FINDINGS REPORT FOR REWATER, LLC PRODUCED WATER DISPOSAL FACILITY CONDITIONAL USE PERMIT

April 2, 2026

FILE NAME:	Findings Report reWater Water Facility 040226.docx
APPLICANT:	reWater, LLC
LOCATION:	Four (4) parcels totaling 200 acres located in southeast of Bridgeland and southwest of the South Myton Bench, pivoting on the SW ¼ of Section 25, the SE ¼ of Section 26, the NE ¼ of Section 35, and the NW ¼ of Section 36 in Township 4S, Range 3W, USB&M
ZONING DISTRICT:	A-5 Agriculture, five-acre minimum

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PROPOSAL DESCRIPTION

reWater, LLC requests a conditional use permit to add three additional water recycling ponds with related surface facilities at the existing Pleasant Valley E&P Waste Disposal Facility (Facility 274) adding an additional 1,787,632 barrels of water storage capacity. The existing recycling facility with Ponds 1 & 2 have been previously authorized by the Utah Division of Oil, Gas and Mining (UDOGM) draft rule R649-9 (Exploration and Production Recycling Facilities). The objective of the existing Pleasant Valley E&P Waste Disposal Facility and three proposed ponds is to safely receive, recycle, and store drilling, completion and produced water from nearby oil and gas development and production operations. Produced water recycling is permitted as a produced water disposal facility land use in the A-5 zoning district with a conditional use permit.

Parcels Included in Proposal

Parcel	Acreage
00-0035-0098	49.89
00-0035-0097	12.23
00-0035-0096	26.77
00-0035-0095	111.11
TOTAL:	200.00

HISTORY OF EVENTS

March 11, 2026 ..... Land use application submitted.

March 11, 2026 ..... The application was deemed complete.

March 12 through April 2, 2026..... Public hearing notice posted in the .

March 18 and 25, 2026 ..... Public hearing notice published in the Uintah Basin Standard.

March 18, 2026 ..... Public hearing notice mailed to property owners within 300 feet of proposed conditional use.

March 19, 2026 ..... Public Hearing notice mailed to property owners within two (2) miles of proposed conditional use.

April 2, 2026 ..... Planning Commission meeting.

DUCHESNE COUNTY ZONING REGULATIONS COMPLIANCE REVIEW

Application Required

All requests for a conditional use permit shall be made on the application form provided by the county, detailing the nature of the conditional use request. The applicant shall also provide the necessary information identifying the purpose of the conditional use request, and all required information shall be provided to the planning office twenty one (21) days prior to the planning commission meeting. The planning commission is authorized to render a final decision on the issuance of a conditional use permit following the review and receipt of a recommendation from the zoning administrator. (8-13-2: APPLICATION FOR PERMIT)

Application was originally submitted in July 2025 as an Oil and Gas Drilling and Exploration Site Administrative Conditional Use Permit. Application was successfully resubmitted and determined to be complete on March 11, 2026.

Public Hearing Required

All applications for a conditional use permit shall be made in accordance with the provisions of this title, and shall be the subject of a public hearing held before the planning commission for which a minimum of fourteen (14) days' public notice has been provided and the planning staff notifying all property owners by U.S. mail within three hundred feet (300') of the proposed conditional use. (8-13-3: PUBLIC HEARING REQUIRED)

A public hearing notice was published in the Uintah Basin Standard on March 18 and 25, 2026, and posted in the Duchesne County Administrative Building, Duchesne County website, and on the Utah Public Notice website on March 12, 2026, running until April 2, 2026. The public hearing notice was mailed to property owners within 300 feet of the proposed conditional use permit on March 18, 2026.

Findings Required

A. Findings Required: The planning commission may grant a conditional use permit in compliance with this title if, from the application and the facts presented at the public hearing, it finds:
   1. The proposed use at the proposed location will not be unduly detrimental or injurious to property or improvements in the vicinity, and will not be detrimental to the public health, safety or general welfare.
   2. The proposed use will be located and conducted in compliance with the goals and policies of the county general plan and the purposes of this title.
   3. That the property on which the use, building or other structure is proposed is of adequate size and dimensions to permit the conduct of the use in such a manner that will not be materially detrimental to adjoining and surrounding properties. (8-13-4: FINDINGS AND CONDITIONS FOR APPROVAL)

B. Conditions:
   1. In approving a conditional use permit, the planning commission may impose such reasonable conditions or restrictions as it deems necessary to secure the purposes of the county general plan and to assure operation of the use in a manner compatible with the aesthetics, mass, bulk and character of existing and potential uses in the general vicinity. Minimum conditions shall be included for produced water disposal facilities, extraction of earth products and residential treatment or secure treatment facilities as indicated in section 8-13-5 of this chapter.
   2. When approving a conditional use permit, the planning commission may impose such requirements and conditions as follows: location, construction, maintenance, odor control, operation, site planning, traffic control, dust control, noise, time limits and other items for the conditional use permit as deemed necessary for the protection of adjacent properties and the public interest. The planning commission may require guarantees or other evidence that such conditions will be met and complied with. (8-13-4: FINDINGS AND CONDITIONS FOR APPROVAL)

Expansion of a produced water recycling facility at this location will not be unduly detrimental or injurious to property or improvements in the vicinity, nor will it be detrimental to the public health safety or general welfare if the applicant adheres to the conditions proposed herein, as approved by the Planning Commission. The goals and policies of the county general plan support economic development and the supporting industries to energy development. With the facility allowed as a conditional use in the A-5 Agriculture Zoning District and setback from residential development, the proposed conditional use aligns with the purposes of Duchesne County zoning ordinance for regular and orderly development. The 200 total acres included in the expansion of the produced water recycling facility is of adequate size and dimensions to permit the conduct of the use in such a manner that will not be materially detrimental to adjoining and surrounding properties.

Specific Conditional Uses Regulated: Produced Water Disposal Facilities

A. Fencing: The site must be fenced to sustain safety, and prevent access by livestock, wildlife and unauthorized personnel;
B. Compliance with State: Mandatory compliance with state division of oil, gas and mining (DOGM) general rules, including submittal of the DOGM application and DOGM approval to the county prior to the receipt of water;
C. Odor Control: Mandatory odor control;
D. Distance Requirements: Must be located a minimum of two (2) miles from any state or federal highway, city, town, or primary residential use (as determined by the county tax rolls) and at least one mile from the property line of a parcel containing a primary residential use, unless written consent to locate closer is obtained from the owner of the property containing the primary residential use;
E. Number Permitted: Produced water disposal ponds shall be limited by number on each conditional use permit to the number of ponds that would be under construction within eighteen (18) months and completed within three (3) years of permit approval, and cannot be enlarged or modified until the issue is re-presented to the planning commission for a new conditional use permit and the enlargement or modification is approved;
F. Section 404 Permit Required: Prior to receipt of water, the applicant must provide the county with evidence of compliance with the section 404 permit process administered by the U.S. army corps of engineers and the migratory bird treaty act administered by the U.S. fish and wildlife service;
G. Notice Requirements: Notwithstanding the notification requirements of section 8-13-3 of this chapter, mailed notice of the public hearing shall be given to all property owners within two (2) miles of the parcel proposed for the use;
H. On Site Operator: An operator shall be on site at all times for monitoring of the site during receiving operations. The facility shall be secured against entry when an operator is not present. (8-13-5-1: PRODUCED WATER DISPOSAL FACILITIES)

The produced water facility remains fenced. The facility as proposed complies with state regulations as shown by the State Engineer's approval of the plans for the facility[1], and the Utah Division of Oil, Gas and

[1] Utah Division of Water Rights letter dated July 7, 2025, *Order of the State Engineer for Application No. UT54137, UT54139, and UT54140*. Signed by Matthew L. Call, P.E. – Assistant State Engineer.

Mining approval of the application to construct the additional Ponds 3, 4, and 5, with conditions[2], on July 1, 2025. Odor is minimal, due to hydrocarbons being stripped as part of the processing of the produced water. No state of federal highway, city, town, or primary residential use is within two (2) miles of the proposed facility. No parcel containing a primary residential use is within one (1) mile of the proposed facility. The impetus of this conditional use permit was the expansion of this facility from two ponds to five. The three proposed ponds will be required to be under construction within eighteen (18) months of approval completed within three (3) years of the same date. No enlargement or modification is allowed without the issue being presented to the planning commission for a new conditional use permit. A Section 404 permit is required for any discharge of produced water into U.S. waters, including wetlands. Since no water is being discharged, a Section 404 permit would not apply. Additional public hearing notices were sent on March 19, 2026, to all property owners within two (2) miles of the four parcels associated with the facility. There are three employees dedicated to the facility since it is fully automated.

Term Of Permit

> Unless there is substantial action under a conditional use permit within a period of eighteen (18) months of its issuance, the permit shall be considered null and void. (8-13-6: TERM OF PERMIT)

CONCLUSIONS

1. The request complies with the requirements of the Duchesne County Zoning Ordinance.
2. The request is valid.

RECOMMENDATION

A recommended motion for this conditional use permit may be as follows: “I move to approve the request to expand the reWater LLC produced water recycling facility by three (3) ponds, with the following conditions:

1. The site remains fenced.
2. The facility remains compliant with state requirements.
3. Odor be minimized, and if a complaint be lodged, and the facility is verified to be the source, the operator address the odor to return to level as described in this conditional use permit within a reasonable time;
4. The three proposed ponds be under construction within eighteen (18) months of conditional use permit approval and completed within three (3) years of the same date. No enlargement or modification is allowed without the issue being presented to the planning commission for a new conditional use permit.
5. If any treated produced water be discharged into waters of the U.S. or wetlands, a Section 404 permit be obtained from the Army Corp of Engineers.
6. An operator shall be on site at all times for monitoring of the site during receiving operations. The facility shall be secured against entry when an operator is not present.

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[2] Utah Division of Oil, Gas and Mining Form 9 Sundry Notices and Reports on Facilities: Sundry Number: 135025, Facility Number: 274; received February 6, 2025. Includes attachment: *Sundry Conditions for Facility Number 274*. Approved on July 1, 2025, by Corie Miller, Environmental Manager.

Recommended to the Planning Commission this day, [state date of Planning Commission meeting], by

Duchesne County Zoning Administrator

Mike Gottfredson AICP
Deputy Director of Community Development

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS, AND MINING

FORM 9

SUNDRY NOTICES AND REPORTS ON FACILITIES

1. TYPE OF FACILITY Recycling Facilities	**5. FACILITY NAME:** Pleasant Valley
2. NAME OF OPERATOR: reWater, LLC	**6. FACILITY NUMBER:** 274
3. ADDRESS OF OPERATOR: 4844 N 300 W Suite 100 , Provo, UT, 84604	**7. PHONE NUMBER:**
4. LOCATION OF FACILITY Qtr/Qtr:SESE Section: 26 Township: 4S Range: 3W Meridian: U	**COUNTY:** DUCHESNE
	STATE: UTAH

11.

CHECK APPROPRIATE BOXES TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION
✓ **NOTICE OF INTENT** Approximate date work will start: 3/7/2025	☐ **New Facility Construction**
	☐ **Repair of Facility**
	☐ **Facility Reclamation**
	☐ **Facility Status Report**
	☐ **Results of Sampling**
☐ **SUBSEQUENT REPORT** Date of Work Completion:	☐ **Change to Previous Plans**
	☐ **E&P Waste Disposal Facility Permit**
	☐ **5 Year Renewal**
	✓ **Other** Additional Ponds 3, 4 & 5 Construction

12. DESCRIBE PROPOSED OR COMPLETED OPERATIONS. Clearly show all pertinent details including dates, depths, volumes, etc.

reWater, LLC requests approval for three additional water recycling ponds with related surface facilities at the existing Pleasant Valley E&P Waste Disposal Facility (Facility 274) adding an additional 1,787,632 barrels of water storage capacity. The existing recycling facility with Ponds 1 & 2 have been previously authorized by the Utah Division of Oil, Gas and Mining (UDOGM) draft rule R649-9 (Exploration and Production Recycling Facilities). The objective of the existing Pleasant Valley E&P Waste Disposal Facility and three proposed ponds is to safely receive, recycle, and store drilling, completion and produced water from nearby oil and gas development and production operations. Required application details attached to include a plan, plats package and supplemental information for the additional ponds.

Approved by the Utah Division of Oil, Gas and Mining

Date: July 01, 2025

By:

Please Review Attached Conditions

NAME (PLEASE PRINT) Don Hamilton	**PHONE NUMBER** 4356503866	**TITLE** Permitting Agent
SIGNATURE N/A		**DATE** 2/6/2025

RECEIVED: Feb. 06, 2025

The Utah Division of Oil, Gas, and Mining

- State of Utah
- Department of Natural Resources

Electronic Permitting System - Sundry Notices

Sundry Conditions For Facility Number 274

Conditions of Approval:

-The operator shall comply with rules and regulations set forth in R649-9; Exploration and Production Recycling Facilities.

-The long term produced water recycling pond facility shall be designed, maintained, and operated to separate oil, or floating solids, from produced water prior to discharge into a pond.

-Hydrocarbon accumulation, other than de minimis quantities, on an produced water recycling pond is considered a violation and shall be both reported to the division and removed within 24 hours.

-A minimum of 2 feet of freeboard shall be maintained in the pond(s) at all times.

-The leak detection system must be checked weekly. Any leak must be reported to OGM immediately, and corrective measures must be communicated to OGM.

-Unauthorized discharges or spills from E and P recycling facilities including water observed in a leak detection system shall be reported, within 24 hours, to the division.

Construction Notification Requirements:

The operator is required to notify the Division of Oil, Gas and Mining 72 hours prior to the following actions: -Commencing earthwork -Installation of HDPE liners (secondary, geonet and primary) -Installation of leak detection

Contact Information:

The following are Division of Oil, Gas and Mining contacts and their telephone numbers (please leave a voicemail message if the person is not available to take the call):

Liahona Oloapu, Environmental Scientist 385-602-7327 loloapu@utah.gov

Corie Miller Environmental Manager 801-588-9020 coriemiller@utah.gov

RECEIVED: Jul. 01, 2025

reWater, LLC

Ponds 3, 4 & 5 Permit Application

Pleasant Valley E&P Waste Disposal Facility
(Water Recycling Facility 274)

RECEIVED: Feb. 20, 2023

February 6, 2025

Utah Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
Salt Lake City, Utah 84116
P.O. Box 145801
Salt Lake City, Utah 84114-5801

RE: Application and Revised Business Plan for Proposed Ponds 3, 4 & 5
Pleasant Valley E&P Waste Disposal Facility (Water Recycling Facility 274)

Introduction

reWater, LLC requests approval for three additional water recycling ponds with related surface facilities at the existing Pleasant Valley E&P Waste Disposal Facility (Facility 274) adding an additional 1,787,632 barrels of water storage capacity. The existing recycling facility with Ponds 1 & 2 have been previously authorized by the Utah Division of Oil, Gas and Mining (UDOGM) draft rule R649-9 (Exploration and Production Recycling Facilities). Facility 274 (facility) was previously acquired from Dalbo (Q1, 2023), an industry leader in water management, and upgraded by re-Water, LLC to recycle produced and completion flow-back water to the extent possible for reuse in the drilling and completion of wells in the region. Initial approvals, construction and operation was focused on produced water disposal but reWater, LLC realized the true potential of the facility was to recycle water as the commodity becomes more limited with more regulatory restrictions in our arid environment. Water treatment and storage is an integral component of water recycling and required at the facility with only minor water losses anticipated to natural associated storage ponds evaporation. Any waste generated from the recycling facility does and will continue to be disposed of at approved and regulated commercial waste disposal facilities.

The objective of the existing Pleasant Valley E&P Waste Disposal Facility and three proposed ponds is to safely receive, recycle, and store drilling, completion and produced water from nearby oil and gas development and production operations. This facility is focused on recycling produced water for drilling and completions operations to reduce overall project freshwater usage in full compliance with applicable regulations.

Facility Process, Design and Proposed Upgrades

Following recent upgrades, Facility 274 presently consists of an operational water separation and filtration process with two previously authorized and existing ponds (Ponds 1 & 2). No changes or upgrades to the existing infrastructure is proposed with this application. The existing liquids processing equipment, consisting of a gun barrel and a series of cascading separation tanks (11 total tanks), will continue to will receive, settle, separate and store liquids onsite. There are three main phases of separation in this existing system that will also be employed for water entering Ponds 3, 4 & 5:

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1) Oil will be separated from incoming liquids and sent to the “slop tanks” via Coriolis density meters at the load rack and inlet. Oil will also be skimmed from each tank back to “slop tanks”. The oil in the slop tank will be treated with heat and chemical (emulsion breaker) and given retention time to separate. The sellable oil will be transferred to oil storage tanks and transported by truck to sales with appropriate quarterly reporting to the UDOGM.
2) Slop / solids waste will remain as a bi-product from separating oil and water. Solids consisting primarily of iron sulfides will be removed from the processing tanks via a manual clean out process and sent to a third-party for disposal at a permitted and managed commercial land farm.
3) Remaining water will travel through a series of cascading tanks and will be filtered via sock filters to remove any remaining solids prior to being sent to the existing and proposed storage ponds.

Ponds Construction

Proposed Ponds 3, 4 & 5 will be constructed to the same standards as existing Ponds 1 & 2 with focus on updated regulations within draft rule R649-9. The liquids falling out of the production stream will be captured in the slug catcher and dumped into (2) onsite 500-barrel (bbl) storage tanks for further processing. Proposed ponds will be used to contain hydrocarbon and solids free processed water that has passed through the gun barrel facility and associated filters. Treated water will be stored in existing ponds 1 & 2 and proposed ponds 3, 4 & 5. The facility also has two fresh water storage ponds with a capacity of 1.2 million bbls, fresh water may be blended with the recycled produced water for reuse within area drilling and completion operations.

The location of the proposed ponds is in an area with only minor surface water drainage concerns and where subsurface information is understood because of past excavation and drilling activity in and around the existing facility. The proposed ponds are not located in a flood plain and therefore should not receive surface water through sheet flow following large storm events that may not reach established drainages prior to entering the proposed pond area. The pond exterior walls will prevent any surface water from entering the proposed ponds. Additionally, the established drainages around the proposed pond would be maintained to collect and divert the surface run-off around the area. An inspection of the drainages, and pond area will be completed monthly and after large storm events to determine if modifications, and or repairs need to be made. Furthermore, surface water, that enters the ponds area will be diverted around the ponds as necessary and practical and allowed to drain away from the facility;

The three proposed ponds are located with greater than 50% of their volume in cut material and with levees less than 25% of the total vertical depth of each pond. The pond levees will be compacted in lifts to no less than 95% of the optimum dry density as obtained by the AASHTO Method T-99. Fresh and recycled water will enter the pond 4-inches above the maximum water line to prevent the pipe-liner interface seal from being in continuous contact with the water. The liner will be sealed through fusion or other manufacturer recommended long-term seal to prevent any leakage around any pipe/liner interfaces. The proposed ponds will be closed to influent water, if needed, to maintain a safe and adequate storage capacity and maintain a marked two-feet of free-board at each pond. The receiving headwork is designed to prevent hydrocarbons and solids from entering the ponds. Should hydrocarbons ever become present a floating/absorbent boom will be deployed as a further measure to prevent hydrocarbons from accumulating on the pond surface. This floating/absorbent boom will also make removal of residual hydrocarbons less difficult;

A leak detection collection system will be installed above the secondary liner and below the primary liner at each of the three proposed ponds. Each pond's leak detection system shall include an individual monitoring sump. A permeable material will be installed between the two liners to allow water to flow unimpeded towards the collection sumps. Pea gravel, (or similar material) will be placed around the leak-detection sumps between the two liners on the bottom of the ponds to serve as a conduit to the leak detection system for any liquids that may breach the primary liner. The secondary liner will be installed and sealed around the leak-detection drainage pipe utilizing a water stop to prevent any water from leaving the secondary liner except through the drainage pipes. The drainage pipes will exit outside of the pond area into a sump that will facilitate the visual inspection of each sump. The sumps will also be used to clean out accumulated rainwater should rainwater collect in the sump (see attached plats). The leak-detection sump will be monitored monthly at a minimum.

The occurrence of water in a leak detection system during operation constitutes liner failure and requires immediate action. The division has the option of allowing the operator a short period of time to take corrective action. Further utilization will be allowed only after liner repairs and an inspection by the division, which inspection shall occur within ten days after the operator has taken corrective action and notified the division regarding the action taken to resolve the situation.

The area will be adequately fenced to prevent unauthorized entry, and prevent livestock from accessing the ponds. Gates installed along the fence will be always closed to help prevent unauthorized entry. The fence and gates will be inspected for damage or deterioration weekly, and repairs made as soon as practicable to correct any problem detected. A minimum sized 24" by 18" sign containing legal description, lease name, operator and county will be established and maintained at the proposed pond for identification. The lettering on the sign shall be kept in a legible condition and shall be large enough to be legible under normal conditions at 25 feet.

Liner Details and Repair

The proposed ponds can be closed to influent water, if needed, to maintain a safe and adequate storage capacity while maintaining two-feet of freeboard. Subsurface discharge of water from the ponds will be prevented through use of an appropriate HDPE synthetic primary liner and a secondary liner that will be separated by a permeable layer to serve as a conduit to the leak detection system. The synthetic liners have an anticipated lifespan of 30 years. An inspection of the liner and seals will be completed and repaired or replaced when necessary. The primary liner shall be constructed with a minimum 60-mil HDPE or equivalent liner approved by the division. All installation practices will adhere to manufacturer specification and be performed by manufacturer authorized installers under the direction of a Professional Engineer or his representative. The above specified liner will be unrolled and multiple lengths placed along the bottom and sides of the pond to minimize seams. The seams and pipe-liner interfaces will then be fused together with heat until a solid impermeable liner exists. Finally, the liner ends will be keyed into a trench and buried along the perimeter of the pond.

Significant amounts of precipitated solids in the ponds is not anticipated. Should any solids precipitate, they will be transported by truck to a licensed commercial landfill at the end of the pond’s useful life. Additionally, any solids that have collected on the bottom of the receiving headworks will be periodically removed and properly disposed of in a licensed commercial landfill. In the unlikely event of hydrocarbons entering a pond they will be retained in a small area near the discharge point with floating hydrophobic booms for efficient removal. Any hydrocarbons on the pond will be removed as soon as practicable with absorbent pads or a vacuum truck. The recovered hydrocarbons will be recycled or properly disposed of.

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While geosynthetic liner is manufactured to endure, animals, high winds, hail, extreme heat and cold, UV degradation, and mechanical damage issues can occur and lead to a pond leak. If water is detected during routine monitoring efforts or the pond level fluctuates inconsistent with routine pond use an initial investigation should be performed to determine likely causes, if an obvious cause is not found then the water level within the leaking pond should be quickly and systematically lowered until a visible leak is found or water stops rising within the monitoring sumps. If necessary, the pond will be pumped dry to make repairs. Once the leak is identified liner repair requires pre-planning that should be completed in consultation with manufacturers specifications and repair guidelines and considers the size of the repair and the age and integrity of the overall liner. In general liner repairs would be completed using the following guidelines:

- The simplest and easiest damage to repair and less than four inches in length may simply require thorough area cleaning the leak area and joining the torn areas utilizing a heat gun or squeeze welding torch to carefully fuse the original liner material and repair the leak.
- For a larger repair cut a repair material of the same material and thickness into a round or oval shape (about three times the damaged part area) and cover the damaged part for repair. Generally, hot air gun, squeeze welding torch or special geomembrane glue is used to repair such damage.
- When the damaged part is at the joint of the geomembrane generally due to the cracking of the welded seam caused by the stress of the geomembrane. To repair such damage, the cracked welded seam must be cleaned up, and then re-welded with a double-track crawling welding machine. Use an extrusion welding gun for welding repair. After the repair is completed, the repaired part should be pressure tested to prevent cracking again.
- When the damaged part is at the corner or combined with other materials it is very difficult to repair such damage, and the repair method should be carefully selected according to the actual situation. Generally, joints or places with small damage should be repaired with an extrusion welding torch, areas with small damage at the corners should be repaired with hot air guns, and areas with large damage at the corners should be patched with welding machines.
- Finally, no matter what kind of damaged geomembrane is to be repaired, the repair material selected should be the same as the original geomembrane in material, thickness, and quality standards. Geomembranes that are lower than the original geomembrane quality standards and thickness cannot be used as repair materials.

Management and Monitoring Plan

Facility 274 will be monitored daily by the local and trained operations team. Specifically, the following procedures will be provided to operations:

1) Start Up Procedure;
2) Shut Down Procedure;
3) Operating Procedure(s);
4) Maintenance and testing Procedure(s);
5) Emergency Shut Down Procedure(s); and
6) HSE Reporting and Compliance Procedure(s).

The procedures will include but are not limited to daily hands-on and visual inspection and assessment by the operations team. This would include the following:

1) Facility and access are maintained and safe, free of ruts, drainage issues, trash, debris, staining or other environmental concerns;
2) Facilities are free of signs of overflow and erosion;
3) Tanks, piping, and process equipment are free of leaks, drips, stains and corrosion;
4) Equipment doesn't show excessive wear or need of immediate shut down /

maintenance;
5) Process controls such as heaters, pumps, emissions control devices, level sensors, shut down switches and other critical devices are in good working order;
6) Leak detection system monitoring and accessible;
7) Process sampling is being completed; and
8) Reporting and compliance procedures are in place.

Contingency Plan

The facility design and construction has taken the facility from an outdated truck off- load facility to a state-of-the-art water recycling facility with additional water storage capacity required at this time. Fulltime surveillance via automation, alarm systems and remote viewing capabilities will ensure that the operations team is notified prior to any system upsets with adequate response time. If for some reason the operations team is not able to respond in time to avoid an upset, the facility is equipped with emergency shutdowns and automated systems to stop the flow of gases and liquids in and out of the facility. All equipment, design parameters, equipment specifications and safeguards built into the re-Water facility have been evaluated by professional engineers, regulators and by the operations team intended to operate the facility. The facility will be protected by redundant automated systems and devices to prevent overflow, spilling, over temperature, fire, explosion, and other unplanned events. Operating parameters will be programmed into devices and said devices will operate as outlined below:

1) 24/7 monitoring and reporting through radio communications / SCADA. Operations will have access to view / monitor operating parameters via mobile devices;
2) In case of abnormal condition or parameters, a sequence of events will be triggered based on a risk assessment and cause & effect (C&E) diagram. In the case of high tank levels, the following sequence would occur:
   i) Notification to operator (High Level) will be sent at set level in tank from High Level Switch;
   ii) If levels continue to climb and are not resolved a second notification will be sent (High High Level) from a High High-Level Switch (HHLS);
   iii) If levels continue to climb and reach a critical point, prior to spill, the facility would then ESD (Emergency Shut Down) and all incoming liquids would be stopped via automated valves closing on the inlet to facility from the truck rack and pipelines; and
   iv) After issues are resolved a manual / onsite reset will be required to restart the facility to prevent operations from starting process back up remotely without having line of site on facility during start-up.
3) Other processes such as burner management systems on tanks (heaters), pumps, skim lines, filter skids, etc. will have alarms and automated devices that act in a similar fashion:
   v) Warning;
   vi) Final Warning; and
   vii) Shut Down or ESD facility or process.

A periodic review of facility systems and the ponds area must be conducted to identify equipment that may be experiencing abnormal or unusual operating or maintenance conditions. On-site visits may be considered along with analysis of records to complete this review. Immediate action shall be taken to report and correct a hazardous or potentially hazardous condition that may influence the integrity of a facility system.

RECEIVED: Feb. 20, 2025

Summary
Ultimately, trained eyes on facility via remote surveillance, on site observation, operator experience and understanding of the facility and its operation are the best prevention tools for avoiding health, safety, or environmental incidents. The facility is in a remote area of rural Utah with limited consequence to any nearby permanent population. This plan is limited to emergency response, operators and government agencies and is not for public distribution. This plan is designed to augment and not replace current emergency response plans and that current emergency response plans be reviewed annual to ensure compliance with the facilities operation.

reWater, LLC
4844 N 300 W, Suite 100
Provo, Utah 84604

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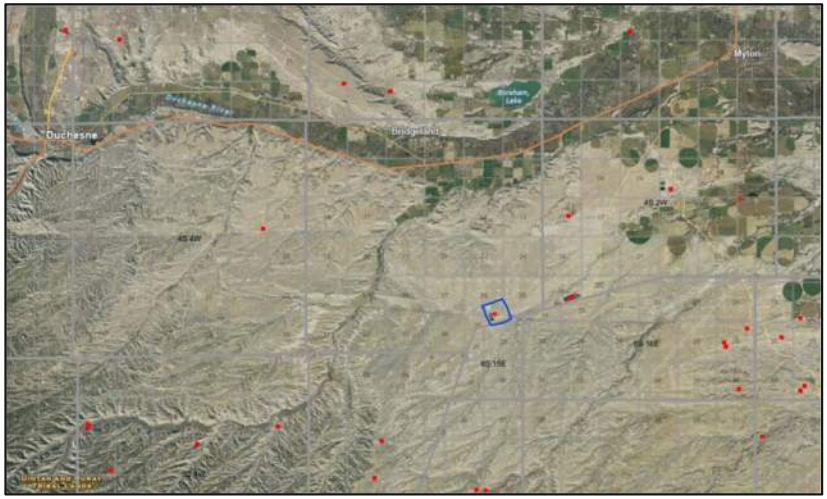
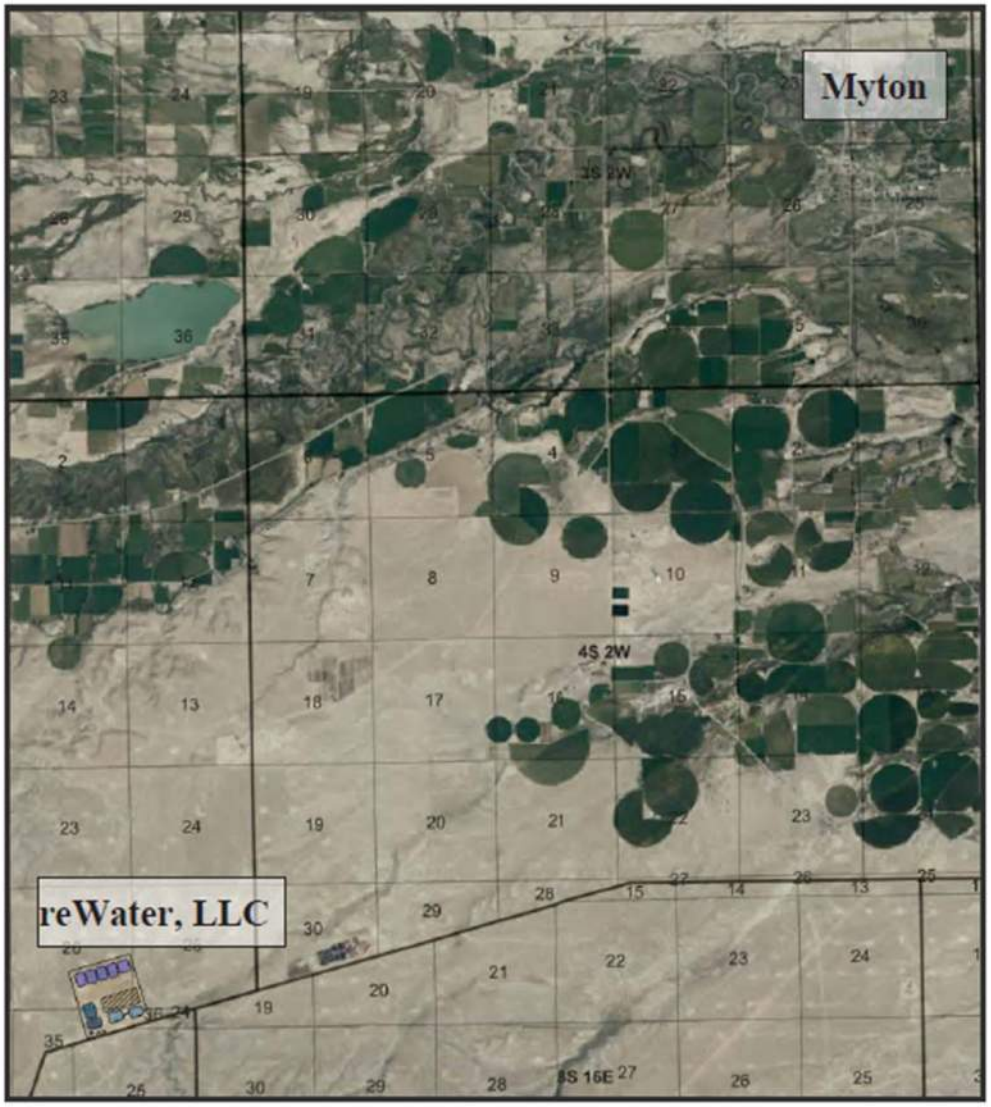
Pleasant Valley E&P Waste Disposal Facility (Water Recycling Facility 274)



Locator map to Myton



Property Location:
200 Acres in Sections 25, 26, 35 and 36, T4S, R3W, USB&M
Duchesne County, Utah

Property Address:
10300 West BLM Fence Road
Bridgeland, Duchesne County, Utah 84021

RECEIVED: Feb. 20, 2025

Points of Contact

- Daniel Gunnell – CEO
- Kimball Hodges – President
- Bradley Gunnell – CLO
- Dustin Treick – COO dustin@wemenergy.com
- Keith Schetne – CFO
- Lynn Hadlock – Field Supervisor lynn@wemenergy.com
- Jake Woodland – VP Surface
- Bryan Martin – Facilities and Automation
- BJ Hadlock – Facilities Manager
- Geo-Strata, Mike mikev@geostrata-llc.com
- Outlaw McCoy Anderson mccoy@outlaw-engineering.com
- Star Point Enterprises, Inc. Don Hamilton starpoint@etv.net

RECEIVED: Feb. 20, 2023

PLEASANT VALLEY NORTH PONDS 3, 4 & 5

INDEX TO SHEETS

SHEET NUMBER	DESCRIPTION
1	TITLE SHEET
2	POND GRADING
3	POND LAYOUT
4	PLAN & PROFILES
5	PIPE DETAILS

SPECIAL NOTE:

1. PONDS 3-5 ARE PRODUCED WATER PONDS AND WILL BE FILLED FROM POND 3 WHICH WILL SPILL TO POND 4 AND FINALLY TO POND 5. THESE PONDS MUST COMPLY TO THE UTAH DIVISION OF OIL GAS AND MINING RULES R649-9 AND THEREFORE, POND 5 DOES NOT INCLUDE A SPILLWAY. IT IS THE OPERATORS RESPONSIBILITY TO ENSURE THE WATER DOESN'T EXCEED THE MAX FILL LEVEL AS NOTED ON THE CONSTRUCTION DRAWINGS.

2. PONDS 3-5 EACH HAVE AN EMBANKMENT THAT IMPOUNDS 20 AC FT OR LESS OF PRODUCED WATER AND EACH POND REQUIRES A MINOR DAM PERMIT FROM THE UTAH DIVISION OF WATER RIGHTS. DUE TO THE ELIMINATION OF THE SPILLWAY IN POND 5, IT IS THE OPERATORS RESPONSIBILITY TO MAINTAIN 3' OF FREEBOARD AT ALL TIMES BY REMAINING AT OR BELOW THE MAX FILL LEVEL AS NOTED ON THE PLANS. IF THE WATER EVER DOES ACCIDENTALLY OVER TOP THE POND, THE BERM MUST BE RECONSTRUCTED AND RE-COMPACTED ACCORDING TO THE RULES OF UTAH DIVISION OF WATER RIGHTS DAM SAFETY GUIDELINES FOR MINOR DAMS.

THESE DRAWINGS, OR ANY PORTION THEREOF, SHALL NOT BE USED ON ANY PROJECT OR EXTENSIONS OF THIS PROJECT EXCEPT BY AGREEMENT IN WRITING WITH OUTLAW ENGINEERING, INC.

REGISTERED PROFESSIONAL ENGINEER
MITCH C. MORTENSEN
375112
EXP:3-31-25
STATE OF UTAH

REVISIONS

DESIGNER: AAM | REVIEWED: MCM | DRAWN: AAM

PROJECT
PLEASANT VALLEY NORTH PONDS 3, 4 & 5
LOCATION: SECTION 25, 26, 35, 36 T4S, R3W, U.S.B.&M.
DUCHESNE COUNTY, UTAH
LAT: 40.09776 LONG: -110.18088

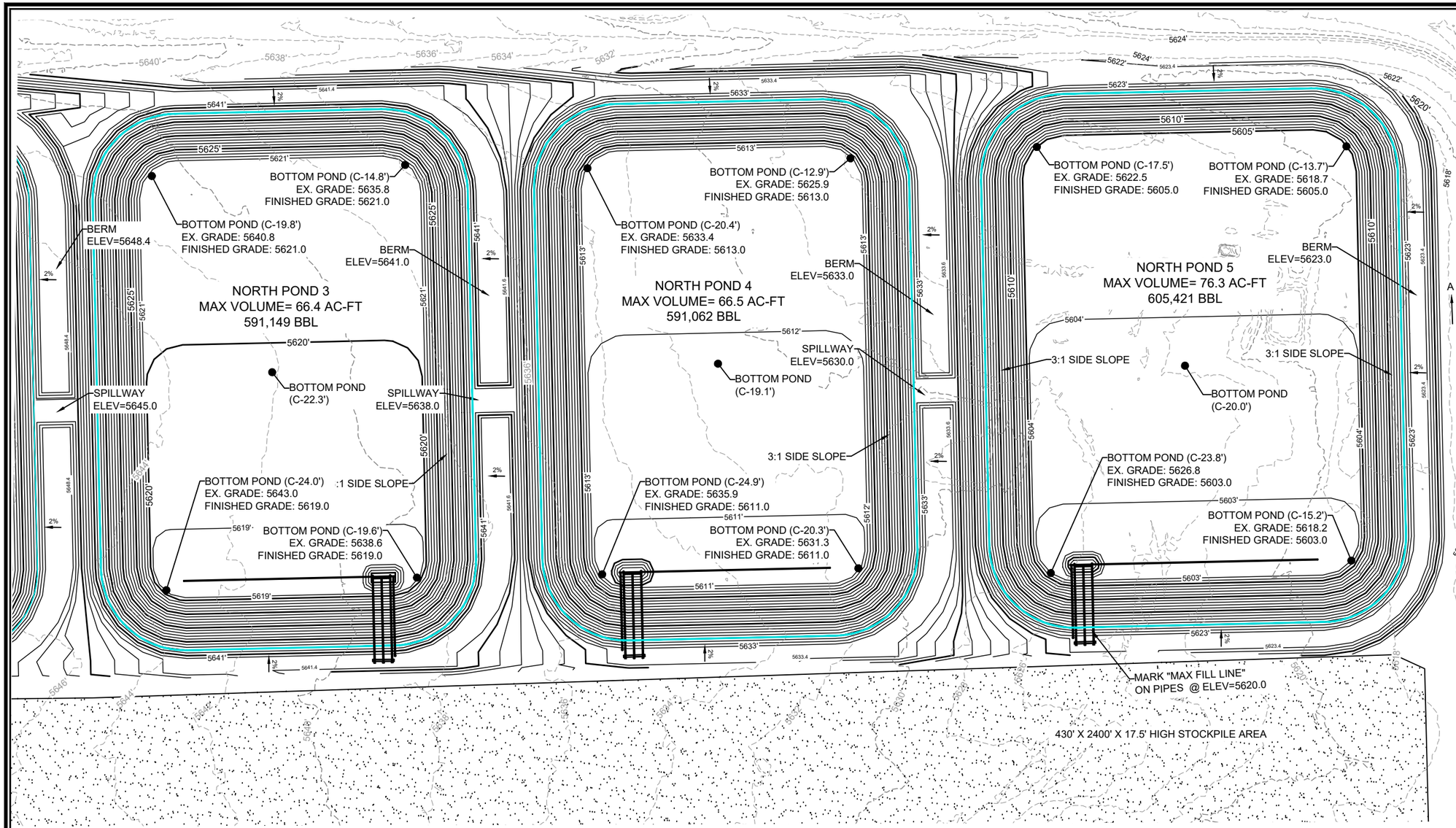
SHEET
COVER

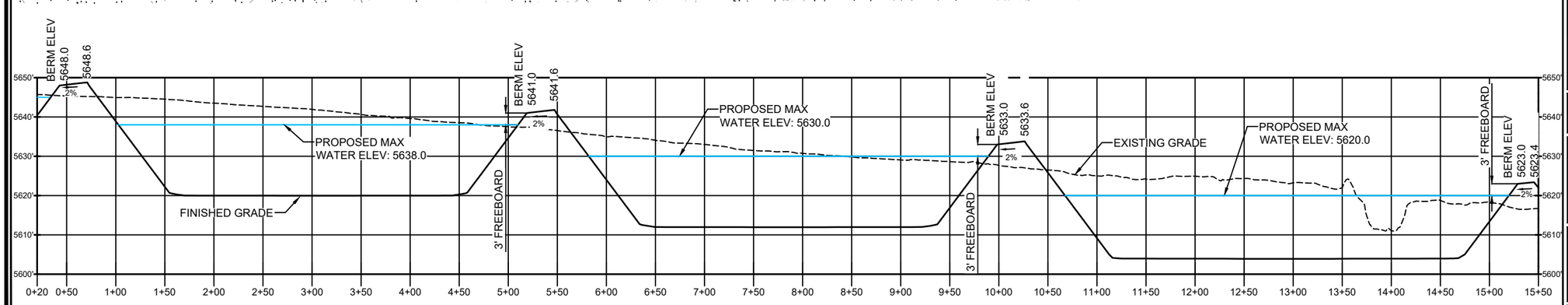
OUTLAW ENGINEERING INC.
510 West 200 North
Roosevelt, UTAH 84066
(435) 232-4321

JOB NO.

SHEET NO.
1 OF 5

RECEIVED: Feb. 20, 2025





CROSS SECTION A-A

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LEGEND

- = PROPOSED CONTOURS
- = TOP OF WATER
- = EXIST CONTOURS

N W E S

11x17 SCALE:
1" = 120'

REGISTERED PROFESSIONAL ENGINEER
MITCH C. MORTENSEN
375112
EXP:3-31-25
STATE OF UTAH

ESTIMATED POND EARTHWORK QUANTITIES

* NO SHRINK OR SWELL FACTORS HAVE BEEN USED
(QUANTITIES EXPRESSED IN CUBIC YARDS)

ITEM	CUT	FILL	EXCESS/ IMPORT
POND 3	146,531	7,678	138,853 (CUT)
POND 4	139,242	9,541	129,701 (CUT)
POND 5	150,130	7,837	142,293 (CUT)

REVISIONS

DESIGNER: AAM | REVIEWED: MCM | DRAWN: AAM

PROJECT

PLEASANT VALLEY
NORTH PONDS 3, 4 & 5

LOCATION: SECTION 25, 26, 35, 36 T4S, R3W, U.S.B.&M.
DUCHESNE COUNTY, UTAH

LAT: 40.09776 LONG: -110.18088

SHEET
PONDS 3-5 GRADING PLAN

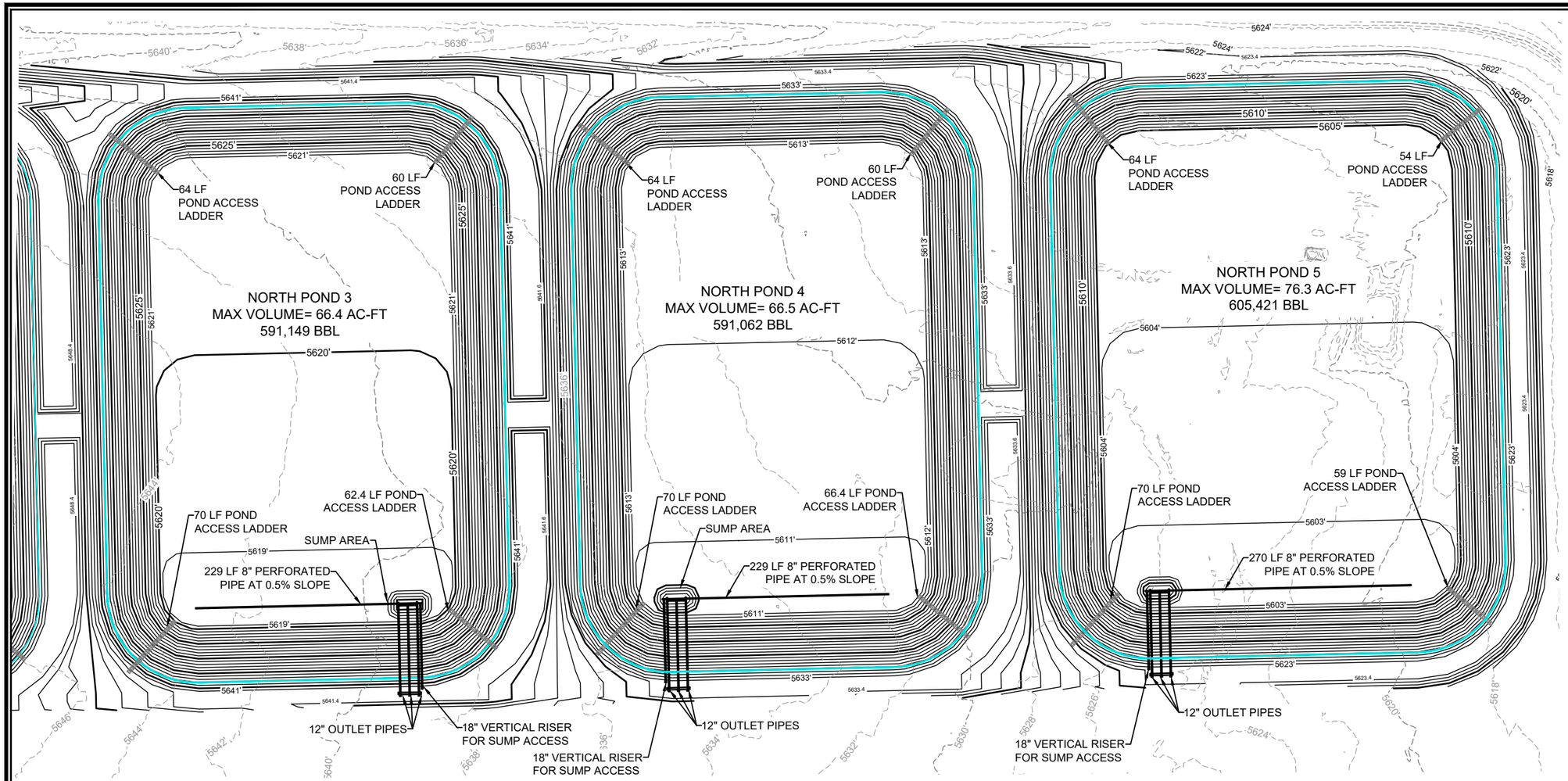
reWater

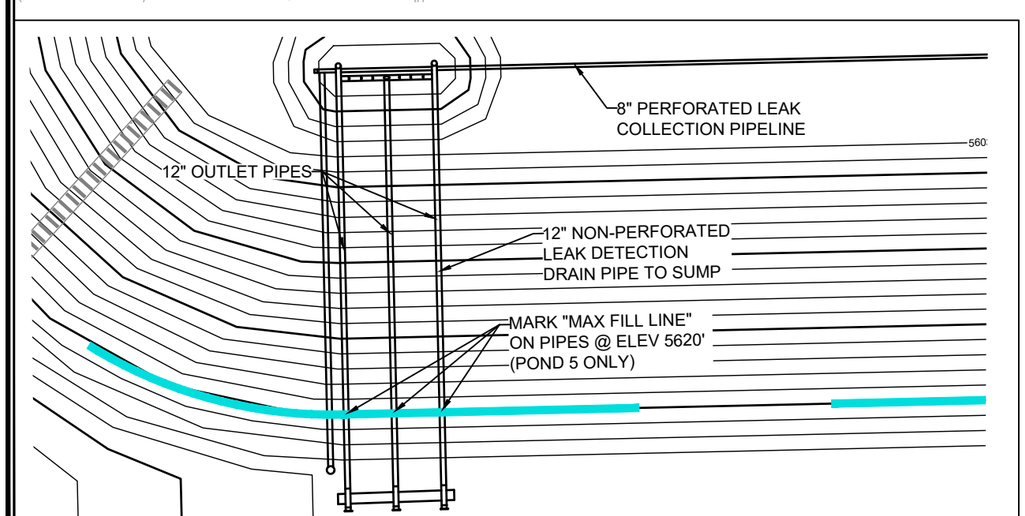
OUTLAW ENGINEERING INC.
510 West 200 North
Roosevelt, UTAH 84066
(435) 232-4321

JOB NO.

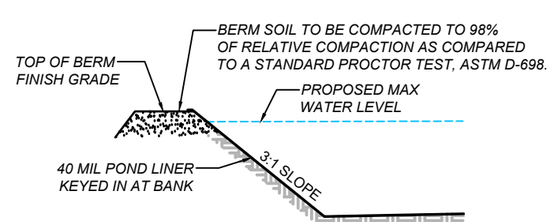
SHEET NO.
2 OF 5

RECEIVED: Feb. 20, 2025

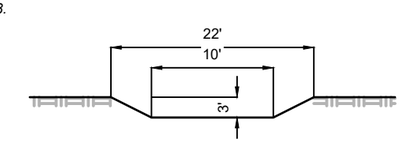




TYP. PIPE LAYOUT



BERM DETAIL
NOT TO SCALE



OUTLET SPILLWAY DETAIL
NOT TO SCALE

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LEGEND

= POND CONTOURS
= TOP OF WATER
= EXIST CONTOURS

REGISTERED PROFESSIONAL ENGINEER
MITCH C. MORTENSEN
375112
EXP:3-31-25
STATE OF UTAH

N
W E
S

11x17 SCALE:
1" = 120'

REVISIONS

DESIGNER: AAM | REVIEWED: MCM | DRAWN: AAM

PROJECT

PLEASANT VALLEY NORTH PONDS 3, 4 & 5

LOCATION: SECTION 25, 26, 35, 36 T4S, R3W, U.S.B.&M.
DUCHESNE COUNTY, UTAH

LAT: 40.09776 LONG: -110.18088

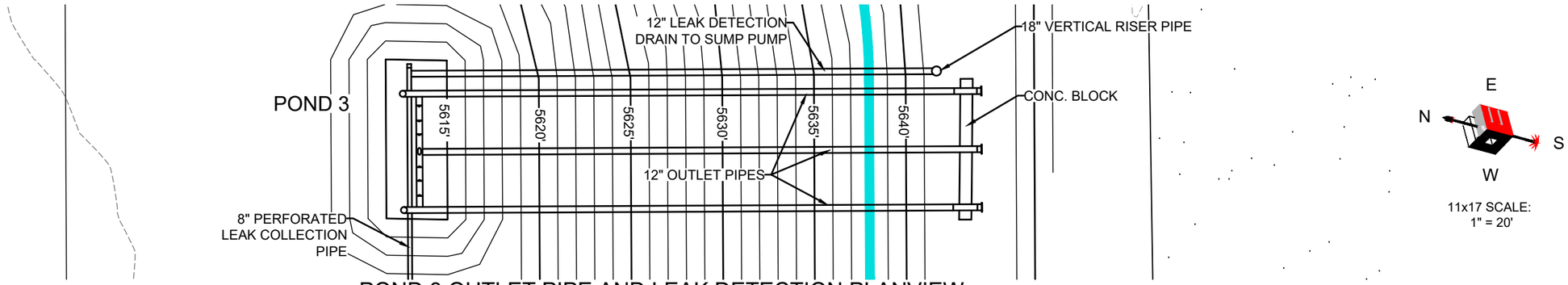
SHEET
POND LAYOUT

OUTLAW ENGINEERING INC.
510 West 200 North
Roosevelt, UTAH 84066
(435) 232-4321

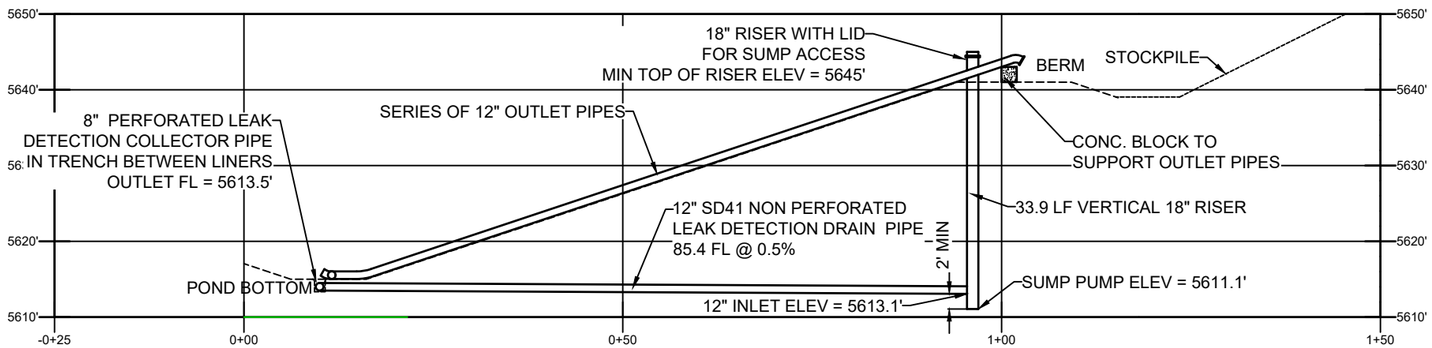
JOB NO.

SHEET NO.
3 OF 5

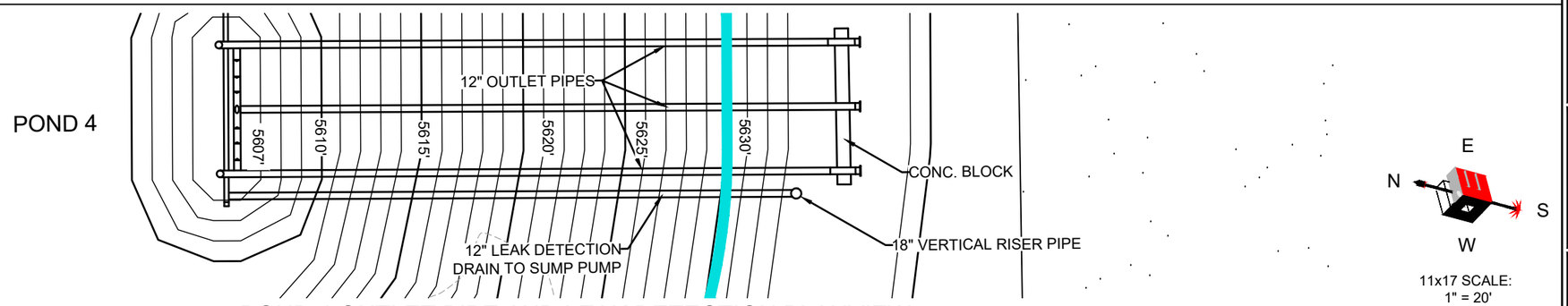
RECEIVED: Feb. 20, 2025



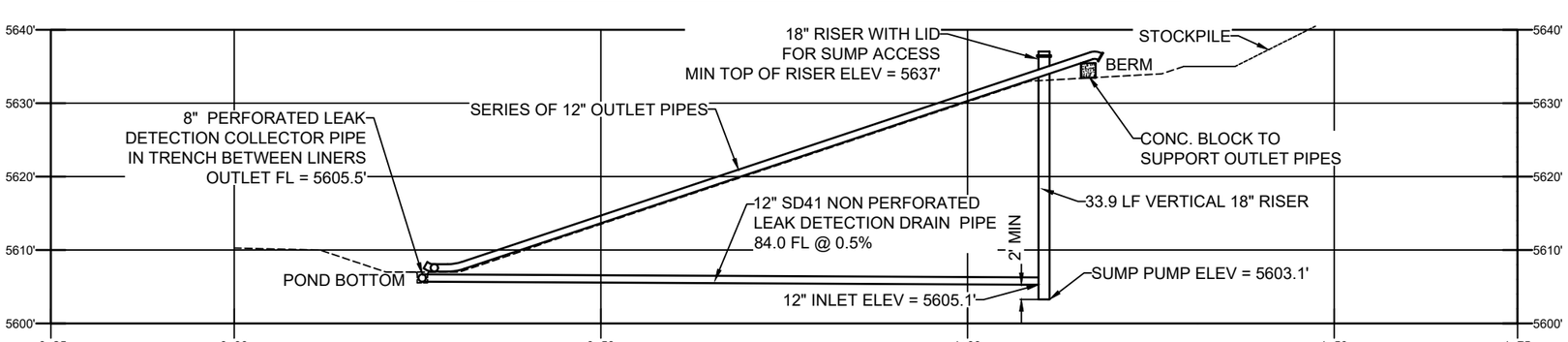
POND 3 OUTLET PIPE AND LEAK DETECTION PLANVIEW



POND 3 OUTLET PIPE AND LEAK DETECTION PROFILE



POND 4 OUTLET PIPE AND LEAK DETECTION PLANVIEW



POND 4 OUTLET PIPE AND LEAK DETECTION PROFILE

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E N S W

11x17 SCALE: 1" = 20'

REGISTERED PROFESSIONAL ENGINEER MITCH C. MORTENSEN 375112 EXP:3-31-25 STATE OF UTAH

REVISIONS

DESIGNER: AAM | REVIEWED: MCM | DRAWN: AAM

PROJECT

PLEASANT VALLEY NORTH PONDS 3, 4 & 5

LOCATION: SECTION 25, 26, 35, 36 T4S, R3W, U.S.B.&M.
DUCHESNE COUNTY, UTAH

LAT: 40.09776 LONG: -110.18088

SHEET

PLAN AND PROFILES

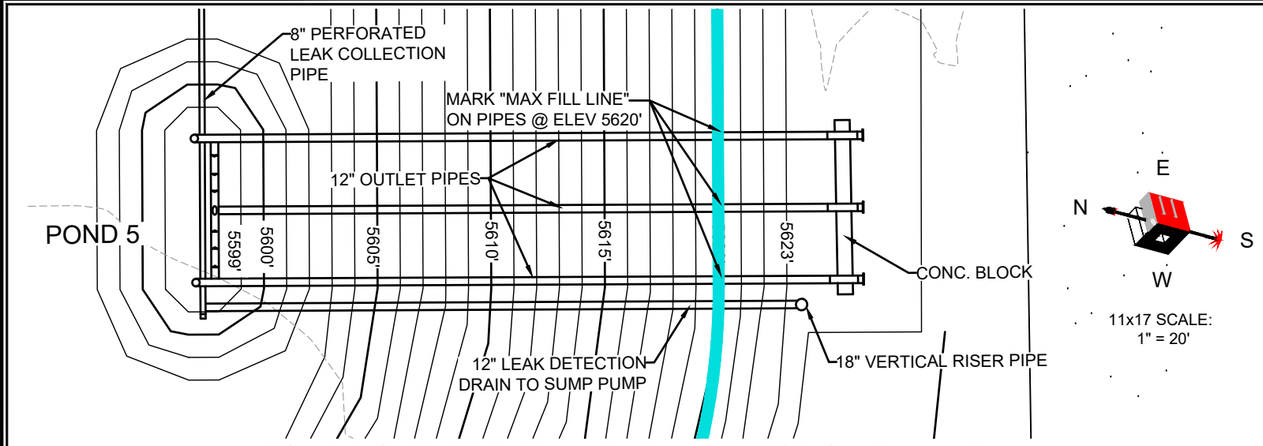
reWater LLC

OUTLAW ENGINEERING INC.
510 West 200 North
Roosevelt, UTAH 84066
(435) 232-4321

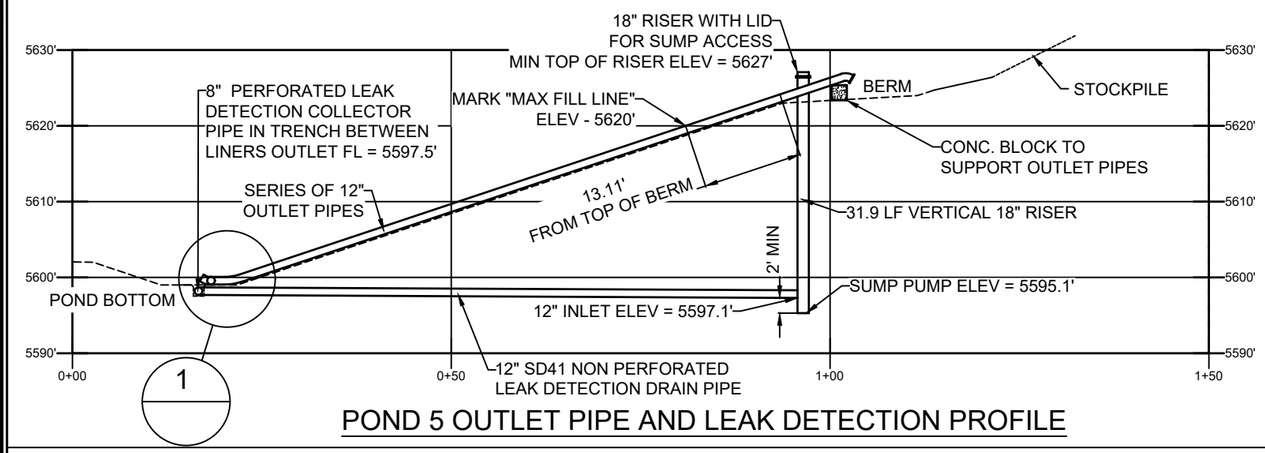
JOB NO.

SHEET NO. 4 OF 5

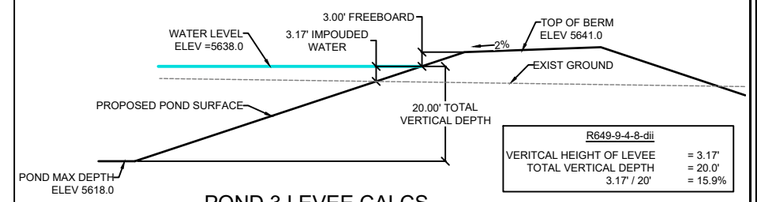
RECEIVED: Feb. 20, 2025



POND 5 OUTLET PIPE AND LEAK DETECTION PLANVIEW



POND 5 OUTLET PIPE AND LEAK DETECTION PROFILE



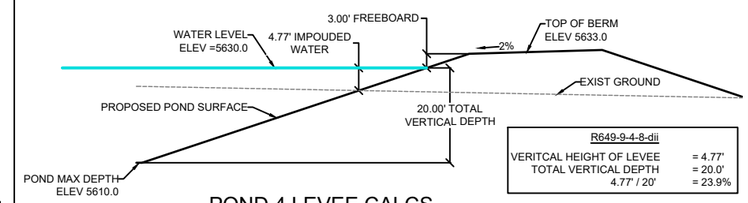
R649-9-4-8-dii

VERITCAL HEIGHT OF LEVEE	= 3.17'
TOTAL VERTICAL DEPTH	= 20.0'
3.17' / 20'	= 15.9%

POND 3 LEVEE CALCS

NOT TO SCALE

* PLEASE REFER TO SPECIAL NOTE ON COVER PAGE



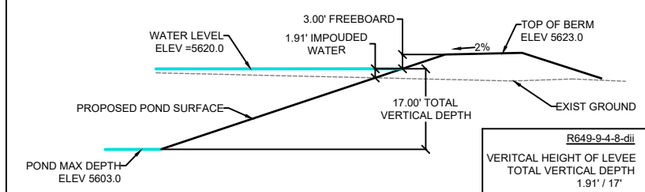
R649-9-4-8-dii

VERITCAL HEIGHT OF LEVEE	= 4.77'
TOTAL VERTICAL DEPTH	= 20.0'
4.77' / 20'	= 23.9%

POND 4 LEVEE CALCS

NOT TO SCALE

* PLEASE REFER TO SPECIAL NOTE ON COVER PAGE



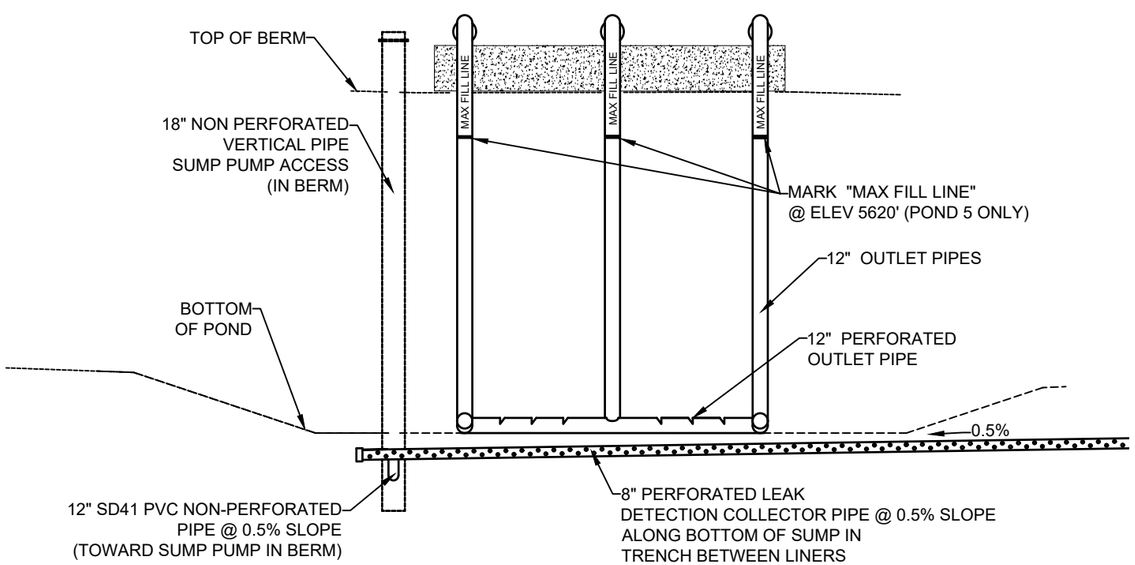
R649-9-4-8-dii

VERITCAL HEIGHT OF LEVEE	= 1.91'
TOTAL VERTICAL DEPTH	= 17.0'
1.91' / 17'	= 11%

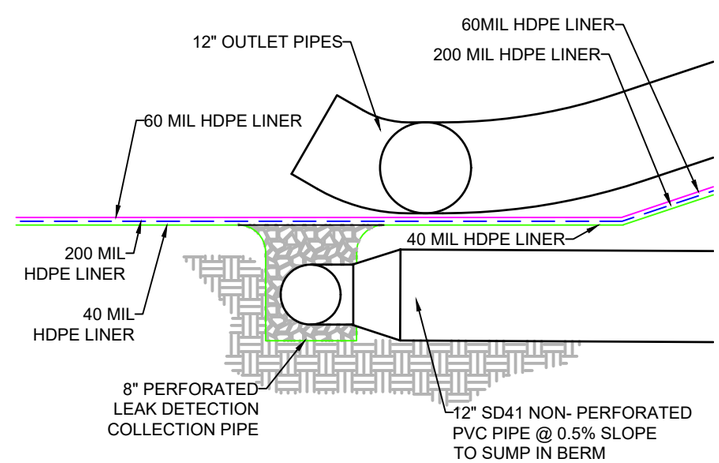
POND 5 LEVEE CALCS

NOT TO SCALE

* PLEASE REFER TO SPECIAL NOTE ON COVER PAGE



PIPE LAYOUT DETAILS (TYP)



DETAIL 1

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REGISTERED PROFESSIONAL ENGINEER
MITCH C. MORTENSEN
375112
EXP:3-31-25
STATE OF UTAH

REVISIONS

DESIGNER:	AAM	REVIEWED:	MCM	DRAWN:	AAM

PROJECT

PLEASANT VALLEY NORTH PONDS 3, 4 & 5

LOCATION: SECTION 25, 26, 35, 36 T4S, R3W, U.S.B.&M.
DUCHESNE COUNTY, UTAH

LAT: 40.09776 LONG: -110.18088

SHEET
PIPE DETAILS

OUTLAW ENGINEERING INC.
510 West 200 North
Roosevelt, UTAH 84066
(435) 232-4321

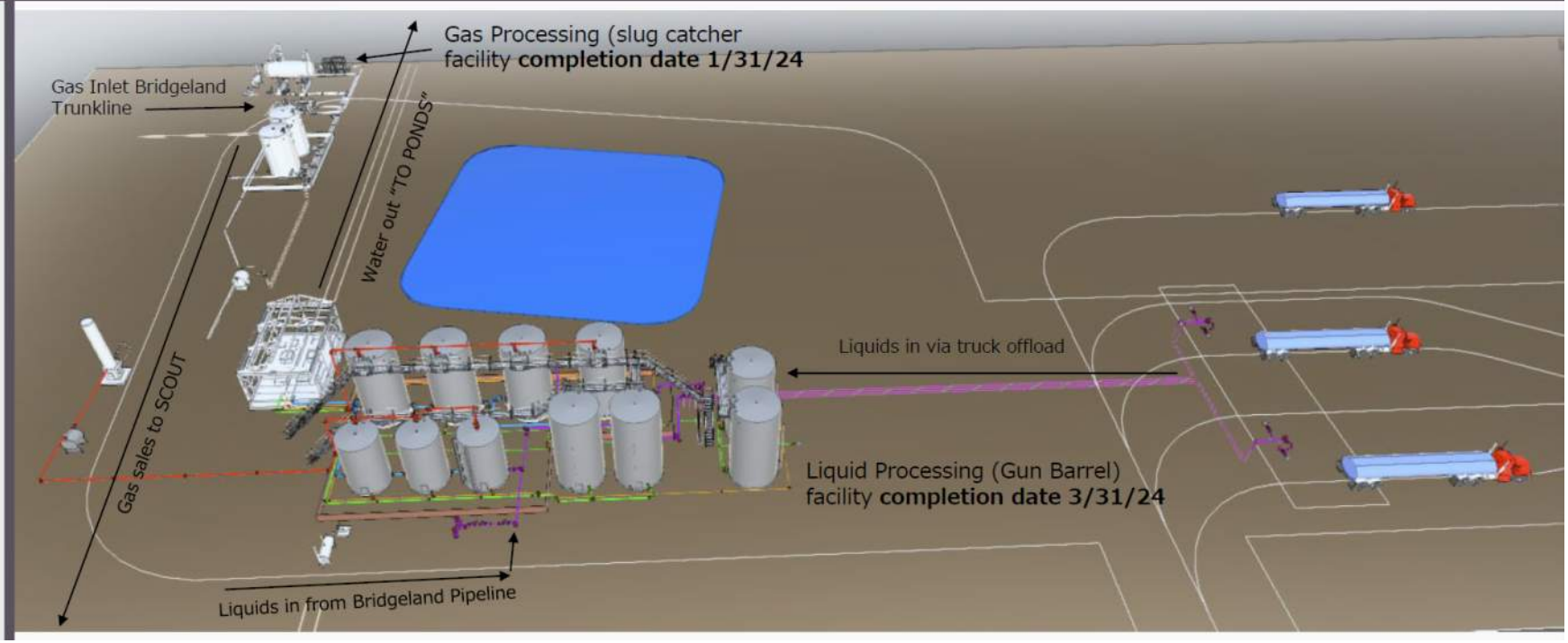
JOB NO.

SHEET NO. 5 OF 5

RECEIVED: Feb. 20, 2025

Existing Facility Layout

Permanent Facility Layout



RECEIVED: Feb. 20, 2025

Supplemental

Submitted for Additional Ponds

GeoStrata Engineering & Geosciences
14425 S. Center Point Way, Bluffdale, Utah 84065 ~ T: (801) 501-0583 ~ F: (801) 501-0584

April 20, 2023

Bart Kettle
Deputy Director – Oil and Gas
Division of Oil, Gas and Mining

Brian Speer
Manager - Solid Waste
Division of Waste Management and Radiation Control

Subject: Application for Evaporation Ponds at Pleasant Valley Facility

Mr. Kettle and Mr. Speer:

On behalf of RN Industries (RNI) GeoStrata has prepared this letter requesting approval for additional evaporation ponds at the Pleasant Valley Disposal Facility (Facility). The application attached to this letter was initially submitted for approval to the Utah Division of Oil, Gas & Mining (DOGM) in 2008. In April of 2009 DOGM issued an approval to construct notice for the additional ponds. Due to rule changes the application was subsequently modified and resubmitted several times and additional approval to construct notices were issued by DOGM. As a result of the proposed ponds not being constructed within three years of the most recent notice to construct issued by DOGM, the approval to construct has subsequently expired.

Due to regulatory changes and based on conversations with personnel from both DOGM and the Utah Division of Waste Management and Radiation Control (UDWMRC), we are submitting this application to both agencies for review and approval. It is our understanding that both agencies will cooperate in reviewing this application.

In addition, the ownership of the Facility is in the process of being transferred from RNI to Wasatch Energy Management. Future approvals for this Facility should be issued to Wasatch Energy Management.

Included in this letter are permitting and engineering data that GeoStrata has provided to the UDOGM of the Pleasant Valley Disposal facility.

1. Approval to Construct from UDOGM dated April 9, 2009
2. Geotechnical Report dated August 3, 2011 – Includes the investigation of the site for design and construction of additional ponds for RNI.
3. GeoStrata Letter to UDOGM dated Nov 7, 2014 – Includes requested groundwater data for pond construction approval.
4. GeoStrata Letter to UDOGM dated October 2, 2018 – includes groundwater data and engineering drawings of the pond redesign layout.
5. Permit issued by UDOGM on January 25, 2019 – line item 4.2 has the approval of the permit application.

The data provided in the reports and letters were prepared in accordance with the UDOGM requirements of construction for evaporation ponds with DOGM and follow recommendations that were requested at the time of the preparation of the design update. Since the time of the original application, the Utah Administrative code R-649 outlining the guidelines for the construction of evaporation ponds has been modified. The redesign of the ponds in 2018 and the submittal of groundwater data was in response to the updated rules from UDOGM.

Please review the data and reports provided in this letter. If you have any questions please feel free to contact Mike Vorkink or Jon Peaden at GeoStrata at 801-501-0583

Respectfully submitted,

Jon Peaden
Environmental Scientist

1. **Approval to Construct from UDOGM Dated April 9, 2009**

State of Utah
DEPARTMENT OF NATURAL RESOURCES
MICHAEL R. STYLER
Executive Director
Division of Oil, Gas and Mining
JOHN R. BAZA
Division Director

JON M. HUNTSMAN, JR.
Governor
GARY R. HERBERT
Lieutenant Governor

April 9, 2009

Mr. Roger Chapman
RN Industries, Inc.
P. O. Box 98
Roosevelt, UT 84066

Subject: Approval to Construct a Commercial Produced Water Disposal Facility Pleasant Valley Facility – Sections 25, 26, 35, and 36, Township 4 South, Range 3 West, (USM) Duchesne County, Utah

Dear Mr. Chapman,

Your application to construct the above referenced facility (the "Facility") was received on December 29, 2008. The application was reviewed by Division staff and meets the requirements for a commercial produced water disposal facility in accordance with Utah Administrative Code R649-9 et al., of the Oil and Gas General Rules.

Therefore, approval to commence construction of the Facility that will consist of an unloading area (turnout, skim pit, concrete dump vault, 3 X 480 bbl. storage tank with pad, surrounding overflow containment berm and overflow catchment pond) and twelve evaporation pits, with secondary containment, is hereby granted in accordance with the following stipulations:

1. The Division requires that our staff be informed of all phases of construction and be allowed the opportunity for inspection during the construction and installation activities including, but not limited to, secondary liner installation, leak detection system emplacement, primary liner installation, and dike/berm construction. Call Dan Jarvis at (801) 538-5338 or Richard Powell at (435) 790-6145 at least 2 days prior to construction activity.

1594 West North Temple, Suite 1210, PO Box 145801, Salt Lake City, UT 84114-5801
telephone (801) 538-5340 • facsimile (801) 359-3940 • TTY (801) 538-7458 • www.ogm.utah.gov

UTAH DNR OIL, GAS & MINING

2. Secondary liners of compacted clay, one-foot thick, constructed in (2) 6" lifts (1.0x10-7 cm/sec or less permeability rate) shall be emplaced in the bottoms of the pits below the leak detection systems, as specified in the engineering plans. A "certification statement" from a licensed professional engineer is required on a pit-by-pit basis.

3. The leak detection systems shall be emplaced as specified in the engineering plans, (as amended by e-mail on 4/3/09) and the lines shall be exposed (unburied) at time of the subject inspection, as specified in #2, above.

4. 60-mil HDPE primary liners shall be emplaced over the leak detection systems as specified in the engineering plans. The seams shall be tested prior to inspection, and the liner(s) shall be keyed into a trench at time of the subject inspection.

5. The facility/pits shall be fenced to deter pronghorn antelope & other wildlife, and the skim pit shall be netted to deter waterfowl.

6. Diversion ditches shall be built to channel any precipitation runoff water around the facility/pits and into secondary containment (through the secondary containment drain after the storm).

7. Secondary containment is required at the Facility to prevent pit waters from leaving the site in the event of catastrophic pit failure.

8. The full bonding requirement for the Facility (Phase 1) is **$2,364,991.50,** which may be submitted in full or on a pit-by-pit basis prior to facility/pits' use. See attached facility bonding spreadsheet.

9. The Facility shall be constructed under the supervision of a registered professional engineer.

Final approval to operate the Facility will be issued upon completion of the construction phase and compliance with all the stipulations.

This approval does not exempt the operator from complying with all other federal, state and local rules and ordinances.

If you have any questions concerning this approval, please contact Christopher Kierst at (801) 538-5337 or Brad Hill at (801) 538-5315.

Sincerely,

for Gil Hunt
Associate Director, Oil & Gas

GLH/CK/MLR/js
Attachment: 1 (Facility Bonding Spreadsheet)
cc: Brad Hill, Permitting Manager
Dan Jarvis, Operations Manager
Richard Powell, Roosevelt Office
Mike George, DEQ/Div. of Water Quality (SLC)
Dave Marble, Div. of Water Rights/Dam Safety (SLC)
Robert Leake, Div. of Water Rights/Dam Safety (Vernal)
Troy Ostler, P.E., CIVCO Engineering, Inc.
Mike Hyde, Duchesne County Planning Office
Facility File
Bond File

N:\O&G Permits\Disposal Facilities (Pits, LF, etc)\RN Industries (Pleasant Valley)

2. **Geotechnical Report dated August 3, 2011**

GeoStrata

Engineering & Geosciences
781 West 14600 South, Bluffdale, Utah 84065
Phone (801) 501-0583 | Fax (801) 501-0584

Geotechnical Investigation for the
Pleasant Valley Disposal Site
Ponds 1, 2 and 3
Bridgeland, Utah

GeoStrata Job No. 524-018

August 3, 2011

Prepared for:

RN Industries
PO Box 98
Roosevelt, Utah 84066

Attention: Mr. Roger Chapman

GeoStrata Engineering & Geosciences 781 West 14600 South, Bluffdale, Utah 84065
T: (801) 501-0583 - F: (801) 501-0584

Prepared for:

RN Industries
c/o Mr. Roger Chapman
PO Box 98
Roosevelt, Utah 84066

Geotechnical Investigation for the Pleasant Valley Disposal Site
Ponds 1, 2 and 3
Bridgeland, Utah
GeoStrata Job No. 524-018

Prepared by:

Mike Vorkink
Project Geologist

Reviewed by:

REGISTERED PROFESSIONAL ENGINEER
08/03/11
HIRAM ALBA
175774
STATE OF UTAH

Mark Christensen, P.E.
Senior Engineer

Hiram Alba P.E., P.G.
Principal

GeoStrata, LLC
781 West 14600 South
Bluffdale, UT 84065
(801) 501-0583

August 3, 2011

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Plate A -3 ..... Geologic Map

Appendix B Plates B-1 thru B-18 ..... Test Pit Logs
Plate B-19 ..... Key to Soil Symbols and Terms
Plate B-20 ..... Key to Physical Rock Properties

Appendix C Plate C-1 ..... Laboratory Testing Summary
Plate C-2 & C-3 ..... Atterberg Limits' Results
Plates C-4 thru C-7 ..... Grain Size Distribution
Plates C-8 & C-9 ..... Compaction Test Results
Plates C-10 thru C-12 ..... Direct Shear Test Results
Plate C-13 ..... Consolidated Undrained Triaxial Tests

Appendix D Plates D-1 thru D-3 ..... Slope Stability Analyses

1.0 EXECUTIVE SUMMARY

This report presents the results of a geotechnical investigation for design and construction of three evaporation ponds at the Pleasant Valley Disposal Site. The Pleasant Valley Site is located in Bridgeland, Utah in Sections 25, 26, 35 and 36 of Township T4S, Range R3W West of the Uintah Base Meridian. We understand that 3 ponds are planned for construction at the site. Each pond will be lined in one of two ways. The ponds may be double lined with a 60 mil HDPE liner. Between the liners will be a 200 mil geocomposite drain net. As an alternative to the double lined HDPE liner, the second liner beneath the geocomposite may consist of a 24-inch thick clay liner. The Ponds will be located adjacent to each other and will have embankments heights generally no greater than 19 feet in height.

Based on the subsurface conditions encountered at the site, it is our opinion that the subject site is suitable for the proposed construction provided that the recommendations contained in this report are properly implemented in the design and construction of the project.

As a part of this investigation, subsurface soil conditions in the vicinity of the proposed ponds were explored by advancing 18 test pits to depths ranging from approximately 10 to 21 feet below site grade. Subsurface conditions encountered within the upper 2- to 7-feet of the test pits generally consisted of Sandy to Gravelly SILT (ML) with varying amounts of sand and gravel. Beneath this soil was layer of Poorly Graded SAND (SM) with varying amounts of gravel and occasional silt. Bedrock was encountered in all but one of the test pits at depths ranging from 7- to 19-feet below the existing surface.

Based on our analysis, the proposed reservoir embankment meets the minimum design factor-of-safety of 1.5 and 1.0 for static and pseudo-static (MCE ground motion) conditions, respectively. Plates showing results of the slope stability modeling are presented in Appendix D (Plates D-1 to D-3).

The maximum total height of the proposed embankment (19 feet), and the presence of a secondary containment dike, leads us to assume that the embankment would classify as a low hazard dam and appropriate permit applications should be completed for this structure. Final determination of whether the dam is a low hazard dam will be provided by the State Engineer.

NOTICE: This executive summary is not intended to replace the report of which it is part and should not be used separately from the report. The executive summary is provided solely for purposes of overview. The executive summary omits a number of details, any one of which could be crucial to the proper application of this report.

2.0 INTRODUCTION

2.1 PURPOSE AND SCOPE OF WORK

This report presents the results of a geotechnical investigation for design and construction of three evaporation ponds at the Pleasant Valley Disposal Site. The Pleasant Valley Site is located south of Myton, Utah in Sections 25, 26, 35 and 36 of Township T4S, Range R3W West of the Uintah Base Meridian. The purposes of this investigation were to assess the nature and engineering properties of the subsurface soils at the proposed ponds site and to provide geotechnical recommendations for design and construction of the ponds.

The scope of work completed for this study included completing 18 test pits at the site of the proposed ponds, a site geological reconnaissance, soil sampling, laboratory testing, engineering analyses, and preparation of this report. Our services were performed in accordance with our proposal. The recommendations contained in this report are subject to the limitations presented in the "Limitations" section of this report.

2.2 PROJECT DESCRIPTION

We understand that 3 ponds are planned for construction at the site. Each pond will be lined in one of two ways. The ponds may be double lined with a 60 mil HDPE liner. Between the liners will be a 200 mil geocomposite drain net. As an alternative to the double lined HDPE liner, the second liner beneath the geocomposite may consist of a 24-inch thick clay liner. The Ponds will be located adjacent to each other and will have embankments heights generally no greater than 19 feet in height. The proposed ponds will be located at the northern end of the existing property and will consist of a cut and fill operation. The slopes of the pond embankments will be 3:1 horizontal to vertical for interior and exterior slopes.

The project site is shown on the *Site Vicinity Map* included in Appendix A at the end of this report (Plate A-1). A more local and detailed map including test pit locations is located in Appendix A (Plate A-2) identified as the *Site Exploration Map*.

3.0 METHOD OF STUDY

3.1 TEST PIT SUBSURFACE INVESTIGATION

As a part of this investigation, subsurface soil conditions in the vicinity of the proposed ponds were explored by advancing 18 test pits to depths ranging from approximately 10 to 21 feet below site grade. Subsurface soil and bedrock conditions as encountered in the explorations were logged at the time of our investigation by a member of our technical staff and are presented on the enclosed exploration logs, Plates B-1 through B-18 in Appendix B. A *Soil Symbols Description Key* and a *Physical Rock Properties Key* are presented on Plates B-19 and B-20.

These test pits were completed using a Case model CX-210 trackhoe. Representative bulk soil samples were obtained from the side walls of the test pits. Relatively undisturbed samples were obtained using a hand-driven soil sampling sleeves as well as by obtaining block soil samples for subsequent cutting in our lab.

All samples were transported to our laboratory for testing to evaluate engineering properties of the various soil types observed. The soils observed in the explorations were logged and classified in general accordance with the Unified Soil Classification System (USCS).

3.2 LABORATORY TESTING

Representative soil samples were tested in the laboratory to assess the soil's pertinent engineering properties. The following tests were performed during this investigation:

- In-situ moisture content/dry unit weight
- Atterberg limits (ASTM D4318)
- Grain-size distribution (ASTM D422)
- Standard Proctor (ASTM D698)
- Consolidated Undrained, Triaxial (ASTM D 4767)
- Direct Shear (ASTM D3080, remolded to 95% of ASTM D698)
- Direct Shear (ASTM D3080)
- Pin Hole Dispersion (ASTM D 4647)
- Soil Resistivity and pH (AASHTO T288-91)

In-situ moisture contents ranged from 4.9% to 16.6% with dry densities ranging from 81.1 pcf to 103.9 pcf. Atterberg limits ranged from non plastic to 54 for the liquid limit and from non plastic to 30 for the plasticity index. Triaxial tests and direct shear tests were completed to measure the strength of the soils. Consolidated undrained triaxial tests and a direct shear test were completed on the native soils.

A pinhole dispersion test was completed to assess the potential of piping in the embankment soils. The purpose for this test is to assess the dispersive characteristics of clayey site soils. This is determined by causing water to flow through a small hole punched in a specimen and measuring the flow rate and cloudiness of the effluent. The soils tested classified as non dispersive (ND2).

To evaluate the corrosion potential of ferrous metals in contact with native soils and to assess the sulfate attack potential to concrete within those soils a soluble sulfate test was completed. This test determines if the native soils at the site have sulfate and provides an assessment of the amount of sulfate present. Resistivity and pH laboratory tests were also performed to determine the corrosiveness of the native soils.

The results of the laboratory tests are presented on the attached exploration logs (Plates B-1 through B-18), on the Laboratory Test Results Reports (Plates C-2 through C-13), and on the *Summary Table of Laboratory Testing* (Plate C-1) located at the end of this report.

4.0 GEOLOGIC CONDITIONS

4.1 GEOLOGIC SETTING

The site is located at an elevation of approximately 5650 feet above sea level in Duchesne County, near Myton Utah. The site is located in a valley with a relatively thin veneer of mixed Holocene age alluvium and eolian deposits (Qae) (Sprinkel, 2007). The Qae deposits in the study area likely range from 1 ft to 15 ft thick. The Qae deposits overlie member B of the Uintah formation (Tub). The Uinta formation was deposited by an Eocene age lake and consists of thinly bedded purple and green mudstones and claystones, and some fine-grained sandstone beds (Sprinkel, 2007). The Tub unit averages about 275 m thick in this area. The subject site appears to be near the upper boundary of the Tub as the member C unit (Tuc) which overlies Tub is mapped on the top of the cliffs surrounding the subject site (Plate A-3).

4.2 SEISMICITY AND FAULTING

4.2.1 Potential Seismic Sources

There are no known active faults that pass under or immediately adjacent to the site (Morgan, 2006). The site is located approximately 45 miles to the east of the Stinking Springs fault and 49 miles east of the Strawberry fault. Because of the distance of these faults from the site it is our opinion that the risk of damage to the planned ponds from seismic activity is low.

4.2.2 Probabilistic Ground Acceleration

Seismic hazard maps depicting probabilistic ground motions have been developed for the United States by the U. S. Geological Survey as part of NEHRP/NSHMP (Frankel et al, 1996). Based on an approximate latitude and longitude of 40.1010° N and 110.1911° W respectively for the site, the peak ground acceleration (PGA) anticipated for the site as reported on the USGS NEHRP/NSHMP seismic database is estimated to be 0.167g.

4.3 OTHER GEOLOGIC HAZARDS

Geologic hazards can be defined as naturally occurring geologic conditions or processes that could present a danger to human life and property. These hazards must be considered before

development of the site. There are several hazards in addition to seismicity and faulting that if present at the site, should be considered in the design of the reservoir. Potential hazards considered for this site include liquefaction, shallow groundwater, and stream flooding.

4.3.1 Liquefaction

Liquefaction is the loss of soil strength due to a buildup of pore-water pressure during severe ground shaking. Liquefaction is associated primarily with loose (low density), saturated, fine- to medium-grained, clean cohesionless soils. As the shaking action of an earthquake progresses, soil granules are rearranged and the soil densifies within a short period of time. This rapid densification of soil results in a buildup of pore-water pressure. When the pore-water pressure approaches the total overburden pressure, the soil reduces greatly in strength and temporarily behaves similarly to a fluid. Effects of liquefaction can include sand boils, lateral spreading, settlement, and bearing capacity failures below structural foundations. The following three components are required for liquefaction to occur:

1. Shallow groundwater,
2. Loose, relatively clean sands and gravels that are saturated, and
3. Strong ground shaking.

If one of these components is missing, then liquefaction will not occur. The site is underlain primarily by relatively dense clays and strong ground shaking is unlikely at this site. Therefore, in our opinion, the liquefaction hazard at the site is considered low.

4.3.2 Shallow Groundwater

Shallow groundwater flooding is a hazard that can cause the flooding of excavated areas where the depth of excavation exceeds the depth of the local water table. Shallow groundwater flooding should be considered when designing structures that require excavation that may exceed the depth to the shallow groundwater.

Groundwater was not encountered in any of the 18 test pits excavated in the portion of the site where the proposed ponds will be located. Because of this the risk of encountering problems related to shallow groundwater during pond construction is considered low.

4.3.3 Stream Flooding

Stream flooding is a hazard related to spring snowmelt run-off and flash–flooding from rainstorms. Flood hazards should be considered when planning the development of habitable structures and essential and critical facilities located within areas having a potential flood risk.

According to the 7.5' topographic map of the area surrounding the site, there is a handful of ephemeral streams that enter the site at the south or southwest ends of the site and exit the site at the north or northeast ends. Surface water has not been observed flowing in any of these stream channels during our visits to the site, but it can be assumed that during wet springs or other times of heavy rainfall that water may flow in any of these dry stream beds. It is our opinion that the risk of stream flooding at the subject site is considered low.

5.0 GENERALIZED SITE CONDITIONS

5.1 SURFACE CONDITIONS

The site is located approximately 9 miles southwest of Myton in Duchesne County, Utah. The site is covered with native brush and grasses. Brush covered hills and plateaus border the site on the south. The Myton valley is to the north. A handful of dry creek beds surround the site, with some cutting through the site. The bedding of the surrounding bedrock in the hills and plateaus observed during our site investigation is generally horizontal, commonly dipping to the northeast less than 5 degrees. The rocks in the surrounding hills and plateaus consist of sandstone, siltstone and claystone. The area where the planned ponds will be located is relatively flat, sloping gently to the northeast.

5.2 SUBSURFACE CONDITIONS

5.2.1 Soils

The subsurface soil conditions were explored at the site by completing 18 test pits at the site of the proposed new pond. Four soil borings were completed in the general vicinity of the proposed ponds as a part of an earlier scope of work. The 18 new test pits ranged in depth from approximately 10 to approximately 21 feet below site grades. Subsurface conditions encountered within the upper 2- to 7-feet of the test pits generally consisted of Sandy to Gravelly SILT (ML) with varying amounts of sand and gravel. Beneath this soil was layer of Poorly Graded SAND (SM) with varying amounts of gravel and occasional silt. Bedrock was encountered in all but one of the test pits at depths ranging from 7- to 19-feet below the existing surface. Test pit TP-12 was advanced to a depth of approximately 21-feet and no bedrock was encountered. Bedrock encountered in the test pits was observed to be similar to the bedrock observed in the surrounding hills consisting of sandstone, siltstone, and claystone. Bedrock was observed to be generally thin-bedded, moderately to completely weathered and moderately strong to weak and friable. Once bedrock was encountered, the trackhoe used could penetrate approximately 2- to 4-feet into the bedrock.

Subsurface soil conditions were logged during our field investigation and are included in the exploration logs in Appendix B (Plates B-1 through B-18). A Key to Soil Symbols and Terms and is included in Appendix B (Plates B-19). The stratification lines shown on the attached logs

represent the approximate boundary between soil types. The actual in-situ vertical transitions may be gradual. Due to the nature and depositional characteristics of the native soils, and the distance between exploration locations, care should be taken when interpolating subsurface conditions between and beyond the exploration locations.

5.2.2 Groundwater

Groundwater was not encountered in our test pits at the time of completion. Moisture content for the soils encountered at the site ranged from a low of 4.9% to a high of 16.62%. Seasonal fluctuations in precipitation, surface runoff from adjacent properties, or other on or offsite sources may increase moisture conditions at the site; groundwater conditions may rise several feet depending on the time of year.

5.2.3 Expansive Soils

Expansive soils contain significant amounts of clay particles that change volume as a result of varying moisture conditions. These soils may cause uplifting forces resulting from the swelling.

Based on the Atterberg limits testing conducted for this investigation the onsite claystone bedrock may a relatively high expansive potential.

5.2.4 Strength of Earth Materials

Representative samples of the native soils encountered were tested to evaluate the inherent strength properties of site soils. Direct shear tests were performed on remolded samples of the Silty Sand (SM) and Silt (ML). The samples were remolded to about 95 percent of the maximum density as determined by ASTM D 698 to approximate the density of structural fill. The direct shear tests produced angles of internal friction ranging from 28 to a high of 32. The cohesion associated with the test also ranged from a low of 190 to a high of 385. In assessing the results of the direct shear tests, much of the cohesion was discounted in our slope stability analysis.

A single triaxial test was also completed on the native Lean Clay (CL) soils. The test was a consolidated undrained with pore pressure measurement test and was completed in accordance with ASTM 4767. Results of the soil strength tests are presented in the Laboratory Summary Table on plate C-1 and on plates C-10 to C-13 in Appendix C.

5.2.5 Dispersive Clay Soils

A Pinhole Dispersion Test (ASTM D4647) was completed on a representative sample of clayey alluvium from Test Pit TP-8, at a depth of 2 feet. The purpose for this test is to assess the dispersive characteristics of clayey site soils. The results of the tests indicated that the samples is classified as ND2 (non dispersive). The site soils should be suitable for use in embankment construction and would likely not be dispersive when impacted by seepage or other waters.

6.0 ENGINEERING CONCLUSIONS AND RECOMMENDATIONS

6.1 GENERAL CONCLUSIONS

Based on the subsurface conditions encountered at the site, it is our opinion that the subject site is suitable for the proposed construction provided that the recommendations contained in this report are properly implemented in the design and construction of the project. Supporting data upon which the following recommendations are based have been presented in the previous sections of this report. The recommendations presented herein are governed by the physical properties of the earth materials encountered during our subsurface exploration and the anticipated design data discussed in the *Project Description* section. If subsurface conditions other than those described herein are encountered in conjunction with construction, and/or if design and layout changes are initiated, GeoStrata must be informed so that our recommendations can be reviewed and revised as changes or conditions may require.

The following sub-sections present our recommendations for general site grading, excavation, slope stability, and embankment construction.

6.2 EARTHWORK

General site grading is recommended to provide uniform support for the proposed lined ponds and ancillary structures, to provide proper drainage and moisture control on the subject property, and to aid in preventing differential movement in the pond subgrade as a result of variations in moisture conditions.

6.2.1 General Site Preparation and Grading

Although not expected, any underground obstructions or existing utilities under the proposed pond footprints or ancillary structures should be removed and/or rerouted. Excavations required to remove these obstructions should either be properly backfilled with compacted fill as discussed below.

At pond embankment areas, ancillary structures requiring a foundation, roadways, and concrete flatwork areas, any existing vegetation, debris, and fill soils should be removed. Any loose or disturbed soils beneath these areas should also be removed or compacted in place as outlined in Section 6.2.5. Following the removal of vegetation, and loose or disturbed soils as described above, site grading may be conducted to bring various areas at the site to design elevations.

For pond areas planned to receive engineered fill, prior to fill placement the exposed native soils a GeoStrata representative should inspect the exposed foundation soils.

6.2.2 Excavations

Soft or unsuitable soils beneath the pond embankments, footings, roadways, and concrete flatwork may need to be over-excavated and replaced with structural fill. If over-excavation is required, the excavations should extend a minimum of 1-foot laterally for every foot of depth of over-excavation. Structural fill should consist of on site native materials and should be placed and compacted in accordance with the recommendations contained in this report.

6.2.3 Temporary Excavations

Based on soils observed at the site and on Occupational Safety and Health (OSHA) guidelines for excavation safety, trenches with vertical walls up to 5 feet in depth may be occupied. A qualified person should inspect all excavations frequently to evaluate stability. The Contractor is ultimately responsible for trench and site safety. Pertinent OSHA requirements should be met to provide a safe work environment.

Temporary excavation required at the site over 5 feet should be protected with a trench shield or shoring or the side slopes should be graded no steeper than one and one half horizontal to one vertical (1.5H:1V) in the native overburden soils. If significant excavations are planned, a geotechnical engineer/engineering geologist should be present to evaluate conditions and provide recommendations as the excavation proceeds. If saturated conditions are encountered, or if adverse bedding, jointing, or fractures are identified during the excavation, slopes will likely require flattening or shoring to maintain stability.

6.2.4 Structural Fill and Compaction

All fill placed for the support of the proposed pond embankments, appurtenant structures, or concrete flatwork, should consist of structural fill. We anticipate that the majority of the on-site overburden soils will be suitable for use as structural fill in the pond embankment; however, it should be understood that the native soils are generally fine grained and can be difficult to moisture condition and achieve adequate compaction. The contractor should be aware that addition effort may be required for compaction when native soils are used. Any on-site material

planned for use as structural fill should be approved by GeoStrata prior to placement. Structural fill from on-site sources should be free of vegetation and debris, and contain no inert materials larger than 6 inches in nominal size.

If imported material is required for the ancillary structures, the material should be approved prior to importing. All imported fill should be granular soils with a maximum of 30 percent retained on the ¾ inch screen and maximum fines content (minus No.200 mesh sieve) of 15 percent. Earth materials not meeting the aforementioned criteria may be suitable for use as embankment fill; however, any such material should be evaluated on a case-by-case basis and should be approved by GeoStrata.

Structural fill should be placed in maximum 8-inch loose lifts and compacted on a horizontal plane, unless otherwise approved by GeoStrata. Structural fill may be placed in larger lifts (up to 12 inches) provided the Contractor can demonstrate to the Geotechnical Engineer that sufficient compaction can be achieved with the equipment in use. Structural fill beneath the pond embankments, ancillary structures, roadways and associated flatwork should be compacted to at least 95 percent of the maximum dry density, as determined by ASTM D-698. The moisture content should be at or slightly above (no greater than 2%) optimum moisture content at the time of compaction. Also, prior to placing fill, the excavations should be observed by GeoStrata to confirm that unsuitable materials have been removed. In addition, proper grading should precede placement of structural fill, as described in the General Site Preparation and Grading subsection of this report.

6.3 EMBANKMENT STABILITY

6.3.1 Slope Stability Analysis - Methodology

Based on the plans provided we understand the proposed pond embankments will have a maximum height on the order of approximately 19 feet with 3H:1:V interior slopes and 3H:1V exterior slopes. The stability of the embankment was modeled using Slide a computer application incorporating (among others) Bishop's Simplified Method of analysis. The design incorporates 2 HDPE liners, our analysis assumed that the liners would leak and that a phreatic level would be developed. We modeled an upstream water level of 17 feet and a downstream water level of 1 foot high at the downstream toe. We consider these conditions to be conservative. Calculations for stability were developed by searching for the minimum factor of safety for a circular-type failure. In our seismic

loading conditions, we assigned the full anticipated PGA, which again we consider to be conservative.

Stability analyses were conducted for a representative cross-section drawn through the tallest critical portion of the planned embankments (see Plates D-1 through D-3). Slope stability was performed for the following conditions:

- End of Construction – Outboard Case (Minimum FS of 1.5)
- End of Construction – Outboard Case, Seismic Loading Conditions (Minimum FS of 1.0)

Strength parameters used in our analyses were developed based on consolidated drained direct shear and triaxial tests performed on site soils, experience, and engineering judgment. We understand that the embankment fill will consist of clayey alluvium excavated from the bottom of the proposed reservoir. Based on this assumption, we have assigned the following soil strength parameters for our analysis:

Soil Strength Parameters

Soil Type	Phi Angle (degrees)	Cohesion (psf)
Embankment Fill	30	100
Foundation Soils	28	150

6.3.2 Slope Stability Analysis Results

Based on our analysis, the proposed reservoir embankment meets the minimum design factor-of-safety of 1.5 and 1.0 for static and pseudo-static (MCE ground motion) conditions, respectively. Plates showing results of the slope stability modeling are presented in Appendix D (Plates D-1 to D-2). Plate D-3 illustrates all of the failure planes analyzed as a part of the seismic analysis. More than 4,000 individual planes were analyzed as a part of our assessment.

The maximum total height of the proposed embankment (19 feet), and the presence of a secondary containment dike, leads us to assume that the embankment would classify as a low hazard dam and appropriate permit applications should be completed for this structure. Final determination of whether the dam is a low hazard dam will be provided by the State Engineer.

6.4 FOUNDATIONS

We assume non-habitable ancillary structures and/or equipment pads will be associated with construction of the ponds. Recommendations for these types of structures are presented in the following sections.

6.4.1 Conventional Foundations

Prior to construction of footings the recommendations presented in the *Site Preparation and Grading* section of this report should be followed. We recommend that the footings for ancillary structures be founded entirely on the re-compacted native soils or entirely on bedrock. Where a combination of native soils and bedrock is exposed at the footing elevation, footings should be extended down to bedrock or the bedrock should be over-excavated to allow placement of at least 12 inches of structural fill between the footing and bedrock. If required, all fill beneath the foundations should extend at least 12 inches beyond the edge of footings and should be placed and compacted in accordance with our recommendations contained in the *Structural Fill and Compaction* section of this report. Shallow spread or continuous wall footings constructed on the re-compacted native soils fill may be proportioned utilizing a maximum net allowable bearing pressure of **3,500 pounds per square foot (psf)** for dead load plus live load conditions.

All foundations exposed to the full effects of frost should be established at a minimum depth of 40 inches below the lowest adjacent final grade. The minimum recommended footing width is 20 inches for continuous wall footings.

6.4.2 Settlement - Footings

Settlements of properly designed and constructed conventional footings, founded as described above, are anticipated to be less than 1 inch. Differential settlements are expected to be on the order of ½ the total settlement over a distance of 30 feet.

6.4.3 Settlement - Embankments

The embankments are expected to be founded on competent bedrock and/or a relatively thin wedge of residual soils/alluvium. In addition, the majority of primary consolidation and secondary compression is expected to take place during and shortly after construction. If localized pockets of hydro-collapsible soils are located in areas of the dike, dike portions may

experience settlements greater than 1 inch. An inspection of the embankment foundations should be completed prior to placement of structural fill for embankment construction.

We do not anticipate excessive settlements given the dike heights. If the embankments are greater than anticipated, then we recommend that prior to placement of the synthetic liner, settlement monitoring be performed to evaluate the degree to which primary settlement under the embankment has taken place.

6.5 LATERAL EARTH PRESSURES

Lateral forces imposed upon conventional foundations due to wind or seismic forces may be resisted by the development of passive earth pressures and friction between the base of the footing and the supporting subgrade. In determining the frictional resistance, a coefficient of friction of 0.45 for native silt and clay soils acting against concrete should be used.

Ultimate lateral earth pressures from silt and sand backfill acting against retaining walls and buried structures may be computed from the lateral pressure coefficients or equivalent fluid densities presented in the following table:

Silts and Clays (φ=28°)		
Condition	**Lateral Pressure Coefficient**	**Equivalent Fluid Density (pounds per cubic foot)**
Active	0.36	43
At-rest	0.53	63
Passive	2.76	330
Seismic Active	0.47	56

These coefficients and densities assume no buildup of hydrostatic pressures. The force of the water should be added to the presented values if hydrostatic pressures are anticipated. For transient wind or seismic loads, these values may be increased by 1/3. If the soils are to be compacted adjacent to the walls then the design fluid density should be increased by 30 percent.

Clayey soils drain poorly and may swell upon wetting, thereby greatly increasing lateral pressures acting on earth retaining structures; therefore, clayey soils are discouraged from use as retaining wall backfill. Backfill should consist of either native granular soil or sandy imported material with an Expansion Index (EI) less than 20 (ASTM 4829-08).

Walls and structures allowed to rotate slightly should use the active condition. If the element is constrained against rotation, the at-rest condition should be used. These values should be used with an appropriate factor of safety against overturning and sliding. A value of 1.5 is typically used.

6.6 SOIL CORROSION

As part of our investigation two samples of the native soils retrieved from Test Pit TP-3, at a depth of 3 feet and Test Pit TP-10, and a depth of 2 feet were tested to evaluate the corrosion potential of ferrous metals in contact with native soils and to assess the sulfate attack potential to concrete.

The resistivity and pH tests indicated that the native soils tested have a minimum soil resistivity of 2000 OHM-cm and pH value of 9.3. Based on these result, the native soils at the site are considered highly corrosive to ferrous metal. Consideration should be given to retaining the services of a qualified corrosion engineer to provide an assessment of any metal in contact with existing site soils.

6.7 LINER RECOMMENDATIONS

We understand that the ponds to be constructed are to be lined with 40 and 60 mil HDPE liners. The following recommendations are provided to aid in creating a competent liner system.

6.7.1 Subgrade Preparation

Prior to the placement of any liner system, the subgrade should be prepped for installation of liners. Subgrade surfaces should be compacted, smooth and free of all rocks greater than 3/8-inch in diameter. The compaction should meet the requirements noted in Section 6.2.4 of this report. Sharp angular stones, sticks, vegetation, roots, sharp objects, gravel or debris of any kind should be removed from the subgrade surface. The surface shall provide a firm unyielding foundation for the lining system with no sudden, sharp or abrupt changes or break in grade or geometry.

6.7.2 Anchor Trench Systems

All anchor trench systems shall be excavated to the lines and widths required by the liner supplier and as provided in the project plans. The anchor trench should be inspected by the geotechnical engineer to assess the adequacy of the trench to retain the liner system. As with the subgrade, the trench system should be appropriately compacted, and free of all rocks greater than 3/8-inch in diameter. The liner should be carefully placed within the trench to minimize the potential of cracking and ripping the liner.

6.7.3 Liner Placement

The liner should be placed in accordance with the manufacturers recommendations. The following should be adhered to where possible. Equipment used to place the liner shall not damage tear or provide excess heat or leakage of fluids during placement. Personnel working on the liner should not smoke, wear damaging shoes or engage in other activities which could damage the liner. Unrolling of the liner should be performed such that it does not cause scratches, crimps of damage to the supporting soil or liner. Liner placement should not be performed when excess winds or rains are occurring at the site. Appropriate ballast (sand bags) should be used to prevent wind uplift; the ballast should be placed along all edges of the liner and should be frequently spaced to minimize uplift. The installer is responsible for making allowances considered necessary to accommodate variations in temperature and weather conditions that may exist during the life of the project.

Independent quality control and quality assurance testing shall be performed during all liner installation. Trial welds shall be made on fragment pieces of liner to verify that welding machine parameters are set to produce satisfactory welds. Such trial welds shall be made prior to actual field welds at the beginning of the project.

A GeoStrata representative should be on site during all liner placement to assess the competency of the liner system. If the liner is damaged and cannot be reasonably repaired, all damaged liner shall be removed and replaced with competent material.

7.0 CLOSURE

7.1 LIMITATIONS

The recommendations contained in this report are based on limited field exploration and our understanding of the proposed construction. The subsurface data used in the preparation of this report were obtained from the three borings advanced across the subject site for this investigation. It is possible that variations in the soil and groundwater conditions might exist. The nature and extent of variations may not be evident until construction occurs. If any conditions are encountered at this site that are different from those described in this report, our firm should be immediately notified so that we may make any necessary revisions to recommendations contained in this report. In addition, if the scope of the proposed construction changes from that described in this report, our firm should also be notified.

This report was prepared in accordance with the generally accepted standard of practice at the time the report was written. No warranty, expressed or implied, is made.

It is the Client's responsibility to see that all parties to the project including the Designer, Contractor, Subcontractors, etc. are made aware of this report in its entirety. The use of information contained in this report for bidding purposes should be done at the Contractor's option and risk.

7.2 ADDITIONAL SERVICES

The recommendations made in this report are based on the assumption that an adequate program of tests and observations will be made during the construction. GeoStrata staff should be on site to document compliance with these recommendations and to verify geologic conditions are as anticipated. Our services should include, but not necessarily be limited to, the following:

- Observations and testing during site preparation, earthwork and embankment fill placement.
- Consultation as may be required during construction, including verification that the geologic conditions are as anticipated during excavation.
- Quality control during concrete placement to verify slump, air content, and strength.

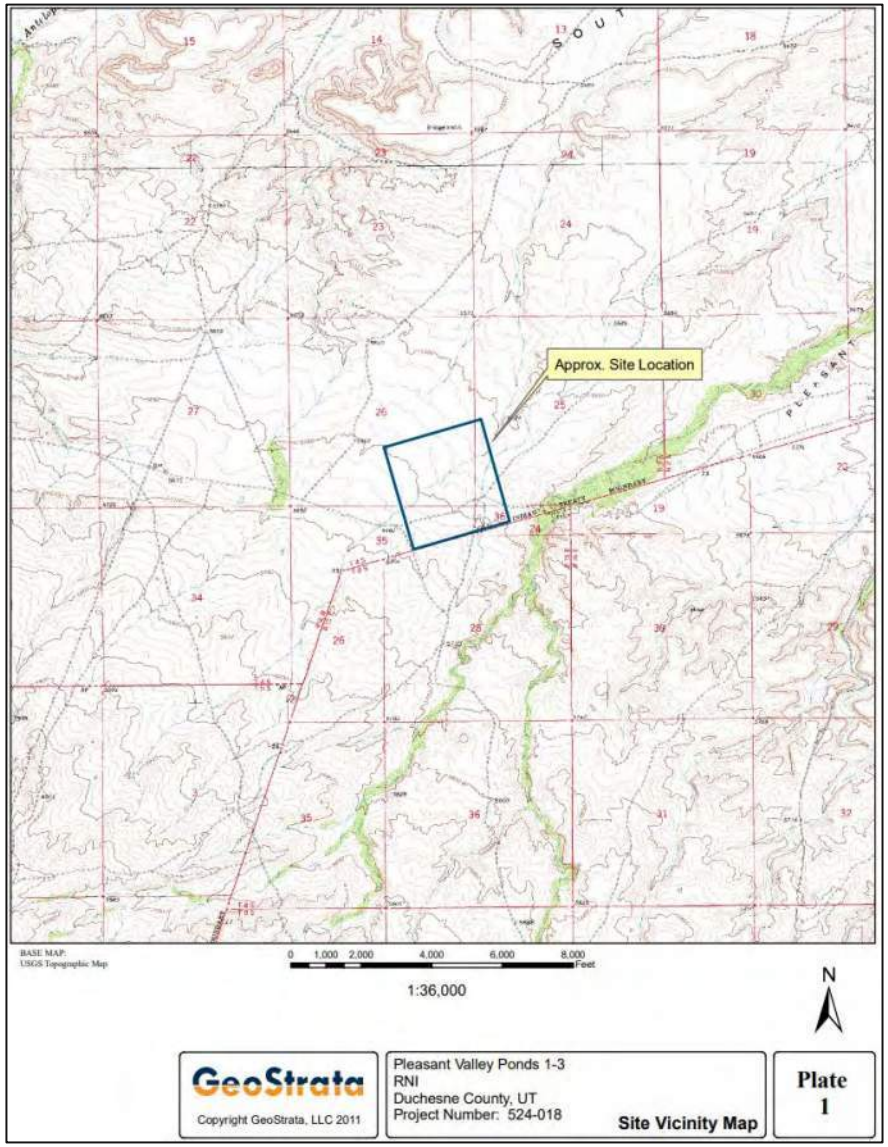
We also recommend that project plans and specifications be reviewed by us to verify compatibility with our conclusions and recommendations. Additional information concerning the scope and cost of these services can be obtained from our office.

We appreciate the opportunity to be of service on this project. Should you have any questions regarding the report or wish to discuss additional services, please do not hesitate to contact us at your convenience at (801) 501-0583.

8.0 REFERENCES CITED

Leyendecker, E.V. (2000) IBC/NEHRP/IRC Rehab Seismic Design Parameters, Software Program, USGS.

Sprinkle, D., 2007 Interim geologic map of the Vernal 30' x 60' quadrangle, Uintah and Duchesne Counties, Utah, and Moffat and Rio Blanco, Colorado. Utah Geological Survey Open-file report 506DM.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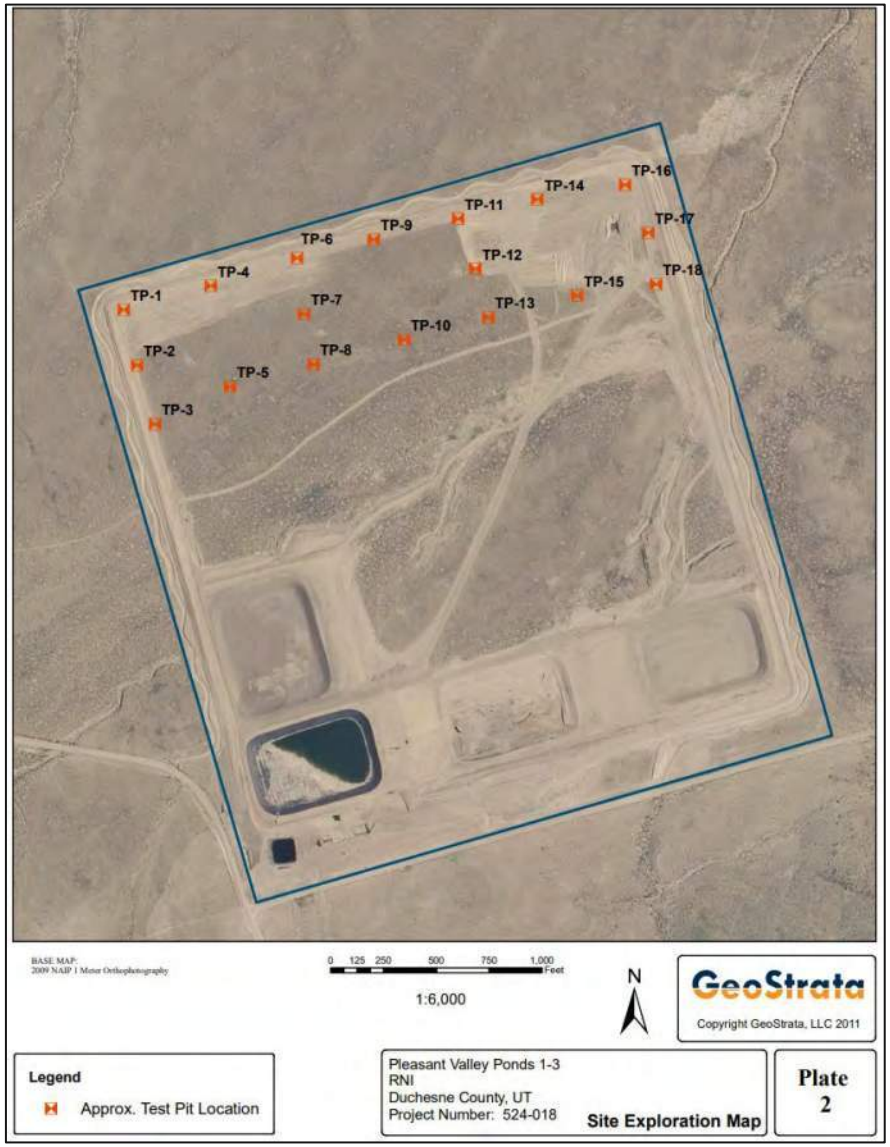
Pleasant Valley Ponds 1-3
RNI
Duchesne County, UT
Project Number: 524-018
Site Vicinity Map
Plate 1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TP-14
TP-15
TP-16
TP-17
TP-18
BASE MAP:
2009 NAIP 1 Meter Orthophotography
0 125 250 500 750 1,000 Feet
1:6,000
N
GeoStrata
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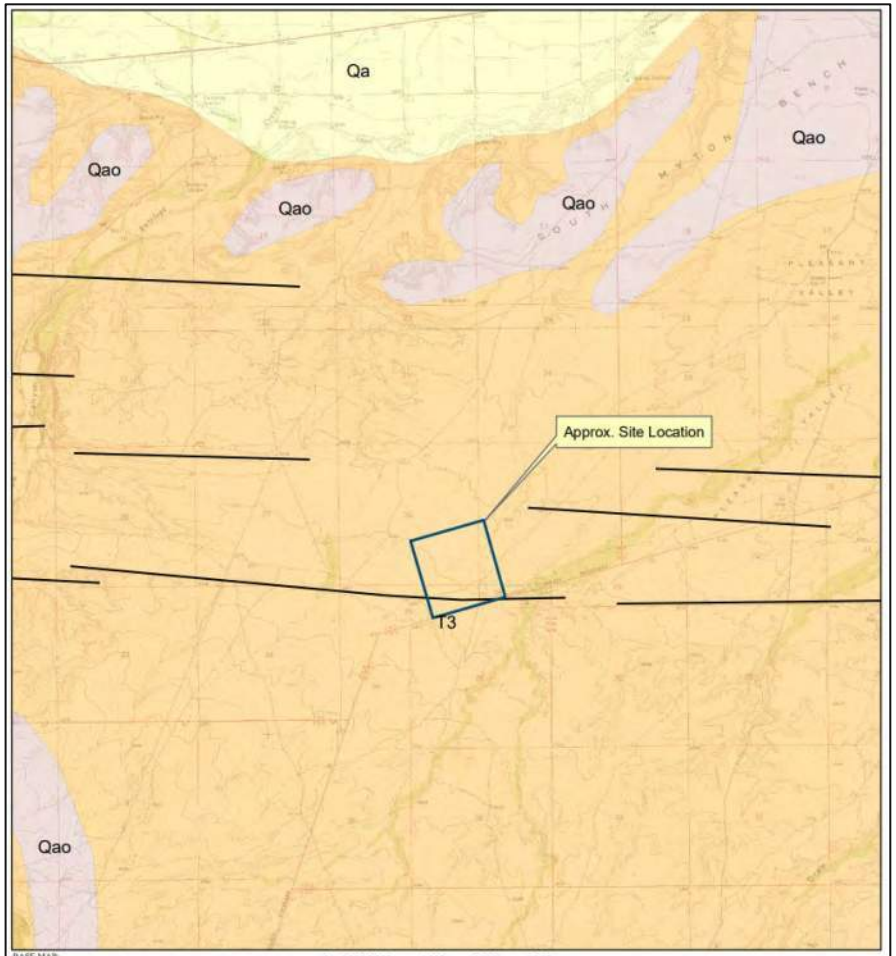
Legend
Approx. Test Pit Location
Pleasant Valley Ponds 1-3
RNI
Duchesne County, UT
Project Number: 524-018
Site Exploration Map
Plate 2


Qa
Qao
Qao
Qao
Qao
Approx. Site Location
T3
Qao
BASE MAP:
USGS Topographic Map
State of Utah Geologic Map
0 1,000 2,000 4,000 6,000 8,000 Feet
1:48,000
N
GeoStrata
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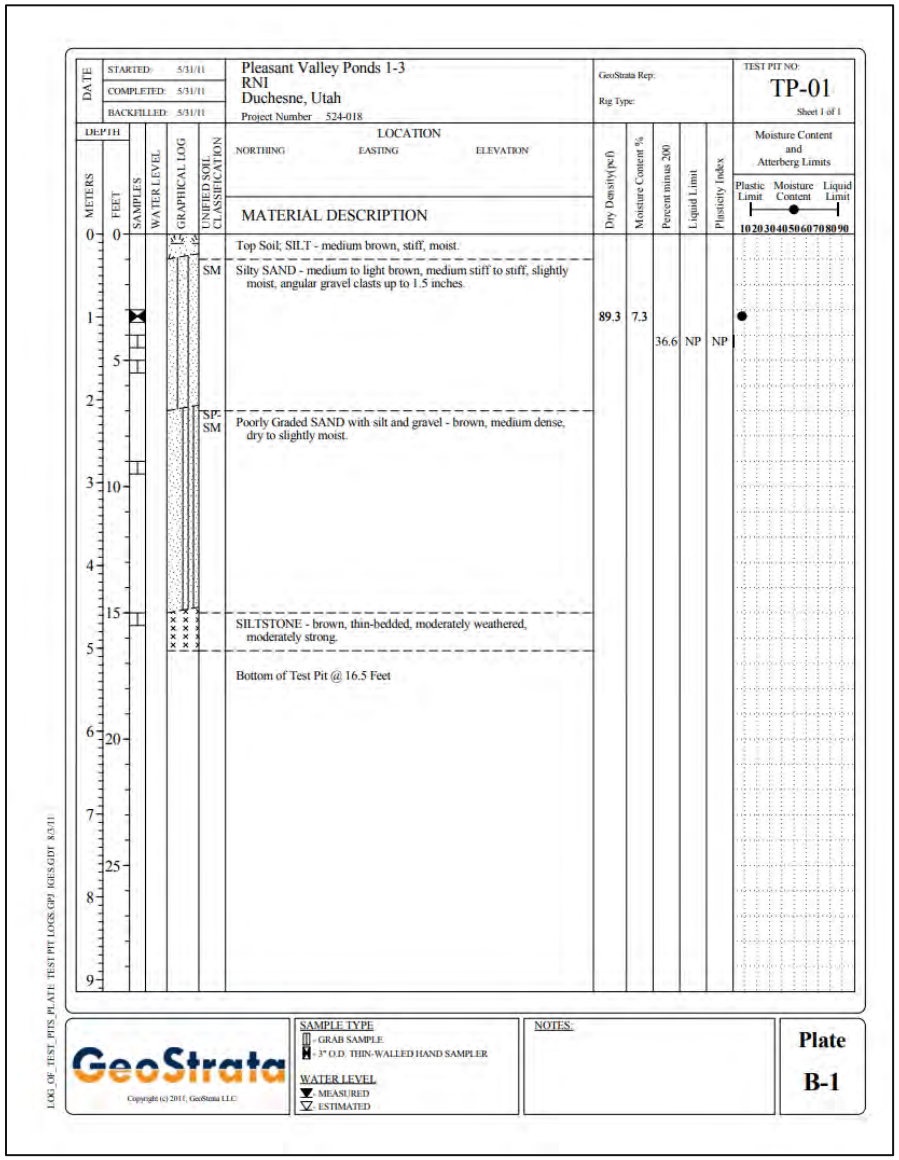
Legend
fault, normal, well located
Qa - surficial alluvium and colluvium
Qao - surficial older alluvium and colluvium
T3 - Member B of the Uinta Formation
Pleasant Valley Ponds 1-3
RNI
Duchesne County, UT
Project Number: 524-018
Surficial Geologic Map
Plate
3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STARTED: 5/31/11
COMPLETED: 5/31/11
BACKFILLED: 5/31/11
Pleasant Valley Ponds 1-3
RNI
Duchesne, Utah
Project Number 524-018
GeoStrata Rep:
Rig Type:
TEST PIT NO:
TP-01
Sheet 1 of 1
DEPTH
METERS
FEET
SAMPLES
WATER LEVEL
GRAPHICAL LOG
UNIFIED SOIL CLASSIFICATION
LOCATION
NORTHING
EASTING
ELEVATION
MATERIAL DESCRIPTION
Dry Density(pcf)
Moisture Content %
Percent minus 200
Liquid Limit
Plasticity Index
Moisture Content and Atterberg Limits
Plastic Limit
Moisture Content
Liquid Limit
Top Soil; SILT - medium brown, stiff, moist.
SM
Silty SAND - medium to light brown, medium stiff to stiff, slightly moist, angular gravel clasts up to 1.5 inches.
89.3
7.3
36.6
NP
NP
SP-SM
Poorly Graded SAND with silt and gravel - brown, medium dense, dry to slightly moist.
SILTSTONE - brown, thin-bedded, moderately weathered, moderately strong.
Bottom of Test Pit @ 16.5 Feet
GeoStrata
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SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER
WATER LEVEL
- MEASURED
- ESTIMATED
NOTES:
Plate
B-1
LOG_OF_TEST_PITS_PLATE_TEST PIT LOGS.GPJ IGES.GDT 8/3/11

DATE: STARTED: 5/31/11; COMPLETED: 5/31/11; BACKFILLED: 5/31/11

Pleasant Valley Ponds 1-3
RNI
Duchesne, Utah
Project Number 524-018

GeoStrata Rep:
Rig Type:

TEST PIT NO: TP-02
Sheet 1 of 1

LOCATION: NORTHING / EASTING / ELEVATION

DEPTH (METERS)	DEPTH (FEET)	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density (pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit – Moisture Content – Liquid Limit)
0	0					Top Soil						
					ML	Gravelly SILT - medium to light brown.						
1					SP-SM	Poorly Graded SAND with gravel - brown, dense, dry to slightly moist, angular clasts up to 3 inches, coarse sand lenses. Old stream/debris flow channel bisecting test pit from south to north.						
2	5							4.9	5.6			
3	10											
4						CLAYSTONE - purple, completely weathered, friable.						
5	15					CLAYSTONE - green, completely weathered, friable.						
						CLAYSTONE - purple, completely weathered, friable.						
6	20					CLAYSTONE - green, completely weathered, friable.						
						Bottom of Test Pit @ 19 Feet						
7	25											
8												
9												

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SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate B-2

LOG_OF_TEST_PITS_PLATE: TEST PIT LOGS.GPJ IGES.GDT 8/3/11

DATE: STARTED: 5/31/11; COMPLETED: 5/31/11; BACKFILLED: 5/31/11

Pleasant Valley Ponds 1-3
RNI
Duchesne, Utah
Project Number 524-018

GeoStrata Rep:
Rig Type:

TEST PIT NO: TP-03
Sheet 1 of 1

LOCATION: NORTHING / EASTING / ELEVATION

DEPTH (METERS)	DEPTH (FEET)	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density (pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit – Moisture Content – Liquid Limit)
0	0					Top Soil						
					SM	Silty SAND with gravel - medium to light brown, medium stiff, slightly moist to moist.						
1					SP-SM	Poorly Graded SAND with gravel - brown, medium dense, dry to slightly moist, angular clasts up to 2 inches.						
2	5											
3	10											
4												
5	15											
					SM	Silty SAND - brown, slightly moist, dense, depositional, some gravel.						
6	20					CLAYSTONE - purple, completely weathered, friable.		13.5	92.0	44	21	
						Bottom of Test Pit @ 21 Feet						
7	25											
8												
9												

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SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate B-3

LOG_OF_TEST_PITS_PLATE: TEST PIT LOGS.GPJ IGES.GDT 8/3/11

DATE
STARTED: 5/31/11
COMPLETED: 5/31/11
BACKFILLED: 5/31/11

Pleasant Valley Ponds 1-3
RNI
Duchesne, Utah
Project Number 524-018

GeoStrata Rep:
Rig Type:

TEST PIT NO:
TP-04
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit – Moisture Content – Liquid Limit)
0	0					Top Soil						
					SC	Clayey SAND - brown, medium dense, slightly moist.		6.9	40.8	28	11	
1	5				SP-SM	Poorly Graded SAND with silt and gravel - light brown, medium dense, dry to slightly moist, angular clasts up to 2 inches.						
2												
3	10											
4	15											
5					SM	Silty SAND - brown, slightly moist, very dense, likely depostional, some gravel.						
6	20					CLAYSTONE - green, completely weathered, friable.						
						Bottom of Test Pit @ 21 Feet						
7												
8	25											
9												

Moisture Content and Atterberg Limits: 10 20 30 40 50 60 70 80 90

LOG_OF_TEST_PITS_PLATE TEST PIT LOGS.GPJ IGES.GDT 8/3/11

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SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
B-4

DATE
STARTED: 5/31/11
COMPLETED: 5/31/11
BACKFILLED: 5/31/11

Pleasant Valley Ponds 1-3
RNI
Duchesne, Utah
Project Number 524-018

GeoStrata Rep:
Rig Type:

TEST PIT NO:
TP-05
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit – Moisture Content – Liquid Limit)
0	0					Top Soil						
					SM	Silty SAND - brown, dense, moist.		12.9	42.5	NP	NP	
1	5				SM	Silty SAND with gravel - light brown, dense, dry to slightly moist, angular clasts up to 2 inches.						
2												
3	10											
4	15											
5						CLAYSTONE - purple, completely weathered, friable.						
6	20											
						Bottom of Test Pit @ 21 Feet						
7												
8	25											
9												

Moisture Content and Atterberg Limits: 10 20 30 40 50 60 70 80 90

LOG_OF_TEST_PITS_PLATE TEST PIT LOGS.GPJ IGES.GDT 8/3/11

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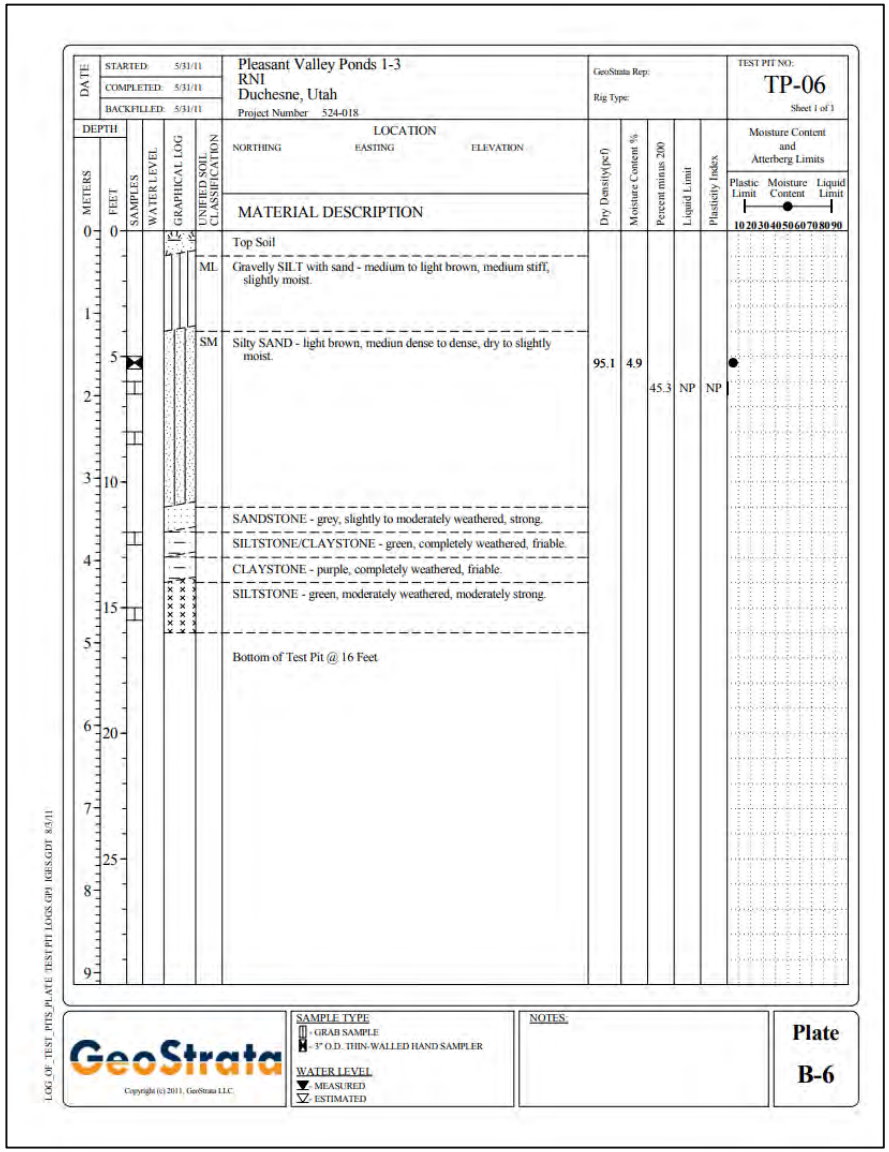
SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
B-5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Pleasant Valley Ponds 1-3
RNI
Duchesne, Utah
Project Number 524-018
GeoStrata Rep:
Rig Type:
TEST PIT NO:
TP-06
Sheet 1 of 1
DEPTH
METERS
FEET
SAMPLES
WATER LEVEL
GRAPHICAL LOG
UNIFIED SOIL CLASSIFICATION
LOCATION
NORTHING
EASTING
ELEVATION
MATERIAL DESCRIPTION
Dry Density(pcf)
Moisture Content %
Percent minus 200
Liquid Limit
Plasticity Index
Moisture Content and Atterberg Limits
Plastic Limit
Moisture Content
Liquid Limit
Top Soil
ML
Gravelly SILT with sand - medium to light brown, medium stiff, slightly moist.
SM
Silty SAND - light brown, mediun dense to dense, dry to slightly moist.
95.1
4.9
45.3
NP
NP
SANDSTONE - grey, slightly to moderately weathered, strong.
SILTSTONE/CLAYSTONE - green, completely weathered, friable.
CLAYSTONE - purple, completely weathered, friable.
SILTSTONE - green, moderately weathered, moderately strong.
Bottom of Test Pit @ 16 Feet
LOG_OF_TEST_PITS_PLATE TEST PIT LOGS.GPJ IGES.GDT 8/3/11
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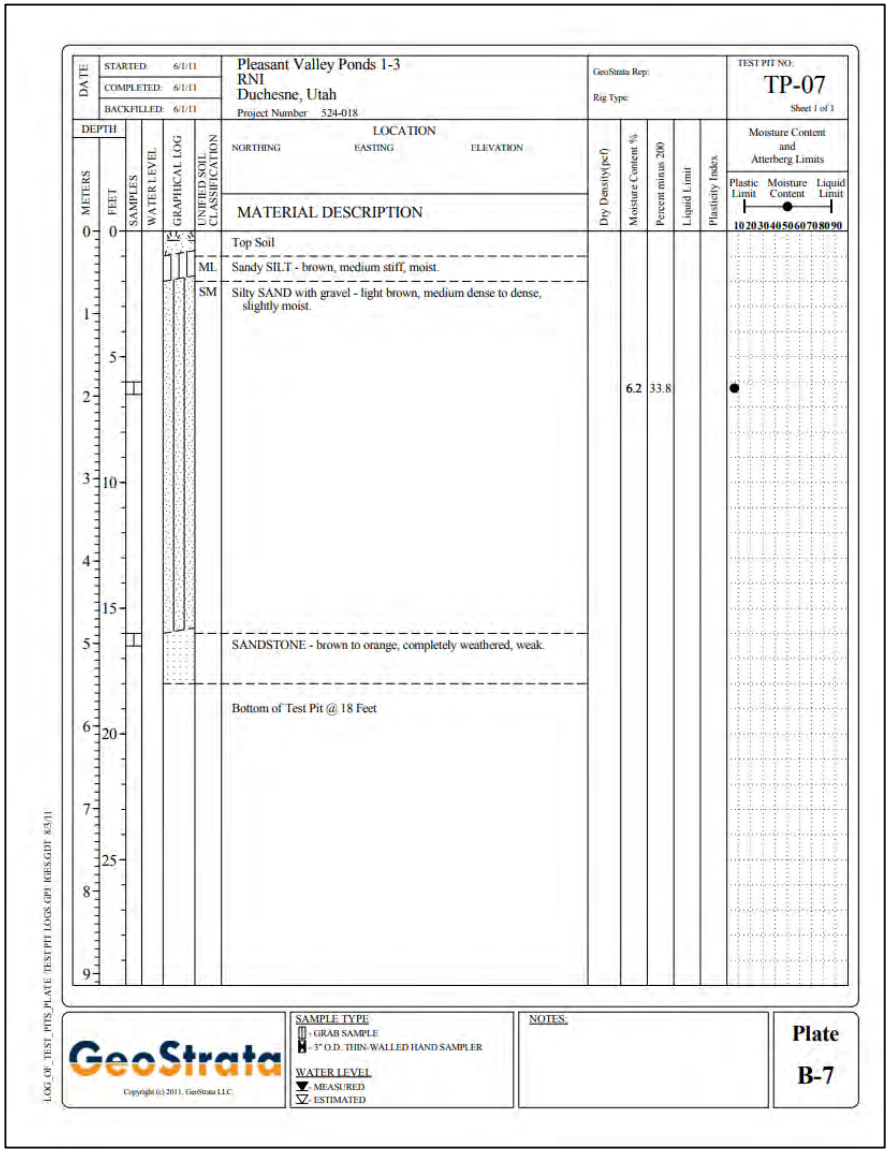
SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER
WATER LEVEL
- MEASURED
- ESTIMATED
NOTES:
Plate
B-6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STARTED: 6/1/11
COMPLETED: 6/1/11
BACKFILLED: 6/1/11
Pleasant Valley Ponds 1-3
RNI
Duchesne, Utah
Project Number 524-018
GeoStrata Rep:
Rig Type:
TEST PIT NO:
TP-07
Sheet 1 of 1
DEPTH
METERS
FEET
SAMPLES
WATER LEVEL
GRAPHICAL LOG
UNIFIED SOIL CLASSIFICATION
LOCATION
NORTHING
EASTING
ELEVATION
MATERIAL DESCRIPTION
Dry Density(pcf)
Moisture Content %
Percent minus 200
Liquid Limit
Plasticity Index
Moisture Content and Atterberg Limits
Plastic Limit
Moisture Content
Liquid Limit
Top Soil
ML
Sandy SILT - brown, medium stiff, moist.
SM
Silty SAND with gravel - light brown, medium dense to dense, slightly moist.
6.2
33.8
SANDSTONE - brown to orange, completely weathered, weak.
Bottom of Test Pit @ 18 Feet
LOG_OF_TEST_PITS_PLATE TEST PIT LOGS.GPJ IGES.GDT 8/3/11
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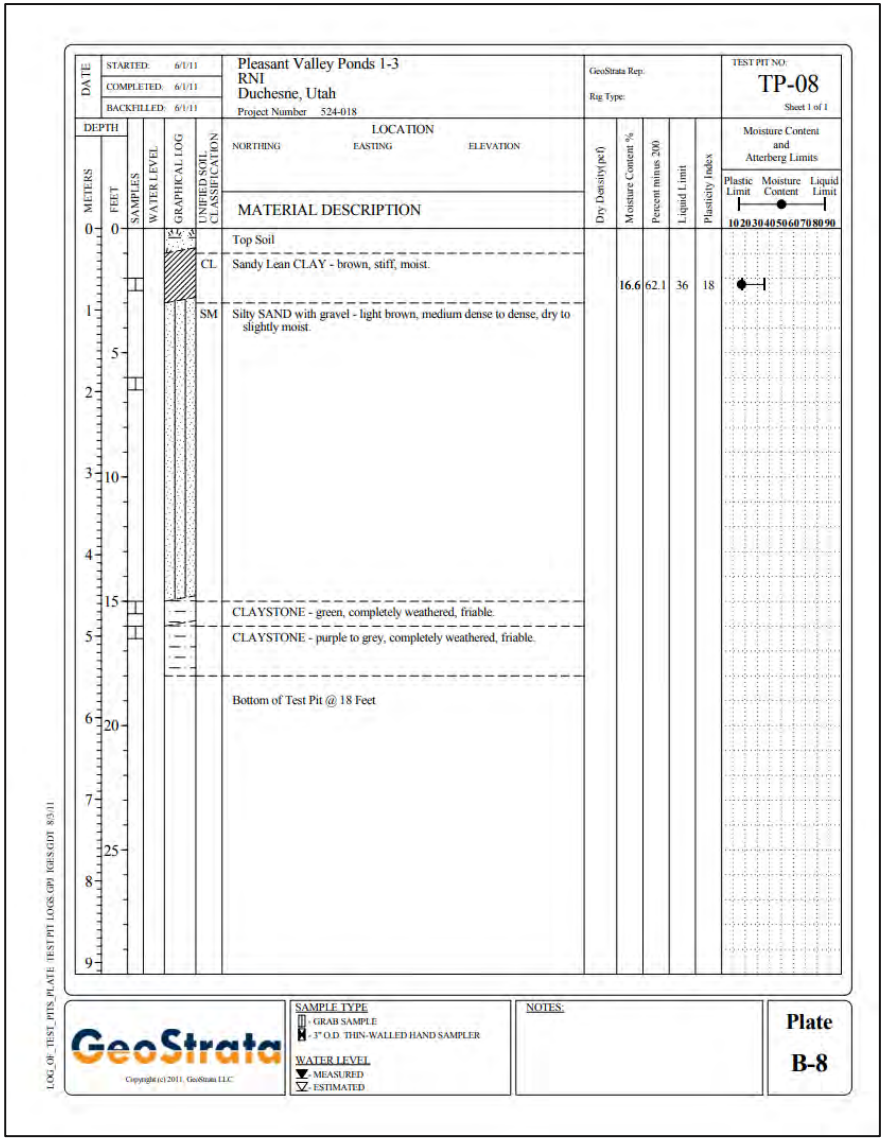
SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER
WATER LEVEL
- MEASURED
- ESTIMATED
NOTES:
Plate
B-7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BACKFILLED: 6/1/11
Pleasant Valley Ponds 1-3
RNI
Duchesne, Utah
Project Number 524-018
GeoStrata Rep:
Rig Type:
TEST PIT NO:
TP-08
Sheet 1 of 1
DEPTH
METERS
FEET
SAMPLES
WATER LEVEL
GRAPHICAL LOG
UNIFIED SOIL CLASSIFICATION
LOCATION
NORTHING
EASTING
ELEVATION
MATERIAL DESCRIPTION
Dry Density(pcf)
Moisture Content %
Percent minus 200
Liquid Limit
Plasticity Index
Moisture Content and Atterberg Limits
Plastic Limit
Moisture Content
Liquid Limit
Top Soil
CL
Sandy Lean CLAY - brown, stiff, moist.
16.6
62.1
36
18
SM
Silty SAND with gravel - light brown, medium dense to dense, dry to slightly moist.
CLAYSTONE - green, completely weathered, friable.
CLAYSTONE - purple to grey, completely weathered, friable.
Bottom of Test Pit @ 18 Feet
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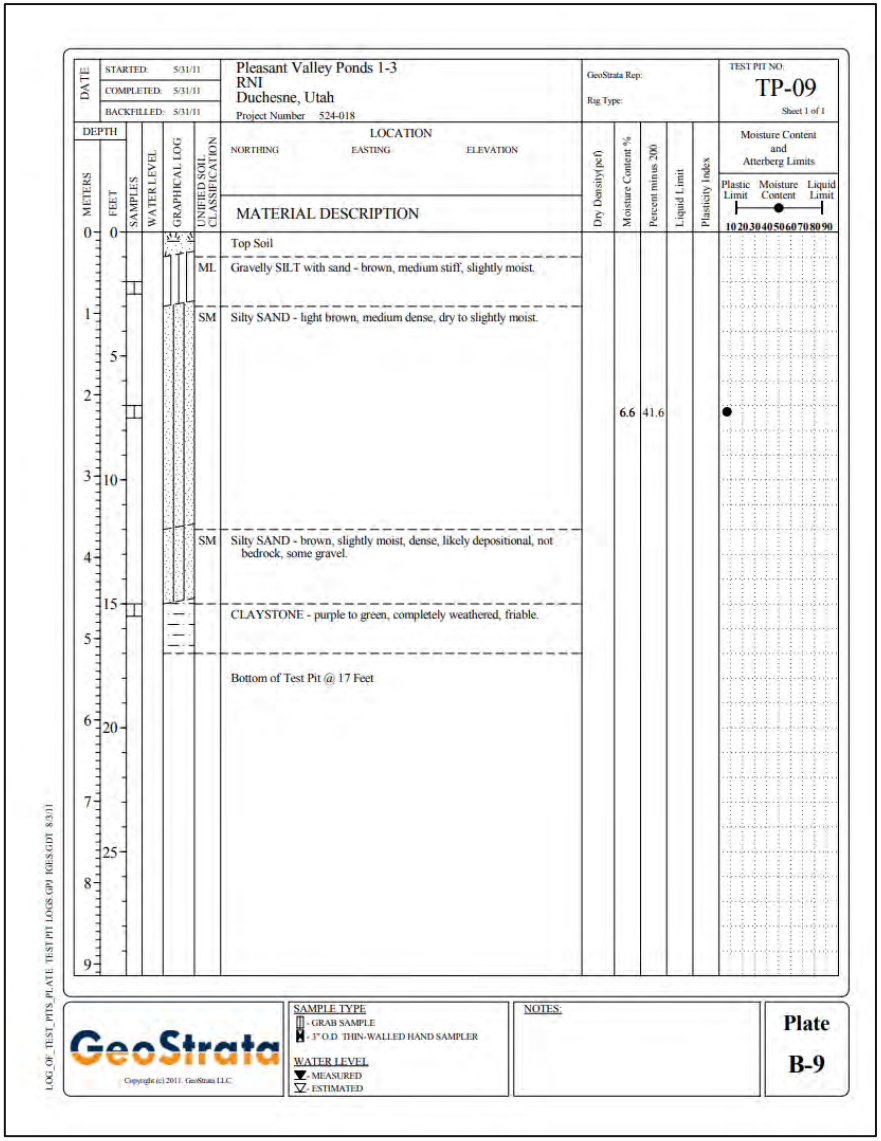
SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER
WATER LEVEL
- MEASURED
- ESTIMATED
NOTES:
Plate
B-8
LOG_OF_TEST_PITS_PLATE TEST PIT LOGS.GPJ IGES.GDT 8/3/11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COMPLETED: 5/31/11
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Pleasant Valley Ponds 1-3
RNI
Duchesne, Utah
Project Number 524-018
GeoStrata Rep:
Rig Type:
TEST PIT NO:
TP-09
Sheet 1 of 1
DEPTH
METERS
FEET
SAMPLES
WATER LEVEL
GRAPHICAL LOG
UNIFIED SOIL CLASSIFICATION
LOCATION
NORTHING
EASTING
ELEVATION
MATERIAL DESCRIPTION
Dry Density(pcf)
Moisture Content %
Percent minus 200
Liquid Limit
Plasticity Index
Moisture Content and Atterberg Limits
Plastic Limit
Moisture Content
Liquid Limit
Top Soil
ML
Gravelly SILT with sand - brown, medium stiff, slightly moist.
SM
Silty SAND - light brown, medium dense, dry to slightly moist.
6.6
41.6
SM
Silty SAND - brown, slightly moist, dense, likely depositional, not bedrock, some gravel.
CLAYSTONE - purple to green, completely weathered, friable.
Bottom of Test Pit @ 17 Feet
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SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER
WATER LEVEL
- MEASURED
- ESTIMATED
NOTES:
Plate
B-9
LOG_OF_TEST_PITS_PLATE TEST PIT LOGS.GPJ IGES.GDT 8/3/11

DATE: STARTED: 6/1/11 COMPLETED: 6/1/11 BACKFILLED: 6/1/11

Pleasant Valley Ponds 1-3
RNI
Duchesne, Utah
Project Number 524-018

GeoStrata Rep:
Rig Type:

TEST PIT NO. TP-10
Sheet 1 of 1

LOCATION: NORTHING EASTING ELEVATION

DEPTH (METERS)	DEPTH (FEET)	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index
0	0		Top Soil					
		ML	Sandy SILT - brown, medium dense, moist.		10.7	51.6	NP	NP
1	5	SP-SM	Poorly Graded SAND with silt and gravel - brown, dense, slightly moist.					
3	10		SILTSTONE - brown, highly weathered, weak.					
5	15		CLAYSTONE - orange to brown, thinly laminated, completely weathered, friable.					
			Bottom of Test Pit @ 17 Feet					

Moisture Content and Atterberg Limits: Plastic Limit, Moisture Content, Liquid Limit (10 20 30 40 50 60 70 80 90)

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SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate B-10

LOG_OF_TEST_PITS_PLATE TEST PIT LOGS.GPJ (GEIS.GDT 8/3/11

DATE: STARTED: 6/1/11 COMPLETED: 6/1/11 BACKFILLED: 6/1/11

Pleasant Valley Ponds 1-3
RNI
Duchesne, Utah
Project Number 524-018

GeoStrata Rep:
Rig Type:

TEST PIT NO. TP-11
Sheet 1 of 1

LOCATION: NORTHING EASTING ELEVATION

DEPTH (METERS)	DEPTH (FEET)	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index
0	0		Top Soil					
		ML	Sandy SILT with gravel - brown, medium stiff to stiff, slightly moist.					
1	5	SM	Silty SAND - light brown, medium dense, slightly moist, angular clasts up to 1 inch.		7.9	40.3		
3	10		CLAYSTONE - green, completely weathered, friable.					
4	15		CLAYSTONE - grey to purple, completely weathered, friable.					
			Bottom of Test Pit @ 17 Feet					

Moisture Content and Atterberg Limits: Plastic Limit, Moisture Content, Liquid Limit (10 20 30 40 50 60 70 80 90)

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SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate B-11

LOG_OF_TEST_PITS_PLATE TEST PIT LOGS.GPJ (GEIS.GDT 8/3/11

DATE
STARTED: 6/1/11
COMPLETED: 6/1/11
BACKFILLED: 6/1/11

Pleasant Valley Ponds 1-3
RNI
Duchesne, Utah
Project Number 524-018

GeoStrata Rep:
Rig Type:

TEST PIT NO: TP-12
Sheet 1 of 1

DEPTH (METERS / FEET) | SAMPLES | WATER LEVEL | GRAPHICAL LOG | UNIFIED SOIL CLASSIFICATION | LOCATION (NORTHING, EASTING, ELEVATION) | MATERIAL DESCRIPTION | Dry Density (pcf) | Moisture Content % | Percent minus 200 | Liquid Limit | Plasticity Index | Moisture Content and Atterberg Limits (Plastic Limit, Moisture Content, Liquid Limit)

Depth (feet)	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Percent minus 200	Liquid Limit	Plasticity Index
0		Top Soil			
	ML	Sandy SILT - brown, medium dense, moist.	50.4	NP	NP
5	SM	Silty SAND with gravel - light brown, dense, dry to slightly moist.			
10					
15	SM	Silty SAND with gravel - brown, dense, slightly moist. Debris flow material, some rounded gravel clasts.			
20		Bottom of Test Pit @ 21 Feet			
25					

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SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate B-12

LOG_OF_TEST_PITS_PLATE TEST PIT LOGS.GPJ IGES.GDT 8/3/11

DATE
STARTED: 6/1/11
COMPLETED: 6/1/11
BACKFILLED: 6/1/11

Pleasant Valley Ponds 1-3
RNI
Duchesne, Utah
Project Number 524-018

GeoStrata Rep:
Rig Type:

TEST PIT NO: TP-13
Sheet 1 of 1

DEPTH (METERS / FEET) | SAMPLES | WATER LEVEL | GRAPHICAL LOG | UNIFIED SOIL CLASSIFICATION | LOCATION (NORTHING, EASTING, ELEVATION) | MATERIAL DESCRIPTION | Dry Density (pcf) | Moisture Content % | Percent minus 200 | Liquid Limit | Plasticity Index | Moisture Content and Atterberg Limits (Plastic Limit, Moisture Content, Liquid Limit)

Depth (feet)	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Moisture Content %	Percent minus 200
0		Top Soil		
	SC	Clayey SAND - brown, medium dense, moist.		
5	SM	Silty SAND - medium to light brown, dense, dry to slightly moist.	5.8	24.2
10		SANDSTONE - brown to orange, moderately weathered, weak.		
15		Bottom of Test Pit @ 12 Feet		
20				
25				

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SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate B-13

LOG_OF_TEST_PITS_PLATE TEST PIT LOGS.GPJ IGES.GDT 8/3/11

DATE
STARTED: 6/1/11
COMPLETED: 6/1/11
BACKFILLED: 6/1/11

Pleasant Valley Ponds 1-3
RNI
Duchesne, Utah
Project Number 524-018

GeoStrata Rep:
Rig Type:

TEST PIT NO:
TP-14
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

Moisture Content and Atterberg Limits
Plastic Limit — Moisture Content — Liquid Limit
10 20 30 40 50 60 70 80 90

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density (pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index
0	0					Top Soil					
					ML	Sandy SILT with gravel - brown, stiff, moist.	81.1	9.2			
1	5				SM	Silty SAND - light brown, dry to slightly moist, angular clasts up to 2 inches.					
2								5.0	27.8		
3	10										
4	15										
5					SM	Silty SAND with gravel - brown, dense, slightly moist, rounded clasts up to 0.5 inches, likely debirs flow deposits.					
6	20					CLAYSTONE - purple to brown, completely weathered, friable.					
						Bottom of Test Pit @ 20.5 Feet					
7											
8	25										
9											

LOG_OF_TEST_PITS_PLATE TEST PIT LOGS.GPJ IGES.GDT 8/3/11

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SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate B-14

DATE
STARTED: 6/1/11
COMPLETED: 6/1/11
BACKFILLED: 6/1/11

Pleasant Valley Ponds 1-3
RNI
Duchesne, Utah
Project Number 524-018

GeoStrata Rep:
Rig Type:

TEST PIT NO:
TP-15
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

Moisture Content and Atterberg Limits
Plastic Limit — Moisture Content — Liquid Limit
10 20 30 40 50 60 70 80 90

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density (pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index
0	0				SC	Clayey SAND - brown, stiff, moist.					
1	5					SILTSTONE - brown to grey, highly weathered, friable.					
2											
3	10					SANDSTONE - brown to orange, moderately weathered, moderately weak.					
4						Bottom of Test Pit @ 12 Feet					
5	15										
6	20										
7											
8	25										
9											

LOG_OF_TEST_PITS_PLATE TEST PIT LOGS.GPJ IGES.GDT 8/3/11

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SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate B-15

DATE: STARTED: 6/1/11 COMPLETED: 6/1/11 BACKFILLED: 6/1/11

Pleasant Valley Ponds 1-3
RNI
Duchesne, Utah
Project Number 524-018

GeoStrata Rep:
Rig Type:

TEST PIT NO: TP-16
Sheet 1 of 1

LOCATION: NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit – Moisture Content – Liquid Limit)
0	0					FILL; assorted materials, mostly gravelly SILT and gravelly CLAY with sand, dense, appears well compcacted.						
4					GC	Clayey GRAVEL - very dense, slightly moist, debirs flow deposit.						
5	15					CLAYSTONE - brown to grey to purple, completely weathered, friable.	103.9	13.3	90.6	54	31	
						Bottom of Test Pit @ 16 Feet						

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SAMPLE TYPE:
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate B-16

LOG_OF_TEST_PITS_PLATE TEST PIT LOGS.GPJ IGES.GDT 8/3/11

DATE: STARTED: 6/1/11 COMPLETED: 6/1/11 BACKFILLED: 6/1/11

Pleasant Valley Ponds 1-3
RNI
Duchesne, Utah
Project Number 524-018

GeoStrata Rep:
Rig Type:

TEST PIT NO: TP-17
Sheet 1 of 1

LOCATION: NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit – Moisture Content – Liquid Limit)
0	0					FILL; assorted materials, mostly gravelly SILT and gravelly CLAY with sand, dense, appears well compcacted.						
2						CLAYSTONE - brown to purple, completely weathered, friable.		12.4	72.0	42	18	
3	10					SILTSTONE - brown to grey, highly weathered, weak.						
						Bottom of Test Pit @ 10 Feet						

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SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate B-17

LOG_OF_TEST_PITS_PLATE TEST PIT LOGS.GPJ IGES.GDT 8/3/11

DATE	
STARTED:	6/1/11
COMPLETED:	6/1/11
BACKFILLED:	6/1/11

Pleasant Valley Ponds 1-3
RNI
Duchesne, Utah
Project Number 524-018

GeoStrata Rep:
Rig Type:

TEST PIT NO: **TP-18**
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

Moisture Content and Atterberg Limits

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Plastic Limit / Moisture Content / Liquid Limit (10 20 30 40 50 60 70 80 90)
0	0					FILL; assorted materials, mostly gravelly SILT and gravelly CLAY with sand, dense, appears well compcacted.						
1												
	5											
2												
3	10					CLAYSTONE - green, completely weathered, friable.						
4												
	15					Bottom of Test Pit @ 14 Feet.						
5												
6	20											
7												
	25											
8												
9												

LOG_OF_TEST_PITS_PLATE TEST PIT LOGS (2P) IGES.GDT 8/3/11

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SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate B-18

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			USCS SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve)	GRAVELS (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		GRAVELS WITH OVER 12% FINES	GM	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS (More than half of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH OVER 12% FINES	SM	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
			SC	CLAYEY SANDS SAND-GRAVEL-CLAY MIXTURES
FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid limit less than 50)		ML	INORGANIC SILTS & VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (Liquid limit greater than 50)		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

LOG KEY SYMBOLS

- BORING SAMPLE LOCATION
- TEST-PIT SAMPLE LOCATION
- WATER LEVEL (level after completion)
- WATER LEVEL (level where first encountered)

CEMENTATION

DESCRIPTION	DESCRIPTION
WEAKLY	CRUMBLES OR BREAKS WITH HANDLING OR SLIGHT FINGER PRESSURE
MODERATELY	CRUMBLES OR BREAKS WITH CONSIDERABLE FINGER PRESSURE
STRONGLY	WILL NOT CRUMBLE OR BREAK WITH FINGER PRESSURE

OTHER TESTS KEY

C	CONSOLIDATION	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	DS	DIRECT SHEAR
UC	UNCONFINED COMPRESSION	T	TRIAXIAL
S	SOLUBILITY	R	RESISTIVITY
O	ORGANIC CONTENT	RV	R-VALUE
CBR	CALIFORNIA BEARING RATIO	SU	SOLUBLE SULFATES
COMP	MOISTURE/DENSITY RELATIONSHIP	PM	PERMEABILITY
CI	CALIFORNIA IMPACT	<200	% FINER THAN #200
COL	COLLAPSE POTENTIAL	Gs	SPECIFIC GRAVITY
SS	SHRINK SWELL	SL	SWELL LOAD

MODIFIERS

DESCRIPTION	%
TRACE	<5
SOME	5 - 12
WITH	>12

MOISTURE CONTENT

DESCRIPTION	FIELD TEST
DRY	ABSENCE OF MOISTURE, DUSTY, DRY TO THE TOUCH
MOIST	DAMP BUT NO VISIBLE WATER
WET	VISIBLE FREE WATER, USUALLY SOIL BELOW WATER TABLE

STRATIFICATION

DESCRIPTION	THICKNESS	DESCRIPTION	THICKNESS
SEAM	1/16 - 1/2"	OCCASIONAL	ONE OR LESS PER FOOT OF THICKNESS
LAYER	1/2 - 12"	FREQUENT	MORE THAN ONE PER FOOT OF THICKNESS

GENERAL NOTES

1. Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual.
2. No warranty is provided as to the continuity of soil conditions between individual sample locations.
3. Logs represent general soil conditions observed at the point of exploration on the date indicated.
4. In general, Unified Soil Classification designations presented on the logs were evaluated by visual methods only. Therefore, actual designations (based on laboratory tests) may vary.

APPARENT / RELATIVE DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPT (blows/ft)	MODIFIED CA. SAMPLER (blows/ft)	CALIFORNIA SAMPLER (blows/ft)	RELATIVE DENSITY (%)	FIELD TEST
VERY LOOSE	<4	<4	<6	0 - 15	EASILY PENETRATED WITH 1/2-INCH REINFORCING ROD PUSHED BY HAND
LOOSE	4 - 10	5 - 12	6 - 18	15 - 35	DIFFICULT TO PENETRATE WITH 1/2-INCH REINFORCING ROD PUSHED BY HAND
MEDIUM DENSE	10 - 30	12 - 35	18 - 45	35 - 65	EASILY PENETRATED A FOOT WITH 1/2-INCH REINFORCING ROD DRIVEN WITH 5-LB HAMMER
DENSE	30 - 50	35 - 60	45 - 70	65 - 85	DIFFICULT TO PENETRATED A FOOT WITH 1/2-INCH REINFORCING ROD DRIVEN WITH 5-LB HAMMER
VERY DENSE	>50	>60	>70	85 - 100	PENETRATED ONLY A FEW INCHES WITH 1/2-INCH REINFORCING ROD DRIVEN WITH 5-LB HAMMER

CONSISTENCY - FINE-GRAINED SOIL

CONSISTENCY	SPT (blows/ft)	TORVANE UNTRAINED SHEAR STRENGTH (tsf)	POCKET PENETROMETER UNCONFINED COMPRESSIVE STRENGTH (tsf)	FIELD TEST
VERY SOFT	<2	<0.125	<0.25	EASILY PENETRATED SEVERAL INCHES BY THUMB. EXUDES BETWEEN THUMB AND FINGERS WHEN SQUEEZED BY HAND.
SOFT	2 - 4	0.125 - 0.25	0.25 - 0.5	EASILY PENETRATED ONE INCH BY THUMB. MOLDED BY LIGHT FINGER PRESSURE.
MEDIUM STIFF	4 - 8	0.25 - 0.5	0.5 - 1.0	PENETRATED OVER 1/2 INCH BY THUMB WITH MODERATE EFFORT. MOLDED BY STRONG FINGER PRESSURE.
STIFF	8 - 15	0.5 - 1.0	1.0 - 2.0	INDENTED ABOUT 1/2 INCH BY THUMB BUT PENETRATED ONLY WITH GREAT EFFORT.
VERY STIFF	15 - 30	1.0 - 2.0	2.0 - 4.0	READILY INDENTED BY THUMBNAIL.
HARD	>30	>2.0	>4.0	INDENTED WITH DIFFICULTY BY THUMBNAIL.

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Soil Symbols Description Key

Pleasant Valley Ponds 1-3
RNI
Duchesne , UT
Project Number 524-018

Plate B-19

Rock Classification Should Include:
1. Rock name (or classification)
2. Color
3. Weathering
4. Fracturing
5. Competency
6. Additional comments indicating rock characteristics which might affect engineering properties

Bedding of Sedimentary Rocks

Splitting Property	Thickness	Stratification
Massive	>4.0 ft	Very thick bedded
Blocky	2.0-4.0 ft	Thick-bedded
Slabby	2 ½-24 in	Thin-bedded
Flaggy	½-2 ½ in	Very thin-bedded
Shaly or platy	¼ – ½ in	Laminated
Papery	< ¼ in	Thinly laminated

Weathering

Weathering	Field Test
Fresh	No visible sign of decomposition or discoloration. Rings under hammer impact.
Slightly Weathered	Slight discoloration inwards from open fractures, otherwise similar to Fresh.
Moderately Weathered	Discoloration throughout. Weaker minerals such as feldspar are decomposed. Strength somewhat less than fresh rock but cores cannot be broken by hand or scraped with a knife. Texture preserved.
Highly Weathered	Most minerals somewhat decomposed. Specimens can be broken by hand with effort or shaved with a knife. Core stones present in rock mass. Texture becoming indistinct but fabric preserved.
Completely Weathered	Minerals decomposed to soil but fabric and structure preserved. Specimens easily crumble or penetrated.

Fracturing

Spacing	Description
>6 ft	Very Widely
2-6 ft	Widely
8-24 in	Moderately
2 ½-8 in	Closely
¾-2 ½ in	Very Closely

Competency

Class	Strength	Field Test	Approximate Range of Unconfined Compressive Strength (tsf)
I	Extremely Strong	Many blows with geologic hammer required to break intact specimen.	>2000
II	Very Strong	Hand-held specimen breaks with pick end of hammer under more than one blow.	2000-1000
III	Strong	Cannot by scraped or peeled with knife, hand-held specimen can be broken with single moderate blow with pick end of hammer	1000-500
IV	Moderately Strong	Can just be scraped or peeled with knife. Indentations 1-3 mm show in specimen with moderate blow with pick end of hammer.	500-250
V	Weak	Material crumbles under moderate blow with pick end of hammer and can be peeled with a knife, but is hard to hand-trim for triaxial test specimen.	250-10
VI	Friable	Material crumbles in hand.	N/A

RQD

RQD (%)	Rock Quality
90-100	Excellent
75-90	Good
50-75	Fair
25-50	Poor
0-25	Very Poor

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Physical Rock Properties Key

Pleasant Valley Ponds 1-3
RNI
Duchesne, UT
Project Number 524-018

Plate B-20

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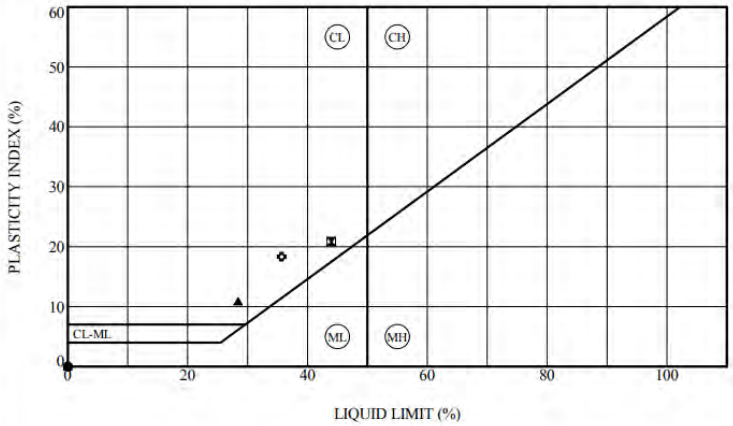
Summary Table of Laboratory Testing

Pleasant Valley Ponds 1 - 3
RNI
Duchesne, UT
Project Number 524-018

Plate C-1

Test Pit No.	Sample Depth (feet)	USCS Soil Classification	Natural Dry Density	Natural Moisture Content (%)	Gradation Gravel (%)	Gradation Sand (%)	Gradation Fines (%)	Atterberg Limits Liquid Limit	Atterberg Limits Plasticity Index	Proctor Max. Dry Density (pcf)	Proctor Optimum Moisture (%)	Soluble Sulfates (ppm)	Resistivity (Ω-cm)	pH	Pinhole Dispersion	Direct Shear Cohesion (psf)	Direct Shear φ (deg.)	Triaxial Test c' (psf)	Triaxial Test φ' (deg.)
TP-01	3.0		89.3	7.3%															
TP-01	4.0	SM			9.4	54	36.6	NP	NP	116.7	13.2					190	32		
TP-02	8.0	SP-SM		4.9%	36.5	57.9	5.6												
TP-03	3.0											<5.44	3500	9.51					
TP-03	20.0	CL		13.5%	0	8	92.0	44	21										
TP-04	3.0	SC		6.9%	5.8	53.4	40.8	28	10										
TP-05	2.0	SM		12.9%	2.4	55.1	42.5	NP	NP										
TP-06	5.0		95.1	4.9%															
TP-06	6.0	SM			2.3	52.4	45.3	NP	NP							270	29		
TP-07	6.0	SM		6.2%	15.8	50.4	33.8								ND2				
TP-08	2.0	CL		16.6%	2.4	35.5	62.1	36	19										
TP-09	7.0	SM		6.6%	5.8	52.6	41.6												
TP-10	2.0	ML		10.7%	1.3	47.1	51.6	NP	NP			<5.48	3800	9.65					
TP-11	9.0	SM		7.9%	7.2	52.5	40.3												
TP-12	3.0	ML			0.6	49	50.4	NP	NP	108.7	14.5		2000	9.3		385	28		
TP-13	6.0	SM		5.8%	8.3	67.5	24.2												
TP-14	3.5		81.1	9.2%															
TP-14	8.0	SM		5.0%	7.4	64.8	27.8												
TP-16	15.0	CH	103.9	13.3%	0	9.4	90.6	54	30									140	31
TP-17	8.0	CL		12.4%	0	28	72.0	42	18										



	Sample Location	Depth (ft)	LL (%)	PL (%)	PI (%)	Fines (%)	Classification
●	TP-01	4.0	NP	NP	NP		Silty SAND
⊠	TP-03	20.0	44	23	21		Lean CLAY
▲	TP-04	3.0	28	18	10		Clayey SAND
★	TP-05	2.0	NP	NP	NP		Silty SAND
⊙	TP-06	6.0	NP	NP	NP		Silty SAND
✿	TP-08	2.0	36	17	19		Sandy Lean CLAY
○	TP-10	2.0	NP	NP	NP		Sandy SILT
△	TP-12	3.0	NP	NP	NP		Sandy SILT

C_ATTERBERG TEST PIT LOGS.GPJ GEOSTRATA.GDT 6/2011

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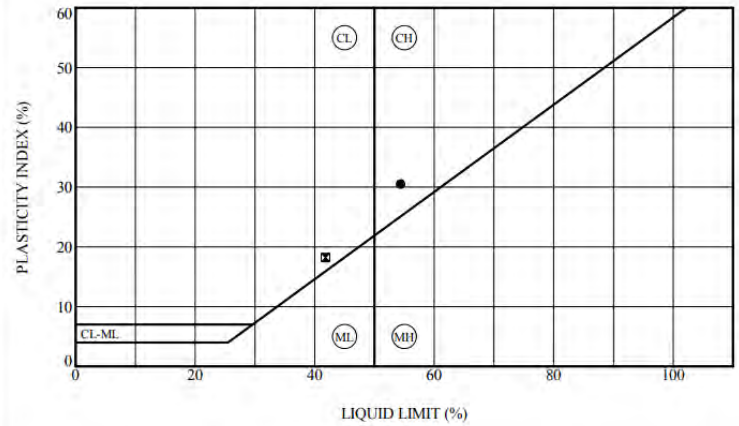
ATTERBERG LIMITS' RESULTS

Pleasant Valley Ponds 1-3
RNI
Duchesne, Utah
Project Number: 524-018

Plate C - 2



	Sample Location	Depth (ft)	LL (%)	PL (%)	PI (%)	Fines (%)	Classification
●	TP-16	15.0	54	24	30		Fat CLAY
⊠	TP-17	8.0	42	24	18		Lean CLAY w/sand

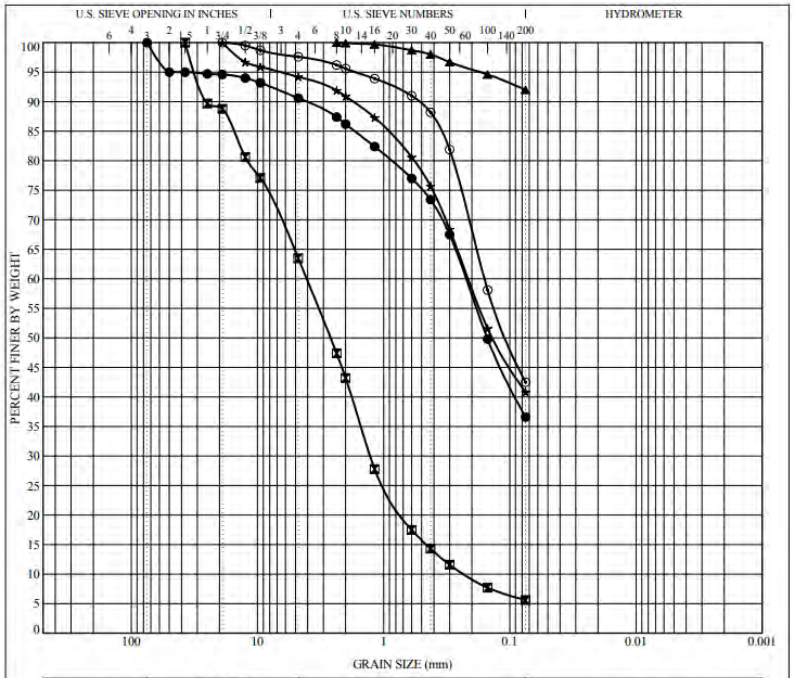
C_ATTERBERG TEST PIT LOGS.GPJ GEOSTRATA.GDT 6/2011

GeoStrata

ATTERBERG LIMITS' RESULTS

Pleasant Valley Ponds 1-3
RNI
Duchesne, Utah
Project Number: 524-018

Plate C - 3



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample Location	Depth	Classification	LL	PL	PI	Cc	Cu
●	TP-01	4.0	Silty SAND	NP	NP	NP		
⊠	TP-02	8.0	Poorly Graded SAND w/gravel				1.76	18.07
▲	TP-03	20.0	Lean CLAY (CLAYSTONE)	44	23	21		
★	TP-04	3.0	Clayey SAND	28	18	10		
⊙	TP-05	2.0	Silty SAND	NP	NP	NP		

	Sample Loctaion	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	TP-01	4.0	75	0.224			9.4	54.0	36.6	
⊠	TP-02	8.0	37.5	4.08	1.272	0.226	36.5	57.9	5.6	
▲	TP-03	20.0	2.36				0.0	8.0	92.0	
★	TP-04	3.0	19	0.212			5.8	53.4	40.8	
⊙	TP-05	2.0	19	0.159			2.4	55.1	42.5	

C_GSD TEST PIT LOGS.GPJ GEOSTRATA.GDT 8/3/11

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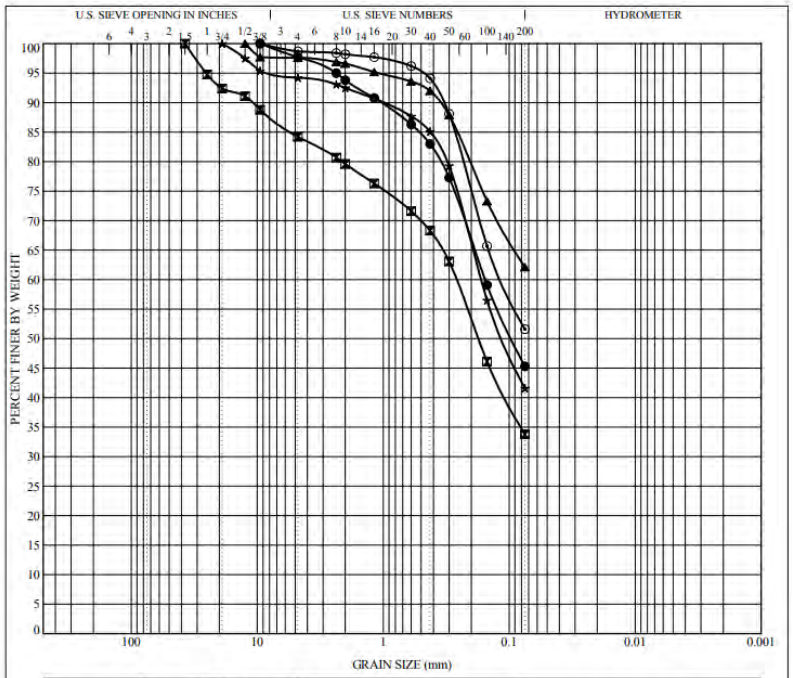
GRAIN SIZE DISTRIBUTION

Pleasant Valley Ponds 1-3
RNI
Duchesne, Utah
Project Number: 524-018

Plate C - 4



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample Location	Depth	Classification	LL	PL	PI	Cc	Cu
●	TP-06	6.0	Silty SAND	NP	NP	NP		
⊠	TP-07	6.0	Silty SAND w/gravel					
▲	TP-08	2.0	Sandy Lean CLAY	36	17	19		
★	TP-09	7.0	Silty SAND					
⊙	TP-10	2.0	Sandy SILT	NP	NP	NP		

	Sample Loctaion	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	TP-06	6.0	9.5	0.155			2.3	52.4	45.3	
⊠	TP-07	6.0	37.5	0.264			15.8	50.4	33.8	
▲	TP-08	2.0	12.5				2.4	35.5	62.1	
★	TP-09	7.0	19	0.167			5.8	52.6	41.6	
⊙	TP-10	2.0	9.5	0.113			1.3	47.1	51.6	

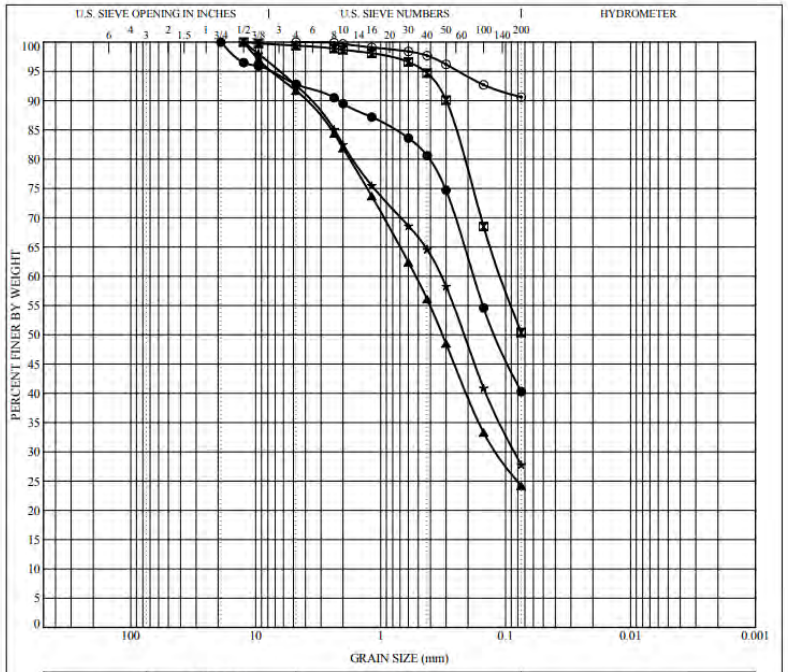
C_GSD TEST PIT LOGS.GPJ GEOSTRATA.GDT 8/3/11

GeoStrata

GRAIN SIZE DISTRIBUTION

Pleasant Valley Ponds 1-3
RNI
Duchesne, Utah
Project Number: 524-018

Plate C - 5



Sample Location	Depth	Classification	LL	PL	PI	Cc	Cu
● TP-11	9.0	Silty SAND					
⊠ TP-12	3.0	Sandy SILT	NP	NP	NP		
▲ TP-13	6.0	Silty SAND					
★ TP-14	8.0	Silty SAND					
⊙ TP-16	15.0	Fat CLAY (CLAYSTONE)	54	24	30		

Sample Loctaion	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● TP-11	9.0	19	0.181			7.2	52.5	40.3	
⊠ TP-12	3.0	12.5	0.108			0.6	49.0	50.4	
▲ TP-13	6.0	12.5	0.526	0.117		8.3	67.5	24.2	
★ TP-14	8.0	12.5	0.33	0.084		7.4	64.8	27.8	
⊙ TP-16	15.0	4.75				0.0	9.4	90.6	

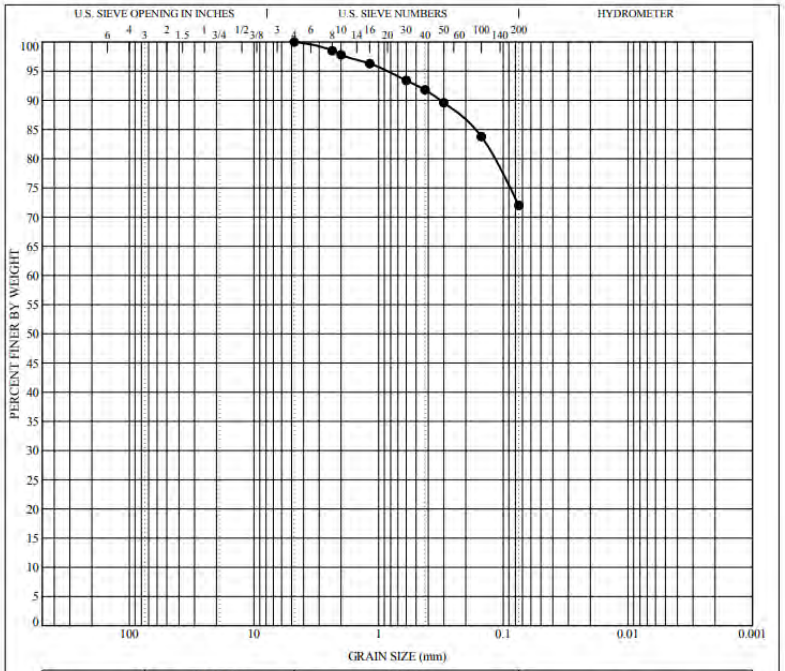
C_GSD TEST PIT LOGS.GPJ GEOSTRATA.GDT 8/3/11

GeoStrata

GRAIN SIZE DISTRIBUTION

Pleasant Valley Ponds 1-3
RNI
Duchesne, Utah
Project Number: 524-018

Plate C - 6



Sample Location	Depth	Classification	LL	PL	PI	Cc	Cu
● TP-17	8.0	Lean CLAY w/sand (CLAYSTONE)	42	24	18		

Sample Loctaion	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● TP-17	8.0	4.75				0.0	28.0	72.0	

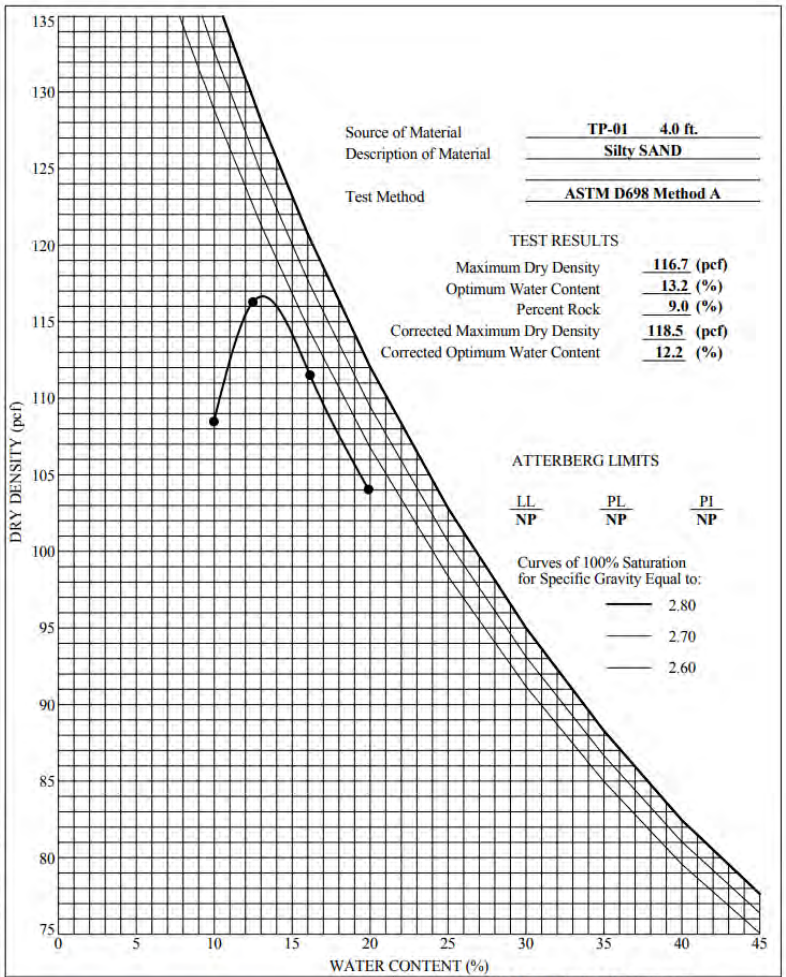
C_GSD TEST PIT LOGS.GPJ GEOSTRATA.GDT 8/3/11

GeoStrata

GRAIN SIZE DISTRIBUTION

Pleasant Valley Ponds 1-3
RNI
Duchesne, Utah
Project Number: 524-018

Plate C - 7



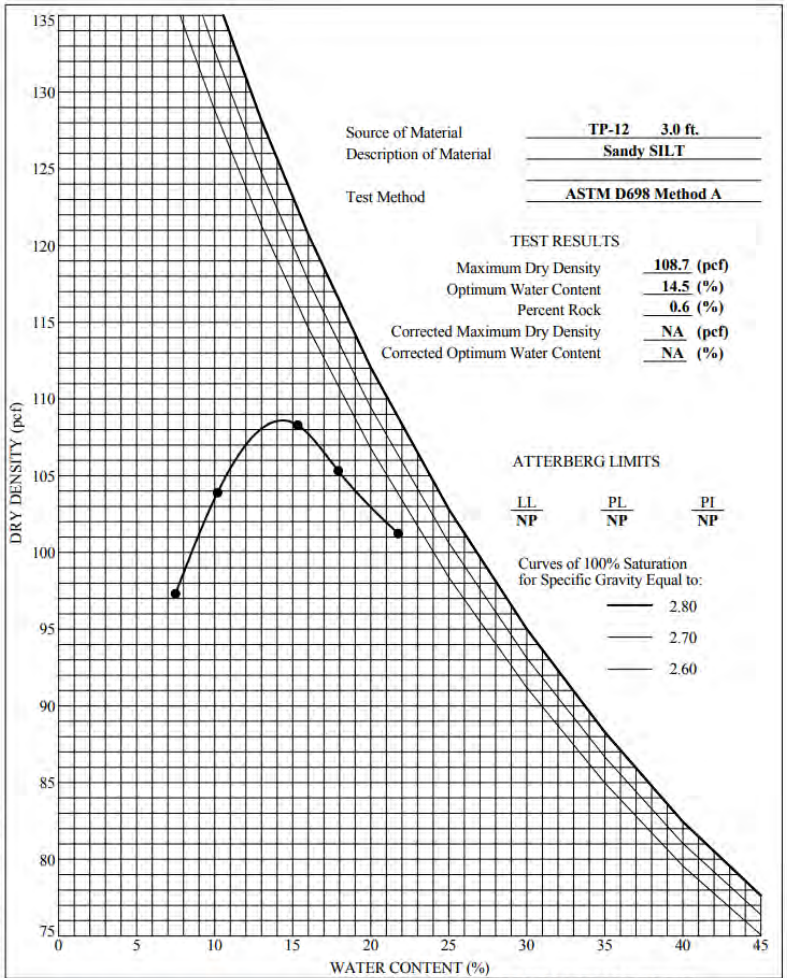
GeoStrata

COMPACTION TEST

Pleasant Valley Ponds 1-3
RNI
Duchesne, Utah

Project Number: 524-018

Plate C - 8



GeoStrata

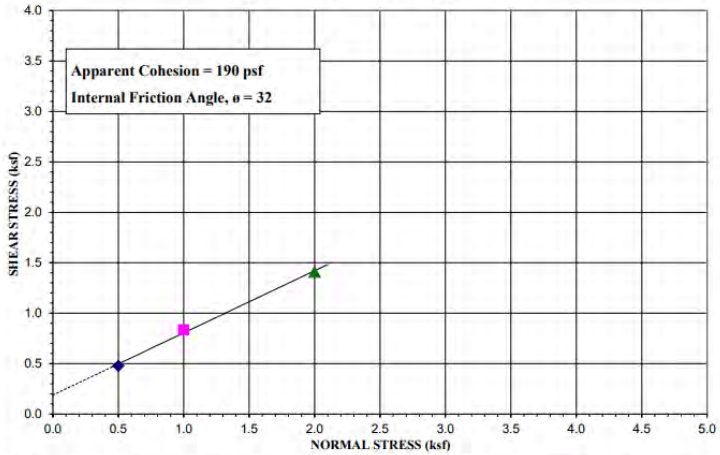
COMPACTION TEST

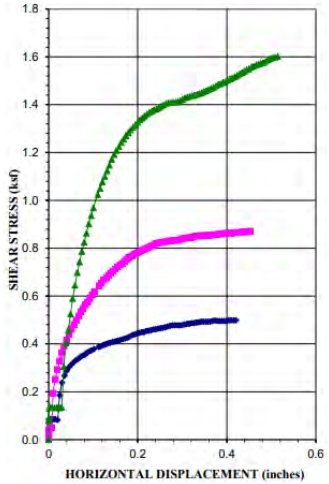
Pleasant Valley Ponds 1-3
RNI
Duchesne, Utah

Project Number: 524-018

Plate C - 9

DIRECT SHEAR TEST





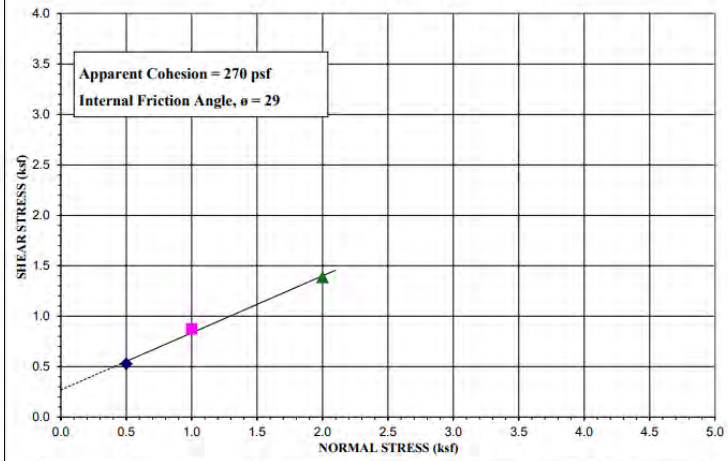
Source: TP-1	Depth: 4 ft.	
Type of Test:	Consolidated Drained/Saturated	

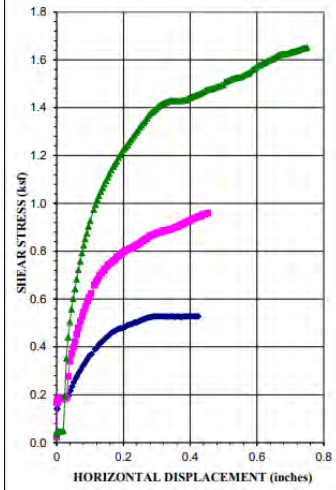
Test No. (Symbol)	1 (◆)	2 (■)	3 (▲)
Sample Type	Remolded		
Initial Height, in.	1	1	1
Diameter, in.	2.5	2.5	2.5
Dry Density Before, pcf	108.5	109.7	109.0
Dry Density After, pcf	113.5	113.5	111.3
Moisture % Before	21.1	21.1	20.3
Moisture % After	21.1	21.1	20.3
Normal Load, ksf	0.5	1.0	2.0
Shear Stress, ksf	0.48	0.83	1.41
Strain Rate	.02 INCHES/MIN		

Sample Properties	
Cohesion, psf	190
Friction Angle, ϕ	32
Liquid Limit, %	NP
Plasticity Index, %	NP
Percent Gravel	9.4
Percent Sand	54
Percent Passing No. 200 sieve	36.6
Classification	SM

PROJECT NO.: 524-018 | GeoStrata | FIGURE NO.: C-10

DIRECT SHEAR TEST





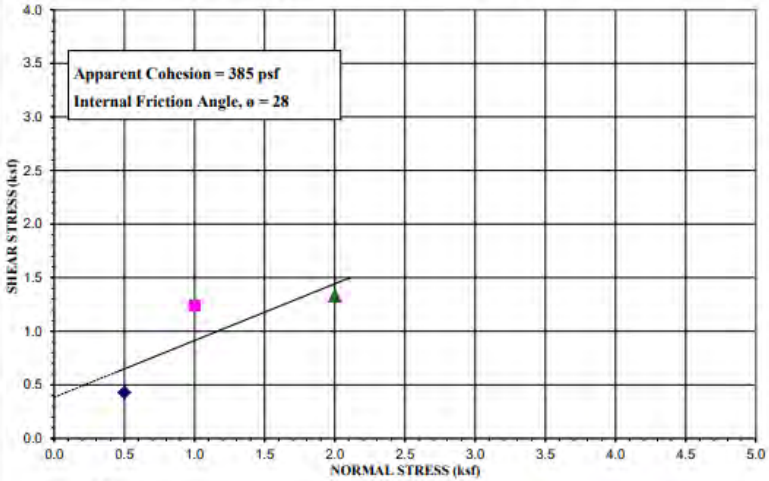
Source: TP-6	Depth: 6 ft.	
Type of Test:	Consolidated Drained/Saturated	

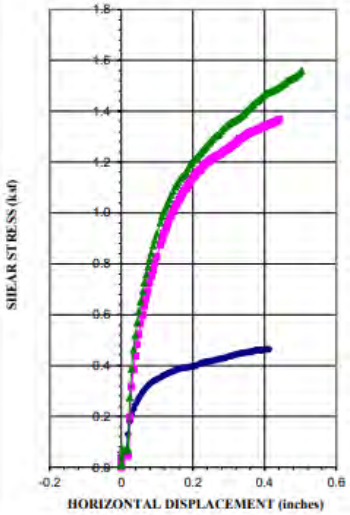
Test No. (Symbol)	1 (◆)	2 (■)	3 (▲)
Sample Type	Remolded		
Initial Height, in.	1	1	1
Diameter, in.	2.5	2.5	2.5
Dry Density Before, pcf	80.6	81.7	80.4
Dry Density After, pcf	97.2	96.6	95.4
Moisture % Before	28.0	24.0	23.6
Moisture % After	28.0	24.0	23.6
Normal Load, ksf	0.5	1.0	2.0
Shear Stress, ksf	0.53	0.87	1.39
Strain Rate	.02 INCHES/MIN		

Sample Properties	
Cohesion, psf	270
Friction Angle, ϕ	29
Liquid Limit, %	NP
Plasticity Index, %	NP
Percent Gravel	2.3
Percent Sand	52.4
Percent Passing No. 200 sieve	45.3
Classification	SM

PROJECT NO.: 524-018 | GeoStrata | FIGURE NO.: C-11

DIRECT SHEAR TEST



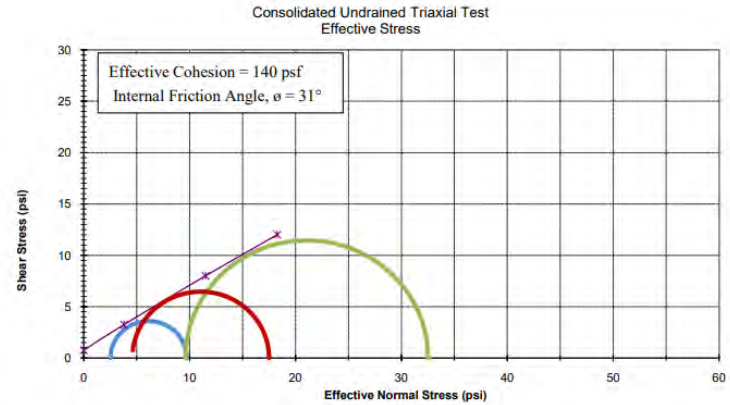


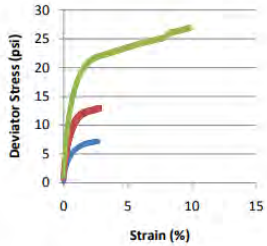
Source: TP-12	Depth: 3 ft.
Type of Test:	Consolidated Drained/Saturated

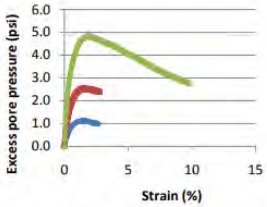
Test No. (Symbol)	1 (◆)	2 (■)	3 (▲)
Sample Type	Remolded		
Initial Height, in.	1	1	1
Diameter, in.	2.5	2.5	2.5
Dry Density Before, pcf	96.6	99.8	99.7
Dry Density After, pcf	104.7	110.0	108.0
Moisture % Before	29.5	25.1	24.1
Moisture % After	29.5	25.1	24.1
Normal Load, ksf	0.5	1.0	2.0
Shear Stress, ksf	0.43	1.24	1.33
Strain Rate	.0052 INCHES/MIN		

Sample Properties	
Cohesion, psf	385
Friction Angle, ϕ	28
Liquid Limit, %	NP
Plasticity Index, %	NP
Percent Gravel	0.6
Percent Sand	49
Percent Passing No. 200 sieve	50.4
Classification	ML

PROJECT NO.: 524-018 | GeoStrata | FIGURE NO.: C-12

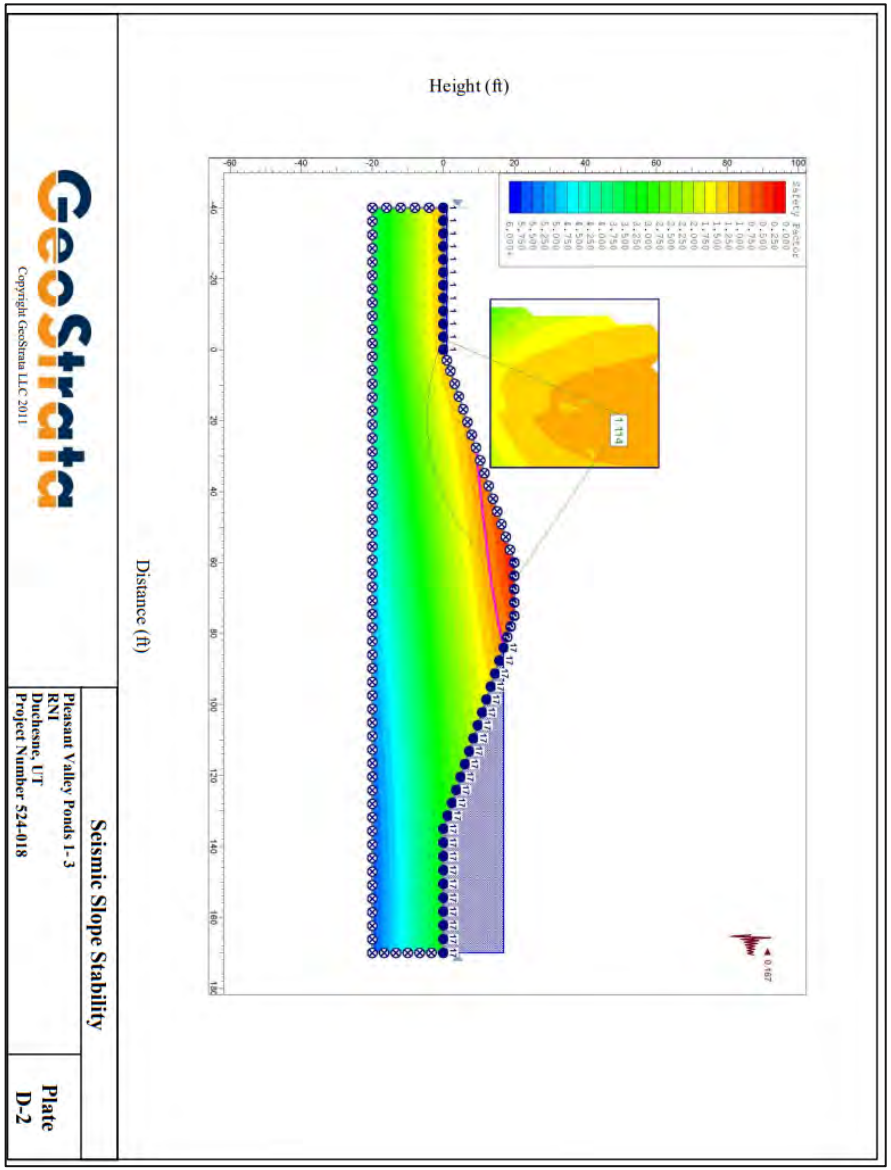






Sample Location	Tp-16 @ 15		
Sample Type	Undisturbed		
Test Type	Consolidated Undrained		
Length (in)	3.25	NA	NA
Diameter (in)	2.19	NA	NA
Dry Density (pcf)	103.9	103.9	103.9
Moisture (%)	13.3	13.3	13.3
Consolidation Press (psf)	720	1440	2160
"B" Parameter	0.95	0.95	0.95
Total Confining Stress σ_3 (psi)	3.5	7.0	14.0
Total Axial Stress σ_1 (psi)	10.7	19.9	36.9
Deviator Stress σ_1-σ_3 (psi)	7.2	12.9	22.9
Effective Confining Stress σ_3' (psi)	2.5	4.6	9.6
Effective Axial Stress σ_1' (psi)	9.7	17.5	32.5
Pore Pressure μ (psi)	1.0	2.4	4.4
Strain (%)	4.0	4.0	4.0

Project No.: 524-018 | GeoStrata | Plate No.: C-13


Height (ft)
Distance (ft)
1.114
Seismic Slope Stability
Pleasant Valley Ponds 1-3
RNI
Duchesne, UT
Project Number 524-018
Plate
D-2
GeoStrata
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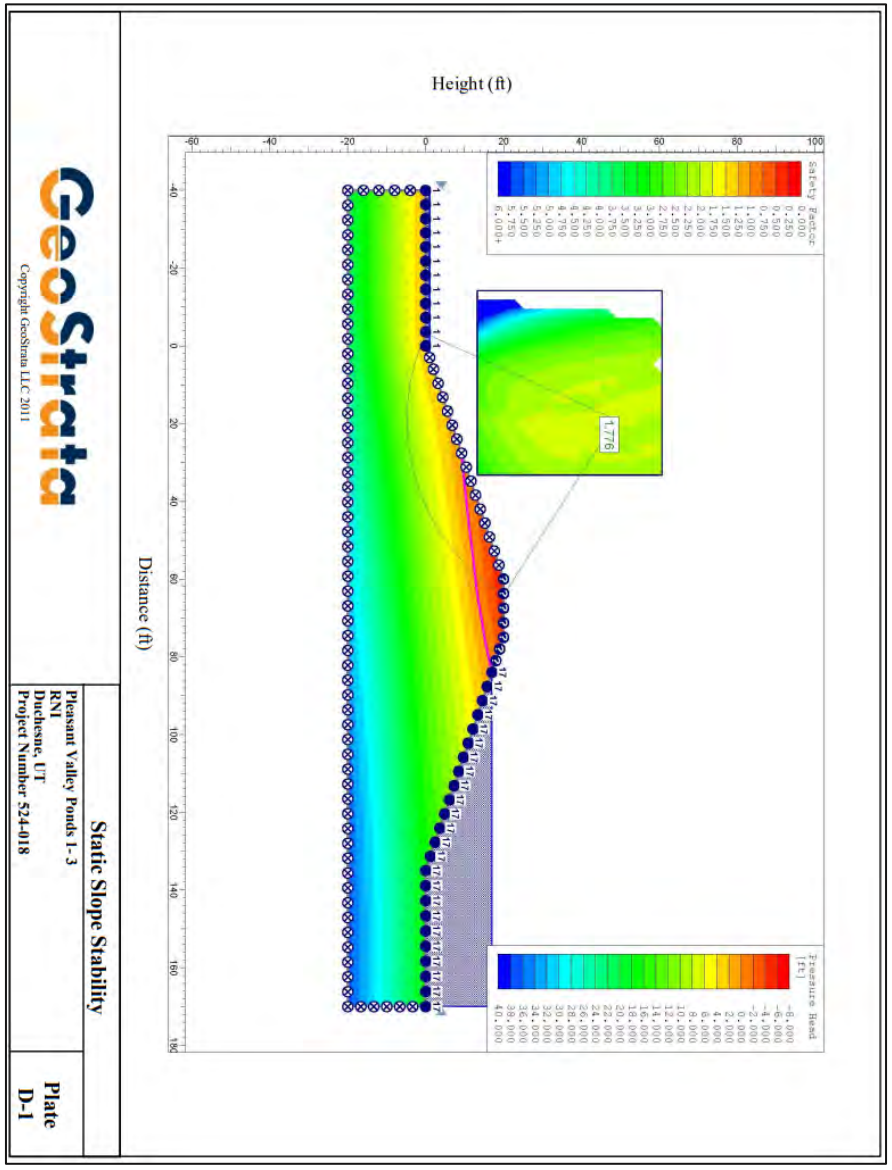
Height (ft)
Distance (ft)
1.776
Static Slope Stability
Pleasant Valley Ponds 1-3
RNI
Duchesne, UT
Project Number 524-018
Plate
D-1
GeoStrata
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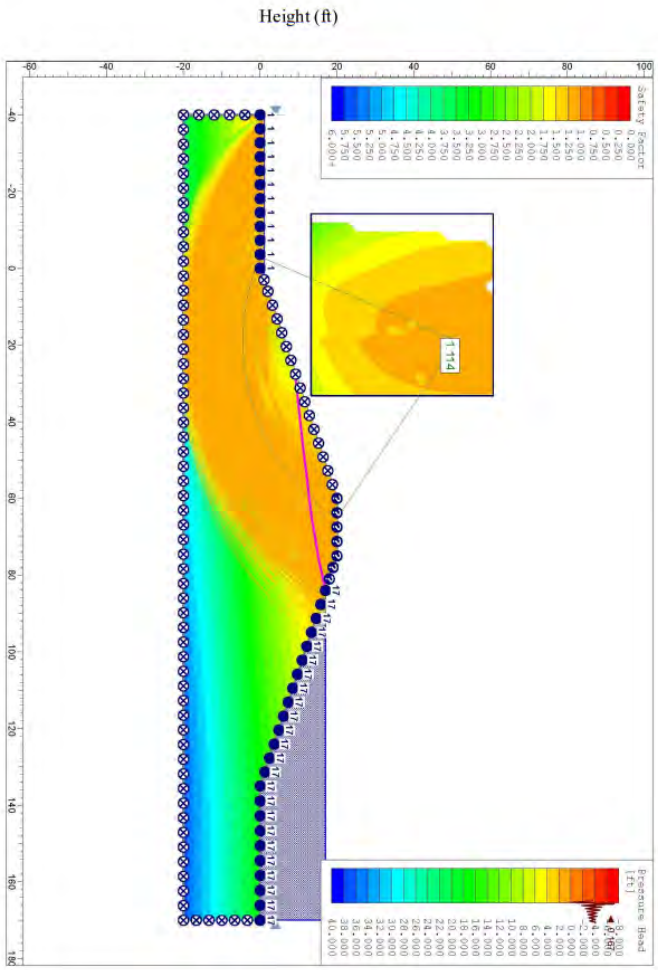
3. GeoStrata Letter to UDOGM dated Nov 7, 2014



GeoStrata Engineering & Geosciences
14425 S. Center Point Way, Bluffdale, Utah 84065 – T: (801) 501-0583 – F: (801) 501-0584

November 7, 2014

Division of Oil, Gas and Mining
Attn: Mr. Ammon McDonald
GeoStrata Project No. 524-049

Subject: Pleasant Valley Pond Redesign Duchesne County, Utah

Mr. McDonald:

GeoStrata has prepared this letter at the request of RN Industries (RNI). RNI currently has a single pond and an evaporation basin currently in operation at their Pleasant Valley disposal facility in Duchesne County, Utah. RNI submitted an application to the Division of Oil, Gas and Mining (DOGM) on December 29, 2008 to build additional ponds. RNI received an approval to construct the ponds on April 9, 2009, then RNI amended the application in July of 2011 and received an approval to construct letter from DOGM on July 12, 2011. Since the ponds were not constructed within 2 years of DOGM approval and because of changes in regulation, the ponds have been redesigned and are being resubmitted for approval.

Subsurface Investigation

As part of the site investigation submitted in July of 2011 application, numerous borings were drilled to measure the depth to groundwater. Plate 1 shows the location of the borings used to measure groundwater at the site. GeoStrata personnel measured water levels in these borings three different times. Table 1 shows the results of the groundwater data.

		6/8/2010	6/17/2010	6/21/2010
	Depth of Boring (ft)	Water level (ft)	Water level (ft)	Water level (ft)
Boring 1	38	dry	37.6	dry
Boring 2	44	dry	dry	dry
Boring 3	36.6	dry	dry	dry
Boring 4a	10	NA	dry	dry
Boring 4b	50	NA	46	45
Boring 5	43	dry	dry	dry
Boring 6a	10	NA	dry	dry
Boring 6b	50	NA	dry	dry
Boring 6c	50	NA	44	43.6
Boring 7	50	dry	dry	dry
Boring 8a	43	dry	dry	dry
Boring 8b	50	NA	44	43

Table 1. Ground water data

GeoStrata has incorporated the groundwater data into a series of cross sections across the proposed ponds and basin. Plate 1 shows the lines of section and plates 3-7 are the cross

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sections. Plate 2 shows a depth to ground water map along with the locations of the proposed ponds and basin. Based on the ground water data gathered it appears that the depth to groundwater shallows approaching the ephemeral drainage that traverses from SW to NE across the site. It is GeoStrata's opinion that there is sufficient distance from groundwater for the proposed ponds to minimize the likelihood of any contamination.

GeoStrata conducted a Geotechnical Investigation at the subject site dated August 3, 2011 for the same general footprint of the proposed ponds. In this study GeoStrata determined that the depth to bedrock averaged approximately 10 ft. across the site and the bedrock consisted of siltstone, claystone, and sandstone. GeoStrata tested the permeability of bedrock samples at three different locations across the footprint of the proposed ponds/basin and all three samples had permeability's of less than 1.0E -7 cm/sec.

It is GeoStrata's opinion that due to the depth to ground water, the proximity to bedrock, and impermeability of the bedrock that the ponds and basin meet DOGM requirements for pond approval.

If you have any questions about our proposal please feel free to give us a call at our office at 801-501-0583.

Respectfully,

LICENSED PROFESSIONAL GEOLOGIST
11/7/14
MICHAEL W. VORKINK
801-316-2258
STATE OF UTAH

Jonathan Peaden
Staff Geologist

Michael Vorkink P.G.
Senior Geologist

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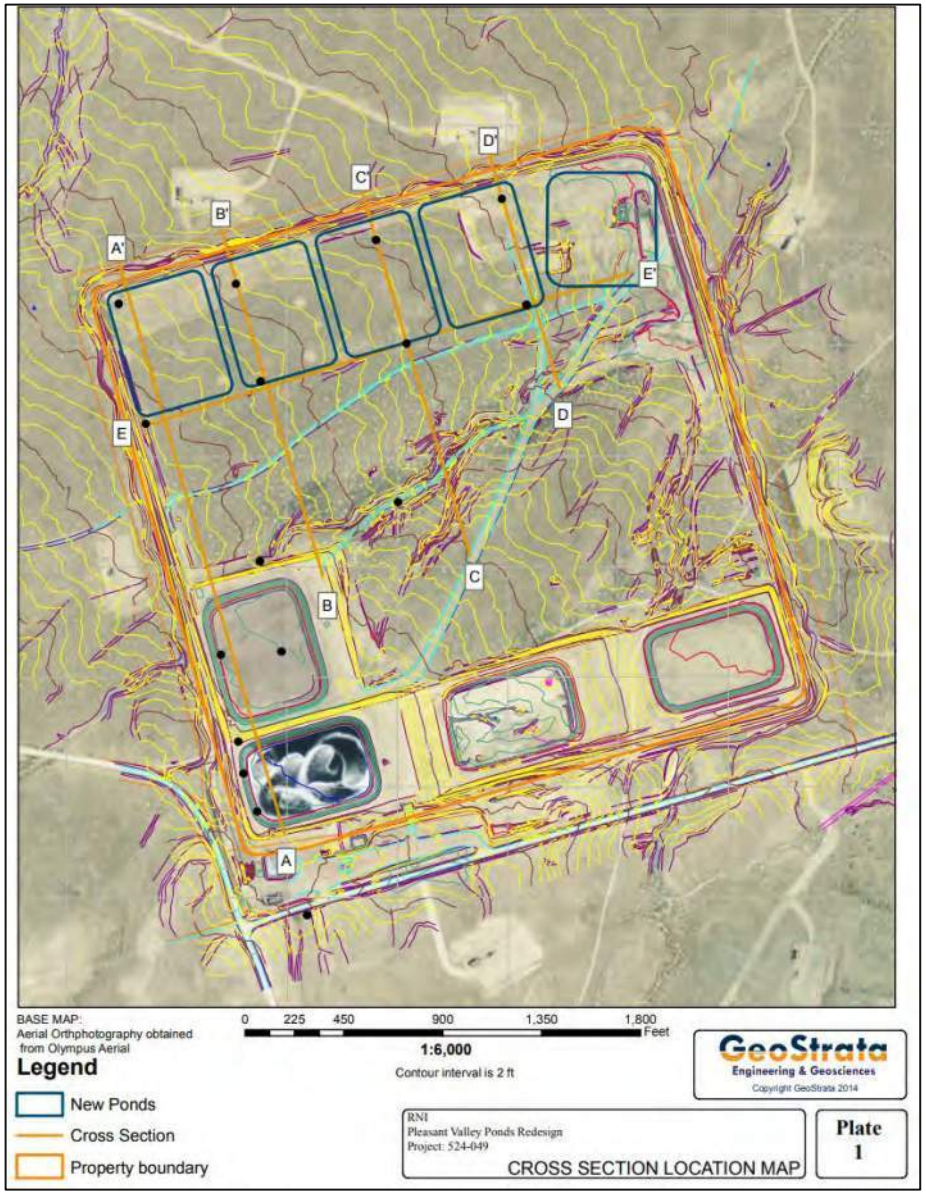
A
A'
B
B'
C
C'
D
D'
E
E'
BASE MAP:
Aerial Orthphotography obtained from Olympus Aerial
0 225 450 900 1,350 1,800 Feet
1:6,000
Contour interval is 2 ft
Legend
New Ponds
Cross Section
Property boundary
GeoStrata
Engineering & Geosciences
Copyright GeoStrata 2014
RNI
Pleasant Valley Ponds Redesign
Project: 524-049
CROSS SECTION LOCATION MAP
Plate 1

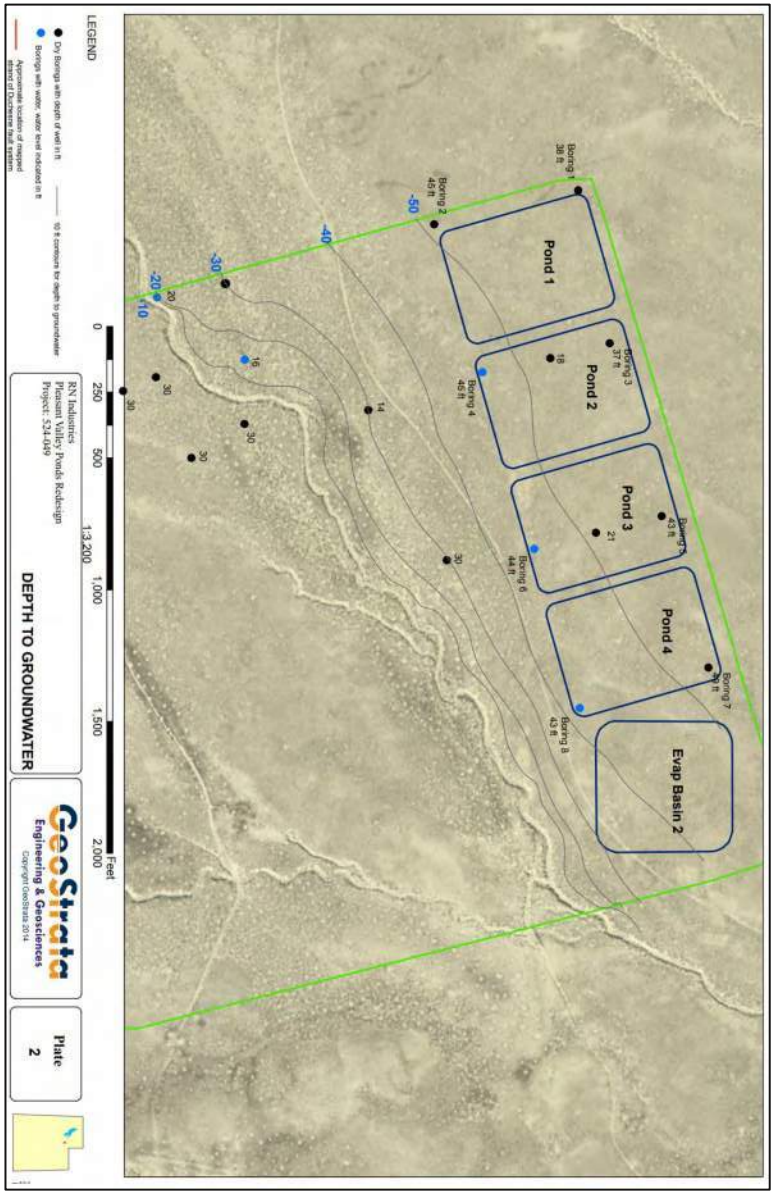
Pond 1
Pond 2
Pond 3
Pond 4
Evap Basin 2
Boring 1
38 ft
Boring 2
45 ft
Boring 3
37 ft
Boring 4
45 ft
Boring 5
43 ft
Boring 6
44 ft
Boring 7
Boring 8
43 ft
-10
-20
-30
-40
-50
LEGEND
Dry Borings with depth of well in ft
Borings with water, water level indicated in ft
10 ft contours for depth to groundwater
Approximate location of mapped extent of Duchesne fault system
0 250 500 1,000 1,500 2,000 Feet
1:3,200
RN Industries
Pleasant Valley Ponds Redesign
Project: 524-049
DEPTH TO GROUNDWATER
GeoStrata
Engineering & Geosciences
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Plate 2

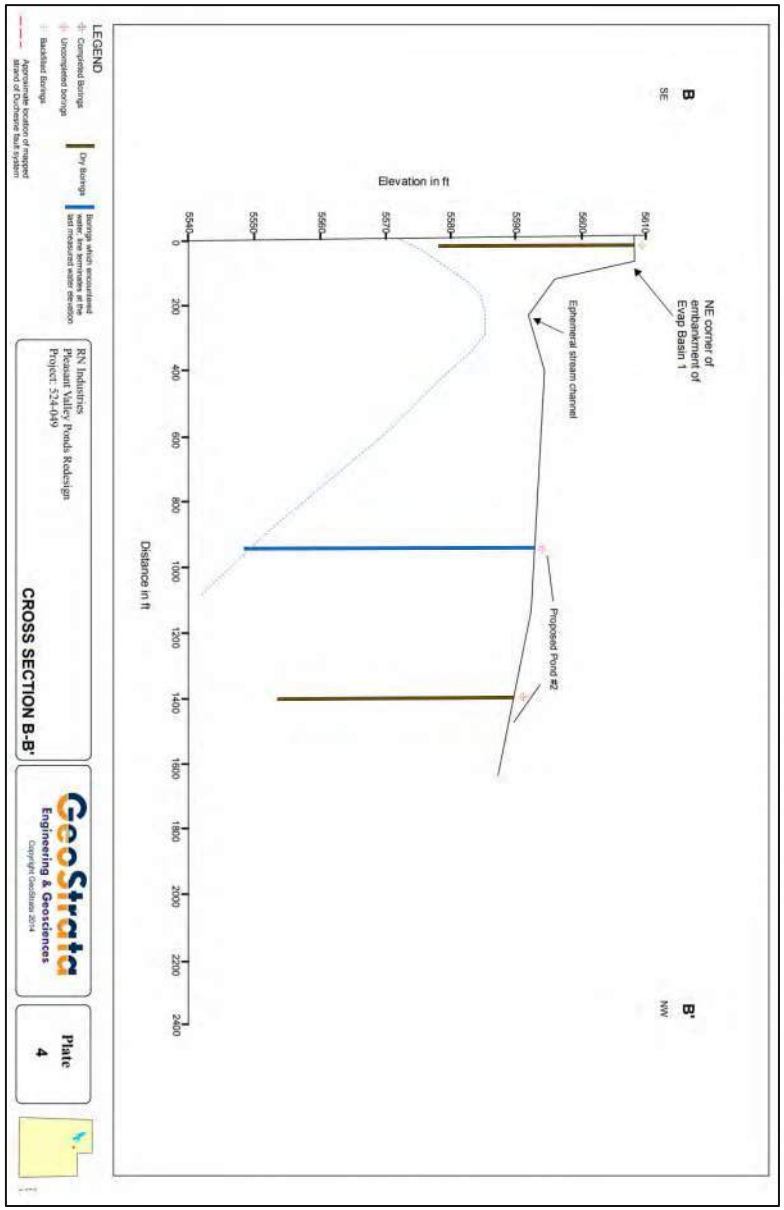
B
SE
NE corner of
embankment of
Evap Basin 1
Ephemeral stream channel
Proposed Pond #2
B'
NW
Elevation in ft
5610
5600
5590
5580
5570
5560
5550
5540
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
Distance in ft
LEGEND
Completed borings
Uncompleted borings
Backfilled Borings
Dry Borings
Borings which encountered water, line terminates at the last measured water elevation
Approximate location of mapped strand of Duchesne fault system
RN Industries
Pleasant Valley Ponds Redesign
Project: 524-049
CROSS SECTION B-B'
GeoStrata
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Plate
4

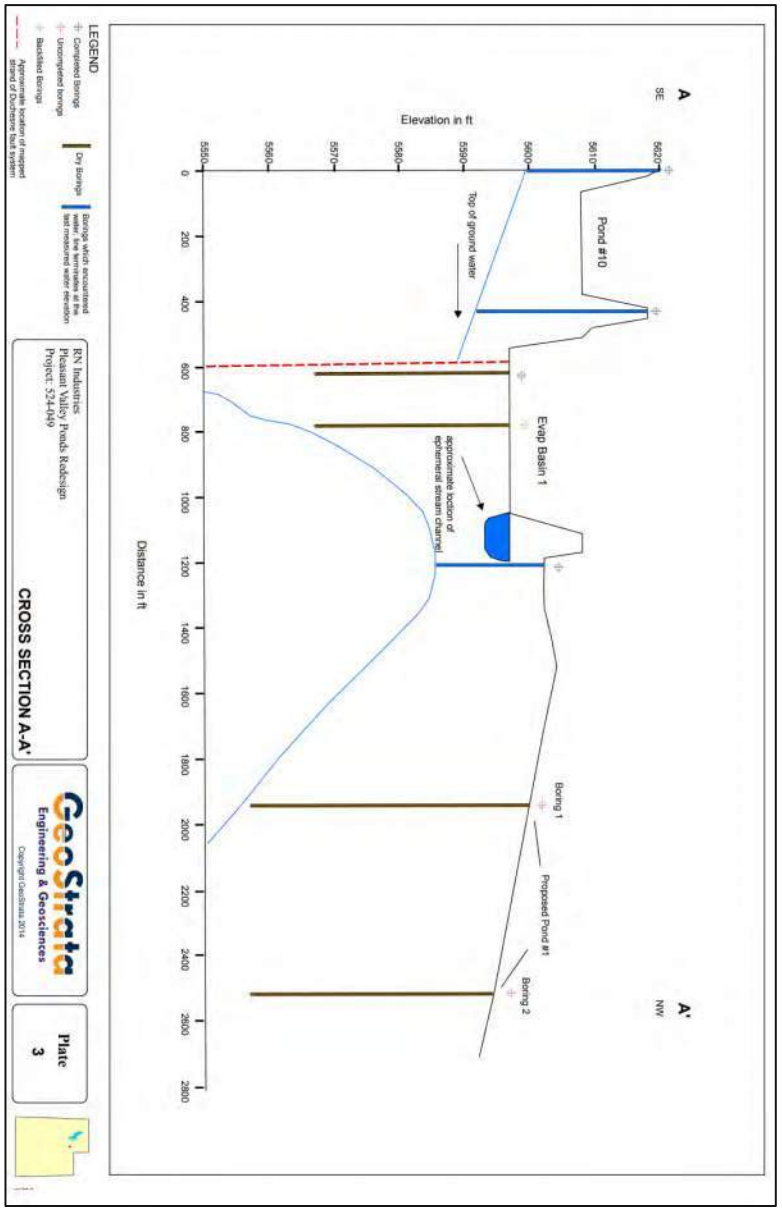
A
SE
Pond #10
Top of ground water
Evap Basin 1
approximate location of
ephemeral stream channel
Boring 1
Proposed Pond #1
Boring 2
A'
NW
Elevation in ft
5620
5610
5600
5590
5580
5570
5560
5550
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
Distance in ft
LEGEND
Completed Borings
Uncompleted borings
Backfilled Borings
Dry Borings
Borings which encountered water, line terminates at the last measured water elevation
Approximate location of mapped strand of Duchesne fault system
RN Industries
Pleasant Valley Ponds Redesign
Project: 524-049
CROSS SECTION A-A'
GeoStrata
Engineering & Geosciences
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Plate
3

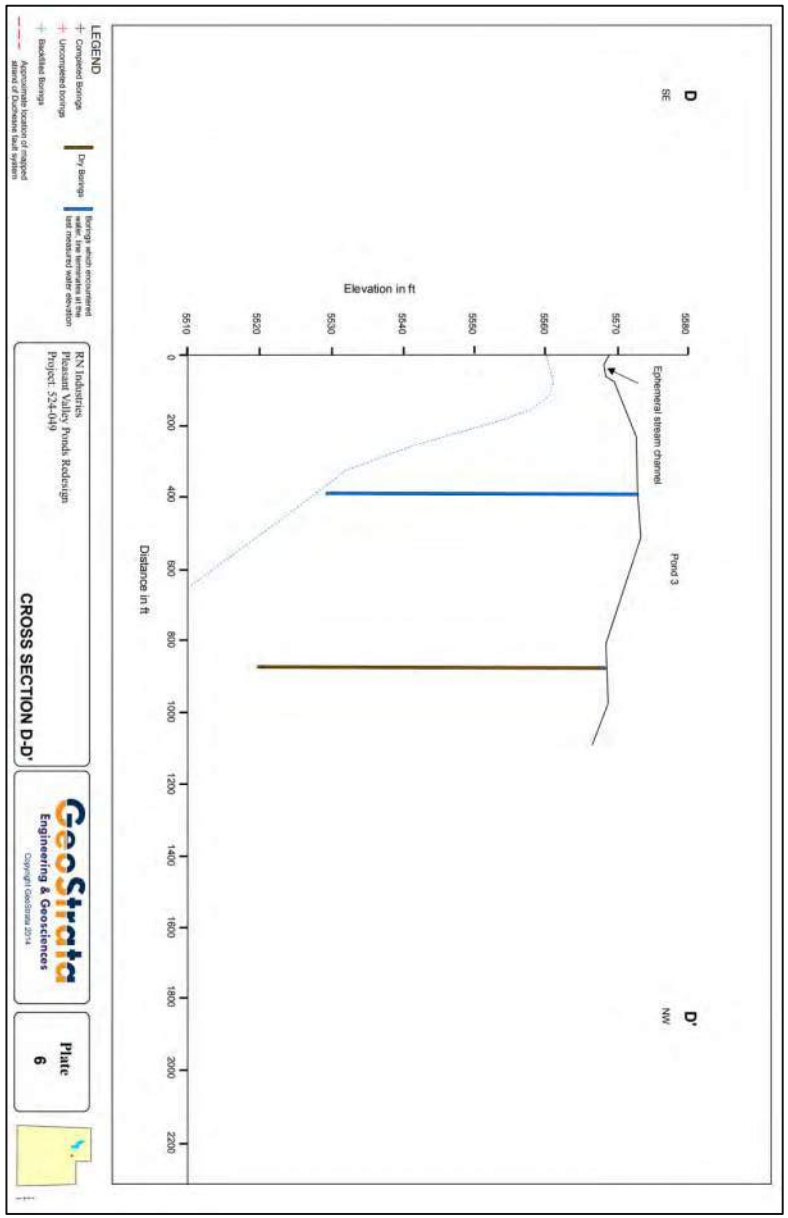
D
SE
D'
NW
Pond 3
Ephemeral stream channel
Elevation in ft
5610
5620
5630
5640
5650
5660
5670
5680
Distance in ft
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
LEGEND
Completed Borings
Uncompleted borings
Backfilled Borings
Approximate location of mapped strand of Duchesne fault system
Dry Borings
Borings which encountered water; line terminates at the last measured water elevation
RN Industries
Pleasant Valley Ponds Redesign
Project 524-049
CROSS SECTION D-D'
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Plate
6

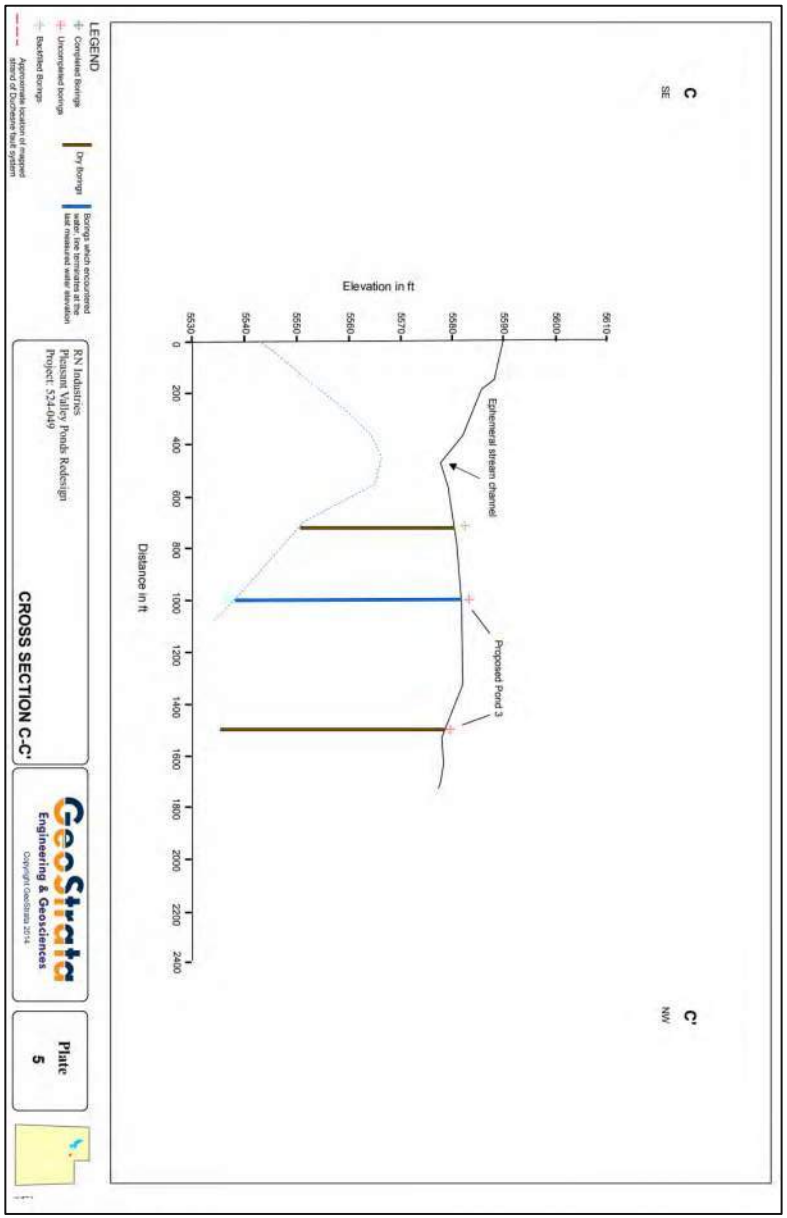
C
SE
C'
NW
Ephemeral stream channel
Proposed Pond 3
Elevation in ft
5530
5540
5550
5560
5570
5580
5590
5600
5610
Distance in ft
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
LEGEND
Completed Borings
Uncompleted borings
Backfilled Borings
Approximate location of mapped strand of Duchesne fault system
Dry Borings
Borings which encountered water; line terminates at the last measured water elevation
RN Industries
Pleasant Valley Ponds Redesign
Project 524-049
CROSS SECTION C-C'
GeoStrata
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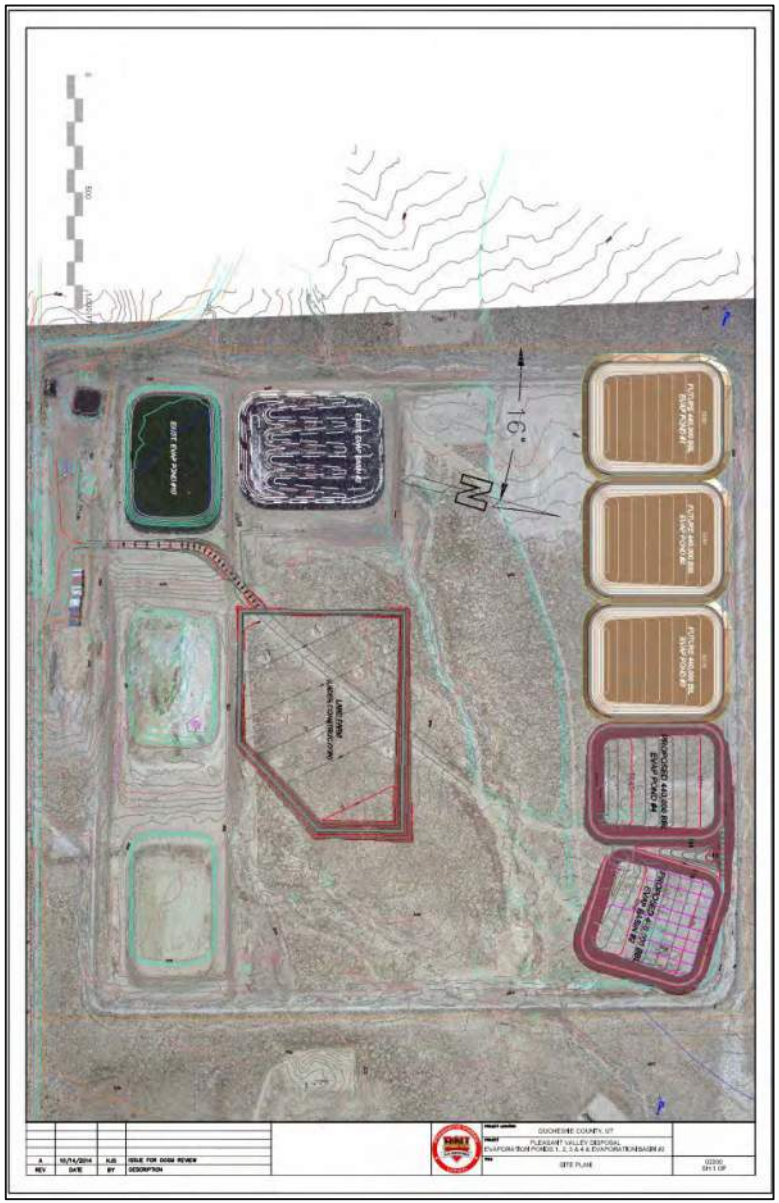
Plate
5


16"
N
BIOT EVAP POND #10
SITE PLAN

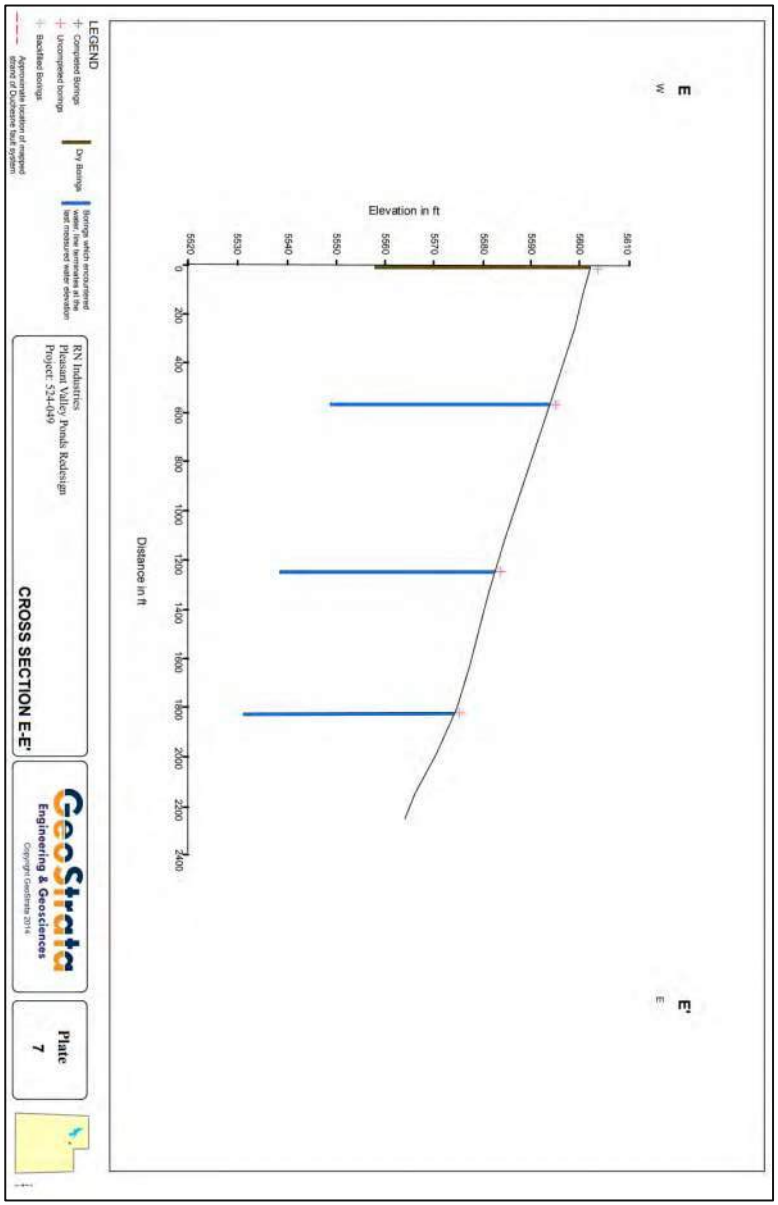

E
W
E'
E
Elevation in ft
5610
5600
5590
5580
5570
5560
5550
5540
5530
5520
0
200
400
600
800
1,000
1,200
1,400
1,600
1,800
2,000
2,200
2,400
Distance in ft
LEGEND
Completed Borings
Uncompleted borings
Backfilled Borings
Dry Borings
Borings which encountered water. Line terminates at the last measured water elevation
Approximate location of exposed strand of Quaternary fault system
RN Industries
Pleasant Valley Permit Redesign
Project: 524-049
GeoStrata
Engineering & Geosciences
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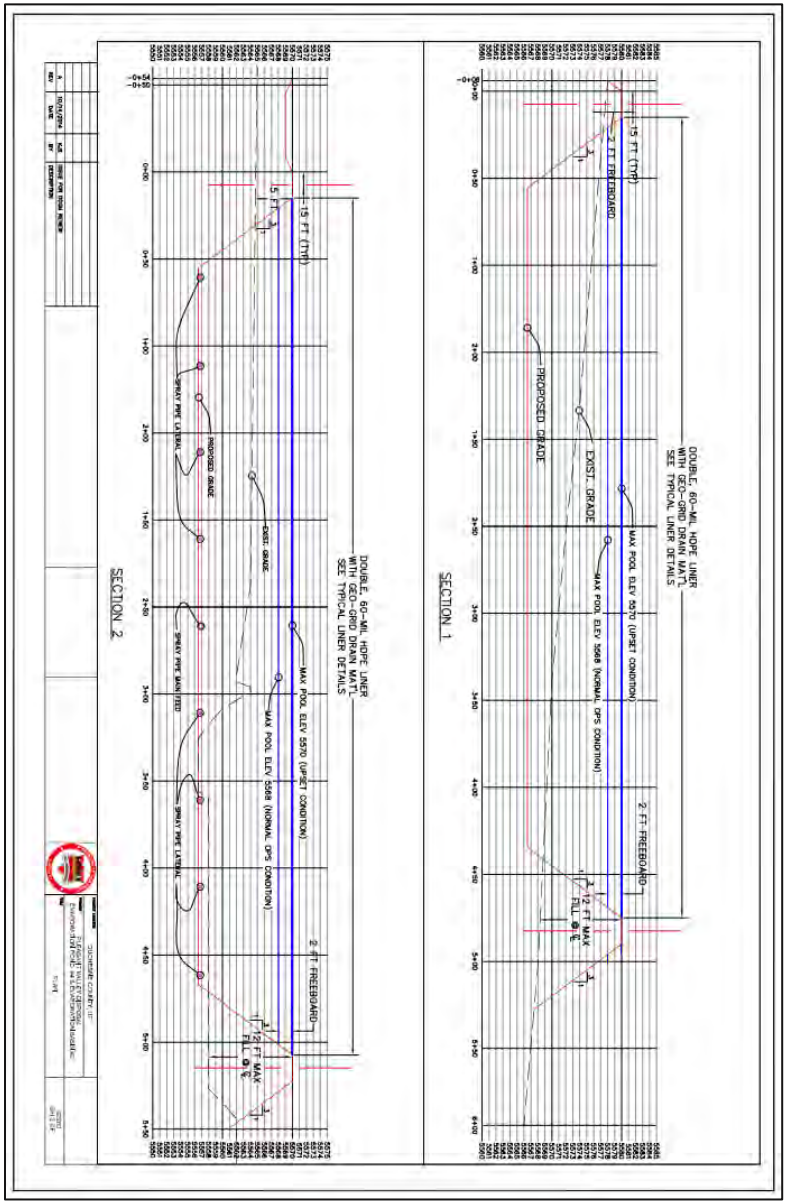
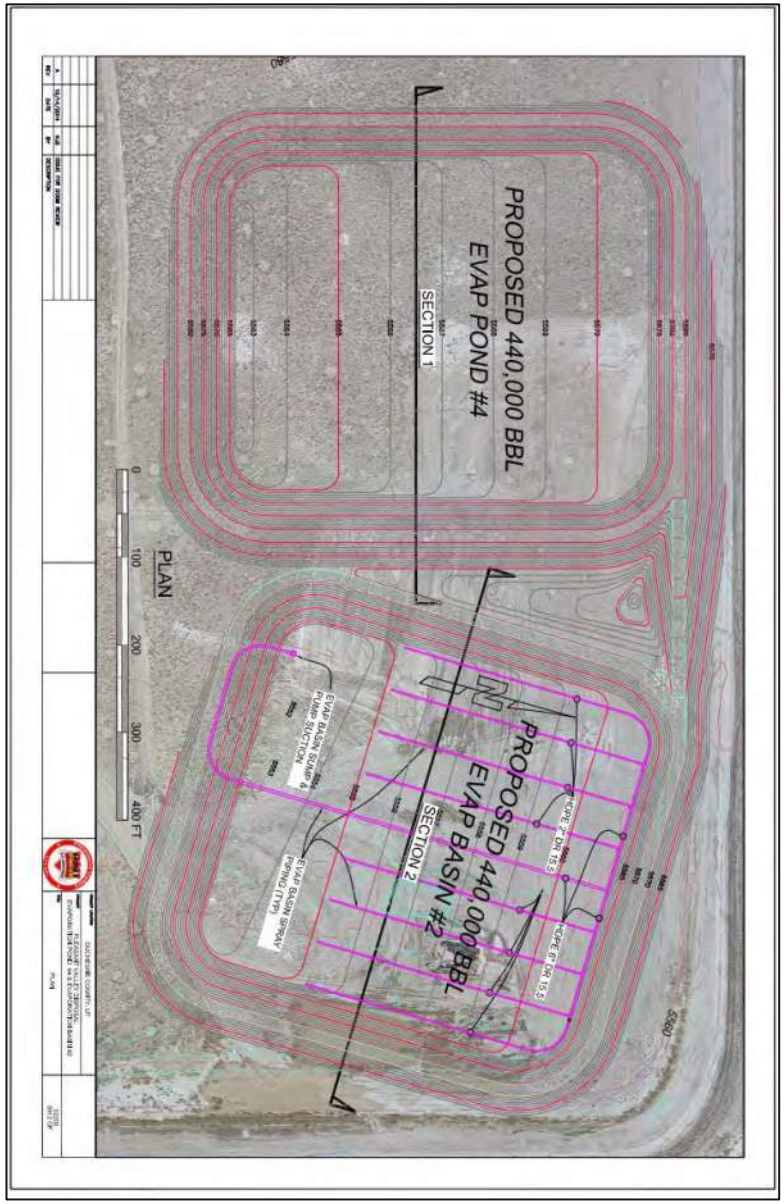
Plate
7
CROSS SECTION E-E'


DOUBLE, 60-MIL HDPE LINER
WITH GEO-GRID DRAIN MAT'L
SEE TYPICAL LINER DETAILS
MAX POOL ELEV 5570 (UPSET CONDITION)
MAX POOL ELEV 5568 (NORMAL OPS CONDITION)
2 FT FREEBOARD
1.5 FT (TYP)
12 FT MAX FILL @ ℄
EXIST. GRADE
PROPOSED GRADE
SECTION 1
SPRAY PIPE LATERAL
SECTION 2


PROPOSED 440,000 BBL
EVAP POND #4
SECTION 1
PROPOSED 440,000 BBL
EVAP BASIN #2
SECTION 2
HDPE 4" DR 15.5
EVAP BASIN SUMP & PUMP SUCTION
EVAP BASIN SPRAY PUMPS (TYP)
PLAN
0
100
200
300
400 FT

4. **GeoStrata Letter to UDOGM dated October 2, 2018**

GeoStrata Engineering & Geosciences
4425 S. Center Point Way, Bluffdale, Utah 84065 – T: (801) 501-0583 – F: (801) 501-0584

October 2, 2018

Division of Oil, Gas and Mining
Attn: Mr. Ammon McDonald
GeoStrata Project No. 524-049

Subject: Pleasant Valley Pond Redesign Duchesne County, Utah

Mr. McDonald:

GeoStrata has prepared this letter at the request of RN Industries (RNI). RNI currently has a single pond and an evaporation basin currently in operation at their Pleasant Valley disposal facility in Duchesne County, Utah. RNI submitted an application to the Division of Oil, Gas and Mining (DOGM) on December 29, 2008 to build additional ponds. RNI received an approval to construct the ponds on April 9, 2009, then RNI amended the application in July of 2011 and received an approval to construct letter from DOGM on July 12, 2011. Since the ponds were not constructed within 2 years of DOGM approval and because of changes in regulation, the ponds have been redesigned and are being resubmitted for approval.

Subsurface Investigation

As part of the site investigation submitted in July of 2011 application, numerous borings were drilled to measure the depth to groundwater. Plate 1 shows the location of the borings used to measure groundwater at the site. GeoStrata personnel measured water levels in these borings three different times. Table 1 shows the results of the groundwater data.

		6/8/2010	*6/17/2010*	*6/21/2010*
	Depth of Boring (ft)	**Water level (ft)**	**Water level (ft)**	**Water level (ft)**
Boring 1	38	dry	37.6	dry
Boring 2	44	dry	dry	dry
Boring 3	36.6	dry	dry	dry
Boring 4a	10	NA	dry	dry
Boring 4b	50	NA	46	45
Boring 5	43	dry	dry	dry
Boring 6a	10	NA	dry	dry
Boring 6b	50	NA	dry	dry
Boring 6c	50	NA	44	43.6
Boring 7	50	dry	dry	dry
Boring 8a	43	dry	dry	dry
Boring 8b	50	NA	44	43

Table 1. Ground water data

GeoStrata has incorporated the groundwater data into a series of cross sections across the

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sections. Plate 2 shows a depth to ground water map along with the locations of the proposed ponds and basin. Based on the ground water data gathered it appears that the depth to groundwater shallows approaching the ephemeral drainage that traverses from SW to NE across the site. It is GeoStrata's opinion that there is sufficient distance from groundwater for the proposed ponds to minimize the likelihood of any contamination.

GeoStrata conducted a Geotechnical Investigation at the subject site dated August 3, 2011 for the same general footprint of the proposed ponds. In this study GeoStrata determined that the depth to bedrock averaged approximately 10 ft. across the site and the bedrock consisted of siltstone, claystone, and sandstone. GeoStrata tested the permeability of bedrock samples at three different locations across the footprint of the proposed ponds/basin and all three samples had permeability's of less than 1.0E -7 cm/sec.

It is GeoStrata's opinion that due to the depth to ground water, the proximity to bedrock, and impermeability of the bedrock that the ponds and basin meet DOGM requirements for pond approval.

If you have any questions about our proposal please feel free to give us a call at our office at 801-501-0583.

Respectfully,

LICENSED PROFESSIONAL GEOLOGIST
11/7/14
MICHAEL W. VORKINK
801-516-2258
STATE OF UTAH

Jonathan Peaden
Staff Geologist

Michael Vorkink P.G.
Senior Geologist

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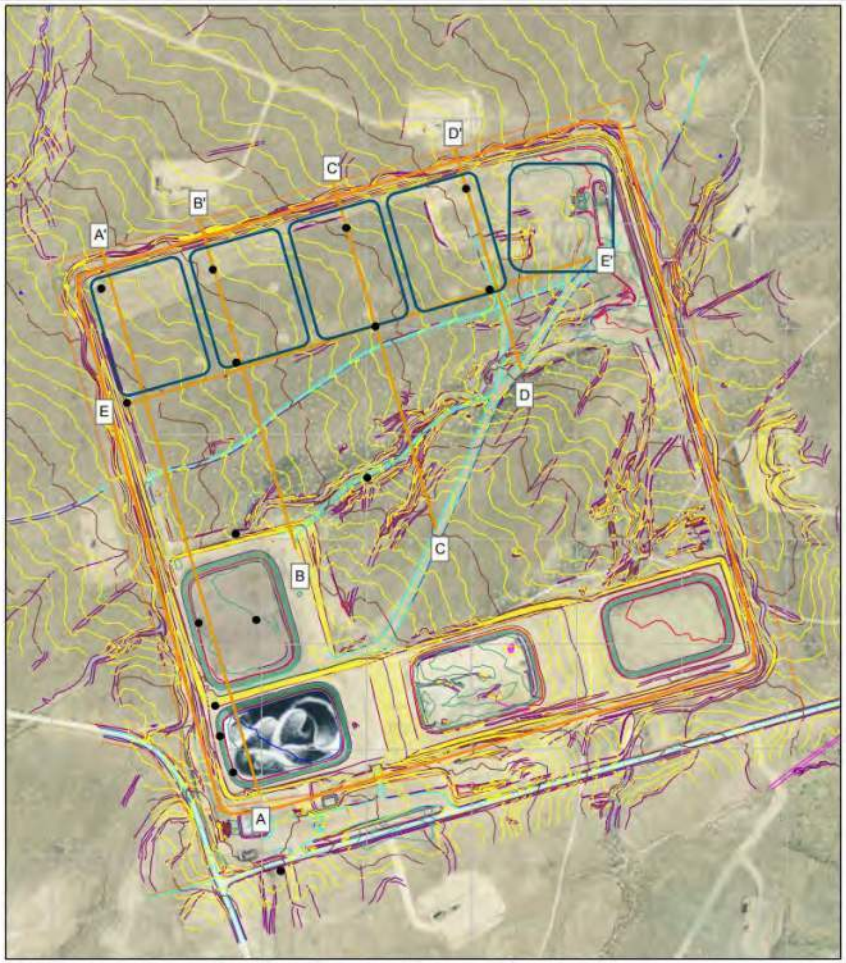


BASE MAP:
Aerial Orthphotography obtained from Olympus Aerial

0 225 450 900 1,350 1,800 Feet

1:6,000

Contour interval is 2 ft

Legend

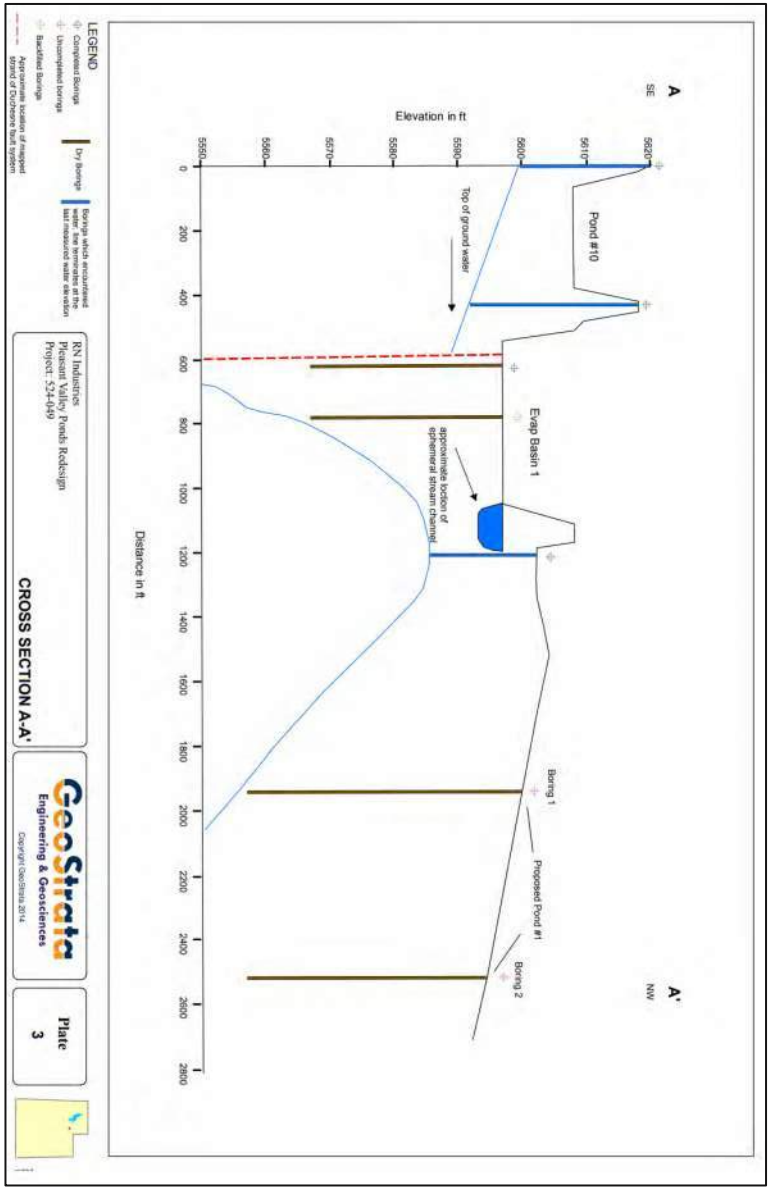
- New Ponds
- Cross Section
- Property boundary

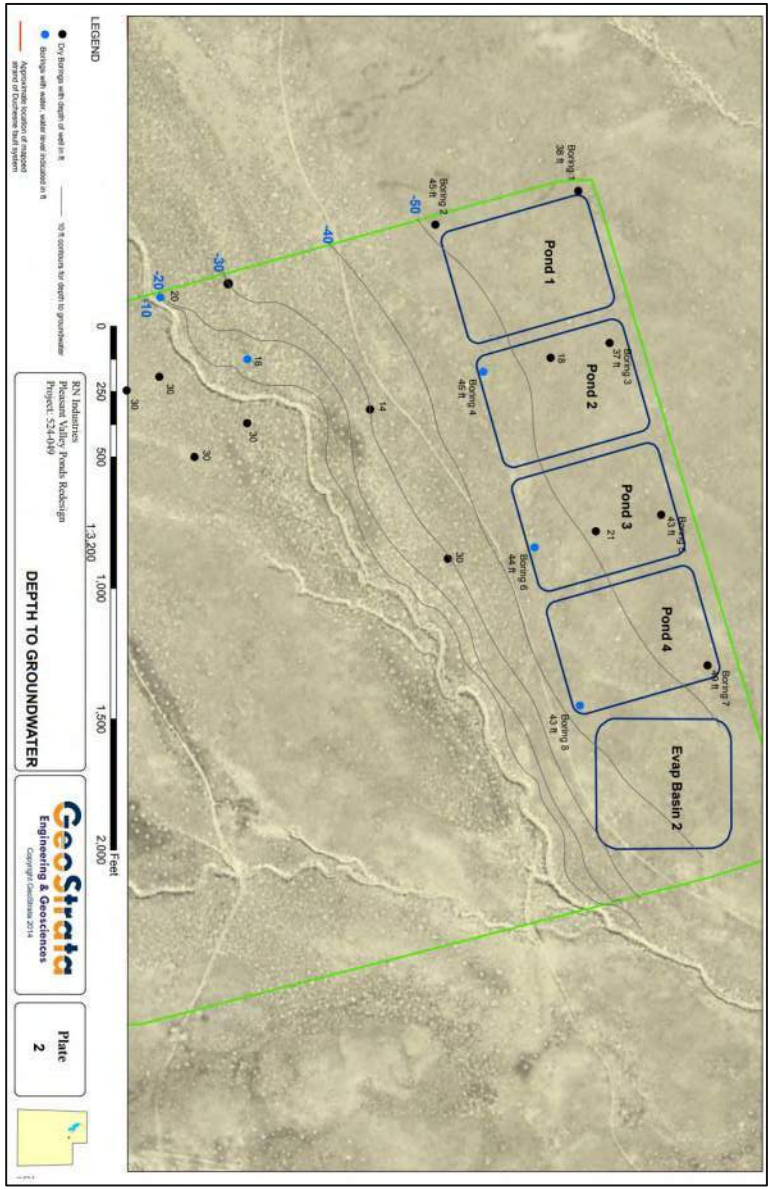
GeoStrata
Engineering & Geosciences
Copyright GeoStrata 2014

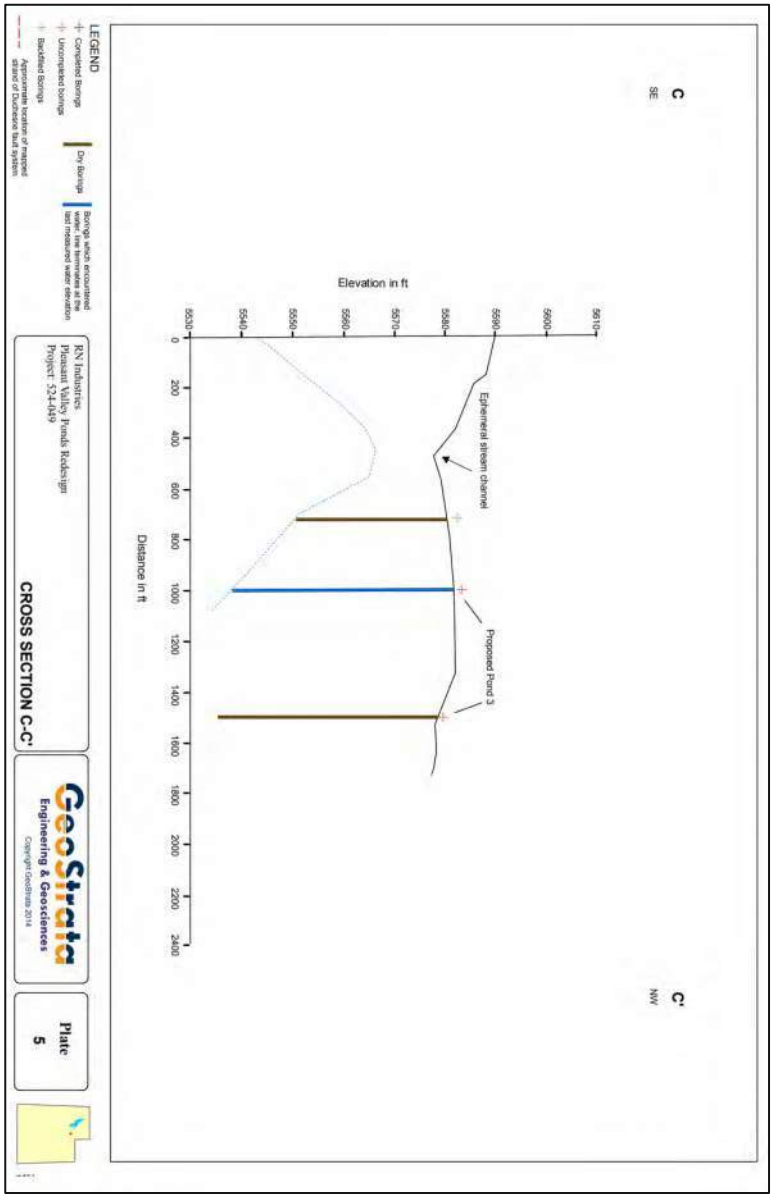
RNI
Pleasant Valley Ponds Redesign
Project: 524-049

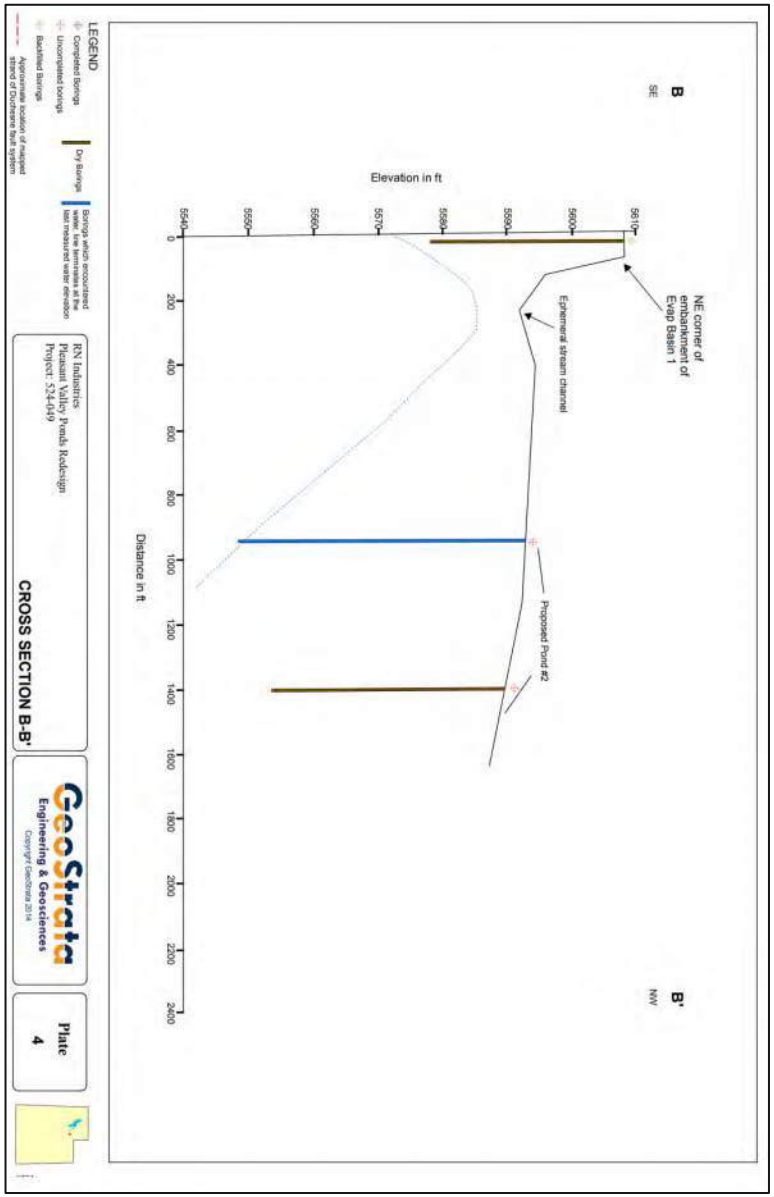
CROSS SECTION LOCATION MAP

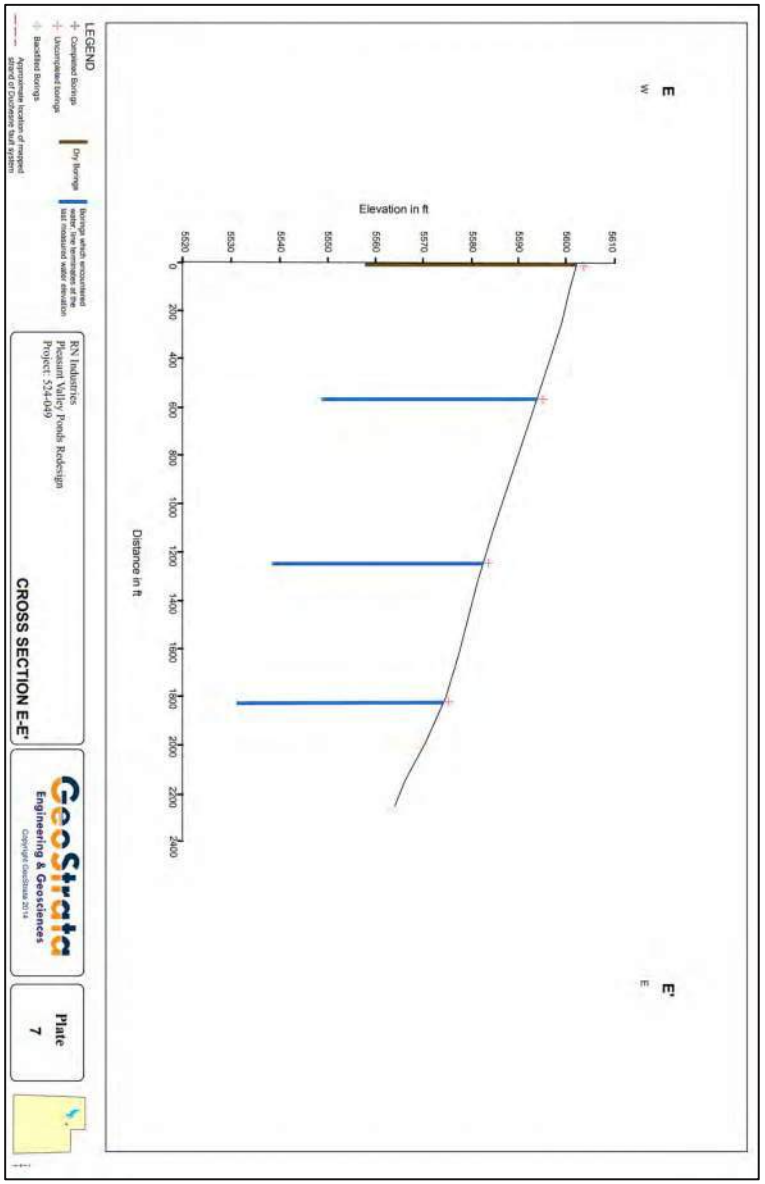
Plate 1

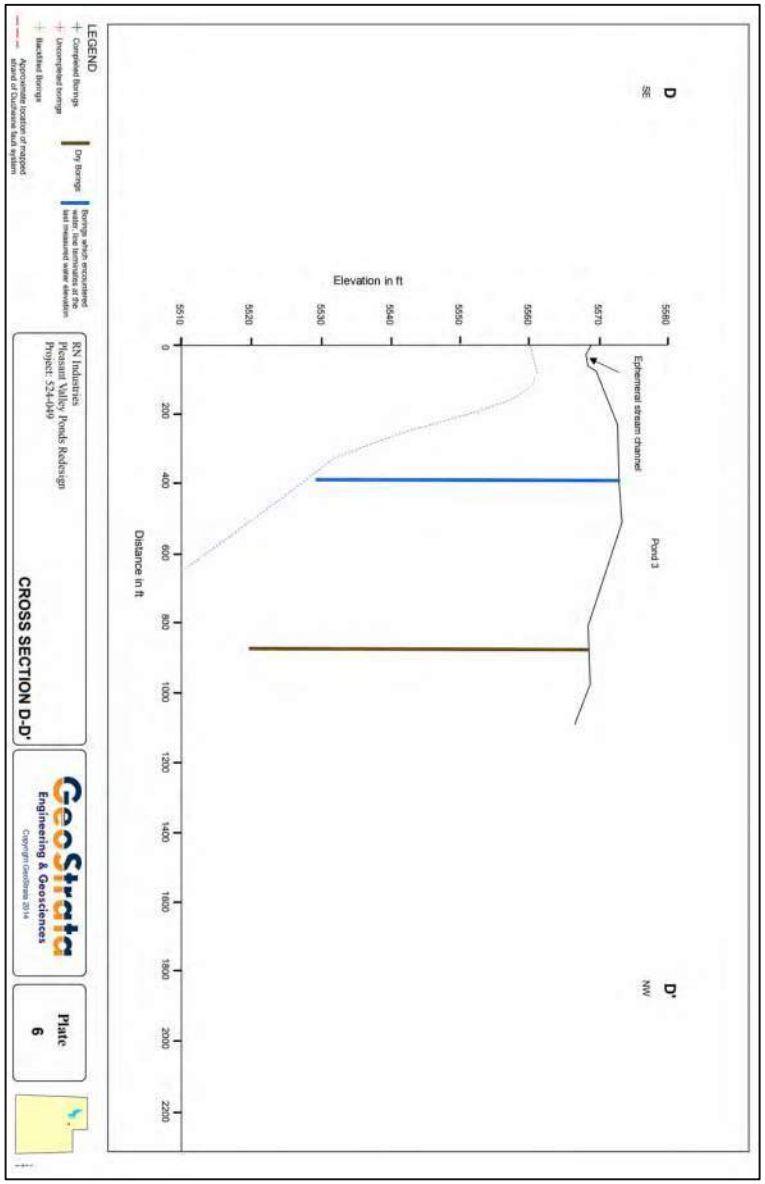

A
SE
A'
NW
Pond #10
Evap Basin 1
Boring 1
Proposed Pond #1
Boring 2
Top of ground water
approximate location of ephemeral stream channel
Elevation in ft
Distance in ft
5620
5610
5600
5590
5580
5570
5560
5550
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
LEGEND
Dry Borings
Borings which encountered water, line terminates at the last measured water elevation
Backfilled Borings
Approximate location of mapped strand of Dachsbane fault system
RN Industries
Pleasant Valley Ponds Redesign
Project: 524-049
CROSS SECTION A-A'
GeoStrata
Engineering & Geosciences
Copyright GeoStrata 2014
Plate
3

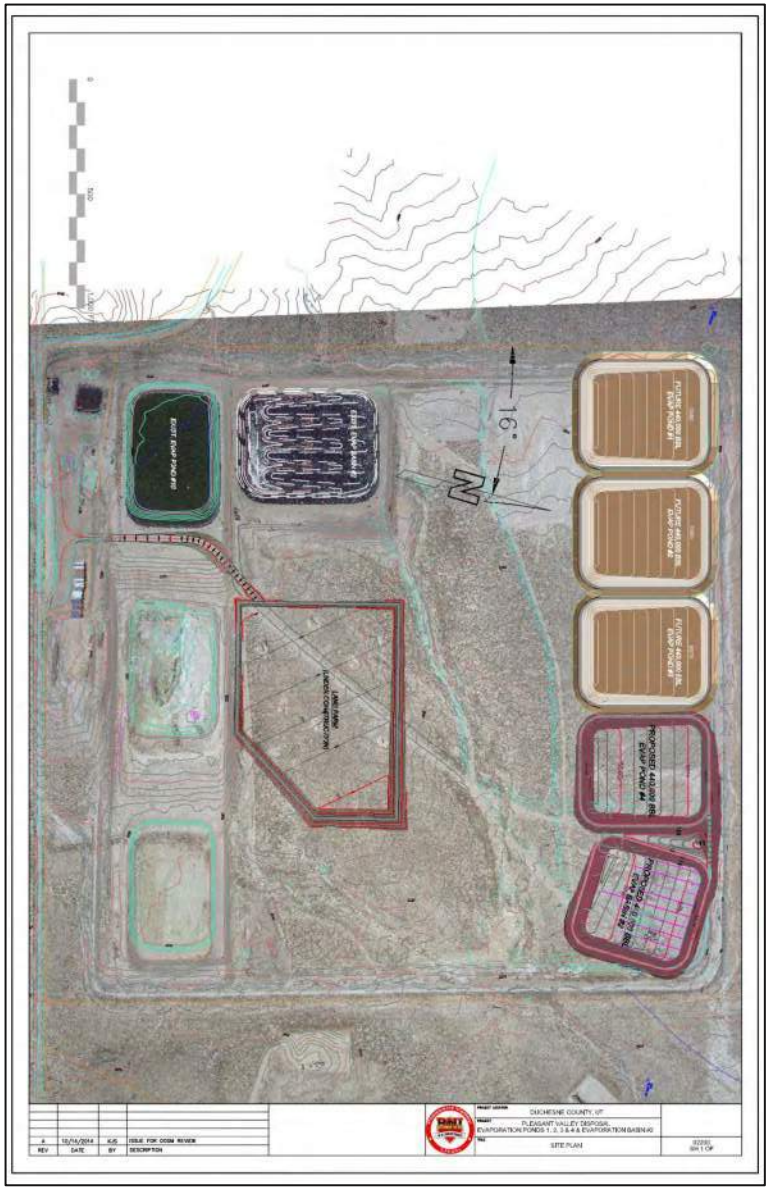

Pond 1
Pond 2
Pond 3
Pond 4
Evap Basin 2
Boring 1
38 ft
Boring 2
45 ft
Boring 3
37 ft
Boring 4
45 ft
Boring 6
44 ft
Boring 7
30 ft
Boring 8
43 ft
-50
-40
-30
-20
-10
LEGEND
Dry Borings with depth of well in ft
Borings with water, water level indicated in ft
10 ft contours for depth to groundwater
Approximate location of mapped strand of Dachsbane fault system
0
250
500
1,000
1,500
2,000
1:3,200
Feet
RN Industries
Pleasant Valley Ponds Redesign
Project: 524-049
DEPTH TO GROUNDWATER
GeoStrata
Engineering & Geosciences
Copyright GeoStrata 2014
Plate
2

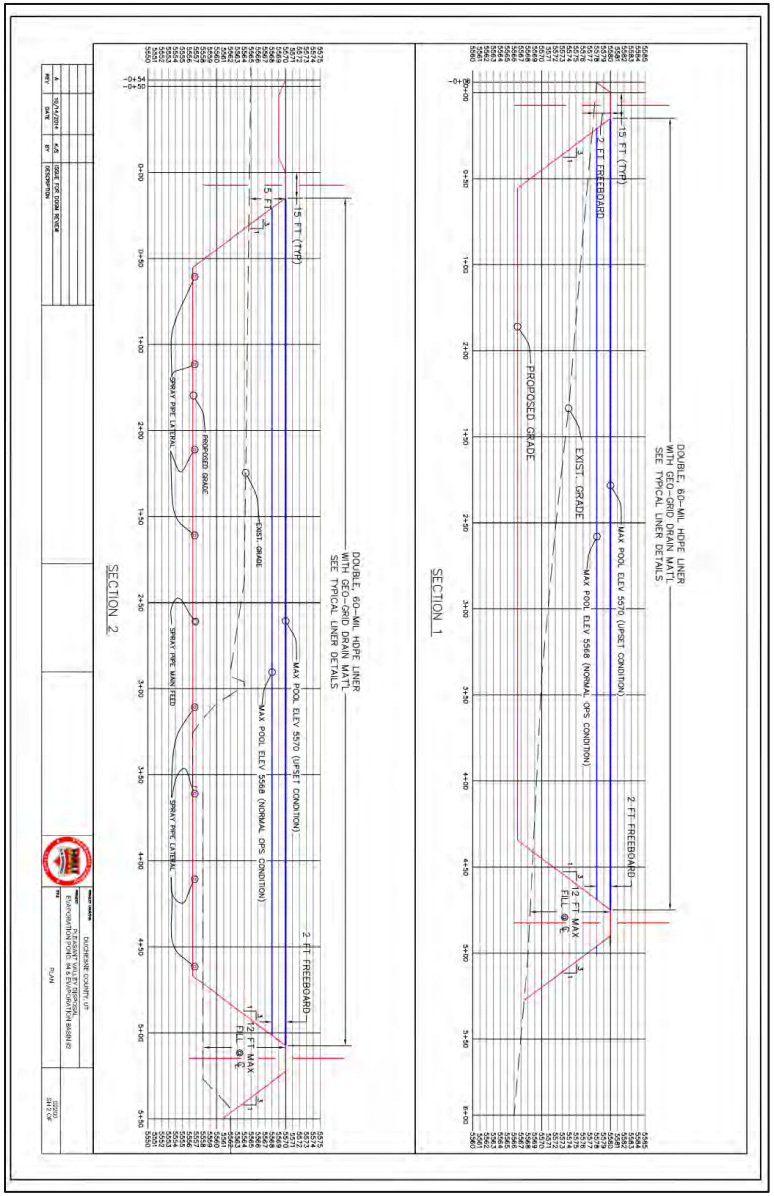

C
SE
C'
NW
Elevation in ft
Distance in ft
Ephemeral stream channel
Proposed Pond 3
LEGEND
Completed borings
Uncompleted borings
Backfilled Borings
Dry Borings
Borings which encountered water, line terminates at the last measured water elevation
Approximate location of mapped strand of Duchesne fault system
RN Industries
Pleasant Valley Ponds Redesign
Project: 524-049
CROSS SECTION C-C'
GeoStrata
Engineering & Geosciences
Copyright GeoStrata 2014
Plate
5


B
SE
B'
NW
NE corner of embankment of Evap Basin 1
Elevation in ft
Distance in ft
Ephemeral stream channel
Proposed Pond #2
LEGEND
Completed borings
Uncompleted borings
Backfilled Borings
Dry Borings
Borings which encountered water, line terminates at the last measured water elevation
Approximate location of mapped strand of Duchesne fault system
RN Industries
Pleasant Valley Ponds Redesign
Project: 524-049
CROSS SECTION B-B'
GeoStrata
Engineering & Geosciences
Copyright GeoStrata 2014
Plate
4


E
W
E'
E
Elevation in ft
5610
5600
5590
5580
5570
5560
5550
5540
5530
5520
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
Distance in ft
LEGEND
Completed Borings
Uncompleted Borings
Backfilled Borings
Approximate location of mapped strand of Duchesne fault system
Dry Borings
Borings which encountered water; line terminates at the last measured water elevation
RN Industries
Pleasant Valley Ponds Redesign
Project: 524-049
CROSS SECTION E-E'
GeoStrata
Engineering & Geosciences
Copyright GeoStrata 2014
Plate
7


D
SE
D'
NW
Ephemeral stream channel
Pond 3
Elevation in ft
5580
5570
5560
5550
5540
5530
5520
5510
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
Distance in ft
LEGEND
Completed Borings
Uncompleted Borings
Backfilled Borings
Approximate location of mapped strand of Duchesne fault system
Dry Borings
Borings which encountered water; line terminates at the last measured water elevation
RN Industries
Pleasant Valley Ponds Redesign
Project: 524-049
CROSS SECTION D-D'
GeoStrata
Engineering & Geosciences
Copyright GeoStrata 2014
Plate
6


PROPOSED 440,000 BBL
EVAP POND #4
SECTION 1
PROPOSED 440,000 BBL
EVAP BASIN #2
SECTION 2
EVAP BASIN SUMP & PUMP SUCTION
EVAP BASIN SPRAY PUMP (TYP)
HDPE 2" DR 13.5
HDPE 6" DR 13.5
PLAN
0
100
200
300
400 FT
N
DUCHESNE COUNTY, UT
PLEASANT VALLEY DISPOSAL
EVAPORATION PONDS 1, 2, 3 & 4 & EVAPORATION BASIN #2
PLAN
SITE PLAN
ISSUE FOR DOGM REVIEW
10/14/2014
KJS
A
REV
DATE
BY
DESCRIPTION
EXIST. EVAP POND #1
EXIST. EVAP POND #2
FUTURE 440,000 BBL EVAP POND #3
FUTURE 440,000 BBL EVAP POND #2
FUTURE 440,000 BBL EVAP POND #1
PROPOSED 440,000 BBL EVAP POND #4
PROPOSED 440,000 BBL EVAP BASIN #2
PROPOSED 440,000 BBL EVAP POND #4
LAGOON CONSTRUCTION
16°
N



5. Permit issued by UDOGM on January 25, 2019

GARY R. HERBERT
Governor
SPENCER J. COX
Lieutenant Governor

State of Utah

DEPARTMENT OF NATURAL RESOURCES

MICHAEL R. STYLER
Executive Director

Division of Oil, Gas and Mining

JOHN R. BAZA
Division Director

Permit to Operate

****

Facility Name: Pleasant Valley
Facility Type: Commercial Waste Disposal Facility
Location: Section 25, 26, 35, 36, Township 4S, Range 3W
County: Duchesne
Approval Date: January 25, 2019
Permit No: SF-616

1. **Issued to:**
   RN Industries

2. **Authority:**
   Pursuant to Utah Code Ann. §§ 40-6-1 et seq., and Utah Admin. Code §§ R649-9 et seq., the Utah Division of Oil, Gas and Mining ("Division") issues this Permit to operate an E and P waste disposal facility.

3. **Duration:**
   This Permit shall expire five years from the Approval Date. The Division may revoke, suspend, or impose additional operating conditions or limitations on a disposal facility permit at any time, for good cause, after notice to the operator. The Division may suspend a waste disposal permit or impose additional conditions or limitations in an emergency to forestall an imminent threat to fresh water, public health, or safety of the environment. Suspension of a disposal facility permit may be for a fixed period of time or until the operator remedies the violation or potential violation. If the Division suspends a disposal facility permit, the disposal facility shall not accept E and P waste during the suspension period.

4. **General:**
   4.1 Effect on Prior Permits. This Permit supersedes any existing E and P waste disposal permit previously obtained for the Facility and provides the terms that govern operations at this Facility.

   4.2 Incorporation of Application. The Division issues this Permit in response to RNI's "Permit Renewal Application" dated 11/12/2018 and received by the Division on 11/15/2018, ("Application"). The Facility shall operate in accordance with the best management practices described in the Application.

   4.3 Compliance with Applicable Laws. The Facility shall comply with Utah Code Ann. §§ 40-6-1 et seq. and Utah Administrative Code §§ R649-9 et seq..

5. **Reporting and Recordkeeping Requirements:**

1594 West North Temple, Suite 1210, PO Box 145801, Salt Lake City, UT 84114-5801
telephone (801) 538-5340 • facsimile (801) 359-3940 • TTY (801) 538-7458 • www.ogm.utah.gov

RECEIVED: Jan. 25, 2019

Sundry Number: 93537

The Facility shall comply with the reporting and recordkeeping requirements in Utah Admin. Code § R649-9-11.

6. **Modifications:**
   This Permit only applies to the Facility as it is described in the Application. Any additions to the Facility or modifications of the waste treatment processes described in the Application are not allowed and require a permit modification.

7. **Enforcement:**
   The issuance of this permit does not supersede local ordinances, county planning and zoning requirements, or other permits required to conduct business at the Facility. A copy of this approval should be kept at the Pleasant Valley field office, and field personnel shall be aware of the Conditions of Approval.

8. **Approval:**
   Therefore, having met all the technical permit requirements of Utah Admin. Code §§ R649-9 et seq., final approval to operate the Facility in accordance with this Permit is hereby granted.

9. **Contact Information:**
   The following are Division of Oil, Gas and Mining contacts and their telephone numbers:
   Dayne Doucet, Permit Manager: 801-538-5303
   Bart Kettle, Operations Manager: 435-820-0862
   Ammon McDonald, Environmental Scientist: 801-538-5337

Approved By:

Dayne Doucet

By: Dayne Doucet
Title: Permit Manager

RECEIVED: Jan. 25, 2019

Sundry Number: 135025 Facility Number: 274

Sundry Number: 93537

Conditions of Approval:

1. **Evaporation Facilities**

   1.1 A minimum of 2 feet of freeboard shall be maintained in the pit(s) at all times, and that a method of obviously displaying the freeboard shall be devised and implemented. Utah Admin. Code § R649-9-4.6.4.

   1.2 Pit(s) are to be maintained such that hydrocarbons will not collect on the surface. Hydrocarbon accumulations, other than de minimis quantities, shall be removed within 24 hours. Utah Admin. Code § R649-9-4.6.4.

   1.3 Spraying water to accelerate evaporation should be closely monitored. Overspray outside the lined pit area is considered a violation. Utah Admin. Code § R649-9-4.9.2.

   1.4 The leak detection system must be checked weekly. Any leak must be reported to the Division immediately, and corrective measures must be taken as directed by the Division.

   1.5 The compacted secondary containment berms at the Facility shall be inspected quarterly and after a major rainstorm or windstorm to ensure integrity Utah Admin. Code § R649-9-11.3.2.

   1.6 Evaporation ponds are permitted to accept produced water.

2. **Landfarms**

   2.1 E and P waste accepted by the landfarm shall be sufficiently free of liquid content to pass a 60-mesh liquid paint filter test (i.e., no produced water or drilling mud).

   2.2 Pooling of liquids in the landfarm is prohibited.

   2.3 Within 72 hours after receipt of E and P waste, the operator shall prepare materials for remediation.

   2.4 Soils shall be turned regularly, a minimum of once a month.

   2.5 Additional materials shall not be added until the soil concentrations of the current lift meet the Division's salinity and hydrocarbon cleanup standards (verified by sampling).

   2.6 The two adjacent monitor wells shall be checked weekly.

FAILURE TO COMPLY WITH THE ABOVE LISTED CONDITIONS OF APPROVAL MAY RESULT IN CLOSURE OF THE FACILITY.

RECEIVED: Jan. 25, 2019

Utah Division of Oil Gas & Mining Permit Renewal Application
for
Pleasant Valley Exploration & Production Waste Disposal
10300 West BLM Fence Road, Bridgeland, Utah

ATTACHMENT 2
CLOSURE COST ESTIMATE
Bev summary &
GeoStrata Backup Calcs

Rev 20181108

GeoStrata
Engineering and Geo-Sciences

RECEIVED: Jan. 25, 2019

Sundry Number: 93537 File: Detailed Site Description

Five Year E&P Waste Disposal Facility Bond Calculation Summary Form

UTAH DNR OIL, GAS & MINING

Direct and Indirect Costs

RN Industries	**Date:**	**5/15/2018**	
Facility: Pleasant Valley E&P Disposal			
Number of Acres to be Reclaimed		14.1 Acres	0
Contamination Remediation Cost Estimates	$	17,904	2
Removal of Infrastructure Costs Estimates	$	28,836	3
Earthwork and Grading Cost Estimates	$	76,524	4
Revegetation Cost Estimates	$	17,810	5
Final Closure & Post Closure Cost Estimates	$	36,044	6
Total Cost Estimate	**$**	**177,118**	
(Increase above total cost estimate by 14% if indirect costs are not included)	$	24,796	
Total Reclamation Cost Required	**$**	**201,914**	
Bond Posted	**$**	**339,191**	7
Difference Between Cost Estimate and Bond	$	137,277	

RECEIVED: Jan. 25, 2019

INORGANIC ANALYTICAL REPORT

American West Analytical Laboratories

3440 South 700 West
Salt Lake City, UT 84119

Phone: (801) 263-8686
Toll Free: (888) 263-8686
Fax: (801) 263-8687
e-mail: awal@awal-labs.com

web: www.awal-labs.com

Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

Client: GeoStrata, LLC **Contact:** Jamey Sage
Project: RNI PV Land Farm Samples / 524-049
Lab Sample ID: 1808273-001
Client Sample ID: PV-LF-N
Collection Date: 8/8/2018 1115h
Received Date: 8/10/2018 1445h

Analytical Results TCLP METALS Method 1311

TCLP Prep Date: 9/17/2018 2230h

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Arsenic	mg/L	9/19/2018 1123h	9/20/2018 1304h	SW6020B	0.0100	< 0.0100	
Barium	mg/L	9/19/2018 1123h	9/20/2018 1304h	SW6020B	0.0700	**1.16**	
Cadmium	mg/L	9/19/2018 1123h	9/20/2018 1304h	SW6020B	0.00350	< 0.00350	
Chromium	mg/L	9/19/2018 1123h	9/20/2018 1304h	SW6020B	0.0200	< 0.0200	
Lead	mg/L	9/19/2018 1123h	9/20/2018 1304h	SW6020B	0.0500	< 0.0500	
Mercury	mg/L	9/18/2018 1840h	9/19/2018 821h	SW7470A	0.0100	< 0.0100	H
Selenium	mg/L	9/19/2018 1123h	9/20/2018 1304h	SW6020B	0.0100	< 0.0100	
Silver	mg/L	9/19/2018 1123h	9/20/2018 1304h	SW6020B	0.0100	< 0.0100	

H - Sample was received outside of the holding time.

All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAC protocols. Pertinent sampling information is located on the attached COC. Confidential Business Information: This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertisement, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only on contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.
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Sundry Number: 93537 File: Detailed Site Description

INORGANIC ANALYTICAL REPORT

American West Analytical Laboratories

3440 South 700 West
Salt Lake City, UT 84119

Phone: (801) 263-8686
Toll Free: (888) 263-8686
Fax: (801) 263-8687
e-mail: awal@awal-labs.com

web: www.awal-labs.com

Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

Client: GeoStrata, LLC **Contact:** Jamey Sage
Project: RNI PV Land Farm Samples / 524-049
Lab Sample ID: 1808273-002
Client Sample ID: PV-LF-E
Collection Date: 8/8/2018 1100h
Received Date: 8/10/2018 1445h

Analytical Results TCLP METALS Method 1311

TCLP Prep Date: 9/17/2018 2230h

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Arsenic	mg/L	9/19/2018 1123h	9/20/2018 1307h	SW6020B	0.0100	< 0.0100	
Barium	mg/L	9/19/2018 1123h	9/20/2018 1307h	SW6020B	0.0700	**1.17**	
Cadmium	mg/L	9/19/2018 1123h	9/20/2018 1307h	SW6020B	0.00350	< 0.00350	
Chromium	mg/L	9/19/2018 1123h	9/20/2018 1307h	SW6020B	0.0200	< 0.0200	
Lead	mg/L	9/19/2018 1123h	9/20/2018 1307h	SW6020B	0.0500	< 0.0500	
Mercury	mg/L	9/18/2018 1840h	9/19/2018 827h	SW7470A	0.0100	< 0.0100	H
Selenium	mg/L	9/19/2018 1123h	9/20/2018 1307h	SW6020B	0.0100	< 0.0100	
Silver	mg/L	9/19/2018 1123h	9/20/2018 1307h	SW6020B	0.0100	< 0.0100	

H - Sample was received outside of the holding time.

All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAC protocols. Pertinent sampling information is located on the attached COC. Confidential Business Information: This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertisement, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only on contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.
RECEIVED: Jan. 25, 2019

Sundry Number: 93537 File: Detailed Site Description

INORGANIC ANALYTICAL REPORT

Client: GeoStrata, LLC **Contact:** Jamey Sage
Project: RNI PV Land Farm Samples / 524-049
Lab Sample ID: 1808273-003
Client Sample ID: PV-LF-S
Collection Date: 8/8/2018 1145h
Received Date: 8/10/2018 1445h

Analytical Results TCLP METALS Method 1311

TCLP Prep Date: 9/17/2018 2230h

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Arsenic	mg/L	9/19/2018 1123h	9/20/2018 1310h	SW6020B	0.0100	< 0.0100	
Barium	mg/L	9/19/2018 1123h	9/20/2018 1310h	SW6020B	0.0700	**1.09**	
Cadmium	mg/L	9/19/2018 1123h	9/20/2018 1310h	SW6020B	0.00350	< 0.00350	
Chromium	mg/L	9/19/2018 1123h	9/20/2018 1310h	SW6020B	0.0200	< 0.0200	
Lead	mg/L	9/19/2018 1123h	9/20/2018 1310h	SW6020B	0.0500	< 0.0500	
Mercury	mg/L	9/18/2018 1840h	9/19/2018 829h	SW7470A	0.0100	< 0.0100	H
Selenium	mg/L	9/19/2018 1123h	9/20/2018 1310h	SW6020B	0.0100	< 0.0100	
Silver	mg/L	9/19/2018 1123h	9/20/2018 1310h	SW6020B	0.0100	< 0.0100	

H - Sample was received outside of the holding time.

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Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

Report Date: 9/20/2018 Page 4 of 12

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RECEIVED: Jan. 25, 2019

Sundry Number: 93537 File: Detailed Site Description

INORGANIC ANALYTICAL REPORT

Client: GeoStrata, LLC **Contact:** Jamey Sage
Project: RNI PV Land Farm Samples / 524-049
Lab Sample ID: 1808273-004
Client Sample ID: PV-LF-W
Collection Date: 8/8/2018 1130h
Received Date: 8/10/2018 1445h

Analytical Results TCLP METALS Method 1311

TCLP Prep Date: 9/17/2018 2230h

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Arsenic	mg/L	9/19/2018 1123h	9/20/2018 1321h	SW6020B	0.0100	< 0.0100	
Barium	mg/L	9/19/2018 1123h	9/20/2018 1321h	SW6020B	0.0700	**1.09**	
Cadmium	mg/L	9/19/2018 1123h	9/20/2018 1321h	SW6020B	0.00350	< 0.00350	
Chromium	mg/L	9/19/2018 1123h	9/20/2018 1321h	SW6020B	0.0200	< 0.0200	
Lead	mg/L	9/19/2018 1123h	9/20/2018 1321h	SW6020B	0.0500	< 0.0500	
Mercury	mg/L	9/18/2018 1840h	9/19/2018 831h	SW7470A	0.0100	< 0.0100	H
Selenium	mg/L	9/19/2018 1123h	9/20/2018 1321h	SW6020B	0.0100	< 0.0100	
Silver	mg/L	9/19/2018 1123h	9/20/2018 1321h	SW6020B	0.0100	< 0.0100	

H - Sample was received outside of the holding time.

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Report Date: 9/20/2018 Page 5 of 12

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Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

QC SUMMARY REPORT

Client: GeoStrata, LLC
Lab Set ID: 1808273
Project: RNI PV Land Farm Samples / 524-049

Contact: Jamey Sage
Dept: ME
QC Type: MBLK

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: MB-58199	Date Analyzed:	09/20/2018 1213h											
Test Code: 6020B-TCLP	Date Prepared:	09/19/2018 1123h											
Arsenic	< 0.0100	mg/L	SW6020B	0.00350	0.0100								
Barium	< 0.0700	mg/L	SW6020B	0.00328	0.0700								
Cadmium	< 0.00350	mg/L	SW6020B	0.00315	0.00350								
Chromium	< 0.0200	mg/L	SW6020B	0.0150	0.0200								
Lead	< 0.0500	mg/L	SW6020B	0.00295	0.0500								
Selenium	< 0.0100	mg/L	SW6020B	0.00203	0.0100								
Silver	< 0.0100	mg/L	SW6020B	0.00136	0.0100								
Lab Sample ID: MB-TCLP-58185	Date Analyzed:	09/20/2018 1234h											
Test Code: 6020B-TCLP	Date Prepared:	09/19/2018 1538h											
Arsenic	< 0.0100	mg/L	SW6020B	0.00350	0.0100								
Barium	< 0.0700	mg/L	SW6020B	0.00328	0.0700								
Cadmium	< 0.00350	mg/L	SW6020B	0.00315	0.00350								
Chromium	< 0.0200	mg/L	SW6020B	0.0150	0.0200								
Lead	< 0.0500	mg/L	SW6020B	0.00295	0.0500								
Selenium	< 0.0100	mg/L	SW6020B	0.00203	0.0100								
Silver	< 0.0100	mg/L	SW6020B	0.00136	0.0100								
Lab Sample ID: MB-TCLP-58162	Date Analyzed:	09/20/2018 1330h											
Test Code: 6020B-TCLP	Date Prepared:	09/19/2018 1123h											
Arsenic	< 0.0100	mg/L	SW6020B	0.00350	0.0100								
Barium	< 0.0700	mg/L	SW6020B	0.00328	0.0700								
Cadmium	< 0.00350	mg/L	SW6020B	0.00315	0.00350								
Chromium	< 0.0200	mg/L	SW6020B	0.0150	0.0200								
Lead	< 0.0500	mg/L	SW6020B	0.00295	0.0500								
Selenium	< 0.0100	mg/L	SW6020B	0.00203	0.0100								
Silver	< 0.0100	mg/L	SW6020B	0.00136	0.0100								

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Laboratory Director

Jose Rocha
QA Officer

QC SUMMARY REPORT

Client: GeoStrata, LLC
Lab Set ID: 1808273
Project: RNI PV Land Farm Samples / 524-049

Contact: Jamey Sage
Dept: ME
QC Type: LCS

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: LCS-58199	Date Analyzed:	09/20/2018 1216h											
Test Code: 6020B-TCLP	Date Prepared:	09/19/2018 1123h											
Arsenic	0.358	mg/L	SW6020B	0.00350	0.0100	0.4000	0	89.4	85 - 115				
Barium	0.360	mg/L	SW6020B	0.00328	0.0700	0.4000	0	89.9	85 - 115				
Cadmium	0.355	mg/L	SW6020B	0.00315	0.00350	0.4000	0	88.6	85 - 115				
Chromium	0.358	mg/L	SW6020B	0.0150	0.0200	0.4000	0	89.4	85 - 115				
Lead	0.368	mg/L	SW6020B	0.00295	0.0500	0.4000	0	92.0	85 - 115				
Selenium	0.357	mg/L	SW6020B	0.00203	0.0100	0.4000	0	89.3	85 - 115				
Silver	0.371	mg/L	SW6020B	0.00136	0.0100	0.4000	0	92.9	85 - 115				
Lab Sample ID: LCS-58171	Date Analyzed:	09/19/2018 754h											
Test Code: HG-TCLP-7470A	Date Prepared:	09/18/2018 1840h											
Mercury	0.00321	mg/L	SW7470A	0.0000307	0.00100	0.003330	0	96.4	80 - 120				

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Jose Rocha
QA Officer

QC SUMMARY REPORT

Client: GeoStrata, LLC
Lab Set ID: 1808273
Project: RNI PV Land Farm Samples / 524-049

Contact: Jamey Sage
Dept: ME
QC Type: MS

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: 1808272-001BMS	Date Analyzed:	09/20/2018 1249h											
Test Code: 6020B-TCLP	Date Prepared:	09/19/2018 1123h											
Arsenic	0.398	mg/L	SW6020B	0.00350	0.0100	0.4000	0.0105	96.8	75 - 125				
Barium	0.622	mg/L	SW6020B	0.00328	0.0700	0.4000	0.26	90.7	75 - 125				
Cadmium	0.368	mg/L	SW6020B	0.00315	0.00350	0.4000	0	92.0	75 - 125				
Chromium	0.369	mg/L	SW6020B	0.0150	0.0200	0.4000	0	92.3	75 - 125				
Lead	0.375	mg/L	SW6020B	0.00295	0.0500	0.4000	0	93.7	75 - 125				
Selenium	0.376	mg/L	SW6020B	0.00203	0.0100	0.4000	0	94.0	75 - 125				
Silver	0.373	mg/L	SW6020B	0.00136	0.0100	0.4000	0	93.3	75 - 125				
Lab Sample ID: 1808273-004BMS	Date Analyzed:	09/20/2018 1324h											
Test Code: 6020B-TCLP	Date Prepared:	09/19/2018 1123h											
Arsenic	0.377	mg/L	SW6020B	0.00350	0.0100	0.4000	0.00544	92.9	75 - 125				
Barium	1.45	mg/L	SW6020B	0.00328	0.0700	0.4000	1.09	92.3	75 - 125				
Cadmium	0.360	mg/L	SW6020B	0.00315	0.00350	0.4000	0	89.9	75 - 125				
Chromium	0.361	mg/L	SW6020B	0.0150	0.0200	0.4000	0	90.2	75 - 125				
Lead	0.366	mg/L	SW6020B	0.00295	0.0500	0.4000	0	91.6	75 - 125				
Selenium	0.367	mg/L	SW6020B	0.00203	0.0100	0.4000	0	91.8	75 - 125				
Silver	0.369	mg/L	SW6020B	0.00136	0.0100	0.4000	0	92.2	75 - 125				
Lab Sample ID: 1808272-001BMS	Date Analyzed:	09/19/2018 802h											
Test Code: HG-TCLP-7470A	Date Prepared:	09/18/2018 1840h											
Mercury	0.0320	mg/L	SW7470A	0.000307	0.0100	0.03330	0	96.1	80 - 120				H
Lab Sample ID: 1808273-001BMS	Date Analyzed:	09/19/2018 823h											
Test Code: HG-TCLP-7470A	Date Prepared:	09/18/2018 1840h											
Mercury	0.0333	mg/L	SW7470A	0.000307	0.0100	0.03330	0	99.9	80 - 120				H

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Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

QC SUMMARY REPORT

Client: GeoStrata, LLC
Lab Set ID: 1808273
Project: RNI PV Land Farm Samples / 524-049

Contact: Jamey Sage
Dept: ME
QC Type: MBLK

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: MB-58171	Date Analyzed:	09/19/2018 752h											
Test Code: HG-TCLP-7470A	Date Prepared:	09/18/2018 1840h											
Mercury	< 0.00100	mg/L	SW7470A	0.0000307	0.00100								
Lab Sample ID: MB-TCLP-58162	Date Analyzed:	09/19/2018 914h											
Test Code: HG-TCLP-7470A	Date Prepared:	09/18/2018 1840h											
Mercury	< 0.00100	mg/L	SW7470A	0.0000307	0.00100								

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Jose Rocha
QA Officer

QC SUMMARY REPORT

Client: GeoStrata, LLC
Lab Set ID: 1808273
Project: RNI PV Land Farm Samples / 524-049

Contact: Jamey Sage
Dept: ME
QC Type: MSD

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: 1808272-001BMSD	Date Analyzed:	09/20/2018 1252h											
Test Code: 6020B-TCLP	Date Prepared:	09/19/2018 1123h											
Arsenic	0.382	mg/L	SW6020B	0.00350	0.0100	0.4000	0.0105	92.8	75 - 125	0.398	4.07	20	
Barium	0.590	mg/L	SW6020B	0.00328	0.0700	0.4000	0.26	82.4	75 - 125	0.622	5.44	20	
Cadmium	0.357	mg/L	SW6020B	0.00315	0.00350	0.4000	0	89.3	75 - 125	0.368	3.03	20	
Chromium	0.358	mg/L	SW6020B	0.0150	0.0200	0.4000	0	89.5	75 - 125	0.369	3.01	20	
Lead	0.358	mg/L	SW6020B	0.00295	0.0500	0.4000	0	89.4	75 - 125	0.375	4.67	20	
Selenium	0.368	mg/L	SW6020B	0.00203	0.0100	0.4000	0	92.0	75 - 125	0.376	2.15	20	
Silver	0.361	mg/L	SW6020B	0.00136	0.0100	0.4000	0	90.3	75 - 125	0.373	3.26	20	
Lab Sample ID: 1808273-004BMSD	Date Analyzed:	09/20/2018 1327h											
Test Code: 6020B-TCLP	Date Prepared:	09/19/2018 1123h											
Arsenic	0.386	mg/L	SW6020B	0.00350	0.0100	0.4000	0.00544	95.1	75 - 125	0.377	2.35	20	
Barium	1.41	mg/L	SW6020B	0.00328	0.0700	0.4000	1.09	82.4	75 - 125	1.45	2.74	20	
Cadmium	0.359	mg/L	SW6020B	0.00315	0.00350	0.4000	0	89.7	75 - 125	0.36	0.185	20	
Chromium	0.364	mg/L	SW6020B	0.0150	0.0200	0.4000	0	91.1	75 - 125	0.361	0.966	20	
Lead	0.364	mg/L	SW6020B	0.00295	0.0500	0.4000	0	91.1	75 - 125	0.366	0.486	20	
Selenium	0.372	mg/L	SW6020B	0.00203	0.0100	0.4000	0	93.1	75 - 125	0.367	1.39	20	
Silver	0.365	mg/L	SW6020B	0.00136	0.0100	0.4000	0	91.2	75 - 125	0.369	1.17	20	
Lab Sample ID: 1808272-001BMSD	Date Analyzed:	09/19/2018 804h											
Test Code: HG-TCLP-7470A	Date Prepared:	09/18/2018 1840h											
Mercury	0.0318	mg/L	SW7470A	0.000307	0.0100	0.03330	0	95.6	80 - 120	0.032	0.574	20	H
Lab Sample ID: 1808273-001BMSD	Date Analyzed:	09/19/2018 825h											
Test Code: HG-TCLP-7470A	Date Prepared:	09/18/2018 1840h											
Mercury	0.0338	mg/L	SW7470A	0.000307	0.0100	0.03330	0	102	80 - 120	0.0333	1.69	20	H

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Laboratory Director

Jose Rocha
QA Officer

QC SUMMARY REPORT

Client: GeoStrata, LLC
Lab Set ID: 1808273
Project: RNI PV Land Farm Samples / 524-049

Contact: Jamey Sage
Dept: ME
QC Type: MS

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: 1808274-001BMS	Date Analyzed:	09/19/2018 843h											
Test Code: HG-TCLP-7470A	Date Prepared:	09/18/2018 1840h											
Mercury	0.0341	mg/L	SW7470A	0.000307	0.0100	0.03330	0	102	80 - 120				H
Lab Sample ID: 1808275-001BMS	Date Analyzed:	09/19/2018 904h											
Test Code: HG-TCLP-7470A	Date Prepared:	09/18/2018 1840h											
Mercury	0.0339	mg/L	SW7470A	0.000307	0.0100	0.03330	0	102	80 - 120				H

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REVISED: 9-14-18
5 Day Rush added - DB

Rev or Add Emailed: UL

WORK ORDER Summary

Work Order: **1808273** Page 1 of 3
Due Date: 9/21/2018

Client: GeoStrata, LLC
Client ID: GEO250
Project: RNI PV Land Farm Samples / 524-049
Comments: QC 2+. 9/13/18: added TCLP metals to all samples per Jamey. 9-14-18 - 5 Day Rush added per Jamey Sage.;

Contact: Jamey Sage
QC Level: II+
WO Type: Standard

DD

Sample ID	Client Sample ID	Collected Date	Received Date	Test Code	Matrix	Sel	Storage	
1808273-001A	PV-LF-N	8/8/2018 1115h	8/10/2018 1445h	COND-S-9050A	Soil		df - wc	1
				ESP			df - wc	
				PMOIST			df - wc	
				SAR-S			df - wc	
				SOIL-PR			df - wc	
1808273-001B				1311LM-PR			df - metals	
				3005A-TCLP-PR			df - metals	
				3051A-ICPMS-PR			df - metals	
				6020B-S			df - metals	
				7 SEL Analytes: AS BA CD CR PB SE AG				
				6020B-TCLP			df - metals	
				7 SEL Analytes: AS BA CD CR PB SE AG				
				HG-S-7471B			df - metals	
				1 SEL Analytes: HG				
				HG-S-PR-B			df - metals	
				HG-TCLP-7470A			df - metals	
				1 SEL Analytes: HG				
				HG-TCLP-PR			df - metals	
1808273-001C				8260-S-PPM			VOCFridge	
				Test Group: 8260-S-MBTEXN/GRO; # of Analytes: 6 / # of Surr: 4				
1808273-001D				3546-TPH-D-O-PR			df - tph / oro	
				8015-S-TPH-D-O-3546			df - tph / oro	
				Test Group: 8015-S-TPH-D-O-3546; # of Analytes: 2 / # of Surr: 2				
1808273-002A	PV-LF-E	8/8/2018 1100h	8/10/2018 1445h	COND-S-9050A	Soil		df - wc	1
				ESP			df - wc	
				PMOIST			df - wc	
				SAR-S			df - wc	
				SOIL-PR			df - wc	
1808273-002B				1311LM-PR			df - metals	
				3005A-TCLP-PR			df - metals	
				3051A-ICPMS-PR			df - metals	

Printed: 9/14/2018 LABORATORY CHECK: %M ☐ RT ☐ CN ☐ TAT ☐ QC ☐ LUO ☐ HOK____ HOK____ HOK____ COC Emailed____

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e-mail: awal@awal-labs.com, web: www.awal-labs.com

Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

QC SUMMARY REPORT

Client: GeoStrata, LLC
Lab Set ID: 1808273
Project: RNI PV Land Farm Samples / 524-049

Contact: Jamey Sage
Dept: ME
QC Type: MSD

Analyte		Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID:	**1808274-001BMSD**	Date Analyzed:	09/19/2018 845h											
Test Code:	HG-TCLP-7470A	Date Prepared:	09/18/2018 1840h											
Mercury		0.0337	mg/L	SW7470A	0.000307	0.0100	0.03330	0	101	80 - 120	0.0341	1.03	20	H
Lab Sample ID:	**1808275-001BMSD**	Date Analyzed:	09/19/2018 906h											
Test Code:	HG-TCLP-7470A	Date Prepared:	09/18/2018 1840h											
Mercury		0.0336	mg/L	SW7470A	0.000307	0.0100	0.03330	0	101	80 - 120	0.0339	1.04	20	H

H - Sample was received outside of the holding time.

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WORK ORDER Summary

Work Order: **1808273** Page 3 of 3

Client: GeoStrata, LLC

Due Date: 9/21/2018

Sample ID	Client Sample ID	Collected Date	Received Date	Test Code	Matrix	Sel	Storage	
1808273-004A	PV-LF-W	8/8/2018 1130h	8/10/2018 1445h	COND-S-9050A	Soil		df - wc	1
				ESP			df - wc	
				PMOIST			df - wc	
				SAR-S			df - wc	
				SOIL-PR			df - wc	
1808273-004B				1311LM-PR			df - metals	
				3005A-TCLP-PR			df - metals	
				3051A-ICPMS-PR			df - metals	
				6020B-S			df - metals	
				7 SEL Analytes: AS BA CD CR PB SE AG				
				6020B-TCLP			df - metals	
				7 SEL Analytes: AS BA CD CR PB SE AG				
				HG-S-7471B			df - metals	
				1 SEL Analytes: HG				
				HG-S-PR-B			df - metals	
				HG-TCLP-7470A			df - metals	
				1 SEL Analytes: HG				
				HG-TCLP-PR			df - metals	
1808273-004C				8260-S-PPM			VOCFridge	
				Test Group: 8260-S-MBTEXN/GRO; # of Analytes: 6 / # of Surr: 4				
1808273-004D				3546-TPH-D-O-PR			df - tph / ero	
				8015-S-TPH-D-O-3546			df - tph / ero	
				Test Group: 8015-S-TPH-D-O-3546; # of Analytes: 2 / # of Surr: 2				

AWAL Use Only - Close Hold Times

Test Code	# Samps	Min. days left
1311LM-PR	4	-9.30

Printed: 9/14/2018 LABORATORY CHECK: %M ☐ RT ☐ CN ☐ TAT ☐ QC ☐ LUO ☐ HOK_____ HOK_____ HOK_____ COC Emailed_____

WORK ORDER Summary

Work Order: **1808273** Page 2 of 3

Client: GeoStrata, LLC

Due Date: 9/21/2018

Sample ID	Client Sample ID	Collected Date	Received Date	Test Code	Matrix	Sel	Storage	
1808273-002B	PV-LF-E	8/8/2018 1100h	8/10/2018 1445h	6020B-S	Soil		df - metals	1
				7 SEL Analytes: AS BA CD CR PB SE AG				
				6020B-TCLP			df - metals	
				7 SEL Analytes: AS BA CD CR PB SE AG				
				HG-S-7471B			df - metals	
				1 SEL Analytes: HG				
				HG-S-PR-B			df - metals	
				HG-TCLP-7470A			df - metals	
				1 SEL Analytes: HG				
				HG-TCLP-PR			df - metals	
1808273-002C				8260-S-PPM			VOCFridge	
				Test Group: 8260-S-MBTEXN/GRO; # of Analytes: 6 / # of Surr: 4				
1808273-002D				3546-TPH-D-O-PR			df - tph / ero	
				8015-S-TPH-D-O-3546			df - tph / ero	
				Test Group: 8015-S-TPH-D-O-3546; # of Analytes: 2 / # of Surr: 2				
1808273-003A	PV-LF-S	8/8/2018 1145h	8/10/2018 1445h	COND-S-9050A	Soil		df - wc	1
				ESP			df - wc	
				PMOIST			df - wc	
				SAR-S			df - wc	
				SOIL-PR			df - wc	
1808273-003B				1311LM-PR			df - metals	
				3005A-TCLP-PR			df - metals	
				3051A-ICPMS-PR			df - metals	
				6020B-S			df - metals	
				7 SEL Analytes: AS BA CD CR PB SE AG				
				6020B-TCLP			df - metals	
				7 SEL Analytes: AS BA CD CR PB SE AG				
				HG-S-7471B			df - metals	
				1 SEL Analytes: HG				
				HG-S-PR-B			df - metals	
				HG-TCLP-7470A			df - metals	
				1 SEL Analytes: HG				
				HG-TCLP-PR			df - metals	
1808273-003C				8260-S-PPM			VOCFridge	
				Test Group: 8260-S-MBTEXN/GRO; # of Analytes: 6 / # of Surr: 4				
1808273-003D				3546-TPH-D-O-PR			df - tph / ero	
				8015-S-TPH-D-O-3546			df - tph / ero	
				Test Group: 8015-S-TPH-D-O-3546; # of Analytes: 2 / # of Surr: 2				

Printed: 9/14/2018 LABORATORY CHECK: %M ☐ RT ☐ CN ☐ TAT ☐ QC ☐ LUO ☐ HOK_____ HOK_____ HOK_____ COC Emailed_____

GeoStrata

Copyright GeoStrata , 2018

Sample Date
9/12/2018

Land Farm Sampling Locations

RNI Pleasant Valley
5-Year Permit Renewal
Duchesne County, UT
Project Number: 524-081

Plate 2

American West
Analytical Laboratories
3440 S. 700 W. Salt Lake City, UT 84119
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CHAIN OF CUSTODY

All analysis will be conducted using NELAP accredited methods and all data will be reported using AWAL's standard analyte lists and reporting limits (PQL) unless specifically requested otherwise on this Chain of Custody and/or attached documentation.

1808273
AWAL Lab Sample Set #
Page 1 of 1

Client: GeoStrata
Address: 14425 S Center Point Way
Bluffdale, UT 84065
Contact: Jamey Sage
Phone #: 801-232-0029 Cell #: 801-232-0029
Email: jamess@geostrata-llc.com
Project Name: RNI PV Land Farm Samples
Project #: 524-049
PO #: 524-049
Sampler Name: J. Sage

QC Level: 1 2 2+ 3 3+
Turn Around Time: 1 2 3 4 5 Stnd
Due Date: 8/24/18

Report down to the MDL
Include EDD:
Lab Filter for:
Field Filtered For:

For Compliance With:
NELAP
RCRA
CWA
SDWA
ELAP / A2LA
NLLAP
Non-Compliance
Other:

Known Hazards & Sample Comments

	Sample ID:	Date Sampled	Time Sampled	# of Containers	Sample Matrix	EC	SAR	ESP	RCRA 8 Metals	TPH-GRO BTEX	TPH-DRO	TPH-ORO	TCLP rcra 8 metals*
1	PV-LF-N	8/8/2018	1115	4	s	x	x	x	x	x	x	x	X
2	PV-LF-E	8/8/2018	1100	4	s	x	x	x	x	x	x	x	X
3	PV-LF-S	8/8/2018	1130	4	s	x	x	x	x	x	x	x	X
4	PV-LF-W	8/8/2018	1145	4	s	x	x	x	x	x	x	x	X
5													
6													
7													
8													
9													
10													
11													
12													

*added 9/13/18 per Jamey - VNS

Laboratory Use Only

Samples Were:
1 Shipped or Hand Delivered
2 Ambient or Chilled
3 Temperature 3.9 °C
4 Received Broken/Leaking (Improperly Sealed) Y N
5 Properly Preserved Y N Checked at bench
6 Received Within Holding Times Y N

COC Tape Was:
1 Present on Outer Package Y N NA
2 Unbroken on Outer Package Y N NA
3 Present on Sample Y N NA
4 Unbroken on Sample Y N NA

Discrepancies Between Sample Labels and COC Record? Y N

Relinquished by:	Date:	Received by:	Date:
Signature: Jamey Sage	8/10/18	Signature: Denise Brown	8/10/18
Print Name: Jamey Sage	Time: 1445	Print Name: Denise Brown	Time: 1445
Relinquished by: Signature	Date:	Received by: Signature	Date:
Print Name:	Time:	Print Name:	Time:
Relinquished by: Signature	Date:	Received by: Signature	Date:
Print Name:	Time:	Print Name:	Time:
Relinquished by: Signature	Date:	Received by: Signature	Date:
Print Name:	Time:	Print Name:	Time:

Special Instructions:
5 Day Rush added per Jamey - DB 9/14/18

* Please Call Jamey Sage @ 801-232-0029 with any questions/comments/suggestions.

Thanks

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Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

Jamey Sage
GeoStrata, LLC
14425 S. Center Point Way
Bluffdale, UT 84065
TEL: (801) 501-0583

RE: RNI PV Land Farm Samples / 524-049

Dear Jamey Sage: Lab Set ID: 1809325

American West Analytical Laboratories received sample(s) on 9/14/2018 for the analyses presented in the following report.

American West Analytical Laboratories (AWAL) is accredited by The National Environmental Laboratory Accreditation Program (NELAP) in Utah and Texas; and is state accredited in Colorado, Idaho, New Mexico, Wyoming, and Missouri.

All analyses were performed in accordance to the NELAP protocols unless noted otherwise. Accreditation scope documents are available upon request. If you have any questions or concerns regarding this report please feel free to call.

The abbreviation "Surr" found in organic reports indicates a surrogate compound that is intentionally added by the laboratory to determine sample injection, extraction, and/or purging efficiency. The "Reporting Limit" found on the report is equivalent to the practical quantitation limit (PQL). This is the minimum concentration that can be reported by the method referenced and the sample matrix. The reporting limit must not be confused with any regulatory limit. Analytical results are reported to three significant figures for quality control and calculation purposes.

Thank You,

Approved by: _____
Laboratory Director or designee

All analyses applicable to the CWA, SDWA, and RCRA are performed in accordance to NELAC protocols. Pertinent sampling information is located on the attached COC. Confidential Business Information: This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertisement, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only on contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.
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Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

INORGANIC ANALYTICAL REPORT

Client: GeoStrata, LLC **Contact:** Jamey Sage
Project: RNI PV Land Farm Samples / 524-049
Lab Sample ID: 1809325-001
Client Sample ID: PV-NW-BGSS
Collection Date: 9/12/2018 1130h
Received Date: 9/14/2018 1530h

Analytical Results TCLP METALS Method 1311

TCLP Prep Date: 9/25/2018 2245h

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Arsenic	mg/L	9/27/2018 1250h	9/27/2018 1857h	SW6020B	0.0100	< 0.0100	
Barium	mg/L	9/27/2018 1250h	9/27/2018 1857h	SW6020B	0.0500	**2.07**	[1]
Cadmium	mg/L	9/27/2018 1250h	9/27/2018 1857h	SW6020B	0.00350	< 0.00350	
Chromium	mg/L	9/27/2018 1250h	9/28/2018 1201h	SW6020B	0.0200	< 0.0200	
Lead	mg/L	9/27/2018 1250h	9/27/2018 1857h	SW6020B	0.0500	< 0.0500	
Mercury	mg/L	9/26/2018 1930h	9/27/2018 934h	SW7470A	0.0100	< 0.0100	
Selenium	mg/L	9/27/2018 1250h	9/27/2018 1857h	SW6020B	0.0100	< 0.0100	
Silver	mg/L	9/27/2018 1250h	9/27/2018 1857h	SW6020B	0.0100	< 0.0100	

[1] - *Analyte concentration is too high for accurate matrix spike recovery and/or RPD.*

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Laboratory Director

Jose Rocha
QA Officer

Client: GeoStrata, LLC **Contact:** Jamey Sage
Project: RNI PV Land Farm Samples / 524-049
Lab Sample ID: 1809325-002
Client Sample ID: PV-NE-BGSS
Collection Date: 9/12/2018 1145h
Received Date: 9/14/2018 1530h

Analytical Results TCLP METALS Method 1311

TCLP Prep Date: 9/25/2018 2245h

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Arsenic	mg/L	9/27/2018 1250h	9/27/2018 1915h	SW6020B	0.0100	< 0.0100	
Barium	mg/L	9/27/2018 1250h	9/27/2018 1915h	SW6020B	0.0500	**1.62**	
Cadmium	mg/L	9/27/2018 1250h	9/27/2018 1915h	SW6020B	0.00350	< 0.00350	
Chromium	mg/L	9/27/2018 1250h	9/28/2018 1210h	SW6020B	0.0200	< 0.0200	
Lead	mg/L	9/27/2018 1250h	9/27/2018 1915h	SW6020B	0.0500	< 0.0500	
Mercury	mg/L	9/26/2018 1930h	9/27/2018 944h	SW7470A	0.0100	< 0.0100	
Selenium	mg/L	9/27/2018 1250h	9/27/2018 1915h	SW6020B	0.0100	< 0.0100	
Silver	mg/L	9/27/2018 1250h	9/27/2018 1915h	SW6020B	0.0100	< 0.0100	

Report Date: 9/28/2018 Page 3 of 31

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QA Officer

Client: GeoStrata, LLC **Contact:** Jamey Sage
Project: RNI PV Land Farm Samples / 524-049
Lab Sample ID: 1809325-003
Client Sample ID: PV-SE-BGSS
Collection Date: 9/12/2018 1200h
Received Date: 9/14/2018 1530h

Analytical Results TCLP METALS Method 1311

TCLP Prep Date: 9/25/2018 2245h

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Arsenic	mg/L	9/27/2018 1250h	9/27/2018 1918h	SW6020B	0.0100	**0.0129**	
Barium	mg/L	9/27/2018 1250h	9/27/2018 1918h	SW6020B	0.0500	**1.99**	
Cadmium	mg/L	9/27/2018 1250h	9/27/2018 1918h	SW6020B	0.00350	< 0.00350	
Chromium	mg/L	9/27/2018 1250h	9/28/2018 1213h	SW6020B	0.0200	< 0.0200	
Lead	mg/L	9/27/2018 1250h	9/27/2018 1918h	SW6020B	0.0500	< 0.0500	
Mercury	mg/L	9/26/2018 1930h	9/27/2018 946h	SW7470A	0.0100	< 0.0100	
Selenium	mg/L	9/27/2018 1250h	9/27/2018 1918h	SW6020B	0.0100	< 0.0100	
Silver	mg/L	9/27/2018 1250h	9/27/2018 1918h	SW6020B	0.0100	< 0.0100	

Report Date: 9/28/2018 Page 4 of 31

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INORGANIC ANALYTICAL REPORT

Client: GeoStrata, LLC **Contact:** Jamey Sage
Project: RNI PV Land Farm Samples / 524-049
Lab Sample ID: 1809325-001
Client Sample ID: PV-NW-BGSS
Collection Date: 9/12/2018 1130h
Received Date: 9/14/2018 1530h

Analytical Results

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Conductivity	µmhos/cm		9/17/2018 606h	SW9050A	10.0	**328**	&
ESP			9/18/2018 1031h	Calc.	-10	**0.38**	
Sodium Adsorption Ratio			9/18/2018 1031h	Calc.	0.0100	**1.12**	

& - Analysis is performed on a 1:1 DI water extract for soils.

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INORGANIC ANALYTICAL REPORT

Client: GeoStrata, LLC **Contact:** Jamey Sage
Project: RNI PV Land Farm Samples / 524-049
Lab Sample ID: 1809325-002
Client Sample ID: PV-NE-BGSS
Collection Date: 9/12/2018 1145h
Received Date: 9/14/2018 1530h

Analytical Results

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Conductivity	µmhos/cm		9/17/2018 606h	SW9050A	10.0	**217**	&
ESP			9/18/2018 1031h	Calc.	-10	**-0.11**	
Sodium Adsorption Ratio			9/18/2018 1031h	Calc.	0.0100	**0.784**	

& - Analysis is performed on a 1:1 DI water extract for soils.

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Client: GeoStrata, LLC **Contact:** Jamey Sage
Project: RNI PV Land Farm Samples / 524-049
Lab Sample ID: 1809325-003
Client Sample ID: PV-SE-BGSS
Collection Date: 9/12/2018 1200h
Received Date: 9/14/2018 1530h

Analytical Results

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Conductivity	µmhos/cm		9/17/2018 606h	SW9050A	10.0	**261**	&
ESP			9/18/2018 1031h	Calc.	-10	**0.81**	
Sodium Adsorption Ratio			9/18/2018 1031h	Calc.	0.0100	**1.41**	

& - Analysis is performed on a 1:1 DI water extract for soils.

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Client: GeoStrata, LLC **Contact:** Jamey Sage
Project: RNI PV Land Farm Samples / 524-049
Lab Sample ID: 1809325-001D
Client Sample ID: PV-NW-BGSS
Collection Date: 9/12/2018 1130h
Received Date: 9/14/2018 1530h

Test Code: 8015-S-TPH-D-O-3546

Analytical Results TPH-DRO and/or ORO by 8015D/3546

Analyzed: 9/18/2018 1728h **Extracted:** 9/17/2018 1204h
Units: mg/kg-dry **Dilution Factor:** 1 **Method:** SW8015D

Compound	CAS Number	Reporting Limit	Analytical Result	Qual
Diesel Range Organics (DRO) (C10-C28)	68476-34-6	21.5	**27.3**	
Oil Range Organics (ORO) (C28-C36)		21.5	< 21.5	

Surrogate (Units: mg/kg-dry)	CAS	Result	Amount Spiked	% REC	Limits	Qual
Surr: 4-Bromofluorobenzene	460-00-4	19.5	35.82	54.5	10-122	
Surr: C38		14.9	17.91	83.0	10-200	

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ORGANIC ANALYTICAL REPORT

Client: GeoStrata, LLC **Contact:** Jamey Sage
Project: RNI PV Land Farm Samples / 524-049
Lab Sample ID: 1809325-002D
Client Sample ID: PV-NE-BGSS
Collection Date: 9/12/2018 1145h
Received Date: 9/14/2018 1530h
Test Code: 8015-S-TPH-D-O-3546

Analytical Results TPH-DRO and/or ORO by 8015D/3546

Analyzed: 9/18/2018 1824h **Extracted:** 9/17/2018 1204h
Units: mg/kg-dry **Dilution Factor:** 1 **Method:** SW8015D

Compound	CAS Number	Reporting Limit	Analytical Result	Qual
Diesel Range Organics (DRO) (C10-C28)	68476-34-6	24.7	**33.3**	
Oil Range Organics (ORO) (C28-C36)		24.7	< 24.7	

Surrogate (Units: mg/kg-dry)	CAS	Result	Amount Spiked	% REC	Limits	Qual
Surr: 4-Bromofluorobenzene	460-00-4	21.3	41.13	51.7	10-122	
Surr: C38		17.3	20.56	84.2	10-200	

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Jose Rocha
QA Officer

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Sundry Number: 93537 File: Detailed Site Description

ORGANIC ANALYTICAL REPORT

Client: GeoStrata, LLC **Contact:** Jamey Sage
Project: RNI PV Land Farm Samples / 524-049
Lab Sample ID: 1809325-003D
Client Sample ID: PV-SE-BGSS
Collection Date: 9/12/2018 1200h
Received Date: 9/14/2018 1530h
Test Code: 8015-S-TPH-D-O-3546

Analytical Results TPH-DRO and/or ORO by 8015D/3546

Analyzed: 9/18/2018 1843h **Extracted:** 9/17/2018 1204h
Units: mg/kg-dry **Dilution Factor:** 1 **Method:** SW8015D

Compound	CAS Number	Reporting Limit	Analytical Result	Qual
Diesel Range Organics (DRO) (C10-C28)	68476-34-6	26.8	**31.3**	
Oil Range Organics (ORO) (C28-C36)		26.8	< 26.8	

Surrogate (Units: mg/kg-dry)	CAS	Result	Amount Spiked	% REC	Limits	Qual
Surr: 4-Bromofluorobenzene	460-00-4	19.9	44.67	44.6	10-122	
Surr: C38		16.4	22.33	73.5	10-200	

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ORGANIC ANALYTICAL REPORT

Client: GeoStrata, LLC **Contact:** Jamey Sage
Project: RNI PV Land Farm Samples / 524-049
Lab Sample ID: 1809325-001C
Client Sample ID: PV-NW-BGSS
Collection Date: 9/12/2018 1130h
Received Date: 9/14/2018 1530h
Test Code: 8260-S-PPM

Analytical Results VOAs MBTEXN/GRO by GC/MS Method 8260C

Analyzed: 9/17/2018 1710h
Units: mg/kg-dry **Dilution Factor:** 2.46 **Method:** SW8260C

Compound	CAS Number	Reporting Limit	Analytical Result	Qual
Benzene	71-43-2	0.00266	< 0.00266	
Ethylbenzene	100-41-4	0.00533	< 0.00533	
Naphthalene	91-20-3	0.00533	< 0.00533	
Toluene	108-88-3	0.00533	< 0.00533	
TPH C6-C10 (GRO)		0.0533	< 0.0533	
Xylenes, Total	1330-20-7	0.00533	< 0.00533	

Surrogate (Units: mg/kg-dry)	CAS	Result	Amount Spiked	% REC	Limits	Qual
Surr: 1,2-Dichloroethane-d4	17060-07-0	0.136	0.1332	102	51-170	
Surr: 4-Bromofluorobenzene	460-00-4	0.140	0.1332	105	50-140	
Surr: Dibromofluoromethane	1868-53-7	0.142	0.1332	106	50-140	
Surr: Toluene-d8	2037-26-5	0.135	0.1332	101	50-140	

Sampling and analytical preparation performed by method 5030A modified for analysis of soil samples collected in 2 or 4 oz jars.

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ORGANIC ANALYTICAL REPORT

Client: GeoStrata, LLC **Contact:** Jamey Sage
Project: RNI PV Land Farm Samples / 524-049
Lab Sample ID: 1809325-002C
Client Sample ID: PV-NE-BGSS
Collection Date: 9/12/2018 1145h
Received Date: 9/14/2018 1530h
Test Code: 8260-S-PPM

Analytical Results VOAs MBTEXN/GRO by GC/MS Method 8260C

Analyzed: 9/17/2018 1811h
Units: mg/kg-dry **Dilution Factor:** 2.42 **Method:** SW8260C

Compound	CAS Number	Reporting Limit	Analytical Result	Qual
Benzene	71-43-2	0.00300	< 0.00300	
Ethylbenzene	100-41-4	0.00599	< 0.00599	
Naphthalene	91-20-3	0.00599	< 0.00599	
Toluene	108-88-3	0.00599	< 0.00599	
TPH C6-C10 (GRO)		0.0599	< 0.0599	
Xylenes, Total	1330-20-7	0.00599	< 0.00599	

Surrogate (Units: mg/kg-dry)	CAS	Result	Amount Spiked	% REC	Limits	Qual
Surr: 1,2-Dichloroethane-d4	17060-07-0	0.153	0.1498	102	51-170	
Surr: 4-Bromofluorobenzene	460-00-4	0.156	0.1498	104	50-140	
Surr: Dibromofluoromethane	1868-53-7	0.160	0.1498	107	50-140	
Surr: Toluene-d8	2037-26-5	0.153	0.1498	102	50-140	

Sampling and analytical preparation performed by method 5030A modified for analysis of soil samples collected in 2 or 4 oz jars.

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Sundry Number: 93537 File: Detailed Site Description

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Jose Rocha
QA Officer

Client: GeoStrata, LLC **Contact:** Jamey Sage
Project: RNI PV Land Farm Samples / 524-049
Lab Sample ID: 1809325-003C
Client Sample ID: PV-SE-BGSS
Collection Date: 9/12/2018 1200h
Received Date: 9/14/2018 1530h

Test Code: 8260-S-PPM

Analytical Results VOAs MBTEXN/GRO by GC/MS Method 8260C

Analyzed: 9/17/2018 1832h
Units: mg/kg-dry **Dilution Factor:** 2.49 **Method:** SW8260C

Compound	CAS Number	Reporting Limit	Analytical Result	Qual
Benzene	71-43-2	0.00334	< 0.00334	
Ethylbenzene	100-41-4	0.00667	< 0.00667	
Naphthalene	91-20-3	0.00667	< 0.00667	
Toluene	108-88-3	0.00667	< 0.00667	
TPH C6-C10 (GRO)		0.0667	< 0.0667	
Xylenes, Total	1330-20-7	0.00667	< 0.00667	

Surrogate (Units: mg/kg-dry)	CAS	Result	Amount Spiked	% REC	Limits	Qual
Surr: 1,2-Dichloroethane-d4	17060-07-0	0.167	0.1668	99.9	51-170	
Surr: 4-Bromofluorobenzene	460-00-4	0.176	0.1668	106	50-140	
Surr: Dibromofluoromethane	1868-53-7	0.181	0.1668	108	50-140	
Surr: Toluene-d8	2037-26-5	0.172	0.1668	103	50-140	

Sampling and analytical preparation performed by method 5030A modified for analysis of soil samples collected in 2 or 4 oz jars.

Report Date: 9/28/2018 Page 13 of 31

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Laboratory Director

Jose Rocha
QA Officer

QC SUMMARY REPORT

Client: GeoStrata, LLC **Contact:** Jamey Sage
Lab Set ID: 1809325 **Dept:** ME
Project: RNI PV Land Farm Samples / 524-049 **QC Type:** LCS

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: LCS-58351 Date Analyzed: 09/27/2018 1839h													
Test Code: 6020B-TCLP Date Prepared: 09/27/2018 1250h													
Arsenic	0.347	mg/L	SW6020B	0.00350	0.0100	0.4000	0	86.9	85 - 115				
Barium	0.349	mg/L	SW6020B	0.00328	0.0500	0.4000	0	87.2	85 - 115				
Cadmium	0.344	mg/L	SW6020B	0.00315	0.00350	0.4000	0	86.0	85 - 115				
Lead	0.356	mg/L	SW6020B	0.00295	0.0500	0.4000	0	89.0	85 - 115				
Selenium	0.344	mg/L	SW6020B	0.00203	0.0100	0.4000	0	85.9	85 - 115				
Silver	0.346	mg/L	SW6020B	0.00136	0.0100	0.4000	0	86.5	85 - 115				
Lab Sample ID: LCS-58351 Date Analyzed: 09/28/2018 1149h													
Test Code: 6020B-TCLP Date Prepared: 09/27/2018 1250h													
Chromium	0.398	mg/L	SW6020B	0.0150	0.0200	0.4000	0	99.4	85 - 115				
Lab Sample ID: LCS-58333 Date Analyzed: 09/27/2018 921h													
Test Code: HG-TCLP-7470A Date Prepared: 09/26/2018 1930h													
Mercury	0.00339	mg/L	SW7470A	0.0000307	0.00100	0.003330	0	102	80 - 120				

Report Date: 9/28/2018 Page 14 of 31

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Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

QC SUMMARY REPORT

Client: GeoStrata, LLC
Lab Set ID: 1809325
Project: RNI PV Land Farm Samples / 524-049

Contact: Jamey Sage
Dept: ME
QC Type: MBLK

Analyte		Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID:	**MB-TCLP-58325**	Date Analyzed:	09/27/2018 1021h											
Test Code:	HG-TCLP-7470A	Date Prepared:	09/26/2018 1930h											
Mercury		< 0.00100	mg/L	SW7470A	0.0000307	0.00100								
Lab Sample ID:	**MB-58333**	Date Analyzed:	09/27/2018 919h											
Test Code:	HG-TCLP-7470A	Date Prepared:	09/26/2018 1930h											
Mercury		< 0.00100	mg/L	SW7470A	0.0000307	0.00100								

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QC SUMMARY REPORT

Client: GeoStrata, LLC
Lab Set ID: 1809325
Project: RNI PV Land Farm Samples / 524-049

Contact: Jamey Sage
Dept: ME
QC Type: MBLK

Analyte		Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID:	**MB-58351**	Date Analyzed:	09/27/2018 1836h											
Test Code:	6020B-TCLP	Date Prepared:	09/27/2018 1250h											
Arsenic		< 0.0100	mg/L	SW6020B	0.00350	0.0100								
Barium		< 0.0500	mg/L	SW6020B	0.00328	0.0500								
Cadmium		< 0.00350	mg/L	SW6020B	0.00315	0.00350								
Lead		< 0.0500	mg/L	SW6020B	0.00295	0.0500								
Selenium		< 0.0100	mg/L	SW6020B	0.00203	0.0100								
Silver		< 0.0100	mg/L	SW6020B	0.00136	0.0100								
Lab Sample ID:	**MB-TCLP-58323**	Date Analyzed:	09/27/2018 1933h											
Test Code:	6020B-TCLP	Date Prepared:	09/27/2018 1250h											
Arsenic		< 0.0100	mg/L	SW6020B	0.00350	0.0100								
Barium		< 0.0500	mg/L	SW6020B	0.00328	0.0500								
Cadmium		< 0.00350	mg/L	SW6020B	0.00315	0.00350								
Lead		< 0.0500	mg/L	SW6020B	0.00295	0.0500								
Selenium		< 0.0100	mg/L	SW6020B	0.00203	0.0100								
Silver		< 0.0100	mg/L	SW6020B	0.00136	0.0100								
Lab Sample ID:	**MB-58351**	Date Analyzed:	09/28/2018 1146h											
Test Code:	6020B-TCLP	Date Prepared:	09/27/2018 1250h											
Chromium		< 0.0200	mg/L	SW6020B	0.0150	0.0200								
Lab Sample ID:	**MB-TCLP-58323**	Date Analyzed:	09/28/2018 1237h											
Test Code:	6020B-TCLP	Date Prepared:	09/27/2018 1250h											
Chromium		< 0.0200	mg/L	SW6020B	0.0150	0.0200								
Lab Sample ID:	**MB-TCLP-58323**	Date Analyzed:	09/27/2018 1019h											
Test Code:	HG-TCLP-7470A	Date Prepared:	09/26/2018 1930h											
Mercury		< 0.00100	mg/L	SW7470A	0.0000307	0.00100								

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Jose Rocha
QA Officer

QC SUMMARY REPORT

Client: GeoStrata, LLC
Lab Set ID: 1809325
Project: RNI PV Land Farm Samples / 524-049

Contact: Jamey Sage
Dept: ME
QC Type: MS

Analyte		Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID:	**1809325-001BMS**	Date Analyzed:	09/28/2018 1204h											
Test Code:	6020B-TCLP	Date Prepared:	09/27/2018 1250h											
Chromium		0.398	mg/L	SW6020B	0.0150	0.0200	0.4000	0	99.5	75 - 125				
Lab Sample ID:	**1809327-002AMS**	Date Analyzed:	09/28/2018 1231h											
Test Code:	6020B-TCLP	Date Prepared:	09/27/2018 1250h											
Chromium		0.382	mg/L	SW6020B	0.0150	0.0200	0.4000	0	95.6	75 - 125				
Lab Sample ID:	**1809324-001AMS**	Date Analyzed:	09/27/2018 930h											
Test Code:	HG-TCLP-7470A	Date Prepared:	09/26/2018 1930h											
Mercury		0.0337	mg/L	SW7470A	0.000307	0.0100	0.03330	0	101	80 - 120				
Lab Sample ID:	**1809325-001BMS**	Date Analyzed:	09/27/2018 936h											
Test Code:	HG-TCLP-7470A	Date Prepared:	09/26/2018 1930h											
Mercury		0.0346	mg/L	SW7470A	0.000307	0.0100	0.03330	0	104	80 - 120				
Lab Sample ID:	**1809327-001AMS**	Date Analyzed:	09/27/2018 950h											
Test Code:	HG-TCLP-7470A	Date Prepared:	09/26/2018 1930h											
Mercury		0.0347	mg/L	SW7470A	0.000307	0.0100	0.03330	0	104	80 - 120				

[1] - Matrix spike recovery indicates matrix interference. The method is in control as indicated by the LCS.
[2] - Analyte concentration is too high for accurate matrix spike recovery and/or RPD.

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Laboratory Director

Jose Rocha
QA Officer

QC SUMMARY REPORT

Client: GeoStrata, LLC
Lab Set ID: 1809325
Project: RNI PV Land Farm Samples / 524-049

Contact: Jamey Sage
Dept: ME
QC Type: MS

Analyte		Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID:	**1809324-001AMS**	Date Analyzed:	09/27/2018 1851h											
Test Code:	6020B-TCLP	Date Prepared:	09/27/2018 1250h											
Arsenic		0.357	mg/L	SW6020B	0.00350	0.0100	0.4000	0	89.3	75 - 125				
Barium		1.58	mg/L	SW6020B	0.00328	0.0500	0.4000	1.24	85.1	75 - 125				
Cadmium		0.346	mg/L	SW6020B	0.00315	0.00350	0.4000	0	86.5	75 - 125				
Lead		0.357	mg/L	SW6020B	0.00295	0.0500	0.4000	0	89.2	75 - 125				
Selenium		0.361	mg/L	SW6020B	0.00203	0.0100	0.4000	0	90.4	75 - 125				
Silver		0.344	mg/L	SW6020B	0.00136	0.0100	0.4000	0	86.1	75 - 125				
Lab Sample ID:	**1809325-001BMS**	Date Analyzed:	09/27/2018 1909h											
Test Code:	6020B-TCLP	Date Prepared:	09/27/2018 1250h											
Arsenic		0.375	mg/L	SW6020B	0.00350	0.0100	0.4000	0.00639	92.1	75 - 125				
Barium		2.33	mg/L	SW6020B	0.00328	0.0500	0.4000	2.07	66.6	75 - 125				[2]
Cadmium		0.347	mg/L	SW6020B	0.00315	0.00350	0.4000	0	86.8	75 - 125				
Lead		0.361	mg/L	SW6020B	0.00295	0.0500	0.4000	0	90.4	75 - 125				
Selenium		0.365	mg/L	SW6020B	0.00203	0.0100	0.4000	0	91.2	75 - 125				
Silver		0.346	mg/L	SW6020B	0.00136	0.0100	0.4000	0	86.6	75 - 125				
Lab Sample ID:	**1809327-002AMS**	Date Analyzed:	09/27/2018 1927h											
Test Code:	6020B-TCLP	Date Prepared:	09/27/2018 1250h											
Arsenic		0.356	mg/L	SW6020B	0.00350	0.0100	0.4000	0	88.9	75 - 125				
Barium		1.66	mg/L	SW6020B	0.00328	0.0500	0.4000	1.37	71.9	75 - 125				[2]
Cadmium		0.342	mg/L	SW6020B	0.00315	0.00350	0.4000	0	85.4	75 - 125				
Lead		0.352	mg/L	SW6020B	0.00295	0.0500	0.4000	0	88.0	75 - 125				
Selenium		0.369	mg/L	SW6020B	0.00203	0.0100	0.4000	0	92.3	75 - 125				
Silver		0.341	mg/L	SW6020B	0.00136	0.0100	0.4000	0	85.1	75 - 125				
Lab Sample ID:	**1809324-001AMS**	Date Analyzed:	09/28/2018 1155h											
Test Code:	6020B-TCLP	Date Prepared:	09/27/2018 1250h											
Chromium		0.397	mg/L	SW6020B	0.0150	0.0200	0.4000	0	99.3	75 - 125				

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Sundry Number: 135025 Facility Number: 274

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Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

QC SUMMARY REPORT

Client: GeoStrata, LLC
Lab Set ID: 1809325
Project: RNI PV Land Farm Samples / 524-049

Contact: Jamey Sage
Dept: ME
QC Type: MSD

Analyte		Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID:	**1809325-001BMSD**	Date Analyzed:	09/28/2018 1207h											
Test Code:	6020B-TCLP	Date Prepared:	09/27/2018 1250h											
Chromium		0.387	mg/L	SW6020B	0.0150	0.0200	0.4000	0	96.8	75 - 125	0.398	2.74	20	
Lab Sample ID:	**1809327-002AMSD**	Date Analyzed:	09/28/2018 1234h											
Test Code:	6020B-TCLP	Date Prepared:	09/27/2018 1250h											
Chromium		0.382	mg/L	SW6020B	0.0150	0.0200	0.4000	0	95.5	75 - 125	0.382	0.113	20	
Lab Sample ID:	**1809324-001AMSD**	Date Analyzed:	09/27/2018 932h											
Test Code:	HG-TCLP-7470A	Date Prepared:	09/26/2018 1930h											
Mercury		0.0342	mg/L	SW7470A	0.000307	0.0100	0.03330	0	103	80 - 120	0.0337	1.42	20	
Lab Sample ID:	**1809325-001BMSD**	Date Analyzed:	09/27/2018 938h											
Test Code:	HG-TCLP-7470A	Date Prepared:	09/26/2018 1930h											
Mercury		0.0344	mg/L	SW7470A	0.000307	0.0100	0.03330	0	103	80 - 120	0.0346	0.531	20	
Lab Sample ID:	**1809327-001AMSD**	Date Analyzed:	09/27/2018 952h											
Test Code:	HG-TCLP-7470A	Date Prepared:	09/26/2018 1930h											
Mercury		0.0344	mg/L	SW7470A	0.000307	0.0100	0.03330	0	103	80 - 120	0.0347	0.676	20	

[2] - Analyte concentration is too high for accurate matrix spike recovery and/or RPD.

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Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

QC SUMMARY REPORT

Client: GeoStrata, LLC
Lab Set ID: 1809325
Project: RNI PV Land Farm Samples / 524-049

Contact: Jamey Sage
Dept: ME
QC Type: MSD

Analyte		Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID:	**1809324-001AMSD**	Date Analyzed:	09/27/2018 1854h											
Test Code:	6020B-TCLP	Date Prepared:	09/27/2018 1250h											
Arsenic		0.370	mg/L	SW6020B	0.00350	0.0100	0.4000	0	92.4	75 - 125	0.357	3.39	20	
Barium		1.66	mg/L	SW6020B	0.00328	0.0500	0.4000	1.24	105	75 - 125	1.58	4.83	20	
Cadmium		0.362	mg/L	SW6020B	0.00315	0.00350	0.4000	0	90.5	75 - 125	0.346	4.61	20	
Lead		0.375	mg/L	SW6020B	0.00295	0.0500	0.4000	0	93.7	75 - 125	0.357	4.96	20	
Selenium		0.365	mg/L	SW6020B	0.00203	0.0100	0.4000	0	91.2	75 - 125	0.361	0.903	20	
Silver		0.361	mg/L	SW6020B	0.00136	0.0100	0.4000	0	90.2	75 - 125	0.344	4.72	20	
Lab Sample ID:	**1809325-001BMSD**	Date Analyzed:	09/27/2018 1912h											
Test Code:	6020B-TCLP	Date Prepared:	09/27/2018 1250h											
Arsenic		0.369	mg/L	SW6020B	0.00350	0.0100	0.4000	0.00639	90.7	75 - 125	0.375	1.54	20	
Barium		2.23	mg/L	SW6020B	0.00328	0.0500	0.4000	2.07	40.9	75 - 125	2.33	4.49	20	*
Cadmium		0.342	mg/L	SW6020B	0.00315	0.00350	0.4000	0	85.4	75 - 125	0.347	1.61	20	
Lead		0.349	mg/L	SW6020B	0.00295	0.0500	0.4000	0	87.2	75 - 125	0.361	3.50	20	
Selenium		0.360	mg/L	SW6020B	0.00203	0.0100	0.4000	0	90.0	75 - 125	0.365	1.31	20	
Silver		0.342	mg/L	SW6020B	0.00136	0.0100	0.4000	0	85.6	75 - 125	0.346	1.19	20	
Lab Sample ID:	**1809327-002AMSD**	Date Analyzed:	09/27/2018 1930h											
Test Code:	6020B-TCLP	Date Prepared:	09/27/2018 1250h											
Arsenic		0.367	mg/L	SW6020B	0.00350	0.0100	0.4000	0	91.8	75 - 125	0.356	3.19	20	
Barium		1.75	mg/L	SW6020B	0.00328	0.0500	0.4000	1.37	94.2	75 - 125	1.66	5.23	20	
Cadmium		0.353	mg/L	SW6020B	0.00315	0.00350	0.4000	0	88.2	75 - 125	0.342	3.22	20	
Lead		0.372	mg/L	SW6020B	0.00295	0.0500	0.4000	0	93.0	75 - 125	0.352	5.54	20	
Selenium		0.353	mg/L	SW6020B	0.00203	0.0100	0.4000	0	88.2	75 - 125	0.369	4.51	20	
Silver		0.354	mg/L	SW6020B	0.00136	0.0100	0.4000	0	88.4	75 - 125	0.341	3.76	20	
Lab Sample ID:	**1809324-001AMSD**	Date Analyzed:	09/28/2018 1158h											
Test Code:	6020B-TCLP	Date Prepared:	09/27/2018 1250h											
Chromium		0.387	mg/L	SW6020B	0.0150	0.0200	0.4000	0	96.6	75 - 125	0.397	2.77	20	

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Laboratory Director

Jose Rocha
QA Officer

QC SUMMARY REPORT

Client: GeoStrata, LLC
Lab Set ID: 1809325
Project: RNI PV Land Farm Samples / 524-049

Contact: Jamey Sage
Dept: WC
QC Type: LCS

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: LCS-R117616 Date Analyzed: 09/17/2018 606h													
Test Code: COND-S-9050A													
Conductivity	996	µmhos/cm	SW9050A	0.733	10.0	1,000	0	99.6	98 - 102				

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QC SUMMARY REPORT

Client: GeoStrata, LLC
Lab Set ID: 1809325
Project: RNI PV Land Farm Samples / 524-049

Contact: Jamey Sage
Dept: WC
QC Type: DUP

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: 1809312-001ADUP Date Analyzed: 09/17/2018 606h													
Test Code: COND-S-9050A													
Conductivity	10,200	µmhos/cm	SW9050A	0.733	10.0					10300	1.08	10	&
Lab Sample ID: 1809325-001ADUP Date Analyzed: 09/17/2018 606h													
Test Code: COND-S-9050A													
Conductivity	325	µmhos/cm	SW9050A	0.733	10.0					328	0.919	10	&

& - Analysis is performed on a 1:1 DI water extract for soils.

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QC SUMMARY REPORT

Client: GeoStrata, LLC
Lab Set ID: 1809325
Project: RNI PV Land Farm Samples / 524-049

Contact: Jamey Sage
Dept: GC
QC Type: LCS

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: LCS-58132	Date Analyzed:	09/18/2018 1709h											
Test Code: 8015-S-TPH-D-O-3546	Date Prepared:	09/17/2018 1204h											
Diesel Range Organics (DRO) (C10-C28)	126	mg/kg	SW8015D	10.8	20.0	166.7	0	75.3	48 - 115				
Oil Range Organics (ORO) (C28-C36)	44.9	mg/kg	SW8015D	10.8	20.0	50.00	0	89.7	10 - 200				
Surr: 4-Bromofluorobenzene	20.0	mg/kg	SW8015D			33.33		60.1	24 - 112				
Surr: C38	14.9	mg/kg	SW8015D			16.67		89.4	10 - 200				

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QC SUMMARY REPORT

Client: GeoStrata, LLC
Lab Set ID: 1809325
Project: RNI PV Land Farm Samples / 524-049

Contact: Jamey Sage
Dept: WC
QC Type: MBLK

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: MB-R117616	Date Analyzed:	09/17/2018 606h											
Test Code: COND-S-9050A													
Conductivity	< 10.0	µmhos/cm	SW9050A	0.733	10.0								

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Jose Rocha
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QC SUMMARY REPORT

Client: GeoStrata, LLC
Lab Set ID: 1809325
Project: RNI PV Land Farm Samples / 524-049

Contact: Jamey Sage
Dept: GC
QC Type: MS

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: 1809325-001DMS	Date Analyzed:	09/18/2018 1747h											
Test Code: 8015-S-TPH-D-O-3546	Date Prepared:	09/17/2018 1204h											
Diesel Range Organics (DRO) (C10-C28)	163	mg/kg-dry	SW8015D	11.7	21.6	180.0	27.3	75.3	10 - 230				
Oil Range Organics (ORO) (C28-C36)	60.3	mg/kg-dry	SW8015D	11.7	21.6	54.00	0	112	10 - 200				
Surr: 4-Bromofluorobenzene	20.2	mg/kg-dry	SW8015D			36.00		56.0	10 - 122				
Surr: C38	15.8	mg/kg-dry	SW8015D			18.00		87.6	10 - 200				

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QC SUMMARY REPORT

Client: GeoStrata, LLC
Lab Set ID: 1809325
Project: RNI PV Land Farm Samples / 524-049

Contact: Jamey Sage
Dept: GC
QC Type: MBLK

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: MB-58132	Date Analyzed:	09/18/2018 1650h											
Test Code: 8015-S-TPH-D-O-3546	Date Prepared:	09/17/2018 1204h											
Diesel Range Organics (DRO) (C10-C28)	< 20.0	mg/kg	SW8015D	10.8	20.0								
Oil Range Organics (ORO) (C28-C36)	< 20.0	mg/kg	SW8015D	10.8	20.0								
Surr: 4-Bromofluorobenzene	18.1	mg/kg	SW8015D			33.33		54.4	24 - 112				
Surr: C38	12.6	mg/kg	SW8015D			16.67		75.3	10 - 200				

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QC SUMMARY REPORT

Client: GeoStrata, LLC
Lab Set ID: 1809325
Project: RNI PV Land Farm Samples / 524-049

Contact: Jamey Sage
Dept: MSVOA
QC Type: LCS

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: LCS VOC-2 091718A	Date Analyzed:	09/17/2018 1609h											
Test Code: 8260-S-PPM													
Benzene	0.0195	mg/kg	SW8260C	0.000174	0.00100	0.02000	0	97.6	69 - 135				
Ethylbenzene	0.0195	mg/kg	SW8260C	0.00195	0.00200	0.02000	0	97.4	52 - 147				
Naphthalene	0.0195	mg/kg	SW8260C	0.000272	0.00200	0.02000	0	97.3	57 - 140				
Toluene	0.0201	mg/kg	SW8260C	0.000393	0.00200	0.02000	0	101	63 - 135				
Xylenes, Total	0.0588	mg/kg	SW8260C	0.000393	0.00200	0.06000	0	98.0	50 - 145				
Surr: 1,2-Dichloroethane-d4	0.0501	mg/kg	SW8260C			0.05000		100	72 - 140				
Surr: 4-Bromofluorobenzene	0.0513	mg/kg	SW8260C			0.05000		103	67 - 145				
Surr: Dibromofluoromethane	0.0516	mg/kg	SW8260C			0.05000		103	70 - 130				
Surr: Toluene-d8	0.0510	mg/kg	SW8260C			0.05000		102	61 - 134				

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QC SUMMARY REPORT

Client: GeoStrata, LLC
Lab Set ID: 1809325
Project: RNI PV Land Farm Samples / 524-049

Contact: Jamey Sage
Dept: GC
QC Type: MSD

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: 1809325-001DMSD	Date Analyzed:	09/18/2018 1806h											
Test Code: 8015-S-TPH-D-O-3546	Date Prepared:	09/17/2018 1204h											
Diesel Range Organics (DRO) (C10-C28)	162	mg/kg-dry	SW8015D	11.6	21.5	179.5	27.3	74.8	10 - 230	163	0.765	25	
Oil Range Organics (ORO) (C28-C36)	62.3	mg/kg-dry	SW8015D	11.6	21.5	53.86	0	116	10 - 200	60.3	3.34	25	
Surr: 4-Bromofluorobenzene	24.0	mg/kg-dry	SW8015D			35.91		66.8	10 - 122				
Surr: C38	16.7	mg/kg-dry	SW8015D			17.95		93.1	10 - 200				

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Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

QC SUMMARY REPORT

Client: GeoStrata, LLC
Lab Set ID: 1809325
Project: RNI PV Land Farm Samples / 524-049

Contact: Jamey Sage
Dept: MSVOA
QC Type: MS

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: 1809325-001CMS Date Analyzed: 09/17/2018 1731h													
Test Code: 8260-S-PPM													
Benzene	0.0523	mg/kg-dry	SW8260C	0.000469	0.00270	0.05392	0	97.0	17 - 138				
Ethylbenzene	0.0530	mg/kg-dry	SW8260C	0.00526	0.00539	0.05392	0	98.3	10 - 164				
Naphthalene	0.0449	mg/kg-dry	SW8260C	0.000733	0.00539	0.05392	0	83.3	13 - 156				
Toluene	0.0553	mg/kg-dry	SW8260C	0.00106	0.00539	0.05392	0	102	23 - 168				
Xylenes, Total	0.162	mg/kg-dry	SW8260C	0.00106	0.00539	0.1617	0	100	10 - 160				
Surr: 1,2-Dichloroethane-d4	0.135	mg/kg-dry	SW8260C			0.1348		100	51 - 170				
Surr: 4-Bromofluorobenzene	0.139	mg/kg-dry	SW8260C			0.1348		103	50 - 140				
Surr: Dibromofluoromethane	0.143	mg/kg-dry	SW8260C			0.1348		106	50 - 140				
Surr: Toluene-d8	0.139	mg/kg-dry	SW8260C			0.1348		103	50 - 140				

Report Date: 9/28/2018 Page 30 of 31

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e-mail: awal@awal-labs.com, web: www.awal-labs.com

Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

QC SUMMARY REPORT

Client: GeoStrata, LLC
Lab Set ID: 1809325
Project: RNI PV Land Farm Samples / 524-049

Contact: Jamey Sage
Dept: MSVOA
QC Type: MBLK

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: MB VOC-2 091718A Date Analyzed: 09/17/2018 1650h													
Test Code: 8260-S-PPM													
Benzene	< 0.00100	mg/kg	SW8260C	0.000174	0.00100								
Ethylbenzene	< 0.00200	mg/kg	SW8260C	0.00195	0.00200								
Naphthalene	< 0.00200	mg/kg	SW8260C	0.000272	0.00200								
Toluene	< 0.00200	mg/kg	SW8260C	0.000393	0.00200								
TPH C6-C10 (GRO)	< 0.0200	mg/kg	SW8260C	0.00486	0.0200								
Xylenes, Total	< 0.00200	mg/kg	SW8260C	0.000393	0.00200								
Surr: 1,2-Dichloroethane-d4	0.0514	mg/kg	SW8260C			0.05000		103	72 - 140				
Surr: 4-Bromofluorobenzene	0.0527	mg/kg	SW8260C			0.05000		105	67 - 145				
Surr: Dibromofluoromethane	0.0526	mg/kg	SW8260C			0.05000		105	70 - 130				
Surr: Toluene-d8	0.0513	mg/kg	SW8260C			0.05000		103	61 - 134				

Report Date: 9/28/2018 Page 29 of 31

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Sundry Number: 135025 Facility Number: 274

American West Analytical Laboratories

Rpt Emailed: UL

WORK ORDER Summary

Work Order: **1809325** Page 1 of 2

Due Date: 9/28/2018

Client: GeoStrata, LLC
Client ID: GEO250 **Contact:** Jamey Sage
Project: RNI PV Land Farm Samples / 524-049 **QC Level:** II+ WO Type: Standard
Comments: QC 2+;

Sample ID	Client Sample ID	Collected Date	Received Date	Test Code	Matrix	Sel	Storage	
1809325-001A	PV-NW-BGSS	9/12/2018 1130h	9/14/2018 1530h	COND-S-9050A	Soil		df - wc	1
				ESP			df - wc	
				PMOIST			df - wc	
				SAR-S			df - wc	
				SOIL-PR			df - wc	
1809325-001B				1311LM-PR			TCLP	
				3005A-TCLP-PR			TCLP	
				6020B-TCLP			TCLP	
				7 SEL Analytes: AS BA CD CR PB SE AG				
				HG-TCLP-7470A			TCLP	
				1 SEL Analytes: HG				
				HG-TCLP-PR			TCLP	
1809325-001C				8260-S-PPM			VOCFridge	
				Test Group: 8260-S-MBTEXN/GRO; # of Analytes: 6 / # of Surr: 4				
1809325-001D				3546-TPH-D-O-PR			df - tph / oro	
				8015-S-TPH-D-O-3546			df - tph / oro	
				Test Group: 8015-S-TPH-D-O-3546; # of Analytes: 2 / # of Surr: 2				
1809325-002A	PV-NE-PGSS	9/12/2018 1145h	9/14/2018 1530h	COND-S-9050A	Soil		df - wc	1
				ESP			df - wc	
				PMOIST			df - wc	
				SAR-S			df - wc	
				SOIL-PR			df - wc	
1809325-002B				1311LM-PR			TCLP	
				3005A-TCLP-PR			TCLP	
				6020B-TCLP			TCLP	
				7 SEL Analytes: AS BA CD CR PB SE AG				
				HG-TCLP-7470A			TCLP	
				1 SEL Analytes: HG				
				HG-TCLP-PR			TCLP	
1809325-002C				8260-S-PPM			VOCFridge	
				Test Group: 8260-S-MBTEXN/GRO; # of Analytes: 6 / # of Surr: 4				
1809325-002D				3546-TPH-D-O-PR			df - tph / oro	

Printed: 09/18/18 11:21 LABORATORY CHECK: %M ☐ RT ☐ CN ☐ TAT ☐ QC ☐ LUO ☐ HOK_____ HOK_____ HOK_____ COC Emailed_____

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Kyle F. Gross
Laboratory Director

Jose Rocha
QA Officer

QC SUMMARY REPORT

Client: GeoStrata, LLC **Contact:** Jamey Sage
Lab Set ID: 1809325 **Dept:** MSVOA
Project: RNI PV Land Farm Samples / 524-049 **QC Type:** MSD

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
Lab Sample ID: 1809325-001CMSD Date Analyzed: 09/17/2018 1751h													
Test Code: 8260-S-PPM													
Benzene	0.0509	mg/kg-dry	SW8260C	0.000467	0.00268	0.05370	0	94.7	17 - 138	0.0523	2.80	35	
Ethylbenzene	0.0524	mg/kg-dry	SW8260C	0.00524	0.00537	0.05370	0	97.6	10 - 164	0.053	1.12	35	
Naphthalene	0.0445	mg/kg-dry	SW8260C	0.000730	0.00537	0.05370	0	82.8	13 - 156	0.0449	1.06	35	
Toluene	0.0530	mg/kg-dry	SW8260C	0.00106	0.00537	0.05370	0	98.6	23 - 168	0.0553	4.23	35	
Xylenes, Total	0.158	mg/kg-dry	SW8260C	0.00106	0.00537	0.1611	0	98.0	10 - 160	0.162	2.37	35	
Surr: 1,2-Dichloroethane-d4	0.129	mg/kg-dry	SW8260C			0.1342		96.1	51 - 170				
Surr: 4-Bromofluorobenzene	0.134	mg/kg-dry	SW8260C			0.1342		100	50 - 140				
Surr: Dibromofluoromethane	0.142	mg/kg-dry	SW8260C			0.1342		105	50 - 140				
Surr: Toluene-d8	0.136	mg/kg-dry	SW8260C			0.1342		102	50 - 140				

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Fax # (801) 263-8687 Email: awal@awal-labs.com
www.awal-labs.com

CHAIN OF CUSTODY

1809325
AWAL Lab Sample Set #
Page 1 of 1

All analysis will be conducted using NELAP accredited methods and all data will be reported using AWAL's standard analyte lists and reporting limits (PQL) unless specifically requested otherwise on this Chain of Custody and/or attached documentation.

QC Level: 1 2 (2+) 3 3+
Turn Around Time: 1 2 3 4 5 (Stnd)
Due Date: 9/28/18
5:00 pm on the day they are due

Client: GeoStrata
Address: 14425 S Center Point Way
Bluffdale, UT 84065
Contact: Jamey Sage
Phone #: 801-232-0029 Cell #: 801-232-0029
Email: jamess@geostrata-llc.com
Project Name: RNI PV Land Farm Samples
Project #: 524-049
PO #: 524-049
Sampler Name: J. Sage

☐ Report down to the MDL
☐ Include EDD:
☐ Lab Filter for:
☐ Field Filtered For:

For Compliance With:
☐ NELAP
☐ RCRA
☐ CWA
☐ SDWA
☐ ELAP / A2LA
☐ NLLAP
☐ Non-Compliance
☐ Other:

Laboratory Use Only
Samples Were:
1 Shipped or hand delivered
2 Ambient or Chilled
3 Temperature 3.0 °C
4 Received Broken/Leaking (Improperly Sealed) Y N
5 Properly Preserved Y N Checked at bench
6 Received Within Holding Times Y N

COC Tape Was:
1 Present on Outer Package Y N NA
2 Unbroken on Outer Package Y N NA
3 Present on Sample Y N NA
4 Unbroken on Sample Y N NA
Discrepancies Between Sample Labels and COC Record? Y N

	Sample ID:	Date Sampled	Time Sampled	# of Containers	Sample Matrix	EC	SAR	ESP	RCRA 8 Metals	TPH-GRO BTEXN	TPH-DRO	TPH-ORO				Known Hazards & Sample Comments
1	PV-NW-BGSS	9/12/2018	1130	4	s	x	x	x	x	x	x	x				
2	PV-NE-BGSS	9/12/2018	1145	4	s	x	x	x	x	x	x	x				
3	PV-SE-BGSS	9/12/2018	1200	4	s	x	x	x	x	x	x	x				
4																
5																
6																
7																
8																
9																
10																
11																
12																

TCLP

Relinquished by:	Date	Received by:	Date	Special Instructions:
Signature: Jamey Sage	9/14/18	Signature: Denise Brown	9/14/18	
Print Name:	Time: 1530	Print Name: Denise Brown	Time: 1530	
Relinquished by: Signature	Date:	Received by: Signature	Date:	
Print Name:	Time:	Print Name:	Time:	
Relinquished by: Signature	Date:	Received by: Signature	Date:	
Print Name:	Time:	Print Name:	Time:	
Relinquished by: Signature	Date:	Received by: Signature	Date:	* Please Call Jamey Sage @ 801-232-0029
Print Name:	Time:	Print Name:	Time:	with any questions/comments/suggestions.
				Thanks

WORK ORDER Summary

Work Order: 1809325 Page 2 of 2
Client: GeoStrata, LLC
Due Date: 9/28/2018

Sample ID	Client Sample ID	Collected Date	Received Date	Test Code	Matrix	Sel	Storage	
1809325-002D	PV-NE-PGSS	9/12/2018 1145h	9/14/2018 1530h	8015-S-TPH-D-O-3546	Soil		df - tph / oro	1
				Test Group: 8015-S-TPH-D-O-3546; # of Analytes: 2 / # of Surr: 2				
1809325-003A	PV-SE-BGSS	9/12/2018 1200h	9/14/2018 1530h	COND-S-9050A	Soil		df - wc	1
				ESP			df - wc	
				PMOIST			df - wc	
				SAR-S			df - wc	
				SOIL-PR			df - wc	
1809325-003B				1311LM-PR			TCLP	
				3005A-TCLP-PR			TCLP	
				6020B-TCLP			TCLP	
				7 SEL Analytes: AS BA CD CR PB SE AG				
				HG-TCLP-7470A			TCLP	
				1 SEL Analytes: HG				
				HG-TCLP-PR			TCLP	
1809325-003C				8260-S-PPM			VOCFridge	
				Test Group: 8260-S-MBTEXN/GRO; # of Analytes: 6 / # of Surr: 4				
1809325-003D				3546-TPH-D-O-PR			df - tph / oro	
				8015-S-TPH-D-O-3546			df - tph / oro	
				Test Group: 8015-S-TPH-D-O-3546; # of Analytes: 2 / # of Surr: 2				

Printed: 09/18/18 11:21 LABORATORY CHECK: %M ☐ RT ☐ CN ☐ TAT ☐ QC ☐ LUO ☐ HOK_____ HOK_____ HOK_____ COC Emailed_____

Soil Sampling

Soil Sampling (1 of 25)

December 13, 2023

Mr. Kevin Darcy, VP
Wasatch Energy Management
3319 N. University Avenue, Suite 200
Provo, Utah 84604

Subject: **Letter Report – Drilling Ponds Soil Sampling**
Rewater Myton Site
Myton, Utah
Project Number 2381400527

Dear Mr. Darcy:

WSP USA (WSP) was retained by Rewater, LLC (Rewater) to conduct soil sampling of an area at the Rewater facility (Site) planned for pond construction ahead of on-site oil and gas drilling operations. The Site is located approximately 9 miles southwest of Myton, Utah (**Figure 1**).

The purpose of this sampling effort was to collect background soil characteristics of the native near-surface soils in the area of the proposed ponds. The soil results will be compared to the Utah Division of Oil, Gas and Mining (UDOGM) cleanup standards and aid with site restoration activities after the completion of planned drilling operations.

SOIL SAMPLING

A total of five ponds could be constructed on the north part of the Site and includes: planned re-use north ponds #1 and #2, proposed re-use ponds #3 and #4, and proposed re-use basin #2. The approximate area of each pond is 250,000 square feet in size.

On November 2, 2023, a field scientist from WSP's Salt Lake City office conducted the soil sampling in the area of the proposed ponds prior to construction activities at the drill pad site. Surface soils approximately 0.2 inches in depth were sampled using the following methods:

- Each pond was split into two sample areas, a north (A) and a south (B) half to enable a thorough sampling approach.
- Six grab samples from each half were collected then composited into a single sample representative sample of each pond half, as shown on **Figure 1**. A total of 10 soil samples were collected from inside the five proposed pond footprints (Pond-1A and Pond-1B through Pond-5A and Pond-5B).
- All new sampling equipment was used for sample collection and compositing of individual area samples. Disposable nitrile gloves and sample bags were used for each sample location.
- The samples were appropriately containerized and shipped to Pace Analytical laboratory in Mount Juliet, Tennessee under chain-of-custody for analysis of the following:
    - Eight RCRA Total Metals – Mercury (Hg; EPA Method 7471A), Arsenic (As), Barium (Ba), Cadmium (Cd), Chromium (Cr), Lead (Pb), Selenium (Se), and Silver (Ag) – all EPA Method 6010D.

WSP USA Environment & Infrastructure Inc.
10876 South River Front Parkway, Suite 250
South Jordan, Utah 84095

T: +1-801-999-2000
F: +1-801-999-2027
wsp.com

- Physical Parameters: Moisture (% solids, EPA Method 2540); Sodium Adsorption Ratio (SAR), Exchangeable Sodium Percentage (ESP), and Specific Conductance (SC) - all EPA Method 9050A.

ANALYTICAL RESULTS

Laboratory analytical reports for the 10 composite soil samples submitted for analysis are attached as **Attachment A**. **Table 1** provides a summary of those results along with UDOGM soil cleanup standards for direct comparison (UDOGM, 2020). A general breakdown of laboratory results follows:

- Moisture content in the 10 composite pond samples (100 - Total Solids %) ranged from 2.5 to 14.6%, with an average of 6.8% (very dry).
- Soil characteristics properties for SAR, ESP, and SC were within acceptable ranges for soil when compared to the UDOGM cleanup standards.
- Of the eight RCRA metals, only Arsenic was present at a concentration above UDOGM cleanup standards at a concentration of 4.18 mg/kg, and only in the Pond-1B sample.
- Reported metal concentrations of Hg, Se, and Ag were none detect and concentrations of remaining metals (Ba, Cd, Cr, and Pb) all at concentrations well below UDOGM cleanup standards.

CONCLUSIONS and RECOMMENDATIONS

Soil characteristics properties were established in the area of the five proposed ponds prior to drilling activities at the Site. Soil characteristics properties for SAR, ESP, SC and metals were within acceptable ranges for surface soil when compared to the UDOGM cleanup standards. The soil sample (Pond-1B) collected from proposed pond-1 area had a reported arsenic concentration of 4.18 mg/kg which was slightly above the UDOGM standard for Arsenic. With consideration of the planned near-future use of the Site (an active drilling pad) for drilling operations it is our recommendation that no further soil investigation or cleanup is warranted at this time.

SIGNATURES

If you have any questions, please do not hesitate to contact the undersigned.

Sincerely,

Corey Buchanan, P.G.
Project Geologist

Bryan Morse
Senior Project Manager

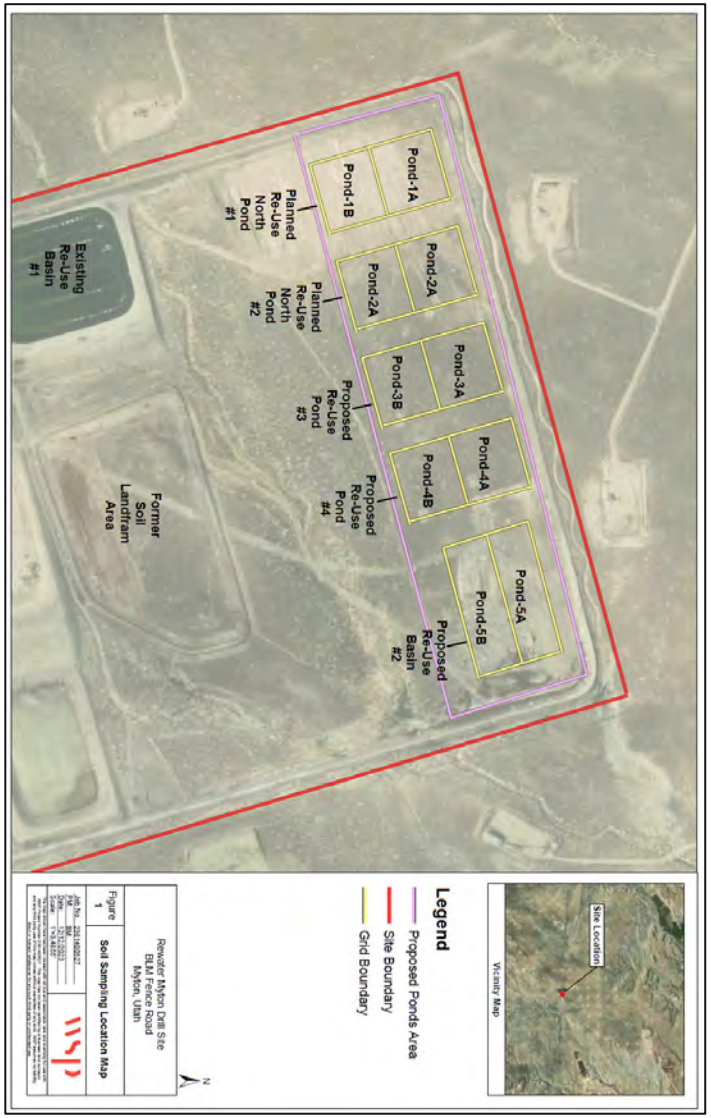
ATTACHMENTS
Figure 1 – Site Map with Sampling Locations
Table 1 – Soil Analytical Results Summary
Attachment A – Pace Analytical Laboratory Analytical Reports

REFERENCES
UDOGM, 2020. Utah Division of Oil, Gas and Mining Guidance Document, prepared by Ammon McDonald, Environmental Scientist. January.

Soil Sampling (2 of 25)

ATTACHMENT

FIGURE



Soil Sampling (3 of 25)

TABLE

Table 1
Soil Analytical Results
Rewater Site

Client Sample ID			POND 1A		POND 1B		POND 2A		POND 2B		POND 3A		POND 3B	
Sample Depth			0-2"		0-2"		0-2"		0-2"		0-2"		0-2"	
Date Collected			11/2/2023		11/2/2023		11/2/2023		11/2/2023		11/2/2023		11/2/2023	
Method	Analyte	DOC Cleanup Level/-EPA RSL	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
9090	SAR	≥12"	-	2.63		2.00		1.41		0.487		0.186		0.414	
9090	ESP	≥15"	%	2.55		1.67		0.811		-0.619		-0.966		-0.653	
9090	SC	≥4"	mmhos/cm	0.189		0.793		0.177		0.176		0.121		0.170	
7471	Mercury	46	mg/kg	<0.0180		<0.0180		<0.0180		<0.0180		<0.0180		<0.0180	
6010	Arsenic	3	mg/kg	1.37	J	4.18		1.85	J	1.03	J	0.940	J	1.13	J
6010	Barium	220000	mg/kg	169		189		179		176		197		189	
6010	Cadmium	930	mg/kg	0.0722	J	<0.0471		0.100	J	0.0694	J	0.170	J	0.129	J
6010	Chromium (Total)	NSL	mg/kg	8.09		13.3		6.60		11.4		6.36		9.57	
6010	Lead	800	mg/kg	7.95		6.72		7.85		9.32		10.5		9.11	
6010	Selenium	5800	mg/kg	<0.764		<0.764		<0.764		<0.764		<0.764		<0.764	
6010	Silver	5800	mg/kg	<0.127		<0.127		<0.127		<0.127		<0.127		<0.127	

Notes:
SAR - Sodium Absorption Ratio
ESP - Exchangeable Sodium Percentage
SC - Specific Conductance
* - Utah Division of Oil, Gas & Mining Level
EPA Regional Screening Level (RSL) for Industrial Soil
NSL - No Standard Level Level
Bold - Concentration exceeds Cleanup Level
Bold Italicized - Concentration exceeds laboratory MDL
Non-detect results are reported less than the MDL
MDL - Method Detection Limit
Qual - Qualifier
Qualifiers:
J - The identification of the analyte is acceptable; the reported value is an estimate

Page 1 of 2

Soil Sampling (4 of 25)

B ANALYTICAL REPORT

Table 1
Soil Analytical Results
Rewater Site

Client Sample ID			POND 4A		POND 4B		POND 5A		POND 5B	
Sample Depth			0-2"		0-2"		0-2"		0-2"	
Date Collected			11/2/2023		11/2/2023		11/2/2023		11/2/2023	
Method	Analyte	DOC Cleanup Level - CDPHE RSL	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual
9050	SAR	≥12*	-	1.17		0.901		0.945		2.0	
9050	ESP	≥15*	%	0.458		-0.375		0.133		1.690	
9050	SC	≥4*	mmhos/cm	0.146		0.143		0.815		0.390	
7471	Mercury	46	mg/kg	<0.0180		<0.0180		<0.0180		<0.0180	
6010	Arsenic	3	mg/kg	1.91	J	1.69	J	1.32	J	1.72	J
6010	Barium	220000	mg/kg	197		154		187		203	
6010	Cadmium	980	mg/kg	0.110		0.113	J	<0.0471		0.119	J
6010	Chromium (Total)	NSL	mg/kg	10.8		8.8		9.5		10.5	
6010	Lead	800	mg/kg	9.39		8.27		5.73		8.17	
6010	Selenium	5800	mg/kg	<0.764		<0.764		<0.764		<0.764	
6010	Silver	5800	mg/kg	<0.127		<0.127		<0.127		<0.127	

Notes:
SAR - Sodium Adsorption Ratio
ESP - Exchangeable Sodium Percentage
SC - Specific Conductance
* - Utah Division of Oil & Gas Cleanup Level
EPA Regional Screening Level (RSL) for Industrial Soils
NSL - No Screening Level
mg/kg - milligrams per kilogram
Italic - Detected analyte concentration exceeded laboratory MDL
Bold - Detected analyte concentration exceeded cleanup level
Italic Highlighted - Detected analyte concentration exceeded cleanup level
J - The reported value is estimated because it is less than the MDL
MDL - Method Detection Limit
Qual - Qualifier

Qualifiers:
J - The identification of the analyte is acceptable; the reported value is an estimate

Soil Sampling (5 of 25)

Pace Analytical

ANALYTICAL REPORT

November 13, 2023

WSP (Formely Wood E&I)-UT

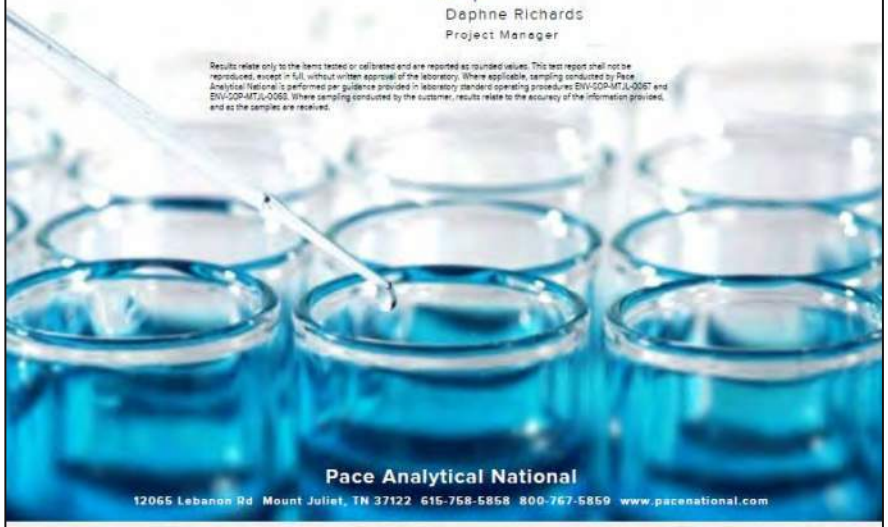
Sample Delivery Group:	L1673940
Samples Received:	11/04/2023
Project Number:	00147368
Description:	Rewater
Report To:	Bryan Morse 10876 South River Front Parkway South Jordan, UT 84095

Cp Tc Ss Cn Sr Qc Gl Al Sc

Entire Report Reviewed By: Daphne R Richards

Daphne Richards
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0060. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.



Pace Analytical National

12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
WSP (Formely Wood E&I)-UT	00147368	L1673940	11/13/23 11:11	1 of 21

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Cp Tc Ss Cn Sr Qc Gl Al Sc

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Soil Sampling (6 of 25)

SAMPLE SUMMARY

POND-1A L1673940-01 Solid
Collected by: John Harris | Collected date/time: 11/02/23 10:40 | Received date/time: 11/04/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG2168157	1	11/10/23 11:56	11/10/23 11:56	JTM	Mt. Juliet, TN
Mercury by Method 7471A	WG2166793	1	11/10/23 12:49	11/10/23 14:35	LAS	Mt. Juliet, TN
Metals (ICP) by Method 6010D	WG2168853	1	11/10/23 12:03	11/10/23 16:08	SPL	Mt. Juliet, TN

POND-1B L1673940-02 Solid
Collected by: John Harris | Collected date/time: 11/02/23 10:50 | Received date/time: 11/04/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG2168157	1	11/10/23 11:40	11/10/23 11:40	JTM	Mt. Juliet, TN
Mercury by Method 7471A	WG2166793	1	11/10/23 12:49	11/10/23 14:42	LAS	Mt. Juliet, TN
Metals (ICP) by Method 6010D	WG2168853	1	11/10/23 12:03	11/10/23 16:11	SPL	Mt. Juliet, TN

POND-2A L1673940-03 Solid
Collected by: John Harris | Collected date/time: 11/02/23 11:20 | Received date/time: 11/04/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG2168157	1	11/10/23 11:57	11/10/23 11:57	JTM	Mt. Juliet, TN
Mercury by Method 7471A	WG2166793	1	11/10/23 12:49	11/10/23 14:46	LAS	Mt. Juliet, TN
Metals (ICP) by Method 6010D	WG2168853	1	11/10/23 12:03	11/10/23 16:14	SPL	Mt. Juliet, TN

POND-2B L1673940-04 Solid
Collected by: John Harris | Collected date/time: 11/02/23 11:40 | Received date/time: 11/04/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG2168157	1	11/10/23 11:26	11/10/23 11:26	JTM	Mt. Juliet, TN
Mercury by Method 7471A	WG2166793	1	11/10/23 12:49	11/10/23 14:47	LAS	Mt. Juliet, TN
Metals (ICP) by Method 6010D	WG2168853	1	11/10/23 12:03	11/10/23 16:22	SPL	Mt. Juliet, TN

POND-3A L1673940-05 Solid
Collected by: John Harris | Collected date/time: 11/02/23 12:10 | Received date/time: 11/04/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG2168157	1	11/10/23 11:52	11/10/23 11:52	JTM	Mt. Juliet, TN
Mercury by Method 7471A	WG2166793	1	11/10/23 12:49	11/10/23 14:50	LAS	Mt. Juliet, TN
Metals (ICP) by Method 6010D	WG2168853	1	11/10/23 12:03	11/10/23 16:25	SPL	Mt. Juliet, TN

POND-3B L1673940-06 Solid
Collected by: John Harris | Collected date/time: 11/02/23 12:25 | Received date/time: 11/04/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG2168157	1	11/10/23 11:49	11/10/23 11:49	JTM	Mt. Juliet, TN
Mercury by Method 7471A	WG2166793	1	11/10/23 12:49	11/10/23 14:52	LAS	Mt. Juliet, TN
Metals (ICP) by Method 6010D	WG2168853	1	11/10/23 12:03	11/10/23 16:28	SPL	Mt. Juliet, TN

Cp | Tc | Ss | Cn | Sr | Qc | Gl | Al | Sc

ACCOUNT: WSP (Formely Wood E&I)-UT | PROJECT: 00147360 | SDG: L1673940 | DATE/TIME: 11/13/23 11:11 | PAGE: 3 of 21

SAMPLE SUMMARY

POND-4A L1673940-07 Solid
Collected by: John Harris | Collected date/time: 11/02/23 12:45 | Received date/time: 11/04/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG2168157	1	11/10/23 12:00	11/10/23 12:00	JTM	Mt. Juliet, TN
Mercury by Method 7471A	WG2166793	1	11/10/23 12:49	11/10/23 15:00	LAS	Mt. Juliet, TN
Metals (ICP) by Method 6010D	WG2168853	1	11/10/23 12:03	11/10/23 16:32	SPL	Mt. Juliet, TN

POND-4B L1673940-08 Solid
Collected by: John Harris | Collected date/time: 11/02/23 13:05 | Received date/time: 11/04/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG2168157	1	11/10/23 11:43	11/10/23 11:43	JTM	Mt. Juliet, TN
Mercury by Method 7471A	WG2166793	1	11/10/23 12:49	11/10/23 15:02	LAS	Mt. Juliet, TN
Metals (ICP) by Method 6010D	WG2168853	1	11/10/23 12:03	11/10/23 16:35	SPL	Mt. Juliet, TN

POND-5A L1673940-09 Solid
Collected by: John Harris | Collected date/time: 11/02/23 13:50 | Received date/time: 11/04/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG2168157	1	11/10/23 12:03	11/10/23 12:03	JTM	Mt. Juliet, TN
Mercury by Method 7471A	WG2166793	1	11/10/23 12:49	11/10/23 15:05	LAS	Mt. Juliet, TN
Metals (ICP) by Method 6010D	WG2168853	1	11/10/23 12:03	11/10/23 16:37	SPL	Mt. Juliet, TN

POND-5B L1673940-10 Solid
Collected by: John Harris | Collected date/time: 11/02/23 14:00 | Received date/time: 11/04/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG2168157	1	11/10/23 11:46	11/10/23 11:46	JTM	Mt. Juliet, TN
Mercury by Method 7471A	WG2166793	1	11/10/23 12:49	11/10/23 15:07	LAS	Mt. Juliet, TN
Metals (ICP) by Method 6010D	WG2168853	1	11/10/23 12:03	11/10/23 16:41	SPL	Mt. Juliet, TN

Cp | Tc | Ss | Cn | Sr | Qc | Gl | Al | Sc

ACCOUNT: WSP (Formely Wood E&I)-UT | PROJECT: 00147360 | SDG: L1673940 | DATE/TIME: 11/13/23 11:11 | PAGE: 4 of 21

Soil Sampling (7 of 25)

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Daphne R Richards

Daphne Richards
Project Manager

Cp Tc Ss Cn Sr Qc Gl Al Sc

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
WSP (Formely Wood E&I)-UT	00147360	L1673940	11/13/23 11:11	5 of 21

POND-1A — SAMPLE RESULTS - 01

Collected date/time: 11/02/23 10:40 — L1673940

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	2.63		1	11/10/2023 11:55	WG2168157

Calculated Results

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Exchangeable Sodium Percentage	2.55		1	11/10/2023 11:55	WG2168157

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	U		0.0180	0.0400	1	11/10/2023 14:35	WG2166793

Metals (ICP) by Method 6010D

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	1.37	J	0.518	2.00	1	11/10/2023 16:08	WG2168853
Barium	189		0.0852	0.500	1	11/10/2023 16:08	WG2168853
Cadmium	0.0722	J	0.0471	0.500	1	11/10/2023 16:08	WG2168853
Chromium	8.09		0.133	1.00	1	11/10/2023 16:08	WG2168853
Lead	7.96		0.208	0.500	1	11/10/2023 16:08	WG2168853
Selenium	U		0.764	2.00	1	11/10/2023 16:08	WG2168853
Silver	U		0.127	1.00	1	11/10/2023 16:08	WG2168853

Cp Tc Ss Cn Sr Qc Gl Al Sc

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
WSP (Formely Wood E&I)-UT	00147360	L1673940	11/13/23 11:11	6 of 21

Soil Sampling (8 of 25)

POND-1B
Collected date/time: 11/02/23 10:50

SAMPLE RESULTS - 02
L1673940

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	2.00		1	11/10/2023 11:40	WG2168157

Calculated Results

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Exchangeable Sodium Percentage	1.67		1	11/10/2023 11:40	WG2168157

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	U		0.0180	0.0400	1	11/10/2023 14:42	WG2166793

Metals (ICP) by Method 6010D

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	4.18		0.518	2.00	1	11/10/2023 16:11	WG2168853
Barium	169		0.0852	0.500	1	11/10/2023 16:11	WG2168853
Cadmium	U		0.0471	0.500	1	11/10/2023 16:11	WG2168853
Chromium	13.3		0.133	1.00	1	11/10/2023 16:11	WG2168853
Lead	6.72		0.208	0.500	1	11/10/2023 16:11	WG2168853
Selenium	U		0.764	2.00	1	11/10/2023 16:11	WG2168853
Silver	U		0.127	1.00	1	11/10/2023 16:11	WG2168853

1 Cp 2 Tc 3 Ss 4 Cn 5 Sr 6 Qc 7 Gl 8 Al 9 Sc

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
WSP (Formely Wood E&I)-UT	00147366	L1673940	11/13/23 11:11	7 of 21

POND-2A
Collected date/time: 11/02/23 11:20

SAMPLE RESULTS - 03
L1673940

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	1.41		1	11/10/2023 11:57	WG2168157

Calculated Results

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Exchangeable Sodium Percentage	0.811		1	11/10/2023 11:57	WG2168157

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	U		0.0180	0.0400	1	11/10/2023 14:45	WG2166793

Metals (ICP) by Method 6010D

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	1.85	J	0.518	2.00	1	11/10/2023 16:14	WG2168853
Barium	179		0.0852	0.500	1	11/10/2023 16:14	WG2168853
Cadmium	0.100	J	0.0471	0.500	1	11/10/2023 16:14	WG2168853
Chromium	6.60		0.133	1.00	1	11/10/2023 16:14	WG2168853
Lead	7.85		0.208	0.500	1	11/10/2023 16:14	WG2168853
Selenium	U		0.764	2.00	1	11/10/2023 16:14	WG2168853
Silver	U		0.127	1.00	1	11/10/2023 16:14	WG2168853

1 Cp 2 Tc 3 Ss 4 Cn 5 Sr 6 Qc 7 Gl 8 Al 9 Sc

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
WSP (Formely Wood E&I)-UT	00147366	L1673940	11/13/23 11:11	8 of 21

Soil Sampling (9 of 25)

POND-2B
Collected date/time: 11/02/23 11:40

SAMPLE RESULTS - 04
L1673940

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.437		1	11/10/2023 11:26	WG2168157

Calculated Results

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Exchangeable Sodium Percentage	-0.619		1	11/10/2023 11:26	WG2168157

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	U		0.0180	0.0400	1	11/10/2023 14:47	WG2166793

Metals (ICP) by Method 6010D

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	1.03	J	0.518	2.00	1	11/10/2023 16:22	WG2168853
Barium	176		0.0852	0.500	1	11/10/2023 16:22	WG2168853
Cadmium	0.0684	J	0.0471	0.500	1	11/10/2023 16:22	WG2168853
Chromium	11.4		0.133	1.00	1	11/10/2023 16:22	WG2168853
Lead	9.32		0.208	0.500	1	11/10/2023 16:22	WG2168853
Selenium	U		0.764	2.00	1	11/10/2023 16:22	WG2168853
Silver	U		0.127	1.00	1	11/10/2023 16:22	WG2168853

1 Cp 2 Tc 3 Ss 4 Cn 5 Sr 6 Qc 7 Gl 8 Al 9 Sc

ACCOUNT: WSP (Formely Wood E&I)-UT | PROJECT: 00147366 | SDG: L1673940 | DATE/TIME: 11/13/23 11:11 | PAGE: 9 of 21

POND-3A
Collected date/time: 11/02/23 12:10

SAMPLE RESULTS - 05
L1673940

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.186		1	11/10/2023 11:52	WG2168157

Calculated Results

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Exchangeable Sodium Percentage	-0.996		1	11/10/2023 11:52	WG2168157

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	U		0.0180	0.0400	1	11/10/2023 14:50	WG2166793

Metals (ICP) by Method 6010D

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	0.940	J	0.518	2.00	1	11/10/2023 16:25	WG2168853
Barium	197		0.0852	0.500	1	11/10/2023 16:25	WG2168853
Cadmium	0.170	J	0.0471	0.500	1	11/10/2023 16:25	WG2168853
Chromium	6.36		0.133	1.00	1	11/10/2023 16:25	WG2168853
Lead	10.5		0.208	0.500	1	11/10/2023 16:25	WG2168853
Selenium	U		0.764	2.00	1	11/10/2023 16:25	WG2168853
Silver	U		0.127	1.00	1	11/10/2023 16:25	WG2168853

1 Cp 2 Tc 3 Ss 4 Cn 5 Sr 6 Qc 7 Gl 8 Al 9 Sc

ACCOUNT: WSP (Formely Wood E&I)-UT | PROJECT: 00147366 | SDG: L1673940 | DATE/TIME: 11/13/23 11:11 | PAGE: 10 of 21

Soil Sampling (10 of 25)

POND-3B — SAMPLE RESULTS - 06

Collected date/time: 11/02/23 12:25 — L1673940

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.414		1	11/10/2023 11:49	WG2168157

Calculated Results

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Exchangeable Sodium Percentage	-0.653		1	11/10/2023 11:49	WG2168157

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	U		0.0180	0.0400	1	11/10/2023 14:52	WG2166793

Metals (ICP) by Method 6010D

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	1.13	J	0.518	2.00	1	11/10/2023 16:28	WG2168853
Barium	189		0.0852	0.500	1	11/10/2023 16:28	WG2168853
Cadmium	0.123	J	0.0471	0.500	1	11/10/2023 16:28	WG2168853
Chromium	9.57		0.133	1.00	1	11/10/2023 16:28	WG2168853
Lead	9.11		0.208	0.500	1	11/10/2023 16:28	WG2168853
Selenium	U		0.764	2.00	1	11/10/2023 16:28	WG2168853
Silver	U		0.127	1.00	1	11/10/2023 16:28	WG2168853

1 Cc 2 Tc 3 Ss 4 Cn 5 Sr 6 Qc 7 Gl 8 Al 9 Sc

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
WSP (Formely Wood E&I)-UT	00147360	L1673940	11/13/23 11:11	11 of 21

POND-4A — SAMPLE RESULTS - 07

Collected date/time: 11/02/23 12:45 — L1673940

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	1.17		1	11/10/2023 12:00	WG2168157

Calculated Results

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Exchangeable Sodium Percentage	0.458		1	11/10/2023 12:00	WG2168157

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	U		0.0180	0.0400	1	11/10/2023 15:00	WG2166793

Metals (ICP) by Method 6010D

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	1.91	J	0.518	2.00	1	11/10/2023 16:32	WG2168853
Barium	197		0.0852	0.500	1	11/10/2023 16:32	WG2168853
Cadmium	0.110	J	0.0471	0.500	1	11/10/2023 16:32	WG2168853
Chromium	10.8		0.133	1.00	1	11/10/2023 16:32	WG2168853
Lead	9.29		0.208	0.500	1	11/10/2023 16:32	WG2168853
Selenium	U		0.764	2.00	1	11/10/2023 16:32	WG2168853
Silver	U		0.127	1.00	1	11/10/2023 16:32	WG2168853

1 Cp 2 Tc 3 Ss 4 Cn 5 Sr 6 Qc 7 Gl 8 Al 9 Sc

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
WSP (Formely Wood E&I)-UT	00147360	L1673940	11/13/23 11:11	12 of 21

Soil Sampling (11 of 25)

POND-4B — SAMPLE RESULTS - 08

Collected date/time: 11/02/23 13:05 — L1673940

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.601		1	11/10/2023 11:43	WG2168157

Calculated Results

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Exchangeable Sodium Percentage	-0.375		1	11/10/2023 11:43	WG2168157

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	U		0.0180	0.0400	1	11/10/2023 15:02	WG2166793

Metals (ICP) by Method 6010D

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	1.03	J	0.518	2.00	1	11/10/2023 16:35	WG2168853
Barium	154		0.0852	0.500	1	11/10/2023 16:35	WG2168853
Cadmium	0.113	J	0.0471	0.500	1	11/10/2023 16:35	WG2168853
Chromium	8.75		0.133	1.00	1	11/10/2023 16:35	WG2168853
Lead	8.27		0.208	0.500	1	11/10/2023 16:35	WG2168853
Selenium	U		0.764	2.00	1	11/10/2023 16:35	WG2168853
Silver	U		0.127	1.00	1	11/10/2023 16:35	WG2168853

1 Cp 2 Tc 3 Ss 4 Cn 5 Sr 6 Qc 7 Gl 8 Al 9 Sc

ACCOUNT: WSP (Formely Wood E&I)-UT | PROJECT: 00147360 | SDG: L1673940 | DATE/TIME: 11/13/23 11:11 | PAGE: 13 of 21

POND-5A — SAMPLE RESULTS - 09

Collected date/time: 11/02/23 13:50 — L1673940

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.945		1	11/10/2023 12:03	WG2168157

Calculated Results

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Exchangeable Sodium Percentage	0.133		1	11/10/2023 12:03	WG2168157

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	U		0.0180	0.0400	1	11/10/2023 15:05	WG2166793

Metals (ICP) by Method 6010D

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	1.32	J	0.518	2.00	1	11/10/2023 16:37	WG2168853
Barium	187		0.0852	0.500	1	11/10/2023 16:37	WG2168853
Cadmium	U		0.0471	0.500	1	11/10/2023 16:37	WG2168853
Chromium	9.53		0.133	1.00	1	11/10/2023 16:37	WG2168853
Lead	5.73		0.208	0.500	1	11/10/2023 16:37	WG2168853
Selenium	U		0.764	2.00	1	11/10/2023 16:37	WG2168853
Silver	U		0.127	1.00	1	11/10/2023 16:37	WG2168853

1 Cp 2 Tc 3 Ss 4 Cn 5 Sr 6 Qc 7 Gl 8 Al 9 Sc

ACCOUNT: WSP (Formely Wood E&I)-UT | PROJECT: 00147360 | SDG: L1673940 | DATE/TIME: 11/13/23 11:11 | PAGE: 14 of 21

Soil Sampling (12 of 25)

POND-5B
Collected date/time: 11/02/23 14:00

SAMPLE RESULTS - 10
L1673940

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	2.02		1	11/10/2023 11:46	WG2168157

Calculated Results

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Exchangeable Sodium Percentage	1.69		1	11/10/2023 11:46	WG2168157

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	U		0.0180	0.0400	1	11/10/2023 15:07	WG2166793

Metals (ICP) by Method 6010D

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	1.72	J	0.518	2.00	1	11/10/2023 16:41	WG2168853
Barium	203		0.0852	0.500	1	11/10/2023 16:41	WG2168853
Cadmium	0.119	J	0.0471	0.500	1	11/10/2023 16:41	WG2168853
Chromium	10.5		0.133	1.00	1	11/10/2023 16:41	WG2168853
Lead	8.17		0.208	0.500	1	11/10/2023 16:41	WG2168853
Selenium	U		0.764	2.00	1	11/10/2023 16:41	WG2168853
Silver	U		0.127	1.00	1	11/10/2023 16:41	WG2168853

1 Cp 2 Tc 3 Ss 4 Cn 5 Sr 6 Qc 7 Gl 8 Al 9 Sc

ACCOUNT: WSP (Formely Wood E&I)-UT | PROJECT: 00147368 | SDG: L1673940 | DATE/TIME: 11/13/23 11:11 | PAGE: 15 of 21

WG2166793
Mercury by Method 7471A

QUALITY CONTROL SUMMARY
L1673940-01,02,03,04,05,06,07,08,09,10

Method Blank (MB)

(MB) R3993364-1 11/10/23 14:30

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Mercury	U		0.0180	0.0400

Laboratory Control Sample (LCS)

(LCS) R3993364-2 11/10/23 14:32

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Mercury	0.500	0.525	105	80.0-120	

L1673940-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1673940-01 11/10/23 14:35 • (MS) R3993364-3 11/10/23 14:37 • (MSD) R3993364-4 11/10/23 14:40

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MS Rec. %	MSD Result mg/kg	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury	0.500	U	0.473	94.6	0.502	100	1	75.0-125			5.90	20

1 Cp 2 Tc 3 Ss 4 Cn 5 Sr 6 Qc 7 Gl 8 Al 9 Sc

ACCOUNT: WSP (Formely Wood E&I)-UT | PROJECT: 00147368 | SDG: L1673940 | DATE/TIME: 11/13/23 11:11 | PAGE: 16 of 21

Soil Sampling (13 of 25)

WG2168853

Metals (ICP) by Method 6010D

QUALITY CONTROL SUMMARY

L1673940-01,02,03,04,05,06,07,08,09,10

Method Blank (MB)

(MB) R3990437-1 11/10/23 15:40

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Arsenic	U		0.516	2.00
Barium	U		0.0952	0.500
Cadmium	U		0.0471	0.500
Chromium	U		0.133	1.00
Lead	U		0.200	0.500
Selenium	U		0.784	2.00
Silver	U		0.127	1.00

Laboratory Control Sample (LCS)

(LCS) R3990437-2 11/10/23 15:51

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Arsenic	100	87.4	87.4	80.0-120	
Barium	100	90.0	90.0	80.0-120	
Cadmium	100	86.2	86.2	80.0-120	
Chromium	100	85.6	85.6	80.0-120	
Lead	100	85.1	85.1	80.0-120	
Selenium	100	87.8	87.8	80.0-120	
Silver	20.0	17.1	85.4	80.0-120	

L1676218-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1676218-01 11/10/23 16:54 • (MS) R3990437-5 11/10/23 16:02 • (MSD) R3990437-6 11/10/23 16:04

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%	%	%			%	%
Arsenic	100	U	75.7	82.6	75.7	82.6	1	75-125			15.7	20
Barium	100	123	183	209	60.3	86.0	1	75-125			13.1	20
Cadmium	100	0.102	74.9	83.3	74.7	83.2	1	75-125			16.5	20
Chromium	100	10.1	79.8	94.2	69.7	84.2	1	75-125	J6	J6	16.6	20
Lead	100	31.2	104	122	72.7	90.4	1	75-125	J6	J6	15.7	20
Selenium	100	U	70.7	82.0	70.7	82.0	1	75-125	J6	J6	15.9	20
Silver	20.0	U	14.9	17.3	74.5	86.7	1	75-125	J6	J6	15.2	20

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.

Soil Sampling (14 of 25)

ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-05-15-05
Alaska	17-026	Nevada	TN00003 2021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [5]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky [1,6]	KY90010	South Carolina	84004002
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1,4]	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas [2]	LAB0152
Maryland	324	Utah	TN00003 2021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0006	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

Cp Tc Ss Cn Sr Qc Gl Al Sc

Company Name/Address: WSP (Formely Wood E&I)-UT, 10876 South River Front Parkway, South Jordan, UT 84095

Billing Information: Accounts Payable, 10876 South River Front Parkway, South Jordan, UT 84095

Report to: Bryan Morse
Email To: bryan.morse@wsp.com;corey.buchanan@wsp.c
Project Description: [redacted] Rewater
City/State Collected: Mytton, UT
Phone: 801-999-2027
Client Project # 00147368
Lab Project # AMECSLCUT-WSP
Site/Facility ID #
P.O. #
Quote #
Collected by (print): John Hecci
Collected by (signature):
Immediately Packed on Ice N ___ Y X
Rush? (Lab MUST Be Notified): Same Day, Next Day, 2 Day, 3 Day, Five Day, 5 Day (Rad Only), 10 Day (Rad Only)
Date Results Needed
No. of Cntrs
Physical Check: PH, Cl, Sf

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	Cntrs	DROMN, TPHOGHEX, TS 4ozClr-NoPres	GRO 40mlAmb/MeOH10ml/5yr	V8260 40mlAmb/MeOH10ml/5yr		
Pond-1A	Comp	SS	0'	11/2/23	1040	3	X	X	X		-01
Pond-1B	Comp	SS	0'	11/2/23	1050	3	X	X	X		-02
Pond-2A	Comp	SS	0'	11/2/23	1120	3	X	X	X		-03
Pond-2B	Comp	SS	0'	11/2/23	1130	3	X	X	X		-04
Pond-3A	Comp	SS	0'	11/2/23	1210	3	X	X	X		-05
Pond-3B	Comp	SS	0'	11/2/23	1225	3	X	X	X		-06
Pond-4A	Comp	SS	0'	11/2/23	1245	3	X	X	X		-07
Pond-4B	Comp	SS	0'	11/2/23	1305	3	X	X	X		-08
Pond-5A	Comp	SS	0'	11/2/23	1320	3	X	X	X		-09
Pond-5B	Comp	SS	0'	11/2/23	1400	3	X	X	X		-10

Remarks: Terrapure 40mL Amb Samples collected via grab

* Matrix: SS - Soil AIR - Air F - Filter GW - Groundwater B - Bioassay WW - Wastewater DW - Drinking Water OT - Other ___

Relinquished by: (Signature) Date: 11/2/23 Time: 1740 Received by: (Signature)
Relinquished by: (Signature) Date: 11/3/23 Time: 17:00 Received by: (Signature)
Samples returned via: UPS ___ FedEx ___ Courier ___ Tracking #
Trip Blank Received: Yes / No HCl / MeoH TBR
Bottles Received:
If preservation required by Login: Date/Time
Hold:
Condition: NCF / OK
Received for lab by: (Signature) Date: 11/4/23 Time: 0800
Temp: 2.4 °C 2.4 to 2.9 °C
pH ___ Temp ___ Flow ___ Other ___
Chain of Custody Page 1 of 1
Pace MT JULIET, TN
Account: AMECSLCUT
Template: T241073
Prelogin: P1034861
PM: 288 - Daphne Richards
Shipped Via: FedEx Ground
Remarks
Sample # (lab only)
SDG # L1673940
H239

Soil Sampling (15 of 25)

Firefox https://kanbanflow.com/board/3WRuMz/print-task

Change analysis AMECSLCUT R2 L1673940 R0/R1

Per client, please change to L1673940 instead of analysis currently logged.

- RCRA 8 Metals (EPA 6010)
- Electrical Conductivity (mmho/cm)
- Exchangeable Sodium Percentage
- Sodium Adsorption Ratio

Thanks

Daphne Richards
Project Manager 2 I National
12065 Lebanon Road I Mt. Juliet, TN 37122
O. 615.773.9662 l pacelabs.com
[cid:image001.jpg@01DA10C7.8E63EA60]

MAKE YOUR PAYMENTS ONLINE<https://login.unitedtranzactions.com/obp/pace_analytical>

Pace Analytical National Center for Testing & Innovation will not be accepting these sample types per the following dates:
BOD Samples on Saturday 11/18, Wednesday, 12/20, Wednesday, 12/27 as the 5-day BOD take off run falls on a holiday.
Microbiological Samples on Wednesday 11/22

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P Please consider the environment before printing this email

Time estimate: oh **Time spent:** oh

Members

DR Daphne Richards (responsible)

1 of 1 11/6/2023, 4:01 PM

Pace Analytical

ANALYTICAL REPORT
November 14, 2023

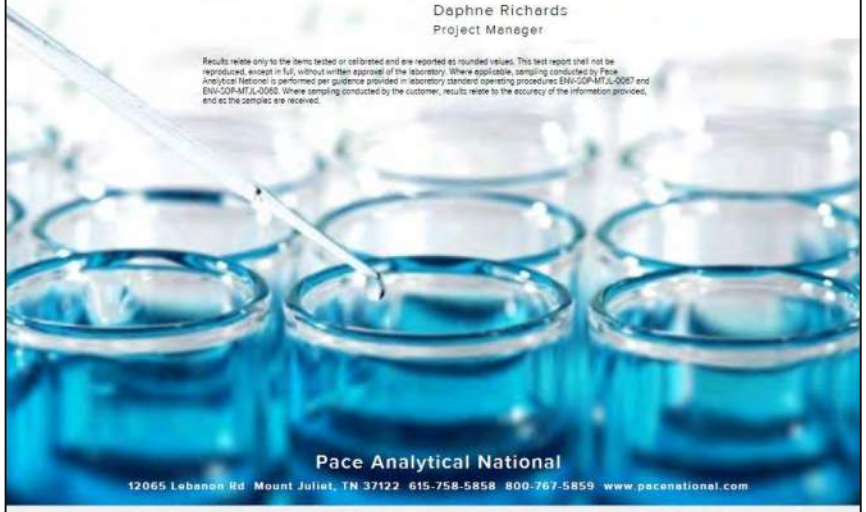
Cp Tc Ss Cn Sr Qc Gl Al Sc

WSP (Formely Wood E&I)-UT

Sample Delivery Group:	L1676876
Samples Received:	11/11/2023
Project Number:	00147368
Description:	Rewater
Report To:	Bryan Morse 10876 South River Front Parkway South Jordan, UT 84095

Entire Report Reviewed By: Daphne R Richards
Daphne Richards
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.



Pace Analytical National
12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
WSP (Formely Wood E&I)-UT	00147368	L1676876	11/14/23 11:07	1 of 21

Soil Sampling (16 of 25)

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SAMPLE SUMMARY

POND-1A L1676876-01 Solid

Collected by: John Harris | Collected date/time: 11/02/23 10:40 | Received date/time: 11/11/23 00:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Total Solids by Method 2540 G-2011	WG2170002	1	11/13/23 12:15	11/13/23 12:20	CMK	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG2170247	1	11/14/23 07:15	11/14/23 09:55	NTG	Mt. Juliet, TN

POND-1B L1676876-02 Solid

Collected by: John Harris | Collected date/time: 11/02/23 10:50 | Received date/time: 11/11/23 00:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Total Solids by Method 2540 G-2011	WG2170002	1	11/13/23 12:15	11/13/23 12:20	CMK	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG2170247	1	11/14/23 07:15	11/14/23 09:55	NTG	Mt. Juliet, TN

POND-2A L1676876-03 Solid

Collected by: John Harris | Collected date/time: 11/02/23 11:20 | Received date/time: 11/11/23 00:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Total Solids by Method 2540 G-2011	WG2170002	1	11/13/23 12:15	11/13/23 12:20	CMK	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG2170247	1	11/14/23 07:15	11/14/23 09:55	NTG	Mt. Juliet, TN

POND-2B L1676876-04 Solid

Collected by: John Harris | Collected date/time: 11/02/23 11:40 | Received date/time: 11/11/23 00:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Total Solids by Method 2540 G-2011	WG2170002	1	11/13/23 12:15	11/13/23 12:20	CMK	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG2170247	1	11/14/23 07:15	11/14/23 09:55	NTG	Mt. Juliet, TN

POND-3A L1676876-05 Solid

Collected by: John Harris | Collected date/time: 11/02/23 12:10 | Received date/time: 11/11/23 00:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Total Solids by Method 2540 G-2011	WG2170002	1	11/13/23 12:15	11/13/23 12:20	CMK	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG2170247	1	11/14/23 07:15	11/14/23 09:55	NTG	Mt. Juliet, TN

POND-3B L1676876-06 Solid

Collected by: John Harris | Collected date/time: 11/02/23 12:25 | Received date/time: 11/11/23 00:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Total Solids by Method 2540 G-2011	WG2170002	1	11/13/23 12:15	11/13/23 12:20	CMK	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG2170247	1	11/14/23 07:15	11/14/23 09:55	NTG	Mt. Juliet, TN

POND-4A L1676876-07 Solid

Collected by: John Harris | Collected date/time: 11/02/23 12:45 | Received date/time: 11/11/23 00:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Total Solids by Method 2540 G-2011	WG2170002	1	11/13/23 12:15	11/13/23 12:20	CMK	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG2170247	1	11/14/23 07:15	11/14/23 09:55	NTG	Mt. Juliet, TN

Soil Sampling (17 of 25)

SAMPLE SUMMARY

POND-4B L1676876-08 Solid

Collected by	Collected date/time	Received date/time
John Harris	11/02/23 12:05	11/11/23 00:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Total Solids by Method 2540 G-2011	WG2170003	1	11/13/23 12:00	11/13/23 12:14	CMK	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG2170247	1	11/14/23 07:15	11/14/23 09:55	NTG	Mt. Juliet, TN

POND-5A L1676876-09 Solid

Collected by	Collected date/time	Received date/time
John Harris	11/02/23 13:40	11/11/23 00:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Total Solids by Method 2540 G-2011	WG2170003	1	11/13/23 12:00	11/13/23 12:14	CMK	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG2170247	1	11/14/23 07:15	11/14/23 09:55	NTG	Mt. Juliet, TN

POND-5B L1676876-10 Solid

Collected by	Collected date/time	Received date/time
John Harris	11/02/23 14:00	11/11/23 00:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Total Solids by Method 2540 G-2011	WG2170003	1	11/13/23 12:00	11/13/23 12:14	CMK	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG2170247	1	11/14/23 07:15	11/14/23 09:55	NTG	Mt. Juliet, TN

Cp Tc Ss Cn Sr Qc Gl Al Sc

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
WSP (Formely Wood E&I)-UT	00147368	L1676876	11/14/23 11:07	4 of 21

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Daphne R Richards

Daphne Richards
Project Manager

Cp Tc Ss Cn Sr Qc Gl Al Sc

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
WSP (Formely Wood E&I)-UT	00147368	L1676876	11/14/23 11:07	5 of 21

Soil Sampling (18 of 25)

POND-1A
Collected date/time: 11/02/23 10:40

SAMPLE RESULTS - 01
L1676876

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	%				
Total Solids	97.4		1	11/13/2023 12:20	WG2170002

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	umhos/cm		umhos/cm			
Specific Conductance	189		10.0	1	11/14/2023 09:55	WG2170247

Sample Narrative:
L1676876-01 WG2170247: at 25C

Cp Tc Ss Cn Sr Qc Gl Al Sc

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
WSP (Formely Wood E&I)-UT	00147368	L1676876	11/14/23 11:07	6 of 21

POND-1B
Collected date/time: 11/02/23 10:50

SAMPLE RESULTS - 02
L1676876

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	%				
Total Solids	97.5		1	11/13/2023 12:20	WG2170002

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	umhos/cm		umhos/cm			
Specific Conductance	793		10.0	1	11/14/2023 09:55	WG2170247

Sample Narrative:
L1676876-02 WG2170247: at 25C

Cp Tc Ss Cn Sr Qc Gl Al Sc

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
WSP (Formely Wood E&I)-UT	00147368	L1676876	11/14/23 11:07	7 of 21

Soil Sampling (19 of 25)

POND-2A
Collected date/time: 11/02/23 11:20

SAMPLE RESULTS - 03
L1676876

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	%				
Total Solids	96.0		1	11/13/2023 12:20	WG2170002

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	umhos/cm		umhos/cm			
Specific Conductance	177		10.0	1	11/14/2023 09:55	WG2170247

Sample Narrative:
L1676876-03 WG2170247: at 25C

Cp Tc Ss Cn Sr Qc Gl Al Sc

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
WSP (Formely Wood E&I)-UT	00147368	L1676876	11/14/23 11:07	8 of 21

POND-2B
Collected date/time: 11/02/23 11:40

SAMPLE RESULTS - 04
L1676876

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	%				
Total Solids	97.4		1	11/13/2023 12:20	WG2170002

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	umhos/cm		umhos/cm			
Specific Conductance	176		10.0	1	11/14/2023 09:55	WG2170247

Sample Narrative:
L1676876-04 WG2170247: at 25C

Cp Tc Ss Cn Sr Qc Gl Al Sc

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
WSP (Formely Wood E&I)-UT	00147368	L1676876	11/14/23 11:07	9 of 21

Soil Sampling (20 of 25)

POND-3A
Collected date/time: 11/02/23 12:10

SAMPLE RESULTS - 05
L1676876

Total Solids by Method 2540 G-2011

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	94.5		1	11/13/2023 12:20	WG2170002

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	121		10.0	1	11/14/2023 09:55	WG2170247

Sample Narrative:
L1676876-05 WG2170247: at 25C

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
WSP (Formely Wood E&I)-UT	00147368	L1676876	11/14/23 11:07	10 of 21

POND-3B
Collected date/time: 11/02/23 12:25

SAMPLE RESULTS - 06
L1676876

Total Solids by Method 2540 G-2011

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	92.9		1	11/13/2023 12:20	WG2170002

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	170		10.0	1	11/14/2023 09:55	WG2170247

Sample Narrative:
L1676876-06 WG2170247: at 25C

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
WSP (Formely Wood E&I)-UT	00147368	L1676876	11/14/23 11:07	11 of 21

Soil Sampling (21 of 25)

POND-4A
Collected date/time: 11/02/23 12:45

SAMPLE RESULTS - 07
L1676876

Total Solids by Method 2540 G-2011

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	93.7		1	11/13/2023 12:20	WG2170002

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	166		10.0	1	11/14/2023 09:55	WG2170247

Sample Narrative:
L1676876-07 WG2170247: at 25C

Cp Tc Ss Cn Sr Qc Gl Al Sc

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
WSP (Formely Wood E&I)-UT	00147368	L1676876	11/14/23 11:07	12 of 21

POND-4B
Collected date/time: 11/02/23 13:05

SAMPLE RESULTS - 08
L1676876

Total Solids by Method 2540 G-2011

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	90.8		1	11/13/2023 12:14	WG2170003

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	163		10.0	1	11/14/2023 09:55	WG2170247

Sample Narrative:
L1676876-08 WG2170247: at 25C

Cp Tc Ss Cn Sr Qc Gl Al Sc

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
WSP (Formely Wood E&I)-UT	00147368	L1676876	11/14/23 11:07	13 of 21

Soil Sampling (22 of 25)

POND-5A
Collected date/time: 11/02/23 13:40

SAMPLE RESULTS - 09
L1676876

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	%				
Total Solids	95.9		1	11/13/2023 12:14	WG2170003

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	umhos/cm		umhos/cm			
Specific Conductance	815		10.0	1	11/14/2023 09:55	WG2170247

Sample Narrative:
L1676876-09 WG2170247: at 25C

Cp Tc Ss Cn Sr Qc Gl Al Sc

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
WSP (Formely Wood E&I)-UT	00147568	L1676876	11/14/23 11:07	14 of 21

POND-5B
Collected date/time: 11/02/23 14:00

SAMPLE RESULTS - 10
L1676876

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	%				
Total Solids	85.4		1	11/13/2023 12:14	WG2170003

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	umhos/cm		umhos/cm			
Specific Conductance	390		10.0	1	11/14/2023 09:55	WG2170247

Sample Narrative:
L1676876-10 WG2170247: at 25C

Cp Tc Ss Cn Sr Qc Gl Al Sc

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
WSP (Formely Wood E&I)-UT	00147568	L1676876	11/14/23 11:07	15 of 21

Soil Sampling (23 of 25)

WG2170003

Total Solids by Method 2540 G-2011

QUALITY CONTROL SUMMARY

L1676876-02,03,10

Method Blank (MB)

(MB) R3999324-1 11/13/23 12:14

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	%		%	%
Total Solids	0.00100			

L1676830-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1676830-04 11/13/23 12:14 • (DUP) R3999324-3 11/13/23 12:14

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	%	%		%		%
Total Solids	82.7	82.2	1	0.0337		10

Laboratory Control Sample (LCS)

(LCS) R3999324-2 11/13/23 12:14

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	%	%	%	%	
Total Solids	50.0	50.0	100	90.0-110	

ACCOUNT: WSP (formerly Wood E&I)-UT
PROJECT: 00147968
SDG: L1676876
DATE/TIME: 11/14/23 11:07
PAGE: 17 of 21

WG2170002

Total Solids by Method 2540 G-2011

QUALITY CONTROL SUMMARY

L1676876-01,02,03,04,05,06,07

Method Blank (MB)

(MB) R3999325-1 11/13/23 12:20

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	%		%	%
Total Solids	0.00300			

L1676876-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1676876-03 11/13/23 12:20 • (DUP) R3999325-3 11/13/23 12:20

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	%	%		%		%
Total Solids	96.8	97.0	1	0.181		10

Laboratory Control Sample (LCS)

(LCS) R3999325-2 11/13/23 12:20

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	%	%	%	%	
Total Solids	50.0	50.0	99.9	90.0-110	

ACCOUNT: WSP (formerly Wood E&I)-UT
PROJECT: 00147968
SDG: L1676876
DATE/TIME: 11/14/23 11:07
PAGE: 18 of 21

Soil Sampling (24 of 25)

WG2170247

Wet Chemistry by Method 9050A/Mod

QUALITY CONTROL SUMMARY

L1676876-01,02,03,04,05,06,07,08,09,10

Method Blank (MB)

MB: R3999404-1 11/14/23 09:55

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	umhos/cm		umhos/cm	umhos/cm
Specific Conductance	U		10.0	10.0

Sample Narrative:
BLANK: at 25C

L1676516-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1676516-02 11/14/23 09:55 • (DUP) R3999404-3 11/14/23 09:55

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	umhos/cm	umhos/cm		%		%
Specific Conductance	175	180	1	2.8		20

Sample Narrative:
OS: at 25C
DUP: at 25C

L1676876-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1676876-05 11/14/23 09:55 • (DUP) R3999404-4 11/14/23 09:55

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	umhos/cm	umhos/cm		%		%
Specific Conductance	121	119	1	1.68		20

Sample Narrative:
OS: at 25C
DUP: at 25C

Laboratory Control Sample (LCS)

(LCS) R3999404-2 11/14/23 09:55

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	umhos/cm	umhos/cm	%	%	
Specific Conductance	327	346	106	85.0-115	

Sample Narrative:
LCS: at 25C

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measureble result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
	The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.

Soil Sampling (25 of 25)

ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN00003 2021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [4]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200000	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky [1,6]	KY90010	South Carolina	84004002
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1,4]	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas [5]	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C047
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

Cp Tc Ss Cn Sr Qc Gl Al Sc

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
WSP (Formely Wood E&I)-UT	00147368	L1676876	11/14/23 11:07	20 of 21

Company Name/Address: WSP (Formely Wood E&I)-UT, 10876 South River Front Parkway, South Jordan, UT 84095

Billing Information: Accounts Payable, 10876 South River Front Parkway, South Jordan, UT 84095

Report to: Bryan Morse

Email To: bryan.morse@wsp.com;corey.buchanan@wsp.c

Project Description: Rewater

City/State Collected: Mytn, UT

Please Circle: PT MT CT ET

Phone: 801-999-2027

Client Project # 00147368

Lab Project # AMECSLCUT-REWATER

Collected by (print): John Harris

Site/Facility ID #

P.O. #

Collected by (signature):

Rush? (Lab MUST Be Notified): Rush

Quote #

Same Day Five Day

Immediately Packed on Ice N ___ Y X

Date Results Needed: 11/15/23

No. of Cntrs

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	Cntrs	
Pond-1A	Grab	SS	0'	11/2/23	1040	1	X
Pond-1B		SS		11/2/23	1050	1	X
Pond-2A		SS		11/2/23	1120	1	X
Pond-2B		SS		11/2/23	1140	1	X
Pond-3A		SS		11/2/23	1210	1	X
Pond-3B		SS		11/2/23	1225	1	X
Pond-4A		SS		11/2/23	1245	1	X
Pond-4B		SS		11/2/23	1305	1	X
Pond-5A		SS		11/2/23	1340	1	X
Pond-5B		SS		11/2/23	1400	1	X

Analysis / Container / Preservative: SPCON,TS 4oz Clr-NoPres

Chain of Custody Page 1 of 1

Pace NATIONAL

MT JULIET, TN 12065 Lebanon Rd Mount Juliet, TN 37122

Submitting a sample via this chain of custody Pace Terms and Conditions found at www.pacelabs.com/terms-conditions

SDG # L1676876

C179

Accnum: AMECSLCUT

Template: T241835

Prelogin: P1036961

PM: 288 - Daphne Richards

PB:

Shipped Via: FedEx Ground

Remarks

Sample # (Lab only)

01 02 03 04 05 06 07 08 09 10

Remarks:

pH ___ Temp ___

Flow ___ Other ___

Samples returned via: UPS ___ FedEx ___ Courier ___

Tracking # 6645 4310 2705 SUA

Sample Receipt Checklist: COC Seal Present/Intact: NP; COC Signed/Accurate: Y; Bottles arrive intact: Y; Correct bottles used: Y; Sufficient volume sent: If Applicable; VOA Zero Headspace: Y; Preservation Correct/Checked: Y; RAD Screen <0.5 mR/hr: Y

Relinquished by (Signature): John Harris — Date: 11/10/23 — Time: 1258

Received by (Signature): — Date: — Time:

Relinquished by (Signature): — Date: — Time:

Received by (Signature): — Date: — Time:

Relinquished by (Signature): — Date: 11/10/23 — Time: 17:00

Received for lab by (Signature): — Date: 11/11/23 — Time: 0700

Trip Blank Received: Yes / No HCl / MeoH TBR

Temp °C Bottles Received: 10

If preservation required by Login: Date/Time

Hold:

Condition NCF / OK

Produced Water in Frac

Produced Water in Frac (1 of 11)

Big Red Frac 12.8% Produced Water

	ReWater Metered		OVV Water Metered	
			0	
	Produced	Cumu	Fresh	Cumu
8-Jun				
13-Jun				375,059
14-Jun				445,540
15-Jun				502,108
16-Jun				547,286
17-Jun		108,144		601,021
18-Jun	11,935	120,079		686,512
19-Jun	13,496	133,575	73,428	759,940
20-Jun	12,687	146,262	82,531	842,471
21-Jun	12,248	158,510	85,801	928,272
22-Jun	16,304	174,814	86,800	1,015,072
23-Jun	10,073	184,887	78,821	1,093,893
24-Jun	12,178	197,065	77,564	1,171,457
25-Jun	13,075	210,140	82,748	1,254,205
26-Jun	11,564	221,704	74,735	1,328,940
27-Jun	10,742	232,446	92,916	1,421,856
28-Jun			75,828	1,497,684
29-Jun			85,111	1,582,795
30-Jun				

ReWater Produced Cost Summary
***DOES NOT INCLUDE TRANSFER TO BIG RED

Biocide Treat	$ 31,214.30	Innospec
Pumps/Fork	$ 41,325.00	Sunbelt
Mix Tank	$ 7,500.00	Kristy's
Hold Tanks	$ 3,600.00	CHI
Supervision	$ 2,000.00	TDW
Trucking	$ 1,000.00	Peak
Contingency	$ 8,663.93	WEM
	$ 95,303.23	$ 0.41 per bbl

		AFE		Rewater	OVV Water	Total	
BIG RED	2H	644305	32.37%	75,239	512,325	587,564	
BIG RED	4H	670956	33.71%	78,351	533,516	611,868	
BIG RED	6H	675279	33.92%	78,856	536,954	615,810	
				232,446	1,582,795	1,815,241	0.128052418

Produced Water in Frac (2 of 11)

Project ID: 2305-009 / Scout

innospec OILFIELD SERVICES chemistry matters

Water and Bacteria Test Report

Rewater, UT

May 22, 2023

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Project ID: 2305-009 / Scout

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Lab Project No:	2305-009
Customer Name:	Scout
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Produced Water in Frac (3 of 11)

Project ID: 2305-009 / Scout

History

- Approximately four (4) gallons of "Duchesne River" water and four (4) gallons of "Production" water were received at the Woodlands Technology Center (WTC) on **May 1st, 2023** and assigned project number **2305-009 (Appendix E)**
- A test request was submitted on **May 4th, 2023** for water analysis of the provided source waters as well as bacteria analysis using BioSuite™ GQ510x and BioSuite™ GQ123x at lab recommended loadings and contact times (**Appendix D**)
- Requested analyses included complete water analysis by inductively coupled plasma optical emission spectroscopy (ICP-OES) and a bacteria kill study using bioluminescence of cellular adenosine triphosphate (cATP)

Objective

Characterize the water chemistry of "Duchesne River" and "Production" source waters as well as determine the efficacy of BioSuite™ GQ510x and BioSuite™ GQ123x at lab recommended loadings and contact times.

Executive Summary

The "Duchesne River" water is a slightly alkaline freshwater with a total dissolved solids (TDS) of 592 ppm and has minimal risk for calcite and siderite scale formation based upon DownHole™ SAT scaling tendency reports. While the "Production" water is a slightly alkaline brackish water with a total dissolved solids (TDS) of 14,331 ppm and has minimal risk for calcite, barite, and siderite scale formation based upon DownHole™ SAT scaling tendency reports. The "Duchesne River" source water had an initial cATP value of 654.97 pg/mL which is equivalent to a "moderate" microbial risk. Treatment with 0.15 gpt of BioSuite™ GQ123x or BioSuite™ GQ510x was capable of reducing the microbial severity level to "minimal" after 48 hours and was maintained at that level for 72 hours of testing. The "Production" source water had an initial cATP value of 8,978 pg/mL which rose to over 20,000 pg/mL over 24 hours, an extremely "severe" microbial risk. Treatment with 0.15 or 0.25 gpt of BioSuite™ GQ123x or BioSuite™ GQ510x, while significantly reducing the microbial counts, were not able to reduce the cATP to less than 1,000 pg/mL. Increased loadings of 0.5 gpt of both products saw 98-99% reductions to a "moderate" severity level after 72 hours of testing.

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Results Summary

Table 1— Scout Water Analysis

Sample Name	"Duchesne River"	"Production"
Properties:		
pH (70 °F)	7.92	7.85
Specific Gravity (70 °F)	1.00	1.01
Total Dissolved Solids (ppm)	592.48	14,331
Hardness Cations (mg/L):		
Calcium (Ca^{+2})	71.33	82.85
Magnesium (Mg^{+2})	29.66	21.34
Barium (Ba^{+2})	0.12	16.27
Strontium (Sr^{+2})	0.71	7.53
Anions (mg/L):		
Chlorides (Cl^-)	50.00	6,572
Sulfates (SO_4^{2-})	113.51	154.33
Phosphate (PO_4^{3-})	0.49	6.89
Alkalinity (mg/L):		
Bicarbonates (HCO_3^{2-})	262.30	2,062
Carbonates (CO_3^{2-})	0.00	0.00
Select Ions (mg/L):		
Sodium (Na^+)	45.45	5,013
Boron (B^{+3})	0.30	9.71
Iron (Fe^{+2})	1.19	6.40
Other Ions (mg/L):		
Aluminum (Al^{+3})	1.25	0.84
Potassium (K^+)	2.02	183.86
Lithium (Li^+)	0.04	3.92
Manganese (Mn^{+2})	0.15	0.39
Silicon (Si^{+2})	5.59	17.85
Zinc (Zn^{+2})	0.00	0.00

- The "Duchesne River" water is a slightly alkaline freshwater with a total dissolved solids (TDS) of 592 ppm and has minimal risk for calcite and siderite scale formation based upon DownHole™ SAT scaling tendency reports (**Appendix B**)
- While the "Production" water is a slightly alkaline brackish water with a total dissolved solids (TDS) of 14,331 ppm and has minimal risk for calcite, barite, and siderite scale formation based upon DownHole™ SAT scaling tendency reports (**Appendix B**)

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Produced Water in Frac (4 of 11)

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Table 2 – Microbial Quick Kill Analysis

Source Water	Biocide	Loading (gpt)	Contact Time (hr)	cATP (pg/mL)	Bacteria Severity
"Duchesne River"	None	0.00	0	654.97	Moderate
			24	680.22	
			48	702.07	
			72	497.70	
	BioSuite™ GQ123x	0.15	24	20.53	Minimal
			48	10.41	
			72	23.92	
		0.25	24	45.07	Low
			48	15.60	Minimal
			72	29.16	
	BioSuite™ GQ510x	0.15	24	26.24	Minimal
			48	21.03	
			72	14.03	
		0.25	24	27.92	
			48	9.91	
			72	20.30	

- The "Duchesne River" source water had an initial cATP value of 654.97 pg/mL which is equivalent to a "moderate" microbial risk
- Treatment with 0.15 gpt of BioSuite™ GQ123x or BioSuite™ GQ510x was capable of reducing the microbial severity level to "minimal" after 48 hours and was maintained at that level for 72 hours of testing

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Table 3 – Microbial Quick Kill Analysis

Source Water	Biocide	Loading (gpt)	Contact Time (hr)	cATP (pg/mL)	Bacteria Severity
"Production"	None	0.00	0	8,978	Severe
			24	20,194	
			48	25,774	
			72	22,884	
	BioSuite™ GQ123x	0.15	24	6,819	Severe
			48	11,331	
			72	12,052	
		0.25	24	2,918	
			48	1,580	
			72	9,830	
		0.5	24	268.52	Moderate
			48	5.46	Minimal
			72	385.50	Moderate
	BioSuite™ GQ510x	0.15	24	6,819	Severe
			48	13,593	
			72	20,762	
		0.25	24	1,891	
			48	7,838	
			72	9,461	
		0.5	24	390.15	Moderate
			48	228.73	
			72	218.49	

- The "Production" source water had an initial cATP value of 8,978 pg/mL which rose to over 20,000 pg/mL over 24 hours, an extremely "severe" microbial risk
- Treatment with 0.15 or 0.25 gpt of BioSuite™ GQ123x or BioSuite™ GQ510x, while significantly reducing the microbial counts, were not able to reduce the cATP to less than 1,000 pg/mL
- Increased loadings of 0.5 gpt of both products saw 98-99% reductions to a "moderate" severity level after 72 hours of testing

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Produced Water in Frac (5 of 11)

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Table 4—Microbial Interpretation Table

cATP (pg/mL)	Microbial Equivalents (Log_{10}(M.E./mL))	CFU/mL	Expected Bottles Turned	Risk Rating & Actions Required
0-30	0 - 4.47	10	0-1	**Minimal** - Preventative action only, biocide loading recommended. Continue to monitor
30-100	4.47 - 5	100	2	**Low** - Preventative action only, biocide loading recommended. Monitor regularly.
100-250	5 - 5.39	1000	3	**Moderate** - Maintenance treatment recommended. Monitor regularly
250-750	5.39 - 5.87	10000	4	**Moderate** - Maintenance treatment recommended. Monitor regularly
750-1000	5.87 - 6	100000	5	**High** - Preventative treatment required. Increased monitoring
> 1000	> 6	>1000000	6	**Severe** - Immediate preventative treatment recommended. Increased monitoring.

*cATP to CFU relationship is approximate

**Microbial equivalents calculation based upon 1 E. coli-sized bacteria containing 0.001 pg of ATP

$$cATP(ME/mL) = cATP(pg\ ATP/mL) \times \frac{1\,ME}{0.001\,pg\ ATP}$$

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Conclusion

- The "Duchesne River" water is a slightly alkaline freshwater with a total dissolved solids (TDS) of 592 ppm and has minimal risk for calcite and siderite scale formation based upon DownHole™ SAT scaling tendency reports (**Table 1; Appendix B**)
- While the "Production" water is a slightly alkaline brackish water with a total dissolved solids (TDS) of 14,331 ppm and has minimal risk for calcite, barite, and siderite scale formation based upon DownHole™ SAT scaling tendency reports (**Table 1; Appendix B**)
- The "Duchesne River" source water had an initial cATP value of 654.97 pg/mL which is equivalent to a "moderate" microbial risk. Treatment with 0.15 gpt of BioSuite™ GQ123x or BioSuite™ GQ510x was capable of reducing the microbial severity level to "minimal" after 48 hours and was maintained at that level for 72 hours of testing (**Tables 2, 4**)
- The "Production" source water had an initial cATP value of 8,978 pg/mL which rose to over 20,000 pg/mL over 24 hours, an extremely "severe" microbial risk (**Tables 3, 4**)
- Treatment with 0.15 or 0.25 gpt of BioSuite™ GQ123x or BioSuite™ GQ510x, while significantly reducing the microbial counts, were not able to reduce the cATP to less than 1,000 pg/mL. Increased loadings of 0.5 gpt of both products saw 98-99% reductions to a "moderate" severity level after 72 hours of testing (**Tables 3, 4**)

Value Added via Laboratory Testing

Based on the request and amount/type of testing, the value of the testing performed for this project is equivalent to $6,500.

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Produced Water in Frac (6 of 11)

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Appendices

Appendix A. Test Procedures

Water Analysis

Water chemistry is reported as specific gravity, alkalinity, pH, and overall composition of major cations and anions; this data is used to generate models for scale risk using the French Creek DownholeSAT™ scale prediction software. Specific gravity is determined using an Anton Paar™ DMA 4500M, alkalinity is determined through titrations using 0.02M sulfuric acid and a combination of phenolphthalein and methyl purple indicator, and chemical composition is measured using a Spectro™ Arcos Inductively Coupled Plasma – Optical Emission Spectrometer (ICP-OES). Samples for ICP-OES are diluted in triplicate, digested using trace-metal grade nitric acid, and introduced to the spectrometer. Individual species in solution are elevated to an excited electron state at the atomic level using the argon plasma which when relaxed emit photons at wavelengths characteristic to each element. The intensities of the released energies are compared against known standards to determine concentrations of the individual species. Results from the individual triplicate dilutions are evaluated based on their relative standard deviations and then averaged for reporting. Averaged results are combined with reported pH and physical properties and are used to generate scaling tendency reports.

Microbial Activity by Bioluminescence

The alive bacteria count and biocide effectiveness were determined by the bioluminescence method using the LuminUltra luminometer. This method measures the ATP (adenosine triphosphate), which is the primary energy carrier of all forms of life, present in the cells of the microorganisms in the water. The water is filtered (to retain only living cells) and then the cells are lysed (broken apart) to allow the ATP inside the living cells (cellular ATP – cATP) to be released. The cATP is then quantified by measuring the light produced through its reaction with a naturally occurring enzyme known as Luciferase that can be found in fireflies. The amount of light produced is directly proportional to the amount of cATP present in the water.

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Appendix B. Water Analysis Reports

"Duchesne River"

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SYSTEM IDENTIFICATION

2305-009 Scout
Fresh
Water
Received on 5/1/2023

Sample ID#:	0
ID:	1.00
Sample Date:	05-01-2023 at 1200
Report Date:	05-02-2023

WATER CHEMISTRY

CATIONS		ANIONS	
Calcium(as Ca)	71.33	Chloride(as Cl)	50.00
Magnesium(as Mg)	29.84	Sulfate(as SO_4)	113.51
Barium(as Ba)	0.120	Dissolved O_2(as O_2)	6.47
Strontium(as Sr)	0.710	Bicarbonate(as HCO_3)	262.30
Sodium(as Na)	65.65	Carbonate(as CO_3)	0.00
Potassium(as K)	2.02	Silica(as SiO_2)	8.59
Lithium(as Li)	0.0400	Phosphate(as PO_4)	0.490
Iron(as Fe)	1.19	Boron(as B)	0.380
Aluminum(as Al)	1.23		
Manganese(as Mn)	0.158		
Zinc(as Zn)	0.08		

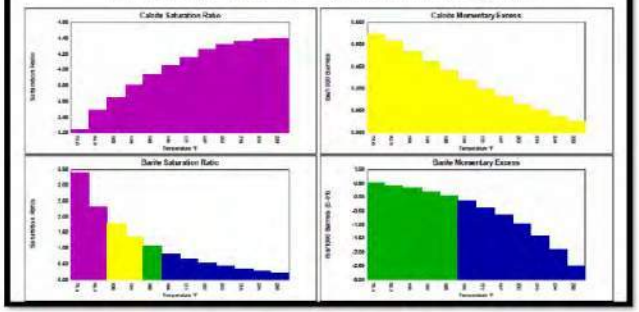
PARAMETERS

Temperature(°F)	77.00	Sample pH	7.92
Conductivity	554.49	Sp.G.(g/mL)	1.00
Resistivity	1.505	T.D.S.	351.48

SCALE AND CORROSION POTENTIAL

Temp. (°F)	Press. (psia)	Calcite $CaCO_3$		Anhydrite $CaSO_4$		Gypsum $CaSO_4 \cdot 2H_2O$		Barite $BaSO_4$		Celestite $SrSO_4$		Siderite $FeCO_3$		Mackinawite FeS		CO_2 (mg/)	pCO_2 (atm)
75.00	300.00	3.24	0.522	0.0142	-425.39	0.0229	-359.93	3.38	0.0598	0.0130	-26.01	44.47	0.150	0.00	-0.0118	0.3154	0.0637
92.50	420.00	3.45	0.508	0.0150	-407.68	0.0229	-361.44	2.32	0.0405	0.0141	-25.41	69.01	0.445	0.00	-0.0122	0.3344	0.0882
110.25	538.00	3.65	0.484	0.0167	-377.14	0.0234	-358.88	1.74	0.0306	0.0147	-24.64	92.67	0.488	0.00	-0.0131	0.3633	0.112
124.00	636.00	3.80	0.463	0.0193	-340.86	0.0263	-336.98	1.35	0.0186	0.0153	-23.85	117.02	0.550	0.00	-0.0146	0.3663	0.135
139.75	764.00	3.94	0.440	0.0231	-300.47	0.0292	-295.56	1.05	0.00357	0.0158	-22.79	140.69	0.571	0.00	-0.0167	0.3408	0.158
155.00	892.00	4.06	0.418	0.0286	-259.12	0.0321	-273.53	0.826	-0.0149	0.0162	-22.15	161.96	0.571	0.00	-0.0195	0.3476	0.183
171.25	960.00	4.18	0.399	0.0365	-216.77	0.0350	-254.41	0.653	-0.0277	0.0166	-21.63	179.69	0.555	0.00	-0.0232	0.3550	0.204
187.00	1056.00	4.25	0.382	0.0475	-180.63	0.0375	-237.82	0.529	-0.0054	0.0168	-21.22	192.55	0.531	0.00	-0.0279	0.3550	0.227
202.75	1176.00	4.31	0.368	0.0643	-146.21	0.0404	-223.41	0.417	-0.0393	0.0170	-20.90	203.76	0.500	0.00	-0.0339	0.3576	0.250
218.50	1284.00	4.36	0.351	0.0863	-114.03	0.0426	-212.01	0.333	-0.142	0.0170	-20.79	203.85	0.465	0.00	-0.0415	0.3576	0.273
234.25	1392.00	4.29	0.327	0.120	-89.09	0.0448	-201.26	0.270	-0.192	0.0169	-20.66	203.48	0.426	0.00	-0.0502	0.3496	0.296
250.00	1500.00	4.40	0.324	0.178	-66.00	0.0460	-191.99	0.219	-0.252	0.0169	-20.62	195.38	0.376	0.00	-0.0618	0.3619	0.315
			Lbs per 1000 Barrels		Lbs per 1000 Barrels		Lbs per 1000 Barrels		Lbs per 1000 Barrels		Lbs per 1000 Barrels		Lbs per 1000 Barrels		Lbs per 1000 Barrels		
		XSAT		XSAT		XSAT		XSAT		XSAT		XSAT		XSAT			

Saturation Ratios (XSAT) are the ratio of ion activity to solubility, e.g. $[Ca][CO_3]/K_{sp}$. pCO_2 (atm) is the partial pressure of CO_2 in the gas phase.
Lbs/1000 Barrels scale is the quantity of precipitation (or dissolution) required to instantaneously bring the water to equilibrium.



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Produced Water in Frac (7 of 11)

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Appendix B. Water Analysis Reports

"Duchesne River"

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SYSTEM IDENTIFICATION

2305-009 Scout
Fresh
Water
Received on 5/1/2023

Sample ID#: 0
ID: 1.00

Sample Date: 05-01-2023 at 1200
Report Date: 05-02-2023

WATER CHEMISTRY

CATIONS		ANIONS	
Calcium(as Ca)	71.33	Chloride(as Cl)	50.00
Magnesium(as Mg)	29.86	Sulfate(as SO_4)	113.51
Barium(as Ba)	0.129	Dissolved CO_2(as CO_2)	6.47
Strontium(as Sr)	0.710	Bicarbonate(as HCO_3)	262.30
Sodium(as Na)	61.45	Carbonate(as CO_3)	0.00
Potassium(as K)	2.02	Silica(as SiO_2)	5.98
Lithium(as Li)	0.0400	Phosphate(as PO_4)	0.490
Iron(as Fe)	1.15	Boron(as B)	0.300
Aluminum(as Al)	1.25		
Manganese(as Mn)	0.150		
Zinc(as Zn)	0.00		

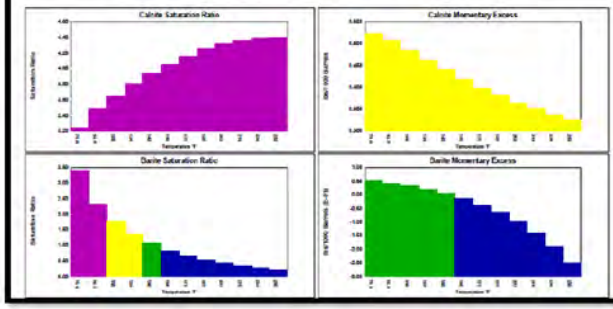
PARAMETERS

Temperature(°F)	77.00	Sample pH	7.92
Conductivity	554.49	Sp.Gr.(g/mL)	1.00
Resistivity	1528	T.D.S	592.48

SCALE AND CORROSION POTENTIAL

Temp. (°F)	Press. (psia)	Calcite $CaCO_3$		Anhydrite $CaSO_4$		Gypsum $CaSO_4*2H_2O$		Barite $BaSO_4$		Celestite $SrSO_4$		Siderite $FeCO_3$		Mackinawite FeS		CO_2 (mm)	pCO_2 (atm)
		SSAT	Lbs per 1000 Barrels	SSAT	Lbs per 1000 Barrels	SSAT	Lbs per 1000 Barrels	SSAT	Lbs per 1000 Barrels	SSAT	Lbs per 1000 Barrels	SSAT	Lbs per 1000 Barrels	SSAT	Lbs per 1000 Barrels		
75.00	300.00	3.24	0.522	0.0142	-425.35	0.0229	-355.03	3.30	0.0590	0.0130	-26.03	44.47	0.350	0.00	-0.0118	0.0154	0.0037
92.50	420.00	3.48	0.506	0.0150	-405.68	0.0229	-361.44	2.23	0.0405	0.0141	-25.41	69.01	0.445	0.00	-0.0122	0.0344	0.0092
106.25	528.00	3.65	0.484	0.0157	-377.55	0.0234	-358.40	1.76	0.0306	0.0147	-24.45	87.67	0.488	0.00	-0.0131	0.0470	0.112
124.00	636.00	3.80	0.463	0.0163	-348.88	0.0243	-338.98	1.35	0.0236	0.0153	-23.55	117.02	0.530	0.00	-0.0146	0.0663	0.135
139.75	744.00	3.94	0.440	0.0171	-306.47	0.0292	-295.54	1.05	0.00257	0.0159	-22.78	140.69	0.571	0.00	-0.0167	0.0408	0.158
155.50	852.00	4.06	0.418	0.0186	-259.12	0.0321	-273.53	0.826	-0.0149	0.0162	-22.15	161.06	0.571	0.00	-0.0195	0.0476	0.181
171.25	960.00	4.16	0.399	0.0205	-218.77	0.0350	-254.41	0.653	-0.0277	0.0166	-21.63	179.69	0.555	0.00	-0.0232	0.0550	0.204
187.00	1068.00	4.25	0.382	0.0478	-186.61	0.0379	-237.82	0.529	-0.0654	0.0168	-21.22	192.55	0.531	0.00	-0.0279	0.0350	0.227
202.75	1176.00	4.31	0.364	0.0640	-146.21	0.0404	-223.41	0.417	-0.0995	0.0170	-20.90	203.76	0.500	0.00	-0.0339	0.0276	0.250
218.50	1284.00	4.36	0.251	0.0068	-116.82	0.0426	-212.31	0.323	-0.142	0.0170	-20.78	203.85	0.465	0.00	-0.0415	0.0276	0.273
234.25	1392.00	4.39	0.227	0.129	-89.09	0.0448	-201.26	0.270	-0.193	0.0169	-20.66	203.48	0.426	0.00	-0.0502	0.0496	0.294
250.00	1500.00	4.40	0.124	0.179	-66.00	0.0468	-191.39	0.219	-0.252	0.0168	-20.62	195.30	0.376	0.00	-0.0610	0.0619	0.319

(Saturation Ratios (SSAT) are the ratio or the activity to solubility, e.g. $(Ca^{2+})(CO_3^{2-})/K_{sp}$. pCO_2 (atm) is the partial pressure of CO_2 in the gas phase. Lbs/1000 Barrels scale is the quantity of precipitation (or dissolution) required to instantaneously bring the water to equilibrium.



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Appendix C. Water Analysis Color Code

DownHole SAT COLOR CODING

Graphs produced by DownHole SAT are color coded as an aid in interpreting them. This section discusses the meaning of the colors.

Saturation Level and Simple Scale Indices

RED - Red signifies a definite problem prediction. Corrective action such as treatment, pH adjustment, or concentration ratio decrease (blowdown) should be taken to eliminate, or alleviate, the problem. Red signifies loss of control in TREATED SATURATION LEVEL PROFILES.

MAGENTA - Magenta (purple) signifies that a problem is highly likely. Some systems might be able to carry the degree of supersaturation indicated by magenta without deposition occurring. Most system will scale if operated in the Magenta range without treatment.

YELLOW - Yellow signifies that a problem will occur with a minimum of change. Make sure of your measurements. A slight error in pH could mean that you are really operating in a RED zone. The system is borderline and should be watched.

GREEN - No problems are likely. Significant changes (e.g. a 0.1 pH increase, a 10 °C increase) could result in a problem.

BLUE - Blue signifies a safe operating range where deposition from the scale evaluated would not be expected. Blue is also used to signify a successful treatment in TREATED SYSTEM PROFILES.

Values in RED on scaling tendency reports represent cation/anion charge balance by DownHole SAT™

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Produced Water in Frac (8 of 11)

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Appendix D. Test Request Form

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REQUEST FORM FOR WATER & BACTERIA ANALYSIS

CUSTOMER	Scout
WELL/LEASE/PAD NAME	
REGION	Utah
ACCOUNT MANAGER	Russ
TEST REQUEST DATE	05/04/23
REPORT DUE DATE	05/19/23
JOB START DATE	
WATER TYPE	Fresh and produced
SAFETY: H_2S RISK?	
FOR LAB USE ONLY	
PROJECT NUMBER	2305-009

WATER ANALYSIS			CHECK		
ICP ANALYSIS & ALKALINITY TITRATION			☑		
BACTERIA ANALYSIS					
BACTERIA BY BIOLUMINESENCE					
CUSTOMER PROPOSED			LAB RECOMMENDED		
BIOCIDE	LOADINGS (gpt)		BIOCIDE	LOADINGS	
			☑	☑	
BACTERIA LONGTERM KILL STUDY (BUG BOTTLES)					
CUSTOMER PROPOSED			LAB RECOMMENDED		
BIOCIDE	LOADINGS (gpt)	CONTACT TIME	BIOCIDE	LOADINGS (gpt)	CONTACT TIME
			☑	☑	☑

COMMENTS

They are looking at running the Duchane River water and 10% produced water (WEM Production)

Lets chat about how we would like to look at this before testing.

SAMPLE SIZE FOR TESTING

COMPLETE WATER ANALYSIS – 1 L, BIOLUMINESENCE – 1 L, KILL STUDY – 2 GAL

Please contact Lab Supervisor – Mark McLaughlin for more information
mark.mclaughlin@innospecinc.com (281-513-2196)

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innospec OILFIELD SERVICES chemistry matters

Appendix E. Sample Pictures

Company: Scout

Project Number: 2305-009

Lease	Sample Point/Description	Date on Sample	Date Received	Type	Volume
WEM Wilson	Production	N/A	5/1/2023	Water	4 Gal
WEM Wilson	Duchesne River	N/A	5/1/2023	Fresh Water	4 Gal

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Produced Water in Frac (9 of 11)

POND-4A
Collected date/time: 11/02/23 12:45

SAMPLE RESULTS - 07
L1676876

Total Solids by Method 2540 G-2011

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	93.7		1	11/13/2023 12:20	WG2170002

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	166		10.0	1	11/14/2023 09:55	WG2170247

Sample Narrative:
L1676876-07 WG2170247: at 25C

Cp Tc Ss Cn Sr Qc Gl Al Sc

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
WSP (Formely Wood E&I)-UT	00147368	L1676876	11/14/23 11:07	12 of 21

POND-4B
Collected date/time: 11/02/23 13:05

SAMPLE RESULTS - 08
L1676876

Total Solids by Method 2540 G-2011

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	90.8		1	11/13/2023 12:14	WG2170003

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	163		10.0	1	11/14/2023 09:55	WG2170247

Sample Narrative:
L1676876-08 WG2170247: at 25C

Cp Tc Ss Cn Sr Qc Gl Al Sc

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
WSP (Formely Wood E&I)-UT	00147368	L1676876	11/14/23 11:07	13 of 21

Produced Water in Frac (10 of 11)

Appendix F. Chemical Addition Points

Figure F1—Injection Point Reference for Suction Side of Hydration

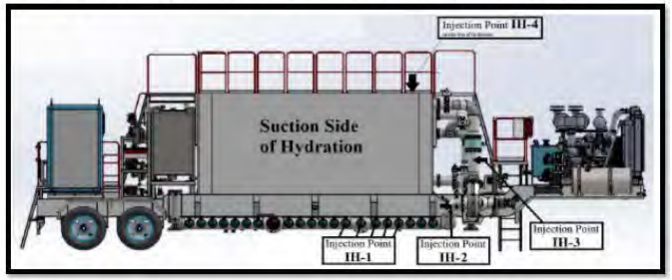

Figure F2—Injection Point Reference for Discharge Side of Hydration

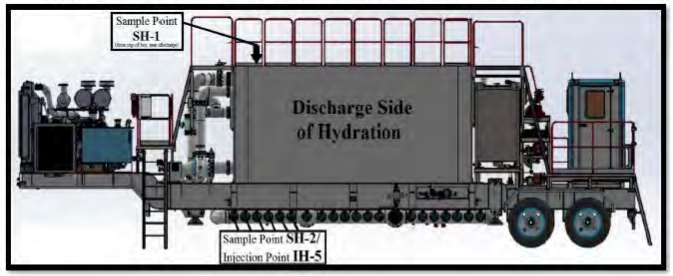

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Figure F3—Blender Chemical Injection and Sampling Points

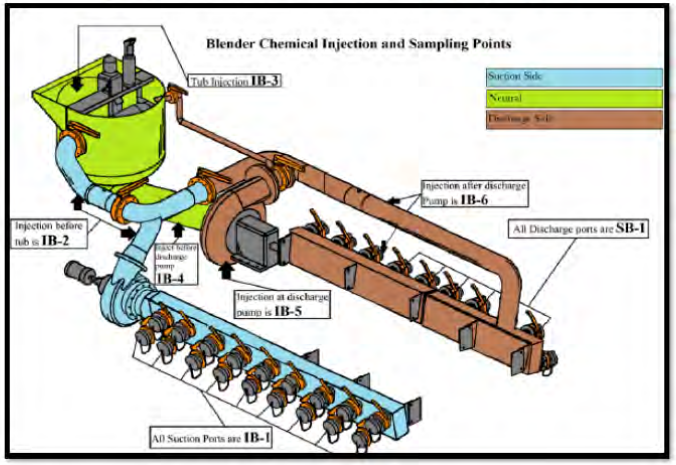

Table F1—Chemical Introduction Points

Additive	Function	Point of Chemical Introduction
BioSuite™ GQ510x	Biocide	Suction Side of Hydration Unit (Fig. 1, IH-1)
BioSuite™ GQ123x		

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Produced Water in Frac (11 of 11)

innospec OILFIELD SERVICES chemistry matters

Project ID: 2305-009 / Scout

Appendix G. Chemical Properties and Hazards

Table G1—Chemical Hazards and Physical Properties

IOS Product	Comment	Flash Point (°F)	Freeze Point (°F)
BioSuite™ GQ510x	Danger! Toxic if inhaled. Harmful if swallowed. Causes severe skin burns and eye damage. May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause an allergic skin reaction. May cause respiratory irritation. Wear protective gloves. Wear eye or face protection. Wear protective clothing. Wear respiratory protection. Use only outdoors or in a well-ventilated area. Avoid breathing vapor. Do not eat, drink, or smoke when using this product. Wash hands thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace. Store locked up.	212	N/A
BioSuite™ GQ123x	Danger! Harmful if swallowed. Causes serious eye damage. Causes skin irritation. May cause allergy or asthma symptoms or breathing difficulties if inhaled. Wear protective gloves. Wear eye or face protection. Wear respiratory protection. Avoid breathing vapor. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.	> 212	26.6

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Approved UDOGM Board Order

Approved UDOGM Board Order (1 of 6)

FILED

NOVEMBER 13 2023

SECRETARY, BOARD OF OIL, GAS & MINING

BEFORE THE BOARD OF OIL, GAS AND MINING
DEPARTMENT OF NATURAL RESOURCES
STATE OF UTAH

IN THE MATTER OF THE REQUEST FOR AGENCY ACTION OF REWATER LLC, FOR AN ORDER WAIVING UTAH ADMIN. CODE RULE R649-9-4.6.1 AS IT RELATES TO THE PERMIT APPLICATION FOR PROPOSED RNI PLEASANT VALLEY EVAPORATION PONDS #1-4 AND EVAPORATION BASIN #2, RECYCLED WATER PONDS TO BE CONSTRUCTED AND OPERATED IN SECTION 26 AND THE NW¼ OF SECTION 25, TOWNSHIP 4 SOUTH, RANGE 3 WEST, U.S.M. IN DUCHESNE COUNTY, UTAH	**FINDINGS OF FACT, CONCLUSIONS OF LAW AND ORDER** **Docket No. 2023-036** **Cause No. 138-04**

This cause came on for hearing before the Board of Oil, Gas and Mining (the "**Board**") on Wednesday, September 27, 2023, at approximately 10:20 a.m., in the Auditorium of the Utah Department of Natural Resources Building in Salt Lake City, Utah. The following Board members were present and participated at the hearing: Chairman Richard K. Borden, LaVonne J. Garrison, Gordon L. Moon, Gregg Galecki, Stephen B. Church, and Alan J. Walker. The Board was represented by Michael Begley and Madeleine Whittier, Assistant Attorneys General.

Testifying on behalf of Rewater, LLC ("**ReWater**") were Kevin P. Darcy, Vice President of Business Development for ReWater, and Brett Mickelson, President of IGES Inc., an independent engineering firm that regularly works with solid waste disposal facilities and Waste

Management and Radiation Control ("**WMRC**"). Mr. Darcy testified as a fact witness at the hearing in this Cause; Mr. Mickelson testified as an expert in civil engineering with an emphasis in solid waste management. Mitchell S. Maio, of Lear & Lear P.L.L.C., appeared on behalf of ReWater.

Andrew Haynes, Assistant Attorney General, represented the Utah Division of Oil, Gas and Mining (the "**Division**"). Bart Kettle, Deputy Director of the Division, was allowed to ask questions on behalf of the Division.

On August 9, 2023, the Division filed a Response and Notice of Non-Opposition ("**Response**") addressing ReWater's RAA. Specifically, the Response detailed the Division's support for ReWater's request, including (1) waiver of Utah Admin. Code Rule R649-9-4(6.1) ("**Pond Size Rule**") with respect to ReWater's existing permit application; (2) waiver of the Pond Size Rule by the Division when approving future permit applications by ReWater, but only until new rules for recycling facilities take effect; and (3) instruction to the Division to approve or deny ReWater's pending permit application in a timely manner. The Board received no other comments relating to the RAA.

NOW THEREFORE, the Board, having fully considered the testimony and evidence adduced at the hearing and being fully advised in the premises, makes and enters its Findings of Fact, Conclusions of Law, and Order (the "**Order**"), as follows:

FINDINGS OF FACT

1. ReWater is a Utah limited liability company, with its principal place of business in Provo, Utah.

2. In the first quarter of 2023, ReWater purchased from RN Industries, Inc., a subsidiary of Dalbo Holdings, Inc., an existing water disposal facility ("**Disposal Facility**")

Approved UDOGM Board Order (2 of 6)

located in Section 26 and the NW¼ of Section 25, Township 4 South, Range 3 West, U.S.M. ("**Subject Lands**"), for the dual purposes of (1) utilizing the existing disposal facilities as wastewater disposal facilities, and (2) permitting, building, and operating four to five additional ponds (each of which is anticipated to hold approximately fifty-seven acre-feet of water) for the storage and recycling of produced water (**"Recycling Facilities"**).

3. The Notice Rule—Utah Admin. Code Rule R649-9-7(1)—requires the following: "The applicant for a new [waste disposal] facility … shall give written notice of the application, by certified mail, return receipt requested, to surface and mineral owners of record within one-half mile of the facility, the county commission of the county where the facility is located, and affected tribal and governmental agencies."

4. The Pond Size Rule—Utah Admin. Code Rule R649-9-4(6.1)—contains the following limitation on the size of evaporation ponds: "Ponds shall be designed for 10 acre-feet of water or less, unless otherwise approved by the Division."

5. On or about June 5, 2023, ReWater electronically filed, with the Division, a Permit Application for RNI Pleasant Valley Evaporation Ponds #1-4 and Evaporation Basin #2, ("**Permit Application**") which, if approved, would allow ReWater to build and operate the Recycling Facilities, which are designed to hold much larger volumes of water than allowed under the Pond Size Rule.

6. Pursuant to the Notice Rule, on or about June 5, 2023, ReWater mailed notice of the Permit Application, certified mail with return receipt requested, to all surface and mineral owners of record within one-half mile of the Recycling Facilities, to the Duchesne County Commission, and to all "affected tribal and governmental agencies." *See* Utah Admin. Code Rule R649-9-7(1).

7. ReWater received no response from any owner notified of the Permit Application.

8. In consultation with the Division, before filing the Permit Application, it was made clear to ReWater the Division was unable to approve the Permit Application without a Board hearing, especially given the regulatory changes underway related to such facilities.

9. On July 10, 2023, ReWater filed its Request for Agency Action ("**RAA**"), seeking a waiver of the Pond Size Rule as it relates to the Permit Application.

10. Utah Admin. Code Rule R641-100-400 states, in its entirety: "When good cause appears, the Board may permit a deviation from these rules insofar as it may find compliance therewith to be impractical or unnecessary or in the furtherance of justice or the statutory purposes of the Board." Utah Admin. Code Rule R641-100-400; *see also* Utah Admin. Code Rule R649-9- 13 (expressly allowing for variances to the requirements and standards spelled out in Utah Admin. Code Rule R649-9: Waste Management and Disposal).

11. Under Utah law, tribunals such as the Board are given broad discretion to determine what constitutes "good cause" based on the specific facts and rationale of the arguments presented. *See, e.g., Berger v. Ogden Reg'l Med. Ctr.*, 2020 UT App 85, ¶¶ 31-33, 469 P.3d 1127.

12. "Good cause" in this context includes environmental improvements and safeguards, operational efficiencies, County/State resource protections, resource recovery maximization, and cost-reduction. More specifically, construction and operation of the Recycling Facilities will result in the following benefits:

a. Conserve significant amounts of freshwater annually;

b. Minimize the required surface disturbance and, accordingly, the amount of ground that is covered by these surface operations;

Approved UDOGM Board Order (3 of 6)

c. Eliminate or significantly shorten thousands of heavy truck trips annually, thus increasing protections to the environment, public roadways, and human safety;

d. Minimize both the chance of leaks and the physical resources (steel tubing, netting, liners, etc.) required to construct and operate the facility;

e. Allow for easier oversight and enforcement by the Division; and

f. Promote more efficient recovery of oil, gas, and associated hydrocarbons by reducing the costs and environmental hazards associated with their recovery.

13. To adequately serve the operational needs of oil and gas producers in this area of the Uinta Basin, ReWater must construct and operate the Recycling Facilities, comprised of five ponds – individually designed to hold up to fifty-seven acre-feet of produced water and collectively designed to hold up to 285 acre-feet of water (approximately 2,200,000 bbls) – to be available for reuse.

14. Put simply, the Pond Size Rule, as it relates to the storage and recycling of produced water, no longer reflects the operational needs of oil and gas producers in the Uinta Basin. If the Pond Size Rule were imposed in this instance, ReWater would need to construct and operate a total of twenty-nine recycled water ponds in order to store the same volume of water as will be stored in the five ponds requested in the Permit Application.

15. In addition, ReWater plans, at a later date, to reclaim an existing water disposal pond located on the Subject Lands and to construct instead an additional recycling pond similar to the ponds addressed above, specifically including the larger pond size allowed under the Pond Size Rule (**"Future Pond"**).

16. Historically, WMRC has regulated solid and hazardous waste while the Division has regulated waste related to oil and gas development. *Compare* Utah Code Ann. § 19-6-1, *et.*

seq. with Utah Admin. Code Rule R649-9: Waste Management and Disposal.

17. Recently, however, this historic regulatory framework has changed such that, going forward, the Division will, relevant to this Cause, regulate the use and recycling of oil and gas related exploration and production waste, including produced water (**"E&P Waste"**). WMRC will regulate the disposal of E&P Waste.

18. Both WMRC and the Division have begun the process of promulgating new rules clarifying their respective jurisdictions over the management and disposal of E&P Waste, including the Division's planned revision of the relevant regulations at issue in this Cause—Utah Admin. Code Rule R649-9-1, *et. seq.* However, it is estimated these new rules will not be in place for another six to twelve months.

19. Given the estimated time to complete the rulemaking discussed above and in line with the decision announced herein, it is appropriate to allow the Division to waive the Pond Size Rule as it relates to a permit application for the Future Pond, so long as the Future Pond is applied for prior to the effective date of the Division's rulemaking discussed above. should the If the application for the Future Pond is submitted after the promulgation of new rules, the Future Pond must be permitted under the newly-promulgated rules.

20. Should the Division approve the Permit Application, the Recycling Facilities will be bonded as part of the permit issuance process.

21. Should ReWater later apply for, and the Division later approve, a permit application for the Future Pond, the Future Pond will be bonded as part of the permit issuance process.

22. Notice of the filing of the RAA and of the September 27, 2023 Board hearing was duly published in the Salt Lake Tribune on August 6, 2023, the Uintah Basin Standard on August

Approved UDOGM Board Order (4 of 6)

2, 2023, and the Deseret News on August 4, 2023.

23. The vote of the Board members present and participating in this Cause was unanimous (6-0) in favor of granting the Request.

CONCLUSIONS OF LAW

1. The Board has jurisdiction of the parties and of the subject matter of the RAA pursuant to Utah Code Ann. §§ 40-6-5(3)(a), (d) and (e).

2. Due and regular notice of the time, place, and purpose of the September 27, 2023 Board hearing was properly given to all interested parties whose legally protected interests will or may be affected by the RAA, in the form and manner as required by Utah law.

3. The relief granted hereby will result in protection of vital resources while simultaneously preventing waste, promoting efficient recovery of the oil, gas, and associated hydrocarbons, and protecting the correlative rights of all affected parties.

4. ReWater has sustained its burden of proof, demonstrated good cause, and satisfied all legal requirements for granting the request to (1) waive the Pond Size Rule with respect to the existing Permit Application; (2) allow the Division to waive the Pond Size Rule when approving future permit applications by ReWater, but only until new rules for recycling facilities take effect; and (3) instruct the Division to approve or deny ReWater's Permit Application in a timely manner.

ORDER

Based upon the RAA, the evidence submitted at the September 27, 2023 Board hearing and the Findings of Fact and Conclusions of Law as stated above, the Board **HEREBY ORDERS**:

A. The request to waive the Pond Size Rule set forth in Utah Admin. Code

Rule R649-9-4(6.1) with respect to the existing Permit Application in this Cause is **GRANTED**.

B. The request that the Division be allowed to waive the Pond Size Rule set forth in Utah Admin. Code Rule R649-9-4(6.1) with respect to future permit applications by ReWater is **GRANTED**, but only until new rules are promulgated by the Division and WMRC, as discussed above.

C. To the extent consistent with its authority to do so, the Board instructs the Division to review the Permit Application and approve or deny it based on the applicable regulations in a timely manner.

D. Pursuant to Utah Admin. Code Rule R641, *et seq.* and Utah Code Ann. §§63G-4-204 through 208, the Board has considered and decided this Cause as a formal adjudication.

E. This Order is based exclusively on evidence of record in the adjudicative proceeding, or on facts officially noted as weighed and analyzed by the Board in the exercise of its expertise as set forth in Utah Code Ann. §§ 40-6-4(2)(a) through (3), and it constitutes the signed written order stating the Board's decision and the reasons for the decision as required by the Utah Administrative Procedures Act, Utah Code Ann. § 63G-4-208 and Utah Admin. Code Rule R641-109.

F. **Notice of Right of Judicial Review by the Supreme Court of the State of Utah.** The Board hereby notifies all parties to this proceeding that they have the right to seek judicial review of this Order by filing an appeal with the Supreme Court of the State of Utah within 30 days after the date this Order is issued. *See* Utah Code Ann. §§ 63G-4-208(1)(f); 63G-4-401(3)(a); 78A-3-102(3)(e)(iv).

Approved UDOGM Board Order (5 of 6)

G. **Notice of Right to Petition for Reconsideration.** As an alternative, but not as a prerequisite, to judicial review, the Board hereby notifies all parties to this proceeding that they may apply for reconsideration of this Order. *See* Utah Code Ann. § 63G-4-302. In pertinent part, the Utah Administrative Procedures Act provides:

> (1) (a) Within 20 days after the date that an order is issued for which review by the agency or by a superior agency under Section 63G-4-301 is unavailable, and if the order would otherwise constitute final agency action, any party may file a written request for reconsideration with the agency, stating the specific grounds upon which relief is requested.
> (b) Unless otherwise provided by statute, the filing of the request is not a prerequisite for seeking judicial review of the order.
> (2) The request for reconsideration shall be filed with the agency and one copy shall be mailed to each party by the person making the request.
> (3)(a) The agency head, or a person designated for that purpose, shall issue a written order granting the request or denying the request.
> (b) If the agency head or the person designated for that purpose does not issue an order within 20 days after the filing of the request, the request for reconsideration shall be considered to be denied.

Id.

H. The Board also hereby notifies all parties that Utah Admin. Code R641-110-100, which is part of a group of Board rules entitled "Rehearing and Modification of Existing Orders," states:

> Any person affected by a final order or decision of the Board may file a petition for rehearing. Unless otherwise provided, a petition for rehearing must be filed no later than the 10th day of the month following the date of signing of the final order or decision for which the rehearing is sought. A copy of such petition will be served on each other party to the proceeding no later than the 15th day of that month.

Utah Admin. Code R641-110-100.

I. Utah Admin. Code Rule R641-110-200 provides the required contents of a

petition for rehearing.

J. If there is any conflict between the deadlines provided in the Utah Administrative Procedures Act and the Rules of Practice and Procedure before the Board, the later of the two deadlines shall be available to any party moving to rehear this matter. If the Board later denies a timely petition for rehearing, the aggrieved party may seek judicial review of the Order by perfecting an appeal with the Utah Supreme Court within 30 days thereafter.

K. The Board retains exclusive and continuing jurisdiction of all matters covered by this Order and of all parties affected thereby; specifically, the Board retains and reserves exclusive and continuing jurisdiction to make further orders as appropriate and authorized by statute and applicable regulations.

The Chairman's signature on a facsimile copy of this Order shall be deemed the equivalent of a signed original for all purposes.

ENTERED this 13th day of November, 2023.

STATE OF UTAH
BOARD OF OIL, GAS AND MINING

Richard K. Borden, Chairman

Approved UDOGM Board Order (6 of 6)

CERTIFICATE OF SERVICE

I hereby certify that on this 14th day of November, 2023, I caused a true and correct copy of the foregoing **FINDINGS OF FACT, CONCLUSIONS OF LAW AND ORDER** for **Docket No. 2023-036 Cause No. 138-04** to be mailed to the following:

Via Email:

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Email: mitchmaio@learlaw.com
Attorney for Petitioner reWater LLC

Petitioner's Address:
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Salt Lake City, UT 84114-0873
Email: bfrandall@agutah.gov

Via USPS First Class Mail, Postage Prepaid:

Moon Kenneth Alton Trustee
HC 64 BOX 102
Duchesne UT 84021

Vaibhav Shree LLC
1625 W Center St
Provo UT 84601

Bureau of Land Management
170 South 500 East
Vernal UT 84078

Ute Indian Tribe of the
Uintah and Ouray Reservation
PO Box 190
Ft. Duchesne UT 84026

Ute Distribution Corporation, a Utah Corporation
PO Box 696
Roosevelt UT 84066

Division of Waste Management and Radiation Control
Attn: Douglas J. Hansen, Director
PO Box 140873
Salt Lake City UT 84114-0873

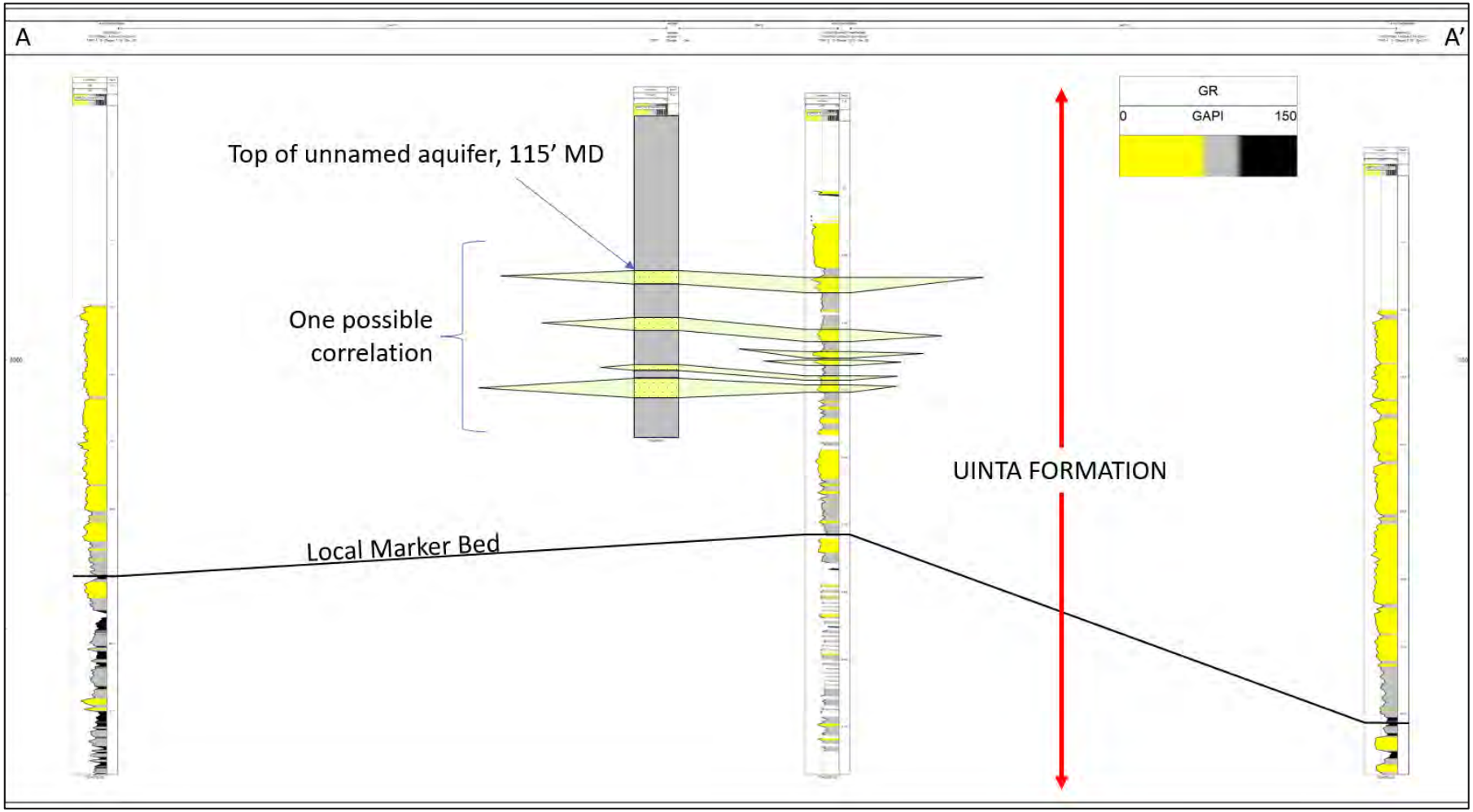
Duchesne County Commission
Attn: Irene Hansen, Chair
734 North Center Street
Duchesne UT 84021

/s/ Julie Ann Carter

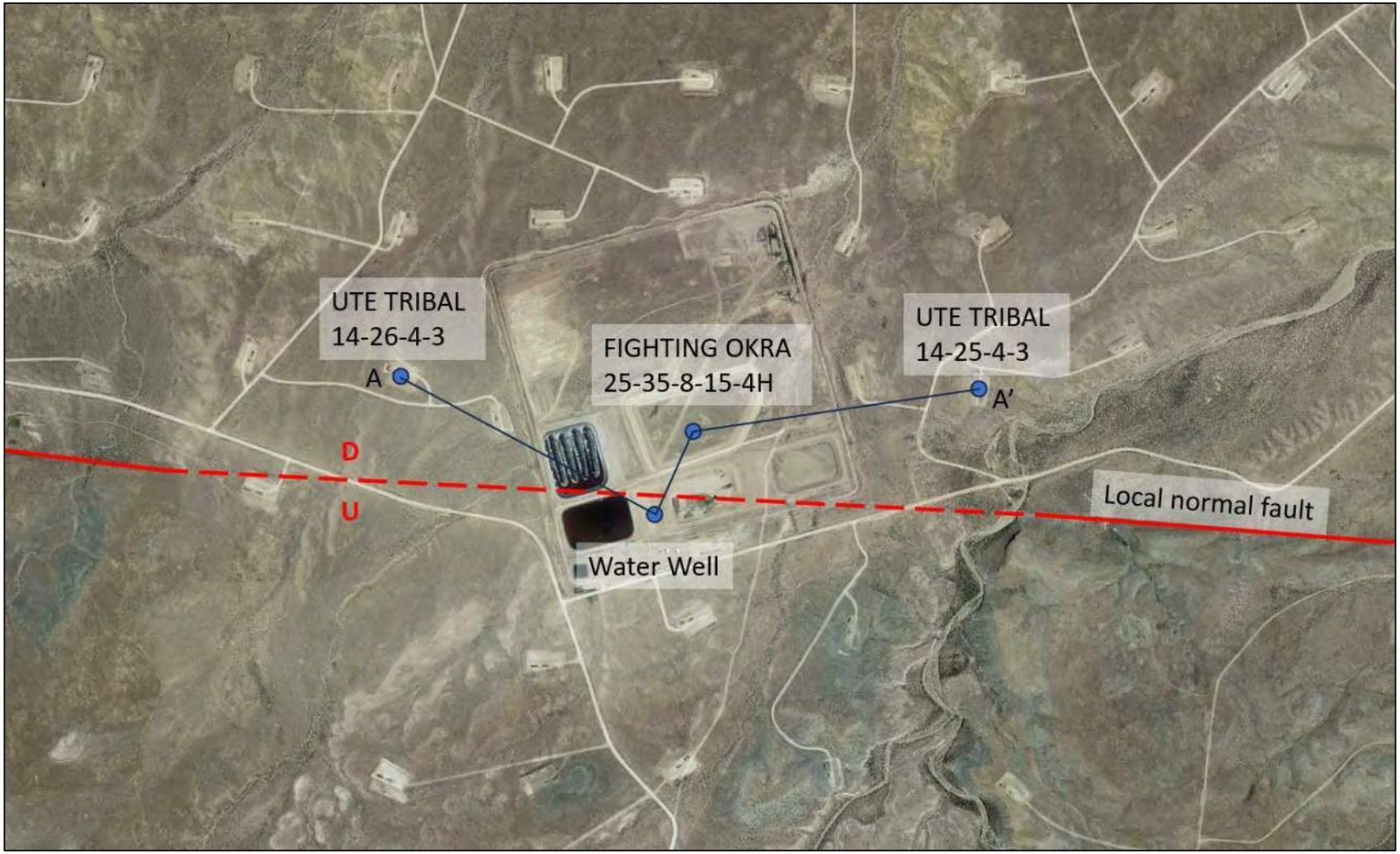
Additional Geo Cross Section Specific to Water Aquifer

Water Well drilled on Property in 2023 provided fantastic additional data.

Additional Geo Cross Section Specific to Water Aquifer (1 of 2)



Additional Geo Cross Section Specific to Water Aquifer (2 of 2)



Other Docs

Other Docs

ACORD

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 6/26/2023

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER: The Insurance Advisors, LLC, 1256 W 440 S, Suite 2, Vineal, UT 84078

CONTACT NAME: Jared McKee
PHONE (A/C, No, Ext): (435) 789-0151
FAX (A/C, No): [illegible]
E-MAIL ADDRESS: jmckee@insuranceadvisors.com

INSURED: reWater, LLC, 3319 N UNIVERSITY AVE, Suite 2, PROVO, UT 84604-4539

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : National American Insurance Company	47580
INSURER B :	
INSURER C :	
INSURER D :	
INSURER E :	
INSURER F :	

COVERAGES — CERTIFICATE NUMBER: — REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE X OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: POLICY PRO-JECT LOC OTHER:			CP1014083	06/26/2023	06/26/2024	EACH OCCURRENCE $ 1,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) $ 100,000 MED EXP (Any one person) $ 5,000 PERSONAL & ADV INJURY $ 1,000,000 GENERAL AGGREGATE $ 2,000,000 PRODUCTS - COMP/OP AGG $ 2,000,000
	AUTOMOBILE LIABILITY ANY AUTO OWNED AUTOS ONLY HIRED AUTOS ONLY SCHEDULED AUTOS NON-OWNED AUTOS ONLY						COMBINED SINGLE LIMIT (Ea accident) $ BODILY INJURY (Per person) $ BODILY INJURY (Per accident) $ PROPERTY DAMAGE (Per accident) $
	UMBRELLA LIAB OCCUR EXCESS LIAB CLAIMS-MADE DED RETENTION $						EACH OCCURRENCE $ AGGREGATE $
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y / N / N/A					PER STATUTE OTH-ER E.L. EACH ACCIDENT $ E.L. DISEASE - EA EMPLOYEE $ E.L. DISEASE - POLICY LIMIT $

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

CERTIFICATE HOLDER: UDOT

CANCELLATION: SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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ACORD 25 (2016/03) The ACORD name and logo are registered marks of ACORD

EXPEDITE

RECEIVED FEB 08 2023 Utah Div. of Corp. & Comm. Cd.

Certificate of Organization of reWater, LLC

This Certificate of Organization forming a limited liability company under the laws of the State of Utah is made and executed this 8th day of February, 2023, by the undersigned persons.

1. Name: The name of the limited liability company is **reWater, LLC** (the "Company").
2. Principal Office: The street and mailing address of the Company's principal office is **3319 N. University Ave., Suite 200, Provo, UT 84604**.
3. Registered Agent: The name of the Company's registered agent is Kimball Hodges; the address of such registered agent is 3319 N. University Ave., Suite 200, Provo, UT 84604.
4. Transfers: All Member interests in the Company, whether held by a Member or by a transfer of a transferable interest, shall be subject to the restrictions, limitations, and options contained in the Operating Agreement of the Company relating to the transfer of Member interests, and no such membership or transferable interest shall be transferred except in accordance with the Operating Agreement. All persons are notified that the Operating Agreement restricts transfers and forbids any such transfer except in accordance with its terms.
5. Operating Agreement: The rights and obligations under the Operating Agreement are inherent characteristics of the Company and of any Membership interest, transferable interest, or other interest in the Company, in which rights and obligations any person obtaining rights relating to the Company or an interest in or relating to the Company shall be subject. The Operating Agreement may currently, or in the future, include, among other things, provisions relating to the arbitration of disputes, the classification and reclassification of membership interests, irrevocable powers of attorney, cross-grants of security interests among us Members and the Company in membership interests, transfer restrictions, requirements for non-member consents to certain amendments and actions, and other matters. All persons are notified that the Operating Agreement will materially affect any interest in the Company and the rights of Members and transferees.

The undersigned affirm, under penalties of perjury, that they are the Organizers of the Company and that the facts stated in the foregoing Certificate of Organization are true.

State of Utah, Department of Commerce, Division of Corporations and Commercial Code. I hereby certify that the foregoing has been filed and approved on this 8 day of Feb A.D. 20 23 in the office of the Division and hereby issued this Certificate thereof.
Examiner 130 Date 2-8-23
Leigh Ann Veillette, Legal Intern, Division Director

Organizer:

Signature: [signature]

Name: Bradley D. Gunnell

Date of Execution: February 8, 2023

Add.: 3319 N. University Ave., Suite 200, Provo, UT 84604

FEB 8 23 PM 2:30

13253826-0160

Utah Department of Commerce
Division of Corporations & Commercial Code
160 East 300 South, 2nd Floor, PO Box 146705
Salt Lake City, UT 84114-6705
Service Center: (801) 530-4849
Toll Free: (877) 526-3994 Utah Residents
Fax: (801) 530-6438
Web Site: http://www.commerce.utah.gov

02/13/2023
13253826-0160/2132023-1939357

CERTIFICATE OF EXISTENCE

Registration Number: 13253826-0160
Business Name: REWATER, LLC
Registered Date: February 08, 2023
Entity Type: LLC - Domestic
Status: Current

The Division of Corporations and Commercial Code of the State of Utah, custodian of the records of business registrations, certifies that the business entity on this certificate is authorized to transact business and was duly registered under the laws of the State of Utah. The Division also certifies that this entity has paid all fees and penalties owed to this state; its most recent annual report has been filed by the Division (unless Delinquent); and, that Articles of Dissolution have not been filed.

L. Veillette

Leigh Veillette
Director
Division of Corporations and Commercial Code

Current Members of reWater, LLC

November 1, 2023

The current members of reWater, LLC as of the date set forth above are:

1. WEM Uintah, LLC (5.8%)—3319 N University Ave, Suite 200, Provo, UT 84604
2. WEM Uintah II, LLC (14.2%)—3319 N University Ave, Suite 200, Provo, UT 84604
3. WEM Uintah IV, LLC (80.0%)—3319 N University Ave, Suite 200, Provo, UT 84604

This is subject to change as additional members join or additional investments are made in reWater, LLC.

Pursuant to Section 48-2c-401 of the Utah Revised Uniform Limited Liability Company Act, this document is to be held with the records of reWater, LLC.

Signature: [signature]

Name: Bradley D. Gunnell

Date of Execution: December 12, 2023

Add.: 3319 N. University Ave., Suite 200, Provo, UT 84604

SPENCER J. COX
Governor

DEIDRE M. HENDERSON
Lieutenant Governor

State of Utah
DEPARTMENT OF NATURAL RESOURCES

JOEL FERRY
Executive Director

Division of Water Rights
TERESA WILHELMSEN
State Engineer/Division Director

ORDER OF THE STATE ENGINEER
ORDER GRANTING PERMIT TO CONSTRUCT, ENLARGE, REPAIR, ALTER, REMOVE OR ABANDON A DAM

Application Nos. UT54137, UT54139, and UT54140, submitted in the name of reWater, LLC (Don Hamilton), applicant, to construct dams without submission of formal plans is hereby APPROVED. The applicant is hereby authorized to conduct the work detailed in the applications and supporting documentation, as described in this Order**.** Any modification may require additional authorization and/or application resubmittal.

The applicant is ORDERED to abide by the terms and conditions of this Order as follows:

1. Authorization is hereby granted to construct the proposed dams as detailed in the applications and supporting documents.

2. All design and construction activities undertaken shall be commensurate with state-of-the-art standards.

3. Identification of the inspector and the contractor for the projects along with inspectors' journals and results of material testing performed during construction shall be submitted to this office upon request.

4. Approval will be voided if construction has not begun within 1 year of the date of this Order.

The statutory process and criteria for evaluation of these applications are described at UTAH CODE ANN. § 73-5a-202 through 205. The State Engineer has determined that the applications meets the necessary legal criteria for approval based upon the following Findings of Fact and reasoning set forth in the Discussion.

FINDINGS OF FACT

1. Pond 3 dam will impound 16.3 acre-feet of water above the natural ground surface.

2. Pond 4 dam will impound 20.0 acre-feet of water above the natural ground surface.

3. Pond 5 dam will impound 19.6 acre-feet of water above the natural ground surface.

DISCUSSION

1. It is the opinion of the State Engineer that the proposed dams do not constitute a threat to human life if they fail.

2. It is the opinion of the State Engineer that the proposed dams may result in only minor property damage that would be limited to property held by the owner of the structures if they fail.

3. A review of the water rights listed in the application was performed by the Utah Division of Water Rights Regional Office and the following comment was submitted:

   > Some of the federally reserved water rights, for Ute Energy and the Ute Tribe, that could be used for these ponds have not been fully quantified at this time. There are various freshwater water rights that could be used by the Ute Tribe, Ute Energy, and/or reWater, LLC for any freshwater uses. Where the ponds will be built on non-Tribal land, the Utah State Engineer would have jurisdiction for the water rights that would be used for any production water recycling purposes at this facility. The production water recyclers or recycled production water users should file the appropriate water rights paperwork with the Utah State Engineer's office. Our region office would be happy to help them with the paperwork.

4. While this Order grants authorization for dam construction, **coordination with the regional office is required to establish the project's water rights.**

Your contact with this office, should you need it, is with the Vernal Regional Office. The telephone number is 435-247-1514.

This Order is subject to the provisions of Utah Admin. Code R655-6-17 of the Division of Water Rights and to Utah Code §§ 63G-4-302, 63G-4-402, and 73-3-14 which provide for filing either a Request for Reconsideration with the State Engineer or for judicial review with the appropriate District Court. A Request for Reconsideration must be filed in writing with the State Engineer within 20 days of the date of this Order. The written request shall be filed in-person, by mail, or electronically. If the request is filed electronically, it shall be submitted to: waterrights@utah.gov, which is the authorized general email for the Division. However, a Request for Reconsideration is not a prerequisite to filing for judicial review. A petition for judicial review must be filed within 30 days after the date of this Order or, if a Request for Reconsideration has been filed, within 30 days after the date the Request for Reconsideration is denied. A Request for Reconsideration is considered denied when no action is taken 20 days after the Request is filed.

Dated this 7th day of July, 2025.

Matthew L. Call

Teresa Wilhelmsen, P.E. – State Engineer
BY: Matthew L. Call, P.E. – Assistant State Engineer

Mailed a copy of the foregoing Order this 7th day of July, 2025, to:

reWater, LLC
Don Hamilton
4844 North 300 West, Suite 100
Provo, UT 84604

Andrew Dutson - Regional Engineer, andrewdutson@utah.gov
Don Hamilton, starpoint@etv.net

BY: Tiffany Gonzales
Tiffany Gonzales, Administrative Secretary

PLEASANT VALLEY NORTH PONDS 3, 4 & 5

INDEX TO SHEETS

SHEET NUMBER	DESCRIPTION
1	TITLE SHEET
2	POND GRADING
3	POND LAYOUT
4	PLAN & PROFILES
5	PIPE DETAILS

SPECIAL NOTE:

1. PONDS 3-5 ARE PRODUCED WATER PONDS AND WILL BE FILLED FROM POND 3 WHICH WILL SPILL TO POND 4 AND FINALLY TO POND 5. THESE PONDS MUST COMPLY TO THE UTAH DIVISION OF OIL GAS AND MINING RULES R649-9 AND THEREFORE, POND 5 DOES NOT INCLUDE A SPILLWAY. IT IS THE OPERATORS RESPONSIBILITY TO ENSURE THE WATER DOESN'T EXCEED THE MAX FILL LEVEL AS NOTED ON THE CONSTRUCTION DRAWINGS.

2. PONDS 3-5 EACH HAVE AN EMBANKMENT THAT IMPOUNDS 20 AC FT OR LESS OF PRODUCED WATER.

   SPECIFICALLY :

   POND 3 (76.2 AC FT)

   IMPOUNDS 16.3 AC FT ABOVE EXISTING GRADE AND 59.9 AC FT BELOW EXISTING GRADE

   POND 4 (73.6 AC FT)

   IMPOUNDS 20.0 AC FT ABOVE EXISTING GRADE AND 53.6 AC FT BELOW EXISTING GRADE

   POND 5 (78.0 AC FT)

   IMPOUNDS 19.6 AC FT ABOVE EXISTING GRADE AND 58.4 AC FT BELOW EXISTING GRADE

(WATER STORED BELOW EXISTING IS NOT CONSIDERED IMPOUNDED WATER)
EACH POND REQUIRES A MINOR DAM PERMIT FROM THE UTAH DIVISION OF WATER RIGHTS. DUE TO THE ELIMINATION OF THE SPILLWAY IN POND 5, IT IS THE OPERATORS RESPONSIBILITY TO MAINTAIN 3' OF FREEBOARD AT ALL TIMES BY REMAINING AT OR BELOW THE MAX FILL LEVEL AS NOTED ON THE PLANS. IF THE WATER EVER DOES ACCIDENTALLY OVER TOP THE POND, THE BERM MUST BE RECONSTRUCTED AND RE-COMPACTED ACCORDING TO THE RULES OF UTAH DIVISION OF WATER RIGHTS DAM SAFETY GUIDELINES FOR MINOR DAMS.

THESE DRAWINGS, OR ANY PORTION THEREOF, SHALL NOT BE USED ON ANY PROJECT OR EXTENSIONS OF THIS PROJECT EXCEPT BY AGREEMENT IN WRITING WITH OUTLAW ENGINEERING, INC.

REGISTERED PROFESSIONAL ENGINEER
MITCH C. MORTENSEN
375112
EXP:3-31-25
STATE OF UTAH

REVISIONS

DESIGNER: AAM | REVIEWED: MCM | DRAWN: AAM

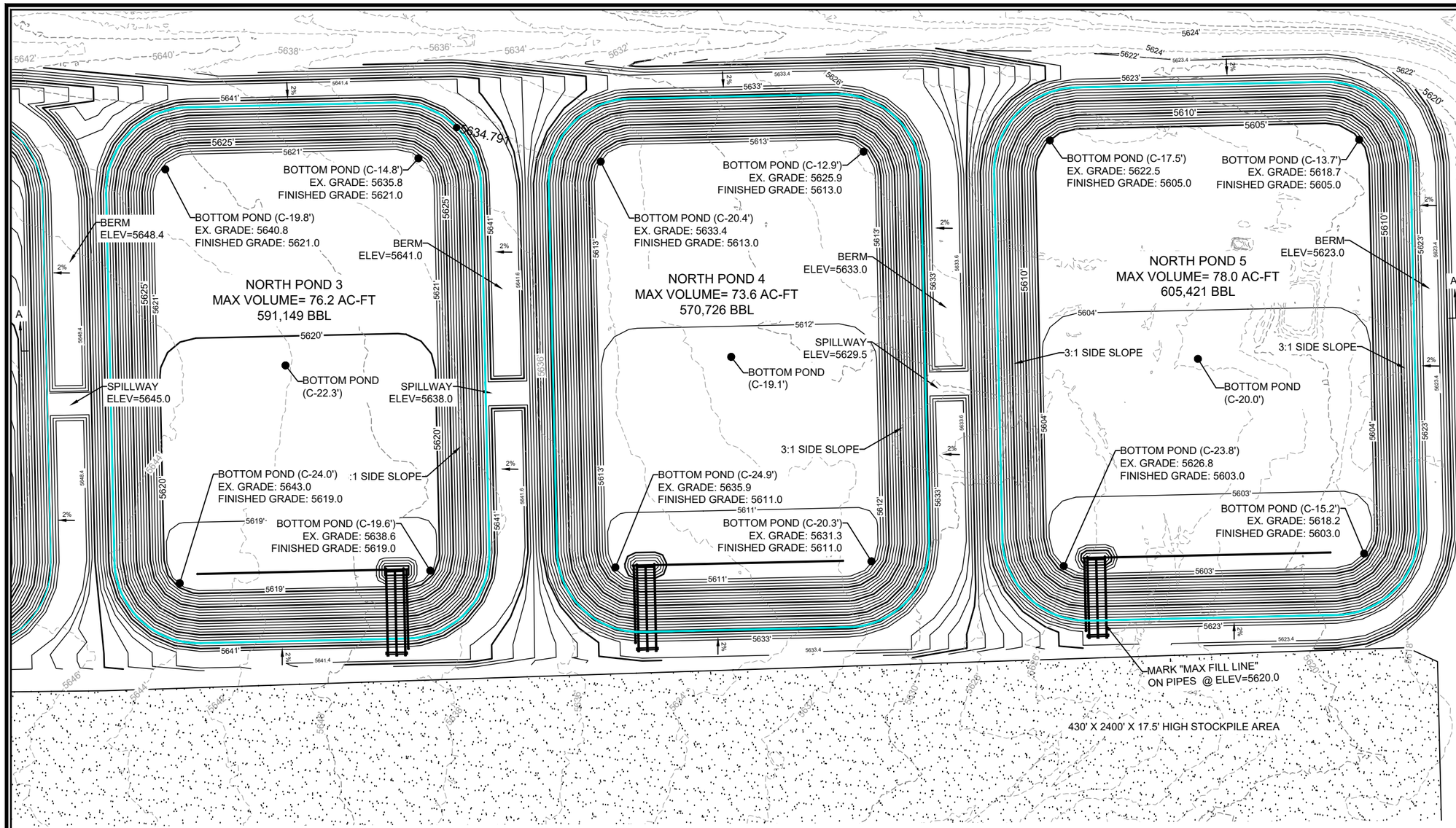
PROJECT
PLEASANT VALLEY NORTH PONDS 3, 4 & 5
LOCATION: SECTION 25, 26, 35, 36 T4S, R3W, U.S.B.&M.
DUCHESNE COUNTY, UTAH
LAT: 40.09776 LONG: -110.18088

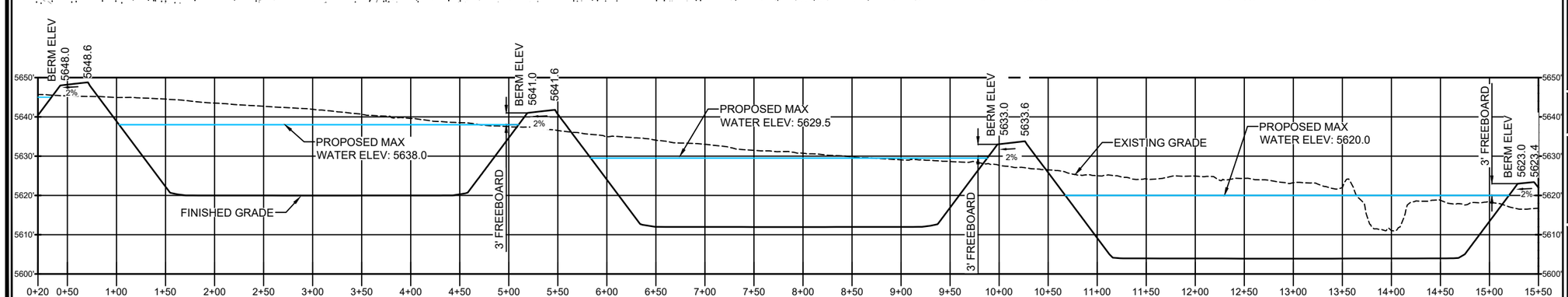
SHEET
COVER

OUTLAW ENGINEERING INC.
510 West 200 North
Roosevelt, UTAH 84066
(435) 232-4321

JOB NO.

SHEET NO.
1 OF 5





CROSS SECTION A-A

THESE DRAWINGS, OR ANY PORTION THEREOF, SHALL NOT BE USED ON ANY PROJECT OR EXTENSIONS OF THIS PROJECT EXCEPT BY AGREEMENT IN WRITING WITH OUTLAW ENGINEERING, INC.

LEGEND

= PROPOSED CONTOURS
= TOP OF WATER
= EXIST CONTOURS

N
W E
S

11x17 SCALE:
1" = 120'

REGISTERED PROFESSIONAL ENGINEER
MITCH C. MORTENSEN
575112
EXP:3-31-25
STATE OF UTAH

ESTIMATED POND EARTHWORK QUANTITIES

* NO SHRINK OR SWELL FACTORS HAVE BEEN USED
(QUANTITIES EXPRESSED IN CUBIC YARDS)

ITEM	CUT	FILL	EXCESS/ IMPORT
POND 3	146,531	7,678	138,853 (CUT)
POND 4	139,242	9,541	129,701 (CUT)
POND 5	150,130	7,837	142,293 (CUT)

REVISIONS

DESIGNER: AAM | REVIEWED: MCM | DRAWN: AAM

PROJECT

PLEASANT VALLEY
NORTH PONDS 3, 4 & 5

LOCATION: SECTION 25, 26, 35, 36 T4S, R3W, U.S.B.&M.
DUCHESNE COUNTY, UTAH
LAT: 40.09776 LONG: -110.18088

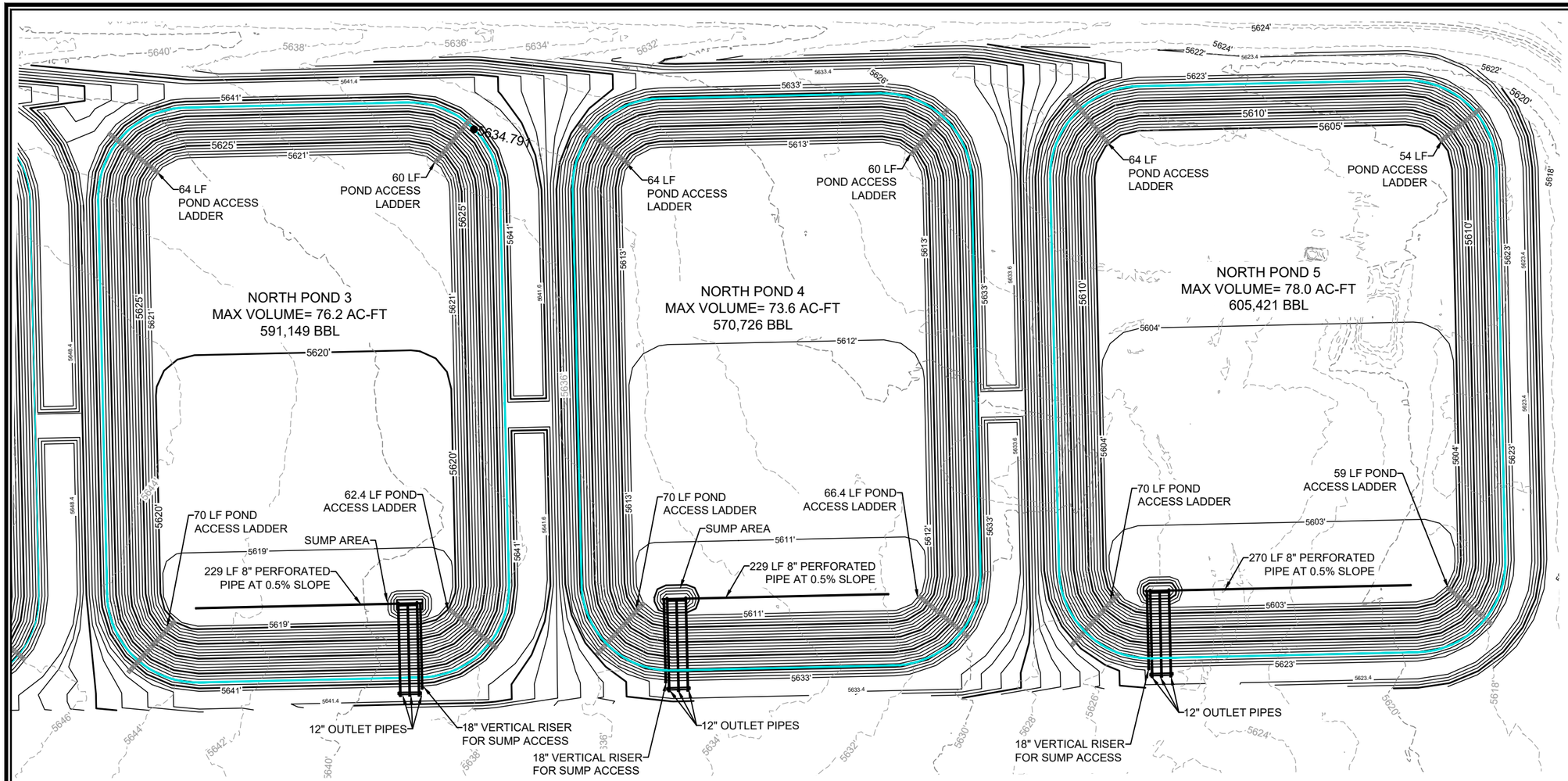
SHEET
PONDS 3-5 GRADING PLAN

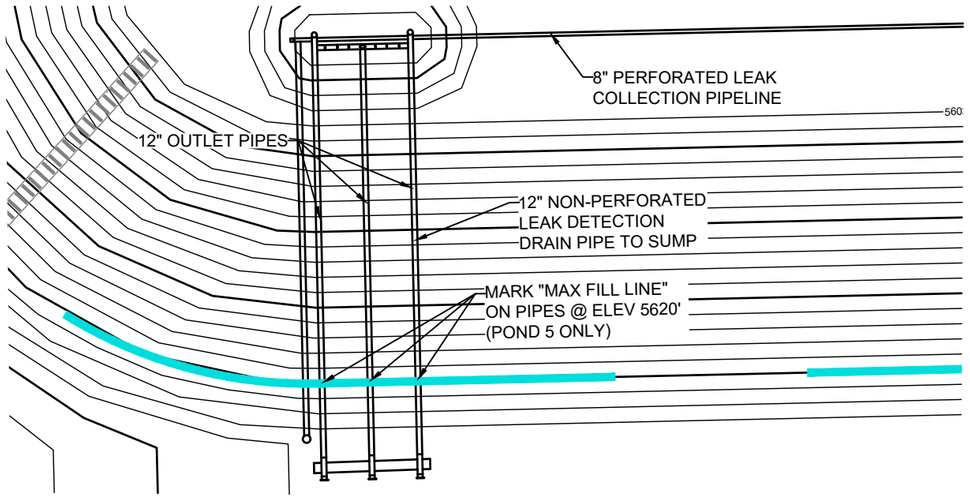
reWater

OUTLAW ENGINEERING INC.
510 West 200 North
Roosevelt, UTAH 84066
(435) 232-4321

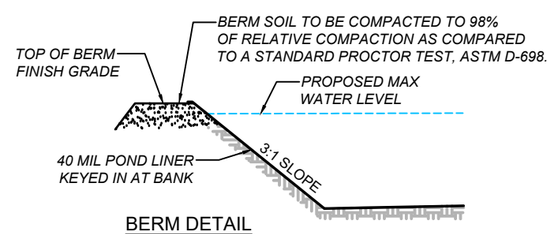
JOB NO.

SHEET NO.
2 OF 5

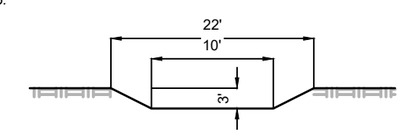




TYP. PIPE LAYOUT



BERM DETAIL
NOT TO SCALE



OUTLET SPILLWAY DETAIL
NOT TO SCALE

THESE DRAWINGS, OR ANY PORTION THEREOF, SHALL NOT BE USED ON ANY PROJECT OR EXTENSIONS OF THIS PROJECT EXCEPT BY AGREEMENT IN WRITING WITH OUTLAW ENGINEERING, INC.

LEGEND

- = POND CONTOURS
- = TOP OF WATER
- = EXIST CONTOURS

REGISTERED PROFESSIONAL ENGINEER
MITCH C. MORTENSEN
375112
EXP:3-31-25
STATE OF UTAH

N
W E
S

11x17 SCALE:
1" = 120'

REVISIONS

DESIGNER:	AAM	REVIEWED:	MCM	DRAWN:	AAM

PROJECT

PLEASANT VALLEY
NORTH PONDS 3, 4 & 5

LOCATION: SECTION 25, 26, 35, 36 T4S, R3W, U.S.B.&M.
DUCHESNE COUNTY, UTAH

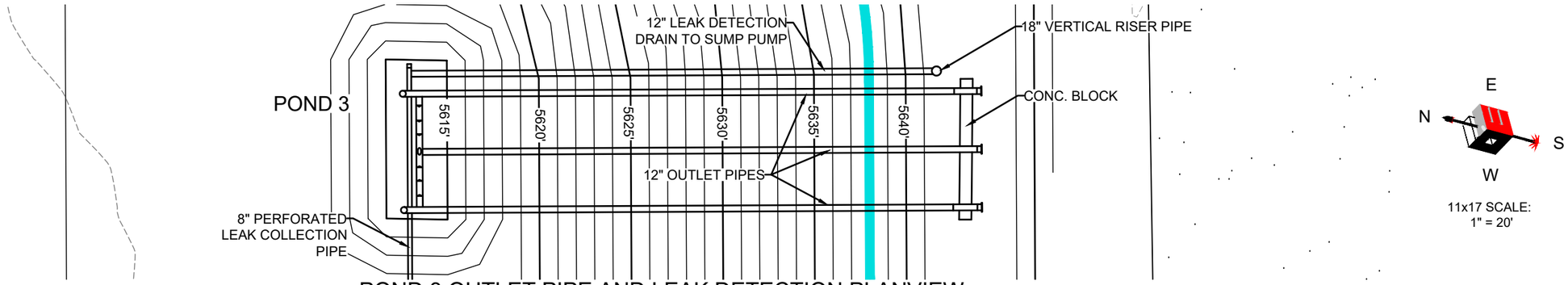
LAT: 40.09776 LONG: -110.18088

SHEET
POND LAYOUT

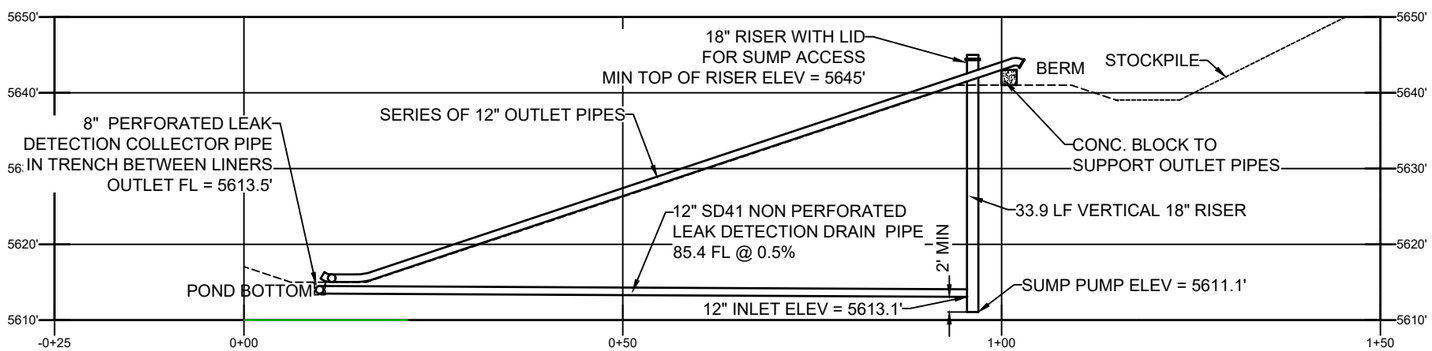
OUTLAW ENGINEERING INC.
510 West 200 North
Roosevelt, UTAH 84066
(435) 232-4321

JOB NO.

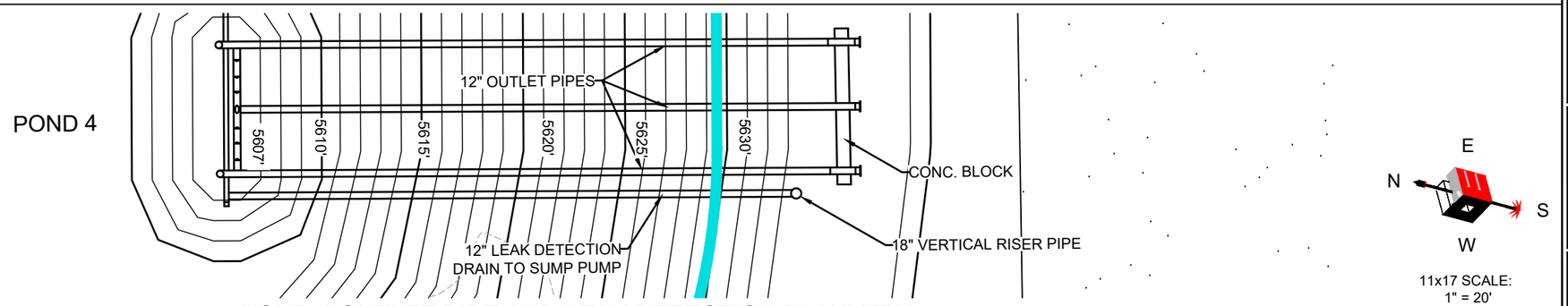
SHEET NO.
3 OF 5



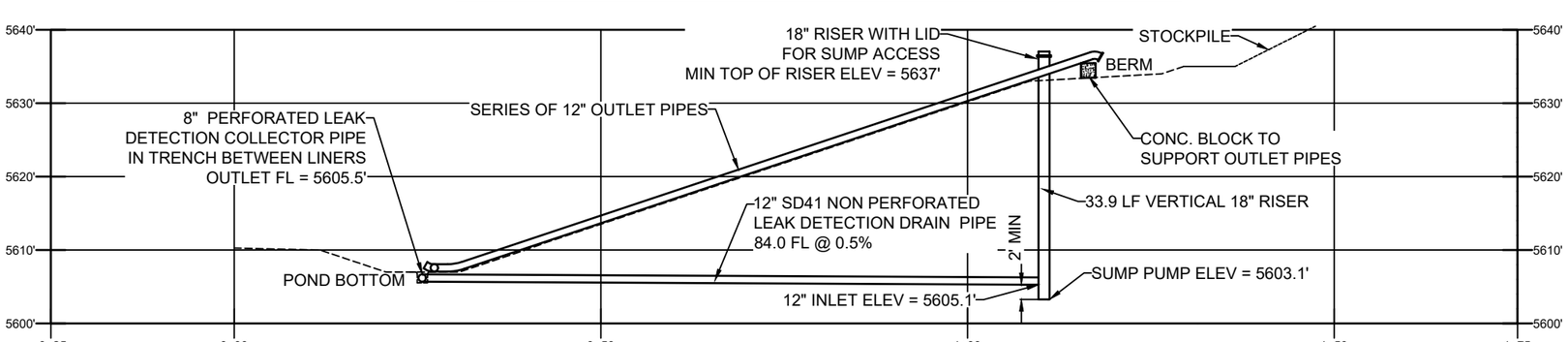
POND 3 OUTLET PIPE AND LEAK DETECTION PLANVIEW



POND 3 OUTLET PIPE AND LEAK DETECTION PROFILE



POND 4 OUTLET PIPE AND LEAK DETECTION PLANVIEW



POND 4 OUTLET PIPE AND LEAK DETECTION PROFILE

THESE DRAWINGS, OR ANY PORTION THEREOF, SHALL NOT BE USED ON ANY PROJECT OR EXTENSIONS OF THIS PROJECT EXCEPT BY AGREEMENT IN WRITING WITH OUTLAW ENGINEERING, INC.

E N S W

11x17 SCALE:
1" = 20'

REGISTERED PROFESSIONAL ENGINEER
MITCH C. MORTENSEN
375112
EXP:3-31-25
STATE OF UTAH

REVISIONS

DESIGNER: AAM | REVIEWED: MCM | DRAWN: AAM

PROJECT

PLEASANT VALLEY NORTH PONDS 3, 4 & 5

LOCATION: SECTION 25, 26, 35, 36 T4S, R3W, U.S.B.&M.
DUCHESNE COUNTY, UTAH

LAT: 40.09776 LONG: -110.18088

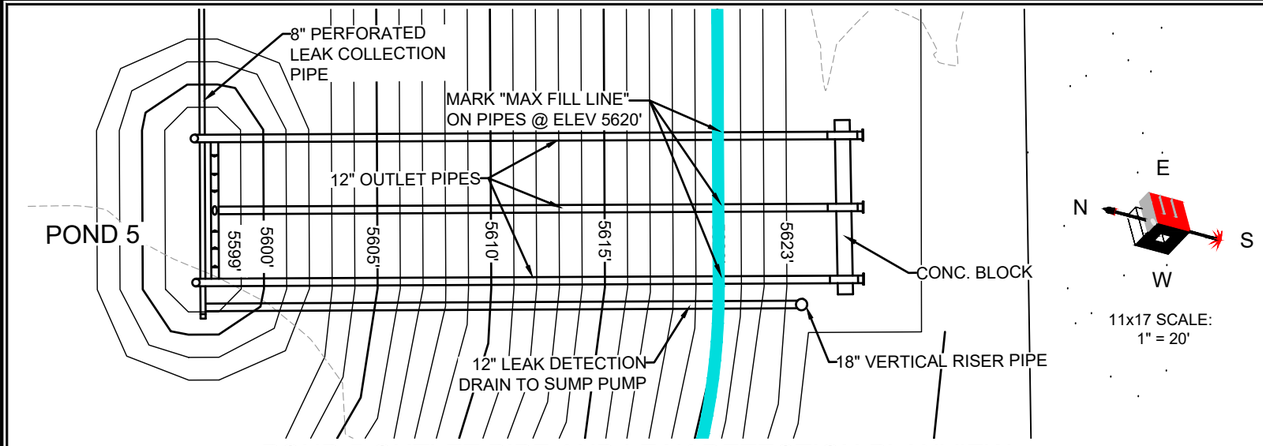
SHEET
PLAN AND PROFILES

reWater LLC

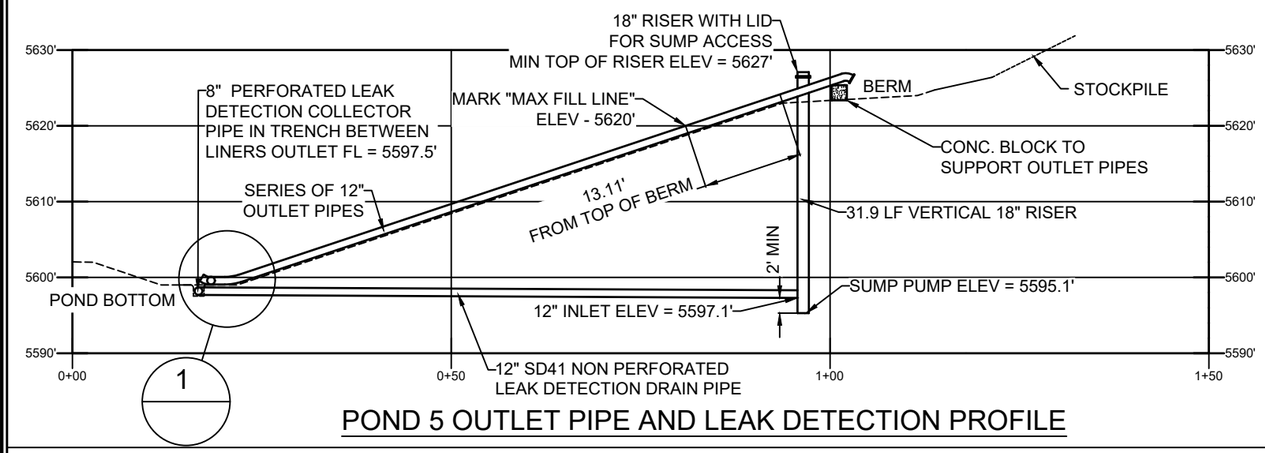
OUTLAW ENGINEERING INC.
510 West 200 North
Roosevelt, UTAH 84066
(435) 232-4321

JOB NO.

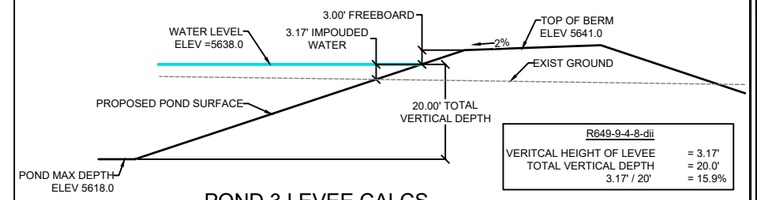
SHEET NO.
4 OF 5



POND 5 OUTLET PIPE AND LEAK DETECTION PLANVIEW



POND 5 OUTLET PIPE AND LEAK DETECTION PROFILE

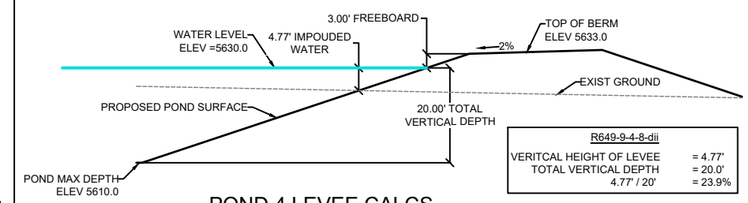


R649-9-4-8-dii	
VERITCAL HEIGHT OF LEVEE	= 3.17'
TOTAL VERTICAL DEPTH	= 20.0'
3.17' / 20'	= 15.9%

POND 3 LEVEE CALCS

NOT TO SCALE

* PLEASE REFER TO SPECIAL NOTE ON COVER PAGE

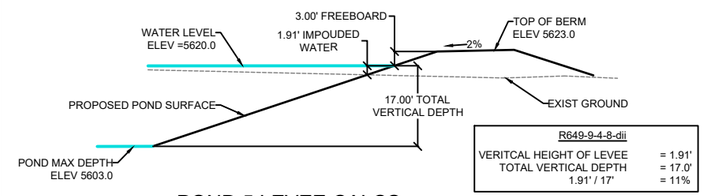


R649-9-4-8-dii	
VERITCAL HEIGHT OF LEVEE	= 4.77'
TOTAL VERTICAL DEPTH	= 20.0'
4.77' / 20'	= 23.9%

POND 4 LEVEE CALCS

NOT TO SCALE

* PLEASE REFER TO SPECIAL NOTE ON COVER PAGE

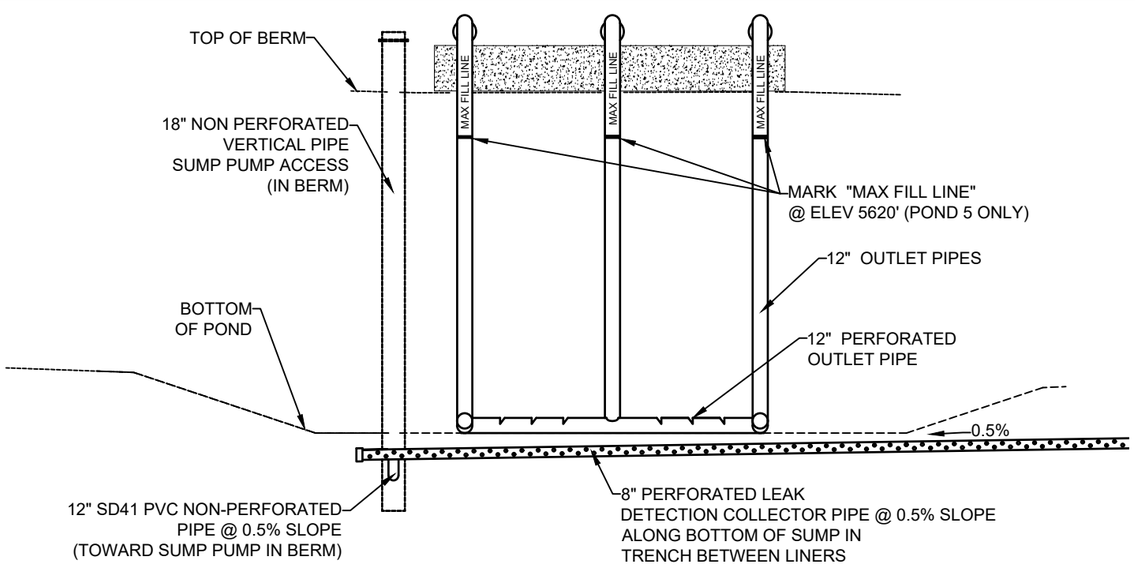


R649-9-4-8-dii	
VERITCAL HEIGHT OF LEVEE	= 1.91'
TOTAL VERTICAL DEPTH	= 17.0'
1.91' / 17'	= 11%

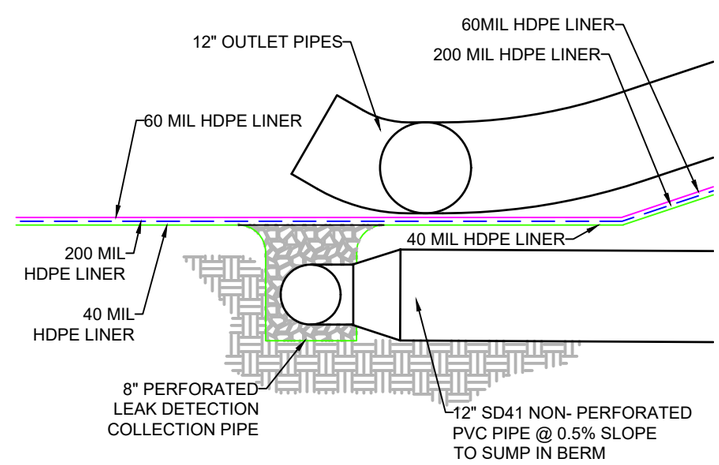
POND 5 LEVEE CALCS

NOT TO SCALE

* PLEASE REFER TO SPECIAL NOTE ON COVER PAGE



PIPE LAYOUT DETAILS (TYP)



DETAIL 1

THESE DRAWINGS, OR ANY PORTION THEREOF, SHALL NOT BE USED ON ANY PROJECT OR EXTENSIONS OF THIS PROJECT EXCEPT BY AGREEMENT IN WRITING WITH OUTLAW ENGINEERING, INC.

REGISTERED PROFESSIONAL ENGINEER
MITCH C. MORTENSEN
375112
EXP:3-31-25
STATE OF UTAH

REVISIONS

DESIGNER: AAM	REVIEWED: MCM	DRAWN: AAM

PROJECT

PLEASANT VALLEY NORTH PONDS 3, 4 & 5

LOCATION: SECTION 25, 26, 35, 36 T4S, R3W, U.S.B.&M.
DUCHESNE COUNTY, UTAH

LAT: 40.09776 LONG: -110.18088

SHEET

PIPE DETAILS

OUTLAW ENGINEERING INC.
510 West 200 North
Roosevelt, UTAH 84066
(435) 232-4321

JOB NO.

SHEET NO. 5 OF 5