled to additional compensation above the prices bid in the schedule by reason of any work required to achieve the placement moisture content and percent compaction in these specifications.

3.6 PLACING ZONE 1A AND ZONE 1B

- A. Place Zone 1a and Zone 1b fill as shown on the drawings in layers with a maximum loose lift thickness of 8 inches before compaction, and in accordance with the moisture and density requirements in paragraph 3.5.A.
- B. Prior to placing Zone 1a and Zone 1b fill on or against the surfaces of previously placed earthfill materials, all previously placed materials which have become soft or loose, which contain erosion channels or cracks, or are excessively dry shall be reworked by removing, replacing, or recompacting as directed by the ENGINEER. No separate payment will be made for placing, reworking, removing, replacing, or recompacting previously placed soft or loose Zone 1a and Zone 1b material.
- C. Distribute the Zone 1a and Zone 1b fill such that it is free from lenses, pockets, streaks, lumps, or layers of material differing substantially in texture, gradation, or moisture content from the surrounding material so as to form as homogeneous layer of material as practical. The ENGINEER reserves the right to designate the locations for placement of each load of material in the Zone 1a and Zone 1b fill.
- D. In any separate portion of the areas where Zone 1a and Zone 1b fill is being placed, construct each layer continuously and approximately horizontal for the width and length of such portion at the elevation of the layer. Incline each layer slightly from the horizontal to provide drainage of surface water.
- E. Do not place Zone 1a and Zone 1b fill when the fill or the foundation on which it would be placed is frozen. Stop fill placement temporarily during unsuitable weather conditions, as directed by the ENGINEER.
- F. The CONTRACTOR shall be permitted to construct separate sections of the Keyway Trench and Zone 1a and Zone 1b, subject to the approval of the

ENGINEER. Construction of the Keyway Trench and embankment shall be subject to the following conditions:

1. Longitudinal bonding surfaces (surfaces parallel to the centerline crest of embankment) between previously constructed Zone 1a and Zone 1b and Zone 1a and Zone 1b to be constructed shall not be steeper than 2:1 horizontal to vertical. Longitudinal bonding surfaces between cuts in the existing native ground shall be clear of erosional rills and good bonding surface prepared such that compaction equipment can effectively compact placed material with an overlap of at least one-half the thickness of the loose lift being placed.
2. At any cross-section, the difference in elevation between adjacent zones of the Zone 1a and Zone 1b shall not be greater than 3.0'.
3. Transverse bonding surfaces (surfaces perpendicular to the centerline crest of Zone 1a and Zone 1b) shall not be steeper than 4:1 horizontal to vertical.
4. During construction of new earthfill, the CONTRACTOR shall adequately prepare the surface of previously constructed Zone 1a and Zone 1b, original embankment and transverse slopes by benching and/or scarifying in a manner acceptable to the ENGINEER to satisfactorily bond the new fill to the existing fill.

3.7 PLACING RIPRAP AND RIPRAP BEDDING

- A. Place riprap and riprap bedding at the locations, thicknesses, lines, and grades shown on the drawings.
- B. Compaction of riprap bedding will not be required; however, riprap bedding shall be spread in such a manner as to form a smooth, uniform layer under the riprap.
- C. Compaction of riprap will not be required. Riprap shall be placed with smaller rock fragments used to fill in the voids between larger rock fragments in such a manner as to form a smooth, uniform, well graded layer of riprap that is stable and not susceptible to sliding. Riprap shall also be placed to form smooth transitions to embankment slopes, channel slopes, and channel side slopes. No distinct horizontal, vertical or angular joints, will be allowed in the riprap that would reduce interlocking capability of the riprap.
- D. Grouting of riprap shall conform to Section 03 30 00: CAST IN-PLACE CONCRETE.

3.8 BACKFILL FOR STRUCTURES

- A. Backfill materials under structures and against structural walls shall include riprap bedding, Zone 1a and Zone 1b fill, as shown on the Drawings.

- B. Special compaction for backfill against structures is required as shown on the Drawings. Refer to paragraph 3.3 of this section. Heavy equipment shall not be allowed in the special compaction zone.
- C. Backfill against structures with uniform fill on both sides shall be placed in a uniform manner such that no unbalanced loading will occur against the structures.
- D. No backfill shall be placed against structures until all forms have been removed and the placement of backfill against the structures has been approved by the ENGINEER.

3.9 PLACING BACKFILL FOR OVEREXCAVATION

- A. Authorized overexcavation shall be backfilled with embankment fill in accordance with the requirements in this section.

3.10 TOLERANCES

- A. All earthwork except riprap shall be finished to within an allowable tolerance of plus or minus 0.10 foot from the grades shown on the drawings.
- B. Construct the riprap within a tolerance of 3 inches above and 1 inch below the neat lines shown on the Drawing.

END OF SECTION

**SECTION 31 25 13
EROSION CONTROL**

PART 1 GENERAL

1.1 WORK INCLUDES

- A. Construct, maintain, and remove temporary drainage facilities as necessary to control surface water runoff, groundwater seepage, dewatering system discharges, and stream flows at the construction site so that water from these sources does not disturb the constructed facilities or cause erosion of the existing topography.
- B. Furnish all materials and labor to construct silt fences, to place hay bales, and to construct other sediment control methods required for prevention of water pollution.
- C. Maintain and remove silt fences, hay bales, and sediment controls.

1.2 RELATED SECTIONS

- A. Section 01 03 30: Submittal
- B. Section 01 05 75: Project Permits and Environmental Controls
- C. Section 31 23 16: Excavation
- D. Section 31 23 19: Dewatering
- E. Section 31 23 23: Fill and Backfill

1.3 SUBMITTALS

- A. At least 7 calendar days prior to beginning of any site clearing, stripping, excavation, stockpiling, or earthwork, submit a plan to the ENGINEER for review, comment, and acceptance, showing the CONTRACTOR's methods for control of surface water runoff. The plan shall also address sediment and erosion control as required by Federal, state, and local laws regarding prevention of water pollution.
- B. In the plan, address as a minimum, the following issues:
 - 1. Sequence of construction of temporary drainage facilities relative to other construction activities.
 - 2. Provisions for limiting sedimentation or other water quality effects downstream.
 - 3. Sequence for removal of temporary drainage facilities.

PART 2 PRODUCTS**2.1 SILT FENCES**

- A. Silt fences for sediment control shall consist of fabric and posts suitable for sedimentation control application. Silt fence fabric shall be UV (ultra-violet) protected. Silt fence shall be toed-in by at least two feet to prevent silt-laden runoff water from running beneath the fence and over the ground surface. Submit product data and method of fence construction for review and approval.

2.2 HAY BALES

- A. Hay bales shall consist of hay or straw stacked and staked in place. Wire shall be tied to stakes to provide additional stability. Provide method of hay bale installation for review and approval.

PART 3 EXECUTION**3.1 SEDIMENT AND EROSION CONTROL**

- A. Install sediment and erosion controls prior to work involving site clearing and excavation.
- B. Maintain and repair sediment and erosion controls during course of construction, as required.

3.2 REMOVAL OF TEMPORARY FACILITIES

- A. Do not remove silt fences, hay bales or sediment ponds without written approval from the ENGINEER.
- B. Silt fence and hay bales will be the property of the CONTRACTOR, and shall be removed offsite after all work is complete.
- C. Remove and dispose the sediments collected in the sediment control systems in onsite disposal area.

END OF SECTION