RJH CONSULTANTS, INC.

GEOTECHNICAL AND
WATER RESOURCES ENGINEERING

CONSTRUCTION COMPLETION REPORT

WEST RESERVOIR NO. 1 OUTLET WORKS REHABILITATION PROJECT

DELTA COUNTY, COLORADO

Submitted to
West Reservoir & Ditch Company
708 1250 Road
Delta, CO 81416

Submitted by
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Project 13129

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Project Manager

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SECTION 1 - PROJECT HISTORY

1.1 Background Information

The West Reservoir No. 1 Dam (dam) outlet works was rehabilitated in 2015 and 2016 to address dam safety concerns identified by the Colorado Office of the State Engineer (SEO) in 2013.

The dam is located approximately 2 miles south of the Overland Ditch in Delta County, Colorado, which is about 30 miles northeast of Delta. The dam is in Section 13, Township 130 South, Range 0930 West of the 6th Principal Meridian. The dam is owned and operated by the West Reservoir & Ditch Company (Owner).

The dam was originally constructed in 1905 and raised using an upstream raise concept in the 1950s. The dam is a homogeneous earthfill structure about 47 feet high (after the 2015/2016 rehabilitation) that impounds about 471 acre-feet (ac-ft) at normal maximum pool elevation (Elevation (El.) 8774.0). The dam is classified as a small, high hazard dam according to the SEO.

The existing outlet works consisted of a 10-inch-diameter, steel pipe that discharged to a tributary of Jay Creek via a riprap-lined ditch. Releases from the reservoir were measured using a Parshall flume located about 35 feet downstream of the dam. Flow through the outlet works pipe was controlled using a manually-operated gate valve installed at the upstream toe of the dam.

A video inspection of the outlet pipe was performed in May 2013 using a remotely operated vehicle. The SEO reviewed this video and concluded that the existing pipe was severely deteriorated and unsafe for normal drawdown of the reservoir. In June 2013 the SEO restricted the reservoir to zero storage because of the severe deterioration of the outlet pipe.

The Owner retained RJH Consultants, Inc. (RJH) of Englewood, Colorado to perform design of a replacement outlet works. The outlet works design was competed and accepted by the SEO in October 2015.

Rehabilitation generally included the following:

- Removal of the existing outlet works.

- Construction of a new outlet works.
- Excavation and stockpiling of the existing embankment from above the outlet works.
- Replacement of the embankment fill. New embankment fill includes a filter collar (filter sand) near the downstream end of the outlet works conduit.
- Placement of riprap upstream slope protection.

The design package was prepared for a design/bid/build contracting method and included:

- Design drawings
- Technical specification
- Contract between the Owner and contractor

The design and construction were performed in general accordance with the requirements of the State of Colorado, *Rules and Regulations for Dam Safety and Dam Construction* (Rules and Regulations) (SEO, 2007).

1.2 Contract Administration

The following entities were involved during construction:

- Owner: West Reservoir & Ditch Company
- Contractor: Rundle Construction (Rundle) of Hotchkiss, Colorado. Rundle performed all construction activities.
- Engineer: RJH performed design and part-time construction observation of selected (critical) construction activities. RJH was responsible to determine if the construction was performed in substantial accordance with the approved plans and specifications.
- Testing: DOWL of Montrose, Colorado performed field and laboratory testing for soils and concrete.
- Testing: HP Geotech of Englewood, Colorado performed laboratory testing for soils.
- Surveying: Wilmore Surveying of Montrose, Colorado performed surveying for construction.
- SEO: The regulatory authority responsible for the safety of all existing dams in the State of Colorado.

SECTION 2 - CONSTRUCTION SUMMARY

The rehabilitation was divided into two phases:

- Phase 1 - Breach the Existing Dam: The Owner requested approval to breach the dam under Rule 7 of the Rules and Regulations, *Requirements for Removing or Breaching an Existing Dam (*SEO, 2007). The breach request included excavation and stockpiling of the embankment above the existing outlet works and demolition and removal of the outlet works. The request was approved by the SEO on July 22, 2015. Rundle began excavation and demolition while the outlet works rehabilitation design was being completed.
- Phase 2 - Outlet Works Rehabilitation: The outlet works rehabilitation was designed in general accordance with the requirements of Rule 6 of the Rules and Regulations, *Requirements for Alteration, Modification, or Repair of an Existing Dam* (SEO, 2007). The design was approved by the SEO on October 2, 2015.

2.1 Construction Activities

During construction, RJH made ten site visits to observe the progress of construction, to perform observation of select activities, to observe the conduit pressure test, and to perform the final inspection. Daily activity reports prepared by RJH are included in Appendix A.

The SEO performed site visits to observe the progress of construction and critical elements of construction. Construction inspection reports prepared by the SEO are included in Appendix B.

DOWL performed site visits to inspect reinforcing steel, perform quality assurance tests on concrete placed (quality control testing performed by the supplier), and perform quality assurance testing on earthwork materials. DOWL also performed inspection and testing for reinforcing steel and concrete placed at Rundle's offices for precast structures. A summary report prepared by DOWL is included in Appendix C.

HP Geotech performed laboratory testing on potential borrow material samples. Samples were obtained by RJH and delivered to HP Geotech's Parker, Colorado office. Test results are included in Appendix D.

Rundle Construction performed all construction activities. Activities are described below and are organized based on feature and generally follow the construction sequence. A construction sequence is included in Section 2.2.

2.1.1 Excavate Existing Embankment

The embankment above the existing conduit was excavated as shown on the plans except that the bottom width of the excavation was up to 30 feet wide instead of 25 feet wide, and the final excavation depth at the upstream end (inlet structure) was at El. 8741 instead of El. 8738. Work was performed under the breach letter, while rehabilitation design was being finalized. Excavated embankment was stockpiled in the reservoir basin.

Rundle encountered dark soils as the excavation approached the lower half of the dam. This material was segregated by Rundle because it appeared that the material contained organics. Based on subsequent tests, the material contained 8.8 percent organics. The maximum allowable organic content is 6 percent; therefore, the material was not acceptable for use as embankment fill. The material was disposed of on-site above the reservoir in areas designated by the Owner.

2.1.2 Demolish Existing Outlet Works

Rundle removed and disposed of the existing gate stem, operator, and inlet gate. As the embankment was excavated, the existing conduit was exposed. A portion of the conduit was encased in concrete (previously unknown). The conduit and concrete encasement were demolished and removed from the embankment.

2.1.3 Dewater Bottom of Excavation

The excavation exposed several springs along the bottom of the excavation. Rundle attempted to control the water by excavating channels in the subgrade to direct the water upstream to a sump or downstream to the discharge channel. The sump installed upstream of the excavation was used to pump water around the work area. Although the water was channeled away from the location of the new outlet conduit, the water level was not lowered below the subgrade. As a result, the subgrade remained unacceptable because of soft areas and sanding water. At the end of the 2015 construction season, rain at the site resulted in significant mud and standing water in the excavation. Rundle elected to stop work for the season.

When work resumed in 2016, Rundle elected to construct a working platform to the right (south) side of the excavation. The working platform was about 3 feet above the bottom of the excavation and allowed Rundle to set the conduit and conduit encasement on dry, firm subgrade. The water seeping into the excavation remained on the north side of the excavation (diversion channel) and the working platform generally remained dry and firm.

2.1.4 Place new outlet works

The new outlet conduit is a 16-inch-diameter, high-density polyethylene (HDPE) pipe (12.9-inch inside-diameter) encased in reinforced concrete. The location of the conduit was adjusted to accommodate the working platform (see Section 2.5). The conduit was fusion welded on site. The conduit was pressure tested in general accordance with the requirements of the Plastics Pipe Institute (Technical Report 31/9-79) (PPI, 1979). Based on test results, the pipe met the pressure test specifications.

A new, 16-inch square slide gate was installed on the upstream end of the conduit. A reinforced concrete inlet structure set at the upstream end. The gate frame is mounted to the inlet structure. The inlet structure was pre-cast by Rundle at their office in Hotchkiss, and delivered to the site. The gate operated smoothly through one open/close cycle. The right (south) side of the gate touched the bottom seal before the left side. The difference was small (less than about 1/4 inch) and should not adversely impact the operation or performance of the gate.

The gate stem, stem cover, and vent pipe are located on the embankment surface and were covered (buried) by the riprap bedding and riprap. No other anchorage was included on the slope. A reinforced concrete gate operator pedestal was precast by Rundle and delivered to the site. The pedestal was modified from the drawings to include a slot in the pedestal in place of a sleeve. Changes are reflected on the record drawings.

A reinforced concrete headwall is located at the downstream end of the conduit. The headwall is taller than design to accommodate the existing ground and final location of the outlet works. The conduit was extended through the headwall so that the HDPE pipe protrudes about 18 inches beyond the headwall concrete.

Concrete for precast structures and cast-in-place structures was provided by United Companies of Delta. Concrete test results are provided in Section 3.

2.1.5 Place Embankment Fill

In 2015, Rundle was unable to control the groundwater or lower the water level below the subgrade and as a result, the outlet works conduit subgrade remained soft with standing water and mud on the surface. The subgrade was not acceptable for placement of the conduit encasement. When work resumed in 2016, Rundle constructed a working platform on the south side of the excavation. The working platform was placed in substantial accordance with common fill specifications and was tested by DOWL. Based on test results, the material tested met specification requirements for moisture content and density. After Rundle constructed the working platform, the subgrade for the outlet conduit encasement remained dry and firm with the ground water contained on the north (left) side of the excavation.

When the conduit encasement was completed, Rundle excavated unsuitable materials (soft material, muck, and water) from the subgrade on the left (north) side of the excavation, where water had been diverted. After the subgrade was accepted, Rundle placed and compacted common fill for the embankment. Rundle excavated the north edge of the working platform and north side of the excavation so that the excavated surface was sloped (no vertical joint) and fresh material was exposed at the existing fill/new fill tie-in.

Rundle prepared the subgrade on the south side of the conduit encasement. Rundle excavated the existing embankment on the south side of the excavation so that the existing fill/new fill contact was sloped and fresh material was exposed at the existing fill/new fill tie-in. The bottom subgrade (top of the working platform) was scarified using the excavator bucket teeth. The south side of the encasement was initially backfilled and compacted using a walk behind compactor; however, the fill did not meet specification requirements for water content or density. The material was removed back to subgrade level and drier fill was placed and compacted. Subsequent tests met specification requirements for moisture content and density.

The downstream headwall was backfilled using common fill and compacted using a walk behind compactor. The headwall was completely backfilled on the south side of the conduit encasement before the north side of the encasement was backfilled.

Common fill was borrowed from the stockpile of excavated dam material or from a borrow area within the reservoir basin. The excavated dam material stockpile and reservoir basin borrow area were tested prior to the start of construction to determine if

the material was suitable for use as embankment fill, and to establish properties for when the material was used.

Common fill was compacted using a CAT 815 sheepsfoot compactor, except in areas where large equipment would not fit. Rundle used small, hand-operated equipment in small areas.

DOWL performed moisture density tests on the fill placed. If test results indicated that the material did not meet specification requirements, the fill was either removed or reworked in place. About 40 percent of the tests indicated that the material tested did not meet the moisture content specification (over the allowable moisture content); however, the material met the specification for density; therefor, the in place material was accepted by RJH.

The downstream filter collar was constructed by first placing and compacting common fill, and then excavating a trench through the completed fill and into the foundation and adjacent existing embankment. The trench was excavated minimum 2 feet into the adjacent material so that the contacts between the new fill/existing fill and new fill/foundation are filter protected. Filter sand was placed by dumping and spreading sand in the trench in lifts up to 12 inches and compacting each lift with a vibratory plate compactor.

A 6-inch polyvinyl chloride (PVC) discharge pipe from the sand drain was bedded and backfilled using excess sand from the filter collar. The sand extended from the filter collar to the downstream headwall.

2.1.6 Place Upstream Slope Protection

Rundle collected rock from the reservoir basin and area surrounding the reservoir for use as riprap. The on-site material was not screened or sized to make Type L riprap and the material did not meet the gradation specification. The material was generally too large (up to 30 inches in diameter) but enough small rock was collected to make a generally well-graded riprap. Riprap bedding was imported from offsite.

Photographs of selected construction activities are included in Appendix E.

2.2 Construction Sequence/Schedule

Construction was performed over an 8-month period, spanning two construction seasons (2015 and 2016). Rundle started construction in August 2015. By late October 2015, weather had such an adverse impact on construction that Rundle decided to suspend work

until the following spring. Construction resumed in spring 2016 and was completed in fall 2016 (September 2016).

The general construction sequence is provided below:

TABLE 2.1
GENERAL CONSTRUCTION SEQUENCE

July 2015	• SEO approved a request from the Owner on July 22 to breach the existing dam and demolish the existing outlet works.
August 2015	• Mobilized to the site and began excavation of the existing embankment. • Excavated the existing embankment to the design subgrade level and demolished the existing outlet works.
September 2015	• Prepared subgrade and worked to control water entering the excavation.
October 2015	• SEO approved the design of the outlet works rehabilitation on October 2. • Continued to work on controlling the water in the excavation and preparing the subgrade for placement of the new outlet works conduit. • Excavated and backfilled a cutoff upstream of the excavation in an attempt to cut off water flowing underground from the reservoir.
November 2015	• Work was stopped and the Project was shut down for winter. The excavation was complete, the HDPE conduit was fused together, and riprap was collected and stockpiled.
May 2016	• Rundle returned to the site and resumed work. • Resumed subgrade preparation and established new dewatering methods to control groundwater.
June 2016	• Constructed a working platform on the right (south) side of the excavation. The platform resulted in groundwater being contained on the left (north) side of the excavation. • Prepared subgrade on the working platform. The subgrade was firm and dry. • Placed the HDPE outlet conduit and concrete encasement. The encasement was placed in three separate placements. • Placed concrete for the downstream headwall. • Set the precast, low-level inlet structure.
July 2016	• Pressure tested the outlet conduit on July 8. • Began backfilling the dewatering trench on July 19 on left side of excavation (first common fill placement for replacement of the embankment). • Placed the filter sand collar at Station 2+90 from July 26 to August 3. • Placed common fill for the embankment to about El. 8750.0.
August 2016	• Completed common fill placement for the embankment to El. 8779.0 (dam crest) on August 16. • Placed topsoil on downstream slope. • Placed riprap slope protection on the upstream slope. Started riprap placement on August 22. • Placed gate stem and vent pipe. • Placed the precast hand wheel pedestal.
September 2016	• Completed riprap placement on about September 16. • Final inspection was completed on September 28, 2016 • Completed punchlist and closeout. • Demobilized.

2.3 Construction Equipment

In general, Rundle used the following equipment during construction:

- CAT 320 C track-mounted excavator
- CAT 325 D track-mounted excavator
- CAT 305 mini rubber track excavator
- CAT D6N dozer
- CAT 966G front-end loader
- CAT 725 off road dump truck (two each)
- CAT 815 sheepsfoot compactor

In addition to the large equipment used, Rundle also used hand operated compactors, pumps, and other small equipment.

2.4 Instrumentation

Existing instrumentation included a Parshall flume located downstream of the embankment to measure releases from the outlet works. The flume was relocated and re-installed in the channel to Jay Creek. No new instrumentation was installed.

2.5 Construction Issues/Changes

2.5.1 Outlet Works

Move Outlet Works:

- Laterally: The conduit was relocated to the south so that a working platform could be constructed (in association with the dewatering channel) and the outlet conduit placed in the dry. The conduit was moved 11 feet (upstream end) to 14 feet (downstream end) to the south.
- Vertically: The working platform required to facilitate outlet work construction resulted in the outlet conduit being generally higher than the design. The inlet invert was designed to El. 8741.0 and the pipe was constructed at El. 8740.9 (no significant change); however, the discharge end was revised from design El. 8733.0 to El. 8735.5 (difference of 2.5 feet). The revision was necessary to set

the conduit, based on the location of the downstream headwall and the existing channel downstream of the dam.

Intake Pipe Size:

The HDPE pipe at the precast inlet structure is 12.5 inches in diameter at the inlet, then increases 12.9 inches downstream of the inlet structure. RJH evaluated the capacity of the 12.9-inch diameter pipe and the 12.5-inch diameter pipe, and calculated that the capacity is adequate to evacuate the top 5 feet of the reservoir in 5 days (requirement for a high hazard dam).

Downstream Headwall Height:

The height of the headwall was modified from 6.6 feet to 8.11 feet to accommodate the existing embankment, revised limit of excavation, and relocation of the conduit to the south.

Backfill Concrete at the Downstream Headwall:

The conduit encasement was extended 6 feet deep from the bottom of the encasement to the bottom of the headwall footing. Rundle chose to backfill this area using concrete rather than earth fill for ease of construction.

Revised Trashrack:

The trashrack was revised so that the 1-inch by 2-inch bars that make the grate are oriented in the upstream/downstream direction (rotated 90 degrees from design). The change allows debris to more easily roll off of the grate.

2.5.2 Embankment

Groundwater Control:

During construction in 2015, Rundle attributed some of the problems with groundwater to subsurface water from the reservoir. In an effort to cut off the flow, Rundle excavated a trench upstream of the work area and backfilled the trench using clayey materials. The trench was excavated to the top of bedrock. In 2016, water continued to flow into the excavation. It appears that the cutoff trench was either not effective or the seeps are located downstream of the cutoff trench.

Groundwater was controlled by directing the water into a 3-foot-deep channel on the left (north) side of the excavation. The channel was formed when the working platform was constructed.

Revised Filter Sand Collar at Station 2+95:

The limits of the sand collar were revised so that the collar extended a minimum of 2 feet into the adjacent natural materials. This adjustment was made to collect seepage between the contact between the new fill and existing fill and between the contact between the foundation and new fill.

Groundwater in Excavation:

The excavation encountered groundwater in multiple locations at different times as the excavation and backfill progressed. During excavation, the bottom of the excavation was wet because of groundwater over the entire area. Because the ground was disturbed, we were not able to identify locations of most seeps. Notable seeps (with flow or wet areas with no surrounding wet soils) were observed at the following four locations.

- Station 1+45
- Station 1+70
- Station 2+25
- Station 2+40

In general, groundwater was observed over most of the bottom of the excavation with little to no water in the reservoir.

At the end of embankment fill construction, the filter collar at the downstream end of the outlet works had a small amount of flow (about 1/4 cup per minute) and the embankment surrounding the left (north) side of the downstream headwall was saturated with no water in the reservoir.

Riprap Size:

Riprap was collected from on-site sources. The material collected was not screened to create material that met the specification requirements. As a result, instead of 12 inches of Type VL riprap (as required by the specifications) the material ranges from about 30 to

3 inches in diameter. Rundle placed the large riprap along the toe of the riprap and then stacked the smaller riprap against the large stones.

Slope Protection Limits:

The limits of the upstream slope protection were adjusted based on topography observed in the field. We adjusted the limits of the slope protection laterally to match the upstream groin.

Existing Toe Drain:

The outlet works excavation exposed the existing toe drain outfall on the left (north) side of the stilling basin. Rundle provided a solid PVC pipe and connected the existing pipe so that flow would exit into the stilling basin. The pipe was extended beyond the riprap so that the flow could be measured.

Changes discussed above are reflected on the Record Drawings (Appendix F).

SECTION 3 - QUALITY CONTROL/QUALITY ASSURANCE

DOWL performed laboratory and field testing for soils and concrete during construction. Laboratory testing was performed on soils to confirm suitability of materials for use in construction. Laboratory testing on concrete included compressive strength testing to confirm that the concrete placed met specification requirements.

In addition to testing performed by DOWL, RJH subcontracted HP Geotech to perform laboratory testing on three samples of borrow material.

3.1 Test Results

3.1.1 Embankment

Laboratory Testing:

Common Fill:

- Gradation: Six gradation tests were performed. The average percent passing was as follows:

TABLE 3.1
COMMON FILL GRADATION TEST RESULTS

	Maximum	Minimum	Average
Gravel	19	2	7.7
Sand	64	26.5	47.2
Minus No. 200	56	31	45.1

- Atterberg Limits: Five Atterberg limit tests were performed. The average plasticity index was 23.5 and the average liquid limit was 40.3.
- Proctor: Five proctor tests were performed. The maximum dry density ranged between 114.5 and 101.6 pounds per cubic foot (pcf), and maximum water content ranged between 20.1 and 15.0 percent.
- Organic Content: One sample of material was tested. The material was excavated from the existing embankment. Rundle recognized that the material contained organic matter and segregated the material in case it was found to be unsuitable for re-use. Tested material contained 8.8 percent organics. The maximum allowable organic content is 6 percent, so the material was not re-used in the embankment.

Filter Sand:

- Gradation: Two tests were performed. Test results were as follows:

TABLE 3.2
FILTER SAND GRADATION TEST RESULTS

Sieve	Specification	Actual
1-inch	100	100
No. 4	78 - 100	99.8
No. 10	53 - 100	78.2
No. 16	38 - 90	65.3
No. 40	10 - 55	30.8
No. 50	0 - 39	17.2
No. 100	0 - 25	3.0
No. 200	0 - 5	1.0

Field Testing:

Moisture/density was performed on common fill placed for the embankment. The average dry density is 101.8 pcf and the average water content is 21.0 percent. Based on 106 field tests performed, the average percent compaction was 99.4 and the fill was placed 2.8 percent over optimum.

3.1.2 Concrete

Laboratory Testing:

Compressive strengths met specification requirements. Average 28-day compressive strengths are as follows:

TABLE 3.3
COMPRESSIVE STRENGTH RESULTS

Feature	Average 28-day Compressive Strength (psi)
Inlet Structure (precast)	5,255
Conduit Encasement	4,720
Downstream Headwall (wall and footing)	4,375
Handwheel Pedestal (precast)	6,055

Field Testing:

Slump, air, temperature, and time limits were recorded in the field. Two placement were performed off site (the inlet structure and hand wheel pedestal were precast at Rundle's office). Test results from off-site placements indicated that the concrete tested met specification requirements for slump, air content, temperature, and time. Five placements were made at the site (three for the outlet works conduit encasement and two for the downstream headwall). The test results from on-site placement indicated that the concrete tested met specification requirements for air content, temperature, and time. Two tests indicated that the concrete tested was below the specified slump and one test was above the specified slump; all were accepted. Tests that were accepted with slump outside the specified limits met the specification for 28-day compressive strength. Remaining tests indicated that the concrete tested met specification requirements for slump.

3.1.3 Miscellaneous

Field Testing:

Rundle performed the required pressure test of the outlet conduit using the following test procedure:

- Use water as the test medium.
- Test pressure 22 pounds per square inch (psi).
- Test time of 3 hours.
- Allowable pressure loss 5 percent (or about 1 psi).
- Pressurize the pipe to 10 to 15 percent over the test pressure (to about 25 psi) and allow the pipe to sit for 90 minutes. As long as there is no significant pressure loss, adjust the pressure so that it is at 22 psi and start the test.

TABLE 3.4
3-HOUR PRESSURE TEST RESULTS

Time	Temperature (ºF)	Pressure (psi)
4:15	48	26.5
5:20	44	26.0
6:10	42	26.0
6:45	41	26.3
7:15	49	26.2
3 hours		0.3 psi drop

The test started at 4:15 a.m. because direct sunlight on the conduit caused temperature to rise and the pipe expanded causing the pressure to drop. The test was performed before sunlight was on the conduit and as a result, the pipe temperature remained constant. Outlet conduit met the specification requirements.

SECTION 4 - REFERENCES

Colorado Office of the State Engineer (SEO) (2007). *Rules and Regulations for Dam Safety and Dam Construction*.

Plastic Pipe Institute (PPI) (1979). Technical Report 31/9-79.

APPENDIX A

RJH DAILY ACTIVITY REPORTS

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project

Prepared By: Doug Neighbors

Weather a.m. Sunny
p.m. ---

Observations

I arrived on site at 9:15 a.m.

Embankment:
Rundle removed existing material from the excavation to about 1-foot below subgrade. The 3-foot fill area that had been placed in 2015 (on the left side of the excavation) was removed. Photo 1 and 2.

One point source of seepage was flowing from the subgrade in the center of the excavation at about Station 1+25. Additional seepage was observed flowing from the left side of the excavation at about Station 1+75. Rundle excavated a channel to direct some of the seepage to a sump on the upstream end of the excavation and the rest of the seepage downstream (Photo 1).

Rundle processed riprap from on-site materials (Photo 3).

Outlet Works:
Rundle had removed the HDPE outlet conduit from the excavation (pipe was upstream of the dam in the reservoir basin).

Correspondence / Communications

I discussed the progress of construction with Lance (Rundle) and Garret Jackson (SEO).

1. Lance said the subgrade was generally firm. Rundle drove a haul truck over the excavation and the base was firm except where seepage was observed.
2. Rundle will be required to over excavate soft areas and backfill using clayey material from the embankment excavation.
3. Rundle will build a working platform of the right side of the excavation so that the pipe can be placed above the seepage.

Directions Given

I asked Lance to perform the following:

1. Clean out soft areas in subgrade and replace with common fill.
2. Use clayey materials (common fill) to construct the working platform.

Administrative Tasks

None.

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project

Photo 1 – Condition of the outlet works subgrade, looking downstream.

Photo 2 – Condition of the outlet works subgrade, looking upstream.

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project

Photo 3 – Riprap stockpile.

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project

Prepared By: Doug Neighbors

Weather a.m. Sunny
p.m. ---

Observations

I arrived on site at 8:45 a.m.

Embankment:
Rundle constructed a working platform on the right side of the excavation. The platform was placed and compacted using common fill. DOWL performed compaction control.

Outlet Works:
No new work had been performed since the previous site visit (June 3).

Correspondence / Communications

I discussed the working platform with Lance (Rundle):

1. The working platform is permanent fill. DOWL tested the material as it was placed and test results indicated that the material met specification requirements for moisture and density.
2. The outlet conduit should be placed as far to the right as possible, but maintain enough space to place and compact fill between the conduit encasement and existing embankment.
3. The working platform is higher than expected and the resulting outlet works may be higher than the design. I said the new outlet must be placed on dry subgrade, so the small change in elevation will be necessary.
4. The left side of the excavation (portion left as a drainage channel) will need to be cleaned and excavated to suitable subgrade when the excavation is filled. Lance said Rundle will excavate to the bottom of the channel and will remove a portion of the working platform to allow the 815 compactor to pass through to the bottom of the excavation. I reminded Lance to cut the working platform at an angle so that the new fill is placed against a slope (no vertical joint through the dam).

Directions Given

None.

Administrative Tasks

None.

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project

Photo 1 – Working platform looking downstream.

Photo 2 – Working platform looking upstream.

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project

Photo 3 – Outlet works conduit (HDPE pipe) prior to placement in the dam.

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project

Report: 16-003
Date: Tuesday, June 21, 2016

Prepared By: Doug Neighbors

Weather a.m. ---
p.m. Sunny, hot

Observations

I arrived on site at 1:00 p.m.

Embankment:
No new work observed.

Outlet Works:
Rundle has prepared the outlet works for placement of the conduit encasement. I observed the following:

1. Conduit encasement subgrade is dry and appears to be firm. Subgrade appears to be acceptable.
2. Formwork for the conduit encasement is set. Forms appeared to be properly positioned and secured.
3. Reinforcing steel for the conduit encasement is placed and acceptable.
4. Rundle has secured the HDPE conduit using tie-downs driven into the subgrade.

Correspondence / Communications

I informed Lance (Rundle) that the conduit encasement is acceptable for concrete placement.

Directions Given

None.

Administrative Tasks

None.

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project

Photo 1 – Outlet works conduit encasement formwork, looking upstream.

HDPE exterior band welded to HDPE pipe

Photo 2 – Outlet works conduit (HDPE pipe) and reinforcing steel.

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project **Report: 16-004**
Date: Wednesday, June 22, 2016

Prepared By: Doug Neighbors

Weather a.m. Sunny
p.m. ---

Observations

I arrived on site at 7:00 a.m.

Embankment:
No work performed.

Outlet Works:
Rundle placed concrete for the outlet works conduit encasement. I observed the following:

1. Concrete was tested by DOWL. In general, the concrete met specification for temperature, slump and air content. However, several loads exceeded the time limit specification. The loads were accepted since a small amount of concrete remained to be placed beyond the time limit.
2. Rundle placed concrete on the north (left) side of the pipe and vibrated the concrete until concrete was observed flowing under the pipe on the south (right) side. When concrete was observed under the pipe and near spring line, then concrete was placed on the south (right) side. Rundle then vibrated concrete on both sides of the pipe.
3. Concrete finish for the top of the encasement was rounded.
4. The concrete placement stopped before then entire encasement was finished. Lance said Rundle will finish the encasement with a subsequent placement rather than order 1 cy to complete the encasement - I agreed. The area that was not finished was approximately 10-feet long and about 6-inches to 16-inches deep. The location is shown on the attached Figure 1.
5. Rundle placed about 35 cy. of concrete.
6. Rundle applied water to the surface of the finished concrete and then covered the surface using concrete blankets to retain the moisture.

Correspondence / Communications

I asked Lance (Rundle) to treat the surface of the unfinished conduit encasement as a cold joint (remove laitance, clean reinforcing steel, pipe, and concrete surface). Lance agreed. I discussed what we expect with Devin (DOWL) and asked Devin to observe the joint prior to concrete placement.

Directions Given

None.

Administrative Tasks

None.

Photo 1 – Placing concrete for the outlet works conduit encasement.

Placing and vibrating concrete on north side of conduit until concrete is visible flowing under the south side of the conduit.

Photo 2 – Placing concrete for the outlet works conduit encasement.

Photo 3 - Placing concrete for the outlet works conduit encasement.

Photo 4 – Placing concrete for the outlet works conduit encasement.

Photo 5 - Placing concrete for the outlet works conduit encasement.

Concrete blankets placed to protect the concrete.

Photo 6 – Placing concrete for the outlet works conduit encasement.

Photo 7 - Placing concrete for the outlet works conduit encasement.

Portion of the conduit encasement that was left un-finished. This area will be completed during a subsequent placement.

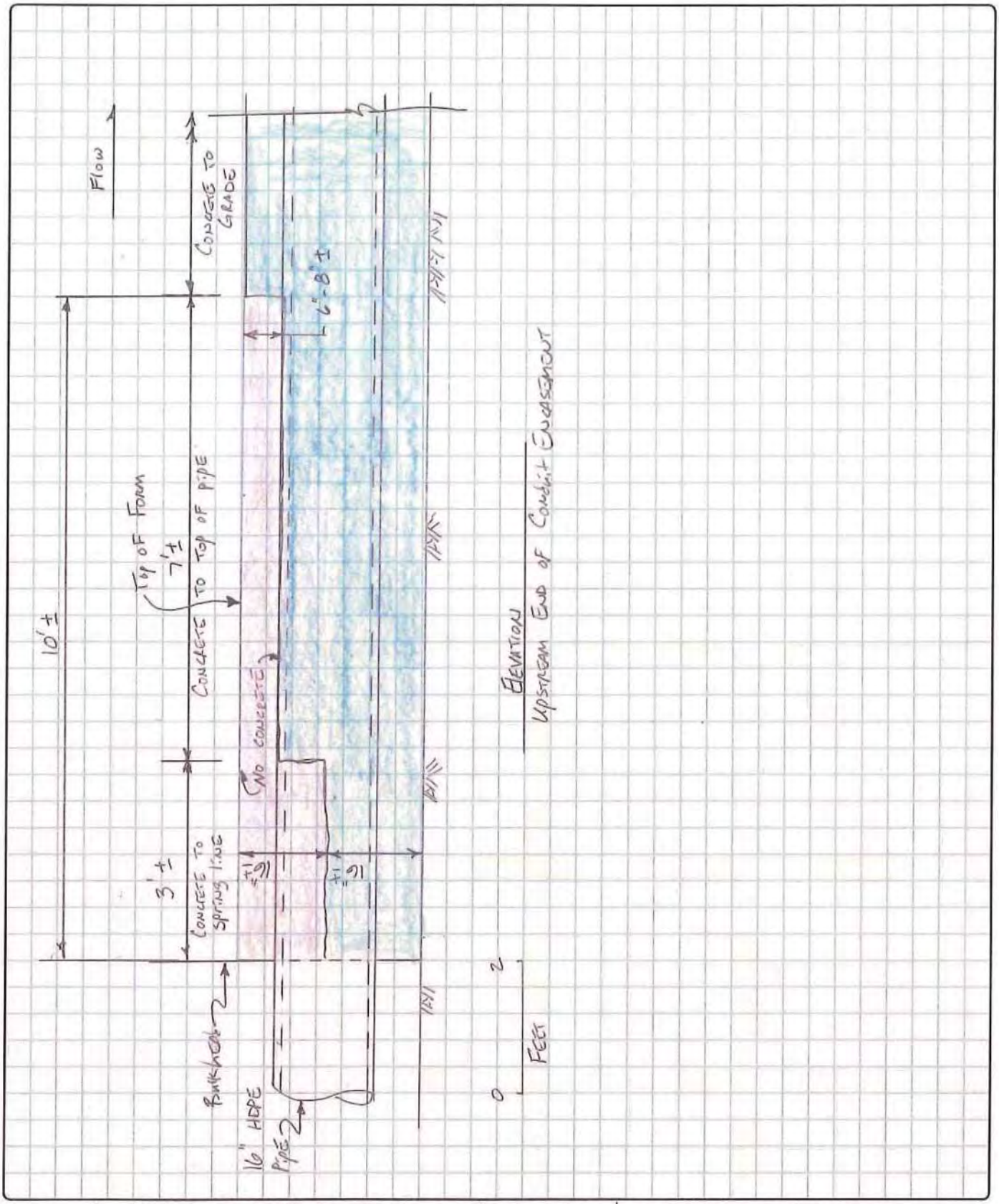
Photo 8 – Placing concrete for the outlet works conduit encasement.

RJH CONSULTANTS, INC.

Project 1329 Page 1/1

Subject WEH Res. No.1 Date 6-23-2016 By JAN

Calculation _____ Checked _____ By _____



DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project

Prepared By: Doug Neighbors

Weather a.m. Sunny
p.m. Sunny

Observations

I arrived on site at 9:00 a.m.

Embankment:
No new work performed.

Outlet Works:
Rundle placed concrete for the downstream headwall. I observed the following:

1. Formwork was set and secured.
2. Reinforcing steel was in position and secured.
3. Chamfer was in place.
4. Concrete was tested by DOWL. Test results indicated that the concrete placed appeared to meet specification requirements for slump, air content, and temperature.
5. Rundle used a tremmie to limit the free fall of concrete.
6. Concrete was vibrated.
7. Once concrete placement was complete, Rundle wet the exposed concrete surface and placed concrete blankets to retain moisture.
8. Rundle placed about 5 cy of concrete.

Correspondence / Communications

Jason Ward (SEO) noted that the inlet pipe at the inlet structure measures 12.5-inches in diameter instead of 14-inches as shown on the design drawings. I said RJH will review the capacity of the pipe to confirm that the pipe can still meet evacuation requirements.

I discussed the riprap bedding with Lance (Rundle). I said the specification requirement for riprap bedding is generally a ¾-inch rock. Lance said he will discuss the specification with the supplier.

Jason and Garrett Jackson (SEO) reminded Lance that the outlet works conduit must be pressure tested. Lance said he has a test head (with valves and gauges) and will see if the test head fits the outlet conduit.

Garrett (SEO) and I talked to Lance about the excavation to remove the drainage channel on the left side of the embankment excavation. Lance will cut out a portion of the working platform so that the 815 compactor will fit in the bottom of the excavation. The cut will be sloped to eliminate a vertical joint through the embankment (at the working platform/new fill contact). Lance will also cut the existing embankment to slope the embankment and eliminate a vertical joint (at the existing embankment/new fill contact).

DAILY ACTIVITY REPORT

Directions Given

None.

Administrative Tasks

None.

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project

Photo 1 – End plug for the outlet works conduit (HDPE pipe).

Photo 2 – Placing concrete for the downstream headwall.

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project

Prepared By: Doug Neighbors

Weather a.m. Sunny
p.m. ---

Observations

I arrived on site at 4:00 a.m. and left at about 8:00 a.m.

Embankment:
No work performed.

Outlet Works:
Rundle performed pressure testing of the outlet works conduit. Test results were as follows:

Time	Pressure (psi)	Temperature (°F)
4:15 Start	26.5	48
5:20	26.0	44
6:10	26.0	42
6:45	26.3	41
7:15 Finish	26.2	49

Total change between start and finish was 0.3 psi.

The pressure change was less than 0.5 psi (the allowable limit). Photo 1 shows the test equipment setup.

I observed the following additional work activities:
1. Removed formwork from the downstream end of the conduit encasement.

Correspondence / Communications

I informed Jake (Rundle Construction) that the pressure test met the specification requirements.

Directions Given

None.

Administrative Tasks

None.

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project

Gauges and valves used during the conduit pressure test.

Photo 1 – Gauges and valves used for pressure testing the outlet works conduit.

Photo 2 – Removing formwork from the downstream conduit encasement.

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project

Prepared By: Doug Neighbors

Weather a.m. Cloudy
p.m. Cloudy

Observations

I arrived on site at 7:00 a.m.

Embankment:
Rundle began fill placement to replace the excavated portion of the embankment. I observed the following:

1. Excavated the dewatering trench on the left side of the excavation and prepared the trench for fill placement. The bottom of the trench was cleaned to firm material. I checked the bottom of the excavation using a probe. The bottom of the trench was about 20 feet wide. Muck in the bottom of the trench was removed and hauled away from the dam.
2. Placed and compacted common fill. The fill material was borrowed from the embankment stockpile located on the northwest side of the dam. The excavation was filled to about Elevation 8741, between about Sta. 1+10 and the headwall. Compaction was performed using a CAT 815 sheeps foot compactor.
3. Several moisture density test results were above specification limits for water content. I said the tests were acceptable because the density met specification limits.
4. Moisture density tests between about Station 2+00 and Station 3+15, Elevation 8740 ±, were 6% or more over the specified limit for water content and failed to meet the minimum density specification. I told Rundle that the fill was unacceptable. Rundle removed and reworked the area. Subsequent moisture density tests indicated that the material met specification requirements for moisture content and density.
5. After Rundle placed and compacted fill, water was observed exiting the top of the fill at about Station 1+65, 5 feet left of the conduit encasement.

Outlet Works:
I observed the progress of the outlet works construction and noted the following:

1. The inlet structure was set. Rundle placed Mirafi fabric between the subgrade and the gravel base below the inlet structure (Photo 1).
2. The downstream headwall has been patched.
3. The conduit was drained and the pressure testing apparatus had been removed.

Correspondence / Communications

I discussed the progress of embankment construction with Lance (Rundle).

1. Lance and I observed the placement and compaction of embankment fill and noted that over compaction using the sheeps foot compactor was resulting in lower densities. Rundle will spread the fill using the dozer (D6) and then limit the number of passes using the 815 compactor.
2. I asked Rundle to slope the existing embankment so that new fill is placed against a slope (eliminate a possible vertical joint).

Directions Given

None.

Administrative Tasks

None.

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project

Photo 1 – Outlet works inlet structure.

Photo 2 – Outlet works encasement and adjacent subgrade.

Photo 3 – Beginning excavation of the dewatering trench on the north side of the excavation.

Photo 4 – Excavation of the dewatering trench on the north side of the excavation. Note width of excavation and excavation of the existing embankment to create a slope.

Photo 5 – Compacting embankment fill.

Photo 6 – Completed embankment fill to about Elevation 8740. Note slope of existing embankment (right side of photograph).

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project **Report: 16-008**
Date: Wednesday, July 20, 2016

Prepared By: Doug Neighbors

Weather a.m. Sunny
p.m. Cloudy

Observations

I arrived on site at 7:15 a.m.

Embankment:
Rundle continued fill placement to replace embankment. I observed the following:

1. Rundle prepared the subgrade on the right side of the outlet conduit encasement. The subgrade (base and slope) was scarified to expose fresh material.
2. The right side of the outlet conduit was backfilled using soils from the excavated embankment stockpile. Compaction was performed using a Wacker walk behind sheeps foot roller.
3. The excavation was backfilled to about Elevation 8742 ± (top of conduit encasement), between about Sta. 1+10 and the headwall.
4. A portion of the downstream headwall was backfilled and compacted. Compaction adjacent to the headwall was performed using a Wacker compactor.
5. Moisture density tests performed on the backfill on the right side of the conduit encasement showed that the material did not meet specification requirements for moisture (too wet) or density (low compaction). Rundle removed the material and placed and compacted reworked material. Subsequent moisture density test results appeared to meet specification requirements.
6. Moisture density tests performed on embankment fill placed on the left side of the conduit encasement appeared to not meet specification requirements for water content or density. Rundle reworked the material by ripping, adding drier fill and reworking the area. Compaction was performed using the D6 dozer to spread followed by one pass of the 815 compactor. Subsequent moisture density test results appeared to meet specification requirements.

Outlet Works:
No new work was performed.

Correspondence / Communications

Lance asked if the crusher fines could be used for filter material. I said no and explained that the filter material was designed to be filter compatible with the embankment and the C33 sand specified is required.

Directions Given

None.

Administrative Tasks

None.

Using the excavator bucket to scarify the existing subgrade prior to new fill placement.

Photo 1 – Scarifying existing embankment before new fill placement.

Excavating existing embankment for use as backfill. The existing embankment was sloped as much as possible prior to placing backfill.

Photo 2 – Excavating existing embankment for use as backfill on the south side of the conduit encasement.

Photo 3 – Compacting fill on the south side of the conduit encasement.

Photo 4 – Compacting backfill on the north side of the conduit encasement using hand operated equipment.

Photo 5 – Completed backfill on both sides of the conduit encasement.

Photo 6 – Placing embankment fill.

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project

Prepared By: Doug Neighbors

Weather a.m. Sunny
p.m. Cloudy

Observations

I arrived on site at 7:30 a.m.

Water is flowing along the right downstream side of the dam (about 30 feet from the toe) and into the downstream channel. As a result, there is water in area of the downstream energy dissipation structure. The source of the water is the ditch on the north side of the dam. I did not see where the water could be diverted or stopped where it is flowing out of the ditch. See Photo 1.

Embankment:
Rundle performed the following activities:

- Backfilled the conduit encasement and the downstream headwall (Photo 2 and 3).
- Placed and compacted common fill for the embankment. DOWL performed moisture/density testing. Test results indicated that the material tested met specification requirements for water content and density.
- Exposed the existing toe drain on the north side of the energy dissipation structure (Photo 4).

Outlet Works:
No new work was performed.

Correspondence / Communications

None.

Directions Given

None.

Administrative Tasks

None.

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project

Photo 1 – Water flowing around downstream headwall.

Photo 2 – Fill placement north side of headwall.

Photo 3 – Compacting fill on south side of headwall.

Photo 4 – Existing toe drain pipe exposed on the north side of the excavation.

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project

Prepared By: Doug Neighbors

Weather a.m. Sunny
p.m. Sunny

Observations

I arrived on site at 7:00 a.m.

Embankment:
Rundle performed the following activities:

- Excavated for the filter collar near Station 2+95. The excavation was extended a minimum of 2-feet beyond the existing material (embankment or foundation) and new fill contact (see Photos 2 and 3). No filter sand was placed today.
- Placed and compacted common fill for the embankment. DOWL performed moisture/density testing. Test results indicated that the material tested met specification requirements for water content and density.

Outlet Works:
No new work was performed.

Correspondence / Communications

None.

Directions Given

None.

Administrative Tasks

None.

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project

Photo 1 – Excavating for the filter collar near Station 2+95.

Photo 2 – Excavation for the filter collar.

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project

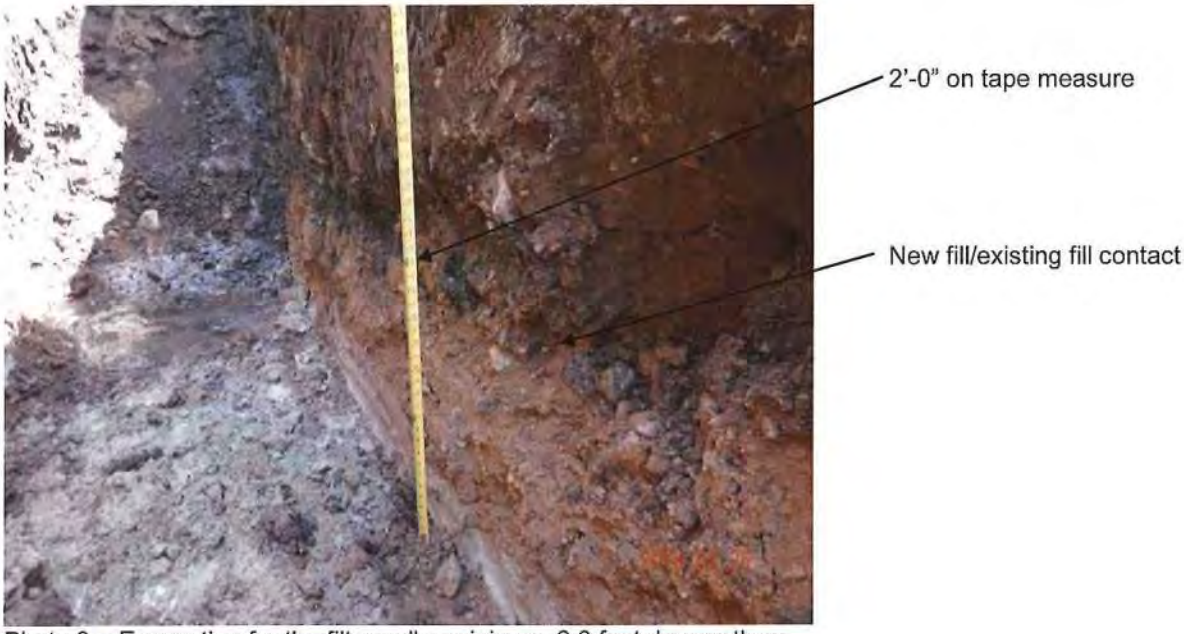


Photo 3 – Excavation for the filter collar minimum 2.0 feet deeper than the new fill/existing fill contact.

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project

Report: 16-011
Date: Tuesday, July 26, 2016

Prepared By: Doug Neighbors

Weather a.m. Sunny
p.m. Sunny

Observations

I arrived on site at 7:30 a.m.

Embankment:
Rundle performed the following activities:

- Placed and compacted filter sand for the filter collar at Station 2+95. Acceptance was based on the number of passes using a vibratory plate compactor and on visual observations of the sand placement.
- Placed and compacted common fill for the embankment. DOWL performed moisture/density testing. Test results indicated that the material tested met specification requirements for water content and density.

Outlet Works:
No new work was performed.

Correspondence / Communications

I reminded Lance (Rundle) to cut into and slope the existing embankment as the fill level rises.

I asked Rundle to limit the equipment over the conduit encasement until 3-feet of fill has been placed and compacted. Lance agreed.

Directions Given

None.

Administrative Tasks

None.

DAILY ACTIVITY REPORT

Photo 1 – View of embankment construction, looking north from dam crest.

Photo 2 – Placing embankment fill, looking upstream.

Photo 3 – Cutting existing embankment at new fill contact.

Photo 4 – Filter collar construction (near Station 2+95).

Photo 5 – Compacting filter sand for the filter collar.

Photo 6 – Compacting filter sand beneath the conduit encasement.

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project **Report: 16-012**
Date: Wednesday, July 27, 2016

Prepared By: Doug Neighbors

Weather a.m. Sunny
p.m. Sunny

Observations

I arrived on site at 7:00 a.m.

Embankment:
Rundle performed the following activities:

- Placed and compacted filter sand for the filter collar at Station 2+95. The filter collar was completed to about Elevation 8739.
- Placed and compacted filter gravel for the filter collar at Station 2+95. Rundle used forms to contain the filter gravel and keep the gravel and filter sand separate. As the filter sand and filter gravel were placed, the forms were removed resulting in the sand/gravel contact as shown on the drawings (Photos 2 through 5).
- Placed filter fabric over the completed filter collar (to Elevation 8739). The fabric will serve as a marker for the next phase of filter placement (after fill is placed and the collar re-excavated) and will protect the existing filter during fill placement. Final filter sand placement will be to Elevation 8745.
- Placed and compacted common fill for the embankment (Photo 1). DOWL performed moisture/density testing. Test results indicated that the material tested met specification requirements for water content and density.

Outlet Works:
No new work was performed.

Correspondence / Communications

Jake (Rundle) said Rundle does not have stainless steel bolts for the connection to the inlet structure and asked if stainless is necessary. I said that it is necessary.

Garrett Jackson (SEO) was on site to observe the placement of the filter collar. Garrett had the following comments:

1. The sand should be placed in a saturated or at least wet condition. I said the existing sand was placed at stockpile moisture. Garrett asked that the existing filter be saturated once sand and gravel placement was finished today. I agreed.
2. Garrett asked that the sand be wet for the next phase of placement (when the filter collar is re-excavated and placed to Elevation 8745). I said I will make this request to Rundle.

Directions Given

I asked Lance Jake (Rundle) to spray the completed filter collar with water to saturate the sand. Jake complied.

I asked Jake to wet the sand prior to placement when sand placement resumes. Jake agreed.

DAILY ACTIVITY REPORT

Administrative Tasks

None.

Photo 1 – Placing common fill for the embankment.

Photo 2 – Placing filter collar near Station 2+95.

Photo 3 – Forms used to contain filter gravel.

Photo 4 – Filter collar to about Elevation 8738.

DAILY ACTIVITY REPORT

Photo 5 – Filter collar with forms removed.

Photo 6 – Spraying water on the partially completed filter collar.

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project **Report: 16-013**
Date: Monday, August 22, 2016

Prepared By: Doug Neighbors

Weather a.m. Cloudy
p.m. Cloudy

Observations

I arrived on site at 8:30 a.m. and left at 4:00 p.m.

Embankment:
Rundle has completed the following activities:

1. Completed embankment placement to Elevation 8779. Photo 1.
2. Placed topsoil on the downstream slope. Photo 2.

Rundle performed the following activities:

1. Placed riprap bedding on the upstream slope between the gate stem alignment and a line about 12 feet to the south, and between about Elevation 8745 and Elevation 8774. Photo 3.
2. Placed riprap on the upstream slope between the gate stem alignment and a line about 12 feet to the south, and between about Elevation 8745 and Elevation 8765. Photos 3 and 4.
3. Stripped vegetation from the upstream slope beyond the limits of excavation. Vegetation was removed to prepare for placement of riprap bedding.

I observed a small amount (about ¼ cup per minute) of water trickling from the filter collar drain pipe. Water is flowing from the pipe with no water in the reservoir. Photo 5

Outlet Works:
Rundle has completed the following work activities:

1. Placed the 4-inch diameter vent pipe from the inlet structure to the dam crest. Photo 6.

Rundle performed the following work activities:

1. Placed the gate stem and 4-inch diameter gate stem cover from the inlet structure to near the dam crest. The stem and cover stopped below the crest until the handwheel pedestal is placed. Photo 6.

Correspondence / Communications

I discussed the following with Jake and Lance (Rundle):

1. The riprap bedding and riprap should only be placed over the embankment. Rundle has cleared ground beyond the limits of the embankment. Rundle placed stakes at the limits of riprap as shown on the Drawings. We adjusted the limits based on conditions observed on the field.
2. Jake asked if the vent pipe at the crest has to be HDPE like the rest of the vent pipe. The 90 degree bend we show on the drawings may be difficult to make using HDPE. I said the vertical portion and the 90 degree bend can be made of different material provided that the material is as strong as the HDPE pipe. Jake said he may be able to find schedule 80 PVC or steel to make the bend.
3. I asked Jake to make sure the pool that has developed upstream of the inlet structure does not inundate the structure before final inspection.

DAILY ACTIVITY REPORT

Directions Given

I worked with Rundle to adjust the limits of slope protection to cover the embankment. The top of riprap was adjusted about 50 to the south on the left side and 10 feet to the south on the right side.

I asked Rundle to extend riprap down the slope in the area of the inlet structure to provide protection for the inlet structure.

I asked Jake to make sure smaller pieces of riprap are placed in void areas (where large riprap is stacked) to protect the riprap bedding. I had observed several areas where riprap bedding was exposed.

Administrative Tasks

None.

Photo 1 – Completed embankment. Looking at the upstream slope.

Photo 2 – Placing topsoil on the downstream slope.

Photo 3 – Placing riprap bedding.

Photo 4 – Placing riprap.

Photo 3 – Flow from the sand collar drain pipe.

Photo 4 – Vent pipe and gate stem/stem cover on the upstream slope.

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project **Report: 15-001**
Date: Wednesday, September 2, 2015

Prepared By: Doug Neighbors

Weather a.m. Sunny, clear
p.m. ---

Observations

I arrived on site at 10:00 a.m.

Embankment:
Rundle Construction (Rundle) had excavated existing embankment to the bottom of the existing outlet works. The excavation is about 25 feet wide at the base with 2H:1V side slopes to the dam crest. The side slopes are notched into the existing embankment creating benches that are about 1.5-feet wide and 1.5-feet high. Photo 1 shows the embankment excavation.

The bottom of the excavation is loose (from excavation) and dry. Rundle excavated three test pits (upstream end, middle and downstream end) to determine subgrade materials.

1. Upstream: Photo 2. Gravelly clay at about 3 feet deep. Material below about 3 feet appears to be firm.
2. Middle: Photo 3. Sandstone at about 3 feet deep. The material appears firm.
3. Downstream: Photo 4. Gravelly clay at about 3 feet deep. The material below about 3 feet deep appears to be natural material and appears to be firm.

Rundle separated and stockpiled dark (apparently organic) material that was excavated from the existing embankment. The material has some organic material visible and has an organic smell. I obtained a sample for testing to determine the organic content. The stockpile is shown on Photo 5.

Other material excavated from the existing embankment was stockpiled by Rundle near the dam. I obtained a sample for laboratory testing. The stockpile is shown near the upstream embankment toe in Photo 1.

I obtained a sample of potential borrow material from the reservoir basin (Photo 6).

I observed a sample of riprap bedding with Eric (Rundle). In general the bedding was one size (about 4-inches). I said we would prefer the bedding to be well graded (more sizes) and smaller since the riprap is Type VL (6-inch d50). Eric said he will discuss with the supplier to see if a more desirable gradation can be made.

Rundle had constructed a cofferdam upstream of the work area (Photo 5).

Outlet Works:
Rundle had demolished and removed the existing outlet works.

DAILY ACTIVITY REPORT

Correspondence / Communications

I discussed the following:

1. RJH will identify testing consultants and solicit bids for testing services.

Directions Given

None.

Administrative Tasks

None.

Embankment fill stockpile.

Photo 1 – Excavation through existing embankment.

Gravely clay material.

Photo 2 – Test pit at upstream toe.

Photo 3 – Test pit near middle of excavation.

Photo 4 – Test pit at downstream toe.

Photo 5 – Cofferdam.

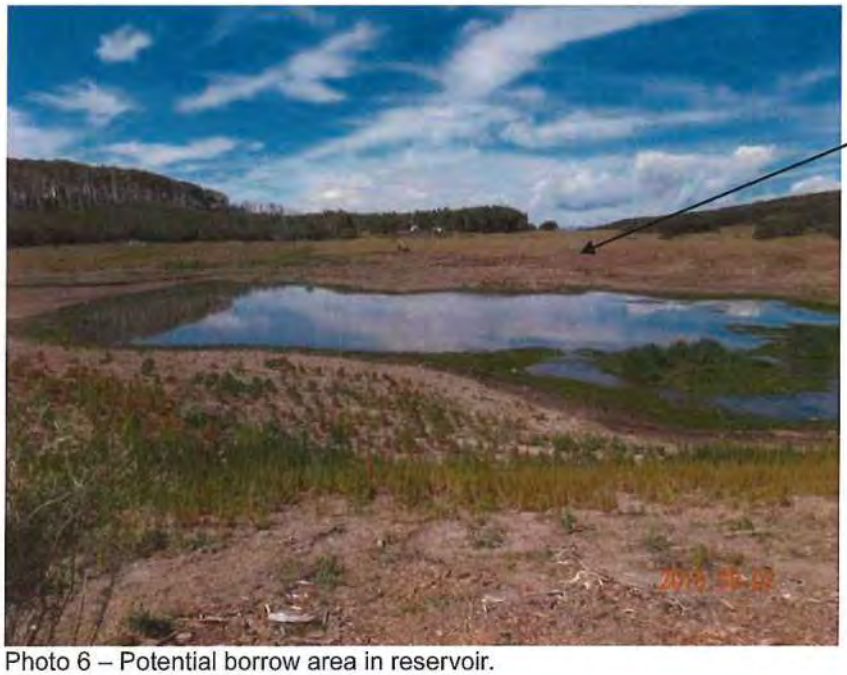


Photo 6 – Potential borrow area in reservoir.

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project **Report: 15-002**
Date: Thursday, September 10, 2015

Prepared By: Doug Neighbors

Weather a.m. Sunny, clear
p.m. ---

Observations

I arrived on site at about 10:00 a.m.

Embankment:
Excavation was continued from the September 2, 2015 site visit to the top of suitable subgrade. Water was present on the surface of the subgrade. Water appears to be seeping from the bottom and sides of the excavation.

Outlet Works:
No new work had been performed since the September 2, 2015 site visit.

Correspondence / Communications

I discussed the excavation with Eric Edwards (Rundle).

1. The subgrade is generally firm, but the water must be removed from beneath the outlet works encasement before placing concrete. It appears that Rundle could excavate or shape the bottom of the excavation to drain water to the sides of the excavation resulting in the middle being dry (where the conduit encasement will be placed).

Directions Given

None.

Administrative Tasks

None.

DAILY ACTIVITY REPORT

Photo 1 – Bottom of excavation looking downstream. Note the standing water.

Photo 2 – Bottom of the excavation looking upstream.

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project **Report: 15-003**
Date: Wednesday, September 30, 2015

Prepared By: Doug Neighbors

Weather a.m. Sunny, clear
p.m. ---

Observations

I arrived on site at about 10:00 a.m.

Embankment:
No new earthwork had been performed on the embankment since the last site visit (September 18, 2015).

Rundle is collecting and processing riprap for upstream slope protection from on-site sources.

Outlet Works:
Rundle had placed the HDPE outlet conduit in the excavation. Eric Edwards (Rundle) indicated that the pipe will be moved into final position once surveyors have set the inlet location.

The subgrade had flowing and standing water and occasional soft subgrade areas (Photo 1).

Rundle excavated the discharge channel downstream of the dam (Photo 2).

Correspondence / Communications

I discussed the outlet works with Eric (Rundle).

1. Subgrade below the outlet works conduit encasement must be dry prior to placing concrete.

Directions Given

None.

Administrative Tasks

Participated in the pre-construction meeting. The meeting was conducted by Garrett Jackson (Colorado SEO dam safety) and attended by Garrett, Jason Ward (SEO dam safety); Paul Schmucker, Steve Tuck (Colorado DWR); Lance Rundle, Eric Edwards (Rundle Construction); Nick Hughes (West Reservoir and Ditch Company); and Grant Jones (DOWL). Meeting agenda was prepared separately.

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project **Report: 15-003**
Date: Wednesday, September 30, 2015

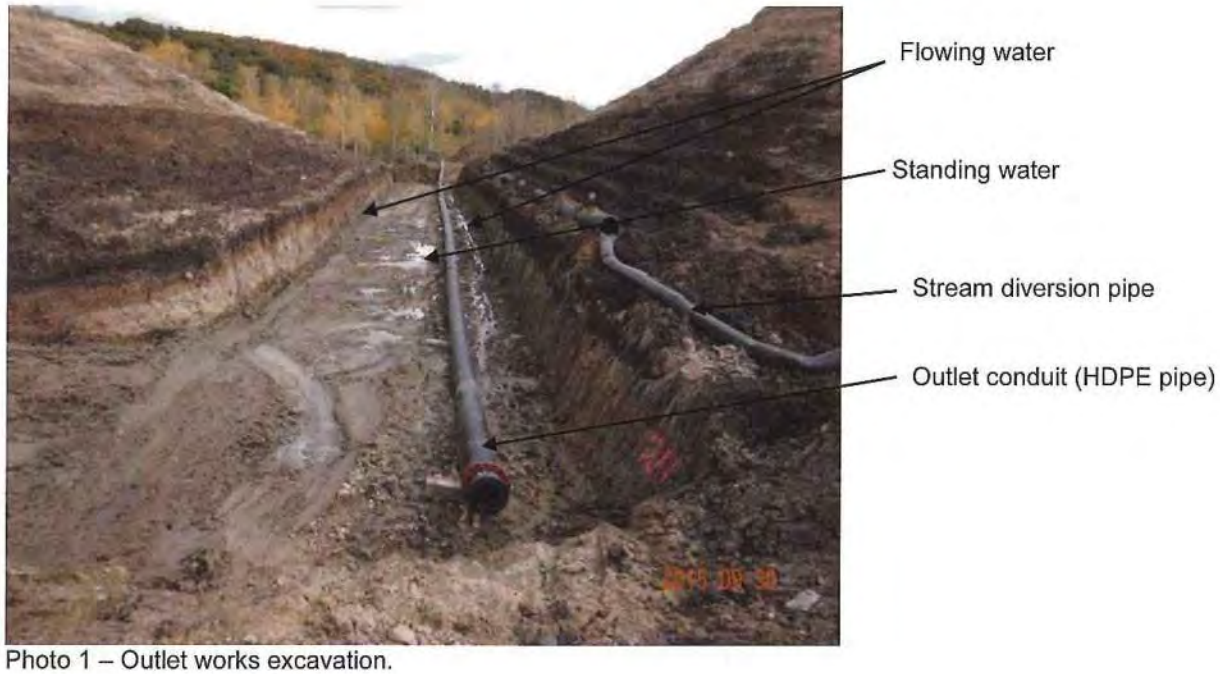


Photo 1 – Outlet works excavation.

Photo 2 – Channel excavation downstream of dam (to Jay Creek).

DAILY ACTIVITY REPORT

West Reservoir No.1 Outlet Works Rehabilitation Project **Report: 15-004**
Date: Monday, October 19, 2015

Prepared By: Doug Neighbors

Weather a.m. Rain
p.m. ---

Observations

I arrived on site at 11:45 a.m. Raining when I arrived and had been raining since early morning. The site access road was muddy and the site was muddy with standing water.

Embankment:
Rundle had placed fill on the left (north) side of the outlet works excavation since my last site visit. The fill was about 12 feet wide and about 3 feet deep.

Outlet Works:
Rundle had placed the HDPE outlet conduit in position in the excavation.

I observed the condition of the outlet works and noted the following:

1. HDPE pipe is in position. Formwork for the encasement is placed. (Photo 1)
2. Reinforcing steel is in place. Splices appear to be adequately tied and secure. Number of bars, bar size and bar spacing all appear to match design drawings.
3. Conduit encasement subgrade is soft, muddy with standing water (see Photos 1 and 2). Subgrade is not acceptable.

Correspondence / Communications

I discussed the outlet works with Mike (Rundle).

1. Formwork not complete. Mike said Rundle still has to place form ties and east end bulkhead. Need to add spacers (e.g. chairs) between forms and reinforcing steel to provide concrete cover. Need to remove wood (2x4's being used to hold reinforcing steel above HDPE pipe) before concrete is placed.
2. Reinforcing steel appears to be correctly placed and acceptable.
3. Subgrade is not acceptable. Mud and standing water in the bottom of the excavation (conduit subgrade) needs to be cleaned or removed before concrete can be placed.

Directions Given

I asked Mike to do the following before concrete is placed:

1. Add spacers to provide clear cover between reinforcing steel and formwork.
2. Remove wood (2x4) between top of HDPE pipe and reinforcing steel.
3. Clean or remove mud and standing water from conduit subgrade.

Administrative Tasks

None.

DAILY ACTIVITY REPORT

Mud and standing water for outlet works encasement subgrade.

Photo 1 – Outlet works.

Photo 2 – Outlet works.

DAILY ACTIVITY REPORT

Photo 3 - Reinforcing steel for the outlet works encasement.

Photo 4 – Exterior band attached to HDPE pipe.

APPENDIX B

SEO INSPECTION REPORTS

COLORADO
Division of Water Resources
Department of Natural Resources
Dam Safety Branch

CONSTRUCTION INSPECTION REPORT

PROJECT INFORMATION			
Dam Name:	West #1	Inspector:	Jason Ward
DAMID:	400538	Date:	06/21/2016
C-#:	C-0545B	Time on Site:	1:30pm – 3:30pm
Dam Owner:	West Ditch and Reservoir Co.	Contact:	Nick Hughes (970.201.1476)
Engineer:	RJH	Contact:	Doug Neighbors (303.225.4611)
Contractor:	Rundle Construction, Inc. (RCI)	Contact:	Lance Rundle
Approved Plans & Specifications On-site? ☑ Yes ☐ No		Engineer Following Const. Obs. Plan? ☑ Yes ☐ No	

INSPECTION PARTICIPANTS	
Inspection Participants:	Jason Ward Doug Neighbors (RJH) Lance Rundle (RCI)

CONDITIONS	
Reservoir:	Empty
Weather:	Clear and Hot
Equipment:	

CONSTRUCTION STATUS	
Work Completed to Date:	Dam breached Outlet foundation prepared New HDPE outlet pipe fused and placed on grade Outlet encasement rebar and forms in place Precast concrete intake structure on-site Outlet valve components on-site
Work in Progress:	Inspection only.
Work Planned and est. Timeframe:	Concrete placement for outlet encasement scheduled for Wednesday June 23, 2016

OBSERVATIONS AND DISCUSSION	
Purpose of Inspection:	Observe outlet conduit, reinforcement, and concrete forms prior to placement of concrete
Items Inspected:	1. Exposed foundation. The foundation under the pipe appears firm and acceptable. Elevations and grades were discussed that vary slightly from the approved plans. All elevations appear acceptable and should be reflected on the As-Constructed plans. 2. Dewatering trench. A dewatering trench is located along the left side of the foundation that is

OBSERVATIONS AND DISCUSSION	
	several feet lower in grade than outlet foundation. The plan is to re-excavate the temporary prepared foundation adjacent to the trench to a width of equipment necessary and within a few feet of the permanent outlet encasement foundation. The dewatering trench and entire foundation (except under the outlet encasement) will then be prepared and brought up to gradefor placement of embankment fill. 3. Fused HDPE outlet pipe is 16 inch DR 11 in conformance with the approved plans and specifications. 4. Outlet pipe encasement reinforcement cage and concrete forms all appear in conformance with the approved plans. Tie-downs to prevent the floatation of the pipe during concrete placement were placed every 10-12 feet consisting of wire straps attached to rebar driven into the prepared foundation. Discussion of concrete placement and forming the crown of the encasement was discussed in detail. 5. Several HDPE exterior bands were placed around the outlet pipe to prevent lateral movement within the concrete encasement. That detail is understood as Detail G and Note 3 on Sheet 07 of the construction plans. 6. The outlet valve and precast intake box were observed and portions of that construction were discussed.
Items not in compliance with approved plans/specs:	
Problems/Concerns:	The contractor was not aware that the HDPE pipe must be pressure tested in accordance with specification Section 02650, 3.2D. Item is not out of compliance at this time, but plans must be made for testing. See discussion below.
Change Orders:	--
Minor Changes:	A minor variation from the plans is a flanged connection between the upstream end of the pipe and the pre-cast intake structure. The connection is not detailed on Sheet 05 of the construction plans and this appears to be an acceptable connection to be encased in concrete at a later date. A request was made to the Engineer to ensure this connection is reflected on the As-Constructed drawings.
Issues Discussed:	
Resolution of Deficiencies:	--
Action Items:	1. RJH and RCI will develop a plan for pressure testing the HDPE pipe in accordance with the approved specification. Testing will occur after concrete encasement of the HDPE outlet pipe, which is viewed as a potential increased risk to the contractor if the test fails, but is in conformance with the approved specification. Since this item was initially overlooked by the Contractor, the Engineer (RJH) should keep the State Engineer's Office informed on the status of the pressure testing.
Recommendations:	
Conclusions:	
Next Inspection:	Observe initial placement of embankment fill.

PHOTOGRAPHS

HDPE outlet pipe placed on prepared foundation with encasement reinforcement and concrete forms.

PHOTOGRAPHS

Close-up of outlet pipe, rebar cage, concrete forms, and exterior band to prevent lateral displacement of pipe.

Close-up of wire tie and rebar to prevent floatation of the outlet pipe during concrete placement.

PHOTOGRAPHS

Upstream end of outlet pipe with flanged end for connection to intake structure. Concrete encasement of this section of pipe will occur at a later date.

Flanged end on precast intake structure.

PHOTOGRAPHS

Outlet valve with stem and stem casing in background.

Bolt pattern for outlet valve on inclined portion of intake structure.

COLORADO
Division of Water Resources
Department of Natural Resources

CONSTRUCTION INSPECTION REPORT

PROJECT INFORMATION			
Dam Name:	West #1	Inspector:	Garrett Jackson
DAMID:	400538	Date:	7/27/2016
C-#:	C-0545B	Time on Site:	10:30-12:00
Dam Owner:	West Reservoir and Ditch Co.	Contact:	Nick Hughes (970.201.1476)
Engineer:	RJH	Contact:	Doug Neighbors (303.225.4611)
Contractor:	Rundle Construction Inc. (RCI)	Contact:	Lance Rundle (970.835.3022)
Approved Plans & Specifications On-site? ☐ Yes ☑ No		Engineer Following Const. Obs. Plan? ☑ Yes ☐ No	

INSPECTION PARTICIPANTS	
Inspection Participants:	Doug Neighbors (RJH), Garrett Jackson

CONDITIONS	
Reservoir:	Drained
Weather:	Clear, warm, breezy
Equipment:	Excavator, dozer, haul trucks

CONSTRUCTION STATUS	
Work Completed to Date:	1. Outlet conduit encasement is complete except for ~10' adjacent to gate structure. 2. Outlet gate structure has been set and temporarily connected to the outlet conduit. 3. Fill has been placed for the full width of the breach to about 2'-3' above the outlet encasement upstream of about the dam centerline, except for immediately downstream of the gate structure. Fill has been placed to the top of the encasement downstream of the dam centerline. 4. The sand diaphragm trench has been excavated and keyed into the breach sides. 5. Riprap and riprap bedding have been stockpiled on site.
Work in Progress:	Contractor is placing diaphragm filter sand and drain gravel. They ran short of sand and had to order another truck, which will arrive later this afternoon. The drain gravel is placed in a plywood form box surrounded by sand. The box is then pulled up, leaving the gravel and sand in place. The filter diaphragm sand was placed without prior wetting. The solid PVC drain pipe downstream of the gravel will be bedded in waste sand and gravel to the concrete headwall at the downstream toe. When work on the filter diaphragm is stopped, more fill is placed in the breach. The fill is stopped near the dam centerline, so the breach bottom slopes down toward the diaphragm.
Work Planned and est. Timeframe:	1. Construction of the filter diaphragm will be completed to the top of the gravel this afternoon. 2. When the sand diaphragm is completed to the level of the gravel (~1' above its current level), the contractor will thoroughly wet the sand and gravel prior to covering the diaphragm with a fabric. Fill will then be placed to even out the bottom of the breach over the top of the diaphragm. Sometime next week, the fill over the diaphragm will be excavated and the fabric removed for completion of the diaphragm by placing new sand tied into the sand already in place. The old sand will be thoroughly wetted prior to placing new sand, and the new sand will be watered in the truck prior to placement to minimize the chance of bulking and future settlement. 3. Once the correct SS nuts for the outlet conduit flanged connection to the outlet structure are received, the structure will be permanently set, and the remaining section of the conduit will be encased in concrete. Contractor plans on placing the concrete tomorrow afternoon. After the

	concrete has attained sufficient strength (estimated by the middle of next week), fill will be placed.

OBSERVATIONS AND DISCUSSION	
Purpose of Inspection:	1. Observe fill placed in the breach, particularly the filling of the two narrow areas along both sides of the breach. 2. Observe construction of the sand filter diaphragm.
Items Inspected:	1. Fill in the breach. Doug (RJH) indicated the fill placed in the narrow area between the outlet encasement and the right side of the breach was initially too wet and was removed. All the fill now in place is properly benched into the breach cut slopes and meets compaction and moisture requirements. 2. Sand filter diaphragm. 3. Outlet gate structure.
Items not in compliance with approved plans/specs:	Specification section 02317-3.4.K requires the filter sand to be placed and compacted at "in-situ, stockpile, or saturated water content", as requested by the engineer. The filter diaphragm sand placed to date has been placed directly from the truck, and appears to be relatively dry.
Problems/Concerns:	Placing sand dry increases the chance of bulking and future settling under the fill.
Change Orders:	NA
Minor Changes:	NA
Issues Discussed:	1. Filter diaphragm sand in place is to be thoroughly wetted prior to covering with the fabric and placing fill. 2. When diaphragm is excavated for completion, existing sand is to be thoroughly wetted prior to placement of new sand. 3. New sand to complete diaphragm is to be thoroughly wetted in the truck prior to placement. 4. Concrete encasement on the remaining section of the outlet conduit will be allowed to attain adequate strength per the specifications prior to placing fill against the concrete. Fill is to be brought up evenly on both sides of the encasement to prevent cracking or displacement.
Resolution of Deficiencies:	See above for placement of filter sand in wet condition.
Action Items:	--
Recommendations:	--
Conclusions:	Work appears to be progressing satisfactorily.
Next Inspection:	DOWL will inspect placement of concrete encasement and earth fill. SEO and/or RJH will observe excavation of the fill over the diaphragm and placement of the remaining filter sand.

PHOTOGRAPHS

~ 10' of conduit remains to be encased after making the permanent connection to the gate structure.

Fill has been placed upstream of the sand filter diaphragm, where the fill level in the breach is now 2'-3' above the top of the outlet encasement.

PHOTOGRAPHS

Sand diaphragm excavation is extended into the sides of the breach excavation on both sides.

Gravel is placed in a form box, which will be lifted out of the sand.

COLORADO
Division of Water Resources
Department of Natural Resources

CONSTRUCTION INSPECTION REPORT

PROJECT INFORMATION			
Dam Name:	West #1	Inspector:	Garrett Jackson
DAMID:	400538	Date:	8/2/2016
C-#:	C-0545B	Time on Site:	09:00-11:30
Dam Owner:	West Reservoir and Ditch Co.	Contact:	Nick Hughes (970.201.1476)
Engineer:	RJH	Contact:	Doug Neighbors (303.225.4611)
Contractor:	Rundle Construction Inc. (RCI)	Contact:	Lance Rundle (970.835.3022)
Approved Plans & Specifications On-site? ☐ Yes ☑ No		Engineer Following Const. Obs. Plan? ☑ Yes ☐ No	

INSPECTION PARTICIPANTS	
Inspection Participants:	Garrett Jackson, Devin (DOWL), Lance Rundle and Jake (RCI)

CONDITIONS	
Reservoir:	Drained
Weather:	Clear, warm, breezy
Equipment:	2 excavators, mini-excavator, dump truck, water truck

CONSTRUCTION STATUS	
Work Completed to Date:	1. Outlet conduit encasement is complete, outlet gate structure has been set. Gate is not installed. 2. Fill has been placed for the full width of the breach to about 11'-12' above the outlet encasement upstream of about the dam centerline. Fill has been placed to about 6' over the top of the encasement downstream of the dam centerline. 3. The filter diaphragm trench has been excavated, and the previously-placed sand has been exposed.
Work in Progress:	Contractor is working on completing the filter diaphragm today.
Work Planned and est. Timeframe:	1. Completion of the filter diaphragm today and tomorrow. 2. Embankment fill in the dam breach will follow completion of the diaphragm.

OBSERVATIONS AND DISCUSSION	
Purpose of Inspection:	1. Observe fill placed in the breach. 2. Observe construction of the sand filter diaphragm.
Items Inspected:	1. Devin indicated that all fill placed has met the specs, even when the moisture is a little over optimum. 2. Sand filter diaphragm. 3. Outlet conduit encasement.
Items not in compliance with approved plans/specs:	None.
Problems/Concerns:	NA
Change Orders:	NA
Minor Changes:	NA
Issues Discussed:	1. Concrete encasement on the remaining section of the outlet conduit will be allowed to attain adequate strength per the specifications prior to placing fill against the concrete. Fill is to be

OBSERVATIONS AND DISCUSSION	
	brought up evenly on both sides of the encasement to prevent cracking or displacement. 2. Lance recommends extending the outlet conduit about a foot beyond the terminal headwall to carry outlet discharges past the wall footer. To be checked and resolved with RJH.
Resolution of Deficiencies:	Issues noted in 7/27/2016 report were adequately addressed today. 1. Previously placed sand was exposed, the top of the sand was carefully cleaned, and the sand was thoroughly wetted with a hose from the water truck. Contractor dug a hole with a shovel and showed the sand was saturated or nearly saturated down to at least 20". Jake reported that they had previously applied a lot of water to the sand before covering it with fill. 2. New sand was delivered in a dump truck. Sand was thoroughly watered in the truck before placing it in the diaphragm. 3. Contractor scooped sand from the dump truck with the excavator and placed it on the old diaphragm sand in 16" lifts. The 325 excavator straddling the trench compacted the sand by pressing the bucket down, consolidating the lift about 1-1/2 inches. Sand will be placed to the full trench depth beginning at the left end and moving toward the right end to avoid problems with the excavator straddling the trench and knocking contaminants into the sand or caving the trench walls. 4. Discussed with Lance, Jake, and Devin that the observed consolidation was about what we're looking for. If the same compactive effort produces less than the observed ~1-1/2" of consolidation, the sand has become too dry and must be wetted again. The sand must not be over-compacted. 5. Sand will be soaked in the stockpile at the pit prior to delivery to the site to save some of the needed time onsite to soak the sand in the truck.
Action Items:	--
Recommendations:	--
Conclusions:	Work appears to be progressing satisfactorily.
Next Inspection:	Installation and testing of the outlet gate.

PHOTOGRAPHS

Outlet conduit encasement has been completed.

Embankment fill has been placed to about 11'-12' above the encasement to about the dam centerline.

Embankment fill slopes down to the filter diaphragm from about the dam centerline.

PHOTOGRAPHS

Excavating the fill to the fabric covering the previously placed sand, removing the fabric, and cleaning the top of the sand.

Moisture conditioning the new sand in the delivery truck.

PHOTOGRAPHS

Moisture conditioning the previously-placed sand prior to placing new sand.

New sand was placed in 16" lifts. 325D excavator bucket was used to gently pack the lift.

COLORADO
Division of Water Resources
Department of Natural Resources

CONSTRUCTION INSPECTION REPORT

PROJECT INFORMATION			
Dam Name:	West #1	Inspector:	Garrett Jackson
DAMID:	400538	Date:	8/18/2015
C-#:	C-0545B	Time on Site:	10:20-11:30
Dam Owner:	West Reservoir and Ditch Co.	Contact:	Nick Hughes (
Engineer:	RJH	Contact:	Doug Neighbors (303.225.4611)
Contractor:	Rundle Construction Inc. (RCI)	Contact:	Eric Edwards (970.835.3022)
Approved Plans & Specifications On-site? ☐ Yes ☑ No		Engineer Following Const. Obs. Plan? ☐ Yes ☐ No	

INSPECTION PARTICIPANTS	
Inspection Participants:	Nick Hughes, Eric Edwards (RCI), Mike Abbott (RCI), Jason Ward, Derek Johnson (CWCB), Garrett Jackson

CONDITIONS	
Reservoir:	Drained
Weather:	Clear, warm, breezy
Equipment:	Excavator, haul trucks

CONSTRUCTION STATUS	
Work Completed to Date:	
Work in Progress:	Contractor has begun excavating into dam for Phase I removal of existing outlet works.
Work Planned and est. Timeframe:	Demolition/removal of outlet conduit planned for next week. Plans for Phase II construction of new outlet works have not been approved yet.

OBSERVATIONS AND DISCUSSION	
Purpose of Inspection:	
Items Inspected:	Excavation into dam crest.
Items not in compliance with approved plans/specs:	N/A
Problems/Concerns:	
Change Orders:	
Minor Changes:	
Issues Discussed:	1. Contractor has questions about placement of concrete encasement on the new conduit. Excavating a vertical trench into fill and casting the encasement against the trench walls is discouraged. Erik will discuss with RJH. 2. Contractor proposed replacing the baffled outlet discharge structure shown on the plans with a riprap-lined stilling basin. Eric to discuss with RJH. 3. Owner expressed a desire to be able to drain the dead pool. Nick will discuss with RJH. 4. Owner wants to investigate using a local geotech firm for QA/QC during fill placement. Nick to discuss with RJH.

OBSERVATIONS AND DISCUSSION	
Resolution of Deficiencies:	
Action Items:	Nick to arrange a conference call next week with RJH, RCI, and SEO to discuss status of the construction plans. If significant changes to the existing plans are envisioned, we will suspend our review until we get the revised plans.
Recommendations:	
Conclusions:	
Next Inspection:	Observe bottom of outlet excavation through the dam.

COLORADO
Division of Water Resources
Department of Natural Resources

CONSTRUCTION INSPECTION REPORT

PROJECT INFORMATION			
Dam Name:	West #1	Inspector:	Garrett Jackson
DAMID:	400538	Date:	9/2/2015
C-#:	C-0545B	Time on Site:	10:00-13:00
Dam Owner:	West Reservoir and Ditch Co.	Contact:	Nick Hughes ( )
Engineer:	RJH	Contact:	Doug Neighbors (303.225.4611)
Contractor:	Rundle Construction Inc. (RCI)	Contact:	Eric Edwards (970.835.3022)
Approved Plans & Specifications On-site? ☐ Yes ☑ No		Engineer Following Const. Obs. Plan? ☐ Yes ☐ No	

INSPECTION PARTICIPANTS	
Inspection Participants:	Nick Hughes, Eric Edwards (RCI), Doug Neighbors (RJH), Garrett Jackson

CONDITIONS	
Reservoir:	Drained
Weather:	Clear, warm, breezy
Equipment:	Excavator, dozer, haul trucks

CONSTRUCTION STATUS	
Work Completed to Date:	Dam is fully breached, old outlet works has been demolished and removed.
Work in Progress:	Contractor is opening borrow area and collecting riprap material.
Work Planned and est. Timeframe:	1. Contractor will complete the outlet conduit excavation to grade by the middle of next week. 2. HDPE conduit will be ordered today. 3. Contractor will work with RJH and material supplier to develop an acceptable riprap bedding gradation.

OBSERVATIONS AND DISCUSSION	
Purpose of Inspection:	Observe outlet works excavation and foundation conditions.
Items Inspected:	1. Excavation and breach of dam is complete. Excavated material has been stockpiled in two piles; one pile for light brown sandy clayey material probably acceptable for dam fill, and one pile for wet dark brown/grey with organics material probably not acceptable for fill. 2. Contractor excavated 3 potholes along the outlet conduit alignment; one outside the downstream toe of the dam and 2 within the dam footprint. • Downstream pothole exposed native reddish-brown gravelly clay about 2'-3' below the surface. This will be the design elevation of the downstream end of the outlet. • Middle pothole encountered a suitable foundation of fine blue-grey sand about 3' below the surface. • Upstream pothole encountered suitable foundation material of fine blue-grey and yellow sand about 3' below the surface. The contractor will use the foundation elevations of the upstream and downstream potholes to establish the design grade and elevation of the outlet conduit excavation. Doug collected samples of the foundation materials from each pothole for lab testing. 3. The lower half of the dam breach excavation exposed dark brown low-plasticity material. The

OBSERVATIONS AND DISCUSSION	
	wet material smells somewhat swampy, indicating the presence of organics. This material has been stockpiled separately from the sandy clay excavated in the upper portion of the breach. Doug collected samples from both stockpiles for lab testing to evaluate the acceptability of the materials as embankment fill. 4. The borrow area test pit exposed light brown and dark brown sandy clay with varying amounts of sand. Lab tests will also be performed on this material.
Items not in compliance with approved plans/specs:	N/A
Problems/Concerns:	--
Change Orders:	--
Minor Changes:	--
Issues Discussed:	1. The owner and contractor have chosen to continue working, even though the plans and specs for the outlet replacement (Phase II) have not been approved. Both Nick and Eric agreed that they are proceeding at their own risk, and that no fill or concrete can be placed until the plans and specs have been approved. Doug has committed to having the needed construction documents submitted for review next week. 2. Nick and Doug will select a geotech testing firm to confirm the suitability of the proposed fill materials for the project. The test results will determine whether the final plans and specs can be accepted. 3. Nick and Doug will also select a local geotech firm to provide field observation of the construction, and include the information in the Construction Observation Plan to be submitted next week. 4. I advised Nick that approval to store water in the completed reservoir will not be issued without an updated EAP on file. 5. Nick agreed that, if the project cannot be completed before winter sets in, he will leave the outlet gate off the conduit to pass all inflow. The project can then be completed next year.
Resolution of Deficiencies:	--
Action Items:	1. Select a local testing firm for lab work and field observations. Include the qualifications in the COP. 2. Submit the plans and specs as PDFs for review next week. After resolution of any issues, the final plans and specs can be submitted for approval. Doug Neighbors, Bill McCormick, and I will all be out of town the week of September 14.
Recommendations:	--
Conclusions:	--
Next Inspection:	Observe bottom of final outlet excavation through the dam.

PHOTOGRAPHS

Looking across the breach towards the left abutment.
Dark brown soil in lower half of the excavation is wet and has unknown amount of organic content. This excavated material has been stockpiled separately upstream of the dam.

The lighter brown material from the upper half of the excavation is a sandy clay soil, stockpiled close to the left end of the dam.

Looking across the excavation toward the left side. What appears to be the downstream slope of the old dam can be seen in the cut.

PHOTOGRAPHS

Looking from the dam breach to the borrow area upstream of the dam.

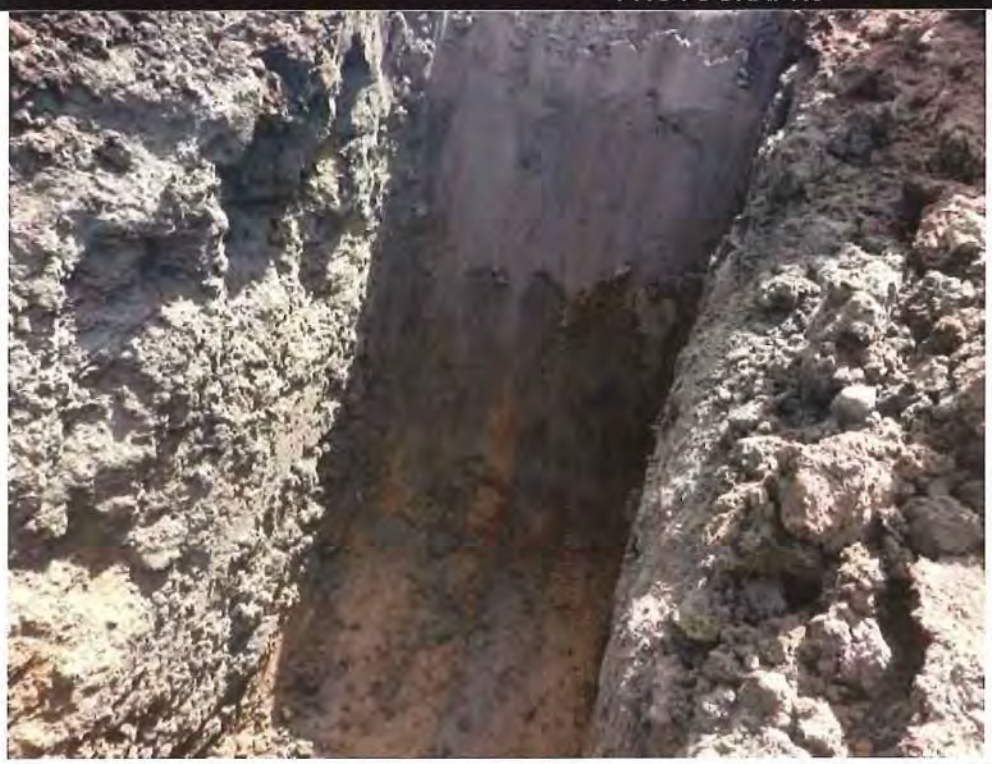
Looking from the borrow area toward the dam breach.

PHOTOGRAPHS

First test pit was excavated downstream of the dam in an undisturbed area. Pit exposed a layer of reddish brown topsoil with organics, underlain by a layer of grey/green silt and sand (old shale?), underlain by orange/brown gravelly clay.

Second pit was excavated along the outlet conduit alignment in the downstream half of the dam. Pit exposed saturated soft brown clay underlain by fine blue-grey sand.

PHOTOGRAPHS



Third pit was excavated along the outlet alignment near the upstream toe. Pit exposed soft saturated blue-grey clay underlain by fine yellow and blue-grey sand.

Borrow area test pit exposed gravelly reddish-brown and brown sandy clay.

COLORADO
Division of Water Resources
Department of Natural Resources

CONSTRUCTION INSPECTION REPORT

PROJECT INFORMATION			
Dam Name:	West #1	Inspector:	Garrett Jackson
DAMID:	400538	Date:	9/10/2015
C-#:	C-0545B	Time on Site:	10:15-11:15
Dam Owner:	West Reservoir and Ditch Co.	Contact:	Nick Hughes ( )
Engineer:	RJH	Contact:	Doug Neighbors (303.225.4611)
Contractor:	Rundle Construction Inc. (RCI)	Contact:	Eric Edwards (970.835.3022)
Approved Plans & Specifications On-site? ☐ Yes ☑ No		Engineer Following Const. Obs. Plan? ☐ Yes ☐ No	

INSPECTION PARTICIPANTS	
Inspection Participants:	Nick Hughes, Lance Rundle (RCI), Doug Neighbors (RJH), Garrett Jackson

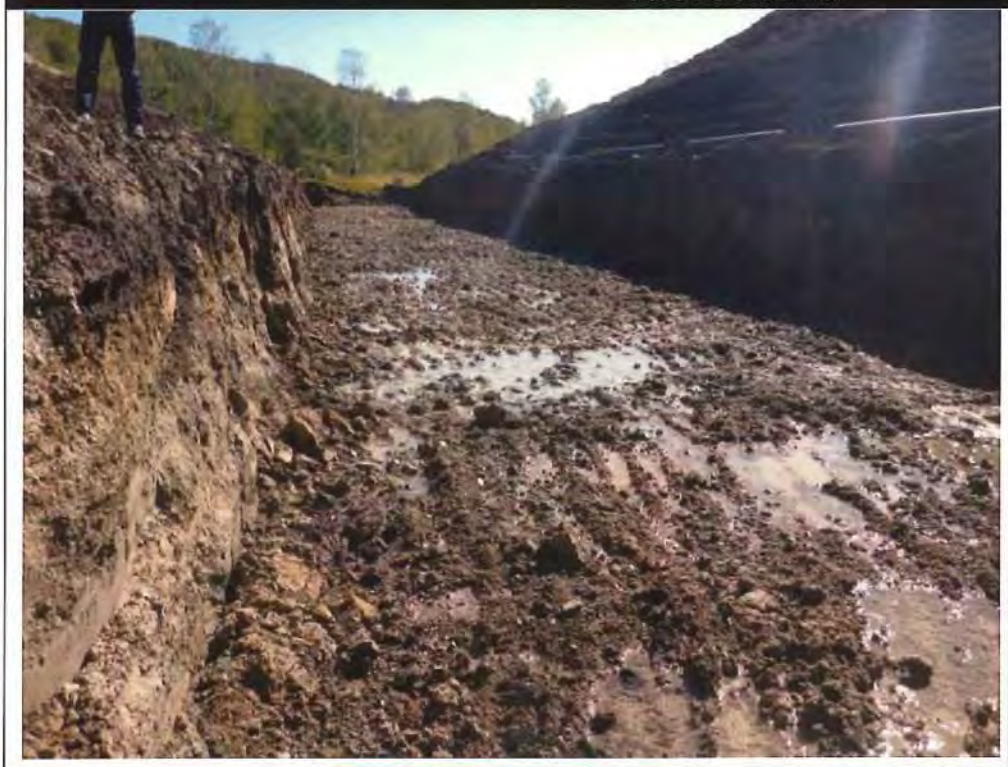
CONDITIONS	
Reservoir:	Drained
Weather:	Clear, warm, breezy
Equipment:	Excavator, dozer, haul trucks

CONSTRUCTION STATUS	
Work Completed to Date:	Dam breach has been excavated to grade for construction of new outlet works.
Work in Progress:	Contractor is processing borrow and riprap.
Work Planned and est. Timeframe:	1. Breach excavation to be dewatered and shaped for placement of pipe and encasement forms next week. 2. Excavation and forming for outlet works terminal structures to begin next week.

OBSERVATIONS AND DISCUSSION	
Purpose of Inspection:	Observe outlet works excavation and foundation conditions.
Items Inspected:	1. Bottom of breach has been extended >4' into the native foundation material to expose a suitably firm subgrade for the conduit encasement. Excavation is very wet with standing water due to several springs and recent rains.
Items not in compliance with approved plans/specs:	--
Problems/Concerns:	Contractor and owner are working at their own risk without approved plans and specifications.
Change Orders:	--
Minor Changes:	--
Issues Discussed:	1. Outlet conduit excavation must be dewatered and proof-rolled to verify the foundation, but the exposed subgrade appears sound. Contractor will drain the excavation and prepare it for placing the pipe and the encasement forms next week. No fill or concrete may be placed before the plans and specifications have been approved. 2. Doug Neighbors and I will both be out of town next week (week of 9/14). The contractor and owner have chosen to proceed with the construction, knowing the plans and specs will not be

OBSERVATIONS AND DISCUSSION	
	approved before the week of 9/21/15. 3. Reviewed the marked-up review copies of the draft plans with Doug Neighbors. Most of the comments are easily addressed. Doug will submit an itemized letter stating how RJH dealt with all the comments. He will also submit the revised drawings and specs as PDFs for final review.
Resolution of Deficiencies:	--
Action Items:	--
Recommendations:	--
Conclusions:	--
Next Inspection:	To observe the outlet conduit, encasement forms, and reinforcing steel in place prior to placement of encasement concrete.

PHOTOGRAPHS



Outlet excavation looking from the upstream end. Water appears to be seeping into the excavation mainly from the sides of the cut. Contractor will cut small drain trenches at each side of the excavation and drain the water out the downstream end.

Outlet excavation looking from the downstream end. The subgrade material changes color as was indicated in last week's test pits. Probing the bottom indicates the subgrade is firm and competent for the entire length of the excavation.

Note the layer of organic topsoil around the excavation at the top of the cut.

COLORADO
Division of Water Resources
Department of Natural Resources

CONSTRUCTION INSPECTION REPORT

PROJECT INFORMATION			
Dam Name:	West #1	Inspector:	Garrett Jackson
DAMID:	400538	Date:	9/28/2016
C-#:	C-0545B	Time on Site:	09:00-11:00
Dam Owner:	West Reservoir and Ditch Co.	Contact:	Nick Hughes (970.201.1476)
Engineer:	RJH	Contact:	Doug Neighbors (303.225.4611)
Contractor:	Rundle Construction Inc. (RCI)	Contact:	Eric Edwards (970.835.3022)
Approved Plans & Specifications On-site? ☑ Yes ☐ No		Engineer Following Const. Obs. Plan? ☑ Yes ☐ No	

INSPECTION PARTICIPANTS	
Inspection Participants:	Garrett Jackson, Jason Ward (DWR), Derek Johnson (CWCB) Nick Hughes (owner) Doug Neighbors (RJH) Lance Rundle, Josh (RCI)

CONDITIONS	
Reservoir:	Drained
Weather:	Clear, cool.
Equipment:	None

CONSTRUCTION STATUS	
Work Completed to Date:	Project has been completed.
Work in Progress:	--
Work Planned and est. Timeframe:	--

OBSERVATIONS AND DISCUSSION	
Purpose of Inspection:	Final construction inspection.
Items Inspected:	1. Dam crest has been surfaced with a thick layer of loose gravel. The gravel is becoming rutted, but will likely become more stable as traffic mashes the rocks into the soil. Owner understands that maintenance will be needed to restore drainage to the upstream slope. 2. Entire upstream slope has been covered with riprap on gravel bedding. Coverage is generally good and uniform, with only a few small areas of exposed bedding near the overbuilt section at the outlet. 3. Trash rack is aluminum, per approved field change. Rack appears stout and serviceable. 4. Outlet slide gate operates smoothly. Gate closes on the right side (looking downstream) just slightly ahead of the left side, but gate appears to seal adequately against the rubber pad. 5. Gate operator on the dam crest is anchored to a concrete block. Design is somewhat unconventional, in that the thrust resistance for opening and closing the gate is not provided by the block, but by friction on the buried gate stem guide. If the stem guide should loosen up in the slope, the operator wheel can be easily mounted on the concrete block to provide the needed resistance. 6. The new outlet conduit discharges through a concrete headwall at the downstream toe of the

OBSERVATIONS AND DISCUSSION	
	repaired embankment breach section. A new riprap-lined discharge basin has been constructed to contain the outlet discharge. 7. The seepage diaphragm drain also discharges through the outlet works headwall. Water is seeping under the diaphragm drain pipe through the concrete wall. The seepage appears to be water collected in the drain pipe trench behind the wall. The drain pipe was bedded in waste (contaminated) granular material between the diaphragm and the headwall, and it appears that water is being impounded in the trench between the diaphragm and the wall. 8. The exposed downstream slope on the embankment breach section appears generally uniform and even. The slope has not been revegetated yet.
Items not in compliance with approved plans/specs:	--
Problems/Concerns:	1. The granular bedding on the diaphragm drain pipe will likely always carry water to the headwall, and the concrete headwall will be subject to freeze-thaw damage. Recommend drilling a weephole through the headwall under the drain pipe to prevent water from standing in the trench behind the wall. 2. The left toe drain discharge is buried in the left side of the riprapped outlet discharge basin and must be daylighted through the riprap for monitoring seepage.
Change Orders:	--
Minor Changes:	--
Issues Discussed:	See above
Resolution of Deficiencies:	See above
Action Items:	1. Left toe drain must be daylighted to the outlet basin for measurement of seepage. 2. Engineer will submit as-constructed drawings, final completion/certification report, first fill and monitoring plan, and EAP. 3. Upon receipt and approval of the final documentation, SEO will remove the storage restriction and permit reservoir to be filled per the first fill and monitoring plan.
Recommendations:	--
Conclusions:	The construction appears to have been satisfactorily completed.
Next Inspection:	NA

PHOTOGRAPHS

Dam crest has been surfaced with a thick layer of loose gravel, some rutting is occurring.

Upstream slope with new riprap and bedding. Large rocks have been lined up along the bottom of the slope to prevent riprap movement downslope.

PHOTOGRAPHS

Upstream slope is slightly overbuilt at the outlet to cover the gate stem.

Some local areas of exposed riprap bedding near the outlet.

PHOTOGRAPHS

Aluminum trash rack on outlet gate.

Right corner (looking downstream) of gate closes barely sooner than left side, gate appears to seal adequately.

PHOTOGRAPHS

Outlet gate operator on dam crest with air vent and oil fill fitting.

Reaction force for opening and closing gate is provided by the buried gate stem guide, not the concrete block.

Plates bolted to concrete block are for alignment of stem guide, not thrust resistance.

PHOTOGRAPHS

Outlet headwall at downstream toe of breached section.

Seepage through headwall under diaphragm drain is from water in the granular bedding for the drain pipe.

PHOTOGRAPHS

Downstream slope of dam in repaired breach area.

7/27/16 construction photo.

Filter diaphragm

Diaphragm drain pipe

Concrete-encased outlet conduit

Filter sand that had been contaminated with other materials was used to bed the diaphragm drain pipe between the diaphragm and the headwall.

COLORADO
Division of Water Resources
Department of Natural Resources

CONSTRUCTION INSPECTION REPORT

PROJECT INFORMATION			
Dam Name:	West #1	Inspector:	Garrett Jackson
DAMID:	400538	Date:	9/30/2015
C-#:	C-0545B	Time on Site:	10:00-12:30
Dam Owner:	West Reservoir and Ditch Co.	Contact:	Nick Hughes (970.201.1476)
Engineer:	RJH	Contact:	Doug Neighbors (303.225.4611)
Contractor:	Rundle Construction Inc. (RCI)	Contact:	Eric Edwards (970.835.3022)
Approved Plans & Specifications On-site? ☐ Yes ☑ No		Engineer Following Const. Obs. Plan? ☐ Yes ☐ No	

INSPECTION PARTICIPANTS	
Inspection Participants:	Garrett Jackson, Jason Ward, Paul Schmucker, Steve Tuck (DWR) Nick Hughes (owner), Doug Neighbors (RJH), Grant Jones (DOWL), Eric Edwards (RCI)

CONDITIONS	
Reservoir:	Drained
Weather:	Clear, warm, breezy
Equipment:	

CONSTRUCTION STATUS	
Work Completed to Date:	Dam breached, outlet foundation exposed, new HDPE outlet conduit fused and lying in excavation.
Work in Progress:	Contractor is gathering riprap from borrow areas.
Work Planned and est. Timeframe:	1. Conduit to be positioned correctly for encasement, rebar cages and encasement forms to be set next week. 2. Contractor to begin construction of pre-cast intake structure in the next couple of weeks.

OBSERVATIONS AND DISCUSSION	
Purpose of Inspection:	Observe outlet encasement rebar and forms. This work has not started yet, so we observed the excavation subgrade, discussed the project status and plan for completion, and held the project pre-construction meeting.
Items Inspected:	1. Exposed foundation excavation and outlet encasement subgrade is wet with standing water in several places from foundation seepage. 2. Breach side slopes are standing, have been benched to prevent erosion. Observed no evidence of instability.
Items not in compliance with approved plans/specs:	Phase I (dam breach and demolition of old outlet works) is complete, no plans and specs required. Phase II (construction of new outlet works and repair of embankment breach) final plans and specs have been submitted for review, approval expected by Monday 10/5/15.
Problems/Concerns:	Seepage in the foundation excavation is a construction concern. RCI is making a plan to drain the excavation so they can place encasement concrete and embankment fill in the dry.
Change Orders:	--
Minor Changes:	--
Issues Discussed:	1. Reviewed project Construction Coordination Memo for pre-construction meeting. Discussion was mostly a repeat of the project communications guidelines that have been followed during the Phase I work.

OBSERVATIONS AND DISCUSSION	
	2. RJH submitted the final Construction Observation Plan. DOWL will perform QA/QC testing and on-site inspections. RJH will inspect critical work like construction of the sand diaphragm filter. 3. RJH will prepare and submit the diversion plan. 4. The upstream end of the new outlet conduit has been approximately positioned, but the final location still needs to be set with a survey to ensure proper alignment of the gate and the gate stem on the slope. 5. The sides of the breach excavation are laid back at 2:1 and benched to prevent erosion. New fill placed to repair the breach must be keyed into undisturbed soil by further benching each lift into the cut slope. Contractor will need to take particular care to ensure no seepage paths are created through the dam along the contact between the existing and new fill. 6. Construction of the filter diaphragm will need to be done in stages around the outlet encasement. RCI will coordinate with RJH to develop an acceptable procedure for construction and documentation of the work. 7. Key points need to be surveyed before they are covered by subsequent construction, including the encasement subgrade elevation, the coordinates of the outlet intake structure and downstream headwall, invert elevations on the encased outlet conduit, and reference coordinates of the filter diaphragm. Other as-constructed information can be measured from these key points.
Resolution of Deficiencies:	--
Action Items:	1. RJH will submit the diversion plan. 2. SEO will review final plans and specs, expedite approval after resolution of comments with RJH.
Recommendations:	--
Conclusions:	--
Next Inspection:	Observe outlet encasement rebar and forms.

PHOTOGRAPHS

New HDPE outlet conduit has been laid in the excavation, but will need to be repositioned so the slide gate in the intake structure and the gate stem on the dam slope will be properly aligned.

Seepage into the foundation excavation will need to be controlled to permit construction in the dry.

PHOTOGRAPHS

The breach sideslopes have been laid back and benched for stability and to prevent erosion. New embankment fill to repair the breach must be placed with care to key the new fill into undisturbed existing embankment fill to prevent seepage paths along the contact between the new and old materials.

APPENDIX C

DOWL REPORT

DOWL
970-249-6828 ■ 800-865-9847 (fax) ■ 222 South Park ■ Montrose, Colorado 81401 ■ www.dowl.com
Alaska ■ Arizona ■ Colorado ■ Montana ■ North Dakota ■ Oregon ■ Washington ■ Wyoming

September 20, 2016

Nick Hughes
West Reservoir and Ditch Company
708 1250 Road
Delta, Colorado, 81416

Transmitted via email: nihughes@hughes.net

Re: Construction Materials Testing and Inspection
West Reservoir No.1 Outlet Works Rehabilitation, Delta County Dam ID#400538
Project 7141.74413.01, Final Report

Dear Mr. Hughes,

In accordance with your request, and as scheduled by Rundle Construction project superintendent, Jake Dickerson, DOWL provided an engineering technician to perform construction materials testing at the referenced site. The attached data is for the period from October 5, 2015 through September 14, 2016. Services provided over this period included: the inspection of reinforcing steel for inlet box structure, bulkhead and HDPE pipe encasement, sampling and testing of fresh concrete properties, lab compressive strength testing of concrete cylinders, and field moisture-density testing of dam embankment construction.

Embankment fill placed and compacted on October 5th and 6th was removed to on-site stockpile and reworked, therefore moisture density test numbers 1 – 6 are no longer valid. Material placed during embankment construction that exceeded optimum moisture contents was accepted by Doug Neighbors PE with RJH Consulting where noted on Daily Compaction Reports.

Requested test results have met or exceeded the project requirements provided to DOWL or were otherwise accepted by on site representatives. Refer to attachments for further detail. Thank you for having DOWL perform this work for you.

Should you require additional information or have any questions, please contact us at 970-249-6828.

Sincerely,

Jeramy Harshman
Laboratory Manager

Reviewed by:

Wayne Pandorf PE
Sr. Geotechnical Engineer

Attachments: Sieve Analysis and Atterberg Limits, Sample #1, #2 and #4
Standard Proctor ASTM D698, Sample #1, #2 and #3
Field Observation Reports, Nos. 1 through 36
Field Concrete Test results, dated May 5, 2016 through August 17, 2016
Moisture-Density Test results, Nos. 1 through 112
Concrete Compressive Strength Test Results, Nos. 1 through 7

CC: Doug Neighbors

DOWL
Consulting Engineers
222 S. Park Ave. Montrose, Colorado 81401
(970) 249-6828 Ph. (970) 249-0945 Fax
www.dowl.com

FIELD OBSERVATION REPORT

DATE 10/05/15

	S	M	T	W	TH	F	S
DAY		X					

Project Name West Reservoir #1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Eric Edwards

WEATHER	Bright Sun	Clear	Overcast	Rain	Snow
			X	X	X
TEMP	To 32	32-50	50-70	70-85	85 up
		X	X		
WIND	Still	Moderate	High	Report No.	
		X		1	
HUMIDITY	Dry	Moderate	Humid		
		X			

CONSTRUCTION ACTIVITIES:

On site as requested by Eric to perform moisture/density tests on initial embankment fill placement. Fill tested to provide access for outlet pipe placement and outlet works concrete forming and placement. Test results indicate conformance to project specifications. Refer to Daily Compaction Report (DCR) for test locations and results.

Reported test results to Eric on site.

Eric will call with time for testing tomorrow.

BY: Devin Gordon TITLE: Materials Testing Technician

Number of site visits today: 1

ARRIVAL TIME 2:30p DEPARTURE TIME 3:30p TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:

[ ] Field Concrete/Grout/Cement Test Results [X] Daily Compaction Report [ ] Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 10/06/15

	S	M	T	W	TH	F	S
DAY			X				

Project Name West Reservoir #1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Eric Edwards

WEATHER	Bright Sun	Clear	Overcast	Rain	Snow
			X		
TEMP	To 32	32-50	50-70	70-85	85 up
			X		
WIND	Still	Moderate	High	Report No.	
		X		2	
HUMIDITY	Dry	Moderate	Humid		
		X			

CONSTRUCTION ACTIVITIES:

On site as requested by Eric to perform moisture/density tests on initial embankment fill placement. Fill tested to provide access for outlet pipe placement and outlet works concrete forming and placement. Test results indicate conformance to project specifications. Refer to Daily Compaction Report (DCR) for test locations and results.

Reported test results to Eric on site.

Eric told me that there would be no further testing needed this week and will call when he knows when they will be ready for testing next week.

BY: Devin Gordon TITLE: Materials Testing Technician

Number of site visits today: 1

ARRIVAL TIME 1:30p DEPARTURE TIME 2:45p TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:

[ ] Field Concrete/Grout/Cement Test Results [X] Daily Compaction Report [ ] Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 05/19/16

DAY	S	M	T	W	TH	F	S
					X		

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER		X			
	To 32	32-50	50-70	70-85	85 up
TEMP			X		
	Still	Moderate	High	Report No.	
WIND	X			3	
	Dry	Moderate	Humid		
HUMIDITY	X				

CONSTRUCTION ACTIVITIES:

Made site visit to Rundle Construction to inspect rebar for inlet structure at Rundle shop. Rebar placed in general conformance to the drawings dated 9/15, submittal version 2, sec 6/05.

One #6 bar was missing at top of inlet structure around sluice gate. Called for seven #6 EQ spaced. Only six bars placed. Contractor will add one #6 bar below sluce gate per drawings.

BY: Jeramy Harshman TITLE: Engineering Technician

Number of site visits today: _____

ARRIVAL TIME 845a DEPARTURE TIME 930a TRAVEL 1.5 MILEAGE 54

Please refer to the following report(s) for additional data and test detail:

☐ Field Concrete/Grout/Cement Test Results ☐ Daily Compaction Report ☐ Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 05/26/16

DAY	S	M	T	W	TH	F	S
					X		

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER			X		
	To 32	32-50	50-70	70-85	85 up
TEMP				X	
	Still	Moderate	High	Report No.	
WIND	X			4	
	Dry	Moderate	Humid		
HUMIDITY		X			

CONSTRUCTION ACTIVITIES:

On-site at 11:00am to test concrete for the inlet structure being precast at the Rundle shop.

Tested for concrete temperature, slump, unit-weight and air-content. All tests are within project specifications. Molded five 4" x 8" cylinders and placed in cure box.

*Floor of forms have been cleaned. Seventh bar had been added as needed. Rebar for pick points has good clearance. No issues or concerns observed.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME 1100a DEPARTURE TIME 1230p TRAVEL 1.5 MILEAGE 68

Please refer to the following report(s) for additional data and test detail:

[X] Field Concrete/Grout/Cement Test Results [ ] Daily Compaction Report [ ] Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 05/27/16

DAY	S	M	T	W	TH	F	S
						X	

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER		X			
	To 32	32-50	50-70	70-85	85 up
TEMP			X		
	Still	Moderate	High	Report No.	
WIND		X		5	
	Dry	Moderate	Humid		
HUMIDITY		X			

CONSTRUCTION ACTIVITIES:

Picked up cylinders molded yesterday. Transported to lab and processed.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: _____

ARRIVAL TIME _____ DEPARTURE TIME _____ TRAVEL 1.5 MILEAGE 68

Please refer to the following report(s) for additional data and test detail:

[ ] Field Concrete/Grout/Cement Test Results [ ] Daily Compaction Report [X] Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 06/07/16

DAY	S	M	T	W	TH	F	S
			X				

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER		X	X		
	To 32	32-50	50-70	70-85	85 up
TEMP			X		
	Still	Moderate	High	Report No.	
WIND		X			
	Dry	Moderate	Humid	6	
HUMIDITY		X			

CONSTRUCTION ACTIVITIES:

On-site for moisture-density testing of subbase for outlet conduit.

Performed 2 tests. Material placed last year had been removed to the stockpile and reworked. Last years moisture-density values No. 1-6 are no longer valid.

Material was dumped then pushed out to a 10-12" lift, compacted with a CAT 815 sheepsfoot.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME 140p DEPARTURE TIME 300p TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:

[ ] Field Concrete/Grout/Cement Test Results [X] Daily Compaction Report [ ] Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 06/08/16

DAY	S	M	T	W	TH	F	S
				X			

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER		X	X		
	To 32	32-50	50-70	70-85	85 up
TEMP			X		
	Still	Moderate	High	Report No.	
WIND	X	X		7	
	Dry	Moderate	Humid		
HUMIDITY		X			

CONSTRUCTION ACTIVITIES:

On-site for moisture-density testing of subbase for outlet conduit.

Ten tests performed. Four locations had moisture out of specification, each on the first lift.

It appears that a very minor amount of blending with the subgrade may have been occurring.

Jake decided to move forward with placement.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME _____ DEPARTURE TIME _____ TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:

[ ] Field Concrete/Grout/Cement Test Results [X] Daily Compaction Report [ ] Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 06/16/16

DAY	S	M	T	W	TH	F	S
					X		

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER		X			
	To 32	32-50	50-70	70-85	85 up
TEMP			X		
	Still	Moderate	High	Report No.	
WIND		X		8	
	Dry	Moderate	Humid		
HUMIDITY		X			

CONSTRUCTION ACTIVITIES:

On-site at 10:00am, as requested by Lance, for inspection of rebar for the outlet conduit encasement.

As per detail G/04;
Four #6 horizontal - good cap - all 34-36"
All "square hoops" - good cap and tie - good spacing - good form clearance on portion observed - will double check form clearance on day of concrete placement.

Observed the presence of the hoop bands mentioned in Note 3, Sheet 7, weld area appeared to have been properly prepared.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME 1000a DEPARTURE TIME 1045a TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:
☐ Field Concrete/Grout/Cement Test Results ☐ Daily Compaction Report ☐ Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 06/22/16

DAY	S	M	T	W	TH	F	S
				X			

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

WEATHER	Bright Sun	Clear	Overcast	Rain	Snow
TEMP	To 32	32-50	50-70	70-85	85 up
WIND	Still	Moderate	High	Report No.	
HUMIDITY	Dry	Moderate	Humid	**9**	

CONSTRUCTION ACTIVITIES:

On-site at 7:00am for a 7:30am scheduled concrete placement of the outlet walls conduit.

As directed by Doug Neighbors, once the United QA tech was satisfied with the load, I sampled and tested each load for concrete temperature, slump, unit-weight and air-content.

On the second load, truck 6365, ticket 31028434, the water valve to the drum was accidently opened. When noticed it was closed. An undetermined amount of water was added. The batch was allowed to mix, then sampled and tested. Tests indicated the concrete was still within specifications. Molded four cylinders from this batch and placed in cure box.

Informed Doug and Lance of results of each batch on-site.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME 700a DEPARTURE TIME 1200p TRAVEL 2 MILEAGE 64

Please refer to the following report(s) for additional data and test detail:

[X] Field Concrete/Grout/Cement Test Results [ ] Daily Compaction Report [ ] Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 06/23/16

DAY	S	M	T	W	TH	F	S
					X		

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER		X	X		
	To 32	32-50	50-70	70-85	85 up
TEMP				X	
	Still	Moderate	High	Report No.	
WIND	X			10	
	Dry	Moderate	Humid		
HUMIDITY		X			

CONSTRUCTION ACTIVITIES:

Picked up cylinders molded yesterday. Transported to lab and processed.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME 100p DEPARTURE TIME 110p TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:

[ ] Field Concrete/Grout/Cement Test Results [ ] Daily Compaction Report [X] Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 06/28/16

DAY	S	M	T	W	TH	F	S
			X				

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER		X	X		
	To 32	32-50	50-70	70-85	85 up
TEMP			X		
	Still	Moderate	High	Report No.	
WIND	X			11	
	Dry	Moderate	Humid		
HUMIDITY		X			

CONSTRUCTION ACTIVITIES:

On-site for rebar inspection at footing for the headwall.

Bar placed in general conformance to the plans and specifications dated 10/1/15, Section 8/07.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME 1000a DEPARTURE TIME 1030a TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:

☐ Field Concrete/Grout/Cement Test Results ☐ Daily Compaction Report ☐ Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 06/29/16

DAY	S	M	T	W	TH	F	S
				X			

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER		X	X		
	To 32	32-50	50-70	70-85	85 up
TEMP			X		
	Still	Moderate	High	Report No.	
WIND	X			12	
	Dry	Moderate	Humid		
HUMIDITY		X			

CONSTRUCTION ACTIVITIES:

On-site as requested for a scheduled 7:30am concrete placement for the footing of the headwall and finish of conduit.

Truck arrived on-site at 6:44am. Sampled from the truck chute for preliminary acceptance. Tested slump and air-content. Air-content was 4.5. The United driver added 8 oz. of micro air AE-90 to the 4 yard load. Mixed as typical. Placement began at the headwall footing.

Obtained a fresh sample from the chute. Tested for concrete temperature, slump, unit-weight and air-content. Molded four cylinders and placed in cure box.

Notified Lance on-site of test results.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME 640a DEPARTURE TIME 810a TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:

[X] Field Concrete/Grout/Cement Test Results [ ] Daily Compaction Report [ ] Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 06/30/16

DAY	S	M	T	W	TH	F	S
					X		

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER			X	X	
	To 32	32-50	50-70	70-85	85 up
TEMP			X		
	Still	Moderate	High	Report No.	
WIND		X		13	
	Dry	Moderate	Humid		
HUMIDITY			X		

CONSTRUCTION ACTIVITIES:

On-site to pick up cylinders molded yesterday. Transported to lab and processed.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME 1000a DEPARTURE TIME 1010a TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:

[ ] Field Concrete/Grout/Cement Test Results [ ] Daily Compaction Report [X] Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 07/08/16

DAY	S	M	T	W	TH	F	S
						X	

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

WEATHER	Bright Sun	Clear	Overcast	Rain	Snow
		X			
TEMP	To 32	32-50	50-70	70-85	85 up
			X		
WIND	Still	Moderate	High	Report No.	
		X		14	
HUMIDITY	Dry	Moderate	Humid		
		X			

CONSTRUCTION ACTIVITIES:

On-site to test fresh concrete for outlet headwall. 2:00pm scheduled pour.

Upon arrival, concrete already on-site. Once United QC had adjusted the batch, I sampled from the truck chute as directed by Doug. Tested for slump, concrete temperature, unit-weight and air-content.

I notified Doug and Jake that slump was 2.5". They chose to accept this and proceed with placement. Molded four cylinders and placed in cure box.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME 130p DEPARTURE TIME 300p TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:

[X] Field Concrete/Grout/Cement Test Results [ ] Daily Compaction Report [ ] Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 07/09/16

DAY	S	M	T	W	TH	F	S
							X

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

WEATHER	Bright Sun	Clear	Overcast	Rain	Snow
		X			
TEMP	To 32	32-50	50-70	70-85	85 up
			X		
WIND	Still	Moderate	High	Report No.	
		X		15	
HUMIDITY	Dry	Moderate	Humid		
		X			

CONSTRUCTION ACTIVITIES:

On-site to pick up cylinders molded yesterday. Transported to lab and processed.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME 300p DEPARTURE TIME 310p TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:

[ ] Field Concrete/Grout/Cement Test Results [ ] Daily Compaction Report [X] Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 07/12/16

DAY	S	M	T	W	TH	F	S
			X				

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER		X			
	To 32	32-50	50-70	70-85	85 up
TEMP				X	
	Still	Moderate	High	Report No.	
WIND	X			16	
	Dry	Moderate	Humid		
HUMIDITY	X				

CONSTRUCTION ACTIVITIES:

Arrived on-site at 10:00am, as scheduled by Lance Rundle, to perform rebar inspection and to sample and test fresh concrete.

I observed rebar in place for conduit encasement around HDPE pipe to be placed in general conformance to the plans and specifications. Rebar inspected from approximately STA 3+10 to the headwall.

Concrete arrived at 11:06am. Took sample after United Companies QC tested air-content. Tested fresh concrete properties for slump, air-content and unit-weight. Molded one set of four concrete cylinders for compressive strength testing. Sample tested indicates conformance to project specifications. Compressive strength conformance pending curing schedule.

Notified Jake Dickerson on-site of test results.

BY: Jeramy Harshamn TITLE: Engineering Technician

Number of site visits today: _____

ARRIVAL TIME 1000a DEPARTURE TIME 1200p TRAVEL _____ MILEAGE _____

Please refer to the following report(s) for additional data and test detail:

[X] Field Concrete/Grout/Cement Test Results [ ] Daily Compaction Report [ ] Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 07/13/16

DAY	S	M	T	W	TH	F	S
				X			

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

WEATHER	Bright Sun	Clear	Overcast	Rain	Snow
		X			
TEMP	To 32	32-50	50-70	70-85	85 up
				X	
WIND	Still	Moderate	High	Report No.	
	X			17	
HUMIDITY	Dry	Moderate	Humid		
		X			

CONSTRUCTION ACTIVITIES:

On-site to pick up cylinders molded yesterday. Transported to lab and processed.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME 1100a DEPARTURE TIME 1115a TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:

[ ] Field Concrete/Grout/Cement Test Results [ ] Daily Compaction Report [X] Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 07/19/16

DAY	S	M	T	W	TH	F	S
			X				

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

WEATHER	Bright Sun	Clear	Overcast	Rain	Snow
			X		
TEMP	To 32	32-50	50-70	70-85	85 up
		X			
WIND	Still	Moderate	High	Report No.	
		X		18	
HUMIDITY	Dry	Moderate	Humid		
		X			

CONSTRUCTION ACTIVITIES:

On-site for moisture-density testing of backfill in the dam around the outlet works conduit then over.

Filling drain trench testing compaction. Moisture is high.

Doug is accepting high moistures.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME 915a DEPARTURE TIME 430p TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:

[ ] Field Concrete/Grout/Cement Test Results [X] Daily Compaction Report [ ] Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 07/20/16

DAY	S	M	T	W	TH	F	S

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

WEATHER	Bright Sun	Clear	Overcast	Rain	Snow
TEMP	To 32	32-50	50-70	70-85	85 up
WIND	Still	Moderate	High	Report No.	
				19	
HUMIDITY	Dry	Moderate	Humid		

CONSTRUCTION ACTIVITIES:

On-site for moisture-density testing.

Working both sides of conduit so as to not put pressure on the concrete.

Doug on-site.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: _____

ARRIVAL TIME _____ DEPARTURE TIME _____ TRAVEL _____ MILEAGE _____

Please refer to the following report(s) for additional data and test detail:

[ ] Field Concrete/Grout/Cement Test Results [X] Daily Compaction Report [ ] Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 07/21/16

DAY	S	M	T	W	TH	F	S
					X		

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER		X	X		
	To 32	32-50	50-70	70-85	85 up
TEMP				X	
	Still	Moderate	High	Report No.	
WIND		X		20	
	Dry	Moderate	Humid		
HUMIDITY		X			

CONSTRUCTION ACTIVITIES:

On-site for moisture-density testing of fill.

Typical day of fill and compaction.

Doug on-site.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: _____

ARRIVAL TIME _____ DEPARTURE TIME _____ TRAVEL _____ MILEAGE _____

Please refer to the following report(s) for additional data and test detail:

[ ] Field Concrete/Grout/Cement Test Results [X] Daily Compaction Report [ ] Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 07/25/16

DAY	S	M	T	W	TH	F	S
		X					

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER			X		
	To 32	32-50	50-70	70-85	85 up
TEMP			X	X	
	Still	Moderate	High	Report No.	
WIND		X		21	
	Dry	Moderate	Humid		
HUMIDITY		X			

CONSTRUCTION ACTIVITIES:

On-site to perform moisture-density testing on new fill placed in the dam. Minimum testing at one test per one foot lift placed daily.

Doug on-site observing work on sand collar.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME 1200p DEPARTURE TIME 300p TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:

☐ Field Concrete/Grout/Cement Test Results ☐ Daily Compaction Report ☐ Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 07/26/16

DAY	S	M	T	W	TH	F	S
			X				

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER			X		
	To 32	32-50	50-70	70-85	85 up
TEMP				X	
	Still	Moderate	High	Report No.	
WIND		X		22	
	Dry	Moderate	Humid		
HUMIDITY		X			

CONSTRUCTION ACTIVITIES:

On-site to perform moisture-density testing on new fill placed in the dam. Minimum testing at two tests per one foot lift placed daily.

Doug on-site observing sand collar.

Nearly filled to top of conduit at end of day. Should complete tomorrow.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME 1030a DEPARTURE TIME 230p TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:

☐ Field Concrete/Grout/Cement Test Results ☐ Daily Compaction Report ☐ Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 07/27/16

	S	M	T	W	TH	F	S
DAY				X			

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER		X			
	To 32	32-50	50-70	70-85	85 up
TEMP			X	X	
	Still	Moderate	High	Report No.	
WIND		X		23	
	Dry	Moderate	Humid		
HUMIDITY		X			

CONSTRUCTION ACTIVITIES:

On-site to perform moisture-density testing on new fill placed in the dam. Minimum test required at two tests per one foot lift placed daily.

Finished sand collar to level with top of conduit. Placed fabric cover over sand extending in all directions 1-2'. Placed fill over collar area and began to compact and fill normal fill.

Pictures of fabric and sand in file.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME _____ DEPARTURE TIME _____ TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:

☐ Field Concrete/Grout/Cement Test Results ☐ Daily Compaction Report ☐ Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 07/28/16

DAY	S	M	T	W	TH	F	S
					X		

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER		X			
	To 32	32-50	50-70	70-85	85 up
TEMP					X
	Still	Moderate	High	Report No.	
WIND		X		24	
	Dry	Moderate	Humid		
HUMIDITY		X			

CONSTRUCTION ACTIVITIES:

On-site to perform moisture-density testing on new fill placed in the dam. Minimum tests required at two tests per one foot lift placed daily.

Rebar inspection fine and concrete. Pictures in file.

Concrete testing. Sampled from truck chute. Tested for slump, unit-weight and air-content. All tests within specifications. Molded five test cylinders and placed in cure box.

Standard practice to use a haul truck to wheel roll the surface at end of day to protect from rain, then scarify the next morning before placing next lift.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME 1000a DEPARTURE TIME 415p TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:

☐ Field Concrete/Grout/Cement Test Results ☐ Daily Compaction Report ☐ Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 07/29/16

DAY	S	M	T	W	TH	F	S
						X	

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER			X		
	To 32	32-50	50-70	70-85	85 up
TEMP			X		
	Still	Moderate	High	Report No.	
WIND		X		25	
	Dry	Moderate	Humid		
HUMIDITY		X			

CONSTRUCTION ACTIVITIES:

Picked up cylinders, transported to lab and processed.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME 1100a DEPARTURE TIME 1115a TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:

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FIELD OBSERVATION REPORT

DATE 08/01/16

DAY	S	M	T	W	TH	F	S
		X					

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

WEATHER	Bright Sun	Clear	Overcast	Rain	Snow
		X	X		
TEMP	To 32	32-50	50-70	70-85	85 up
				X	
WIND	Still	Moderate	High	Report No.	
		X		26	
HUMIDITY	Dry	Moderate	Humid		
		X			

CONSTRUCTION ACTIVITIES:

On-site to perform moisture-density testing on new fill placed in the dam. Minimum testing required at two tests per one foot lifts placed daily.

Resumed sand collar installation. Excavated to previous sand level and removed fabric cover placed on 7/27/16. Placed sand for sand coller up through compacted fill, cleaning and removing contamination as they went. Compaction method of sand same as on lower portion.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME 1030a DEPARTURE TIME 430p TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:

☐ Field Concrete/Grout/Cement Test Results ☐ Daily Compaction Report ☐ Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 08/02/16

DAY	S	M	T	W	TH	F	S
			X				

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

WEATHER	Bright Sun	Clear	Overcast	Rain	Snow
		X	X		
TEMP	To 32	32-50	50-70	70-85	85 up
				X	
WIND	Still	Moderate	High	Report No.	
		X		27	
HUMIDITY	Dry	Moderate	Humid		
		X			

CONSTRUCTION ACTIVITIES:

On-site to perform moisture-density testing on new fill placed in the dam. Minimum testing required at two tests per one foot lifts placed daily.

Main emphasis today was on finishing sand collar which did not get complete. Will take 2+/- loads tomorrow. Fill and compaction - no issues or concerns observed.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME 800a DEPARTURE TIME 400p TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:

[ ] Field Concrete/Grout/Cement Test Results [X] Daily Compaction Report [ ] Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 08/03/16

DAY	S	M	T	W	TH	F	S
				X			

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

WEATHER	Bright Sun	Clear	Overcast	Rain	Snow
		X	X		
TEMP	To 32	32-50	50-70	70-85	85 up
				X	
WIND	Still	Moderate	High	Report No.	
				28	
HUMIDITY	Dry	Moderate	Humid		

CONSTRUCTION ACTIVITIES:

On-site to perform moisture-density testing on new fill placed in the dam. Minimum testing required at two tests per one foot lifts placed daily.

Finished sand collar, fill and compaction. No issues, no concerns observed. Structural fill placed over top and compacted.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME 800a DEPARTURE TIME 430p TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:

[ ] Field Concrete/Grout/Cement Test Results [X] Daily Compaction Report [ ] Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 08/04/16

DAY	S	M	T	W	TH	F	S
					X		

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER				X	
	To 32	32-50	50-70	70-85	85 up
TEMP				X	
	Still	Moderate	High	Report No.	
WIND		X		29	
	Dry	Moderate	Humid		
HUMIDITY			X		

CONSTRUCTION ACTIVITIES:

On-site for moisture-density testing. Light rain becoming steady. They decided to stop fill placement. Wheel rolled the surface to help protect the work area from rain. No testing today.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME 1030a DEPARTURE TIME 1130a TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:

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FIELD OBSERVATION REPORT

DATE 08/08/16

DAY	S	M	T	W	TH	F	S
		X					

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

WEATHER	Bright Sun	Clear	Overcast	Rain	Snow
		X	X		
TEMP	To 32	32-50	50-70	70-85	85 up
				X	
WIND	Still	Moderate	High	Report No.	
		X			
HUMIDITY	Dry	Moderate	Humid	30	
		X			

CONSTRUCTION ACTIVITIES:

On-site to perform moisture-density testing on new fill palced in the dam. Minimum testing at two tests per one foot lifts placed daily.

The top muddy material had been skimmed off and pushed over the east side. Normal placement and compaction continued well.

One area recieved some wet materital. Low compaction. Ripped out. Blended with dryer material and re-compacted. Density test met specifications.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME 1030a DEPARTURE TIME 330p TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:

☐ Field Concrete/Grout/Cement Test Results ☐ Daily Compaction Report ☐ Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 08/09/16

DAY	S	M	T	W	TH	F	S
			X				

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

WEATHER	Bright Sun	Clear	Overcast	Rain	Snow
TEMP	To 32	32-50	50-70	70-85	85 up
WIND	Still	Moderate	High	Report No.	
HUMIDITY	Dry	Moderate	Humid	**31**	

CONSTRUCTION ACTIVITIES:

On-site for moisture-density testing.

Typical fill and compaction. No issues or concerns.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME 1030a DEPARTURE TIME 330p TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:

☐ Field Concrete/Grout/Cement Test Results ☐ Daily Compaction Report ☐ Compressive Strength Analysis

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FIELD OBSERVATION REPORT

DATE 08/10/16

DAY	S	M	T	W	TH	F	S
				X			

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER		X	X		
	To 32	32-50	50-70	70-85	85 up
TEMP			X	X	
	Still	Moderate	High	Report No.	
WIND		X		32	
	Dry	Moderate	Humid		
HUMIDITY		X			

CONSTRUCTION ACTIVITIES:

On-site for moisture-density testing.

Typical fill and compaction.

Some of the fill appeared and behaved like a blend of P.1 and P.3. Compaction looked good as far as 815 walking out well and minimal flex under haul trucks.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME 1145a DEPARTURE TIME 445p TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:

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FIELD OBSERVATION REPORT

DATE 08/11/16

DAY	S	M	T	W	TH	F	S
					X		

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER		X	X		
	To 32	32-50	50-70	70-85	85 up
TEMP			X	X	
	Still	Moderate	High	Report No.	
WIND		X		33	
	Dry	Moderate	Humid		
HUMIDITY		X			

CONSTRUCTION ACTIVITIES:

On-site for moisture-density testing.

Typical fill and compaction. No issues or concerns.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME 1100a DEPARTURE TIME 500p TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:

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970-249-6828

FIELD OBSERVATION REPORT

DATE 08/15/16

DAY	S	M	T	W	TH	F	S
		X					

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER		X			
	To 32	32-50	50-70	70-85	85 up
TEMP			X	X	
	Still	Moderate	High	Report No.	
WIND		X		34	
	Dry	Moderate	Humid		
HUMIDITY		X			

CONSTRUCTION ACTIVITIES:

On-site for moisture-density testing.

Typical day. No issues or concerns.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: 1

ARRIVAL TIME 1000a DEPARTURE TIME _____ TRAVEL 3 MILEAGE 104

Please refer to the following report(s) for additional data and test detail:

[ ] Field Concrete/Grout/Cement Test Results [X] Daily Compaction Report [ ] Compressive Strength Analysis

DOWL
www.dowl.com
222 South Park Avenue
Montrose, Colorado 81401
970-249-6828

FIELD OBSERVATION REPORT

DATE 08/16/16

DAY	S	M	T	W	TH	F	S
			X				

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER			X		
	To 32	32-50	50-70	70-85	85 up
TEMP			X		
	Still	Moderate	High	Report No.	
WIND		X		35	
	Dry	Moderate	Humid		
HUMIDITY		X			

CONSTRUCTION ACTIVITIES:

On-site for moisture-density testing.

Typical day. No issues or concerns.

Topped out with fill.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: _____

ARRIVAL TIME 1100a DEPARTURE TIME 200p TRAVEL _____ MILEAGE _____

Please refer to the following report(s) for additional data and test detail:

☐ Field Concrete/Grout/Cement Test Results ☐ Daily Compaction Report ☐ Compressive Strength Analysis

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222 South Park Avenue
Montrose, Colorado 81401
970-249-6828

FIELD OBSERVATION REPORT

DATE 08/16/16

DAY	S	M	T	W	TH	F	S
			X				

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

WEATHER	Bright Sun	Clear	Overcast	Rain	Snow
			X		
TEMP	To 32	32-50	50-70	70-85	85 up
			X		
WIND	Still	Moderate	High	Report No.	
		X		35	
HUMIDITY	Dry	Moderate	Humid		
		X			

CONSTRUCTION ACTIVITIES:

On-site at 6:30am to test fresh concrete for the hand wheel pedestal.

Sampled from chute. Tested for temperature, unit-weight, air-content and slump. All met spec. Molded four cylinders and placed in cure box.

Communicated test results to Jake.

BY: Devin Gordon TITLE: Engineering Technician

Number of site visits today: _____

ARRIVAL TIME 630a DEPARTURE TIME 800a TRAVEL 1.5 MILEAGE 65

Please refer to the following report(s) for additional data and test detail:

☐ Field Concrete/Grout/Cement Test Results ☐ Daily Compaction Report ☐ Compressive Strength Analysis

DOWL
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222 South Park Avenue
Montrose, Colorado 81401
970-249-6828

FIELD OBSERVATION REPORT

DATE 08/18/16

DAY	S	M	T	W	TH	F	S
					X		

Project Name West Reservoir No. 1 Outlet Works Rehab
Project Number 7141.74413.01

Client West Reservoir & Ditch Co.
Client Rep. Nick Hughes

Contractor Rundle Construction
Contractor Rep. Lance Rundle

WEATHER	Bright Sun	Clear	Overcast	Rain	Snow
			X		
TEMP	To 32	32-50	50-70	70-85	85 up
			X		
WIND	Still	Moderate	High	Report No.	
	X			36	
HUMIDITY	Dry	Moderate	Humid		
	X				

CONSTRUCTION ACTIVITIES:

Picked up 4 concrete cylinders molded on 8/17/16 at contractors shop. Delivered to Montrose laboratory, logged in and placed in cure bath for scheduled breaks.

BY: Bill Heckard TITLE: Engineering Technician

Number of site visits today: _____

ARRIVAL TIME 200p DEPARTURE TIME 230p TRAVEL 1 MILEAGE 70

Please refer to the following report(s) for additional data and test detail:

[ ] Field Concrete/Grout/Cement Test Results [ ] Daily Compaction Report [X] Compressive Strength Analysis

Project Name: West Reservoir No. 1 Outlet Works Rehab	DOWL Consulting Engineers 222 S. Park Ave. Montrose, Colorado 81401 (970) 249-6828 Ph. (970) 249-0945 Fax www.dowl.com	Client / On Site Rep: **West Reservoir & Ditch Co/ Nick Hughes**
		Contractor / Rep: **Rundle Construction/Eric Edwards**
Project Number: **7141.74413.01** **10/5/2015**		Technician: **Devin Gordon**

DAILY COMPACTION REPORT - NUCLEAR MOISTURE-DENSITY TESTING

TEST LOCATION			LAB PROCTOR VALUES				FIELD TESTING VALUES				
TEST NUMBER	LOCATION Dam Imbankment Fill	GRADE ELEVATION	OPTIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	From Proctor Fine Frac.	From Proctor Rock Corr.	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	PERCENT COMPACTION (%)	NOT WITHIN SPEC	COMMENTS
1	Sta 0+20 10' N of C/L (Outlet Pipe)	8740	101.7	18.5			100.3	21.5	98.7		
2	Sta 0+40 12' N of C/L	8739	101.7	18.5			102.7	21.3	100.9		
3	Sta 0+5018' N of C/L	8738	101.7	18.5			101.6	21.5	99.9		

MOISTURE / DENSITY SPECIFICATIONS

Specified Compaction Requirement:

90% [ ] 95% [ ]

Other: 98%

Specified Moisture Requirement:

+/- 2% [ ] Other: -1/+3 [X]

LABORATORY TESTING PROCEDURE:

ASTM	AASHTO
Standard D698 [X]	Standard T99 [ ]
Modified D1557 [ ]	Modified T180 [ ]

Proctor Lab Sample No.:

FIELD OBSERVATIONS

Weather Conditions

Day:	S	M	T	W	Th	F	S
		X					

Weather:	Sun	Clear	Overcast	Rain	Snow
			X	X	X

Temp (°F):	To 32	32-50	50-70	70-85	85 Up
		X	X		

Wind:	Still	Mod	High
		X	

Humidity:	Dry	Mod	Humid
		X	

Compaction Equipment Used:

Sheepsfoot: [X]

Smooth Drum Roller: [ ]

Vibratory: [ ]

Other (List Below): [ ]

CS 433

OBSERVATION / TESTING SCHEDULE

Full Time [ ] Part Time [X]

number of site visits per day: 1

Testing & Observation Requested By: Eric

Test Results reported on-site to: Eric

FIELD COMMENTS/NOTES:

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name: West Reservoir No. 1 Outlet Works Rehab		Client / On Site Rep: **West Reservoir & Ditch Co/ Nick Hughes**
		Contractor / Rep: **Rundle Construction/Eric Edwards**
Project Number: **7141.74413.01**	**10/6/2015**	Technician: **Devin Gordon**

DOWL
Consulting Engineers
222 S. Park Ave. Montrose, Colorado 81401
(970) 249-6828 Ph. (970) 249-0945 Fax
www.dowl.com

DAILY COMPACTION REPORT - NUCLEAR MOISTURE-DENSITY TESTING

TEST LOCATION			LAB PROCTOR VALUES				FIELD TESTING VALUES				
TEST NUMBER	LOCATION Dam Imbankment Fill	GRADE ELEVATION	OPTIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	From Proctor Fine Frac.	From Proctor Rock Corr.	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	PERCENT COMPACTION (%)	NOT WITHIN SPEC	COMMENTS
4	Sta 0+70 18' N of C/L	8737	101.7	18.5			101.6	21.4	99.9		
5	Sta 0+50 20' N of C/L	8739	101.7	18.5			100.4	21.2	98.7		
6	Sta 0+30 21' N of C/L	8740	101.7	18.5			100.9	20.9	99.2		

MOISTURE / DENSITY SPECIFICATIONS

Specified Compaction Requirement:

90% [ ] 95% [ ]

Other: 98%

Specified Moisture Requirement:

+/- 2% [ ] Other: -1/+3 [X]

LABORATORY TESTING PROCEDURE:

ASTM	AASHTO
[X]	[ ]
Standard D698 [X]	Standard T99 [ ]
Modified D1557 [ ]	Modified T180 [ ]

Proctor Lab Sample No.:

FIELD OBSERVATIONS

Weather Conditions

Day:	S	M	T	W	Th	F	S
			X				

Weather:	Sun	Clear	Overcast	Rain	Snow
			X		

Temp (°F):	To 32	32-50	50-70	70-85	85 Up
			X		

Wind:	Still		Mod		High
			X		

Humidity:	Dry		Mod		Humid
			X		

Compaction Equipment Used:

Sheepsfoot: [X]
Smooth Drum Roller: [ ]
Vibratory: [ ]
Other (List Below): [ ]

CS 433

OBSERVATION / TESTING SCHEDULE

Full Time [ ] Part Time [X]

number of site visits per day: 1

Testing & Observation Requested By: Eric

Test Results reported on-site to: Eric

FIELD COMMENTS/NOTES:

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name:		Client / On Site Rep:
West Reservoir No. 1 Outlet Works Rehab	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828	**West Reservoir $ Ditch Co. / Nick Hughes**
		Contractor / Rep: **Rundle Const. / Lance Rundle**
Project Number: **7141.74413.01** / Date: **6/7/2016**		Technician: **D. Gordon**

DAILY COMPACTION REPORT - NUCLEAR MOISTURE-DENSITY TESTING

TEST LOCATION			LAB PROCTOR VALUES				FIELD TESTING VALUES				
TEST NUMBER	LOCATION Subbase for outlet conduit	GRADE ELEVATION	OPTIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	From Proctor Fine Frac.	From Proctor Rock Corr.	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	PERCENT COMPACTION (%)	NOT WITHIN SPEC	COMMENTS
7	1+25 / CL	8335	101.7	18.5	X		101.5	21.4	99.8		
8	1+75 / CL	8335	101.7	18.5	X		99.8	21.5	98.1		

MOISTURE / DENSITY SPECIFICATIONS

Specified Compaction Requirement:

90% [ ] 95% [ ]

Other: 97%

Specified Moisture Requirement:

+/- 2% [ ] Other: -1% / +3% [X]

LABORATORY TESTING PROCEDURE:

ASTM	AASHTO
[X]	[ ]
Standard D698 [X]	Standard T99 [ ]
Modified D1557 [ ]	Modified T180 [ ]

Proctor Lab Sample No.: 1

FIELD OBSERVATIONS

Weather Conditions

Day:	S	M	T	W	Th	F	S
			X				

Weather:	Sun	Clear	Overcast	Rain	Snow
		X	X		

Temp (°F):	To 32	32-50	50-70	70-85	85 Up
			X		

Wind:	Still	Mod	High
		X	

Humidity:	Dry	Mod	Humid
		X	

Compaction Equipment Used:

- Sheepsfoot: [X]
- Smooth Drum Roller: [ ]
- Vibratory: [ ]
- Other (List Below): [ ]

815 CAT

OBSERVATION / TESTING SCHEDULE

Full Time [ ] Part Time [X]

number of site visits per day: _____

Testing & Observation Requested By: Lance Rundle

Test Results reported on-site to: Lance Rundle

FIELD COMMENTS/NOTES: Stationing base on RUH plans

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name:		Client / On Site Rep:
West Reservoir No. 1 Outlet Works Rehab	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828	**West Reservoir $ Ditch Co. / Nick Hughes**
		Contractor / Rep: **Rundle Const. / Lance Rundle**
Project Number: **7141.74413.01** / Date: **6/8/2016**		Technician: **D. Gordon**

DAILY COMPACTION REPORT - NUCLEAR MOISTURE-DENSITY TESTING

TEST LOCATION			LAB PROCTOR VALUES				FIELD TESTING VALUES				
TEST NUMBER	LOCATION Subbase for outlet conduit	GRADE ELEVATION	OPTIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	From Proctor Fine Frac.	From Proctor Rock Corr.	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	PERCENT COMPACTION (%)	NOT WITHIN SPEC	COMMENTS
9	STA 2+70 / 4' S of CL	8333	101.7	18.5			95.9	25.4	94.3	X	high moisture,1st lift near muck
10	STA 2+20 / 2' N of CL	8334	101.7	18.5			102.1	22.0	100.4	X	high moisture,1st lift near muck
9A	retest	8333	101.7	18.5			100.1	22.5	98.5	X	high moisture,1st lift near muck
11	STA 2+00 / 4' S of CL	8336	101.7	18.5			100.6	20.6	98.9		
12	STA 1+90 / CL	8334	101.7	18.5			101.8	21.1	100.1		
13	STA 1+55 / 4' N of CL	8336.5	101.7	18.5			100.1	17.9	98.4		
14	STA 1+60 / CL	8334.5	101.7	18.5			102.3	21.5	100.6		
15	STA 1+40 / CL	8336	101.7	18.5			100.7	21.1	99.1		
16	STA 2+60 / CL	8334	101.7	18.5			100.9	21.8	99.2	X	high moisture,1st lift near muck
17	STA 2+35 / CL	8335	101.7	18.5			101.5	19.0	99.8		
18	STA 2+75 / CL	8334	101.7	18.5			102.7	20.0	100.9		

MOISTURE / DENSITY SPECIFICATIONS

Specified Compaction Requirement:

90% [ ] 95% [ ]

Other: 97%

Specified Moisture Requirement:

+/- 2% [ ] Other: -1% / +3% [X]

LABORATORY TESTING PROCEDURE:

ASTM	AASHTO
[X]	[ ]
Standard D698 [X]	Standard T99 [ ]
Modified D1557 [ ]	Modified T180 [ ]

Proctor Lab Sample No.: 1

FIELD OBSERVATIONS

Weather Conditions

Day:	S	M	T	W	Th	F	S
				X			

Weather:	Sun	Clear	Overcast	Rain	Snow
		X	X		

Temp (°F):	To 32	32-50	50-70	70-85	85 Up
			X		

Wind:	Still	Mod	High
		X	

Humidity:	Dry	Mod	Humid
		X	

Compaction Equipment Used:

- Sheepsfoot: [X]
- Smooth Drum Roller: [ ]
- Vibratory: [ ]
- Other (List Below): [ ]

815 CAT

OBSERVATION / TESTING SCHEDULE

Full Time [ ] Part Time [X]

number of site visits per day: _____

Testing & Observation Requested By: Lance Rundle

Test Results reported on-site to: Jake

FIELD COMMENTS/NOTES: Stationing base on RUH plans

Jake with Rundle Construction elected to continue placing fill over areas with high moisture

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name:		Client / On Site Rep:
West Reservoir No. 1 Outlet Works Rehab	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828	**West Reservoir $ Ditch Co. / Nick Hughes**
		Contractor / Rep: **Rundle Const. / Lance Rundle**
Project Number: **7141.74413.01**	Date: **7/19/2016**	Technician: **D. Gordon**

DAILY COMPACTION REPORT - NUCLEAR MOISTURE-DENSITY TESTING

TEST LOCATION			LAB PROCTOR VALUES				FIELD TESTING VALUES				
TEST NUMBER	LOCATION backfill over pipe	GRADE ELEVATION	OPTIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	From Proctor Fine Frac.	From Proctor Rock Corr.	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	PERCENT COMPACTION (%)	NOT WITHIN SPEC	COMMENTS
19	STA 1+40 / 10' N of pipe	8736	101.7	18.5			99.1	23.0	97.5		Doug ok on moisture
20	STA 2+75 / 15' N	8736	101.7	18.5			101.1	18.9	99.4		Doug ok on moisture
21	STA 2+00 / 12' N	8737	101.7	18.5			100.5	22.5	98.9		Doug ok on moisture
22	STA 2+85 / 10' N	8737	101.7	18.5			99.1	23.4	97.5		
23	STA 1+95 / 2' N	8737	101.7	18.5			101.5	21.2	99.8		

MOISTURE / DENSITY SPECIFICATIONS

Specified Compaction Requirement:

90% [ ] 95% [ ]

Other: 97%

Specified Moisture Requirement:

+/- 2% [ ] Other: -1% / +3% [X]

LABORATORY TESTING PROCEDURE:

ASTM	AASHTO
[X]	[ ]
Standard D698	Standard T99
[X]	[X]
Modified D1557	Modified T180
[ ]	[ ]

Proctor Lab Sample No.: 1

FIELD OBSERVATIONS

Weather Conditions

Day:	S	M	T	W	Th	F	S
			X				

Weather:	Sun	Clear	Overcast	Rain	Snow
			X		

Temp (°F):	To 32	32-50	50-70	70-85	85 Up
			X		

Wind:	Still		Mod		High
			X		

Humidity:	Dry		Mod		Humid
			X		

Compaction Equipment Used:

- Sheepsfoot: [X]
- Smooth Drum Roller: [ ]
- Vibratory: [ ]
- Other (List Below): [ ]

815 CAT

OBSERVATION / TESTING SCHEDULE

Full Time [ ] Part Time [X]

number of site visits per day: _____

Testing & Observation Requested By: Lance Rundle

Test Results reported on-site to: Lance

FIELD COMMENTS/NOTES: Doug accepted over moisture readings

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name:		Client / On Site Rep:
West Reservoir No. 1 Outlet Works Rehab	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828	**West Reservoir $ Ditch Co. / Nick Hughes**
		Contractor / Rep: **Rundle Const. / Lance Rundle**
Project Number: **7141.74413.01** / Date: **7/20/2016**		Technician: **D. Gordon**

DAILY COMPACTION REPORT - NUCLEAR MOISTURE-DENSITY TESTING

TEST LOCATION			LAB PROCTOR VALUES				FIELD TESTING VALUES				
TEST NUMBER	LOCATION around conduit	GRADE ELEVATION	OPTIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	From Proctor Fine Frac.	From Proctor Rock Corr.	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	PERCENT COMPACTION (%)	NOT WITHIN SPEC	COMMENTS
24	STA 2+40 / 2' S	8737	101.7	18.5		X	95.8	23.5	94.2	X	Ripped out
25	STA 2+70 / 2' S	8738	101.7	18.5		X	93.4	26.8	91.8	X	blended
26	STA 3+00 / 2' S	8738	101.7	18.5		x	97.2	23.5	95.6	X	with dry
27	STA 1+85 / 2' S	8739	101.7	18.5		x	94.7	26.6	93.1	X	recompacted
28	STA 2+15 / 2' S	8741	101.7	18.5		x	99.2	23.0	97.5		
29	STA 2+90 / 3' S	8739	101.7	18.5		x	97.0	24.4	95.4	X	Ripped out
30	STA 1+20 / 10' N	8738	101.7	18.5		x	96.7	24.0	95.1	X	blended, recompacted
31	STA 2+00 / 15' N		101.7	18.5		x	100.4	21.8	98.7		
24A	Retest	8737	101.7	18.5		x	101.7	22.3	100.0	X	Doug accepted
26A	Retest	8738	101.7	18.5		x	100.0	22.1	98.3	X	High Moisture
29A	Retest	8739	101.7	18.5		x	101.0	23.4	99.3	X	

MOISTURE / DENSITY SPECIFICATIONS

Specified Compaction Requirement:

90% [ ] 95% [ ]

Other: 97%

Specified Moisture Requirement:

+/- 2% [ ] Other: -1% / +3% [X]

LABORATORY TESTING PROCEDURE:

ASTM	AASHTO
[X]	[ ]
Standard D698	Standard T99
[X]	[X]
Modified D1557	Modified T180
[ ]	[ ]

Proctor Lab Sample No.: 1

FIELD OBSERVATIONS

Weather Conditions

Day:	S	M	T	W	Th	F	S
				X			

Weather:	Sun	Clear	Overcast	Rain	Snow
		X	X		

Temp (°F):	To 32	32-50	50-70	70-85	85 Up
				X	

Wind:	Still		Mod		High
			X		

Humidity:	Dry		Mod		Humid
			X		

Compaction Equipment Used:

Sheepsfoot:	X
Smooth Drum Roller:	
Vibratory:	
Other (List Below):	

OBSERVATION / TESTING SCHEDULE

Full Time [ ] Part Time [X]

number of site visits per day: _____

Testing & Observation Requested By:	Test Results reported on-site to:
Lance Rundle	Lance / Jake

FIELD COMMENTS/NOTES: 25, 27, 28 No sample retest whole aper was reworked

Doug Neighbors accepted high moisture as long as compaction is being met

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name:		Client / On Site Rep:
West Reservoir No. 1 Outlet Works Rehab	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828	**West Reservoir $ Ditch Co. / Nick Hughes**
		Contractor / Rep: **Rundle Const. / Lance Rundle**
Project Number: **7141.74413.01**	Date: **7/20/2016**	Technician: **D. Gordon**

DAILY COMPACTION REPORT - NUCLEAR MOISTURE-DENSITY TESTING

TEST LOCATION			LAB PROCTOR VALUES				FIELD TESTING VALUES				
TEST NUMBER	LOCATION dam backfill	GRADE ELEVATION	OPTIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	From Proctor Fine Frac.	From Proctor Rock Corr.	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	PERCENT COMPACTION (%)	NOT WITHIN SPEC	COMMENTS
32	STA 2+60 / 3' S	8740	101.7	18.5		X	101.0	22.7	99.3		

MOISTURE / DENSITY SPECIFICATIONS

Specified Compaction Requirement:

90% [ ] 95% [ ]

Other: 97%

Specified Moisture Requirement:

+/- 2% [ ] Other: -1% / +3% [X]

LABORATORY TESTING PROCEDURE:

ASTM	AASHTO
[X]	[ ]
Standard D698 [X]	Standard T99 [ ]
Modified D1557 [ ]	Modified T180 [ ]

Proctor Lab Sample No.: 1

FIELD OBSERVATIONS

Weather Conditions

Day:	S	M	T	W	Th	F	S
					X		

Weather:	Sun	Clear	Overcast	Rain	Snow
		X	X		

Temp (°F):	To 32	32-50	50-70	70-85	85 Up
				X	

Wind:	Still		Mod		High
			X		

Humidity:	Dry		Mod		Humid
			X		

Compaction Equipment Used:

Sheepsfoot: [X]

Smooth Drum Roller: [ ]

Vibratory: [ ]

Other (List Below): [ ]

OBSERVATION / TESTING SCHEDULE

Full Time [ ] Part Time [ ]

number of site visits per day: 1

Testing & Observation Requested By: Lance Rundle

Test Results reported on-site to: Lance / Jake

FIELD COMMENTS/NOTES:

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name:		Client / On Site Rep:
West Reservoir No. 1 Outlet Works Rehab	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828	**West Reservoir $ Ditch Co. / Nick Hughes**
		Contractor / Rep: **Rundle Const. / Lance Rundle**
Project Number: **7141.74413.01**	Date: **7/21/2016**	Technician: **D. Gordon**

DAILY COMPACTION REPORT - NUCLEAR MOISTURE-DENSITY TESTING

TEST LOCATION			LAB PROCTOR VALUES				FIELD TESTING VALUES				
TEST NUMBER	LOCATION Dam Backfill	GRADE ELEVATION	OPTIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	From Proctor Fine Frac.	From Proctor Rock Corr.	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	PERCENT COMPACTION (%)	NOT WITHIN SPEC	COMMENTS
33	STA 2+50 / 15' N	8741	101.7	18.5		X	101.0	24.0	99.3	x	Doug Neighbors PE with RJH Consultants accepted high moistures
34	STA 2+00 / 12' N	8741	101.7	18.5		X	100.8	22.7	99.1	x	
35	STA 1+25 / 30' N	8742	101.7	18.5		X	100.1	22.5	98.5	x	
36	STA 1+26 / 2' S	8741	101.7	18.5		X	99.1	23.3	98.2		
37	STA 1+25 / 3' S	8742	101.7	18.5		X	101.7	22.4	100.0		
38	STA 2+70 / 10' N	8741	101.7	18.5		X	99.4	24.3	99.7		
39	STA 2+20 / 8' N	8742	101.7	18.5		X	101.0	23.2	99.3		
40	STA 1+70 / 15' N	8743	101.7	18.5		X	100.5	23.5	98.8		

MOISTURE / DENSITY SPECIFICATIONS

Specified Compaction Requirement:

90% [ ] 95% [ ]

Other: 97%

Specified Moisture Requirement:

+/- 2% [ ] Other: -1% / +3% [X]

LABORATORY TESTING PROCEDURE:

ASTM	AASHTO
[X]	[ ]
Standard D698	Standard T99
[X]	[X]
Modified D1557	Modified T180
[ ]	[ ]

Proctor Lab Sample No.: 1

FIELD OBSERVATIONS

Weather Conditions

Day:	S	M	T	W	Th	F	S
					X		

Weather:	Sun	Clear	Overcast	Rain	Snow
		X	X	X	

Temp (°F):	To 32	32-50	50-70	70-85	85 Up
				X	

Wind:	Still		Mod		High
			X		

Humidity:	Dry		Mod		Humid
			X		

Compaction Equipment Used:

Sheepsfoot:	X
Smooth Drum Roller:	
Vibratory:	
Other (List Below):	

OBSERVATION / TESTING SCHEDULE

Full Time [ ] Part Time [X]

number of site visits per day: 1

Testing & Observation Requested By:	Test Results reported on-site to:
Lance Rundle	Lance / Jake

FIELD COMMENTS/NOTES:

Doug Neighbors accepted high moisture as long as compaction is being met

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name:		Client / On Site Rep:
West Reservoir No. 1 Outlet Works Rehab	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828	**West Reservoir $ Ditch Co. / Nick Hughes**
		Contractor / Rep: **Rundle Const. / Lance Rundle**
Project Number: **7141.74413.01**	Date: **7/25/2016**	Technician: **D. Gordon**

DAILY COMPACTION REPORT - NUCLEAR MOISTURE-DENSITY TESTING

TEST LOCATION			LAB PROCTOR VALUES				FIELD TESTING VALUES				
TEST NUMBER	LOCATION	GRADE ELEVATION	OPTIMUM		From Proctor		DRY DENSITY	MOISTURE CONTENT	PERCENT COMPACTION	NOT WITHIN SPEC	COMMENTS
	Dam Backfill		DRY DENSITY (pcf)	MOISTURE (%)	Fine Frac.	Rock Corr.	(pcf)	(%)	(%)		
41	STA 2+35 / 10' N	8742	101.7	18.5		X	103.4	25.7	101.7	x	Doug Neighbors PE with RJH Consultants accepted high moistures
42	STA 2+10 / 30'N	8743	101.7	18.5		X	100.1	21.0	98.5	x	
43	STA 1+75 / 2' N	8744	101.7	18.5		X	100.1	21.2	98.5	x	

MOISTURE / DENSITY SPECIFICATIONS

Specified Compaction Requirement:

90% [ ] 95% [ ]

Other: 97%

Specified Moisture Requirement:

+/- 2% [ ] Other: -1% / +3% [X]

LABORATORY TESTING PROCEDURE:

ASTM	AASHTO
[X]	[ ]
Standard D698	Standard T99
[X]	[X]
Modified D1557	Modified T180
[ ]	[ ]

Proctor Lab Sample No.: 1

FIELD OBSERVATIONS

Weather Conditions

Day:	S	M	T	W	Th	F	S
		X					

Weather:	Sun	Clear	Overcast	Rain	Snow
			X		

Temp (°F):	To 32	32-50	50-70	70-85	85 Up
			X	X	

Wind:	Still		Mod		High
			X		

Humidity:	Dry		Mod		Humid
			X		

Compaction Equipment Used:

- Sheepsfoot: [X]
- Smooth Drum Roller: [ ]
- Vibratory: [ ]
- Other (List Below): [ ]

OBSERVATION / TESTING SCHEDULE

Full Time [ ] Part Time [X]

number of site visits per day: 1

Testing & Observation Requested By: Lance Rundle

Test Results reported on-site to: Lance / Jake

FIELD COMMENTS/NOTES:

Doug Neighbors accepted high moisture as long as compaction is being met

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name:		Client / On Site Rep:
West Reservoir No. 1 Outlet Works Rehab	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828	**West Reservoir $ Ditch Co. / Nick Hughes**
		Contractor / Rep: **Rundle Const. / Lance Rundle**
Project Number: **7141.74413.01**	Date: **7/26/2016**	Technician: **D. Gordon**

DAILY COMPACTION REPORT - NUCLEAR MOISTURE-DENSITY TESTING

TEST LOCATION			LAB PROCTOR VALUES				FIELD TESTING VALUES				
TEST NUMBER	LOCATION Dam Backfill	GRADE ELEVATION	OPTIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	From Proctor Fine Frac.	From Proctor Rock Corr.	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	PERCENT COMPACTION (%)	NOT WITHIN SPEC	COMMENTS
44	STA 2+50 / 6' N	8744	101.7	18.5		X	95.8	26.0	94.2	x	
45	STA 2+10 / 25' N	8744	101.7	18.5		X	99.1	23.0	97.5		
44A	Retest 44	8744	101.7	18.5		X	99.4	21.7	97.7		
46	STA 2+00 / 30' N	8744	101.7	18.5		X	100.9	23.7	99.2		
47	STA 1+60 / 15' N	8745	101.7	18.5		X	99.4	24.2	97.8		
48	STA 1+25 / 40' N	8745	101.7	18.5		X	100.0	22.7	98.7		
49	STA 1+75 / 2' N	8746	101.7	18.5		X	103.3	19.9	101.5		
50	STA 2+30 / 2' S	8746	101.7	18.5		X	105.2	21.3	103.4		dark blend
51	STA 2+15 / 40' N	8747	101.7	18.5		X	100.7	19.0	99.0		
52	STA 2+50 / 35' N	8744	101.7	18.5		X	102.1	19.8	100.4		

MOISTURE / DENSITY SPECIFICATIONS

Specified Compaction Requirement:

90% [ ] 95% [ ]

Other: 97%

Specified Moisture Requirement:

+/- 2% [ ] Other: -1% / +3% [X]

LABORATORY TESTING PROCEDURE:

ASTM	AASHTO
[X]	[ ]
Standard D698	Standard T99
[X]	[X]
Modified D1557	Modified T180
[ ]	[ ]

Proctor Lab Sample No.: 1

FIELD OBSERVATIONS

Weather Conditions

Day:	S	M	T	W	Th	F	S
			X				

Weather:	Sun	Clear	Overcast	Rain	Snow
			X		

Temp (°F):	To 32	32-50	50-70	70-85	85 Up
				X	

Wind:	Still		Mod		High
			X		

Humidity:	Dry		Mod		Humid
			X		

Compaction Equipment Used:

- Sheepsfoot: [X]
- Smooth Drum Roller: [ ]
- Vibratory: [ ]
- Other (List Below): [ ]

OBSERVATION / TESTING SCHEDULE

Full Time [ ] Part Time [X]

number of site visits per day: 1

Testing & Observation Requested By:	Test Results reported on-site to:
Lance Rundle	Lance / Jake

FIELD COMMENTS/NOTES:

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name:		Client / On Site Rep:
West Reservoir No. 1 Outlet Works Rehab	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828	**West Reservoir $ Ditch Co. / Nick Hughes**
		Contractor / Rep: **Rundle Const. / Lance Rundle**
Project Number: **7141.74413.01**	Date: **7/27/2016**	Technician: **D. Gordon**

DAILY COMPACTION REPORT - NUCLEAR MOISTURE-DENSITY TESTING

TEST LOCATION			LAB PROCTOR VALUES				FIELD TESTING VALUES				
TEST NUMBER	LOCATION Dam Backfill	GRADE ELEVATION	OPTIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	From Proctor Fine Frac.	From Proctor Rock Corr.	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	PERCENT COMPACTION (%)	NOT WITHIN SPEC	COMMENTS
53	STA 2+60 / 8' N	8745	101.7	18.5		X	102.0	20.9	100.3		P1
54	STA 1+90 / 10' N	8746	101.7	18.5		X	99.5	23.0	97.3	X	P1, high moisture
55	STA 2+40 / 6' N	8747	101.7	18.5		X	101.7	19.5	100.0		P1
56	STA 1+40 / 40' N	8747	107.9	16.8		X	108.1	17.9	100.2		dark P3
57	STA 1+17 / center	8749	107.9	16.8		X	106.1	18.5	98.3		dark P3

MOISTURE / DENSITY SPECIFICATIONS

Specified Compaction Requirement:

90% [ ] 95% [ ]

Other: 97%

Specified Moisture Requirement:

+/- 2% [ ] Other: -1% / +3% [ ]

LABORATORY TESTING PROCEDURE:

ASTM	AASHTO
X	
Standard D698	Standard T99
X	X
Modified D1557	Modified T180

Proctor Lab Sample No.: 1 & 3

FIELD OBSERVATIONS

Weather Conditions

Day:	S	M	T	W	Th	F	S
				X			

Weather:	Sun	Clear	Overcast	Rain	Snow
		X			

Temp (°F):	To 32	32-50	50-70	70-85	85 Up
			X	X	

Wind:	Still	Mod	High
		X	

Humidity:	Dry	Mod	Humid
		X	

Compaction Equipment Used:

Sheepsfoot: X

Smooth Drum Roller: [ ]

Vibratory: [ ]

Other (List Below): [ ]

OBSERVATION / TESTING SCHEDULE

Full Time [ ] Part Time [ ]

number of site visits per day: _____

Testing & Observation Requested By: Lance Rundle

Test Results reported on-site to: Lance / Jake

FIELD COMMENTS/NOTES: High moisture accepted on site by Doug Neigbors PE

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name:		Client / On Site Rep:
West Reservoir No. 1 Outlet Works Rehab	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828	**West Reservoir $ Ditch Co. / Nick Hughes**
		Contractor / Rep: **Rundle Const. / Lance Rundle**
Project Number: **7141.74413.01**	Date: **7/28/2016**	Technician: **D. Gordon**

DAILY COMPACTION REPORT - NUCLEAR MOISTURE-DENSITY TESTING

TEST LOCATION			LAB PROCTOR VALUES				FIELD TESTING VALUES				
TEST NUMBER	LOCATION Dam Backfill	GRADE ELEVATION	OPTIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	From Proctor Fine Frac.	From Proctor Rock Corr.	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	PERCENT COMPACTION (%)	NOT WITHIN SPEC	COMMENTS
58	STA 1+60 / 12' N	8748	101.7	18.5		X	104.8	18.6	103.0		
59	STA 2+25 / 4' S	8748	101.7	18.5		X	103.8	21.2	102.1		
60	STA 3+00 / 3' S	8742	101.7	18.5		X	102.0	19.9	100.3		fill over sand collar
61	STA 2+90 / 35' N	8742	101.7	18.5		X	101.0	20.1	99.3		
62	STA 2+80 / 8' N	8743	101.7	18.5		X	101.1	22.2	99.4		
63	STA 3+05 / 20' N	8745	101.7	18.5		X	99.5	23.1	97.8		
64	STA 1+60 / 4' N	8749	101.7	18.5		X	102.3	22.2	100.6		
65	STA 2+30 / 40' N	8748	101.7	18.5		X	101.3	20.5	99.6		
66	STA 1+90 / 2' N	8750	101.7	18.5		X	100.1	21.9	98.5		
67	STA 3+00 / Centerline	8745	101.7	18.5		X	105.0	18.6	103.8		

MOISTURE / DENSITY SPECIFICATIONS

Specified Compaction Requirement:

90% [ ] 95% [ ]

Other: 97%

Specified Moisture Requirement:

+/- 2% [ ] Other: -1% / +3% [ ]

LABORATORY TESTING PROCEDURE:

ASTM	AASHTO
X	
Standard D698	Standard T99
X	
Modified D1557	Modified T180

Proctor Lab Sample No.: 1

FIELD OBSERVATIONS

Weather Conditions

Day:	S	M	T	W	Th	F	S
					X		

Weather:	Sun	Clear	Overcast	Rain	Snow
		X			

Temp (°F):	To 32	32-50	50-70	70-85	85 Up
					X

Wind:	Still	Mod	High
		X	

Humidity:	Dry	Mod	Humid
		X	

Compaction Equipment Used:

- Sheepsfoot: X
- Smooth Drum Roller: [ ]
- Vibratory: [ ]
- Other (List Below): [ ]

OBSERVATION / TESTING SCHEDULE

Full Time [ ] Part Time [ ]

number of site visits per day: _____

Testing & Observation Requested By: Lance Rundle

Test Results reported on-site to: Lance / Jake

FIELD COMMENTS/NOTES:

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name:		Client / On Site Rep:
West Reservoir No. 1 Outlet Works Rehab	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828	**West Reservoir $ Ditch Co. / Nick Hughes**
		Contractor / Rep: **Rundle Const. / Lance Rundle**
Project Number: **7141.74413.01** / Date: **8/1/2016**		Technician: **D. Gordon**

DAILY COMPACTION REPORT - NUCLEAR MOISTURE-DENSITY TESTING

TEST LOCATION			LAB PROCTOR VALUES				FIELD TESTING VALUES				
TEST NUMBER	LOCATION Dam Backfill	GRADE ELEVATION	OPTIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	From Proctor Fine Frac.	From Proctor Rock Corr.	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	PERCENT COMPACTION (%)	NOT WITHIN SPEC	COMMENTS
68	STA 2+85 2' S of pipe	8749	101.7	18.5		X	100.5	20.0	99.0		P1
69	STA 2+60 Center	8751	101.7	18.5		X	103.0	20.3	101.2		P1
70	STA 2+20 40' N of pipe	8750	101.7	18.5		X	106.7	19.9	98.9		P3
71	STA 2+25 30' N	8751	101.7	18.5		X	104.6	18.0	96.9		P3
72	STA 2+50 40' N	8750	101.7	18.5		X	102.2	21.4	100.5		P1
73	STA 2+10 20' N	8751	101.7	18.5		X	101.7	22.4	100.0		
74	STA 1+50 5' S	8752	101.7	18.5		X	99.9	21.0	98.2		

MOISTURE / DENSITY SPECIFICATIONS

Specified Compaction Requirement:

90% [ ] 95% [ ]

Other: 97%

Specified Moisture Requirement:

+/- 2% [ ] Other: -1% / +3% [ ]

LABORATORY TESTING PROCEDURE:

ASTM	AASHTO
X	
Standard D698	Standard T99
X	
Modified D1557	Modified T180

Proctor Lab Sample No.: 1 & 3

FIELD OBSERVATIONS

Weather Conditions

Day:	S	M	T	W	Th	F	S
		X					

Weather:	Sun	Clear	Overcast	Rain	Snow
		X	X		

Temp (°F):	To 32	32-50	50-70	70-85	85 Up
				X	

Wind:	Still		Mod		High
			X		

Humidity:	Dry		Mod		Humid
			X		

Compaction Equipment Used:

- Sheepsfoot: X
- Smooth Drum Roller: [ ]
- Vibratory: [ ]
- Other (List Below): [ ]

OBSERVATION / TESTING SCHEDULE

Full Time [ ] Part Time [ ]

number of site visits per day: _____

Testing & Observation Requested By: Lance Rundle

Test Results reported on-site to: Lance / Jake

FIELD COMMENTS/NOTES:

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name:		Client / On Site Rep:
West Reservoir No. 1 Outlet Works Rehab	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828	**West Reservoir $ Ditch Co. / Nick Hughes**
		Contractor / Rep: **Rundle Const. / Lance Rundle**
Project Number: **7141.74413.01**	Date: **8/2/2016**	Technician: **D. Gordon**

DAILY COMPACTION REPORT - NUCLEAR MOISTURE-DENSITY TESTING

TEST LOCATION			LAB PROCTOR VALUES				FIELD TESTING VALUES				
TEST NUMBER	LOCATION	GRADE ELEVATION	OPTIMUM		From Proctor		DRY DENSITY (pcf)	MOISTURE CONTENT (%)	PERCENT COMPACTION (%)	NOT WITHIN SPEC	COMMENTS
	Dam Backfill		DRY DENSITY (pcf)	MOISTURE (%)	Fine Frac.	Rock Corr.					
75	STA 1+75 20' S	8751	101.7	18.5		X	102.2	21.0	100.5		P1
76	STA 2+10 center	8752	101.7	18.5		X	101.7	19.5	100.0		P1
77	STA 2+00 40' N	8752	101.7	18.5		X	100.4	21.1	98.7		P1

MOISTURE / DENSITY SPECIFICATIONS

Specified Compaction Requirement:

90% [ ] 95% [ ]

Other: 97%

Specified Moisture Requirement:

+/- 2% [ ] Other: -1% / +3% [ ]

LABORATORY TESTING PROCEDURE:

ASTM	AASHTO
[X]	[ ]
Standard D698 [X]	Standard T99 [ ]
Modified D1557 [ ]	Modified T180 [ ]

Proctor Lab Sample No.: P1

FIELD OBSERVATIONS

Weather Conditions

Day:	S	M	T	W	Th	F	S
			X				

Weather:	Sun	Clear	Overcast	Rain	Snow
		X	X		

Temp (°F):	To 32	32-50	50-70	70-85	85 Up
				X	

Wind:	Still		Mod		High
			X		

Humidity:	Dry		Mod		Humid
			X		

Compaction Equipment Used:

- Sheepsfoot: [X]
- Smooth Drum Roller: [ ]
- Vibratory: [ ]
- Other (List Below): [ ]

OBSERVATION / TESTING SCHEDULE

Full Time [ ] Part Time [X]

number of site visits per day: _____

Testing & Observation Requested By: Lance Rundle

Test Results reported on-site to: Lance / Jake

FIELD COMMENTS/NOTES: Limited fill today; focas on sand collar

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name:		Client / On Site Rep:
West Reservoir No. 1 Outlet Works Rehab	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828	**West Reservoir $ Ditch Co. / Nick Hughes**
		Contractor / Rep: **Rundle Const. / Lance Rundle**
Project Number: **7141.74413.01**	Date: **8/3/2016**	Technician: **D. Gordon**

DAILY COMPACTION REPORT - NUCLEAR MOISTURE-DENSITY TESTING

TEST LOCATION			LAB PROCTOR VALUES				FIELD TESTING VALUES				
TEST NUMBER	LOCATION	GRADE ELEVATION	OPTIMUM		From Proctor		DRY DENSITY (pcf)	MOISTURE CONTENT (%)	PERCENT COMPACTION (%)	NOT WITHIN SPEC	COMMENTS
	Dam Backfill		DRY DENSITY (pcf)	MOISTURE (%)	Fine Frac.	Rock Corr.					
78	STA 1+15 2' S	8736	101.7	18.5		X	100.8	17.8	99.1		Around coller P1
79	STA 1+25 24' N	8735	101.7	18.5		X	101.3	20.8	99.6		Around coller P1
80	STA 3+00 6' S	8747	107.9	16.8		X	105.5	16.8	97.8		Around coller P3
81	STA 3+05 10' N	8748	107.9	16.8		X	107.1	18.5	99.3		P3
82	STA 2+50 30' N	8754	107.9	16.8		X	106.5	18.4	98.7		
83	STA 2+75 5' N	8756	107.9	16.8		X	105.4	18.7	97.7		
84	STA 1+75 30' N	8753	107.9	16.8			106.0	17.4	98.2		

MOISTURE / DENSITY SPECIFICATIONS

Specified Compaction Requirement:

90% [ ] 95% [ ]

Other: 97%

Specified Moisture Requirement:

+/- 2% [ ] Other: -1% / +3% [ ]

LABORATORY TESTING PROCEDURE:

ASTM	AASHTO
[X]	[ ]
Standard D698	Standard T99
[X]	[ ]
Modified D1557	Modified T180
[ ]	[ ]

Proctor Lab Sample No.:

FIELD OBSERVATIONS

Weather Conditions

Day:	S	M	T	W	Th	F	S
				X			

Weather:	Sun	Clear	Overcast	Rain	Snow
		X	X		

Temp (°F):	To 32	32-50	50-70	70-85	85 Up
				X	

Wind:	Still		Mod		High
			X		

Humidity:	Dry		Mod		Humid
			X		

Compaction Equipment Used:

- Sheepsfoot: [X]
- Smooth Drum Roller: [ ]
- Vibratory: [ ]
- Other (List Below): [ ]

OBSERVATION / TESTING SCHEDULE

Full Time [ ] Part Time [X]

number of site visits per day: _____

Testing & Observation Requested By:	Test Results reported on-site to:
Lance Rundle	Lance / Jake

FIELD COMMENTS/NOTES:

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name:		Client / On Site Rep:
West Reservoir No. 1 Outlet Works Rehab	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828	**West Reservoir $ Ditch Co. / Nick Hughes**
		Contractor / Rep: **Rundle Const. / Lance Rundle**
Project Number: **7141.74413.01**	Date: **8/8/2016**	Technician: **D. Gordon**

DAILY COMPACTION REPORT - NUCLEAR MOISTURE-DENSITY TESTING

TEST LOCATION			LAB PROCTOR VALUES				FIELD TESTING VALUES				
TEST NUMBER	LOCATION Dam Backfill	GRADE ELEVATION	OPTIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	From Proctor Fine Frac.	From Proctor Rock Corr.	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	PERCENT COMPACTION (%)	NOT WITHIN SPEC	COMMENTS
85	STA 1+85 / 20' N	8758	101.7	18.5		X	101.3	22.8	99.6		
86	STA 2+60 / 10' S	8759	101.7	18.5		X	101.8	22.1	100.1		
87	STA 2+20 / 3' S	8760	101.7	18.5		X	94.1	26.5	93.0		Ripped, blended with dry
88	STA 1+90 / 15' S	8759	101.7	18.5		X	98.7	23.4	97.1		
87A	Retest	8760	101.7	18.5		X	99.9	23.7	98.2		
89	STA 2+50 / 45' N	8761	101.7	18.5		X	104.6	18.1	102.9		

MOISTURE / DENSITY SPECIFICATIONS

Specified Compaction Requirement:

90% [ ] 95% [ ]

Other: 97%

Specified Moisture Requirement:

+/- 2% [ ] Other: -1% / +3% [ ]

LABORATORY TESTING PROCEDURE:

ASTM	AASHTO
X	
Standard D698	Standard T99
X	
Modified D1557	Modified T180

Proctor Lab Sample No.: P1

FIELD OBSERVATIONS

Weather Conditions

Day:	S	M	T	W	Th	F	S
		X					

Weather:	Sun	Clear	Overcast	Rain	Snow
		X	X		

Temp (°F):	To 32	32-50	50-70	70-85	85 Up
				X	

Wind:	Still		Mod		High
			X		

Humidity:	Dry		Mod		Humid
			X		

Compaction Equipment Used:

Sheepsfoot: X

Smooth Drum Roller: [ ]

Vibratory: [ ]

Other (List Below): [ ]

OBSERVATION / TESTING SCHEDULE

Full Time [ ] Part Time X

number of site visits per day: 1

Testing & Observation Requested By: Lance Rundle

Test Results reported on-site to: Lance / Jake

FIELD COMMENTS/NOTES:

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name:		Client / On Site Rep:
West Reservoir No. 1 Outlet Works Rehab	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828	**West Reservoir $ Ditch Co. / Nick Hughes**
		Contractor / Rep: **Rundle Const. / Lance Rundle**
Project Number: **7141.74413.01**	Date: **8/9/2016**	Technician: **D. Gordon**

DAILY COMPACTION REPORT - NUCLEAR MOISTURE-DENSITY TESTING

TEST LOCATION			LAB PROCTOR VALUES				FIELD TESTING VALUES				
TEST NUMBER	LOCATION	GRADE ELEVATION	OPTIMUM		From Proctor		DRY DENSITY	MOISTURE CONTENT	PERCENT COMPACTION	NOT WITHIN SPEC	COMMENTS
	Dam Backfill		DRY DENSITY (pcf)	MOISTURE (%)	Fine Frac.	Rock Corr.	(pcf)	(%)	(%)		
90	STA 2+10 / 45' N	8765	101.7	18.5		X	103.9	23.4	102.0		P1
91	STA 2+30 / 10' S	8761	101.7	18.5		X	99.5	22.4	97.8		P1
92	STA 1+70 / 50' N	8760	101.7	18.5		X	102.3	22.1	100.6		P1
93	STA 2+50 / 30' N	8763	101.7	18.5		X	100.8	22.7	99.1		P1
94	STA 2+40 / 30' N	8764	101.7	18.5		X	99.4	20.7	97.7		P1

MOISTURE / DENSITY SPECIFICATIONS

Specified Compaction Requirement:

90% [ ] 95% [ ]

Other: 97%

Specified Moisture Requirement:

+/- 2% [ ] Other: -1% / +3% [ ]

LABORATORY TESTING PROCEDURE:

ASTM	AASHTO
[X]	[ ]
Standard D698	Standard T99
[X]	[ ]
Modified D1557	Modified T180
[ ]	[ ]

Proctor Lab Sample No.: P1

FIELD OBSERVATIONS

Weather Conditions

Day:	S	M	T	W	Th	F	S
			X				

Weather:	Sun	Clear	Overcast	Rain	Snow
		X	X	X	

Temp (°F):	To 32	32-50	50-70	70-85	85 Up
			X	X	

Wind:	Still		Mod		High
			X		

Humidity:	Dry		Mod		Humid
			X		

Compaction Equipment Used:

Sheepsfoot:	X
Smooth Drum Roller:	
Vibratory:	
Other (List Below):	

OBSERVATION / TESTING SCHEDULE

Full Time [ ] Part Time [X]

number of site visits per day: 1

Testing & Observation Requested By:	Test Results reported on-site to:
Lance Rundle	Lance / Jake

FIELD COMMENTS/NOTES:

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name:		Client / On Site Rep:
West Reservoir No. 1 Outlet Works Rehab	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828	**West Reservoir $ Ditch Co. / Nick Hughes**
		Contractor / Rep: **Rundle Const. / Lance Rundle**
Project Number: **7141.74413.01**	Date: **8/10/2016**	Technician: **D. Gordon**

DAILY COMPACTION REPORT - NUCLEAR MOISTURE-DENSITY TESTING

TEST LOCATION			LAB PROCTOR VALUES				FIELD TESTING VALUES				
TEST NUMBER	LOCATION Dam Backfill	GRADE ELEVATION	OPTIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	From Proctor Fine Frac.	From Proctor Rock Corr.	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	PERCENT COMPACTION (%)	NOT WITHIN SPEC	COMMENTS
95	STA 2+15 / 60' N	8765	101.7	18.5		X	102.7	19.8	101.0		P1
96	STA 2+00 / 30' S	8764	101.7	18.5		X	94.6	25.0	93.0	X	Ripped Blended P1
97	STA 2+50 / 40'	8766	101.7	18.5		X	100.9	20.5	99.2		P1
96A	Retest	8764	101.7	18.5		X	100.9	22.1	100.3		P1
98	STA 1+90 / Center	8763	101.7	18.5		X	103.7	19.5	102.0		P1
99	STA 2+50 / 55' N	8767	107.9	16.8		X	107.9	19.5	100.0		dark P3

MOISTURE / DENSITY SPECIFICATIONS

Specified Compaction Requirement:

90% [ ] 95% [ ]

Other: 97%

Specified Moisture Requirement:

+/- 2% [ ] Other: -1% / +3% [ ]

LABORATORY TESTING PROCEDURE:

ASTM	AASHTO
X	
Standard D698	Standard T99
X	
Modified D1557	Modified T180

Proctor Lab Sample No.: 1 & 3

FIELD OBSERVATIONS

Weather Conditions

Day:	S	M	T	W	Th	F	S
				X			

Weather:	Sun	Clear	Overcast	Rain	Snow
		X	X		

Temp (°F):	To 32	32-50	50-70	70-85	85 Up
			X	X	

Wind:	Still		Mod		High
			X		

Humidity:	Dry		Mod		Humid
			X		

Compaction Equipment Used:

- Sheepsfoot: X
- Smooth Drum Roller: [ ]
- Vibratory: [ ]
- Other (List Below): [ ]

OBSERVATION / TESTING SCHEDULE

Full Time [ ] Part Time X

number of site visits per day: 1

Testing & Observation Requested By: Lance Rundle

Test Results reported on-site to: Lance / Jake

FIELD COMMENTS/NOTES:

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name:		Client / On Site Rep:
West Reservoir No. 1 Outlet Works Rehab	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828	**West Reservoir $ Ditch Co. / Nick Hughes**
		Contractor / Rep: **Rundle Const. / Lance Rundle**
Project Number: **7141.74413.01** / Date: **8/11/2016**		Technician: **D. Gordon**

DAILY COMPACTION REPORT - NUCLEAR MOISTURE-DENSITY TESTING

TEST LOCATION			LAB PROCTOR VALUES				FIELD TESTING VALUES				
TEST NUMBER	LOCATION Dam Backfill	GRADE ELEVATION	OPTIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	From Proctor Fine Frac.	From Proctor Rock Corr.	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	PERCENT COMPACTION (%)	NOT WITHIN SPEC	COMMENTS
100	STA 2+15 / 20' S	8768	101.7	18.5		X	99.0	21.2	97.4		P1
101	STA 2+35 / 60' N	8769	101.7	18.5		X	99.9	21.4	98.4		
102	STA 2+00 / 40' N	8770	101.7	18.5		X	103.4	21.5	101.7		
103	STA 2+10 / 10' S	8771	101.7	18.5		X	101.7	21.8	100.0		
104	STA 2+30 / 10' S	8772	101.7	18.5		X	101.5	22.0	99.8		

MOISTURE / DENSITY SPECIFICATIONS

Specified Compaction Requirement:

90% [ ] 95% [ ]

Other: 97%

Specified Moisture Requirement:

+/- 2% [ ] Other: -1% / +3% [ ]

LABORATORY TESTING PROCEDURE:

ASTM	AASHTO
X	
Standard D698	Standard T99
X	
Modified D1557	Modified T180

Proctor Lab Sample No.: 1

FIELD OBSERVATIONS

Weather Conditions

Day:	S	M	T	W	Th	F	S
					X		

Weather:	Sun	Clear	Overcast	Rain	Snow
		X	X		

Temp (°F):	To 32	32-50	50-70	70-85	85 Up
			X	X	

Wind:	Still		Mod		High
			X		

Humidity:	Dry		Mod		Humid
			X		

Compaction Equipment Used:

- Sheepsfoot: X
- Smooth Drum Roller: [ ]
- Vibratory: [ ]
- Other (List Below): [ ]

OBSERVATION / TESTING SCHEDULE

Full Time [ ] Part Time X

number of site visits per day: 1

Testing & Observation Requested By: Lance Rundle

Test Results reported on-site to: Lance / Jake

FIELD COMMENTS/NOTES:

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name:		Client / On Site Rep:
West Reservoir No. 1 Outlet Works Rehab	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828	**West Reservoir $ Ditch Co. / Nick Hughes**
		Contractor / Rep: **Rundle Const. / Lance Rundle**
Project Number: **7141.74413.01** / Date: **8/15/2016**		Technician: **D. Gordon**

DAILY COMPACTION REPORT - NUCLEAR MOISTURE-DENSITY TESTING

TEST LOCATION			LAB PROCTOR VALUES				FIELD TESTING VALUES				
TEST NUMBER	LOCATION Dam Backfill	GRADE ELEVATION	OPTIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	From Proctor Fine Frac.	From Proctor Rock Corr.	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	PERCENT COMPACTION (%)	NOT WITHIN SPEC	COMMENTS
105	STA 2+35 / 20' N	72	101.7	18.5		X	100.5	22.7	98.9		P2
106	STA 2+15 / 5' S	74	101.7	18.5		X	97.9	20.2	96.3	x	Request additional compaction P2
107	STA 2+25 / 60' N	73	107.9	16.8		X	107.4	20.1	99.5		P3
106a	STA 2+25 / 20' N	72	107.9	16.8		X	101.4	20.1	99.7		P2

MOISTURE / DENSITY SPECIFICATIONS

Specified Compaction Requirement:

90% [ ] 95% [ ]

Other: 97%

Specified Moisture Requirement:

+/- 2% [ ] Other: -1% / +3% [ ]

LABORATORY TESTING PROCEDURE:

ASTM	AASHTO
[X]	[ ]
Standard D698 [X]	Standard T99 [ ]
Modified D1557 [ ]	Modified T180 [ ]

Proctor Lab Sample No.: 2 & 3

FIELD OBSERVATIONS

Weather Conditions

Day:	S	M	T	W	Th	F	S
Weather:		Sun	Clear	Overcast		Rain	Snow
Temp (°F):		To 32	32-50	50-70	70-85	85 Up	
Wind:		Still		Mod		High	
Humidity:		Dry		Mod		Humid	

Compaction Equipment Used:

- Sheepsfoot: [X]
- Smooth Drum Roller: [ ]
- Vibratory: [ ]
- Other (List Below): [ ]

OBSERVATION / TESTING SCHEDULE

Full Time [ ] Part Time [X]

number of site visits per day: 1

Testing & Observation Requested By: Lance Rundle

Test Results reported on-site to: Lance / Jake

FIELD COMMENTS/NOTES: Using / harvesting material from the pond borrow area "P2"

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name:		Client / On Site Rep:
West Reservoir No. 1 Outlet Works Rehab	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828	**West Reservoir $ Ditch Co. / Nick Hughes**
		Contractor / Rep: **Rundle Const. / Lance Rundle**
Project Number: **7141.74413.01** / Date: **8/16/2016**		Technician: **D. Gordon**

DAILY COMPACTION REPORT - NUCLEAR MOISTURE-DENSITY TESTING

TEST LOCATION			LAB PROCTOR VALUES				FIELD TESTING VALUES				
TEST NUMBER	LOCATION Dam Backfill	GRADE ELEVATION	OPTIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE (%)	From Proctor Fine Frac.	From Proctor Rock Corr.	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	PERCENT COMPACTION (%)	NOT WITHIN SPEC	COMMENTS
108	STA 2+20 / 90' N	74	101.6	20.1		X	101.0	20.7	99.4		
109	STA 2+50 / 85' N	75	101.6	20.1		X	100.7	18.8	99.1		
110	STA 2+40 / 70' N	78	101.6	20.1		X	100.4	19.8	98.8		
111	STA 2+10 / 75' N	71	101.6	20.1		X	99.7	98.1	98.1		
112	STA 2+30 / Center	79	101.6	20.1		X	107.2	19.1	103.5		

MOISTURE / DENSITY SPECIFICATIONS

Specified Compaction Requirement:

90% [ ] 95% [ ]

Other: 97%

Specified Moisture Requirement:

+/- 2% [ ] Other: -1% / +3% [ ]

LABORATORY TESTING PROCEDURE:

ASTM	AASHTO
X	
Standard D698	Standard T99
X	
Modified D1557	Modified T180

Proctor Lab Sample No.: 2

FIELD OBSERVATIONS

Weather Conditions

Day:	S	M	T	W	Th	F	S
			X				

Weather:	Sun	Clear	Overcast	Rain	Snow
			X		

Temp (°F):	To 32	32-50	50-70	70-85	85 Up
			X		

Wind:	Still		Mod		High
			X		

Humidity:	Dry		Mod		Humid
			X		

Compaction Equipment Used:

Sheepsfoot: X

Smooth Drum Roller: [ ]

Vibratory: [ ]

Other (List Below): [ ]

OBSERVATION / TESTING SCHEDULE

Full Time [ ] Part Time X

number of site visits per day: 1

Testing & Observation Requested By: Lance Rundle

Test Results reported on-site to: Lance / Jake

FIELD COMMENTS/NOTES: Material harvested from borrow area

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name: West Reservoir No. 1 Outlet Works Rehab	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828	**Technician:** D. Gordon
Project Number: 7141.74413.01		**Date:** 5/26/2016
Client: West Reservoir & Ditch Co.		**Placement Location:** inlet structure
Concrete Supplier: United Companies - Delta	**FIELD TEST RESULTS**	

[X] **CONCRETE** [ ] **GROUT** [ ] **CEMENT** [ ] **FLOW FILL** [ ] _____

BATCH TIME	TIME SAMPLED	TRUCK NUMBER	TICKET NUMBER	SLUMP (INCHES)	AIR CONTENT (%)	Concrete TEMP. (°F.)	UNIT WEIGHT (lb/ft³)	WATER ADDED (GALLONS)	AMBIENT AIR TEMP (°F.)	CST Daily Set No.	Comments
1037a	1132a	6373	31028176	4.75	5.4	70	140.4	0	78	1	5 cylinders

Compressive Strength Specimen Type:

[X] CYLINDRICAL [ ] CUBE [ ] PRISM

[X] 4x8" [ ] 6x12" [ ] 2X2" [ ] 3X6"

[ ] _____ [ ] _____ [ ] _____

Total Number of specimens molded: 5

Testing & observation requested by: Lance Rundle

Test results reported on-site to: Lance Rundle

Please refer to the Compressive Strength Analysis Report, dated the same, for laboratory test data

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name: West Reservoir No. 1 Outlet Works Rehab	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828	**Technician:** D. Gordon
Project Number: 7141.74413.01		**Date:** 6/22/2016
Client: West Reservoir & Ditch Co.		**Placement Location:** Outlet works conduit STA 2+50
Concrete Supplier: United Companies - Delta	**FIELD TEST RESULTS**	

[X] **CONCRETE** [ ] **GROUT** [ ] **CEMENT** [ ] **FLOW FILL** [ ] _____

BATCH TIME	TIME SAMPLED	TRUCK NUMBER	TICKET NUMBER	SLUMP (INCHES)	AIR CONTENT (%)	Concrete TEMP. (°F.)	UNIT WEIGHT (lb/ft³)	WATER ADDED (GALLONS)	AMBIENT AIR TEMP (°F.)	CST Daily Set No.	Comments
546a	730a	6320	321028432	6.0	5.3	78	137.3	5	68		Doug accepted slump
635a	820a	6365	321028434	5.0	4.5	78	142.4	?	70		valve accidentally opened
635a	835a	6365		5.0	5.0	78	141.4	?	70	1	water added not measured
707a	854a	6367	31028437		4.0	80	142.0	0			United QA added air
707a	905a	6367		4.5	5.0	80	140.4	0			retest
734a	930a	6334	31028438	4.0	5.4	80	137.1	0	75		mid load
934a	1110a	6320	31028440	4.0	5.0	80	140.4	0	75		acceptance

Compressive Strength Specimen Type:

[X] CYLINDRICAL [ ] CUBE [ ] PRISM

[X] 4x8" [ ] 6x12" [ ] 2X2" [ ] 3X6"

[ ] _____ [ ] _____ [ ] _____

Total Number of specimens molded: 4

Testing & observation requested by: Lance Rundle

Test results reported on-site to: Lance Rundle

Please refer to the Compressive Strength Analysis Report, dated the same, for laboratory test data

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name: West Reservoir No. 1 Outlet Works Rehab	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828	**Technician:** D. Gordon
Project Number: 7141.74413.01		**Date:** 6/29/2016
Client: West Reservoir & Ditch Co.		**Placement Location:** Head wall footer
Concrete Supplier: United Companies - Delta	**FIELD TEST RESULTS**	

[X] **CONCRETE** [ ] **GROUT** [ ] **CEMENT** [ ] **FLOW FILL** [ ] _____

BATCH TIME	TIME SAMPLED	TRUCK NUMBER	TICKET NUMBER	SLUMP (INCHES)	AIR CONTENT (%)	Concrete TEMP. (°F.)	UNIT WEIGHT (lb/ft³)	WATER ADDED (GALLONS)	AMBIENT AIR TEMP (°F.)	CST Daily Set No.	Comments
512a	650a	6334	31028475	3.5	4.5	70	142.0		60		+ 8 oz. microair AE90
512a	705a	6334	31028475	3.5	6.0	70	140.4	1	60	1	

Compressive Strength Specimen Type:

[X] CYLINDRICAL [ ] CUBE [ ] PRISM

[X] 4x8" [ ] 6x12" [ ] 2X2" [ ] 3X6"

[ ] _____ [ ] _____ [ ] _____

Total Number of specimens molded: 4

Testing & observation requested by: Lance Rundle / Jake

Test results reported on-site to: Lance Rundle / Jake

Please refer to the Compressive Strength Analysis Report, dated the same, for laboratory test data

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name: West Reservoir No. 1 Outlet Works Rehab	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828	**Technician:** D. Gordon
Project Number: 7141.74413.01		**Date:** 7/8/2016
Client: West Reservoir & Ditch Co.		**Placement Location:** Head wall
Concrete Supplier: United Companies - Delta	**FIELD TEST RESULTS**	

[X] **CONCRETE** [ ] **GROUT** [ ] **CEMENT** [ ] **FLOW FILL** [ ] _____

BATCH TIME	TIME SAMPLED	TRUCK NUMBER	TICKET NUMBER	SLUMP (INCHES)	AIR CONTENT (%)	Concrete TEMP. (°F.)	UNIT WEIGHT (lb/ft³)	WATER ADDED (GALLONS)	AMBIENT AIR TEMP (°F.)	CST Daily Set No.	Comments
1128a	1138a	6086	31028541	2.5	5.4	88	140.0	2	75	1	

Compressive Strength Specimen Type:

[X] CYLINDRICAL [ ] CUBE [ ] PRISM

[X] 4x8" [ ] 6x12" [ ] 2X2" [ ] 3X6"

[ ] _____ [ ] _____ [ ] _____

Total Number of specimens molded: 4

Testing & observation requested by: Lance Rundle

Test results reported on-site to: Jake / Doug

Please refer to the Compressive Strength Analysis Report, dated the same, for laboratory test data

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name: West Reservoir No. 1 Outlet Works Rehab	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828	**Technician:** J. Harshman
Project Number: 7141.74413.01		**Date:** 7/12/2016
Client: West Reservoir & Ditch Co.		**Placement Location:** Outlet works STA 3+10 to headwall
Concrete Supplier: United Companies - Delta	**FIELD TEST RESULTS**	

[X] **CONCRETE** [ ] **GROUT** [ ] **CEMENT** [ ] **FLOW FILL** [ ] _____

BATCH TIME	TIME SAMPLED	TRUCK NUMBER	TICKET NUMBER	SLUMP (INCHES)	AIR CONTENT (%)	Concrete TEMP. (°F.)	UNIT WEIGHT (lb/ft³)	WATER ADDED (GALLONS)	AMBIENT AIR TEMP (°F.)	CST Daily Set No.	Comments
932a	1119a	6365	31028567	6.0	6.1	70	139.1	0	74		

Compressive Strength Specimen Type:

[X] CYLINDRICAL [ ] CUBE [ ] PRISM

[X] 4x8" [ ] 6x12" [ ] 2X2" [ ] 3X6"

[ ] _____ [ ] _____ [ ] _____

Total Number of specimens molded: 4

Testing & observation requested by: Lance Rundle

Test results reported on-site to: Jake Dickerson

Please refer to the Compressive Strength Analysis Report, dated the same, for laboratory test data

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name: West Reservoir No. 1 Outlet Works Rehab	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828	**Technician:** D. Gordon
Project Number: 7141.74413.01		**Date:** 7/8/2016
Client: West Reservoir & Ditch Co.		**Placement Location:** Outlet conduit First 11'
Concrete Supplier: United Companies - Delta	**FIELD TEST RESULTS**	

[X] **CONCRETE** [ ] **GROUT** [ ] **CEMENT** [ ] **FLOW FILL** [ ] _____

BATCH TIME	TIME SAMPLED	TRUCK NUMBER	TICKET NUMBER	SLUMP (INCHES)	AIR CONTENT (%)	Concrete TEMP. (°F.)	UNIT WEIGHT (lb/ft³)	WATER ADDED (GALLONS)	AMBIENT AIR TEMP (°F.)	CST Daily Set No.	Comments
1159a	140a	6365	31028707	4.0	4.5	88	139.8	0	86	1	

Compressive Strength Specimen Type:

[X] CYLINDRICAL [ ] CUBE [ ] PRISM

[X] 4x8" [ ] 6x12" [ ] 2X2" [ ] 3X6"

[ ] _____ [ ] _____ [ ] _____

Total Number of specimens molded: 5

Testing & observation requested by: Lance Rundle

Test results reported on-site to: Jake

Please refer to the Compressive Strength Analysis Report, dated the same, for laboratory test data

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

Project Name: West Reservoir No. 1 Outlet Works Rehab	DOWL WWW.DOWL.COM 222 South Park Avenue Montrose, Colorado 81401 970-249-6828	**Technician:** D. Gordon
Project Number: 7141.74413.01		**Date:** 8/17/2016
Client: West Reservoir & Ditch Co.		**Placement Location:** Handwheel pedestal at shop
Concrete Supplier: United Companies - Delta	**FIELD TEST RESULTS**	

[X] **CONCRETE** [ ] **GROUT** [ ] **CEMENT** [ ] **FLOW FILL** [ ] _____

BATCH TIME	TIME SAMPLED	TRUCK NUMBER	TICKET NUMBER	SLUMP (INCHES)	AIR CONTENT (%)	Concrete TEMP. (°F.)	UNIT WEIGHT (lb/ft³)	WATER ADDED (GALLONS)	AMBIENT AIR TEMP (°F.)	CST Daily Set No.	Comments
603a	709a	6378	31028846	3.0	4.5	68	140.8	0	57	1	

Compressive Strength Specimen Type:

[X] CYLINDRICAL [ ] CUBE [ ] PRISM

[X] 4x8" [ ] 6x12" [ ] 2X2" [ ] 3X6"

[ ] _____ [ ] _____ [ ] _____

Total Number of specimens molded: 5

Testing & observation requested by: Lance Rundle

Test results reported on-site to: Lance Rundle

Please refer to the Compressive Strength Analysis Report, dated the same, for laboratory test data

Please refer to the Field Observation Report, dated the same, for on-site activities and test data detail.

DOWL
www.dowl.com
222 South Park Avenue
Montrose, Colorado 81401
970-249-6828

FIELD / LAB TEST DATA - COMPRESSIVE STRENGTH ANALYSIS

[X] CONCRETE CYLINDER [ ] MASONRY GROUT CYLINDER [ ] FLOW FILL CYLINDER
[ ] MASONRY GROUT CUBE [ ] CEMENT CUBE [ ] CONCRETE PRISM [ ] GROUT PRISM

Sample Date: **May 26, 2016** Technician: **D. Gordon**

Project Name: **West Reservoir No. 1 O.W.R** Project Set No. **1** Daily Set No. **1**

Project Number: **7141.74413.01** Submitted to Lab By: **D. Gordon** Date: **5/27/2016**

Client: **West Reservoir and Ditch Company** Testing Requested By: **Lance Rundle**

Concrete Supplier: **United Companies - Delta** Truck#: **6373** Ticket#: **71028179**

Mix Identification#: **37010362** Batch size: **5** cubic yards Batch Time: **1037a** Sample Time: **1132a**

Time in Mixer **0** hours **55** minutes Water Added Before Sampling: **0** gallons Ambient Air Temp. (°F.): **78**

Maximum Size Aggregate: **3/4** inches Required Strength: **4000** psi at **28** days

Sample Location: **Precast form at Shop**

AREA/TYPE PLACEMENT: [ ] CURB/GUTTER [ ] FLOOR SLAB [ ] FOOTING [ ] WALL
[X] OTHER: **Outlet structure precast**

SAMPLING:
(Fresh Concrete) [X] ASTM C172 (Fresh Concrete) [ ] AASHTO T141
[ ] ASTM C1019 (Grout)
Sampled From: chute

UNIT WEIGHT:
[X] ASTM C138 [ ] AASHTO T121
Test Results: **140.4** lb/ft³ (LBF/cubic foot)

CONCRETE TEMPERATURE:
[X] ASTM C1064 [ ] OTHER
Test Results: **70** degrees F.

AIR-CONTENT:
[ ] ASTM C153 [ ] ASTM C173
[X] ASTM C231 [ ] AASHTO T196
Test Results: **5.4** % (percent)

SLUMP:
[X] ASTM C143 [ ] AASHTO T199
[ ] ASTM C1611 [ ]
Test Results: **4.75** in. (inches)

Number of specimens molded: **5**
Approximate size of specimen mold:
Cylindrical: [X] 4x8" [ ] 6x12" [ ]
CUBE [ ] PRISM [ ] Other [ ]

LABORATORY TEST DATA

Specimens cured and tested in the laboratory in accordance with: Field cured and molded: [X] ASTM C31 [ ] AASHTO T23 Cylinders [X] ASTM C39 Cubes [ ] ASTMC109 Drilled Cores [ ] ASTM C42 Storage Tanks [X] ASTM C511

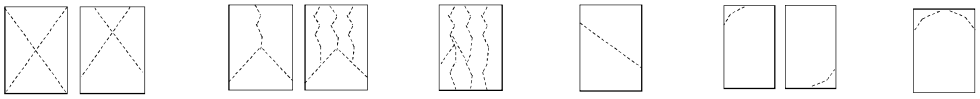
SPECIMEN IDENTIFICATION	DATE TESTED YEAR: 2016	AGE IN DAYS	SPECIMEN MEASUREMENTS Diameter 1	Diameter 2	Average Diameter	Cross Sectional Area	COMPRESSIVE STRENGTH TEST DATA Maximum Load LBF	PSI	FRACTURE TYPE # (See sketch below)	% of spec. achieved	CAP TYPE C1231 NEO. PADS	C617 GYP. CAP	Other	TEST BY
941	**June 2**	**7**	4.007	3.983	3.995	**12.54**	**49380**	**3940**	**1**	**98.5**	**X**			**SJ**
942	**June 2**	**7**	3.993	4.002	3.998	**12.55**	**49150**	**3920**	**1**	**98.0**	**X**			**SJ**
943	**June 23**	**28**	4.009	3.986	3.998	**12.55**	**67630**	**5390**	**1**	**100+**	**X**			**SJ**
944	**June 23**	**28**	4.005	3.986	3.996	**12.54**	**64150**	**5120**	**5**	**100+**	**X**			**SJ**
945	**June 23**	**H**	Tossed											**SJ**

AVERAGE **7** -DAYS AT **3930** PSI AVERAGE **28** -DAYS AT **5260** PSI

COMMENTS:

FRACTURE PATTERN TYPES

Type 1 Type 2 Type 3 Type 4 Type 5 Type 6



Note: Type 5 & 6 commonly occur with unbonded caps.

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FIELD / LAB TEST DATA - COMPRESSIVE STRENGTH ANALYSIS

[X] CONCRETE CYLINDER [ ] MASONRY GROUT CYLINDER [ ] FLOW FILL CYLINDER
[ ] MASONRY GROUT CUBE [ ] CEMENT CUBE [ ] CONCRETE PRISM [ ] GROUT PRISM

Sample Date: **June 22, 2016** Technician: **D. Gordon**

Project Name: **West Reservoir No. 1 O.W.R** Project Set No. **2** Daily Set No. **1**

Project Number: **7141.74413.01** Submitted to Lab By: **D. Gordon** Date: **6/23/2016**

Client: **West Reservoir and Ditch Company** Testing Requested By: **Lance Rundle**

Concrete Supplier: **United Companies - Delta** Truck#: **6365** Ticket#: **31028434**

Mix Identification#: **36510352** Batch size: **7** cubic yards Batch Time: **635a** Sample Time: **835a**

Time in Mixer **2** hours **0** minutes Water Added Before Sampling: **see FOR** gallons Ambient Air Temp. (°F.): **70**

Maximum Size Aggregate: **3/4** inches Required Strength: **4000** psi at **28** days

Sample Location: **STA 2+50**

AREA/TYPE PLACEMENT: [ ] CURB/GUTTER [ ] FLOOR SLAB [ ] FOOTING [ ] WALL
[X] OTHER: **Outlet structure conduit**

SAMPLING:
(Fresh Concrete) [X] ASTM C172 (Fresh Concrete) [ ] AASHTO T141
[ ] ASTM C1019 (Grout)
Sampled From: chute

UNIT WEIGHT:
[X] ASTM C138 [ ] AASHTO T121
Test Results: **141.4** lb/ft³ (LBF/cubic foot)

CONCRETE TEMPERATURE:
[X] ASTM C1064 [ ] OTHER
Test Results: **78** degrees F.

AIR-CONTENT:
[ ] ASTM C153 [ ] ASTM C173
[X] ASTM C231 [ ] AASHTO T196
Test Results: **5.0** % (percent)

SLUMP:
[X] ASTM C143 [ ] AASHTO T199
[ ] ASTM C1611 [ ]
Test Results: **5.0** in. (inches)

Number of specimens molded: **4**
Approximate size of specimen mold:
Cylindrical: [X] 4x8" [ ] 6x12" [ ]
CUBE [ ] PRISM [ ] Other [ ]

LABORATORY TEST DATA

Specimens cured and tested in the laboratory in accordance with: Field cured and molded: [X] ASTM C31 [ ] AASHTO T23 Cylinders [X] ASTM C39 Cubes [ ] ASTMC109 Drilled Cores [ ] ASTM C42 Storage Tanks [X] ASTM C511

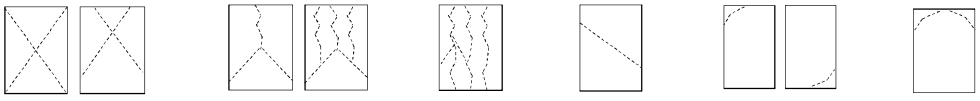
SPECIMEN IDENTIFICATION	DATE TESTED YEAR: 2016	AGE IN DAYS	SPECIMEN MEASUREMENTS Diameter 1	Diameter 2	Average Diameter	Cross Sectional Area	COMPRESSIVE STRENGTH TEST DATA Maximum Load LBF	PSI	FRACTURE TYPE # (See sketch below)	% of spec. achieved	CAP TYPE C1231 NEO. PADS	C617 GYP. CAP	Other	TEST BY
1069	**June 29**	**7**	3.995	4.013	4.004	**12.59**	**39360**	**3130**	**2**	**78.3**	**X**			**SJ**
1070	**July 20**	**28**	4.006	4.008	4.007	**12.61**	**57450**	**4560**	**2**	**100+**	**X**			**SJ**
1071	**July 20**	**28**	4.007	4.009	4.008	**12.62**	**55610**	**4410**	**2**	**100+**	**X**			**SJ**
1072	**July 20**	**H**	Tossed											**SJ**

AVERAGE **28** -DAYS AT **4490** PSI AVERAGE _____ -DAYS AT _____ PSI

COMMENTS:

FRACTURE PATTERN TYPES

Type 1 Type 2 Type 3 Type 4 Type 5 Type 6



Note: Type 5 & 6 commonly occur with unbonded caps.

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FIELD / LAB TEST DATA - COMPRESSIVE STRENGTH ANALYSIS

[X] CONCRETE CYLINDER [ ] MASONRY GROUT CYLINDER [ ] FLOW FILL CYLINDER
[ ] MASONRY GROUT CUBE [ ] CEMENT CUBE [ ] CONCRETE PRISM [ ] GROUT PRISM

Sample Date: **June 29, 2016** Technician: **D. Gordon**
Project Name: **West Reservoir No. 1 O.W.R** Project Set No. **3** Daily Set No. **1**
Project Number: **7141.74413.01** Submitted to Lab By: **D. Gordon** Date: **6/23/2016**
Client: **West Reservoir and Ditch Company** Testing Requested By: **Lance Rundle**

Concrete Supplier: **United Companies - Delta** Truck#: **6334** Ticket#: **31028475**
Mix Identification#: **36510352** Batch size: **4** cubic yards Batch Time: **512a** Sample Time: **705a**
Time in Mixer **1** hours **53** minutes Water Added Before Sampling: **1** gallons Ambient Air Temp. (°F.): **60**
Maximum Size Aggregate: **3/4** inches Required Strength: **4000** psi at **28** days
Sample Location: **north end**
AREA/TYPE PLACEMENT: [ ] CURB/GUTTER [ ] FLOOR SLAB [X] FOOTING [ ] WALL
[ ] OTHER:

SAMPLING:
(Fresh Concrete) [X] ASTM C172 (Fresh Concrete) [ ] AASHTO T141
[ ] ASTM C1019 (Grout)
Sampled From: chute

UNIT WEIGHT:
[X] ASTM C138 [ ] AASHTO T121
Test Results: **140.4** lb/ft³ (LBF/cubic foot)

CONCRETE TEMPERATURE:
[X] ASTM C1064 [ ] OTHER
Test Results: **70** degrees F.

AIR-CONTENT:
[ ] ASTM C153 [ ] ASTM C173
[X] ASTM C231 [ ] AASHTO T196
Test Results: **6.0** % (percent)

SLUMP:
[X] ASTM C143 [ ] AASHTO T199
[ ] ASTM C1611 [ ]
Test Results: **3.5** in. (inches)

Number of specimens molded: **4**
Approximate size of specimen mold:
Cylindrical: [X] 4x8" [ ] 6x12" [ ]
CUBE [ ] PRISM [ ] Other [ ]

LABORATORY TEST DATA

Specimens cured and tested in the laboratory in accordance with: Field cured and molded: [X] ASTM C31 [ ] AASHTO T23 Cylinders [X] ASTM C39 Cubes [ ] ASTMC109 Drilled Cores [ ] ASTM C42 Storage Tanks [X] ASTM C511

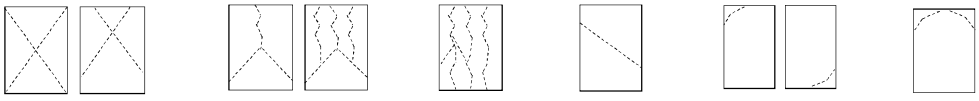
SPECIMEN IDENTIFICATION	DATE TESTED YEAR: 2016	AGE IN DAYS	SPECIMEN MEASUREMENTS Diameter 1	Diameter 2	Average Diameter	Cross Sectional Area	COMPRESSIVE STRENGTH TEST DATA Maximum Load LBF	PSI	FRACTURE TYPE # (See sketch below)	% of spec. achieved	CAP TYPE C1231 NEO. PADS	C617 GYP. CAP	Other	TEST BY
1107	**July 6**	**7**	3.997	4.006	4.002	**12.58**	**45440**	**3610**	**1**	**90.3**	**X**			**SJ**
1108	**July 27**	**28**	3.999	4.002	4.001	**12.57**	**59220**	**4710**	**1**	**100+**	**X**			**SJ**
1109	**July 27**	**28**	4.011	3.992	4.002	**12.58**	**58740**	**4670**	**2**	**100+**	**X**			**SJ**
1110	**July 27**	**H**	Tossed											**SJ**

AVERAGE **28** -DAYS AT **4690** PSI AVERAGE _____ -DAYS AT _____ PSI

COMMENTS:

FRACTURE PATTERN TYPES

Type 1 Type 2 Type 3 Type 4 Type 5 Type 6



Note: Type 5 & 6 commonly occur with unbonded caps.

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FIELD / LAB TEST DATA - COMPRESSIVE STRENGTH ANALYSIS

[X] CONCRETE CYLINDER [ ] MASONRY GROUT CYLINDER [ ] FLOW FILL CYLINDER

[ ] MASONRY GROUT CUBE [ ] CEMENT CUBE [ ] CONCRETE PRISM [ ] GROUT PRISM

Sample Date: **July 8, 2016** Technician: **D. Gordon**

Project Name: **West Reservoir No. 1 O.W.R** Project Set No. **4** Daily Set No. **1**

Project Number: **7141.74413.01** Submitted to Lab By: **D. Gordon** Date: **7/9/2016**

Client: **West Reservoir and Ditch Company** Testing Requested By: **Lance Rundle**

Concrete Supplier: **United Companies - Delta** Truck#: **6086** Ticket#: **31028541**

Mix Identification#: **36510352** Batch size: **5** cubic yards Batch Time: **1128a** Sample Time: **138p**

Time in Mixer **2** hours **10** minutes Water Added Before Sampling: **2** gallons Ambient Air Temp. (°F.): **75**

Maximum Size Aggregate: **3/4** inches Required Strength: **4000** psi at **28** days

Sample Location: **Headwall; 2' up N end**

AREA/TYPE PLACEMENT: [ ] CURB/GUTTER [ ] FLOOR SLAB [ ] FOOTING [X] WALL

[ ] OTHER:

SAMPLING:
(Fresh Concrete) [X] ASTM C172 (Fresh Concrete) [ ] AASHTO T141
[ ] ASTM C1019 (Grout)
Sampled From: chute

UNIT WEIGHT:
[X] ASTM C138 [ ] AASHTO T121
Test Results: **140.0** lb/ft³ (LBF/cubic foot)

CONCRETE TEMPERATURE:
[X] ASTM C1064 [ ] OTHER
Test Results: **88** degrees F.

AIR-CONTENT:
[ ] ASTM C153 [ ] ASTM C173
[X] ASTM C231 [ ] AASHTO T196
Test Results: **5.4** % (percent)

SLUMP:
[X] ASTM C143 [ ] AASHTO T199
[ ] ASTM C1611 [ ]
Test Results: **2.5** in. (inches)

Number of specimens molded: **4**
Approximate size of specimen mold:
Cylindrical: [X] 4x8" [ ] 6x12" [ ]
CUBE [ ] PRISM [ ] Other [ ]

LABORATORY TEST DATA

Specimens cured and tested in the laboratory in accordance with: Field cured and molded: [X] ASTM C31 [ ] AASHTO T23 Cylinders [X] ASTM C39 Cubes [ ] ASTMC109 Drilled Cores [ ] ASTM C42 Storage Tanks [X] ASTM C511

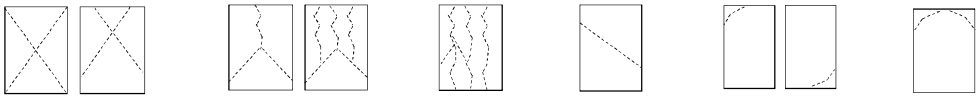
SPECIMEN IDENTIFICATION	DATE TESTED YEAR: 2016	AGE IN DAYS	SPECIMEN MEASUREMENTS Diameter 1	Diameter 2	Average Diameter	Cross Sectional Area	COMPRESSIVE STRENGTH TEST DATA Maximum Load LBF	PSI	FRACTURE TYPE # (See sketch below)	% of spec. achieved	CAP TYPE C1231 NEO. PADS	C617 GYP. CAP	Other	TEST BY
1181	**July 15**	**7**	4.003	4.007	4.005	**12.60**	**35210**	**2790**	**2**	**69.8**	**X**			**SJ**
1182	**Aug. 5**	**28**	4.021	4.011	4.016	**12.67**	**51480**	**4060**	**3**	**100+**	**X**			**JLH**
1183	**Aug. 5**	**28**	4.007	4.017	4.012	**12.64**	**51380**	**4060**	**2**	**100+**	**X**			**JLH**
1185	**Aug. 5**	**H**	Tossed											**JLH**

AVERAGE **28** -DAYS AT **4060** PSI AVERAGE _____ -DAYS AT _____ PSI

COMMENTS:

FRACTURE PATTERN TYPES

Type 1 Type 2 Type 3 Type 4 Type 5 Type 6



Note: Type 5 & 6 commonly occur with unbonded caps.

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FIELD / LAB TEST DATA - COMPRESSIVE STRENGTH ANALYSIS

[X] CONCRETE CYLINDER [ ] MASONRY GROUT CYLINDER [ ] FLOW FILL CYLINDER

[ ] MASONRY GROUT CUBE [ ] CEMENT CUBE [ ] CONCRETE PRISM [ ] GROUT PRISM

Sample Date: **July 12, 2016** Technician: **J. Harshman**

Project Name: **West Reservoir No. 1 O.W.R** Project Set No. **5** Daily Set No. **1**

Project Number: **7141.74413.01** Submitted to Lab By: **D. Gordon** Date: **7/13/2016**

Client: **West Reservoir and Ditch Company** Testing Requested By: **Lance Rundle**

Concrete Supplier: **United Companies - Delta** Truck#: **6365** Ticket#: **31028567**

Mix Identification#: **36510352** Batch size: **5** cubic yards Batch Time: **932a** Sample Time: **1119a**

Time in Mixer **1** hours **47** minutes Water Added Before Sampling: **0** gallons Ambient Air Temp. (°F.): **74**

Maximum Size Aggregate: **3/4** inches Required Strength: **4000** psi at **28** days

Sample Location: **Outlet works hioe STA 3+10 to headwall**

AREA/TYPE PLACEMENT: [ ] CURB/GUTTER [ ] FLOOR SLAB [ ] FOOTING [ ] WALL

[X] OTHER: **encasement**

SAMPLING:
(Fresh Concrete) [X] ASTM C172 (Fresh Concrete) [ ] AASHTO T141
[ ] ASTM C1019 (Grout)
Sampled From: chute

UNIT WEIGHT:
[X] ASTM C138 [ ] AASHTO T121
Test Results: **139.1** lb/ft³ (LBF/cubic foot)

CONCRETE TEMPERATURE:
[X] ASTM C1064 [ ] OTHER
Test Results: **70** degrees F.

AIR-CONTENT:
[ ] ASTM C153 [ ] ASTM C173
[X] ASTM C231 [ ] AASHTO T196
Test Results: **6.1** % (percent)

SLUMP:
[X] ASTM C143 [ ] AASHTO T199
[ ] ASTM C1611 [ ] _____
Test Results: **6.0** in. (inches)

Number of specimens molded: **4**
Approximate size of specimen mold:
Cylindrical: [X] 4x8" [ ] 6x12" [ ] _____
CUBE [ ] PRISM [ ] Other [ ]

LABORATORY TEST DATA

Specimens cured and tested in the laboratory in accordance with: Field cured and molded: [X] ASTM C31 [ ] AASHTO T23 Cylinders [X] ASTM C39 Cubes [ ] ASTMC109 Drilled Cores [ ] ASTM C42 Storage Tanks [X] ASTM C511

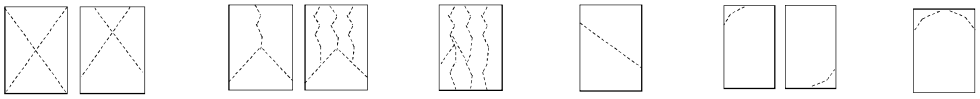
SPECIMEN IDENTIFICATION	DATE TESTED YEAR: 2016	AGE IN DAYS	SPECIMEN MEASUREMENTS Diameter 1	Diameter 2	Average Diameter	Cross Sectional Area	COMPRESSIVE STRENGTH TEST DATA Maximum Load LBF	PSI	FRACTURE TYPE # (See sketch below)	% of spec. achieved	CAP TYPE C1231 NEO. PADS	C617 GYP. CAP	Other	TEST BY
1202	**july 19**	**7**	3.994	3.994	3.994	**12.53**	**37270**	**2970**	**5**	**74.3**	**X**			**SJ**
1203	**Aug. 9**	**28**	3.981	4.021	4.001	**12.57**	**54030**	**4300**	**2**	**100+**	**X**			**SJ**
1204	**Aug. 9**	**28**	4.005	3.992	3.999	**12.56**	**54990**	**4380**	**2**	**100+**	**X**			**SJ**
1205	**Aug. 9**	**H**	Tossed											**SJ**

AVERAGE **28** -DAYS AT **4340** PSI AVERAGE _____ -DAYS AT _____ PSI

COMMENTS:

FRACTURE PATTERN TYPES

Type 1 Type 2 Type 3 Type 4 Type 5 Type 6



Note: Type 5 & 6 commonly occur with unbonded caps.

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FIELD / LAB TEST DATA - COMPRESSIVE STRENGTH ANALYSIS

[X] CONCRETE CYLINDER [ ] MASONRY GROUT CYLINDER [ ] FLOW FILL CYLINDER
[ ] MASONRY GROUT CUBE [ ] CEMENT CUBE [ ] CONCRETE PRISM [ ] GROUT PRISM

Sample Date: **July 28, 2016** Technician: **D. Gordon**

Project Name: **West Reservoir No. 1 O.W.R** Project Set No. **6** Daily Set No. **1**

Project Number: **7141.74413.01** Submitted to Lab By: **D. Gordon** Date: **7/29/2016**

Client: **West Reservoir and Ditch Company** Testing Requested By: **Lance Rundle**

Concrete Supplier: **United Companies - Delta** Truck#: **6365** Ticket#: **31028707**

Mix Identification#: **36510352** Batch size: **3** cubic yards Batch Time: **1159a** Sample Time: **140p**

Time in Mixer **1** hours **41** minutes Water Added Before Sampling: **0** gallons Ambient Air Temp. (°F.): **86**

Maximum Size Aggregate: **3/4** inches Required Strength: **4000** psi at **28** days

Sample Location: **STA 1+12**

AREA/TYPE PLACEMENT: [ ] CURB/GUTTER [ ] FLOOR SLAB [ ] FOOTING [ ] WALL
[X] OTHER: **Outlet Encasement**

SAMPLING:
(Fresh Concrete) [X] ASTM C172 (Fresh Concrete) [ ] AASHTO T141
[ ] ASTM C1019 (Grout)
Sampled From: chute

UNIT WEIGHT:
[X] ASTM C138 [ ] AASHTO T121
Test Results: **139.8** lb/ft³ (LBF/cubic foot)

CONCRETE TEMPERATURE:
[X] ASTM C1064 [ ] OTHER
Test Results: **88** degrees F.

AIR-CONTENT:
[ ] ASTM C153 [ ] ASTM C173
[X] ASTM C231 [ ] AASHTO T196
Test Results: **4.5** % (percent)

SLUMP:
[X] ASTM C143 [ ] AASHTO T199
[ ] ASTM C1611 [ ]
Test Results: **4.0** in. (inches)

Number of specimens molded: **4**
Approximate size of specimen mold:
Cylindrical: [X] 4x8" [ ] 6x12" [ ]
CUBE [ ] PRISM [ ] Other [ ]

LABORATORY TEST DATA

Specimens cured and tested in the laboratory in accordance with: Field cured and molded: [X] ASTM C31 [ ] AASHTO T23; Cylinders [X] ASTM C39; Cubes [ ] ASTMC109; Drilled Cores [ ] ASTM C42; Storage Tanks [X] ASTM C511

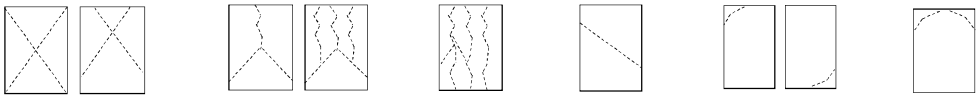
SPECIMEN IDENTIFICATION	DATE TESTED YEAR: 2016	AGE IN DAYS	SPECIMEN MEASUREMENTS Diameter 1	Diameter 2	Average Diameter	Cross Sectional Area	COMPRESSIVE STRENGTH TEST DATA Maximum Load LBF	PSI	FRACTURE TYPE # (See sketch below)	% of spec. achieved	CAP TYPE C1231 NEO. PADS	C617 GYP. CAP	Other	TEST BY
1385	**Aug. 4**	**7**	4.013	4.014	4.014	**12.65**	**44430**	**3510**	**5**	**87.8**	**X**			**SJ**
1386	**Aug. 25**	**28**	4.011	4.012	4.012	**12.64**	**65390**	**5170**	**2**	**100+**	**X**			**SJ**
1387	**Aug. 25**	**28**	4.014	4.013	4.014	**12.65**	**69540**	**5500**	**1**	**100+**	**X**			**SJ**
1388	**Aug. 25**	**H**	Tossed											**SJ**

AVERAGE **28** -DAYS AT **5340** PSI AVERAGE _____ -DAYS AT _____ PSI

COMMENTS:

FRACTURE PATTERN TYPES

Type 1 Type 2 Type 3 Type 4 Type 5 Type 6



Note: Type 5 & 6 commonly occur with unbonded caps.

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FIELD / LAB TEST DATA - COMPRESSIVE STRENGTH ANALYSIS

[X] CONCRETE CYLINDER [ ] MASONRY GROUT CYLINDER [ ] FLOW FILL CYLINDER

[ ] MASONRY GROUT CUBE [ ] CEMENT CUBE [ ] CONCRETE PRISM [ ] GROUT PRISM

Sample Date: **August 17, 2016** Technician: **D. Gordon**

Project Name: **West Reservoir No. 1 O.W.R** Project Set No. **7** Daily Set No. **1**

Project Number: **7141.74413.01** Submitted to Lab By: _____ Date: _____

Client: **West Reservoir and Ditch Company** Testing Requested By: _____

Concrete Supplier: **United Companies** Truck#: **6378** Ticket#: **31028846**

Mix Identification#: **36510352** Batch size: **2** cubic yards Batch Time: **603** Sample Time: **709**

Time in Mixer **1** hours **6** minutes Water Added Before Sampling: **0** gallons Ambient Air Temp. (°F.): **57**

Maximum Size Aggregate: **3/4** inches Required Strength: **4000** psi at **28** days

Sample Location: **Base**

AREA/TYPE PLACEMENT: [ ] CURB/GUTTER [ ] FLOOR SLAB [ ] FOOTING [ ] WALL

[X] OTHER: **Hand work pedestal**

SAMPLING:
(Fresh Concrete) [X] ASTM C172 (Fresh Concrete) [ ] AASHTO T141
[ ] ASTM C1019 (Grout)
Sampled From: chute

UNIT WEIGHT:
[X] ASTM C138 [ ] AASHTO T121
Test Results: **140.8** lb/ft³ (LBF/cubic foot)

CONCRETE TEMPERATURE:
[X] ASTM C1064 [ ] OTHER _____
Test Results: **68** degrees F.

AIR-CONTENT:
[ ] ASTM C153 [ ] ASTM C173
[X] ASTM C231 [ ] AASHTO T196
Test Results: **4.5** % (percent)

SLUMP:
[X] ASTM C143 [ ] AASHTO T199
[ ] ASTM C1611 [ ] _____
Test Results: **3.0** in. (inches)

Number of specimens molded: **4**
Approximate size of specimen mold:
Cylindrical: [X] 4x8" [ ] 6x12" [ ] _____
CUBE [ ] PRISM [ ] Other [ ]

LABORATORY TEST DATA

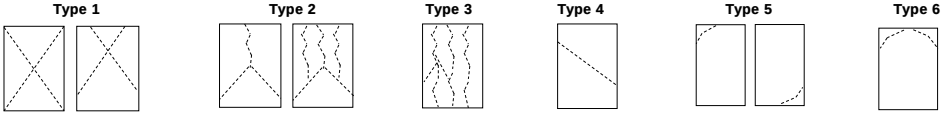
Specimens cured and tested in the laboratory in accordance with — Field cured and molded: [X] ASTM C31 [ ] AASHTO T23 — Cylinders [X] ASTM C39 — Cubes [ ] ASTMC109 — Drilled Cores [ ] ASTM C42 — Storage Tanks [X] ASTM C511

SPECIMEN IDENTIFICATION	DATE TESTED YEAR: 2016	AGE IN DAYS	SPECIMEN MEASUREMENTS Diameter 1	Diameter 2	Average Diameter	Cross Sectional Area	COMPRESSIVE STRENGTH TEST DATA Maximum Load LBF	PSI	FRACTURE TYPE # (See sketch below)	% of spec. achieved	CAP TYPE C1231 NEO. PADS	C617 GYP. CAP	Other	TEST BY
1505	**Aug. 24**	**7**	4.007	4.021	4.014	**12.65**	**52270**	**4130**	**2**	**100+**	**X**			**SJ**
1506	**Sept. 14**	**28**	4.007	3.993	4.000	**12.57**	**74910**	**5960**	**5**	**100+**	**X**			**SJ**
1507	**Sept. 14**	**28**	4.003	4.011	4.007	**12.61**	**77560**	**6150**	**5**	**100+**	**X**			**SJ**
1508	**Sept. 14**	**H**	Tossed											**SJ**

AVERAGE **28** -DAYS AT **6060** PSI AVERAGE _____ -DAYS AT _____ PSI

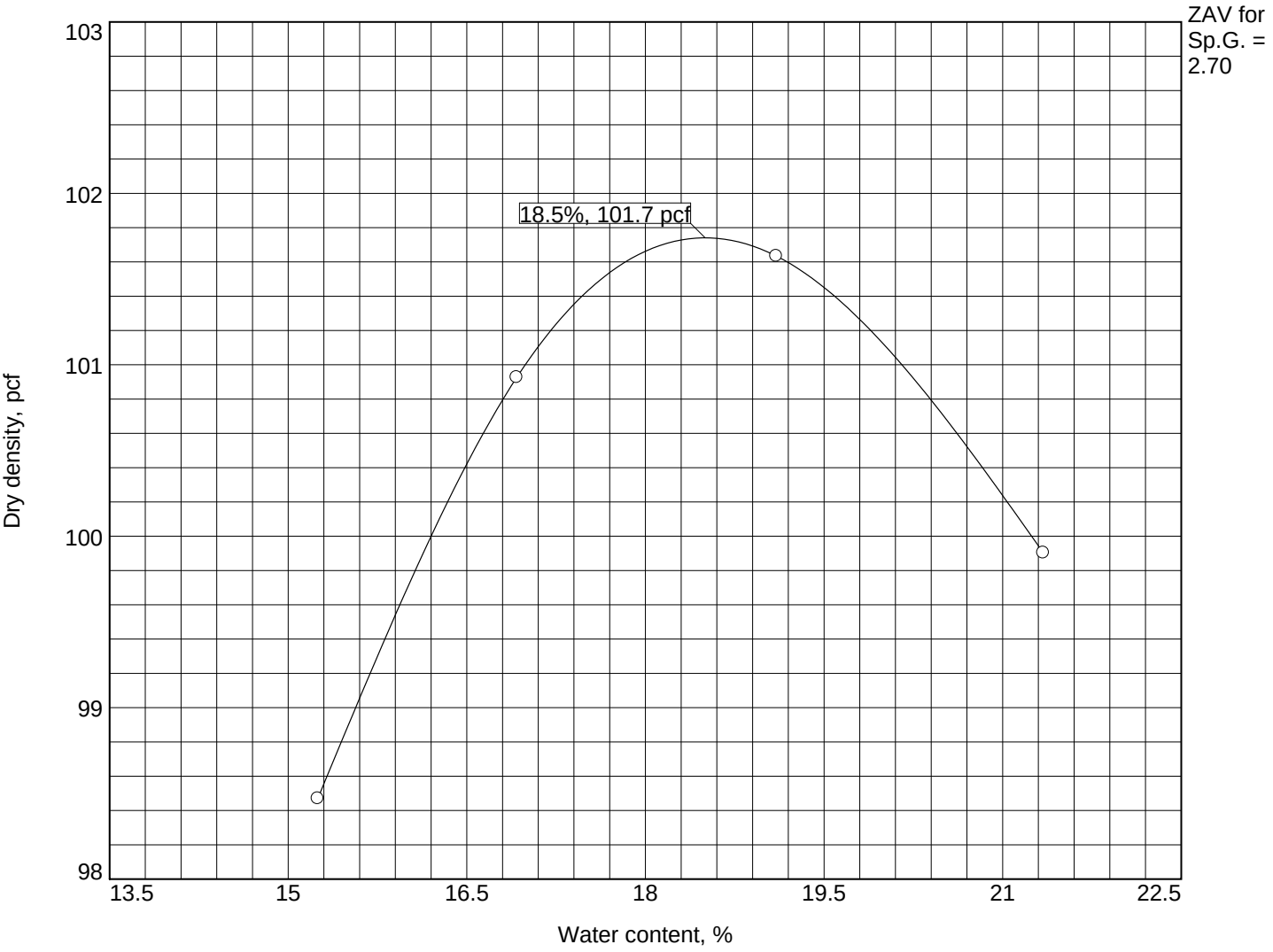
COMMENTS: _____

FRACTURE PATTERN TYPES



Note: Type 5 & 6 commonly occur with unbonded caps.

MOISTURE-DENSITY TEST REPORT



Test specification: ASTM D 698-12 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
	CL	A-7-6(10)		2.7	41	23	4.9	56.3

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 101.7 pcf Optimum moisture = 18.5 %	brown sandy lean CLAY

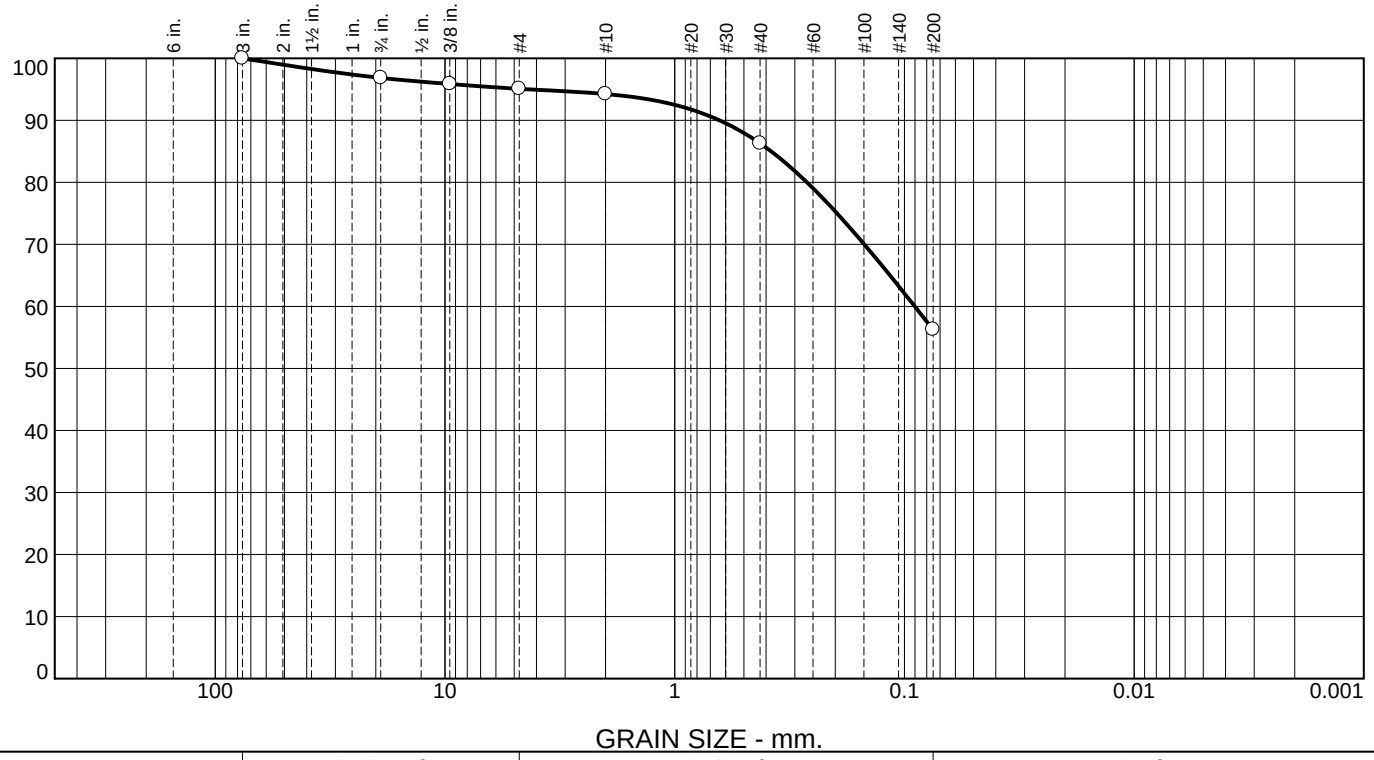
Project No. 7141.74413.01 **Client:** West Reservoir & Ditch Company
Project: West Reservoir No. 1 Outlet Works Rehab
Hotchkiss, CO
○**Location:** on-site stockpile **Sample Number:** 1

Remarks:

DOWL

Tested By: SJ **Checked By:** SJ

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.2	1.7	0.9	7.9	30.0	56.3	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
3/4"	96.8		
3/8"	95.9		
#4	95.1		
#10	94.2		
#40	86.3		
#200	56.3		

* (no specification provided)

Material Description

brown sandy lean CLAY

Atterberg Limits (ASTM D 4318)

PL= 18 **LL=** 41 **PI=** 23

Classification

USCS (D 2487)= CL **AASHTO (M 145)=** A-7-6(10)

Coefficients

D_{90}= 0.6381 D_{85}= 0.3805 D_{60}= 0.0901
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: **Date Tested:** 10/1/15

Tested By: SJ

Checked By: SJ

Title: Laboratory Manager

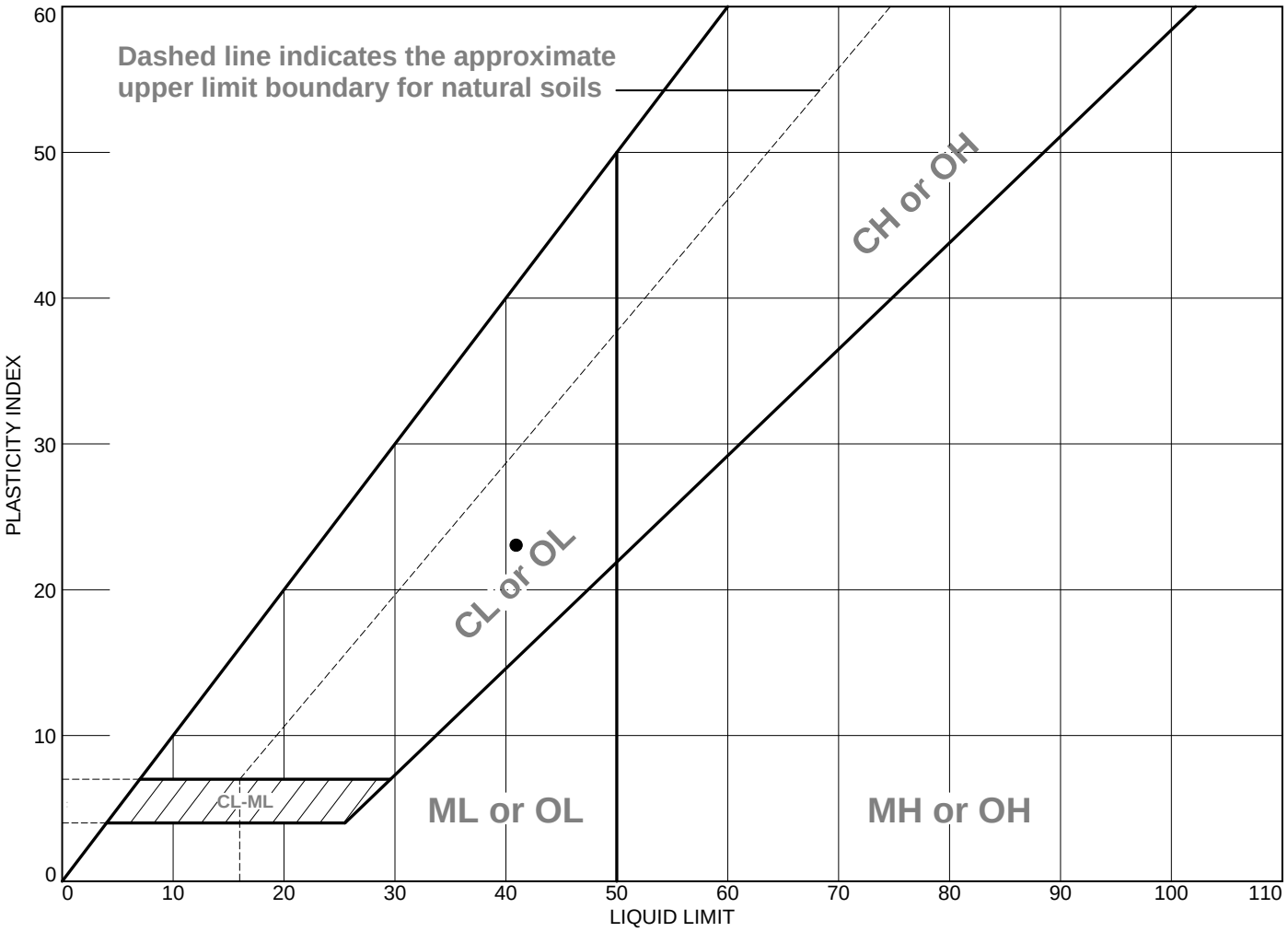
Location: on-site stockpile
Sample Number: 1

Date Sampled: 9/30/15

DOWL

Client: West Reservoir & Ditch Company
Project: West Reservoir No. 1 Outlet Works Rehab
Hotchkiss, CO
Project No: 7141.74413.01

ATTERBERG LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	brown sandy lean CLAY	41	18	23	86.3	56.3	CL

Project No. 7141.74413.01 **Client:** West Reservoir & Ditch Company

Project: West Reservoir No. 1 Outlet Works Rehab

Hotchkiss, CO

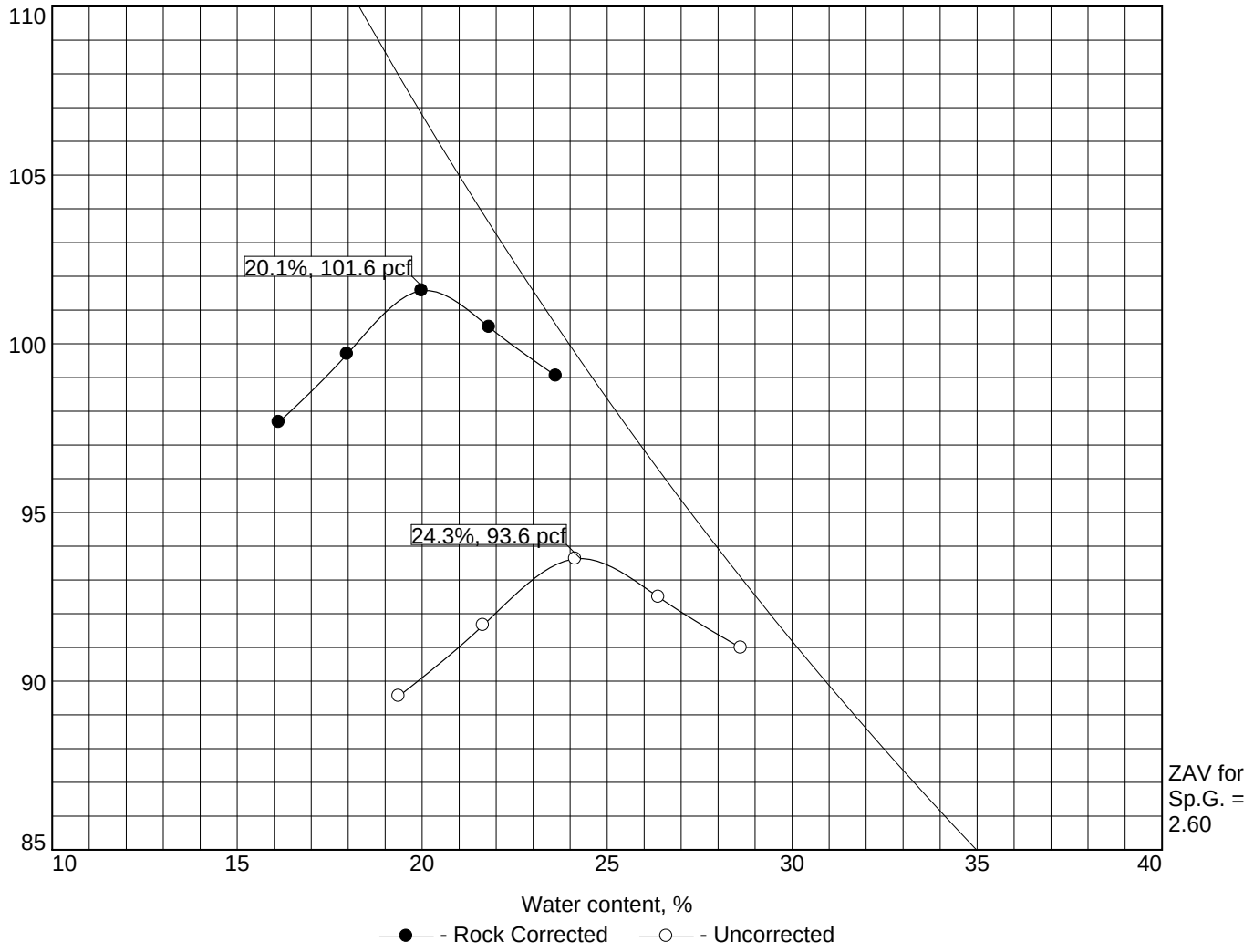
●**Location:** on-site stockpile **Sample Number:** 1

Remarks:

DOWL

Tested By: LC **Checked By:** SJ

MOISTURE-DENSITY RELATIONSHIP



Test specification: ASTM D 698-12 Method A Standard
ASTM D 4718-87 Oversize Corr. Applied to Each Test Point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
0-6'	CH	A-7-6(13)		2.60	54	30	19.0	54.5

ROCK CORRECTED TEST RESULTS	UNCORRECTED	MATERIAL DESCRIPTION
Maximum dry density = 101.6 pcf	93.6 pcf	brown sandy FAT CLAY with gravel
Optimum moisture = 20.1 %	24.3 %	

Project No. 7141.74413.01 **Client:** West Reservoir & Ditch Company
Project: West Reservoir No. 1 Outlet Works Rehab
Hotchkiss, CO
○**Location:** lake borrow area **Sample Number:** 2

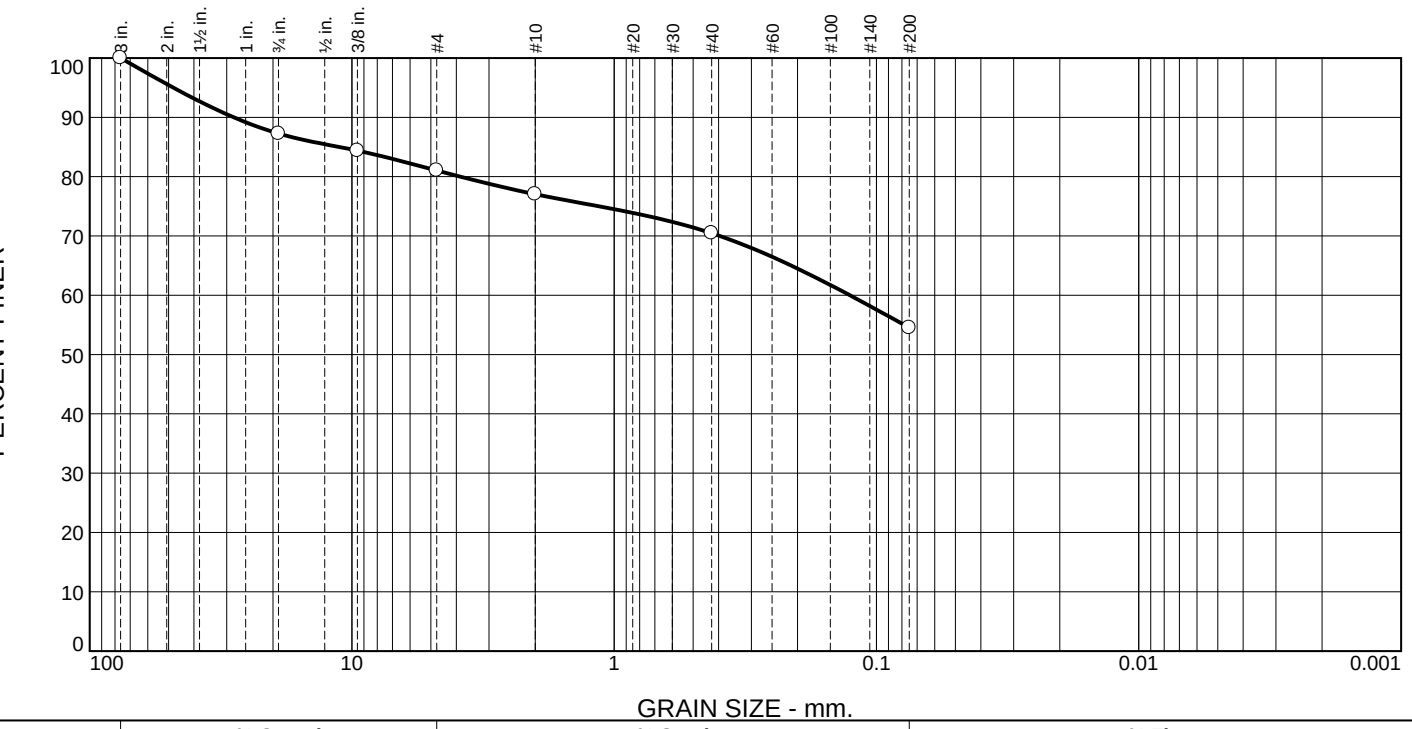
Remarks:

DOWL

Results are for the exclusive use of the client and apply only to the samples testing and are not indicative of apparently identical samples.

Tested By: SJ

Particle Size Distribution



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	12.7	6.3	4.0	6.5	16.0	54.5	

Test Results (ASTM C136 & ASTM C117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
3/4"	87.3		
3/8"	84.4		
#4	81.0		
#10	77.0		
#40	70.5		
#200	54.5		

* (no specification provided)

Material Description

brown sandy FAT CLAY with gravel

Atterberg Limits (ASTM D 4318)

PL= 24 **LL=** 54 **PI=** 30

Classification

USCS (D 2487)= CH **AASHTO (M 145)=** A-7-6(13)

Coefficients

D_{90}= 28.2159 D_{85}= 11.1787 D_{60}= 0.1263
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 6/1/16 **Date Tested:** 6/7/16

Tested By: SJ

Checked By:

Title:

Location: lake borrow area **Date Sampled:** 6/1/16

Sample Number: 2 **Depth:** 0-6'

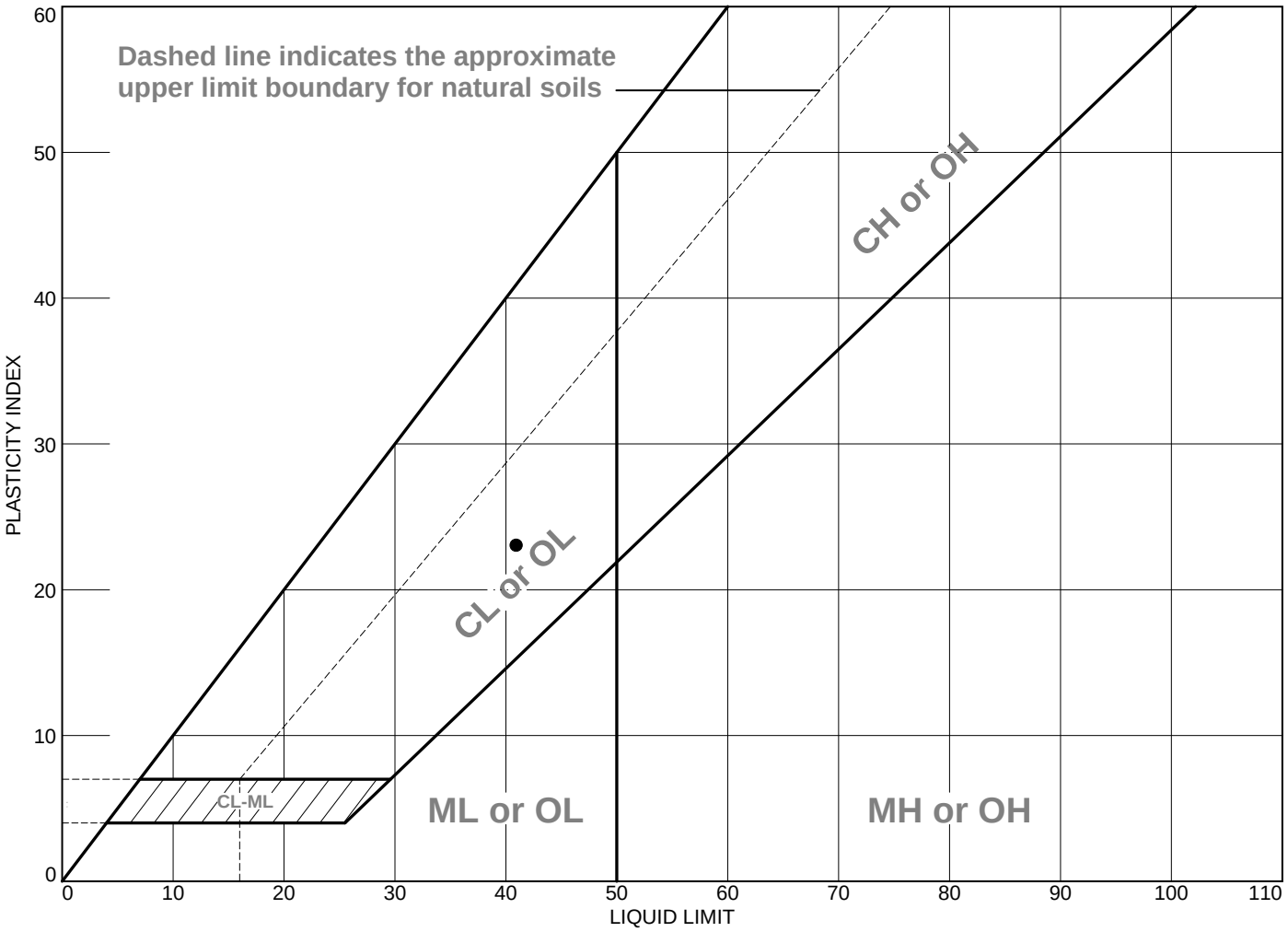
DOWL

Client: West Reservoir & Ditch Company

Project: West Reservoir No. 1 Outlet Works Rehab
Hotchkiss, CO

Project No: 7141.74413.01

ATTERBERG LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	brown sandy lean CLAY	41	18	23	86.3	56.3	CL

Project No. 7141.74413.01 **Client:** West Reservoir & Ditch Company

Project: West Reservoir No. 1 Outlet Works Rehab

Hotchkiss, CO

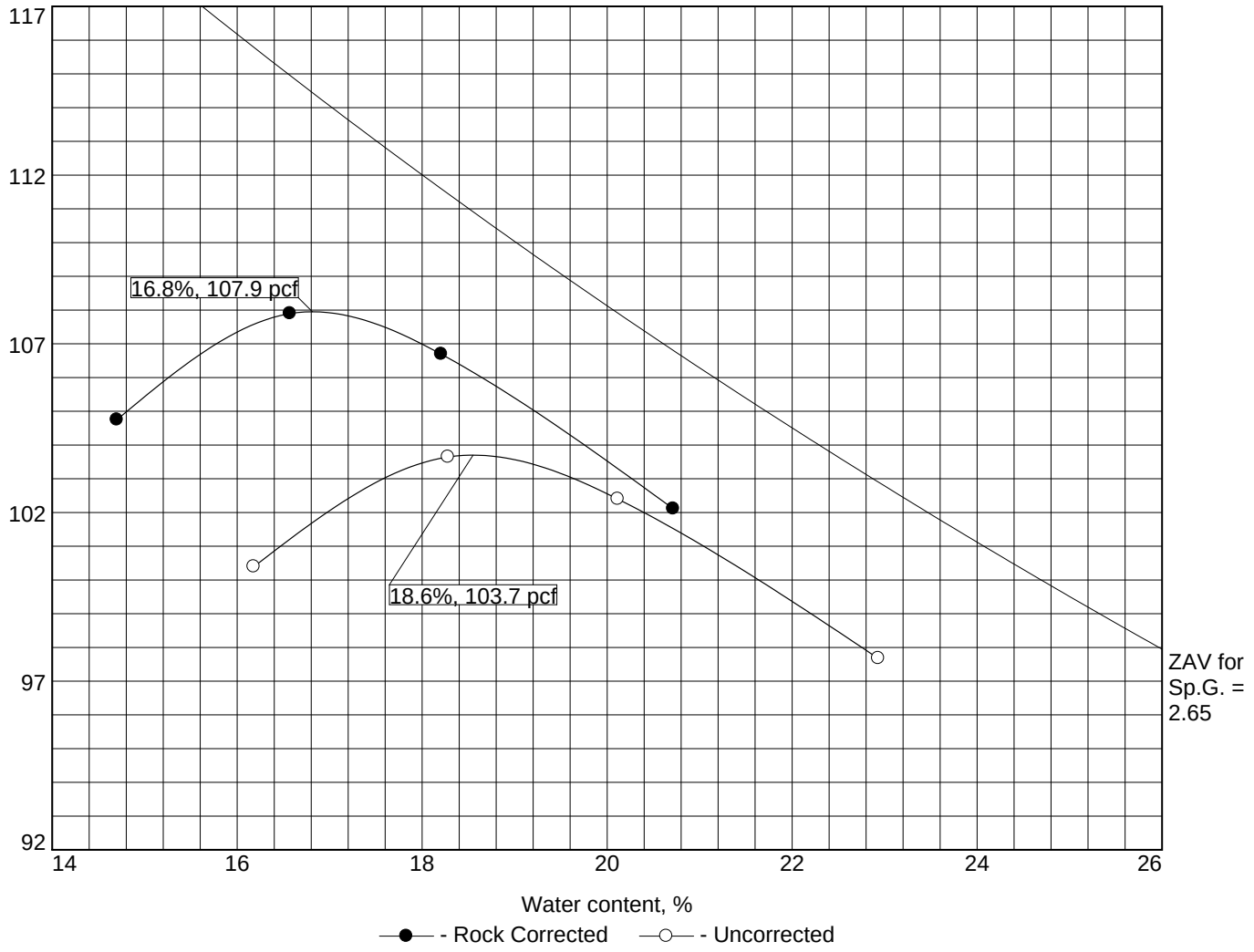
●**Location:** on-site stockpile **Sample Number:** 1

Remarks:

DOWL

Tested By: LC **Checked By:** SJ

MOISTURE-DENSITY TEST REPORT



Test specification: ASTM D 698-12 Method A Standard
ASTM D 4718-87 Oversize Corr. Applied to Each Test Point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
				2.65			10.9	

ROCK CORRECTED TEST RESULTS	UNCORRECTED	MATERIAL DESCRIPTION
Maximum dry density = 107.9 pcf	103.7 pcf	dark brown CLAY (ASTM D2488)
Optimum moisture = 16.8 %	18.6 %	

Project No. 7141.74413.01 **Client:** West Reservoir & Ditch Company
Project: West Reservoir No. 1 Outlet Works Rehab
Hotchkiss, CO
○**Location:** dark blend grab **Sample Number:** 3

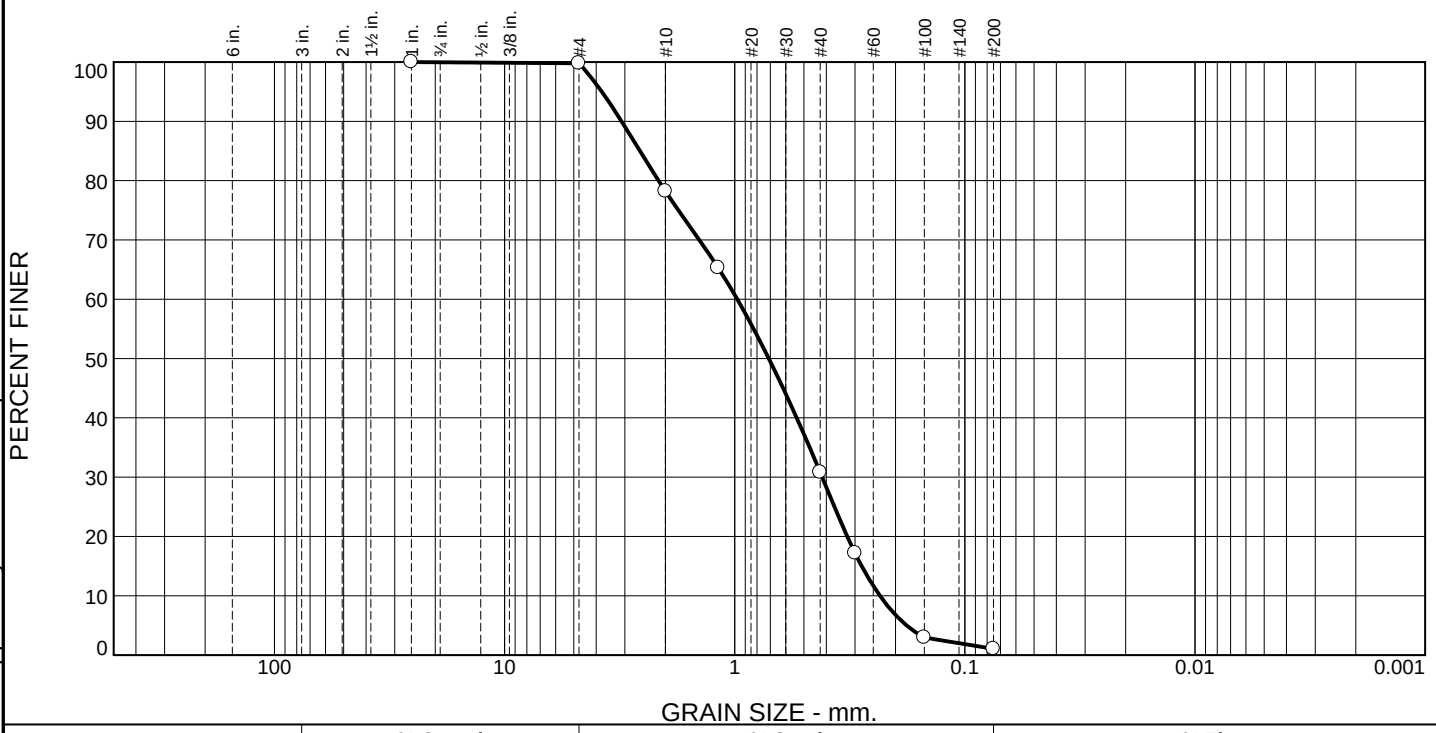
Remarks:

DOWL

Results are for the exclusive use and apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: SJ

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	21.6	47.4	29.8	1.0	

Test Results (ASTM C136 & ASTM C117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0	100.0	
#4	99.8	78.0 - 100.0	
#10	78.2	53.0 - 100.0	
#16	65.3	38.0 - 90.0	
#40	30.8	10.0 - 55.0	
#50	17.2	0.0 - 39.0	
#100	3.0	0.0 - 25.0	
#200	1.0	0.0 - 5.0	

* West Res. C33

Material Description

brown poorly graded SAND

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SP **AASHTO (M 145)=**

Coefficients

D_{90}= 3.1024 D_{85}= 2.5794 D_{60}= 0.9748
D_{50}= 0.7108 D_{30}= 0.4167 D_{15}= 0.2807
D_{10}= 0.2339 C_u= 4.17 C_c= 0.76

Remarks

Date Received: 7/25/16 **Date Tested:** 7/28/16

Tested By: SJ

Checked By:

Title:

Location: C-33 stockpile
Sample Number: 4

Date Sampled: 7/25/16

DOWL

Client: West Reservoir & Ditch Company
Project: West Reservoir No. 1 Outlet Works Rehab
Hotchkiss, CO
Project No: 7141.74413.01

APPENDIX D

HP GEOTECH REPORTS

Hepworth-Pawlak Geotechnical, Inc.
10302 South Progress Way
Parker, Colorado 80134
Phone: 303-841-7119
Fax: 303-841-7556

December 3, 2013

ATTN: Brena Sheridan, P.E.
9800 Mt. Pyramid Court
Suite 330
Englewood, Colorado 80112

213199E

Subject: Laboratory Tests Results for West Reservoir No. 1
Lab Test Request No. 1
RJH Project 13129

Ms. Sheridan:

This letter presents the results of laboratory tests performed on the samples you submitted. Gradations and Atterberg limit tests were run on both samples, and on the combined sample. A standard Proctor Test was run on the combined sample. The test results are presented on the attached figure.

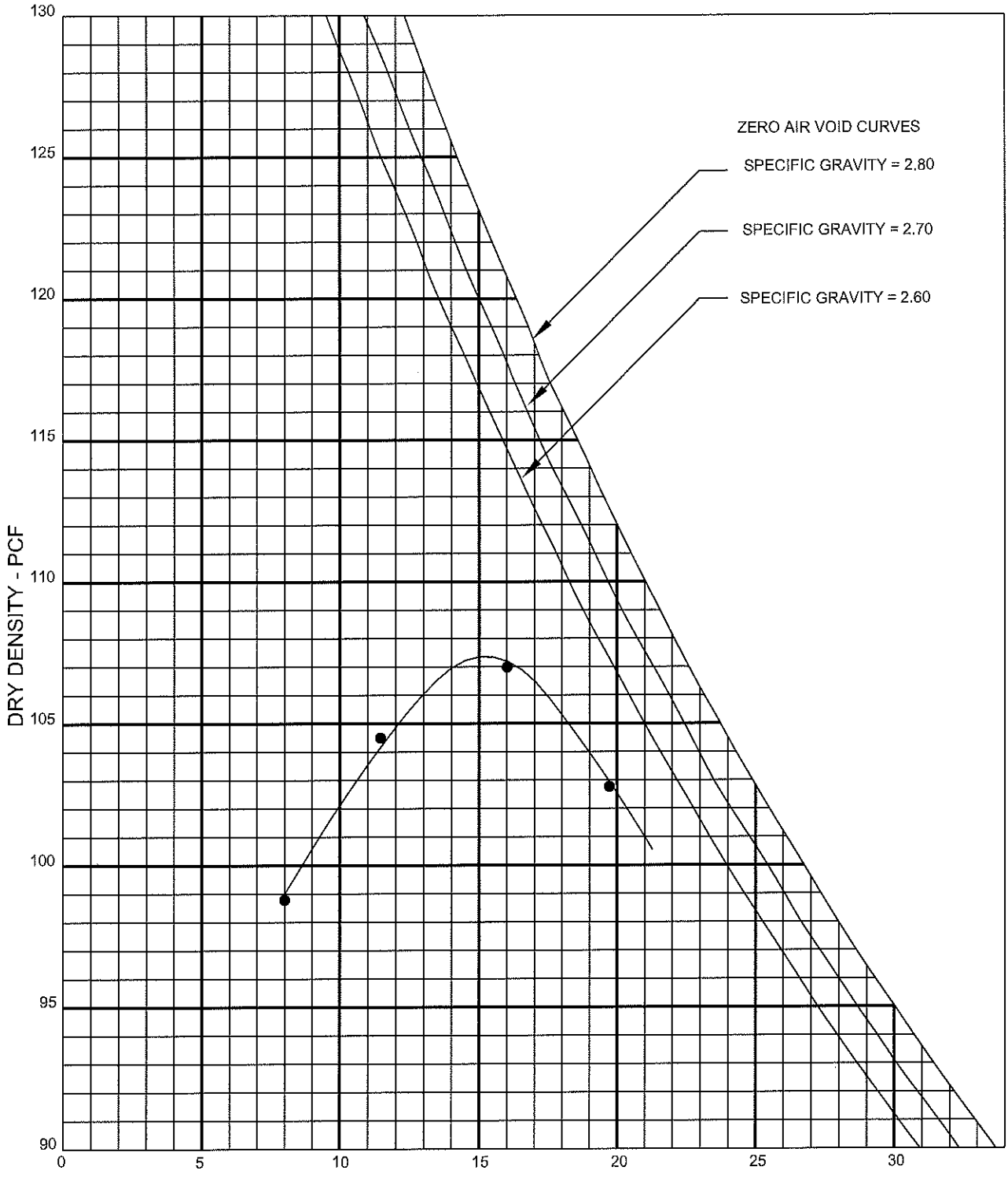
If there are any questions, please feel free to contact us.

Sincerely,

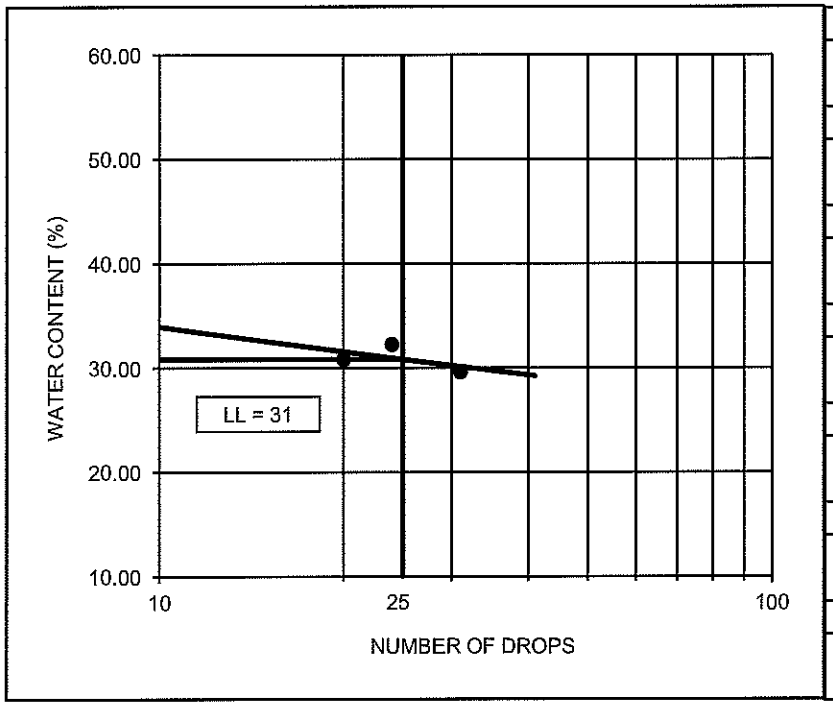
HEPWORTH-PAWLAK GEOTECHNICAL, Inc.

Arben Kalaveshi, P.E.

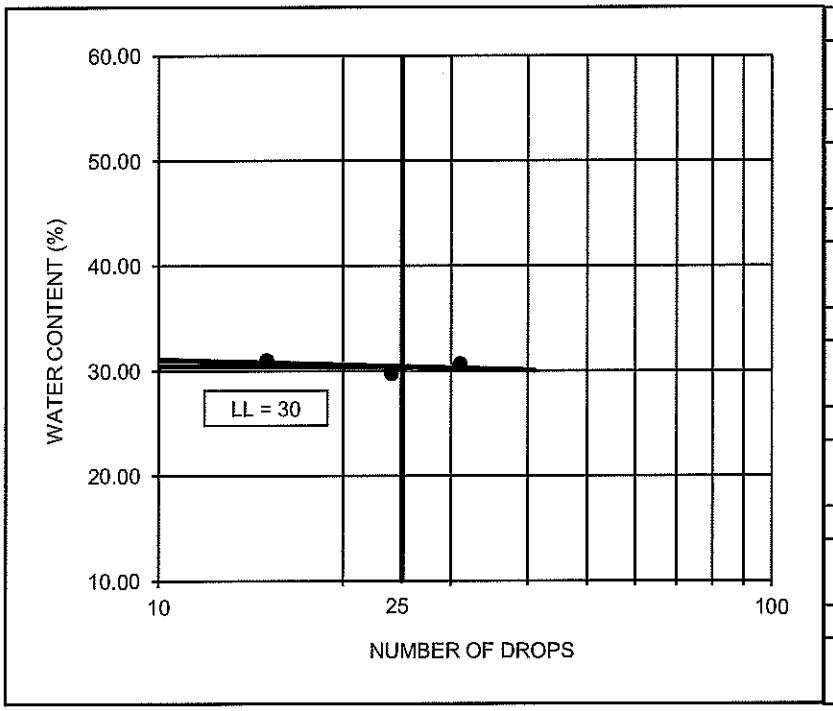
Attachments: Laboratory Test Results



LOCATION : RJH PROJECT 13129	MOISTURE-DENSITY RELATIONSHIPS
CONTRACT LABORATORY TESTING	
SOIL DESCRIPTION : Sand (SC), Clayey, A-6 (1)	HEPWORTH-PAWLAK GEOTECHNICAL, Inc.
MAX. DRY DENSITY : 107.3 PCF OPT. MOIST. CONTENT : 15.1 %	PROCEDURE : ASTM D 698, Method A
LIQUID LIMIT : 31 PLASTICITY INDEX : 18	JOB NO. : 213199E
GRAVEL : 2 % SAND : 59 % SILT AND CLAY (−200) : 39 %	DATE : 12/2/2013, Lab #159 FIG. 1



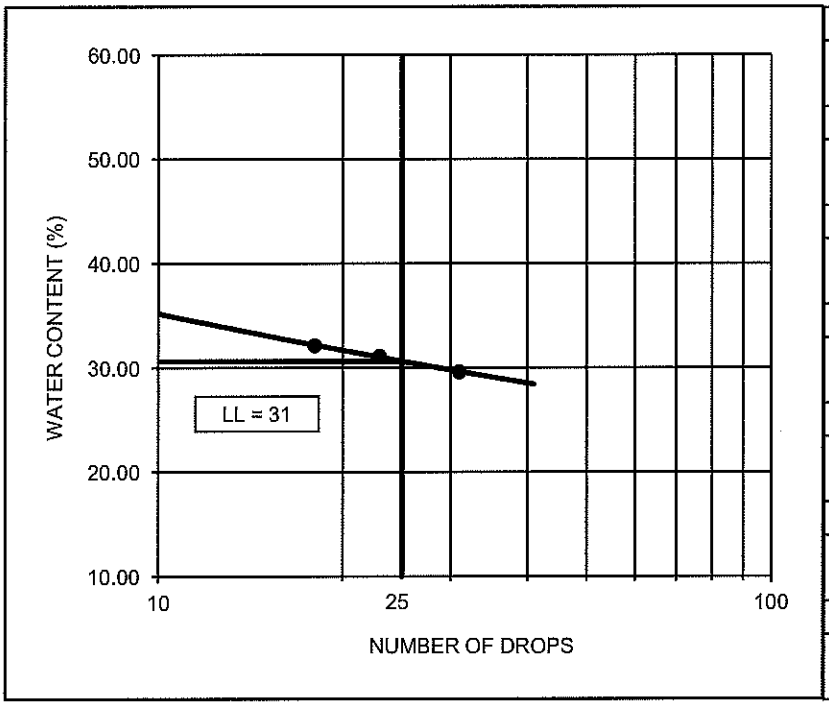
Sample Location:
West Reservoir No. 1
Sample Number:
Dam Upstream Shell
Depth:
--
Material Type:
Sand (SC), clayey A-6 (4)
Liquid Limit:
31
Plastic Limit:
14
Plastic index:
17



Sample Location:
West Reservoir No. 1
Sample Number:
Dam Downstream Shell
Depth:
--
Material Type:
Sand (SC), clayey A-2-7 (0)
Liquid Limit:
30
Plastic Limit:
15
Plastic index:
15

For: RJH Consultants, Inc.
Job Name: West Reservoir No. 1
Job Number: 13129

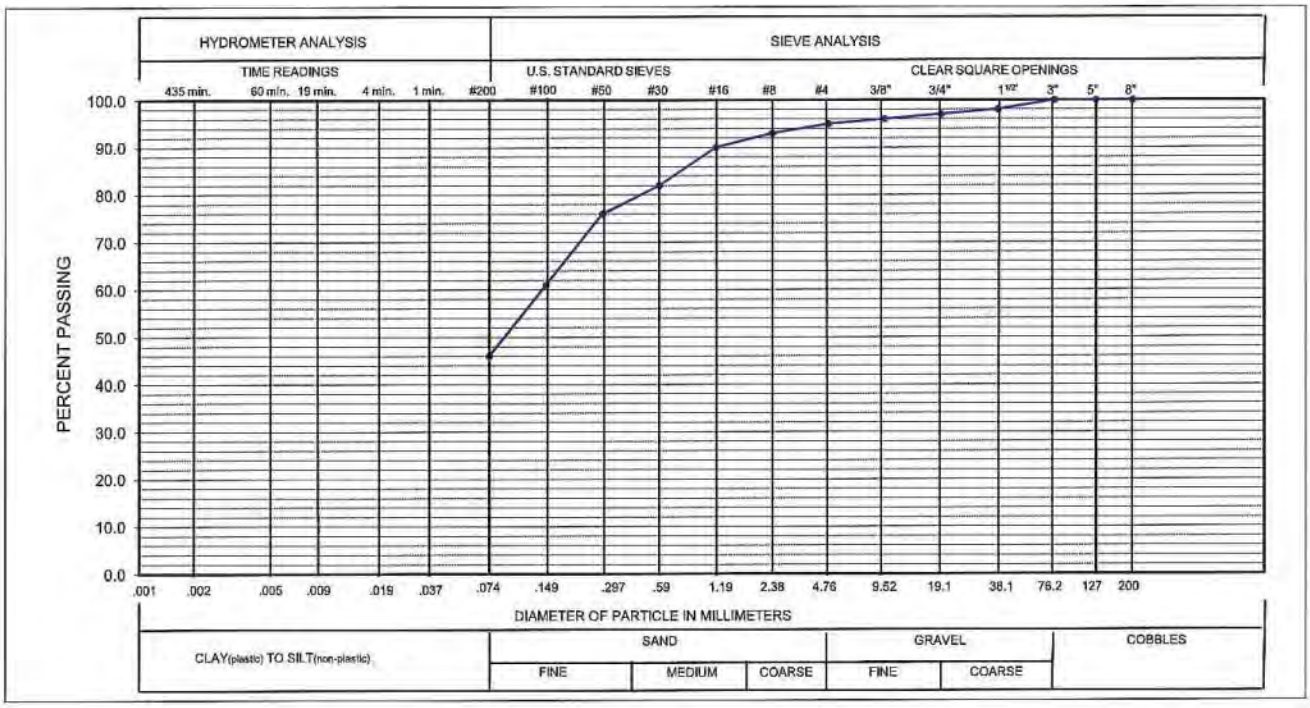
213199E	HEPWORTH-PAWLAK GEOTECHNICAL, INC.	CONTRACT LAB TESTING MULTIPOINT LIQUID LIMIT	FIG. 2



Sample Location:
West Reservoir No. 1
Sample Number:
Combined Sample
Depth:
--
Material Type:
Sand (SC), clayey A-6 (1)
Liquid Limit:
31
Plastic Limit:
13
Plastic index:
18

For: RJH Consultants, Inc.
Job Name: West Reservoir No. 1
Job Number: 13129

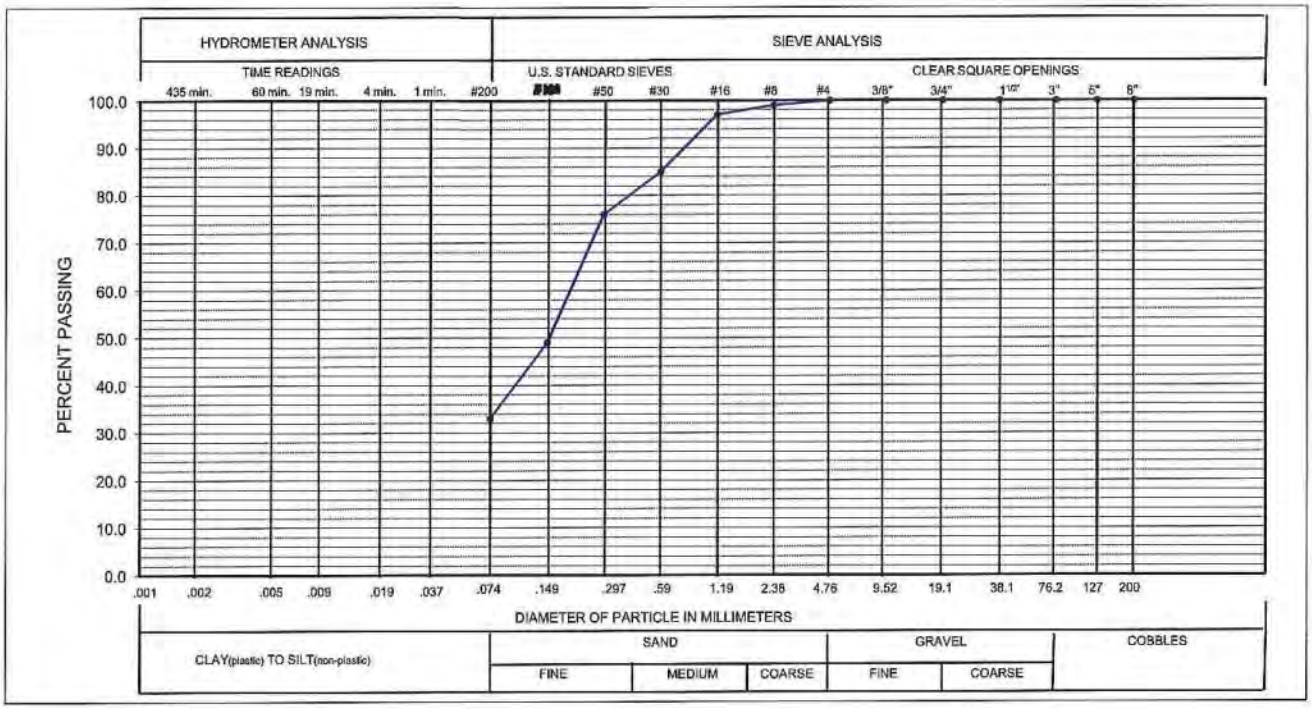
213199A	HEPWORTH-PAWLAK GEOTECHNICAL, INC.	CONTRACT LAB TESTING MULTIPOINT LIQUID LIMIT	FIG. 3



GRAVEL: 5%
LIQUID LIMIT: 31
SAMPLE OF: SAND (SC), clayey A-6 (4)

SAND: 49%

SILT AND CLAY: 46%
PLASTICITY INDEX: 17
West Reservoir No. 1
Dam Upstream Shell

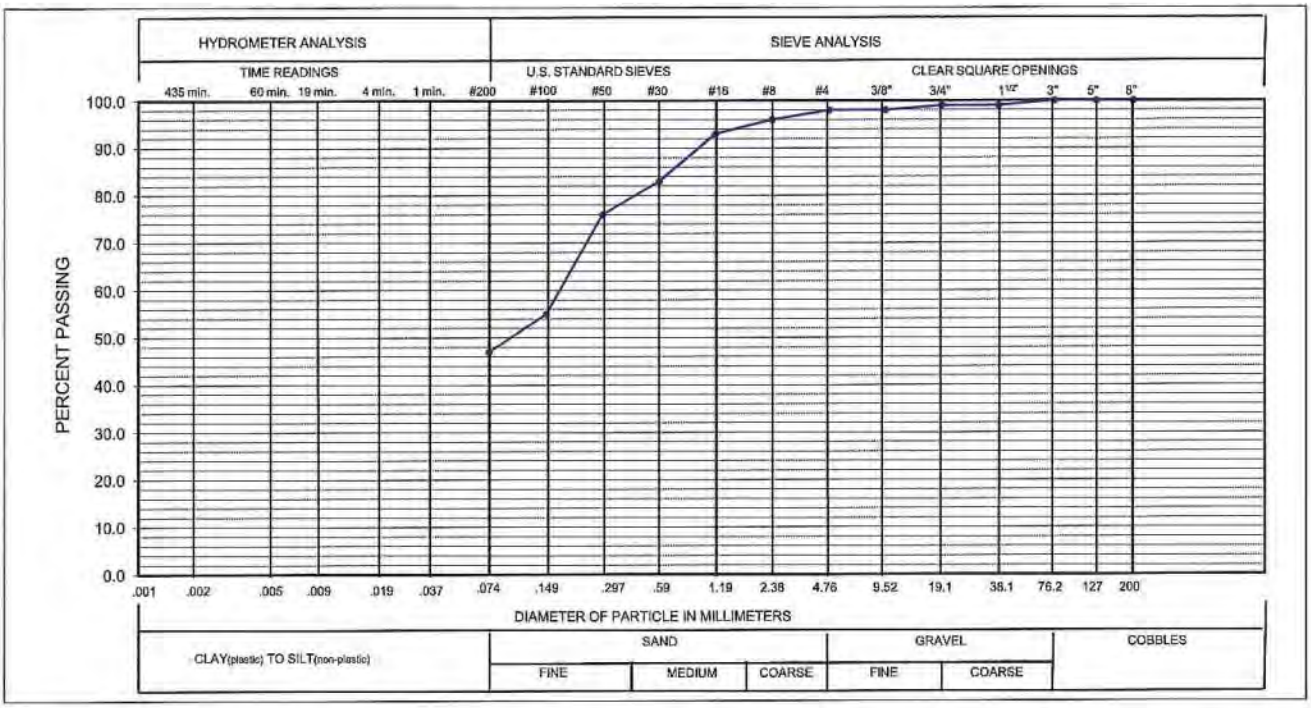


GRAVEL: 0%
LIQUID LIMIT: 31
SAMPLE OF: Sand (SC), clayey A-2-7 (0)

SAND: 67%

SILT AND CLAY: 33%
PLASTICITY INDEX: 15
West Reservoir No. 1
Dam Downstream Shell

213199E	HEPWORTH-PAWLAK GEOTECHNICAL, Inc.	West Reservoir No.1 GRADATION ANALYSIS	FIG. 4



GRAVEL: 2%

SAND: 51%

SILT AND CLAY: 47%

LIQUID LIMIT: 31

PLASTICITY INDEX: 18

SAMPLE OF: SAND (SC), clayey A-6 (1)

West Reservoir No. 1

Combined Sample:
Upstream/Downstream

213199E	HEPWORTH-PAWLAK GEOTECHNICAL, Inc.	West Reservoir No.1 GRADATION ANALYSIS	FIG. 5

Hepworth-Pawlak Geotechnical, Inc.
10302 South Progress Way
Parker, Colorado 80134
Phone: 303-841-7119

Fax: 303-841-7556
email: hpgeo2@hpgeotech.com

October 5, 2015

Doug Neighbors, P.E.
RJH Consultants, Inc.
9800 Mt. Pyramid Court, Suite 330
Englewood, Colorado 80112

215153C

Subject: Laboratory Tests Results for West Reservoir No.1 Outlet Works Rehabilitation Project (Project No: 13129)

Mr. Neighbors:

This letter presents the results of laboratory tests performed on samples submitted for the subject project. The test results are presented on the attached Figures 1-7 and Table 1.

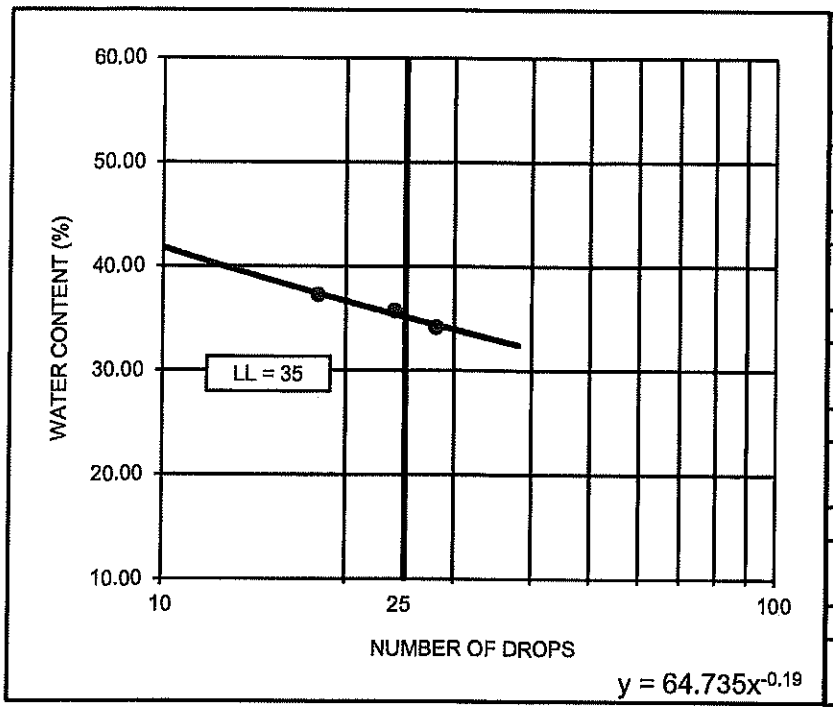
If there are any questions, please feel free to contact us.

Sincerely,

HEPWORTH-PAWLAK GEOTECHNICAL, Inc.

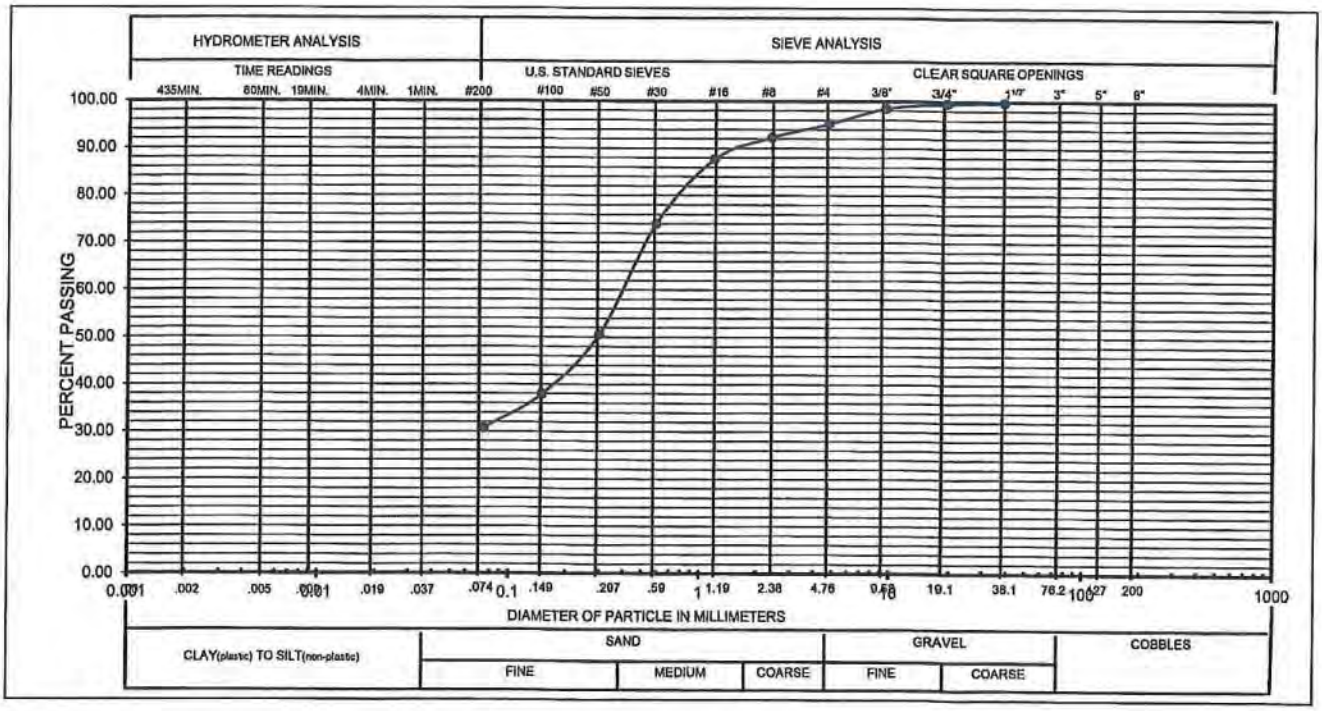
Cuong Vu, Ph.D., P.E.
Reviewed by:
Arben Kalaveshi, P.E.

215153C xmittal.doc



Sample Location:
Sample Number:
SAMPLE A
Depth:
Material Type:
Liquid Limit:
35
Plastic Limit:
12
Plastic index:
23

215153C	HEPWORTH-PAWLAK GEOTECHNICAL, INC.	RJH 3-POINT LIQUID LIMIT	FIG. 1



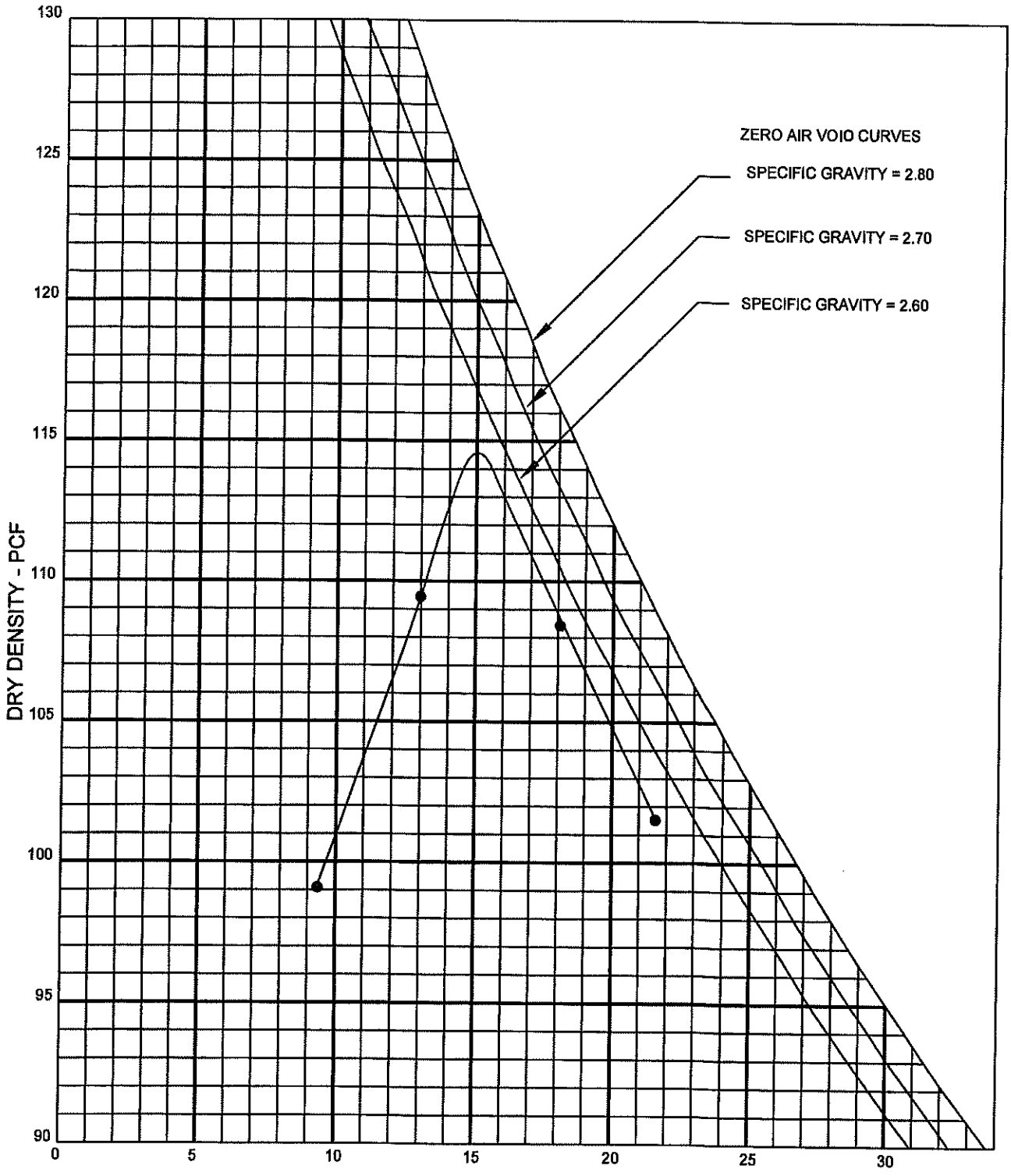
GRAVEL: 5% SAND: 64% SILT AND CLAY: 31%

LIQUID LIMIT: 35% PLASTICITY INDEX: 23%

SAMPLE OF: SAND (SC), clayey SAMPLE: A

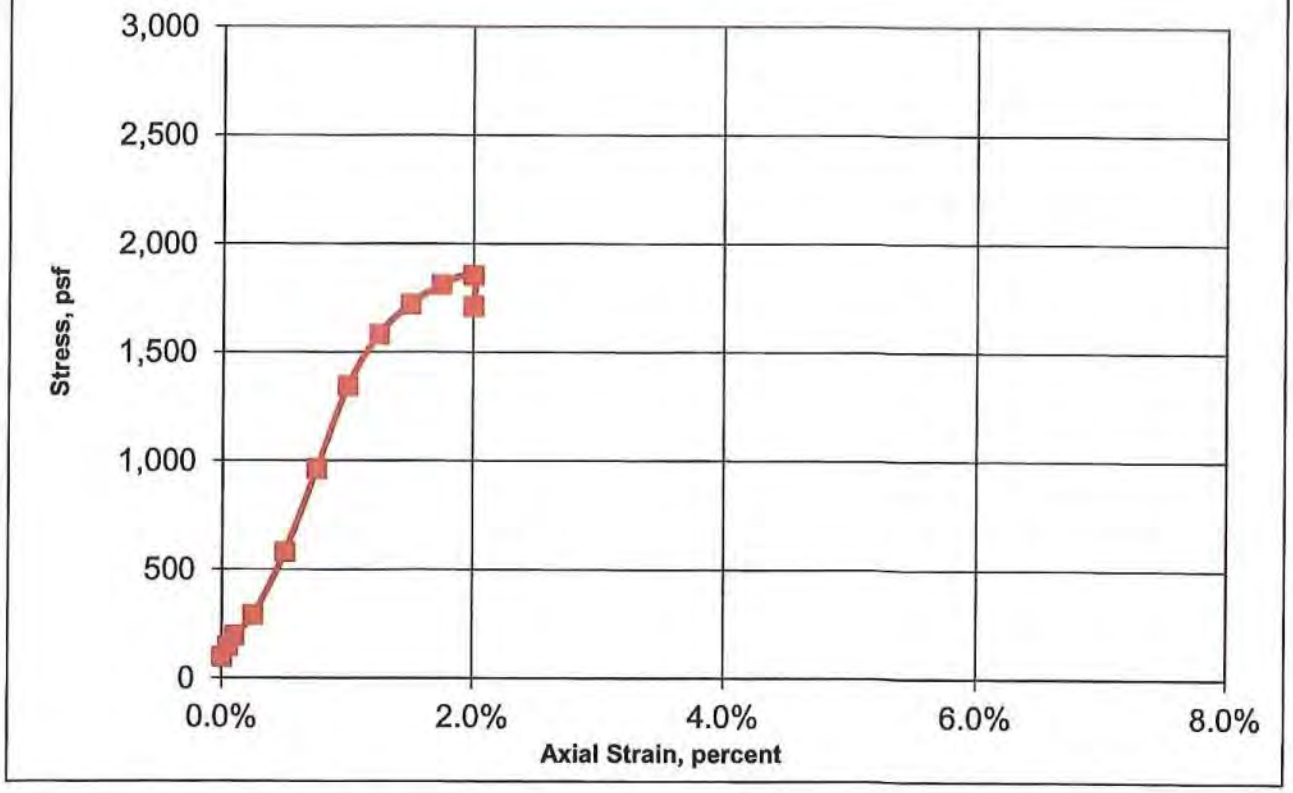
Sieve Size	Percent Passing
No. 4	95
No. 8	92
No. 16	88
No. 30	74
No. 50	51
No. 100	38
No 200	31

215153C	HEPWORTH-PAWLAK GEOTECHNICAL, INC.	RJH GRADATION ANALYSIS	FIG. 2



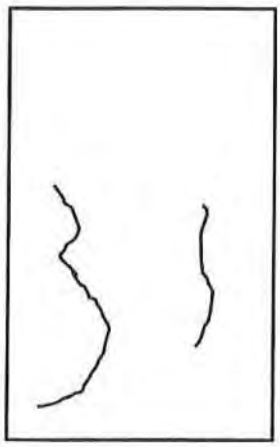
LOCATION : SAMPLE A	MOISTURE-DENSITY RELATIONSHIPS
SOIL DESCRIPTION : SAND (SC), clayey	HEPWORTH-PAWLAK GEOTECHNICAL, Inc.
MAX. DRY DENSITY : 114.5 PCF OPT. MOIST. CONTENT : 15.0 %	PROCEDURE : ASTM D 698-00a, Method A
LIQUID LIMIT : 35 PLASTICITY INDEX : 23	JOB NO. : 215153C
GRAVEL : 5 % SAND : 64 % SILT AND CLAY (-200) : 31 %	DATE : 9/14/2015 FIG. 3

Unconfined Compression Test

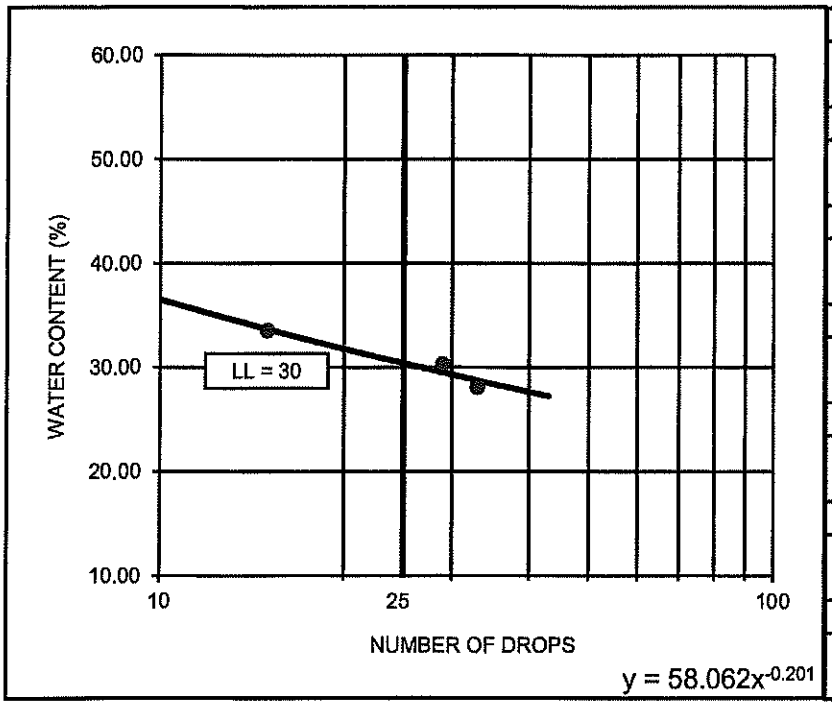


BORING: Sample A
DEPTH: --
SAMPLE OF: Sand (SC), clayey

MOISTURE CONTENT: 17.5 %
DRY DENSITY: 107 pcf
MAX STRESS: 1,900 psf

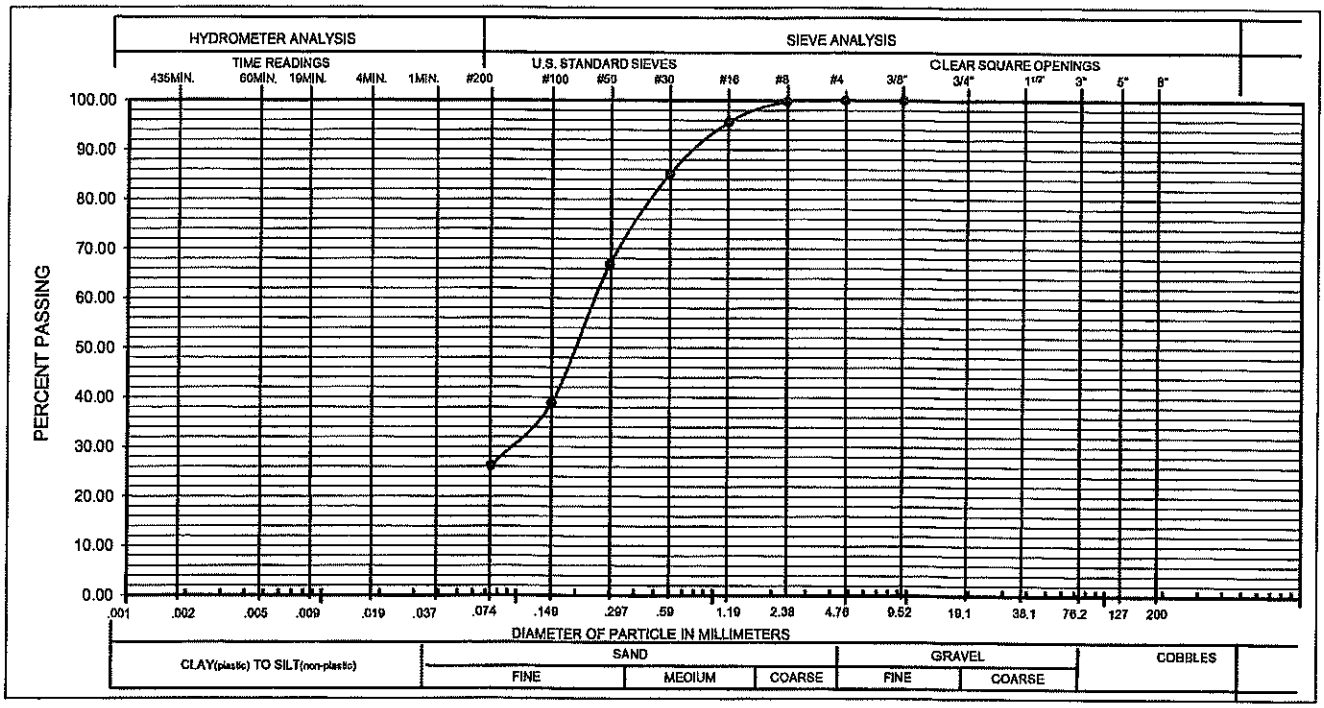


215153C	HEPWORTH-PAWLAK GEOTECHNICAL, Inc.	RJH CONTRACT -Sample A UNCONFINED COMPRESSIVE STRENGTH	FIG. 4



Sample Location:
Sample Number:
SAMPLE B
Depth:
Material Type:
Liquid Limit:
30
Plastic Limit:
25
Plastic index:
5

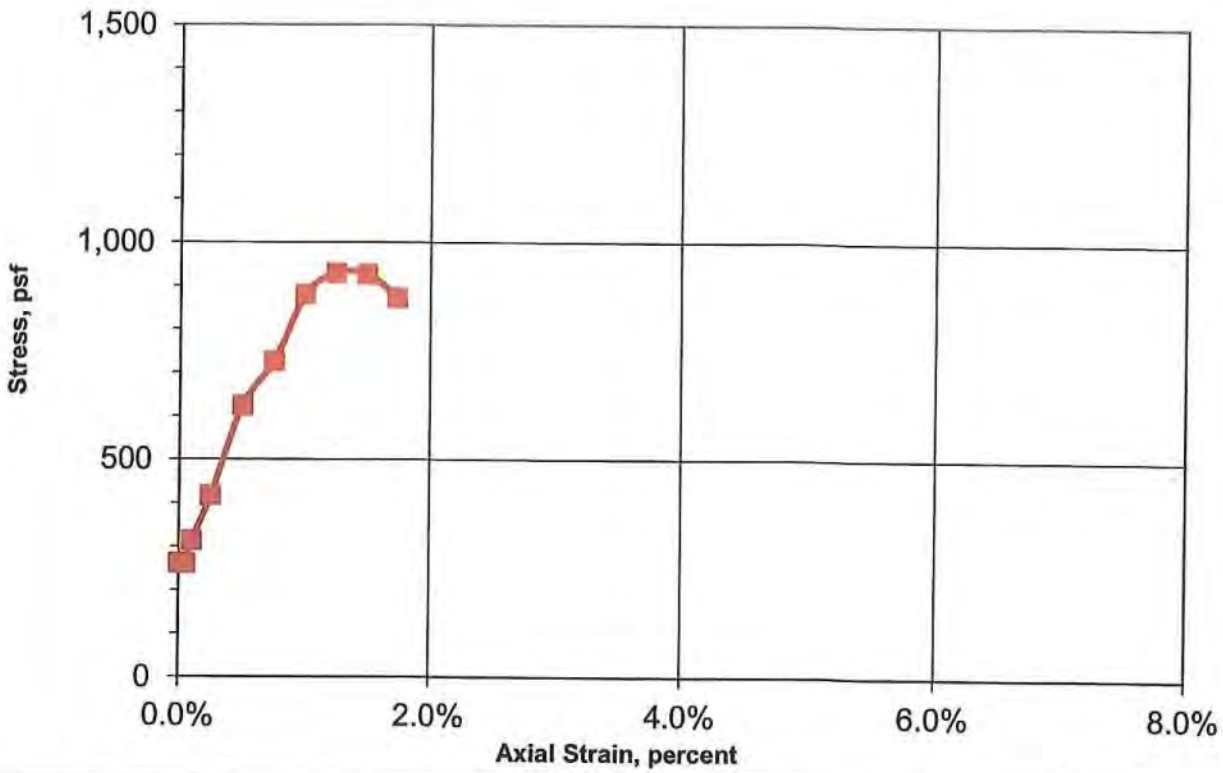
215153C	HEPWORTH-PAWLAK GEOTECHNICAL, INC.	RJH 3-POINT LIQUID LIMIT	FIG. 5



GRAVEL:	0%	SAND:	74%	SILT AND CLAY:	26%
LIQUID LIMIT:	30			PLASTICITY INDEX:	5
SAMPLE OF:	SAND (SC), clayey			FROM:	SAMPLE B

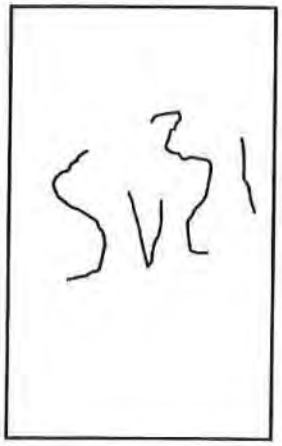
215153C	HEPWORTH-PAWLAK GEOTECHNICAL, INC.	RJH GRADATION ANALYSIS	FIG. 6

Unconfined Compression Test



BORING: Sample B
DEPTH: --
SAMPLE OF: Sand, clayey (SC)

MOISTURE CONTENT: 18.0 %
DRY DENSITY: 112 pcf
MAX STRESS: 900 psf



215153C	HEPWORTH-PAWLAK GEOTECHNICAL, Inc.	RJH CONTRACT - Sample B UNCONFINED COMPRESSIVE STRENGTH	FIG. 7

HEPWORTH-PAWLAK GEOTECHNICAL, INC.

JOB NO. 215153A
PROJECT: RJH

TABLE 1
SUMMARY OF LABORATORY TEST RESULTS

SAMPLE LOCATION	NATURAL MOISTURE (%)	NATURAL DRY WEIGHT (PCF)	GRADATION			ATTERBERG LIMITS		UNCONFINED COMPRESSION (PSF)	ORGANICS (%)	SOIL OR BEDROCK TYPE
			GRAVEL	SAND	SILT & (%)	LIQUID (%)	PLASTIC (%)			
SAMPLE A	6.0		5	64	31	35	12			SAND (SC), clayey
SAMPLE A- UC	17.5	107						1,900		SAND (SC), clayey
SAMPLE B	4.9		0	74	26	30	25			SAND (SC), clayey
SAMPLE B - UC	18.0	112						900.0		SAND (SC), clayey
SAMPLE C									8.8	

APPENDIX E

CONSTRUCTION PHOTOGRAPHS

Photograph 1: Upstream slope prior to the start of excavation.

Photograph 2: Completed excavation above the outlet works.

Photograph 3: Bottom of excavation without effective dewatering.

Photograph 4: Condition of excavation at the end of 2015.

Photograph 5: Condition of excavation at the start of 2016.

Photograph 6: Working platform constructed in 2016.

Photograph 7: Excavating the dewatering trench on the left side of the working platform prior to placing common fill for the embankment.

Photograph 8: CAT 815 compacting common fill for the embankment.

Photograph 9: Scarifying the subgrade on the right side of the conduit encasement prior to placing backfill.

Photograph 10: Placing common fill for the embankment.

Photograph 11: Placing common fill for the embankment.

Photograph 12: Cutting the existing slope back to fresh material and eliminating steep slopes.

Photograph 13: Placing topsoil on the downstream slope.

Photograph 14: Finished embankment, upstream slope.

Photograph 15: Excavating the trench for the filter collar.

Photograph 16: Filter collar overlap between existing material and new fill.

Photograph 17: Placing sand for the filter collar.

Photograph 18: Forms used to separate the filter sand and filter gravel for the filter collar drain pipe.

Photograph 19: Filter sand and filter gravel with forms removed.

Photograph 20: General view of the filter collar.

Photograph 21: Existing embankment toe drain pipe on the left side of the energy dissipation structure (not part of this construction).

Photograph 22: Completed downstream slope.

Photograph 23: Completed downstream slope and discharge channel.

Photograph 24: Existing valve on upstream end (outlet works inlet).

Photograph 25: HDPE conduit and encasement reinforcing steel in place.

Photograph 26: Outlet conduit prior to concrete placement. Note the exterior band welded to the HDPE conduit.

Photograph 27: Placing encasement concrete. Concrete placed and vibrated on one side of the pipe until flow under the conduit is observed.

Photograph 28: Portion of the conduit encasement that was not complete with the rest of the encasement (OW Sta. 1+17 to OW Sta. 1+27).

Photograph 29: Conduit pressure test apparatus (valves and pressure gauges).

Photograph 30: Placing concrete for the downstream headwall.

Photograph 31: Downstream headwall, upstream side.

Photograph 32: Compacting backfill for the downstream headwall (left side).

Photograph 33: Precast inlet structure in-place. Note the flange connection downstream of the structure.

Photograph 34: Placing gate stem and stem cover on the upstream slope.

Photograph 35: Placing pipe joint compound to seal the gate stem cover at the inlet structure.

Photograph 36: Connecting gate stem segments.

Photograph 37: Gate stem cover and vent pipe on the upstream slope.

Photograph 38: Inlet trash rack and gate.

Photograph 39: Hand wheel pedestal on the dam crest. Note the vent pipe, stem cover and fill tube for the stem cover.

Photograph 40: Boulders placed around the hand wheel pedestal for protection.

Photograph 41: Downstream headwall, discharge channel, and Parshall flume.

Photograph 42: Parshall flume in the discharge channel.

Photograph 43: Hydraulic fluid used for the gate.

Photograph 44: Riprap stockpile from on-site materials.

Photograph 45: Placing riprap bedding on the upstream slope.

Photograph 46: Placing riprap on the upstream slope.

Photograph 47: Riprap on the upstream slope from the right abutment.

Photograph 48: Riprap on the upstream, slope from the left abutment.

Photograph 49: Toe of riprap on the upstream slope. Note large rocks on the toe.

Photograph 50: Upstream slope. Note riprap around the inlet structure.

APPENDIX F

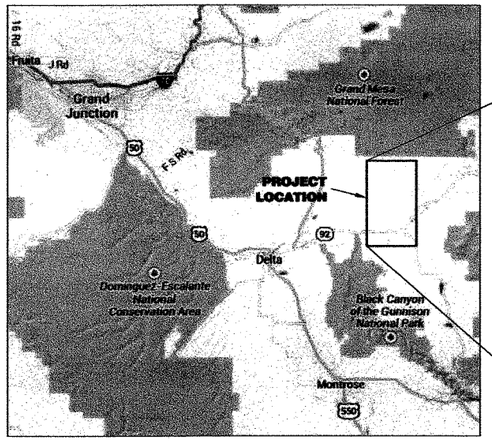
RECORD DRAWINGS

WEST RESERVOIR AND DITCH COMPANY

WEST RESERVOIR NO. 1

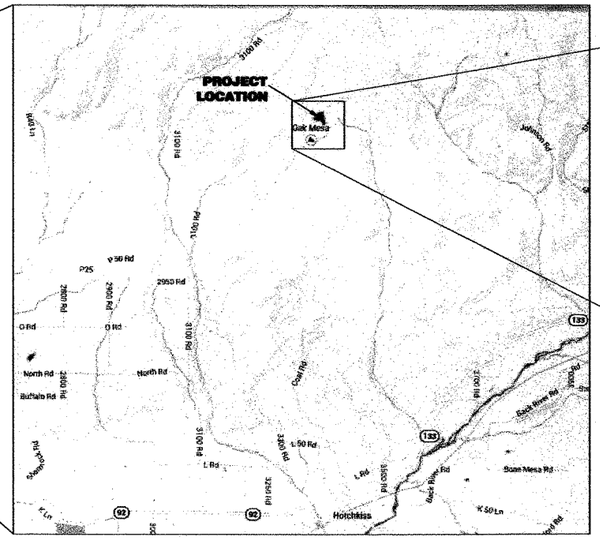
OUTLET WORKS REHABILITATION PROJECT

WATER DIVISION 4, WATER DISTRICT 40, DAM ID: 400538
DELTA COUNTY, COLORADO



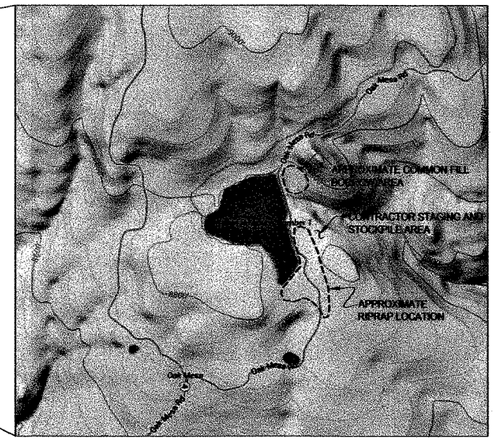
PROJECT VICINITY MAP

(NOT TO SCALE)



SITE LOCATION MAP

(NOT TO SCALE)



WEST RESERVOIR NO. 1

(NOT TO SCALE)

I HEREBY CERTIFY THAT THESE PLANS FOR THE WEST RESERVOIR NO. 1 OUTLET WORKS REHABILITATION PROJECT WERE PREPARED BY ME (OR UNDER MY DIRECT SUPERVISION) FOR THE OWNERS THEREOF.

J. DOUGLAS NEIGHBORS, P.E. COLORADO P.E. #31725
REGISTERED ENGINEER
RJH CONSULTANTS, INC.

COLORADO REGISTERED — JAMES D. NEIGHBORS — No. 31725 — 10-1-2015 — PROFESSIONAL ENGINEER

APPROVED ON THE 2nd DAY OF October, 2015.

Dick Wolfe
STATE ENGINEER

BY:
WILLIAM T. McCORMICK III, P.E. COLORADO P.E. #29127
CHIEF, DAM SAFETY BRANCH

STATE ENGINEER OF COLORADO

THESE PLANS REPRESENT THE AS-CONSTRUCTED CONDITIONS OF THE WEST RESERVOIR NO. 1 OUTLET WORKS REHABILITATION PROJECT TO THE BEST OF MY KNOWLEDGE AND JUDGMENT, BASED IN PART ON INFORMATION FURNISHED BY OTHERS, AS OF THE 5th DAY OF January, 2017.

JAMES D NEIGHBORS (ENGINEER'S PRINTED NAME) (SIGNATURE)

PREPARED FOR

West Reservoir and Ditch Company

PREPARED BY

RJH CONSULTANTS, INC.

ENGLEWOOD • COLORADO

DWG NO. 01

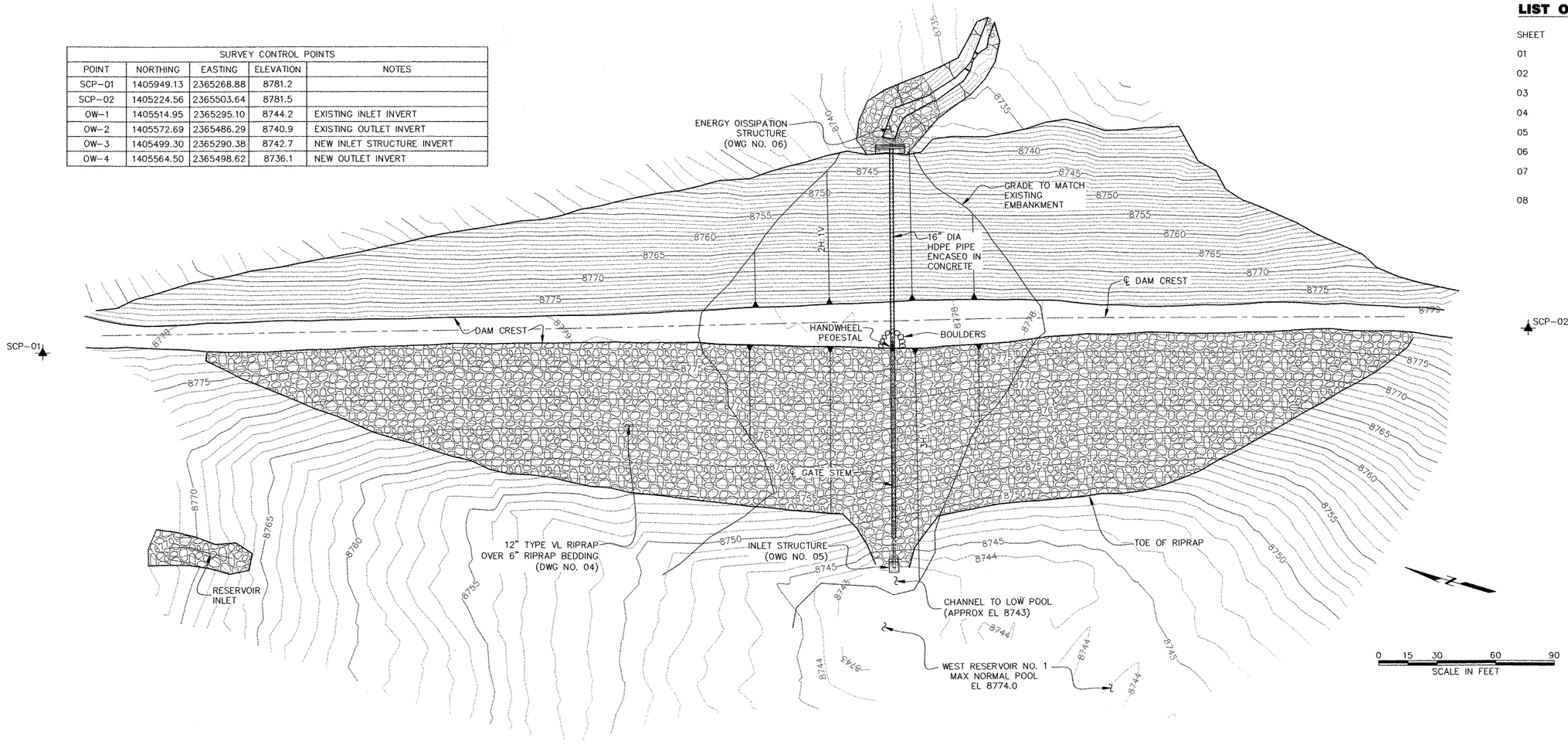
SHEET NO. 01 of 8

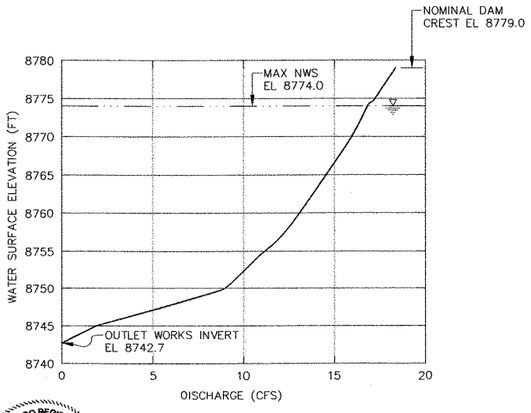
C-0545B

P:\13128 - WEST RESERVOIR NO. 1\CAD\SEO_SUBMITTAL_13128_SEO_SHEET1.DWG 9/23/2015 12:59 PM

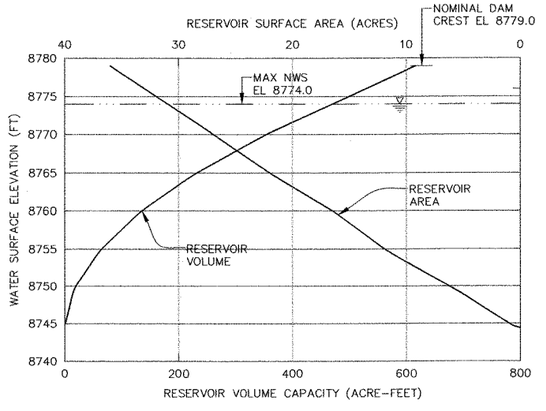
SURVEY CONTROL POINTS				
POINT	NORTHING	EASTING	ELEVATION	NOTES
SCP-01	1405949.13	2365268.88	8781.2	
SCP-02	1405224.56	2365503.64	8781.5	
OW-1	1405514.95	2365295.10	8744.2	EXISTING INLET INVERT
OW-2	1405572.69	2365486.29	8740.9	EXISTING OUTLET INVERT
OW-3	1405499.30	2365290.38	8742.7	NEW INLET STRUCTURE INVERT
OW-4	1405564.50	2365498.62	8736.1	NEW OUTLET INVERT

LIST OF DRAWINGS:





OUTLET WORKS RATING TABLE	
WSE (ft)	FLOW (cfs)
8742.7 (Inlet Gate Invert)	0.0
8745.0	1.7
8750.0	9.2
8755.0	11.3
8760.0	13.1
8765.0	14.6
8770.0	16.0
8774.0 (Max NWS)	16.8
8775.0	17.3
8779.0 (0am Crest)	18.3



STORAGE VOLUME AND AREA TABLE		
WSE (ft)	RESERVOIR STORAGE VOLUME (ACRE-FEET)	RESERVOIR SURFACE AREA (ACRES)
8742.7 (Inlet Gate Invert)	0.0	0.7
8745	1.0	1.0
8750	19.1	6.2
8755	64.5	11.9
8760.0	135.6	16.5
8765.0	231.8	22.0
8770.0	354.1	26.9
8774.0 (Max NWS)	470.5	31.0
8775.0	499.6	32.0
8779.0 (0am Crest)	616.1	36.0

NOTES:

1. DEMOLISH THE EXISTING FACILITIES AS FOLLOWS:
   A) 10" OIA STEEL CONOUIT BURIEO THROUGH THE ENTIRE EMBANKMENT (210 l.f.).
   B) GATE VALVE ON UPSTREAM END OF THE 10" DIA STEEL CONDUIT.
   C) GATE STEM FROM THE GATE VALVE TO THE OAM CREST (125 l.f., BURIED IN UPSTREAM SLOPE).
   D) CONCRETE HAND WHEEL PEOESTAL ON THE OAM CREST.
   E) 2-INCH STEEL PIPE ON THE UPSTREAM SLOPE.

C-0545B

NO.	DATE	ISSUE/REVISION	DES	DRN	CHK	APP
-	12/16	RECORD DRAWING	JDN	RJA	TEO	JDN

RJH CONSULTANTS, INC.

WEST RESERVOIR AND DITCH COMPANY

RJH PROJECT 13129

WEST RESERVOIR NO. 1 OUTLET WORKS REHABILITATION PROJECT DELTA COUNTY, COLORADO

GENERAL PLAN OF MODIFICATIONS

DWG. NO. 02

SHEET NO. 02 of 08

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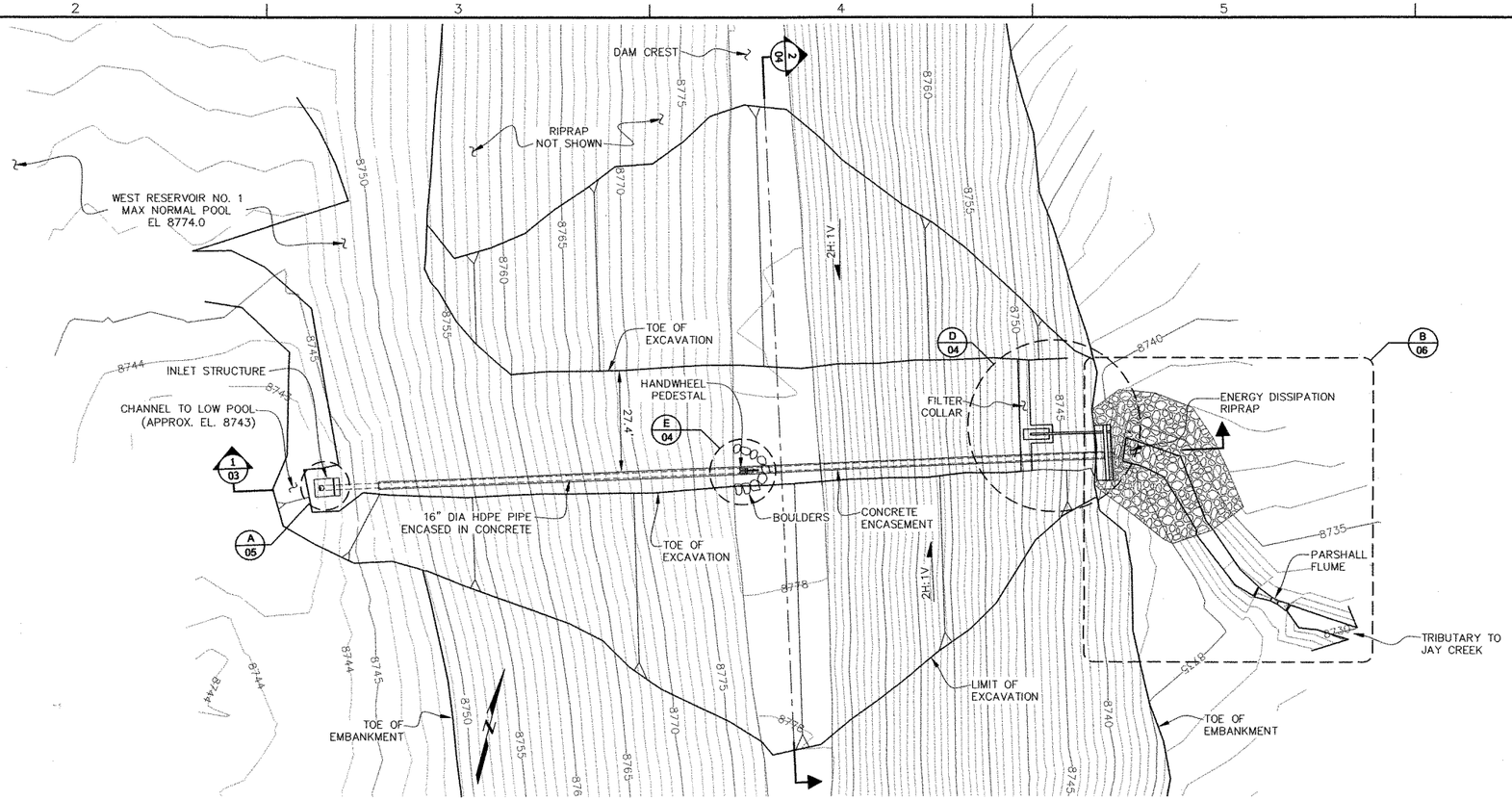
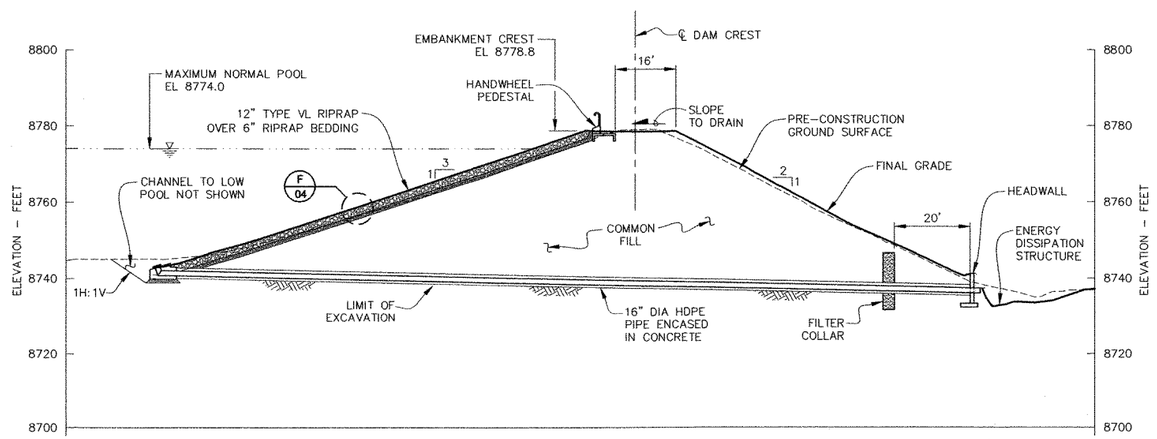


PLAN 0 10 20 40 60 SCALE IN FEET



SECTION 1/03 0 10 20 40 60 SCALE IN FEET

C-0545B

NO.	DATE	ISSUE/REVISION	DES	DRN	CHK	APP
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RJH CONSULTANTS, INC.

WEST RESERVOIR AND DITCH COMPANY

RJH PROJECT 13129

WEST RESERVOIR NO. 1 OUTLET WORKS REHABILITATION PROJECT DELTA COUNTY, COLORADO

PLAN OF EXCAVATION AND OUTLET WORKS

DWG. NO. 03

SHEET NO. 03 of 08

COLORADO REGISTERED JAMES D. HOLLOWAY No. 31725 1-5-2017 PROFESSIONAL ENGINEER

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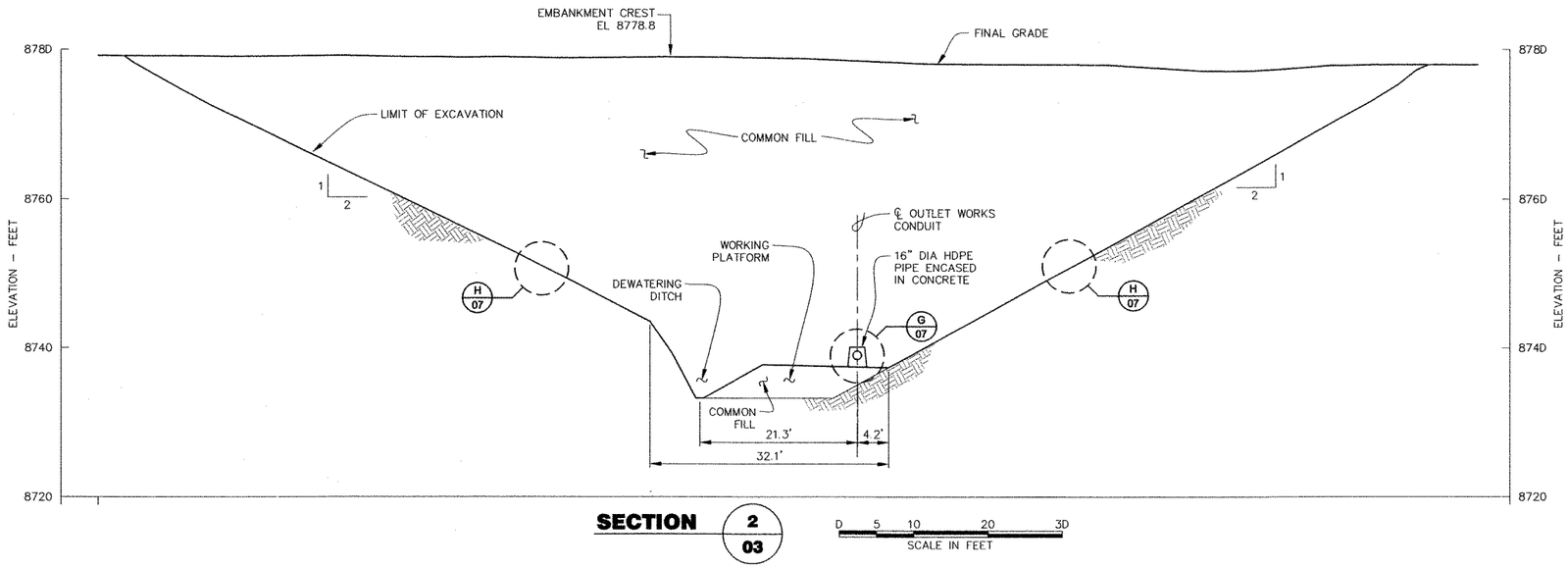

SECTION 2 / 03

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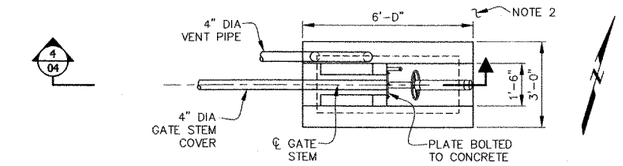
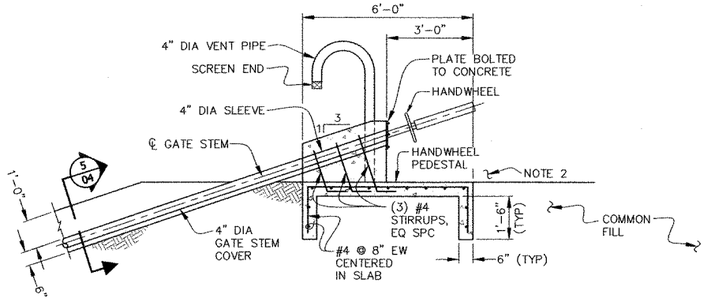


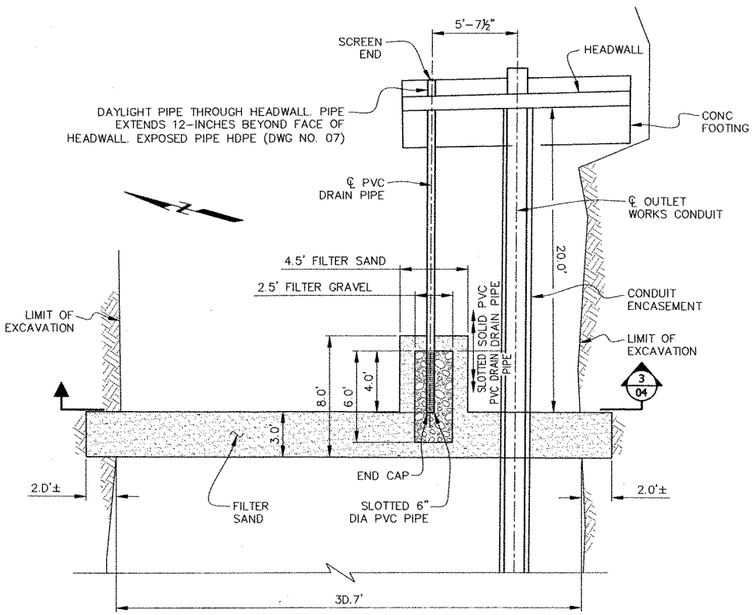
DETAIL E / 03 — **HANDWHEEL PEDESTAL**

0 2 4 6
SCALE IN FEET



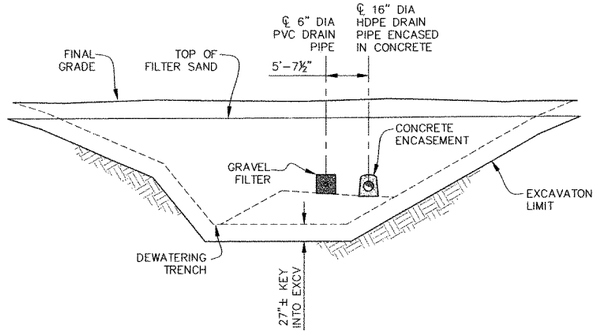
SECTION 4 / 04

D 2 4 6
SCALE IN FEET



DETAIL D / 03 — **FILTER COLLAR**

0 2.5 5 10 15
SCALE IN FEET



SECTION 3 / 04

0 5 10 2D 3D
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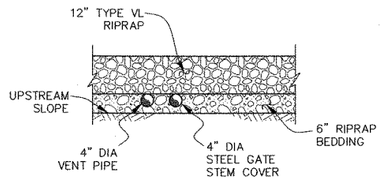

SECTION 5 / 04

D 1 2 4
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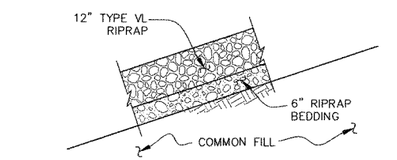

DETAIL F / 03

D 1 2 4
SCALE IN FEET

NOTES:

1. PROVIDE 3 INCHES OF CONCRETE BETWEEN REINFORCEMENT AND SOIL UNLESS OTHERWISE NOTED.
2. BOULDERS PLACED AROUND HANDWHEEL PEDESTAL NOT SHOWN.

C-0545B

COLORADO REGISTERED — JAMES D. NEIDEL — No. 31725 — 1-5-2017 — PROFESSIONAL ENGINEER

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RJH CONSULTANTS, INC.

WEST RESERVOIR AND DITCH COMPANY

RJH PROJECT 13129

WEST RESERVOIR NO. 1 OUTLET WORKS REHABILITATION PROJECT DELTA COUNTY, COLORADO

SECTIONS AND DETAILS

DWG. NO. 04

SHEET NO. 04 of 08

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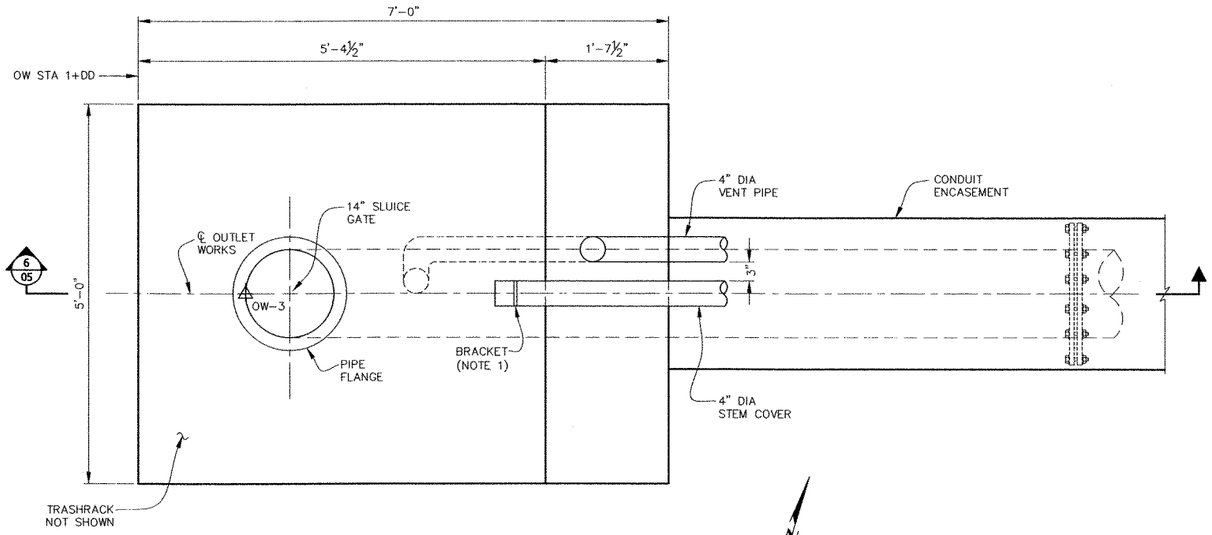
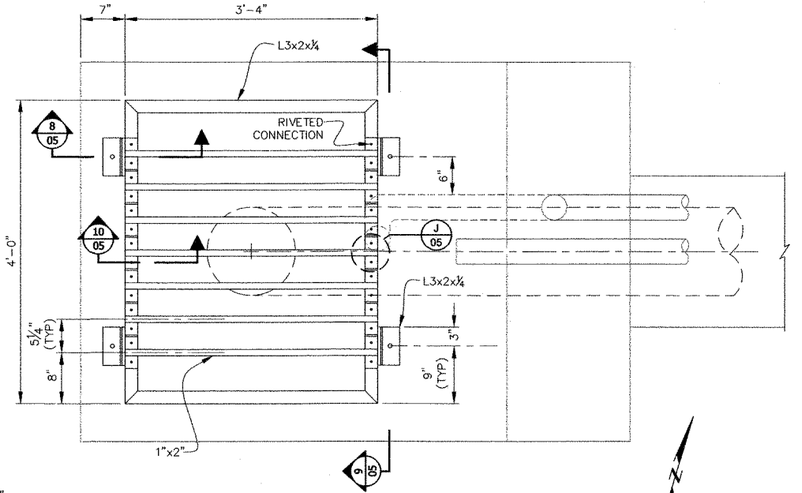


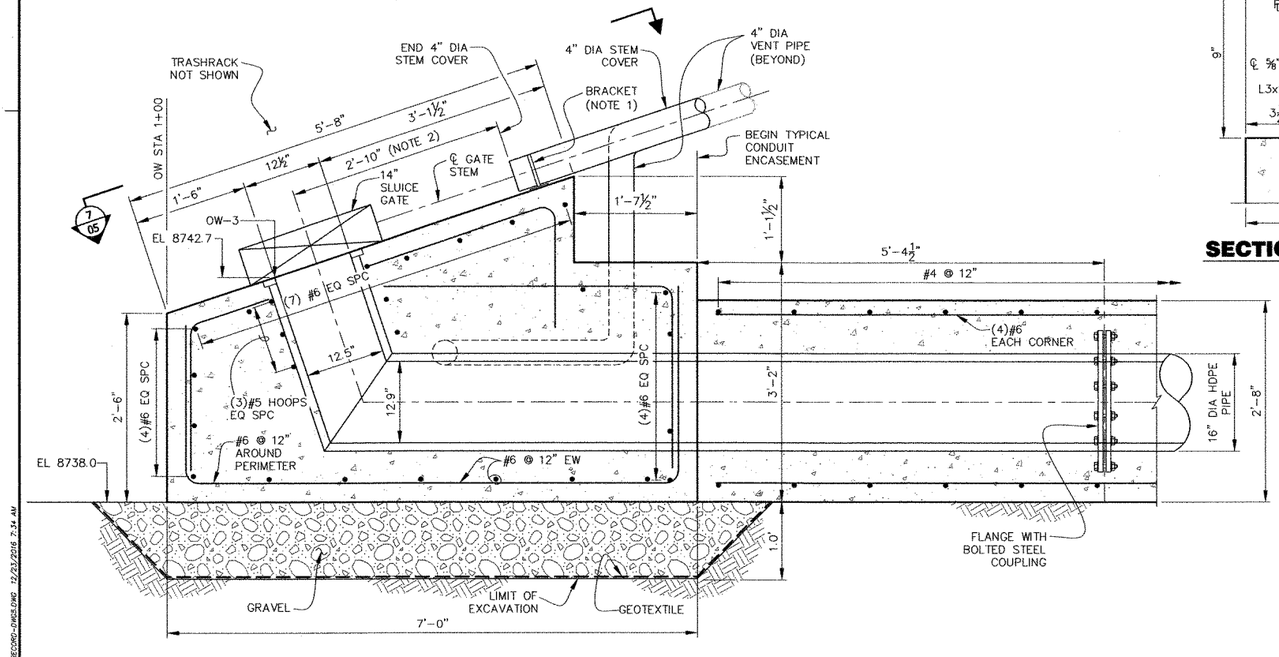
DETAIL A 03 — INLET STRUCTURE

D 0.5 1 2 — SCALE IN FEET



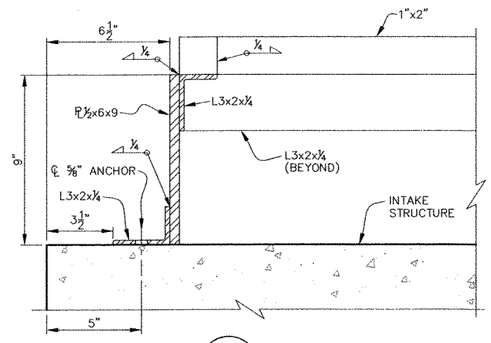
SECTION 7 05

D 0.5 1 2 — SCALE IN FEET



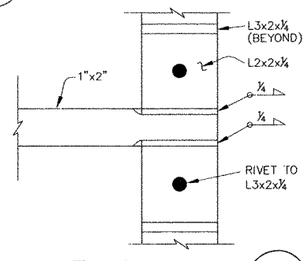
SECTION 6 05

D 0.5 1 2 — SCALE IN FEET



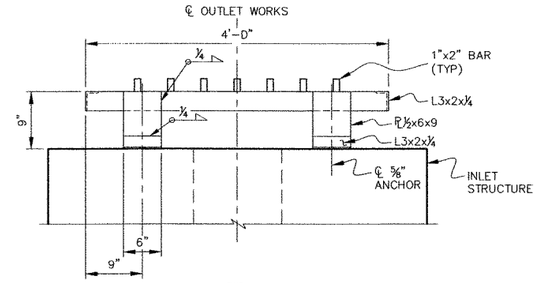
SECTION 8 05

0 1/2 1 — SCALE IN FEET



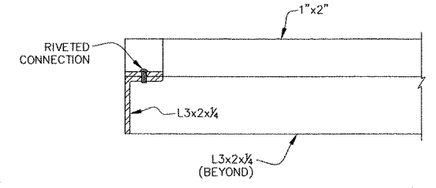
DETAIL J 05

0 1 2 4 — SCALE IN INCHES



SECTION 9 05

D 0.5 1 2 — SCALE IN FEET



SECTION 10 05

0 1/2 1 — SCALE IN FEET

NOTES:

1. SECURE STEM COVER TO INLET STRUCTURE.
2. CONFIRM DIMENSION FOR SLUICE GATE USED.
3. NOT USED.

C-0545B

COLORADO REGISTERED JAMES D. NEWBORG No. 31725 1-5-2017 PROFESSIONAL ENGINEER

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RJH CONSULTANTS, INC.

WEST RESERVOIR AND DITCH COMPANY

RJH PROJECT 13129

WEST RESERVOIR NO. 1 OUTLET WORKS REHABILITATION PROJECT DELTA COUNTY, COLORADO

INLET STRUCTURE PLAN, SECTIONS, AND DETAILS

DWG. NO. 05

SHEET NO. 05 of 08

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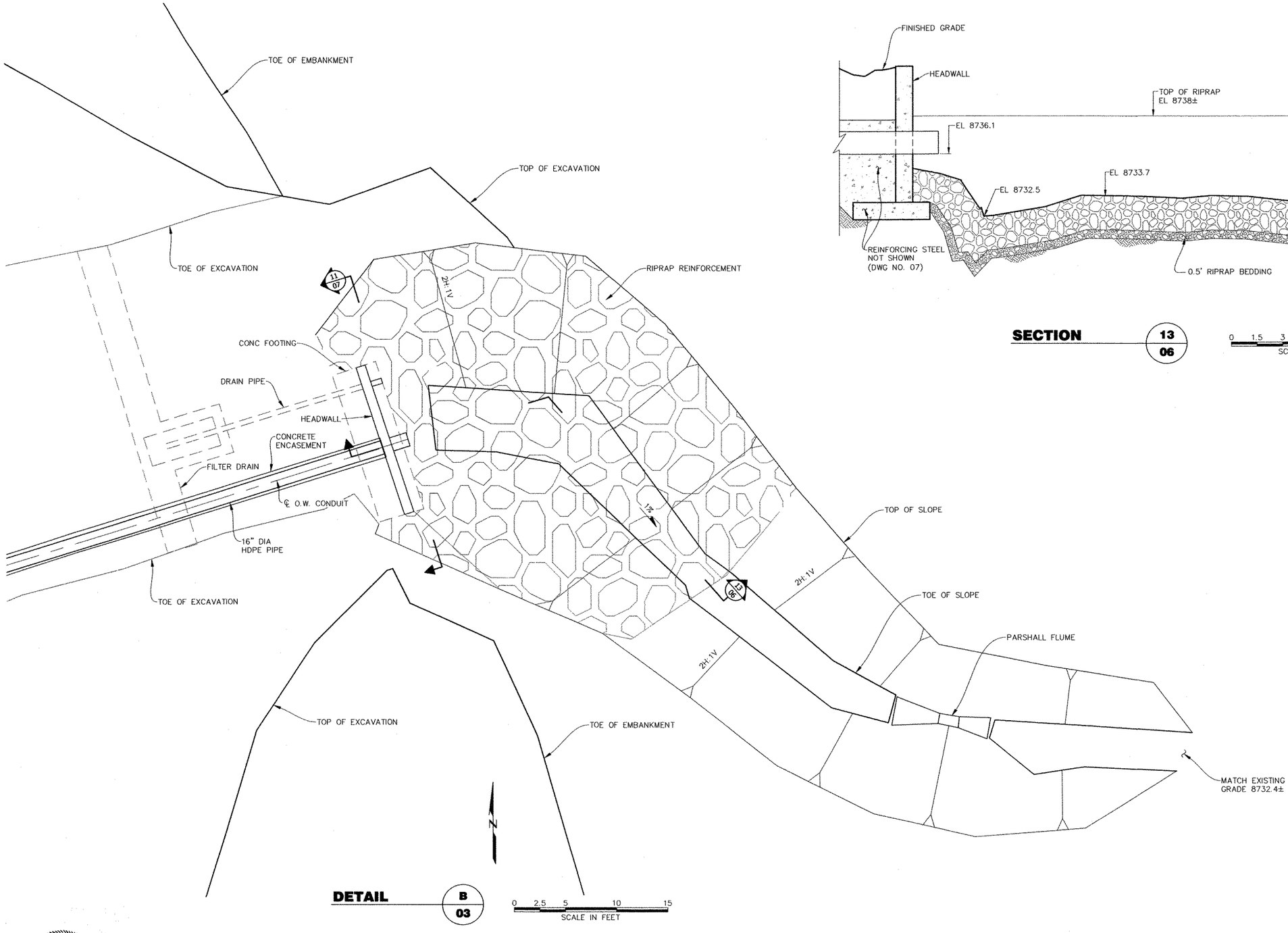

DETAIL B / 03

0 2.5 5 10 15
SCALE IN FEET

SECTION 13 / 06

0 1.5 3 6 9
SCALE IN FEET

COLORADO REGISTERED JAMES A. HOCHARD No. 31725 1-5-2017 PROFESSIONAL ENGINEER

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RJH CONSULTANTS, INC.

WEST RESERVOIR AND DITCH COMPANY

RJH PROJECT 13129

WEST RESERVOIR NO. 1 OUTLET WORKS REHABILITATION PROJECT DELTA COUNTY, COLORADO

ENERGY DISSIPATION STRUCTURE PLAN AND SECTION

DWG. NO. 06

SHEET NO. 06 of 08

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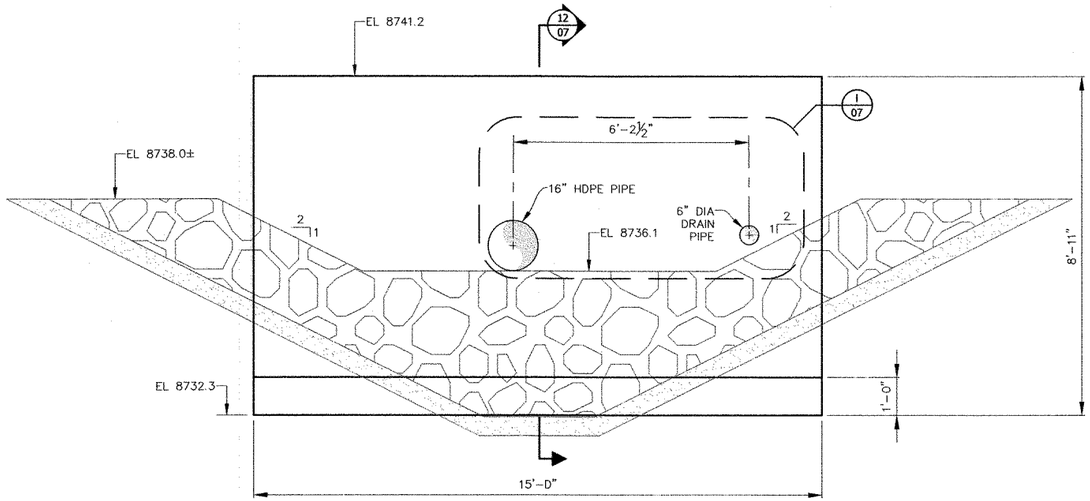
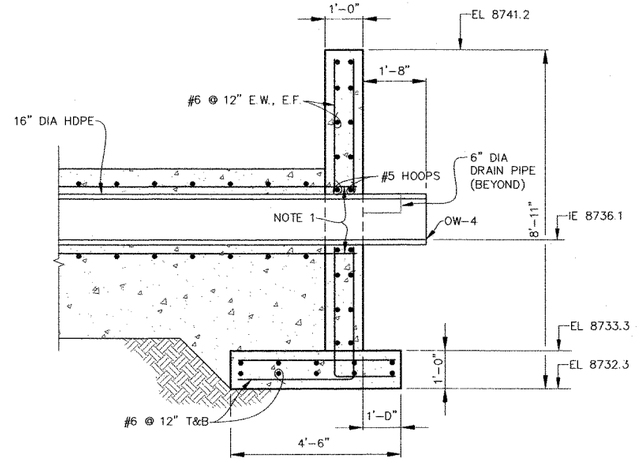


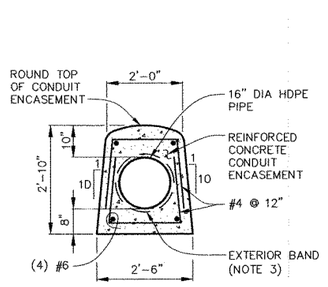
SECTION 11/06

SCALE IN FEET 0 1 2 4



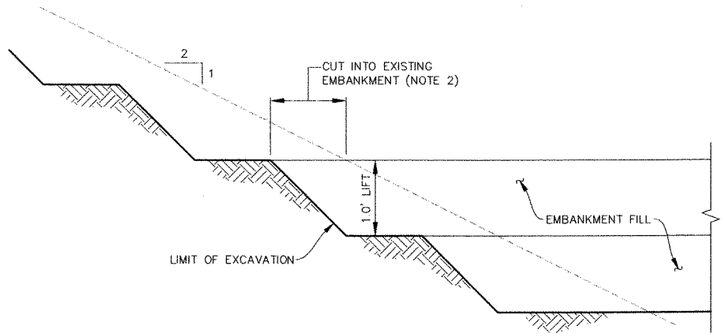
SECTION 12/07

SCALE IN FEET 0 1 2 4



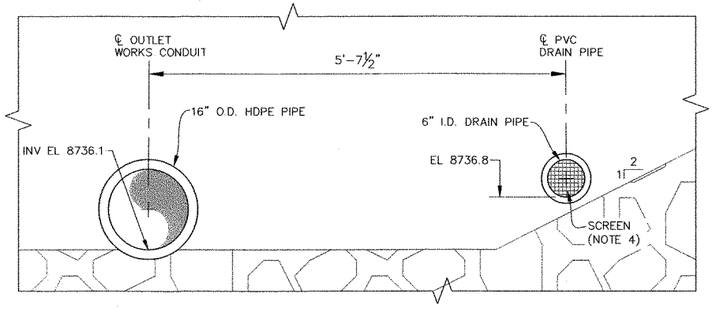
DETAIL G/04

D 1 2 4
SCALE IN FEET



DETAIL H/04

D D.5 1 2 3
SCALE IN FEET



DETAIL I/07

D D.5 1 2 3
SCALE IN FEET

NOTE:

1. CONTINUE HORIZONTAL CONDUIT ENCASEMENT REINFORCING STEEL INTO HEADWALL. PROVIDE MIN. 2'-6" HOOK INTO HEADWALL.
2. FOR EACH 1-FOOT VERTICAL LIFT OF NEW FILL PLACED, CUT INTO THE EXISTING EMBANKMENT 1-FOOT HORIZONTALLY OR INTO FRESH EMBANKMENT MATERIAL FOR THE ENTIRE LENGTH OF THE BENCH.
3. PROVIDE EXTERIOR BANDS ON HDPE CONDUIT AS FOLLOWS:
   a. 35 FT DOWNSTREAM OF INLET STRUCTURE.
   b. 110 FT DOWNSTREAM OF INLET STRUCTURE.
   c. 35 FT UPSTREAM OF HEADWALL.

   EXTERIOR BAND CAN BE WELDED OR MECHANICAL.
4. PROVIDE SCREEN OVER END OF EXPOSED STEEL OR HDPE PIPE. ATTACH SCREEN TO PIPE USING BAND AROUND PIPE.

COLORADO REGISTERED JAMES D. REID No. 31725 PROFESSIONAL ENGINEER 1-5-2017

NO.	DATE	ISSUE/REVISION	DES	DRN	CHK	APP
-	12/16	RECORD DRAWING	JDN	RJA	TEO	JDN

RJH CONSULTANTS, INC.

WEST RESERVOIR AND DITCH COMPANY

RJH PROJECT 13129

WEST RESERVOIR NO. 1 OUTLET WORKS REHABILITATION PROJECT DELTA COUNTY, COLORADO

ENERGY DISSIPATION STRUCTURE AND MISCELLANEOUS SECTIONS AND DETAILS

C-0545B

DWG. NO. 07

SHEET NO. 07 of 08

P:\13129 - WEST RESERVOIR NO. 1\CAD\RECORD DWGS\13129-RECORD-ANDRAD.DWG 12/23/2016 7:36 AM

GENERAL NOTES

1. CONSTRUCTION IS SUBJECT TO THE RULES AND REGULATIONS OF THE COLORADO STATE ENGINEERS OFFICE (SEO). SUBSTANTIVE CHANGES TO THE APPROVED DRAWINGS AND SPECIFICATIONS REQUIRE APPROVAL OF THE SEO.
2. THE VERTICAL DATUM FOR THE PROJECT IS THE NORTH AMERICAN VERTICAL OATUM (NAVO) OF 1988.
3. LOCATION AND NATURE OF EXISTING UTILITIES SHOWN ON THE DRAWINGS ARE APPROXIMATE. CONTRACTOR SHALL FIELO LOCATE ALL UTILITIES, WHETHER SHOWN ON THE ORAWINGS OR NOT, PRIOR TO EXCAVATION. CONTRACTOR SHALL PROTECT ALL UTILITIES IN PLACE UNLESS DESIGNATED FOR REMOVAL OR REPLACEMENT.
4. UNLESS SHOWN OR SPECIFIED OTHERWISE, PAYLINES FOR UNIT PRICE PAY ITEMS ARE BASEO ON THE DESIGN LINES (NEAT LINES) SHOWN ON THE DRAWINGS.
5. WHERE THE TERM "PROJECT LIMITS" IS USED, IT IS UNOERSTOOO TO MEAN THE LIMITS OF SITE DISTURBANCE SHOWN ON THE ORAWINGS OR OTHERWISE DESIGNATEO BY THE ENGINEER.

LEGEND

DETAIL A/3 — DETAIL TITLE. THE LETTER "A" REFERS TO THE DETAIL DESIGNATION. THE NUMBER "3" REFERS TO THE DRAWING NUMBER WHERE THE DETAIL IS CALLED OUT.

SECTION 1/3 **STA 0+00** — SECTION TITLE. THE NUMBER "1" REFERS TO THE SECTION DESIGNATION. THE NUMBER "3" REFERS TO THE DRAWING NUMBER WHERE THE SECTION IS CALLED OUT.

1/3 — SECTION LOCATION. THE NUMBER "1" REFERS TO THE SECTION DESIGNATION. THE NUMBER "3" REFERS TO THE DRAWING NUMBER WHERE THE SECTION IS SHOWN.

A/3 — DETAIL LOCATION. THE LETTER "A" REFERS TO THE DETAIL DESIGNATION. THE NUMBER "3" REFERS TO THE DRAWING NUMBER WHERE THE DETAIL IS SHOWN.

3630 — EXISTING INDEX TOPOGRAPHIC CONTOUR WITH ELEVATION IN FEET

EXISTING INTERMEDIATE TOPOGRAPHIC CONTOUR

EARTH SLOPE

CENTERLINE

SURFACE WATERWAY

APPROXIMATE WATER LEVEL

ABBREVIATIONS

APPROX	= APPROXIMATE	MIN	= MINIMUM
BO	= BLOCKOUT	MH	= MANHOLE
CL, ℄	= CENTERLINE	MFR	= MANUFACTURER
CMU	= CONCRETE MASONRY UNIT	MSE	= MECHANICALLY STABILIZED EARTH
CONC	= CONCRETE	NTS	= NOT TO SCALE
DIA	= DIAMETER	NWS	= NORMAL WATER SURFACE
DWG, DWGS	= DRAWING OR DRAWINGS	OD	= OUTSIDE DIAMETER
EA	= EACH	PEN.	= PENETRATION
EF	= EACH FACE	PVC	= POLYVINYL CHLORIDE
EL, ELEV	= ELEVATION	REINF	= REINFORCEMENT
EQ SPC	= EQUALLY SPACED	SCH	= SCHEDULE
EW	= EACH WAY	STA	= STATION
FLG	= FLANGE	T&B	= TOP & BOTTOM
HDPE	= HIGH DENSITY POLYETHYLENE	T.O.	= TOP OF
ID	= INSIDE DIAMETER	TYP	= TYPICAL
IE	= INVERT ELEVATION	WS	= WATER SURFACE
I.F.	= INSIDE FACE		
MAX	= MAXIMUM		

STRUCTURAL NOTES:

1) REINFORCEMENT SYMBOLS

BARS SHOWN THUS —⌒— #8 @ 1'-0" OR —|—|— # 8 @ 1'-0"

INDICATE A GROUP OF IOENTICAL #8 BARS SPACEO AT 1'-0" (12") CENTERS.

○—— AN OPEN CIRCLE AT THE ENO OF A BAR INOICATES A BEND WITH THE BAR TURNEO AWAY FROM THE OBSERVER.

●—— A CLOSEO CIRCLE AT THE END OF A BAR INOICATES A BENO WITH THE BAR TURNEO TOWARDS THE OBSERVER.

○ INDICATES A DOWEL

SPLICES SHOWN THUS ——═══—— INOICATES A LAPPEO SPLICE, NOT A BENO IN THE BAR.

2) DIMENSIONS

DIMENSIONS ARE TO THE CENTERLINES OF THE BARS UNLESS OTHERWISE SHOWN. CLEAR COVER OIMENSIONS ARE MARKEO "CLR." ALL OIMENSIONS TO A JOINT ARE TO THE CENTERLINE OF THE JOINT. BEAMS, COLUMNS, AND WALLS ARE CENTERED ON REFERENCEO LINES.

THICKNESS SHOWN FOR WALLS AND SLABS ADJACENT TO UNDISTURBEO SOIL OR ROCK ARE MINIMUM OIMENSIONS.

3) COVER

UNLESS OTHERWISE INDICATEO ON THE DRAWING, PLACE THE REINFORCEMENT SO THAT THE CLEAR DISTANCE BETWEEN THE FACE OF CONCRETE AND NEAREST REINFORCEMENT IS 3 INCHES FOR #5 BARS OR LARGER. FOR CONCRETE PLACED DIRECTLY AGAINST EARTH OR ROCK, MINIMUM CLEAR CONCRETE COVER OVER REINFORCEMENT SHALL BE 3 INCHES.

4) REINFORCEMENT DOWELS

DOWELS INDICATED ON THE DRAWING SUCH AS #8(D), SHALL HAVE A MINIMUM STRAIGHT EMBEOMENT AND PROJECTION EOUAL TO THAT REQUIREO FOR LAP SPLICING A BAR OF THE SAME DIAMETER.

5) PLAIN DOWELS

PLAIN DOWELS, INDICATED ON THE DRAWINGS SUCH AS 3/4" (PD), ACROSS CONTRACTION JOINTS SHALL BE PLAIN REINFORCING BARS OF THE BAR DIAMETER INOICATED. PLAIN OOWELS SHALL BE A MINIMUM OF 36 INCHES LONG, WITH EQUAL LENGTH EXTENDING ON EITHER SIDE OF THE CONTRACTION JOINT. IMMEOIATELY BEFORE THE SECOND CONCRETE PLACEMENT, THE PROJECTING HALF LENGTH OF DOWEL SHALL BE GREASED TO PREVENT BONO TO THE CONCRETE.

6) STANDARD HOOKS AND BENDS

HOOKS AND BENDS SHALL CONFORM TO ACI 318, SECTIONS 7.1, 7.2. ANO 7.3.

7) PLACING REINFORCEMENT

PLACE REINFORCEMENT IN ACCOROANCE WITH APPROVED REINFORCEMENT SHOP DRAWINGS. IN THE EVENT OF A CONFLICT BETWEEN THESE ORAWINGS AND THE APPROVEO SHOP ORAWINGS, THE APPROVED SHOP DRAWINGS SHALL GOVERN.

SEE ACI 318, SECTION 7.5 ANO ACI 301, SECTION 5.3 FOR PLACING TOLERANCES.

REINFORCEMENT MAY BE ADJUSTED IN THE FIELD TO CLEAR FORM TIES ANO ANCHOR BARS. IN SUCH CASES, RELOCATION OF THE EMBEOOEO MATERIALS MUST BE CONSIOEREO. IN NO CASE SHALL BARS BE BENT IN THE FIELO.

REINFORCEMENT SHALL BE PLACED TO MAINTAIN A CLEAR OISTANCE OF AT LEAST 1 INCH BETWEEN OTHER REINFORCEMENT, ANCHOR BOLTS, FORM TIES, OR OTHER EMBEDOEO METALWORK.

REINFORCEMENT PARALLEL TO ANCHOR BOLTS OR OTHER EMBEDDEO METALWORK SHALL BE PLACED TO MAINTAIN A CLEAR DISTANCE OF AT LEAST 1-1/3 TIMES THE MAXIMUM SIZE AGGREGATE TO BE USED.

8) SPACING

THE FIRST AND LAST BARS IN SLABS AND WALLS, STIRRUPS IN BEAMS, ANO TIES IN COLUMNS ARE TO START AND ENO AT A MAXIMUM OF ONE HALF OF THE ADJACENT BAR SPACING. ALL REINFORCING TO BE EOUALLY SPACED UNLESS OTHERWISE SHOWN ON THE DRAWINGS.

9) ACCESSORIES

BAR SUPPORTS, SPACERS, AND OTHER ACCESSORIES ARE NOT SHOWN ON THE DRAWINGS. THE RECOMMENDATIONS OF ACI 315 (OETAILING MANUAL) SHALL BE USED IN SELECTING ACCESSORIES.

10) DETAILING

UNLESS OTHERWISE SHOWN, FOLLOW THE RECOMMENDATIONS OF ACI 315. NO CHANGES SHALL BE MADE WITHOUT PRIOR APPROVAL.

11) CONCRETE PLACEMENT

BEFORE PLACING CONCRETE, CHECK ALL APPLICABLE DRAWINGS RELEASED AS SUITABLE FOR CONSTRUCTION INCLUDING MANUFACTURER'S ORAWINGS TO VERIFY THE PRESENCE OF ALL EMBEDDED MATERIAL REQUIRED IN THE PLACEMENT.

12) EMBEDMENT AND LAP SPLICE LENGTH REQUIREMENTS

EMBEDMENT LENGTHS ANO LAP SPLICE LENGTHS ARE SHOWN IN THE TABLE BELOW.

BASIC EMBEDMENT LENGTHS ARE BASED ON ACI 318, SECTION 12.2.

ALL LAP SPLICE LENGTHS SHOWN ARE CLASS B SPLICES BASEO ON ACI 318, SECTION 12.15.

UNLESS OTHERWISE SHOWN ON THE DRAWINGS, THE MINIMUM LENGTHS FOR EMBEDMENT AND LAP SPLICES FOR PARALLEL BARS SHALL BE AS GIVEN IN THE TABLE BELOW.

WHEN REINFORCING BARS OF DIFFERENT SIZE ARE TO BE SPLICED, THE LENGTH OF THE LAP SHALL BE GOVERNED BY THE SMALLER DIAMETER BAR.

SPLICES ARE TO BE MADE SO THAT THE GIVEN CLEAR DISTANCES TO THE FACE OF CONCRETE WILL BE MAINTAINED.

TABLE OF BASIC EMBEDMENT AND LAP SPLICE LENGTHS ACCORDING TO ACI 318

BAR SIZE NO.	EMBEDMENT (INCHES)		LAP SPLICE (INCHES)	
	ALL BARS EXCEPT TOP BARS	TOP BARS *	ALL BARS EXCEPT TOP BARS	TOP BARS *
3	1'-3"	1'-7"	1'-7"	2'-1"
4	1'-7"	2'-1"	2'-1"	2'-9"
5	2'-0"	2'-7"	2'-7"	3'-5"
6	2'-5"	3'-1"	3'-1"	4'-0"
7	3'-6"	4'-6"	4'-6"	5'-10"
8	4'-0"	5'-2"	5'-2"	6'-10"

* TOP BARS ARE HORIZONTAL BARS IN BEAMS AND SLABS PLACEO SO THAT MORE THAN 12 INCHES OF CONCRETE IS CAST IN THE MEMBER BELOW THE BAR.

13) EMBEDDED ITEMS AND OPENINGS

BEFORE PLACING CONCRETE, CARE SHALL BE TAKEN THAT ALL EMBEOOEO ITEMS ARE IN POSITION AND SECURELY FASTENED IN PLACE. ADD ADDITIONAL REINFORCING AROUND OPENINGS AS SHOWN ON ORAWINGS.

14) FINISHING SYMBOLS AND CONCRETE TOLERANCES

THE FOLLOWING FINISHING SYMBOLS HAVE BEEN USED ON THESE ORAWINGS. REFER TO THE CONSTRUCTION SPECIFICATIONS FOR DETAILED REQUIREMENTS ANO CONSTRUCTION TOLERANCES FOR HYDRAULIC STRUCTURES.

F4 U3 SPECIAL FINISH WITH SPECIAL TOLERANCES FOR HIGH VELOCITY WATER FLOW.

FINISH SURFACES FOR ALL CONSTRUCTION AND CONTRACTION JOINTS SHALL BE PROVIDED IN ACCORDANCE WITH THE SPECIFICATIONS. ALL SURFACES REQUIRING AN F4 OR U3 FINISH ARE SHOWN ON THE ORAWINGS.

15) CHAMFER

UNLESS OTHERWISE INOICATEO, CHAMFER EOGES OF ALL PERMANENTLY EXPOSED CONCRETE SURFACES WITH A 45 DEGREE BEVEL, 3/4 INCH X 3/4 INCH. CHAMFER STRIP MAY NOT BE SHOWN ON THE OESIGN ORAWINGS.

16) JOINTS

ALL CONSTRUCTION JOINTS, CONTRACTION JOINTS ANO EXPANSION JOINTS SHALL BE PROVIOED WHERE SHOWN ON THE APPROVED SHOP DRAWINGS. NO OTHER JOINTS SHALL BE INTRODUCEO UNLESS APPROVED BY THE ENGINEER.

17) STRUCTURAL STEEL

17a) GENERAL

FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO CURRENT AISC STEEL CONSTRUCTION MANUAL.

17b) BOLTED CONNECTIONS

ANCHOR AND NON-STRUCTURAL BOLTS ANO NUTS SHALL BE ASTM A 307, STRUCTURAL BOLTS ANO NUTS SHALL BE ASTM A 325. ALL BOLTED STRUCTURAL CONNECTIONS SHALL CONFORM TO THE AISC SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A 325 OR A 490 BOLTS. ALL BOLTS, NUTS ANO WASHERS SHALL BE HOT-OIP GALVANIZED. ALL STRUCTURAL BOLTEO CONNECTIONS SHALL BE BEARING-TYPE CONNECTIONS.

17c) WELDING

CONFORM TO AWS D1.1. WELDING ELECTRODES FOR PLAIN STRUCTURAL STEEL SHALL BE AWS SERIES E-70. WELDING ELECTRODES FOR GALVANIZED STEEL SHALL BE AWS SERIES E6010 OR E6011.

RIPRAP

GRAVEL

EARTH

STRUCTURAL CONCRETE

FILTER/DRAIN SAND

C-0545B

COLORADO REGISTERED JAMES D. NEIHART No. 31725 PROFESSIONAL ENGINEER 1-5-2017

NO.	DATE	ISSUE/REVISION	DES	DRN	CHK	APP
-	12/16	RECORD DRAWING	JDN	RJA	TEO	JDN

RJH CONSULTANTS, INC.

WEST RESERVOIR AND DITCH COMPANY

RJH PROJECT 13129

WEST RESERVOIR NO. 1 OUTLET WORKS REHABILITATION PROJECT DELTA COUNTY, COLORADO

GENERAL AND STRUCTURAL NOTES

DWG. NO. 08

SHEET NO. 08 of 08

P:\13129 - WEST RESERVOIR NO. 1\CAD\RECORD DWGS\13129-RECORD-DWGS.DWG, 12/23/2016 7:37 AM

January 6, 2017
Project 13129

Mr. Garrett Jackson, P.E.
Colorado Division of Water Resources, Office of the State Engineer
Dam Safety Branch
2754 Compass Drive #175
Grand Junction, CO 81506

Re: West Reservoir No.1 Outlet Works Rehabilitation Project
Acceptance of Construction Request (Rule 10)

Dear Mr. Jackson:

The West Reservoir and Ditch Company is requesting storage approval and construction acceptance for the West Reservoir No.1 Outlet Works Rehabilitation Project in accordance with the requirements of Rule 10 of the *Rules and Regulations for Dam Safety and Dam Construction*, effective January 1, 2007.

Based on observations performed by RJH Consultants, Inc. (RJH), field and laboratory testing performed by DOWL, construction surveys (including foundation or limit of excavation surveys and as-constructed survey), and other documentation provided by the contractor, Rundle Construction, Inc., it is our opinion that construction of the West Reservoir No.1 Outlet Works Rehabilitation Project has been completed in substantial conformance with the approved plans, specifications, and change orders.

Construction completion documents, including the as-constructed drawings and the construction completion report, are complete and are transmitted in pdf format separately. A first filling and monitoring plan was submitted to the SEO in October 2016.

Please call if you have any questions, require additional information, or wish to discuss this request further.

Sincerely,
RJH Consultants, Inc.

Doug Neighbors, P.E.
Project Manager

c: Nick Hughes, West Reservoir and Ditch Company

9800 Mt. Pyramid Court, Suite 330
Englewood, CO 80112
www.rjh-consultants.com

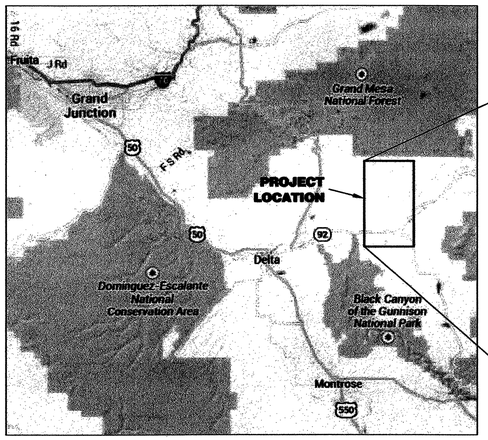
303-225-4611 – phone
303-225-4615 – fax
866-900-1930 – toll free

WEST RESERVOIR AND DITCH COMPANY

WEST RESERVOIR NO. 1

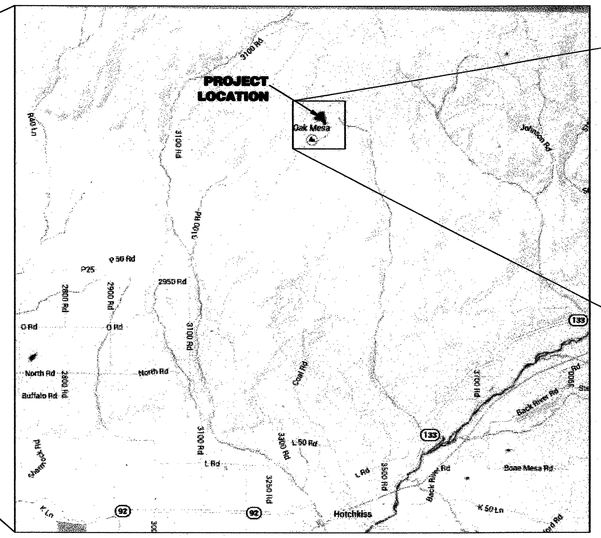
OUTLET WORKS REHABILITATION PROJECT

WATER DIVISION 4, WATER DISTRICT 40, DAM ID: 400538
DELTA COUNTY, COLORADO



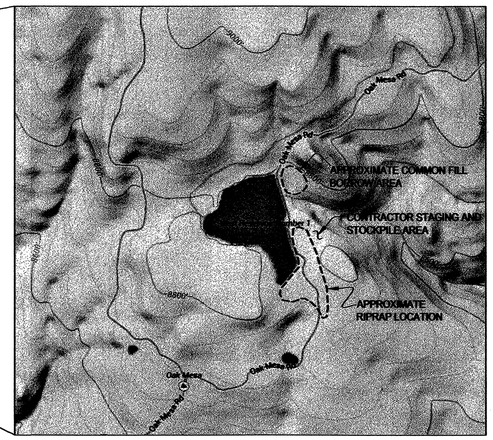
PROJECT VICINITY MAP

(NOT TO SCALE)



SITE LOCATION MAP

(NOT TO SCALE)



WEST RESERVOIR NO. 1

(NOT TO SCALE)

I HEREBY CERTIFY THAT THESE PLANS FOR THE WEST RESERVOIR NO. 1 OUTLET WORKS REHABILITATION PROJECT WERE PREPARED BY ME (OR UNDER MY DIRECT SUPERVISION) FOR THE OWNERS THEREOF.

J. DOUGLAS NEIGHBORS, P.E. COLORADO P.E. #31725
REGISTERED ENGINEER
RJH CONSULTANTS, INC.

COLORADO REGISTERED J. DOUGLAS NEIGHBORS No. 31725 10-1-2015 PROFESSIONAL ENGINEER

APPROVED ON THE 2nd DAY OF October, 2015.

Dick Wolfe
STATE ENGINEER

BY:
WILLIAM T. McCORMICK III, P.E. COLORADO P.E. #29127
CHIEF, DAM SAFETY BRANCH

STATE ENGINEER OF COLORADO

THESE PLANS REPRESENT THE AS-CONSTRUCTED CONDITIONS OF THE WEST RESERVOIR NO. 1 OUTLET WORKS REHABILITATION PROJECT TO THE BEST OF MY KNOWLEDGE AND JUDGMENT, BASED IN PART ON INFORMATION FURNISHED BY OTHERS, AS OF THE 5th DAY OF January, 2017.

JAMES D NEIGHBORS
(ENGINEER'S PRINTED NAME)

(SIGNATURE)

PREPARED FOR

West Reservoir and Ditch Company

PREPARED BY

RJH CONSULTANTS, INC.

ENGLEWOOD • COLORADO

DWG NO. 01

SHEET NO. 01 of 8

C-0545B

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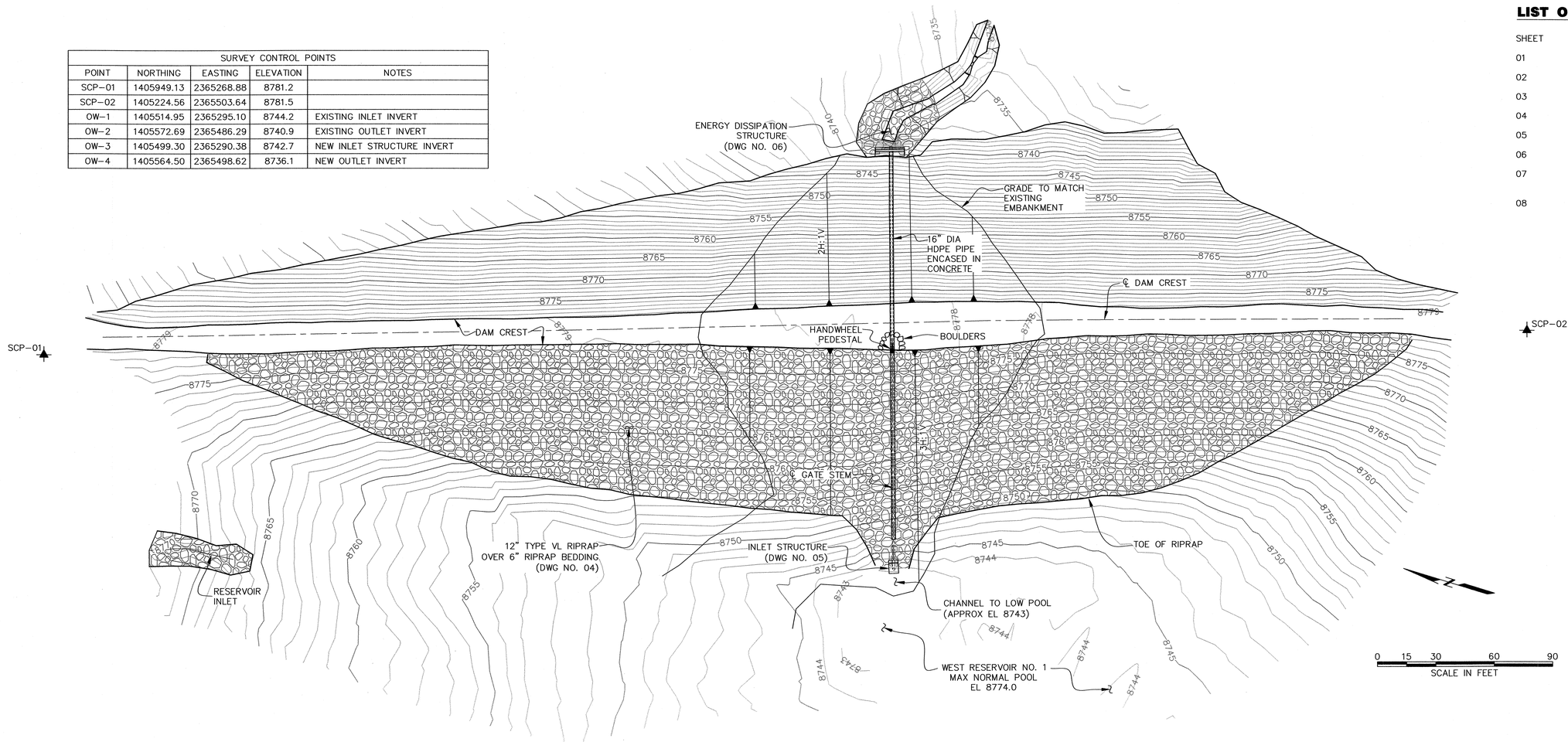
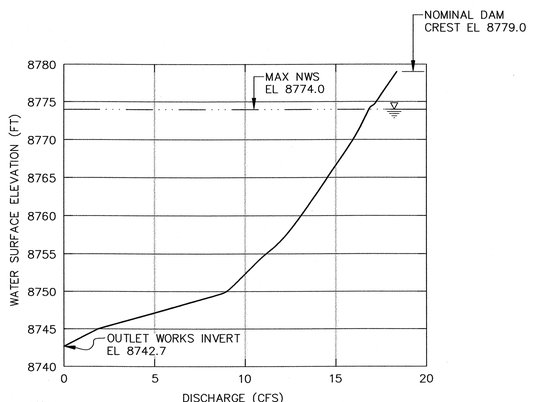
SURVEY CONTROL POINTS				
POINT	NORTHING	EASTING	ELEVATION	NOTES
SCP-01	1405949.13	2365268.88	8781.2	
SCP-02	1405224.56	2365503.64	8781.5	
OW-1	1405514.95	2365295.10	8744.2	EXISTING INLET INVERT
OW-2	1405572.69	2365486.29	8740.9	EXISTING OUTLET INVERT
OW-3	1405499.30	2365290.38	8742.7	NEW INLET STRUCTURE INVERT
OW-4	1405564.50	2365498.62	8736.1	NEW OUTLET INVERT

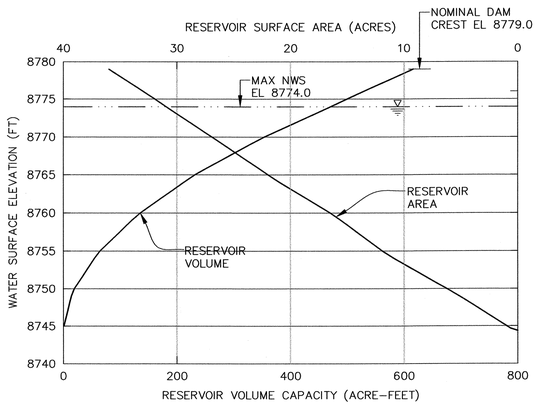
LIST OF DRAWINGS:

SHEET	TITLE
01	COVER SHEET
02	GENERAL PLAN OF MODIFICATIONS
03	PLAN OF EXCAVATION AND OUTLET WORKS
04	SECTIONS AND DETAILS
05	INLET STRUCTURE PLAN, SECTIONS, AND DETAILS
06	ENERGY DISSIPATION STRUCTURE PLAN AND SECTION
07	ENERGY DISSIPATION STRUCTURE AND MISCELLANEOUS SECTIONS AND DETAILS
08	GENERAL AND STRUCTURAL NOTES





OUTLET WORKS RATING TABLE	
WSE (ft)	FLOW (cfs)
8742.7 (Inlet Gate Invert)	0.0
8745.0	1.7
8750.0	9.2
8755.0	11.3
8760.0	13.1
8765.0	14.6
8770.0	16.0
8774.0 (Max NWS)	16.8
8775.0	17.3
8779.0 (Dam Crest)	18.3



STORAGE VOLUME AND AREA TABLE		
WSE (ft)	RESERVOIR STORAGE VOLUME (ACRE-FEET)	RESERVOIR SURFACE AREA (ACRES)
8742.7 (Inlet Gate Invert)	0.0	0.7
8745	1.0	1.0
8750	19.1	6.2
8755	64.5	11.9
8760.0	135.6	16.5
8765.0	231.8	22.0
8770.0	354.1	26.9
8774.0 (Max NWS)	470.5	31.0
8775.0	499.6	32.0
8779.0 (Dam Crest)	616.1	36.0

NOTES:

1. DEMOLISH THE EXISTING FACILITIES AS FOLLOWS:
   A) 10" DIA STEEL CONDUIT BURIED THROUGH THE ENTIRE EMBANKMENT (210 l.f.).
   B) GATE VALVE ON UPSTREAM END OF THE 10" DIA STEEL CONDUIT.
   C) GATE STEM FROM THE GATE VALVE TO THE DAM CREST (125 l.f., BURIED IN UPSTREAM SLOPE).
   D) CONCRETE HAND WHEEL PEDESTAL ON THE DAM CREST.
   E) 2-INCH STEEL PIPE ON THE UPSTREAM SLOPE.

COLORADO REGISTERED No. 31725 PROFESSIONAL ENGINEER 1-5-2017

C-0545B

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RJH CONSULTANTS, INC.

WEST RESERVOIR AND DITCH COMPANY

RJH PROJECT 13129

WEST RESERVOIR NO. 1 OUTLET WORKS REHABILITATION PROJECT DELTA COUNTY, COLORADO

GENERAL PLAN OF MODIFICATIONS

DWG. NO. 02

SHEET NO. 02 of 08

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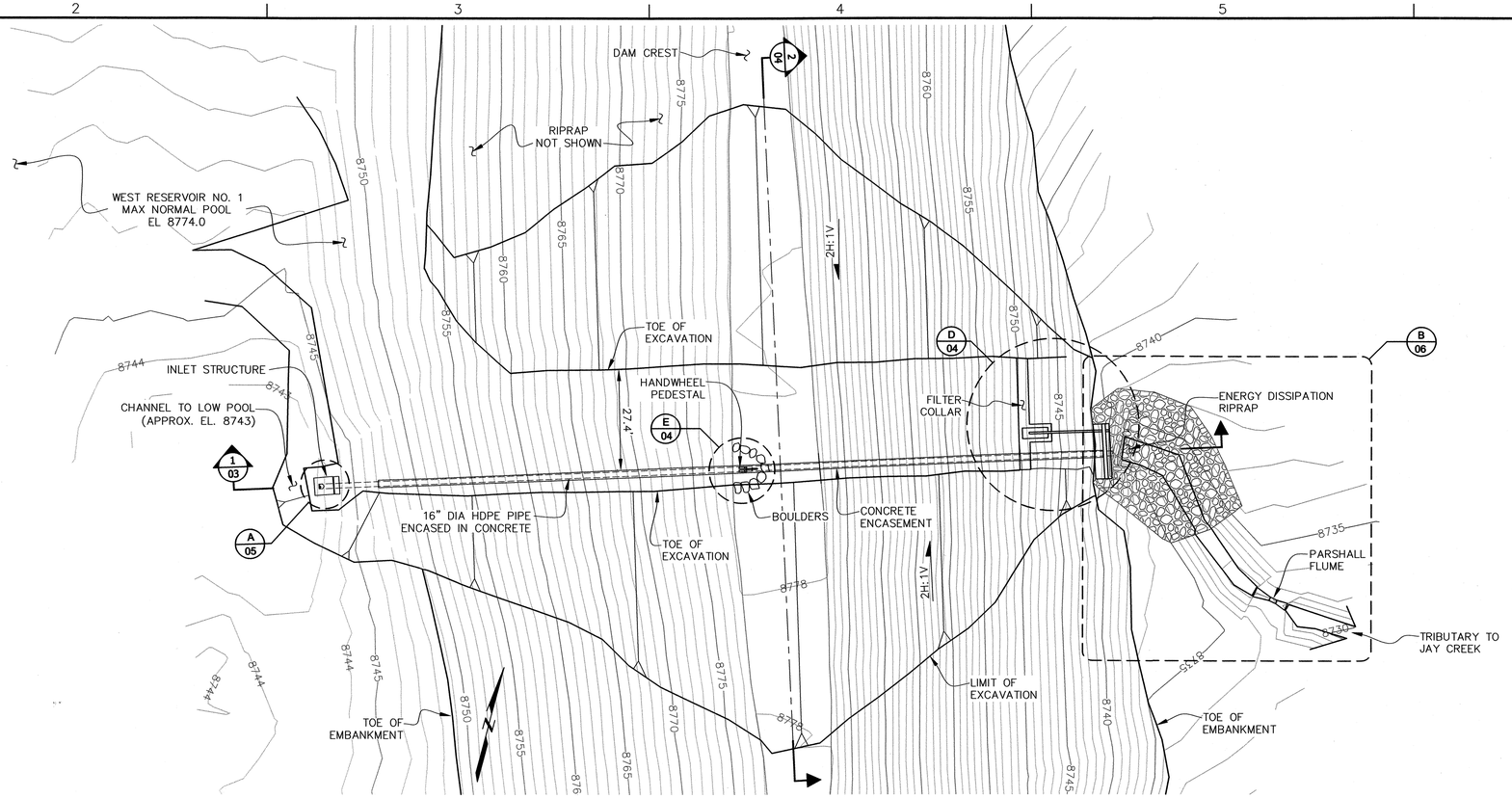

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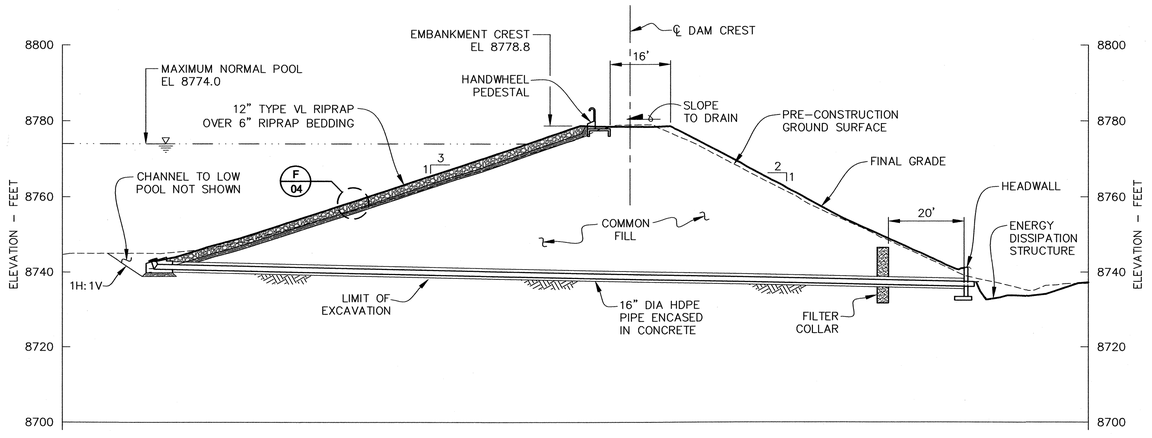

SECTION 1/03 0 10 20 40 60 SCALE IN FEET

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NO.	DATE	ISSUE/REVISION	DES	DRN	CHK	APP
-	12/16	RECORD DRAWING	JDN	RJA	TEO	JDN

RJH CONSULTANTS, INC.

WEST RESERVOIR AND DITCH COMPANY

RJH PROJECT 13129

WEST RESERVOIR NO. 1 OUTLET WORKS REHABILITATION PROJECT DELTA COUNTY, COLORADO

PLAN OF EXCAVATION AND OUTLET WORKS

DWG. NO. 03

SHEET NO. 03 of 08

JAMES D. ASHBY No. 31725 COLORADO REGISTERED PROFESSIONAL ENGINEER 1-5-2017

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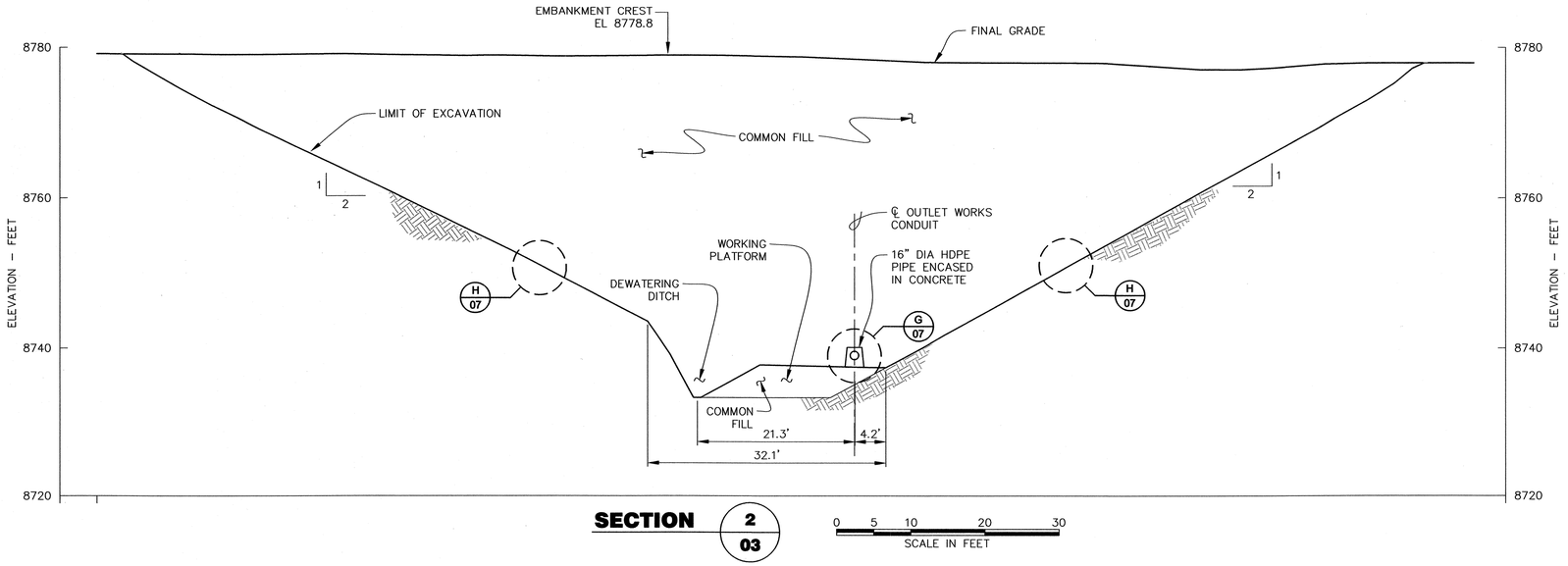

SECTION 2 / 03

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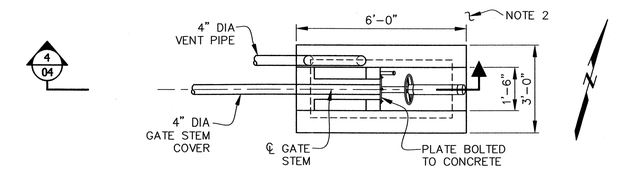
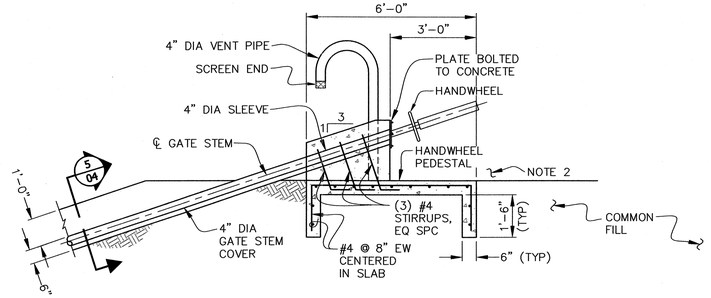


DETAIL E / 03
HANDWHEEL PEDESTAL

0 2 4 6
SCALE IN FEET



SECTION 4 / 04

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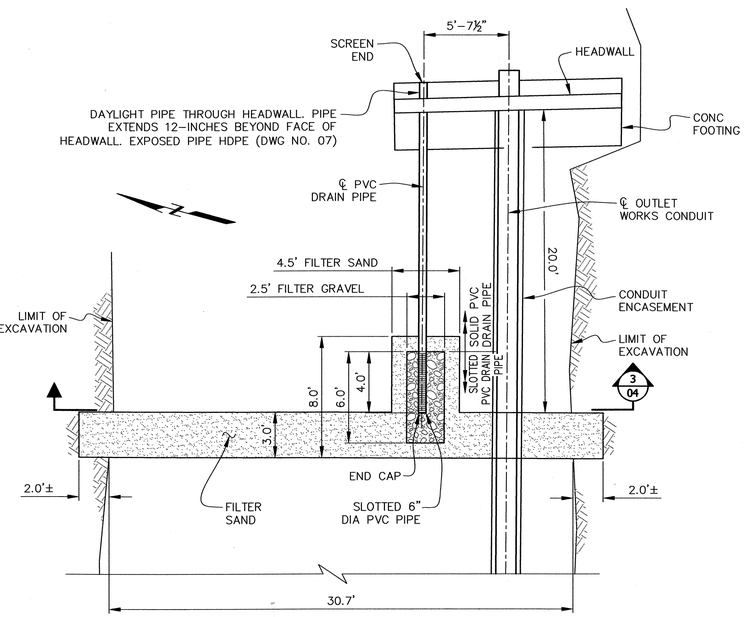
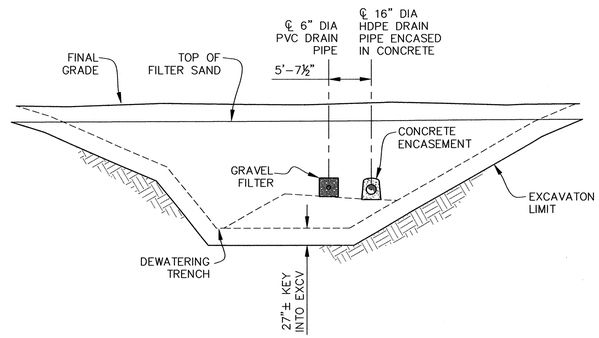


DETAIL D / 03
FILTER COLLAR

0 2.5 5 10 15
SCALE IN FEET



SECTION 3 / 04

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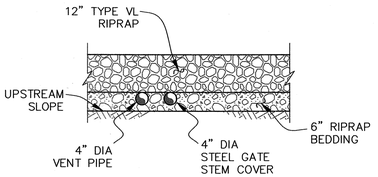

SECTION 5 / 04

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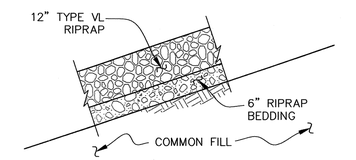

DETAIL F / 03

0 1 2 4
SCALE IN FEET

NOTES:

1. PROVIDE 3 INCHES OF CONCRETE BETWEEN REINFORCEMENT AND SOIL UNLESS OTHERWISE NOTED.
2. BOULDERS PLACED AROUND HANDWHEEL PEDESTAL NOT SHOWN.

C–0545B

COLORADO REGISTERED
JAMES D. NEILD
No. 31725
1-5-2017
PROFESSIONAL ENGINEER

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WEST RESERVOIR NO. 1
OUTLET WORKS
REHABILITATION PROJECT
DELTA COUNTY,
COLORADO

SECTIONS AND DETAILS

DWG. NO. 04

SHEET NO. 04 of 08

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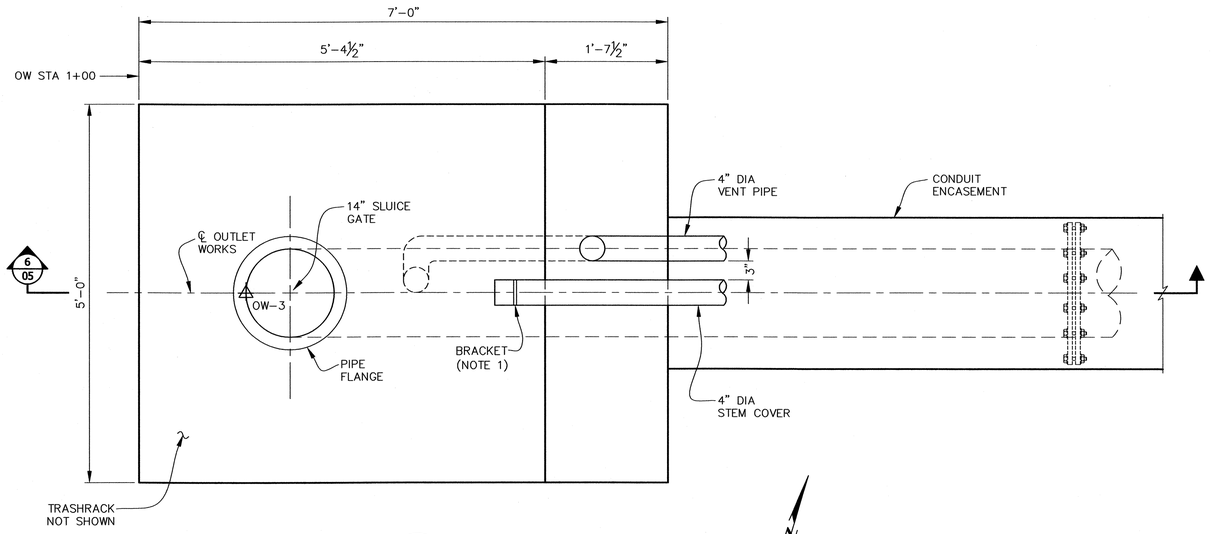

DETAIL A **INLET STRUCTURE** 03

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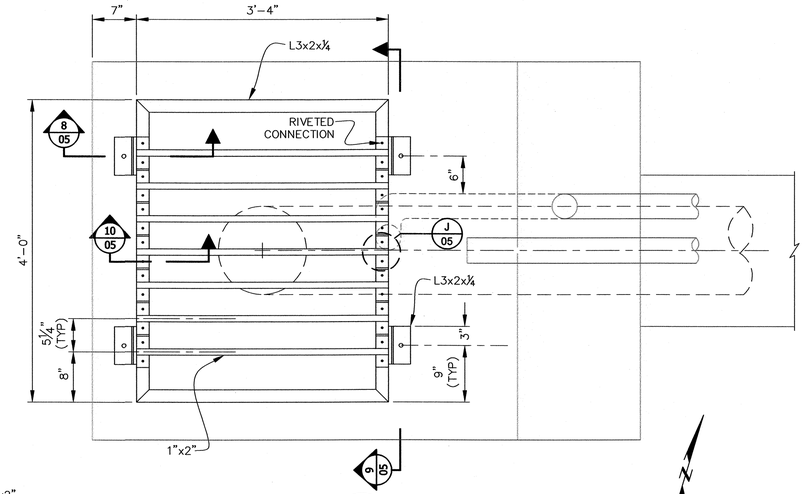

SECTION 7 **05**

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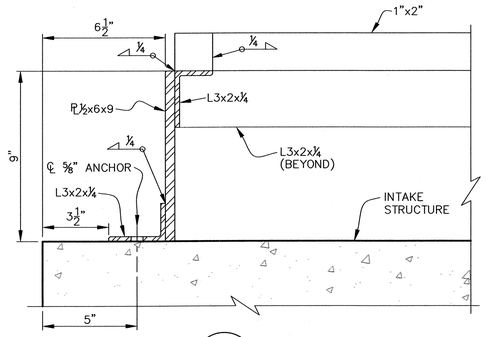

SECTION 8 **05**

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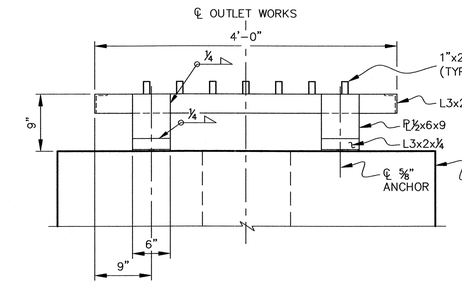

SECTION 9 **05**

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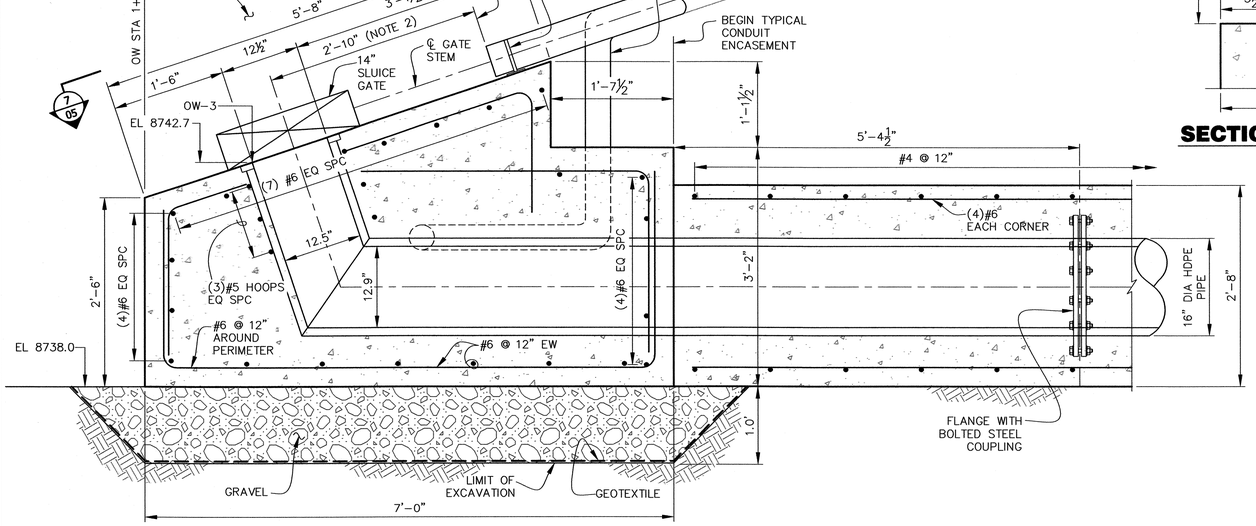

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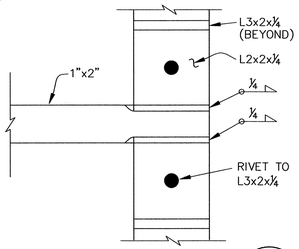
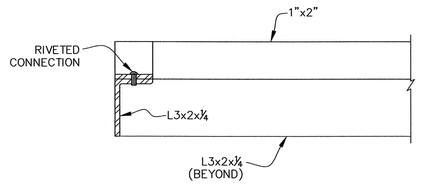


DETAIL J **05**

0 1 2 4 SCALE IN INCHES



SECTION 10 **05**

0 1/2 1 SCALE IN FEET

NOTES:

1. SECURE STEM COVER TO INLET STRUCTURE.
2. CONFIRM DIMENSION FOR SLUICE GATE USED.
3. NOT USED.

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COLORADO REGISTERED JAMES R. JOHNSON No. 31725 1-5-2017 PROFESSIONAL ENGINEER

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INLET STRUCTURE PLAN, SECTIONS, AND DETAILS

DWG. NO. 05

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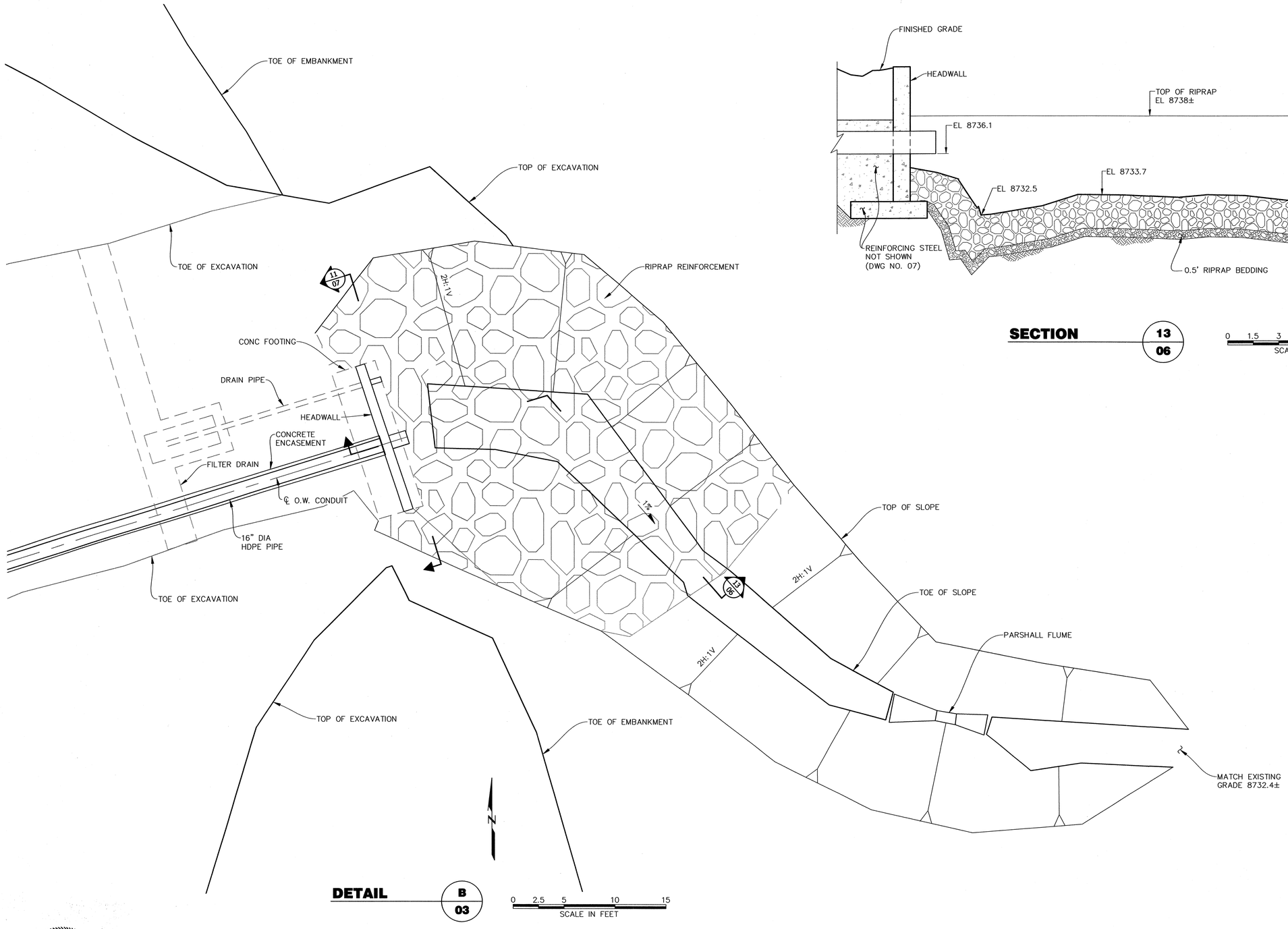

DETAIL B / 03

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SCALE IN FEET

SECTION 13 / 06

0 1.5 3 6 9
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No. 31725
1-5-2017

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WEST RESERVOIR NO. 1 OUTLET WORKS REHABILITATION PROJECT DELTA COUNTY, COLORADO

ENERGY DISSIPATION STRUCTURE PLAN AND SECTION

DWG. NO. 06

SHEET NO. 06 of 08

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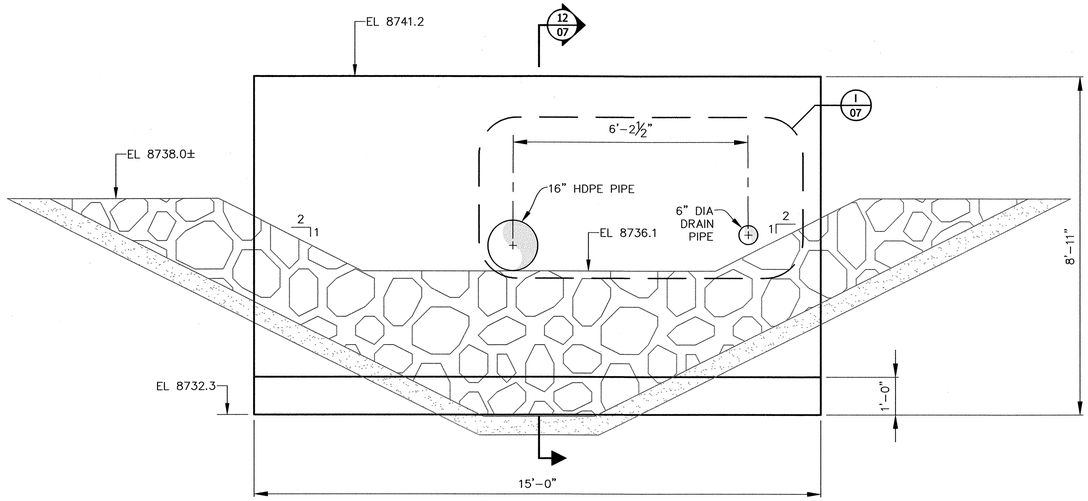

SECTION 11/06

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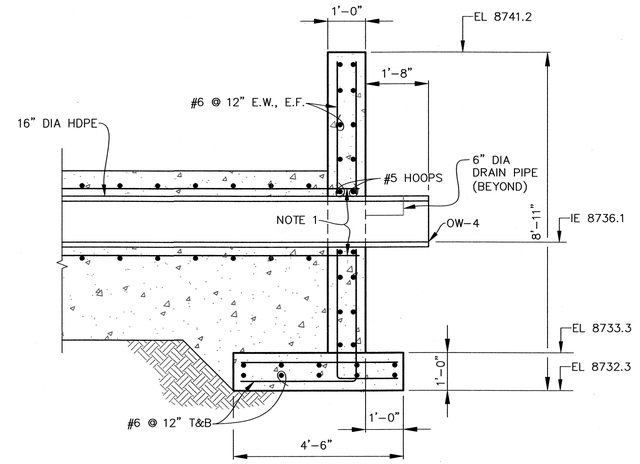

SECTION 12/07

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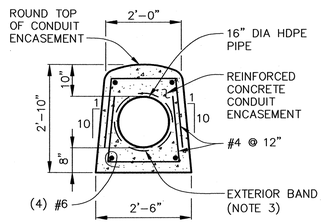

DETAIL G/04

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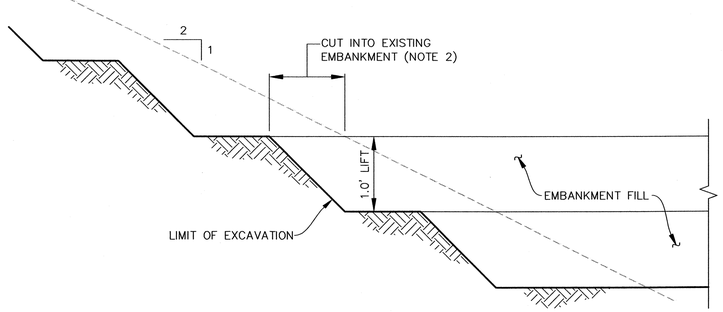
SCALE IN FEET



DETAIL H/04

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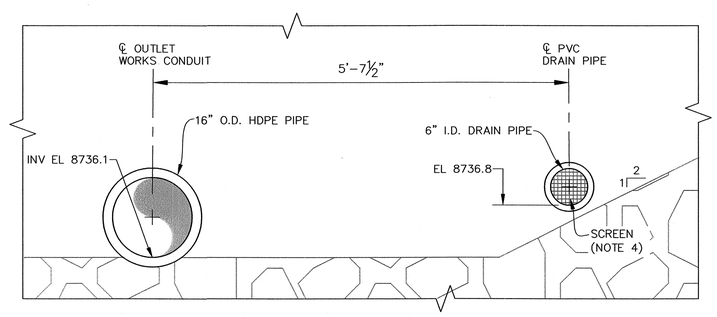

DETAIL I/07

0 0.5 1 2 3
SCALE IN FEET

NOTE:

1. CONTINUE HORIZONTAL CONDUIT ENCASEMENT REINFORCING STEEL INTO HEADWALL. PROVIDE MIN. 2'–6" HOOK INTO HEADWALL.
2. FOR EACH 1–FOOT VERTICAL LIFT OF NEW FILL PLACED, CUT INTO THE EXISTING EMBANKMENT 1–FOOT HORIZONTALLY OR INTO FRESH EMBANKMENT MATERIAL FOR THE ENTIRE LENGTH OF THE BENCH.
3. PROVIDE EXTERIOR BANDS ON HDPE CONDUIT AS FOLLOWS:
   a. 35 FT DOWNSTREAM OF INLET STRUCTURE.
   b. 110 FT DOWNSTREAM OF INLET STRUCTURE.
   c. 35 FT UPSTREAM OF HEADWALL.

   EXTERIOR BAND CAN BE WELDED OR MECHANICAL.
4. PROVIDE SCREEN OVER END OF EXPOSED STEEL OR HDPE PIPE. ATTACH SCREEN TO PIPE USING BAND AROUND PIPE.

COLORADO REGISTERED JAMES D. REID No. 31725 1-5-2017 PROFESSIONAL ENGINEER

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WEST RESERVOIR NO. 1 OUTLET WORKS REHABILITATION PROJECT DELTA COUNTY, COLORADO

ENERGY DISSIPATION STRUCTURE AND MISCELLANEOUS SECTIONS AND DETAILS

C–0545B

DWG. NO. 07

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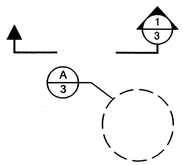
GENERAL NOTES

1. CONSTRUCTION IS SUBJECT TO THE RULES AND REGULATIONS OF THE COLORADO STATE ENGINEERS OFFICE (SEO). SUBSTANTIVE CHANGES TO THE APPROVED DRAWINGS AND SPECIFICATIONS REQUIRE APPROVAL OF THE SEO.
2. THE VERTICAL DATUM FOR THE PROJECT IS THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988.
3. 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.
4. UNLESS SHOWN OR SPECIFIED OTHERWISE, PAYLINES FOR UNIT PRICE PAY ITEMS ARE BASED ON THE DESIGN LINES (NEAT LINES) SHOWN ON THE DRAWINGS.
5. WHERE THE TERM "PROJECT LIMITS" IS USED, IT IS UNDERSTOOD TO MEAN THE LIMITS OF SITE DISTURBANCE SHOWN ON THE DRAWINGS OR OTHERWISE DESIGNATED BY THE ENGINEER.

LEGEND

DETAIL A / 3 — DETAIL TITLE. THE LETTER "A" REFERS TO THE DETAIL DESIGNATION. THE NUMBER "3" REFERS TO THE DRAWING NUMBER WHERE THE DETAIL IS CALLED OUT.

SECTION 1 / 3 **STA 0+00** — SECTION TITLE. THE NUMBER "1" REFERS TO THE SECTION DESIGNATION. THE NUMBER "3" REFERS TO THE DRAWING NUMBER WHERE THE SECTION IS CALLED OUT.



SECTION LOCATION. THE NUMBER "1" REFERS TO THE SECTION DESIGNATION. THE NUMBER "3" REFERS TO THE DRAWING NUMBER WHERE THE SECTION IS SHOWN.

DETAIL LOCATION. THE LETTER "A" REFERS TO THE DETAIL DESIGNATION. THE NUMBER "3" REFERS TO THE DRAWING NUMBER WHERE THE DETAIL IS SHOWN.

3630 — EXISTING INDEX TOPOGRAPHIC CONTOUR WITH ELEVATION IN FEET

EXISTING INTERMEDIATE TOPOGRAPHIC CONTOUR

EARTH SLOPE

CENTERLINE

SURFACE WATERWAY

APPROXIMATE WATER LEVEL

ABBREVIATIONS

APPROX	= APPROXIMATE	MIN	= MINIMUM
BO	= BLOCKOUT	MH	= MANHOLE
CL, ℄	= CENTERLINE	MFR	= MANUFACTURER
CMU	= CONCRETE MASONRY UNIT	MSE	= MECHANICALLY STABILIZED EARTH
CONC	= CONCRETE	NTS	= NOT TO SCALE
DIA	= DIAMETER	NWS	= NORMAL WATER SURFACE
DWG, DWGS	= DRAWING OR DRAWINGS	OD	= OUTSIDE DIAMETER
EA	= EACH	PEN.	= PENETRATION
EF	= EACH FACE	PVC	= POLYVINYL CHLORIDE
EL, ELEV	= ELEVATION	REINF	= REINFORCEMENT
EQ SPC	= EQUALLY SPACED	SCH	= SCHEDULE
EW	= EACH WAY	STA	= STATION
FLG	= FLANGE	T&B	= TOP & BOTTOM
HDPE	= HIGH DENSITY POLYETHYLENE	T.O.	= TOP OF
ID	= INSIDE DIAMETER	TYP	= TYPICAL
IE	= INVERT ELEVATION	WS	= WATER SURFACE
I.F.	= INSIDE FACE		
MAX	= MAXIMUM		

STRUCTURAL NOTES:

1) REINFORCEMENT SYMBOLS

BARS SHOWN THUS —— #8 @ 1'–0" OR —— # 8 @ 1'–0"

INDICATE A GROUP OF IDENTICAL #8 BARS SPACED AT 1'–0" (12") CENTERS.

o—— AN OPEN CIRCLE AT THE END OF A BAR INDICATES A BEND WITH THE BAR TURNED AWAY FROM THE OBSERVER.

●—— A CLOSED CIRCLE AT THE END OF A BAR INDICATES A BEND WITH THE BAR TURNED TOWARDS THE OBSERVER.

o INDICATES A DOWEL

SPLICES SHOWN THUS ——═══—— INDICATES A LAPPED SPLICE, NOT A BEND IN THE BAR.

2) DIMENSIONS

DIMENSIONS ARE TO THE CENTERLINES OF THE BARS UNLESS OTHERWISE SHOWN. CLEAR COVER DIMENSIONS ARE MARKED "CLR." ALL DIMENSIONS TO A JOINT ARE TO THE CENTERLINE OF THE JOINT. BEAMS, COLUMNS, AND WALLS ARE CENTERED ON REFERENCED LINES.

THICKNESS SHOWN FOR WALLS AND SLABS ADJACENT TO UNDISTURBED SOIL OR ROCK ARE MINIMUM DIMENSIONS.

3) COVER

UNLESS OTHERWISE INDICATED ON THE DRAWING, PLACE THE REINFORCEMENT SO THAT THE CLEAR DISTANCE BETWEEN THE FACE OF CONCRETE AND NEAREST REINFORCEMENT IS 3 INCHES FOR #5 BARS OR LARGER. FOR CONCRETE PLACED DIRECTLY AGAINST EARTH OR ROCK, MINIMUM CLEAR CONCRETE COVER OVER REINFORCEMENT SHALL BE 3 INCHES.

4) REINFORCEMENT DOWELS

DOWELS INDICATED ON THE DRAWING SUCH AS #8(D), SHALL HAVE A MINIMUM STRAIGHT EMBEDMENT AND PROJECTION EQUAL TO THAT REQUIRED FOR LAP SPLICING A BAR OF THE SAME DIAMETER.

5) PLAIN DOWELS

PLAIN DOWELS, INDICATED ON THE DRAWINGS SUCH AS 3/4" (PD), ACROSS CONTRACTION JOINTS SHALL BE PLAIN REINFORCING BARS OF THE BAR DIAMETER INDICATED. PLAIN DOWELS SHALL BE A MINIMUM OF 36 INCHES LONG, WITH EQUAL LENGTH EXTENDING ON EITHER SIDE OF THE CONTRACTION JOINT. IMMEDIATELY BEFORE THE SECOND CONCRETE PLACEMENT, THE PROJECTING HALF LENGTH OF DOWEL SHALL BE GREASED TO PREVENT BOND TO THE CONCRETE.

6) STANDARD HOOKS AND BENDS

HOOKS AND BENDS SHALL CONFORM TO ACI 318, SECTIONS 7.1, 7.2. AND 7.3.

7) PLACING REINFORCEMENT

PLACE REINFORCEMENT IN ACCORDANCE WITH APPROVED REINFORCEMENT SHOP DRAWINGS. IN THE EVENT OF A CONFLICT BETWEEN THESE DRAWINGS AND THE APPROVED SHOP DRAWINGS, THE APPROVED SHOP DRAWINGS SHALL GOVERN.

SEE ACI 318, SECTION 7.5 AND ACI 301, SECTION 5.3 FOR PLACING TOLERANCES.

REINFORCEMENT MAY BE ADJUSTED IN THE FIELD TO CLEAR FORM TIES AND ANCHOR BARS. IN SUCH CASES, RELOCATION OF THE EMBEDDED MATERIALS MUST BE CONSIDERED. IN NO CASE SHALL BARS BE BENT IN THE FIELD.

REINFORCEMENT SHALL BE PLACED TO MAINTAIN A CLEAR DISTANCE OF AT LEAST 1 INCH BETWEEN OTHER REINFORCEMENT, ANCHOR BOLTS, FORM TIES, OR OTHER EMBEDDED METALWORK.

REINFORCEMENT PARALLEL TO ANCHOR BOLTS OR OTHER EMBEDDED METALWORK SHALL BE PLACED TO MAINTAIN A CLEAR DISTANCE OF AT LEAST 1–1/3 TIMES THE MAXIMUM SIZE AGGREGATE TO BE USED.

8) SPACING

THE FIRST AND LAST BARS IN SLABS AND WALLS, STIRRUPS IN BEAMS, AND TIES IN COLUMNS ARE TO START AND END AT A MAXIMUM OF ONE HALF OF THE ADJACENT BAR SPACING. ALL REINFORCING TO BE EQUALLY SPACED UNLESS OTHERWISE SHOWN ON THE DRAWINGS.

9) ACCESSORIES

BAR SUPPORTS, SPACERS, AND OTHER ACCESSORIES ARE NOT SHOWN ON THE DRAWINGS. THE RECOMMENDATIONS OF ACI 315 (DETAILING MANUAL) SHALL BE USED IN SELECTING ACCESSORIES.

10) DETAILING

UNLESS OTHERWISE SHOWN, FOLLOW THE RECOMMENDATIONS OF ACI 315. NO CHANGES SHALL BE MADE WITHOUT PRIOR APPROVAL.

11) CONCRETE PLACEMENT

BEFORE PLACING CONCRETE, CHECK ALL APPLICABLE DRAWINGS RELEASED AS SUITABLE FOR CONSTRUCTION INCLUDING MANUFACTURER'S DRAWINGS TO VERIFY THE PRESENCE OF ALL EMBEDDED MATERIAL REQUIRED IN THE PLACEMENT.

12) EMBEDMENT AND LAP SPLICE LENGTH REQUIREMENTS

EMBEDMENT LENGTHS AND LAP SPLICE LENGTHS ARE SHOWN IN THE TABLE BELOW.

BASIC EMBEDMENT LENGTHS ARE BASED ON ACI 318, SECTION 12.2.

ALL LAP SPLICE LENGTHS SHOWN ARE CLASS B SPLICES BASED ON ACI 318, SECTION 12.15.

UNLESS OTHERWISE SHOWN ON THE DRAWINGS, THE MINIMUM LENGTHS FOR EMBEDMENT AND LAP SPLICES FOR PARALLEL BARS SHALL BE AS GIVEN IN THE TABLE BELOW.

WHEN REINFORCING BARS OF DIFFERENT SIZE ARE TO BE SPLICED, THE LENGTH OF THE LAP SHALL BE GOVERNED BY THE SMALLER DIAMETER BAR.

SPLICES ARE TO BE MADE SO THAT THE GIVEN CLEAR DISTANCES TO THE FACE OF CONCRETE WILL BE MAINTAINED.

TABLE OF BASIC EMBEDMENT AND LAP SPLICE LENGTHS ACCORDING TO ACI 318

BAR SIZE NO.	EMBEDMENT (INCHES)		LAP SPLICE (INCHES)	
	ALL BARS EXCEPT TOP BARS	TOP BARS *	ALL BARS EXCEPT TOP BARS	TOP BARS *
3	1'–3"	1'–7"	1'–7"	2'–1"
4	1'–7"	2'–1"	2'–1"	2'–9"
5	2'–0"	2'–7"	2'–7"	3'–5"
6	2'–5"	3'–1"	3'–1"	4'–0"
7	3'–6"	4'–6"	4'–6"	5'–10"
8	4'–0"	5'–2"	5'–2"	6'–10"

* TOP BARS ARE HORIZONTAL BARS IN BEAMS AND SLABS PLACED SO THAT MORE THAN 12 INCHES OF CONCRETE IS CAST IN THE MEMBER BELOW THE BAR.

13) EMBEDDED ITEMS AND OPENINGS

BEFORE PLACING CONCRETE, CARE SHALL BE TAKEN THAT ALL EMBEDDED ITEMS ARE IN POSITION AND SECURELY FASTENED IN PLACE. ADD ADDITIONAL REINFORCING AROUND OPENINGS AS SHOWN ON DRAWINGS.

14) FINISHING SYMBOLS AND CONCRETE TOLERANCES

THE FOLLOWING FINISHING SYMBOLS HAVE BEEN USED ON THESE DRAWINGS. REFER TO THE CONSTRUCTION SPECIFICATIONS FOR DETAILED REQUIREMENTS AND CONSTRUCTION TOLERANCES FOR HYDRAULIC STRUCTURES.

F4 U3 SPECIAL FINISH WITH SPECIAL TOLERANCES FOR HIGH VELOCITY WATER FLOW.

FINISH SURFACES FOR ALL CONSTRUCTION AND CONTRACTION JOINTS SHALL BE PROVIDED IN ACCORDANCE WITH THE SPECIFICATIONS. ALL SURFACES REQUIRING AN F4 OR U3 FINISH ARE SHOWN ON THE DRAWINGS.

15) CHAMFER

UNLESS OTHERWISE INDICATED, CHAMFER EDGES OF ALL PERMANENTLY EXPOSED CONCRETE SURFACES WITH A 45 DEGREE BEVEL, 3/4 INCH X 3/4 INCH. CHAMFER STRIP MAY NOT BE SHOWN ON THE DESIGN DRAWINGS.

16) JOINTS

ALL CONSTRUCTION JOINTS, CONTRACTION JOINTS AND EXPANSION JOINTS SHALL BE PROVIDED WHERE SHOWN ON THE APPROVED SHOP DRAWINGS. NO OTHER JOINTS SHALL BE INTRODUCED UNLESS APPROVED BY THE ENGINEER.

17) STRUCTURAL STEEL

17a) GENERAL

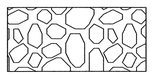
FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO CURRENT AISC STEEL CONSTRUCTION MANUAL.

17b) BOLTED CONNECTIONS

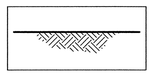
ANCHOR AND NON–STRUCTURAL BOLTS AND NUTS SHALL BE ASTM A 307, STRUCTURAL BOLTS AND NUTS SHALL BE ASTM A 325. ALL BOLTED STRUCTURAL CONNECTIONS SHALL CONFORM TO THE AISC SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A 325 OR A 490 BOLTS. ALL BOLTS, NUTS AND WASHERS SHALL BE HOT–DIP GALVANIZED. ALL STRUCTURAL BOLTED CONNECTIONS SHALL BE BEARING–TYPE CONNECTIONS.

17c) WELDING

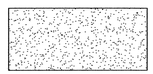
CONFORM TO AWS D1.1. WELDING ELECTRODES FOR PLAIN STRUCTURAL STEEL SHALL BE AWS SERIES E–70. WELDING ELECTRODES FOR GALVANIZED STEEL SHALL BE AWS SERIES E6010 OR E6011.


RIPRAP


GRAVEL


EARTH


STRUCTURAL CONCRETE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COLORADO REGISTERED MICHAEL NEIL WOOD No. 31725 1-5-2017 PROFESSIONAL ENGINEER

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WEST RESERVOIR NO. 1 OUTLET WORKS REHABILITATION PROJECT DELTA COUNTY, COLORADO

GENERAL AND STRUCTURAL NOTES

DWG. NO. 08

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