ENVIROTECH

ENGINEERING

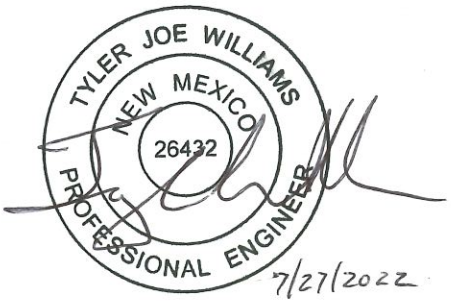
C-147 REGISTRATION PACKAGE

PARKWAY RECYCLE FACILITY

WATERBRIDGE STATELINE, LLC

EDDY COUNTY, NEW MEXICO

WATERBRIDGE



JULY 2022

022138-00

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources
Department
Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-147
Revised April 3, 2017

Recycling Facility and/or Recycling Containment

Type of Facility: ☐ Recycling Facility ☒ Recycling Containment*

Type of action: ☒ Permit ☐ Registration ☐ Modification ☐ Extension ☐ Closure ☐ Other (explain) _____

*** At the time C-147 is submitted to the division for a Recycling Containment, a copy shall be provided to the surface owner.**

Be advised that approval of this request does not relieve the operator of liability should operations result in pollution of surface water, ground water or the environment. Nor does approval relieve the operator of its responsibility to comply with any other applicable governmental authority's rules, regulations or ordinances.

1.
Operator: WaterBridge Stateline LLC (For multiple operators attach page with information) OGRID #: 330129
Address: 5555 San Felipe Suite 1200 Houston, TX 77056
Facility or well name (include API# if associated with a well): Parkway Recycle
OCD Permit Number: _____ (For new facilities the permit number will be assigned by the district office)
U/L or Qtr/Qtr _____ Section 36 Township 19 south Range 28 East County: Eddy County
Surface Owner: ☐ Federal ☐ State ☒ Private ☐ Tribal Trust or Indian Allotment

2.
☐ **Recycling Facility:**
Location of recycling facility (if applicable): Latitude 32.619314° Longitude -104.137340° NAD83
Proposed Use: ☒ Drilling* ☒ Completion* ☒ Production* ☒ Plugging *
The re-use of produced water may NOT be used until fresh water zones are cased and cemented
☐ Other, ***requires permit for other uses. Describe use, process, testing, volume of produced water and ensure there will be no adverse impact on groundwater or surface water.***
☐ Fluid Storage
☐ Above ground tanks ☒ Recycling containment ☐ Activity permitted under 19.15.17 NMAC explain type_____
☐ Activity permitted under 19.15.36 NMAC explain type:_____ ☐ Other explain _____
☐ For multiple or additional recycling containments, attach design and location information of each containment
☐ **Closure Report (required within 60 days of closure completion):** ☐ Recycling Facility Closure Completion Date:_____

3.
☐ **Recycling Containment:**
☐ Annual Extension after initial 5 years (attach summary of monthly leak detection inspections for previous year)
Center of Recycling Containment (if applicable): Latitude 32.619314° Longitude -104.137340° NAD83
☐ For multiple or additional recycling containments, attach design and location information of each containment
☒ Lined ☐ Liner type: Thickness 60/40 mil ☐ LLDPE ☒ HDPE ☐ PVC ☐ Other _____
☐ String-Reinforced
Liner Seams: ☒ Welded ☐ Factory ☐ Other _____ Volume: 1,160,386 bbl Dimensions: L 720 x W 720 x D 24
☐ Recycling Containment Closure Completion Date:_____

4.

Bonding:

☐ Covered under bonding pursuant to 19.15.8 NMAC per 19.15.34.15(A)(2) NMAC **(These containments are limited to only the wells owned or operated by the owners of the containment.)**

☒ Bonding in accordance with 19.15.34.15(A)(1). Amount of bond $ 1,216,187.32 **(work on these facilities cannot commence until bonding amounts are approved)**

☒ Attach closure cost estimate and documentation on how the closure cost was calculated.

5.

Fencing:

☐ Four foot height, four strands of barbed wire evenly spaced between one and four feet

☒ Alternate. Please specify 8-ft tall Game Fence

6.

Signs:

☒ 12"x 24", 2" lettering, providing Operator's name, site location, and emergency telephone numbers

☐ Signed in compliance with 19.15.16.8 NMAC

7.

Variances:

Justifications and/or demonstrations that the proposed variance will afford reasonable protection against contamination of fresh water, human health, and the environment.

Check the below box only if a variance is requested:

☒ Variance(s): Requests must be submitted to the appropriate division district for consideration of approval. If a Variance is requested, include the variance information on a separate page and attach it to the C-147 as part of the application.

If a Variance is requested, it must be approved prior to implementation.

8.

Siting Criteria for Recycling Containment

Instructions: The applicant must provide attachments that demonstrate compliance for each siting criteria below as part of the application. Potential examples of the siting attachment source material are provided below under each criteria.

General siting

Ground water is less than 50 feet below the bottom of the Recycling Containment. NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells	☐ Yes ☒ No ☐ NA
Within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended. - Written confirmation or verification from the municipality; written approval obtained from the municipality	☐ Yes ☒ No ☐ NA
Within the area overlying a subsurface mine. - Written confirmation or verification or map from the NM EMNRD-Mining and Minerals Division	☐ Yes ☒ No
Within an unstable area. - Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; topographic map	☐ Yes ☒ No
Within a 100-year floodplain. FEMA map	☐ Yes ☒ No
Within 300 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse, or lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark). - Topographic map; visual inspection (certification) of the proposed site	☐ Yes ☒ No
Within 1000 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. - Visual inspection (certification) of the proposed site; aerial photo; satellite image	☐ Yes ☒ No
Within 500 horizontal feet of a spring or a fresh water well used for domestic or stock watering purposes, in existence at the time of initial application. - NM Office of the State Engineer - iWATERS database search; visual inspection (certification) of the proposed site	☐ Yes ☒ No
Within 500 feet of a wetland. - US Fish and Wildlife Wetland Identification map; topographic map; visual inspection (certification) of the proposed site	☐ Yes ☒ No

9.
Recycling Facility and/or Containment Checklist:
Instructions: Each of the following items must be attached to the application. Indicate, by a check mark in the box, that the documents are attached.

- [X] Design Plan - based upon the appropriate requirements.
- [X] Operating and Maintenance Plan - based upon the appropriate requirements.
- [X] Closure Plan - based upon the appropriate requirements.
- [X] Site Specific Groundwater Data -
- [X] Siting Criteria Compliance Demonstrations –
- [X] **Certify that notice of the C-147 (only) has been sent to the surface owner(s)**

10.
Operator Application Certification:
I hereby certify that the information and attachments submitted with this application are true, accurate and complete to the best of my knowledge and belief.

Name (Print): Michael Reitz Title: EVP Operations

Signature: Date: 07/25/22

e-mail address: michael.reitz@h2obridge.com Telephone: (713) 230-8864

11.
OCD Representative Signature: _____ **Approval Date:** _____

Title: _____ **OCD Permit Number:** _____

- [ ] OCD Conditions _____
- [ ] Additional OCD Conditions on Attachment

ENVIROTECH
ENGINEERING

July 20, 2022

Ms. Emily Hernandez
New Mexico EMNRD
Oil conservation Division
811 S. First St.
Artesia, New Mexico 88210

RE: Rule 34 Variance Request –Produced Water Impoundment Fencing

Ms. Hernandez:

WaterBridge Stateline, LLC (WaterBridge) is requesting a variance to C-147 Fencing requirement for requiring a fence four foot in height, with four strands of barbed wire evenly spaced between one and four feet. WaterBridge is requesting approval to a wire mesh, game fence, eight (8) feet in height. Based on our experience, we feel that the requested fencing will provide greater security to the facility for excluding animals and unauthorized individual access. Details for this type of fence can be found on Sheet 9 of 9 in Appendix D Engineering Drawings.

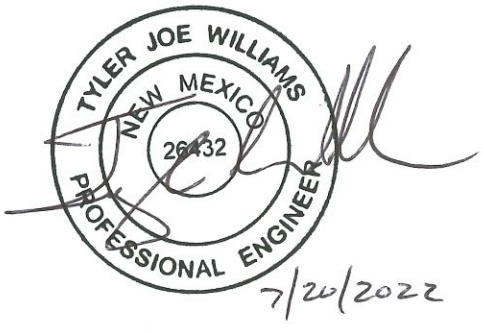
The proposed fencing has been used extensively on similar projects in Texas with outstanding success in deterring unauthorized entry by both humans and wildlife.

Should you have any questions or require additional information, please contact me by phone at 580-234-8780 or by email at twilliams@envirotechconsulting.com at your convenience.

Thank you for your consideration.
Best regards,

ENVIROTECH ENGINEERING & CONSULTING, INC.

Tyler Williams, P.E.
President and Principal Engineer



2500 N. Eleventh Street Enid, OK 73701 envirotechconsulting.com info@envirotechconsulting.com 580.234.8780

ENVIROTECH
ENGINEERING

July 20, 2022

Ms. Emily Hernandez
New Mexico EMNRD
Oil conservation Division
811 S. First St.
Artesia, New Mexico 88210

RE: Rule 34 Variance Request –Produced Water Recycling Containment Liner

Ms. Hernandez:

WaterBridge Stateline, LLC (WaterBridge) is requesting a variance to Rule 34 Part 12(A)(4) requiring secondary liners to be 30-mil string reinforced LLDPE. WaterBridge is requesting approval to use 40-mil LLDPE in place of the specified material. Based on our experience, we feel that the requested material will allow us to provide greater environmental protection in our impoundments.

Due to the construction of the 30-mil reinforced LLDPE material, nondestructive QA/QC testing cannot be performed. The proposed 40-mil LLDPE will be seamed in a manner that will allow nondestructive pressure testing of the seams to ensure proper sealing.

The proposed LLDPE is appropriate material for the proposed use in the impoundment and is compatible with the material that will be stored. This material will provide equal or better environmental protection as the specified 30-mil reinforced LLDPE. Attached with this request is a sample specification sheet for the LLDPE with the proposed material highlighted.

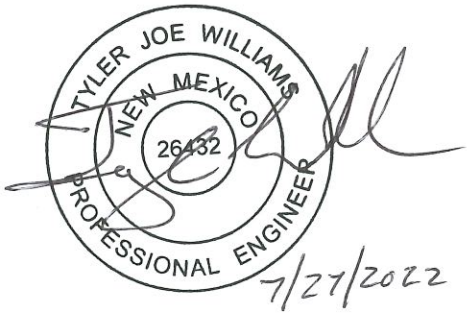
The proposed new liner system cross-section is as follows: prepare subgrade, 12 oz. geotextile, 40-mil LLDPE, single sided geocomposite, 60-mil HDPE (smooth on bottom, textured on slopes). This will replace the cross-section required by the current rule and submitted with the original permit application. It should also be noted that this variance has been granted on past sites.

Should you have any questions or require additional information, please contact me by phone at 580-234-8780 or by email at twilliams@envirotechconsulting.com at your convenience.

Thank you for your consideration.
Best regards,

ENVIROTECH ENGINEERING & CONSULTING, INC.

Tyler Williams, P.E.
President and Principal Engineer



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ENVIROTECH
ENGINEERING

July 20, 2022

Ms. Emily Hernandez
New Mexico EMNRD
Oil conservation Division
811 S. First St.
Artesia, New Mexico 88210

RE: Rule 34 Variance Request –Produced Water Impoundment Bird Netting

Ms. Hernandez:

WaterBridge Stateline, LLC (WaterBridge) is requesting a variance to Rule 34-Part 12(E) Netting to ensure the recycling facility is protected from wildlife. Based on our experience from previous projects, we believe audible bird deterrents provide equal or better protection when compared to netting. In addition, they require less inspection, maintenance, and repair over the life of the facility.

WaterBridge is proposing to use the "Bird-X Mega Blaster Pro" system. A copy of the user's manual is attached to this variance request letter.

This system will replace the netting required by the current rule and submitted with the original permit application.

Should you have any questions or require additional information, please contact me by phone at 580-234-8780 or by email at twilliams@envirotechconsulting.com at your convenience.

Thank you for your consideration.
Best regards,

ENVIROTECH ENGINEERING & CONSULTING, INC.

Tyler Williams, P.E.
President and Principal Engineer

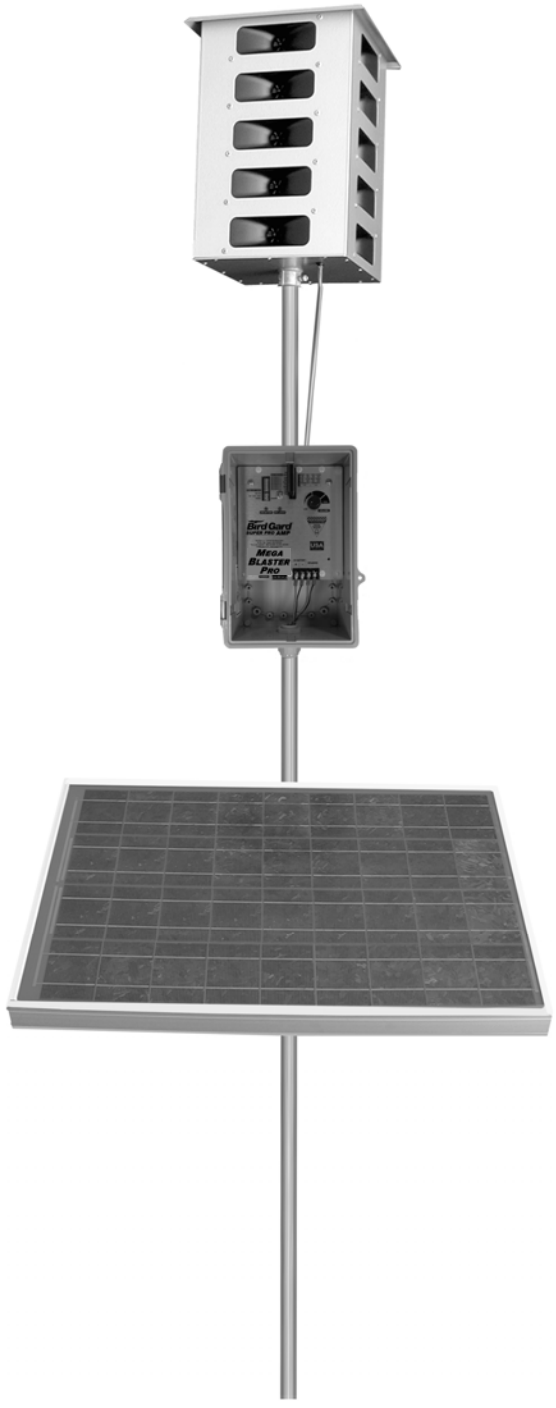
TYLER JOE WILLIAMS
NEW MEXICO
26432
PROFESSIONAL ENGINEER
7/27/2022

2500 N. Eleventh Street Enid, OK 73701 envirotechconsulting.com info@envirotechconsulting.com 580.234.8780

MEGA BLASTER PRO

BIRD-X

User's Manual



Overview

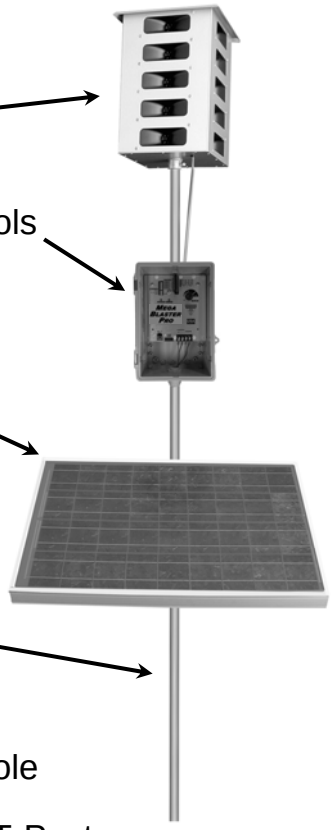
The Bird-X Mega Blaster Pro utilizes the innate power of the natural survival instincts of birds to effectively repel them. Digital recordings of distressed and alarmed birds, along with the sounds made by their natural predators are broadcast through high fidelity weather-resistant speakers over the top of areas. This action triggers a primal fear and flee response. Pest birds soon relocate to where they can feed without feeling threatened.

Your Bird-X Mega Blaster Pro system consists of:

20-Speaker Tower broadcasts the bird sounds

Control Unit produces the bird sounds and contains all operational controls

Solar Panel recharges the 12-volt deep cycle battery



Items needed but <u>not</u> included:

(1) **Mounting Pole** or **Mast** tall enough to raise the 20-Speaker Tower at least 5 feet above the top of the areas, trees or other obstructions

(1) **12-volt Deep Cycle Battery** (RV/Marine) Group 27 or larger wet cell

(1) **T-Post** or similar (Optional) may be needed to support the mounting pole

(1) **Bailing Wire or zip-tie** (Optional) to secure the Mounting Pole to the T-Post

CAUTION: THE MEGA BLASTER PRO IS CAPABLE OF PRODUCING SOUNDS UP TO 125 DECIBELS. PROPER HEARING PROTECTION MUST BE WORN ANYTIME THE UNIT IS TURNED ON.

Bird Control Management Guidelines

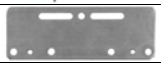
An active bird control management program is a key to successfully repelling pest birds. Bird feeding patterns may take several days or weeks to break. Follow all suggestions for maximum effectiveness. Read all instructions prior to installation.

For best results:

- **It is extremely important to fully protect your entire area from birds.** Any areas not fully protected will allow birds to begin feeding at the fringes of the sound coverage. They will soon become bolder and learn the sounds are nothing to fear. This will cause the effectiveness to diminish. Complete Bird-X product coverage forces birds to leave the area entirely.
- Install the Mega Blaster Pro unit at least two weeks before birds are attracted to your area. It is much easier to keep birds away before they have found a food source than it is to repel them once they have developed a feeding pattern.
- Most birds begin feeding from the perimeter of an area. Place Mega Blaster Pro units so the sound protection covers past the edges of the area.
- Birds will often use tall trees for roosting and observation. If birds are in bordering trees it is necessary to position the units so the sound protection covers the trees as well.
- Mount the 20-Speaker Tower at least five feet above trees, areas and structures for maximum coverage. The higher the better. Sound will disperse or reflect off structures or foliage. Mount control unit out of direct sun, if possible.
- When first installed, run Mega Blaster Pro units at FULL volume and on SHORT time off periods. This ensures maximum “bird stress” and creates a hostile environment.
- Watch for changes in bird activity and adjust the location of your Mega Blaster Pro unit if needed.
- **Check the battery and unit settings often to insure continuous bird control. Be certain that the system is not turned down or has a dead battery. Field hands or harvesters may turn down the volume.**
- Changing settings and switches often helps to prevent bird habituation. Periodically change the switch settings of the eight sounds (turning them ON or OFF). NEVER turn OFF the distress calls of the target birds you are trying to repel and always keep at least one predator bird sound turned ON.
- If different bird species enter the protected area and begin causing damage contact us immediately for an updated Sound Recording Card designed to repel the new invading birds.
- Remember that the Mega Blaster Pro system is a management tool, and should be used as part of your overall bird control strategy, sometimes in conjunction with other bird control techniques and devices.

Be aware that under extreme drought or other adverse conditions, birds will disregard all deterrents and risks in order to survive

Materials List

Item	Qty		Notes
Mega Blaster Pro Control Box	1		
Sound Recording Card	1		Pre-installed in control box
20-Speaker Tower	1		
Control Box Mounting U-Bolts	2		1/4” x 1” x 2”
Control Box Brackets	2		
40-Watt Solar Panel	1		
Solar Panel Mounting Bracket	1		
Solar Panel Mounting U-Bolts	2		1/4” x 1-1/8” x 2”
Control Box Connector Cable	1		2 Wire, 4 ft. Long
Battery Box	1		

Assembly

Note: You will find it easier to pre-assemble the following components prior to installation in the field.

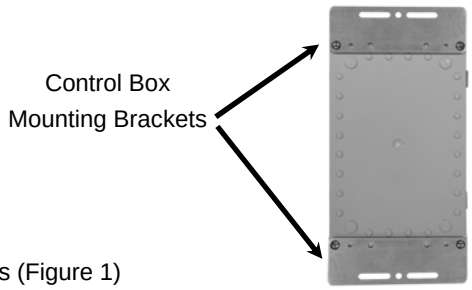


Figure 1

Control Unit

1. Lay the Control Unit face down
2. Attach the two Control Box Mounting Brackets to the back with the included screws (Figure 1)

Solar Panel

3. Install the two Solar Panel Mounting U-Bolts in the Head of the Solar Panel Mounting Bracket (Figure 2)
4. Loosen, but do not remove the Carriage Bolts securing the movable Clamp Plates on the Solar Panel Mount Bracket
5. Lay the solar panel on a flat surface with the glass side down
6. Lay the Mounting Arm across the Solar Panel with the Clamp Plates down. Position the Mounting Arm at an angle so the Clamp Plates slide under the lip of the Solar Panel (Figure 3A)
7. Rotate the Mounting Arm and secure it to the Solar Panel by tightening the Carriage Bolts (Figure 3B)

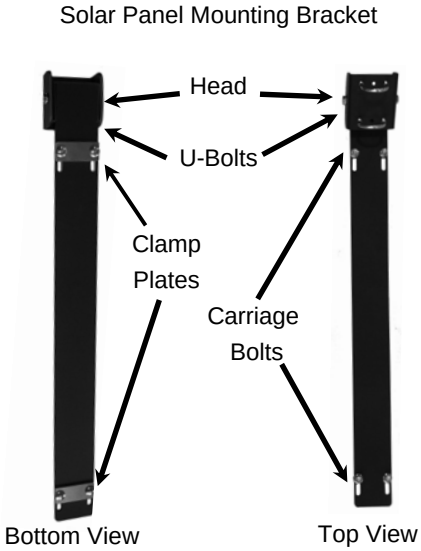


Figure 2

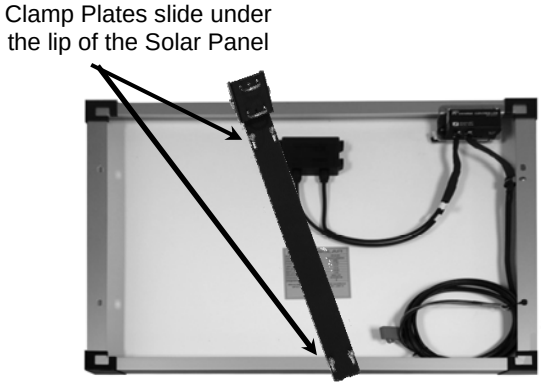


Figure 3A

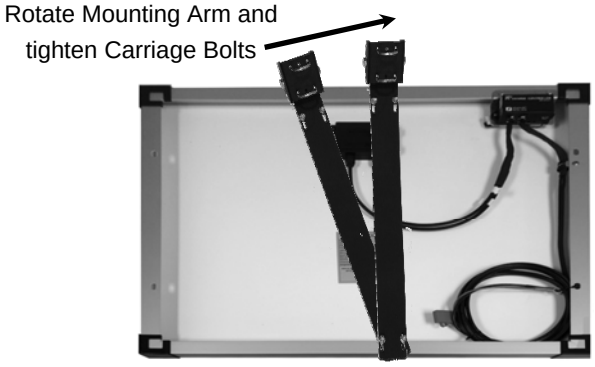


Figure 3B

Placement

Your Mega Blaster Pro will protect an area up to approximately 600 feet in all directions.

Factors to consider when selecting the best location include:

- Birds typically feed from the perimeter of the area and work their way in. Place Mega Blaster Pro units so the sound protection covers all the way to the edges of the area. For larger areas Mega Blaster Pro units should be positioned 400-500 feet inside the area and spaced every 1,200 feet.
- Mount the 20-Speaker Tower at least 5 feet above terrain, areas, trees and other obstacles.
- Placing the Mega Blaster Pro on top of a hill or small rise will give you much better coverage than at the bottom of a valley. The greater the height the further the sounds will travel.
- Wind can blow the sound waves. If the area you need to protect has consistent wind coming from the same direction, position your Mega Blaster Pro more “upwind.”
- Trees surrounding areas provide birds with a safe perch that allows them to fly in, grab food and fly out. It is much more difficult to eliminate bird damage if the birds are able to use the surrounding trees as a staging area for attacks on your areas. Your Mega Blaster Pro unit should be positioned close to any trees bordering your areas. If birds are roosting in the trees at night the TIME OF OPERATION should be set to 24 HOUR.
- Lakes, rivers and wetlands are a favorite resting and hiding place for birds. Your Mega Blaster Pro unit should be placed so the sound thoroughly covers any areas where birds frequent.
- Neighbors, businesses and others may not appreciate hearing the bird sounds. At the limits of the effective range the sounds from your Mega Blaster Pro are at a level people may find annoying. Avoid placing the unit where it becomes a nuisance.

Building a Mounting Pole or Mast

CAUTION: TALL POLES AND MASTS CAN BE HEAVY AND POTENTIALLY DANGEROUS. USE EXTREME CAUTION WHEN CONSTRUCTING OR WORKING AROUND TALL POLES AND MASTS. BIRD-X, INC., ASSUMES NO RESPONSIBILITY FOR DAMAGES OR INJURIES.

Things to consider:

- The 20-Speaker Tower is designed to mount onto a 1 in. (outside diameter) pipe at least 14 in. long. 1 in. conduit works well as it is light, rigid, inexpensive and available in 10 ft. lengths making it ideal for low areas, vineyards and bushes.
- You will want to take down your Mega Blaster Pro unit after harvest and store it in a dry location until the next season.

A suggestion for masts up to 20 feet tall:

1. 3/4 inch Galvanized steel water pipe has a 1 inch outside diameter and is the correct size to fit inside the 20-Speaker Tower. It is often available in 20 ft. lengths from hardware and plumbing supply stores. If these are not available, 10 ft. lengths are common and can be fastened together with a threaded coupler. Assemble the poles on the ground.
2. Slide the 20-Speaker Tower over the pipe and tighten the set screw in the collar at the base.
3. Stand the pole assembly up just inside the drip line of a tree and securely tie the pole to a few heavy branches.
4. Drive a T-Post into the ground at the base of the pole and secure with wire.

For masts taller than 20 feet:

1. Use 20 ft. lengths of galvanized steel water pipe or similar, securely fastened together with threaded reducing couplers.
2. Starting with 3 in. pipe, step the size down with each length of pipe.
3. The last 10 ft. can be 1 in. (O.D.) conduit hose clamped to the final section of galvanized pipe.

A semi-permanent mast support can be made by digging a hole 4 ft. deep and 4 ft. round. In the middle of the hole sink a length of galvanized water pipe large enough that your mast will easily fit inside. Make sure at least 2 ft. of pipe is above ground level. Fill the area around the pipe with packed sand, leaving the last foot filled with concrete to form a cap over the hole. Your mast can be dropped into the galvanized water pipe “receiver” for support. At the end of harvest the mast can be lifted out and positioned on the ground for easy disassembly and storage.

Installation

Note: Foliage, trees, and other obstructions severely reduce the effective range of Mega Blaster Pro units. It is critical that the 20-Speaker Tower is mounted at least 5 feet above all obstructions to achieve the maximum protection.

Mounting Pole or Mast

1. The Mounting Pole or Mast will need to be supported by a T-Post, fence post, tree or other means. The Pole Support should be in place before proceeding.

20-Speaker Tower

2. Lay the 20-Speaker Tower on its side on the ground and cut the zip-tie securing the speaker cables.
3. Slide the 1 in. (outside diameter) Mounting Pole through the Collar at the bottom of the 20-Speaker Tower until it slides over the positioning bolt inside the top of the Tower (Figure 4).
4. Tighten the Set Screw in Collar securely.

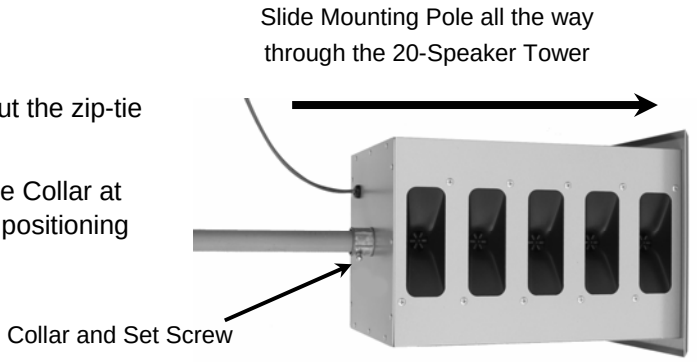


Figure 4

Solar Panel

5. Rest the lower end of the Mounting Pole on the Solar Panel Mounting Bracket approximately three feet from the bottom of the pole with the top of the solar panel facing the 20-Speaker Tower (Figure 5).
6. Lean up the Mounting Pole with the 20-Speaker Tower on top, against the Pole Support and fasten the Mounting Pole to the Pole Support securely with wire or other semi-permanent means.
7. Rotate the solar panel so it receives sunlight.

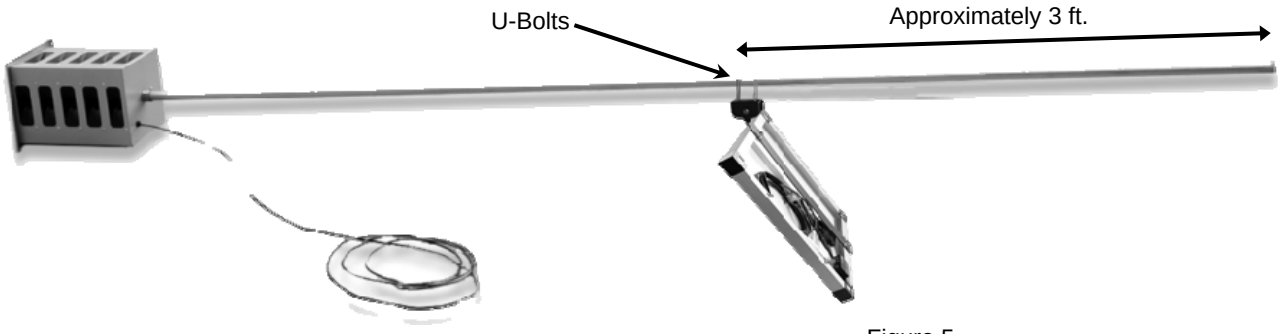


Figure 5

Control Box

Figure 6

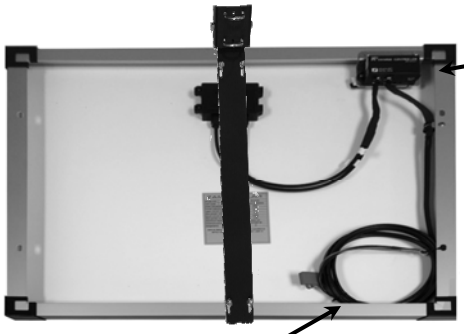
8. Attach the Control Box to the Mounting Pole with the U-Bolts.
9. Feed the Speaker Cables through the Cable Strain Relief at the bottom
10. Attach the Speaker Cables from the 20-Speaker Tower to the screws marked “SPEAKER” on the faceplate of the control panel.
11. Locate the Control Box Connector Cable (the grey 2 lead cables) and feed one end through the Cable Strain Relief.
12. Connect the RED wire to the screw marked “+” and the BLACK wire to the screw marked “-” under “12V BATTERY” on the faceplate of the control panel.
13. **MAKE SURE THE POWER SWITCH IS TURNED OFF BEFORE ATTACHING BATTERY.**
14. Connect the other end of the RED wire to the “+” terminal on the 12-volt Deep Cycle battery (not included). Connect the BLACK wire to the “-” terminal on the battery.
15. Hand tighten the Tapered Cinch Nut on the bottom of the Cable Strain Relief to help keep insects and moisture out.

Solar Panel Connections

16. Cut the black zip-ties securing the RED and BLACK wires on the underside of the solar panel. (Figure 7)
17. Connect the RED wire to the “+” terminal on the 12-volt battery and connect the BLACK wire to the “-” terminal on the battery.

NOTE: If you are using a “Sealed Gel” 12-volt battery (instead of a Lead Acid battery) you will need to cut the indicated small BLUE wire on the attached voltage regulator. This prevents Sealed Gel batteries from being overcharged. Failure to cut this wire can result in permanent battery damage. (Figure 8)

Figure 7



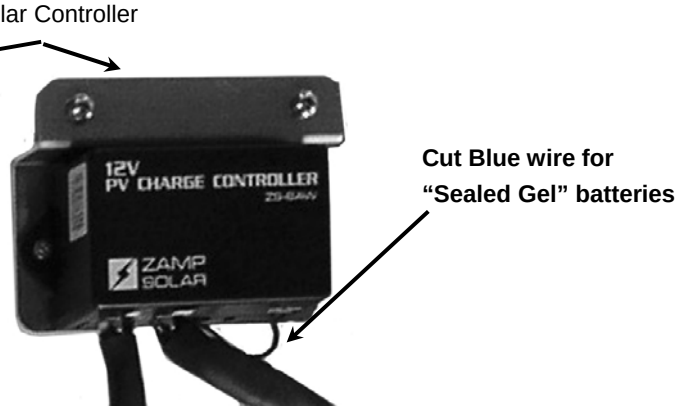


Figure 8

CAUTION: The Mega Blaster Pro is capable of producing sounds up to 125 decibels. Hearing protection must be worn anytime the unit is on!

Settings

Repelling birds requires regular monitoring and active management. Birds are intelligent and highly adaptable so it is important to create and maintain an environment the birds perceive as hostile and dangerous. This is achieved by playing the sounds frequently and at a high volume, otherwise the birds will not be fully repelled and will soon learn to adapt.

Below are the initial settings that should be used when your Mega Blaster Pro is first installed. Please see the "Bird Control Management Guidelines" section for more information.

Recordings

There are eight separate bird sounds contained on the Replaceable Sound Card. The label on the sound card lists each sound with a number corresponding to the eight "RECORDINGS" dip switches to the left of the Sound Card. Initially all RECORDING switches should be turned ON. If the target birds begin returning, periodically change the switch settings for the eight sounds (turning them ON or OFF). ***NOTE:*** **NEVER turn OFF the distress calls of the target birds you are trying to repel and always keep at least one predator bird sound turned ON.**

Mode Settings

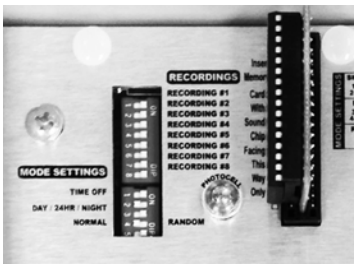
TIME OFF INTERVAL controls the time off periods between each playing of the bird recordings.

Setting	Time Off Duration	Switch #1	Switch #2
SHORT	**17-50 Seconds**	**ON**	**OFF**
MEDIUM	1:00-4:15 Minutes	OFF	ON
LONG	5:00-10:00 Minutes	ON	ON
XLONG	10:00-30:00 Minutes	OFF	OFF

When the Mega Blaster Pro unit is first installed the TIME OFF INTERVAL should be set to SHORT to create the greatest sense of danger and move the birds out of the area the fastest. Once the birds have left the area completely for a week or more you may try increasing the TIME OFF INTERVAL gradually, but you must monitor the birds carefully. Switch back to SHORT at the first sign birds are returning.

TIME OF OPERATION controls when the bird recordings play.

Setting	Switch #3	Switch #4
DAY ONLY	**ON**	**OFF**
24-HOUR	OFF	ON
NIGHT ONLY	ON	ON



Recommended Settings

In most cases birds are only active during the day so the DAY ONLY is recommended. If birds are roosting in bordering trees at night you will need to set the TIME OF OPERATION for 24-HOUR.

RANDOM OPERATION should always be turned **ON**. **VOLUME should be set as high as possible.**

Troubleshooting

Problem	Possible Cause	Solution
No Sound	Volume turned down	Turn volume up
	Dead battery	Charge or replace battery
	Loose battery connection	Verify all battery connections are tight
	All RECORDINGS are turned OFF	Verify all RECORDINGS are switched to ON
	Sound Card not fully seated	Remove sound card and reinstall, making sure it is fully inserted into the socket
	Sound Card is installed backward	Unplug the sound card and reinstall with the label facing to the left
	TIME OF OPERATION set to DAY ONLY without enough light	Change TIME OF OPERATION to 24-HOUR
	Unit was not shut down before the battery was disconnected causing the unit to go into “SAFE MODE”	1. Turn the POWER switch OFF 2. Disconnect the battery 3. Remove the sound card 4. Wait 30 seconds 5. Reinstall sound card 6. Reconnect the battery 7. Turn the POWER switch ON
Was working but stopped	The battery is dead	Connect the battery to a battery charger and see if it will hold a charge. Replace if necessary
	Solar Panel is not getting enough sunlight	Reposition the Solar Panel

Limited Warranty

THIS MEGA BLASTER PRO UNIT IS WARRANTED AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP FOR SIX MONTHS FROM DATE OF PURCHASE (EXTENDED WARRANTY AVAILABLE). BIRD-X WILL REPLACE OR REPAIR, PROVIDED DEFECT OCCURS UNDER NORMAL USE. *RETURNS ACCEPTED ONLY WITH AUTHORIZATION FROM OUR CHICAGO OFFICE.*

300 North Oakley Blvd.
Chicago, IL 60612
Toll-Free (800) 662-5021
Fax (312) 312-2480
www.Bird-X.com
Info@Bird-X.com

EPA Establishment Number 075130-OR-001

Mega Blaster Pro P/N 655-0065-00 (Rev. 9/2013)

CE

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SITE CRITERIA FOR RECYCLING CONTAINMENT

1.0 LOCATION

WaterBridge Stateline, LLC is proposing to construct a recycle facility, Parkway Recycle Pond, located in Section 36, Township 19 South, Range 28 East in Eddy County, New Mexico. An aerial photographic map, *Figure 1*, shows the location of the proposed facility. This study was performed on the proposed location to evaluate that the proposed facility location would be in accordance with the 19.15.34.11 NMAC Siting Requirements for Recycling Containments.

2.0 DISTANCE TO GROUNDWATER

2.1 GROUNDWATER WELLS

Banks Environmental Data (Banks) was contracted to search the New Mexico Office of State Engineers (OSE) records for water wells within a 1.0-mi. radius of the proposed facility location. According to Banks, three (3) water wells were identified within a 1.0-mi radius of the proposed facility. No water wells were identified to be located within the proposed facility boundaries. The Banks Water Well Report is included as *Appendix A*, and *Figure 2.1* illustrates the location of the three (3) water wells located within a 1.0-mi. radius of the proposed facility.

Of the three (3) total water wells, one (1) is labeled as "exploration", one (1) is labeled as "livestock watering", and one (1) is labeled as a USGS water well. Two (2) water wells had reported drilled depths, the average total depth drilled of the two (2) water wells was 193-ft. below ground surface (bgs.). One (1) water well, OSE POD id CP-01231-POD1, driller's log stated the "exploration" well had a total depth of approximately 300-ft. bgs. and a depth to water of 75-ft. bgs. OSE POD id CP-01231-POD1 is located approximately 0.65-mi. to the east of the proposed facility.

The New Mexico Oil and Gas Division (NMOCD) requires that groundwater (freshwater as defined by NMOCD rules) at the location be greater than 50-ft below the containment bottom. *Figure 2.1* demonstrates the following to meet these criteria:

1. The location of the proposed facility shown on the United States Geologic Survey (USGS) Angel Draw, NM 7.5 Minute Series Topographic Map.
2. A 1.0-mile radius from the site, and location of water wells in comparison to that radius. It should be noted, OSE wells can be mis-located as older wells are plotted in the center of the quarter, quarter, quarter section, township, and range.
3. The Banks search of the OSE records show there were no water wells located within the boundary of the proposed facility.

During onsite investigation, conducted by COZ Engineering, LLC on June 16, 2022, five (5) total borings were advanced on the proposed facility location. Four (4) borings were drilled to a total depth of approximately 20-ft. bgs. and one (1) boring was drilled to a total depth of approximately 75-ft. bgs. The one (1) boring drilled to a total depth of approximately 75-ft. bgs. encountered water at a depth of approximately 70-ft. bgs. The onsite boring demonstrates that the depth to groundwater at the

proposed facility location is greater than 50-ft. bgs. The geotechnical engineering report prepared by COZ Engineering, LLC is included in *Appendix C*.

2.2 AQUIFERS

Information reviewed from the Bureau of Land Management (BLM) Carlsbad Field Office shows the proposed facility is located within the Capitan Reef Aquifer system. The Capitan Reef is a fossil limestone reef of the middle Permian age. Recharge of the Capitan Reef Aquifer occurs by direct infiltration into outcropping cavernous zones formed in the Capitan limestone and equivalent backreef units of the Artesia Group. *Figure 2.2* shows the site location in reference to Bureau of Land Management Declared Aquifers in the State of New Mexico.

2.3 GEOLOGY

A geological map of New Mexico was obtained from the United States Geological Survey (USGS) to review the geologic setting for the proposed containment location. Based on the review of the geologic map, the containment location lies within Middle to Lower Pleistocene alluvial, lacustrine, and eolian deposits. These are unconsolidated older alluvial deposits of upland plains and piedmont areas, and calcic soils and eolian cover sediments of High Plains Region.

Figure 2.3 is reproduction of the USGS New Mexico Geologic Map. *Figure 2.3* shows the following:

1. Location of the proposed Containment
2. Geologic setting of the Containment

Area stratigraphy to a depth of 75-ft. bgs. was obtained from five (5) geotechnical borings conducted on the site by COZ Engineering, LLC on June 16, 2022. The boring logs recorded silty sand with some gravel to an approximate depth of 10-ft. bgs. and silty sand from approximately 10-ft. bgs. to boring termination at a total depth of approximately 75-ft. bgs.

3.0 DISTANCE TO MUNICIPALITIES AND FRESHWATER FIELDS

Figure 3 demonstrates that the location is not located within incorporated municipal boundaries or within a defined municipal freshwater field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3. *Figure 3* illustrates the following:

1. The closest municipality to the proposed facility is Carlsbad, New Mexico, located approximately 16.2-mi. to the southwest.
2. The closest freshwater field to the proposed facility is the Carlsbad Municipal Water System, located approximately 23.2-mi. to the southwest.

4.0 DISTANCE TO SUBSURFACE MINES

According to the New Mexico Mining and Minerals Division there are no subsurface mines near the proposed facility. The proposed facility location is not within an area overlying a subsurface mine. *Figure 4* illustrates the following:

1. The nearest registered subsurface mine is the Eddy Potash Mill, actively mining potash. The subsurface potash mine is located approximately 9.25-mi. to the east of the proposed facility location.

5.0 DISTANCE TO HIGH OR CRITICAL KARST AREAS (UNSTABLE AREAS)

The Bureau of Land Management Carlsbad Field Office Cave Potential map was reviewed for the proposed facility. *Figure 5* illustrates the following:

1. The proposed facility is located in a "high" karst potential area.
2. Voids or other evidence of karsting was not observed during an aerial karst survey conducted by Southwest Geophysical Consulting, LLC.

Southwest Geophysical Consulting, LLC conducted an aerial karst survey for the location of the proposed facility. No surface karst features were located during the aerial survey. It is noted that the lack of surface karst features does not indicate there are not karstified areas. However, mitigation is not necessary. Caution should be used during all phases of construction and that any dikes, buffers, or liners installed should be checked regularly for integrity, with repairs made immediately upon discovery. A copy of the "Cave and Karst Resource Inventory Report" prepared by Southwest Geophysical Consulting, LLC is included in *Appendix B*.

6.0 DISTANCE TO 100-YEAR FLOOD PLAIN

The Federal Emergency Management Agency (FEMA) Flood Map Service Center was utilized to review the flood map for the proposed facility location. The proposed facility is located on FEMA flood map panel number 35015C0825D, "Zone X" was effective on 6/4/2010. *Figure 6* demonstrates the area of the site is not located within a 100-year Floodplain.

1. The proposed facility is located within "Zone X." Zone X for the proposed facility is an area of "area of minimal flood hazard."

7.0 DISTANCE TO SURFACE WATER

After review of the Angel Draw, NM, USGS 7.5-Minute Series Topographic map, *Figure 7*, there is no continuously flowing surface waters located on or near the proposed facility. *Figure 7* illustrates the following:

1. No continuously flowing surface waters or other water bodies defined by NMOCD are located on the proposed facility.
2. The closest surface waterbody is Palmilla Draw located approximately 2.11-mi. to the west.

8.0 DISTANCE TO PERMANENT RESIDENCE OR STRUCTURES

The United States Geological Survey (USGS) Angel Draw, NM, USGS 7.5-Minute Series Topographic Map, *Figure 8*, demonstrates:

1. The proposed facility is not within 1,000-ft. of an occupied permanent residence, school, hospital, institution, church, or other permanent structure.
2. *Figure 8* and *Figure 1 (Site Map)* show that the nearest structure to the proposed facility is an oil tank battery located to the southwest.

9.0 DISTANCE TO NON-PUBLIC WATER SUPPLY

The proposed facility must not be within 500-ft. horizontally of a spring or freshwater well used for domestic or stock watering purposes, in existence at the time of initial application. *Figure 9* demonstrates the following:

1. The proposed facility is not located within 500-ft. horizontally of a spring or freshwater well.
2. The nearest freshwater well or spring used for stock watering purposes is located approximately 0.99-mi. to the southwest of the proposed facility location.
3. No springs were identified within the proposed facility location.

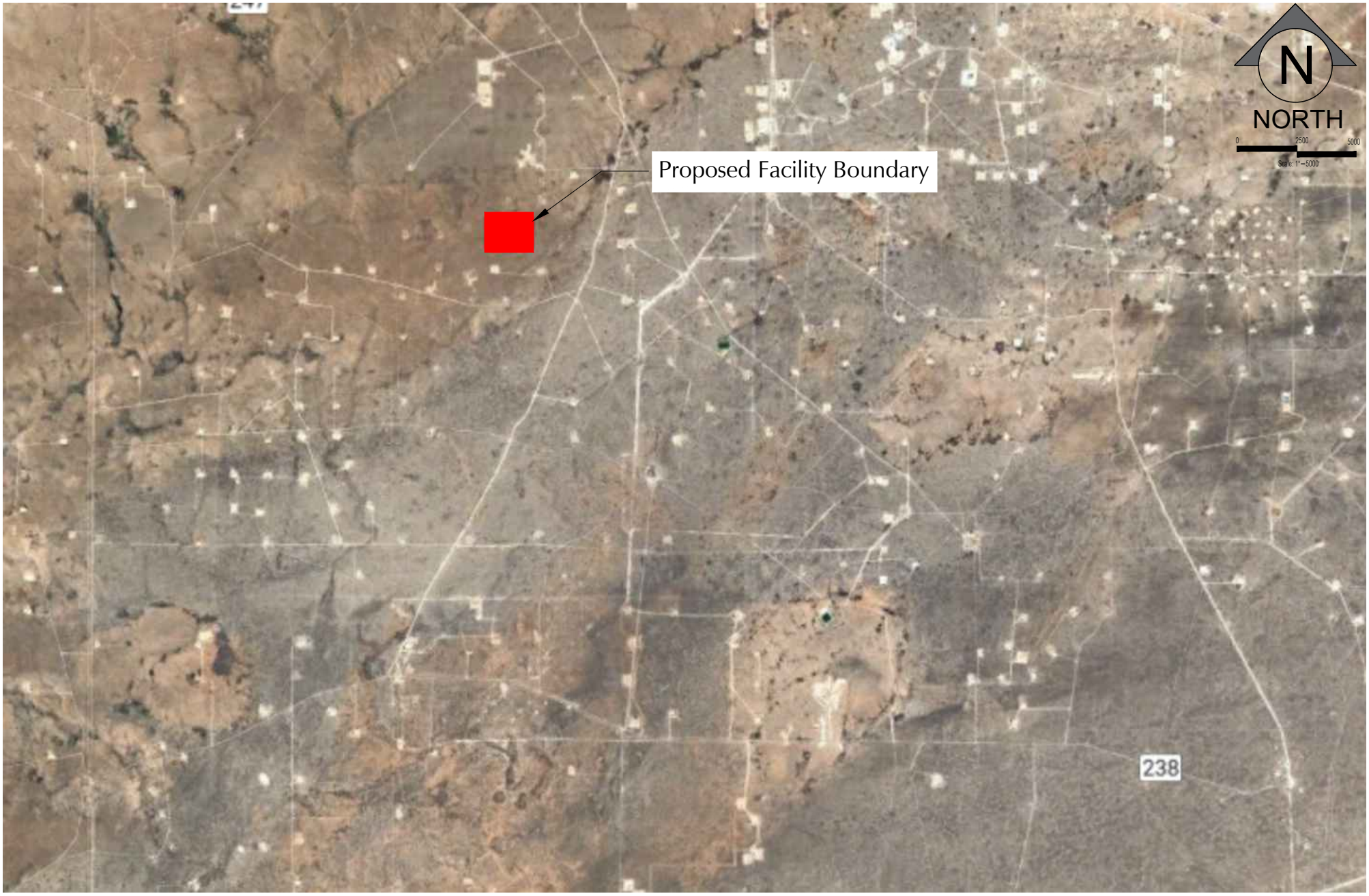
In addition, *Figure 2.1 (Groundwater Wells Map)* illustrates that the proposed facility location is not located within 1,000-ft. of known domestic water wells. There are no identified domestic water wells within a 1.0-mi. radius of the proposed facility location.

10.0 DISTANCE TO WETLANDS

The United States Fish and Wildlife National Wetlands Inventory Maps were reviewed for the area of the proposed facility. *Figure 10* confirms the proposed facility is not located within an area of a potential wetland. In addition, *Figure 10* illustrates the following:

1. The nearest potential wetland is located approximately 0.56-mi. to the northeast of the proposed facility location. The potential wetland closest to the proposed facility is labeled as a "riverine" with a wetland code "R4SBC."
2. The National Wetlands Inventory Maps do not show a potential wetland located within 500-ft. of the proposed facility location.

It should be noted the United States Fish and Wildlife Service generates the NWI maps through infrared aerial imagery and aerial photograph interpretation; no actual field reconnaissance was conducted in the making of the maps. As such, the NWI maps do not always accurately identify wetlands or the extent of those wetlands; therefore, the maps are used for preliminary analysis only.



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Site Map

Parkway Recycle Pond
Section 36, Township 19 South, Range 28 East
Eddy County, New Mexico

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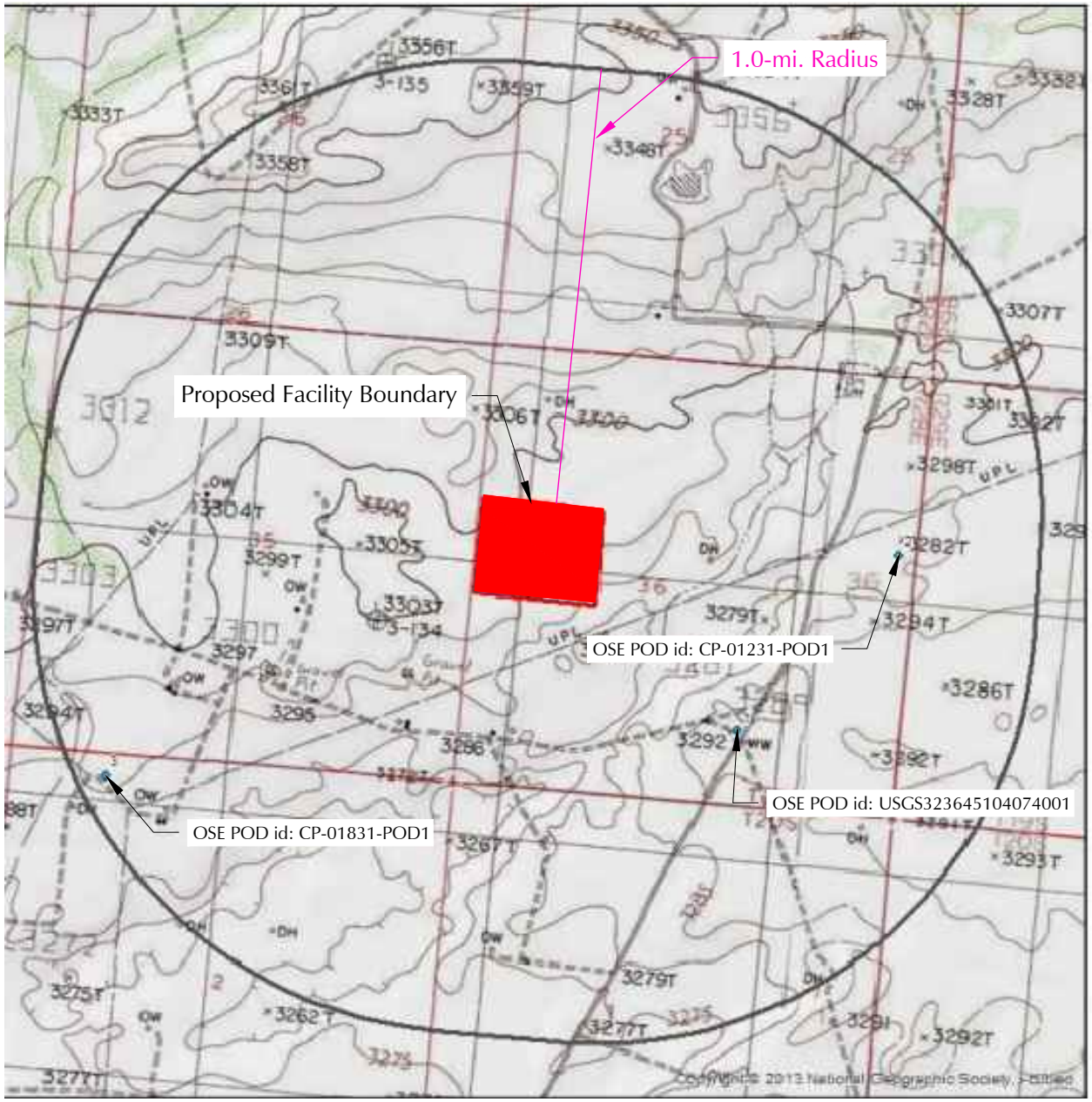
022138-00

Figure 1



N
NORTH
0 1000 2000
Scale: 1" = 2000'

Groundwater Well Information

OSE POD id: USGS323645104074001
Well Type: USGS WW
Total Depth: 87-ft. bgs.
Depth to Water: Not Reported

OSE POD id: CP-01231-POD1
Well Type: Exploration
Total Depth: 300-ft. bgs.
Depth to Water: 75-ft. bgs.

OSE POD id: CP-01831-POD1
Well Type: Livestock Watering (72-12-1)
Total Depth: Not Reported
Depth to Water: Not Reported

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Groundwater Wells Map

Parkway Recycle Pond
Section 36, Township 19 South, Range 28 East
Eddy County, New Mexico

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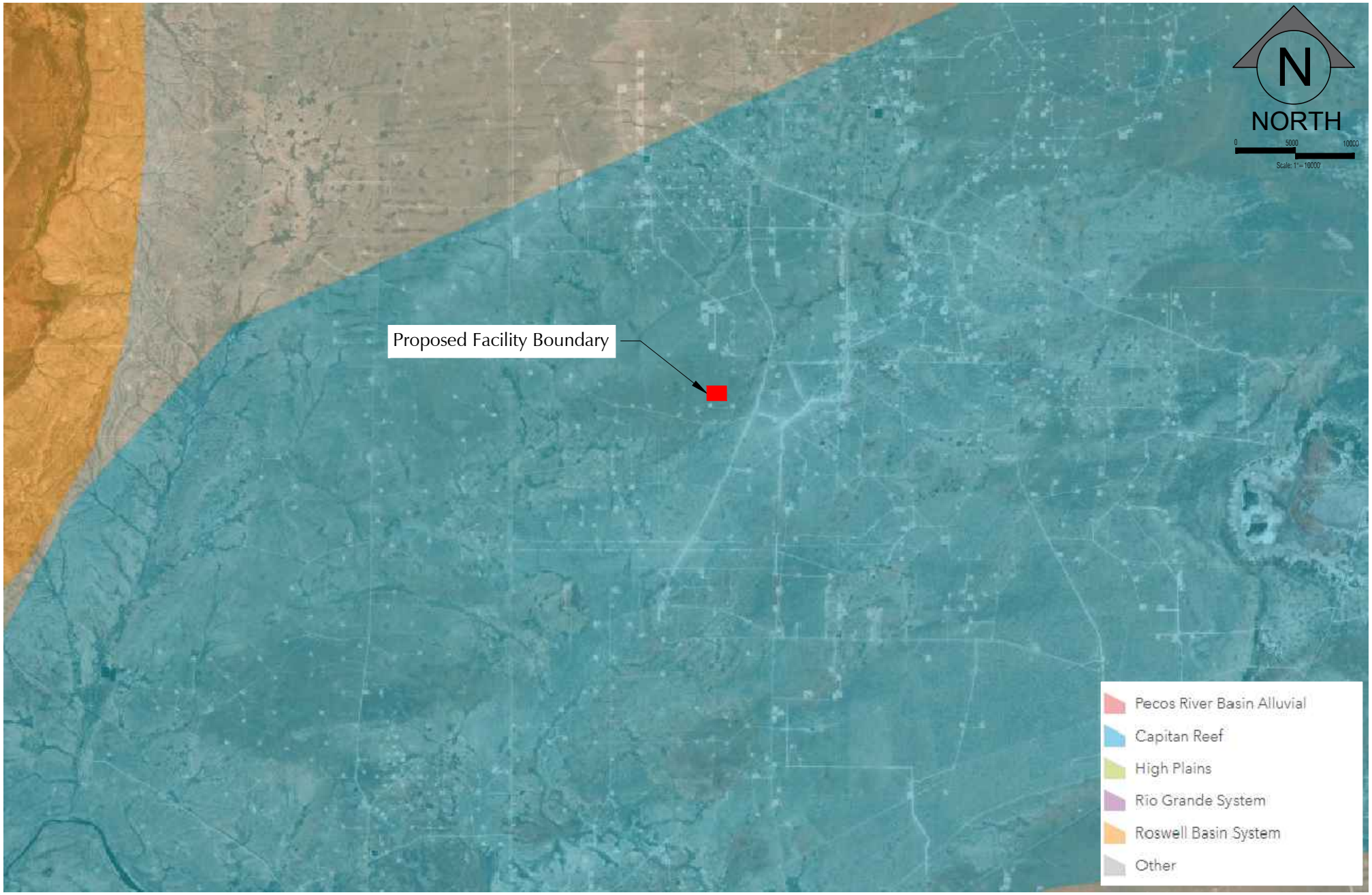
Figure 2.1



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New Mexico Aquifers Map

Parkway Recycle Pond
Section 36, Township 19 South, Range 28 East
Eddy County, New Mexico

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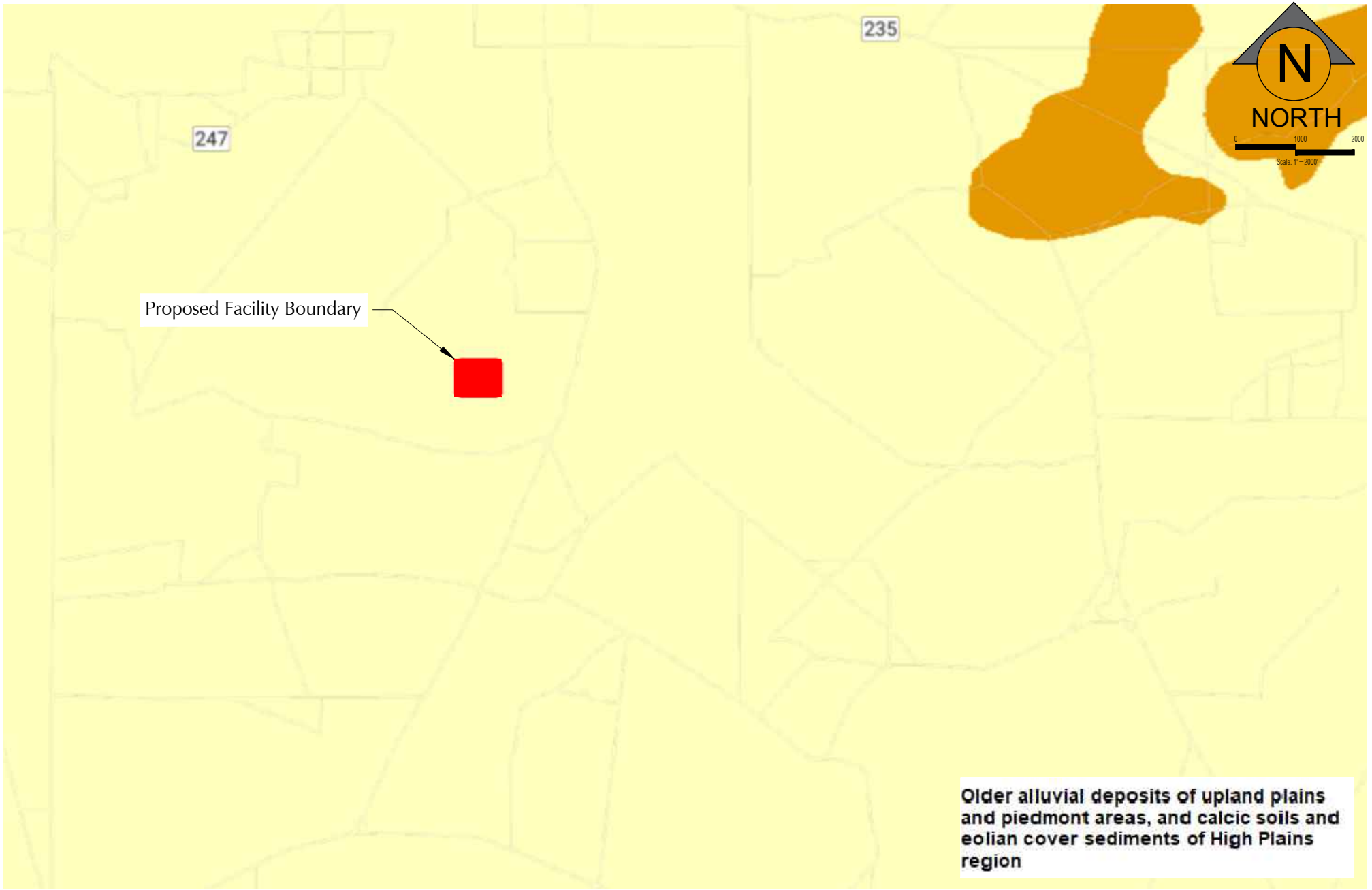
Figure 2.2



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New Mexico Geologic Map

Parkway Recycle Pond
Section 36, Township 19 South, Range 28 East
Eddy County, New Mexico

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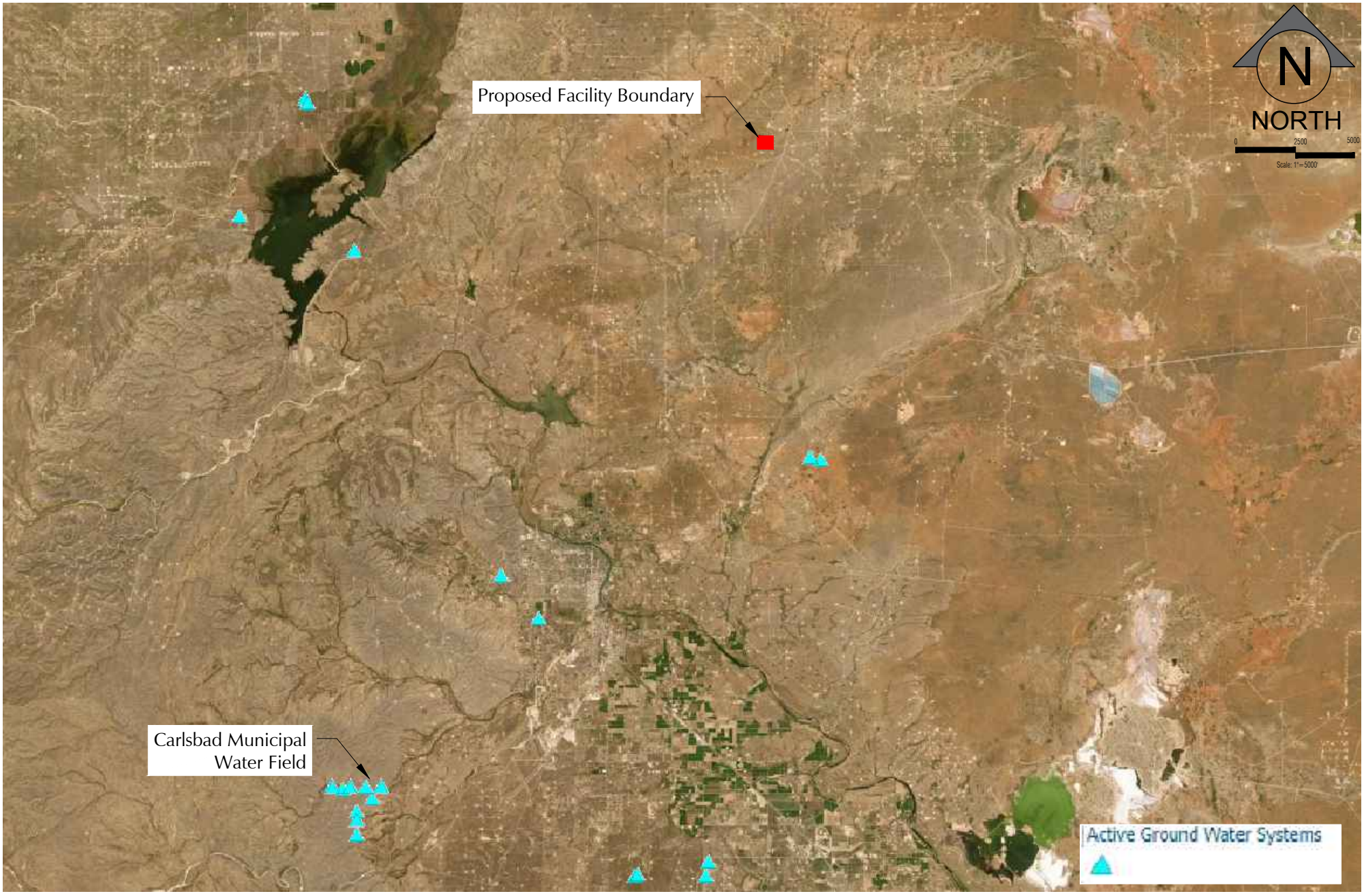
Figure 2.3



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Municipalities & Freshwater Fields Map

Parkway Recycle Pond
Section 36, Township 19 South, Range 28 East
Eddy County, New Mexico

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Figure 3

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New Mexico Registered Mines Map

Parkway Recycle Pond
Section 36, Township 19 South, Range 28 East
Eddy County, New Mexico

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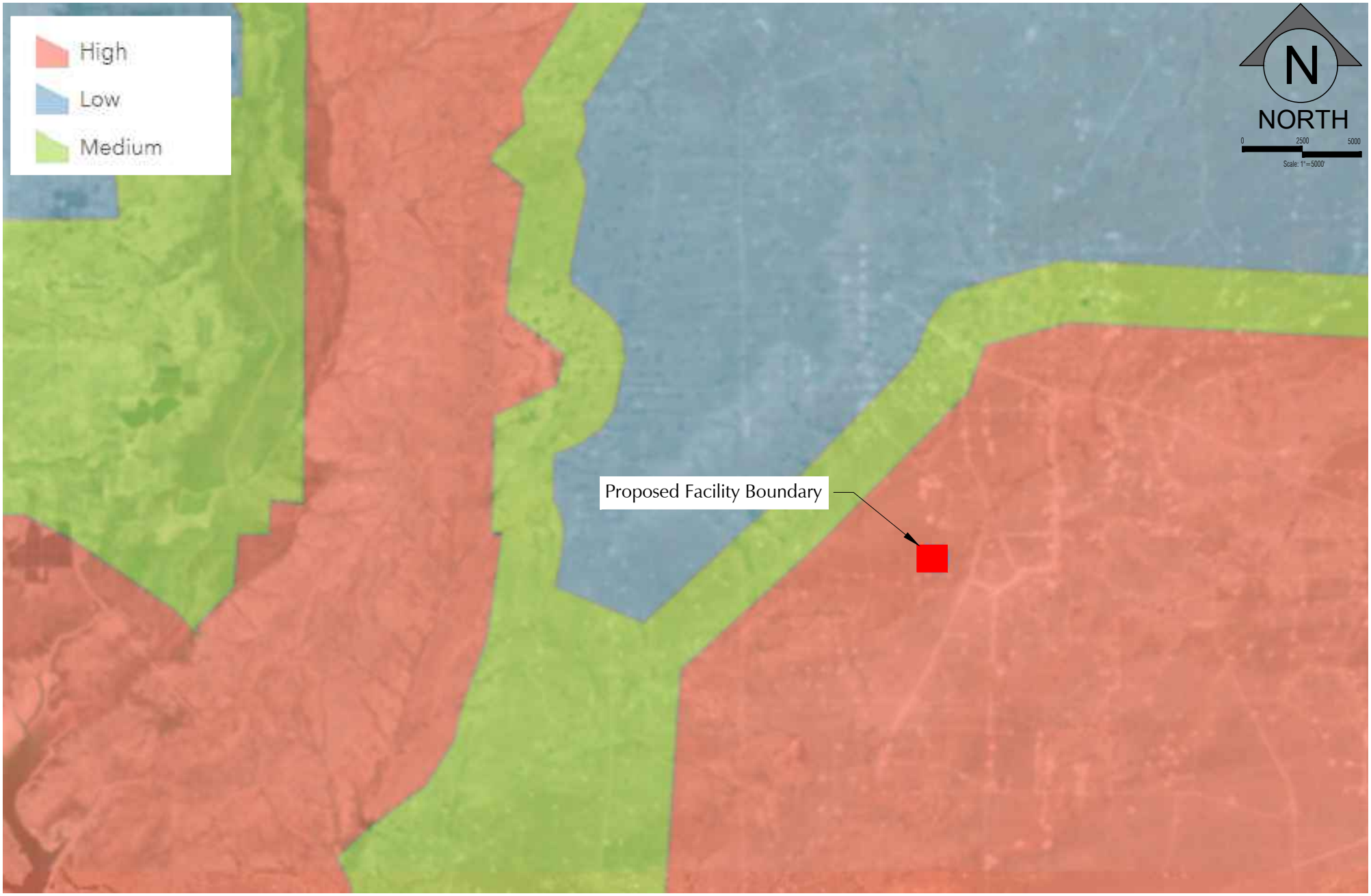
Figure 4



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Karst & Cave Potential Map

Parkway Recycle Pond
Section 36, Township 19 South, Range 28 East
Eddy County, New Mexico

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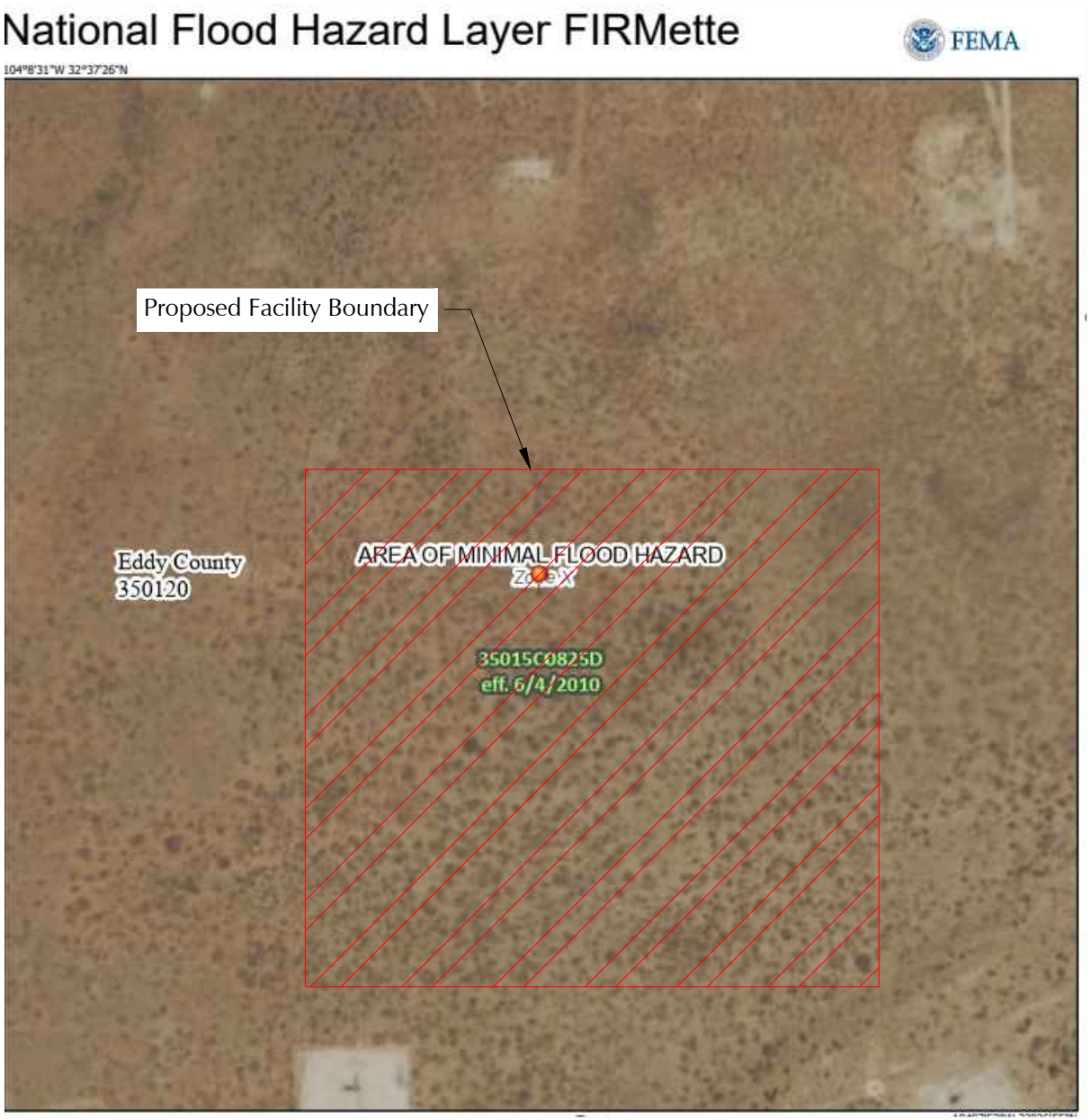
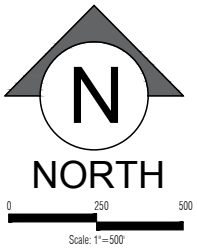
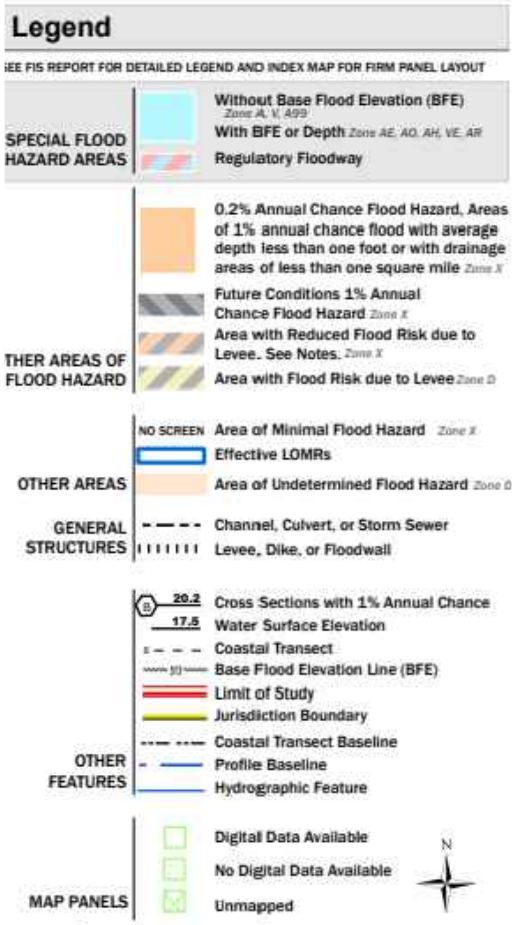
Figure 5







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FEMA Flood Map

Parkway Recycle Pond
Section 36, Township 19 South, Range 28 East
Eddy County, New Mexico

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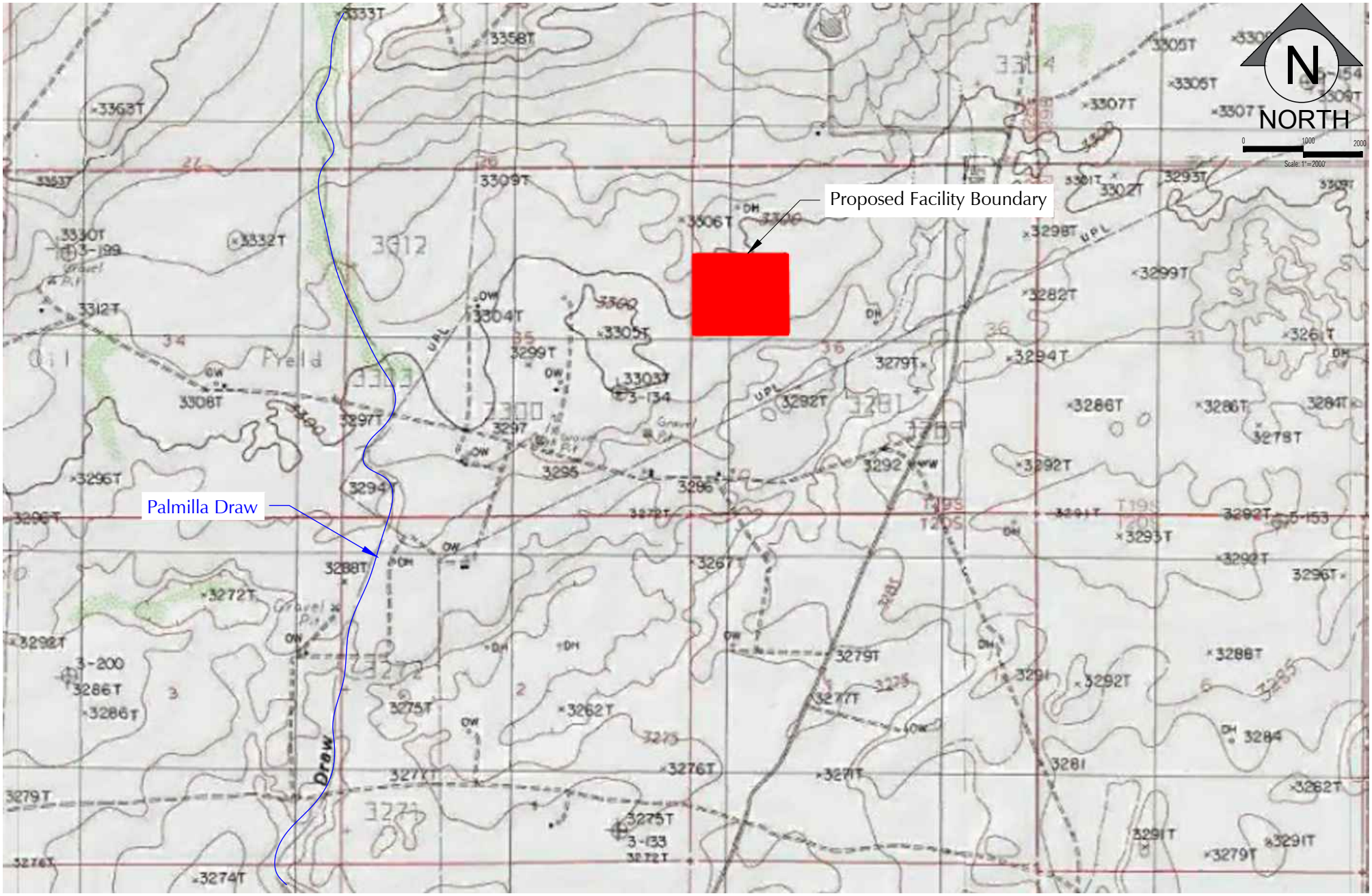
Figure 6



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Surface Water Map

Parkway Recycle Pond
Section 36, Township 19 South, Range 28 East
Eddy County, New Mexico

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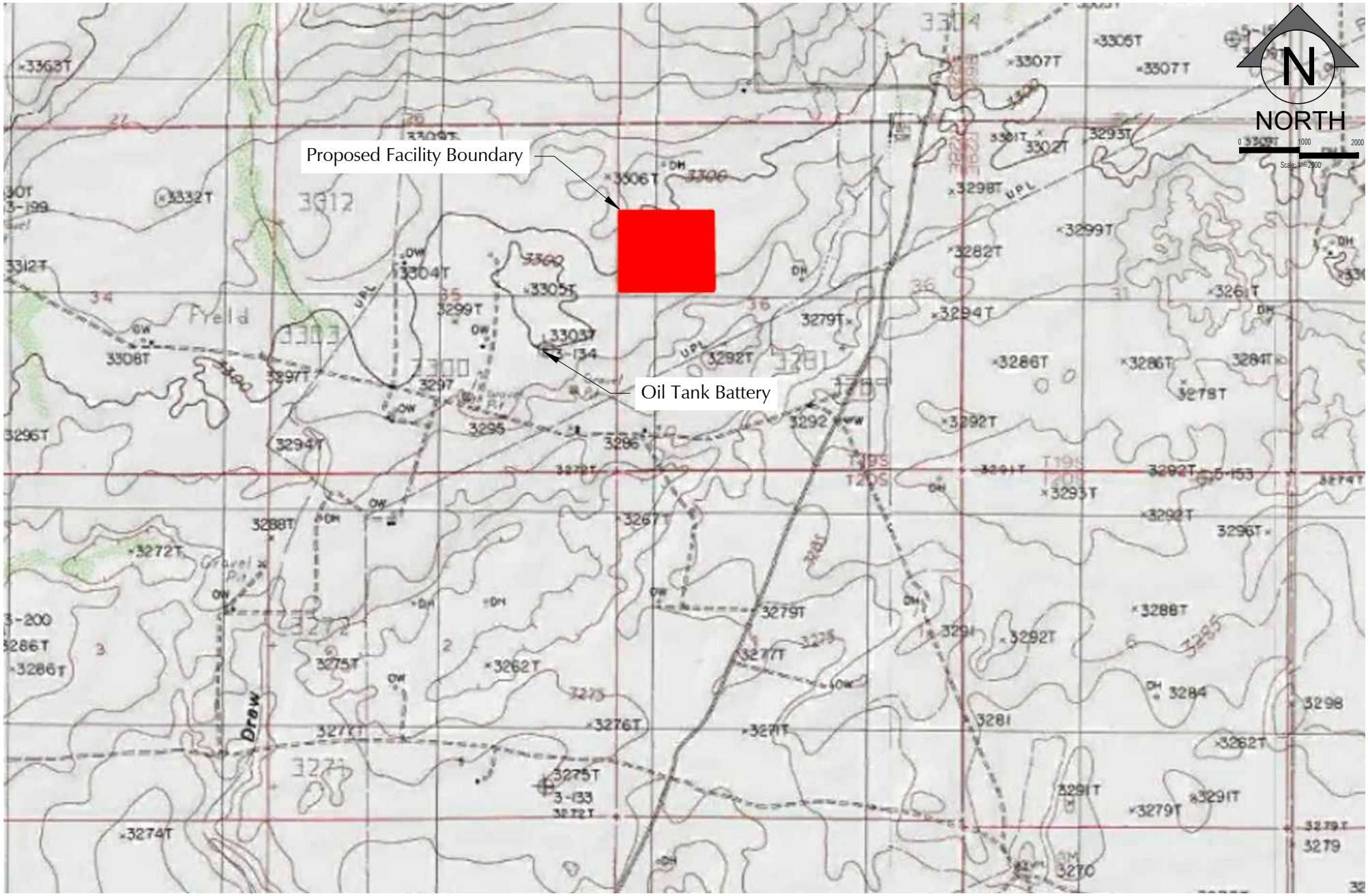
Figure 7



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Permanent Residence & Structures Map

Parkway Recycle Pond
Section 36, Township 19 South, Range 28 East
Eddy County, New Mexico

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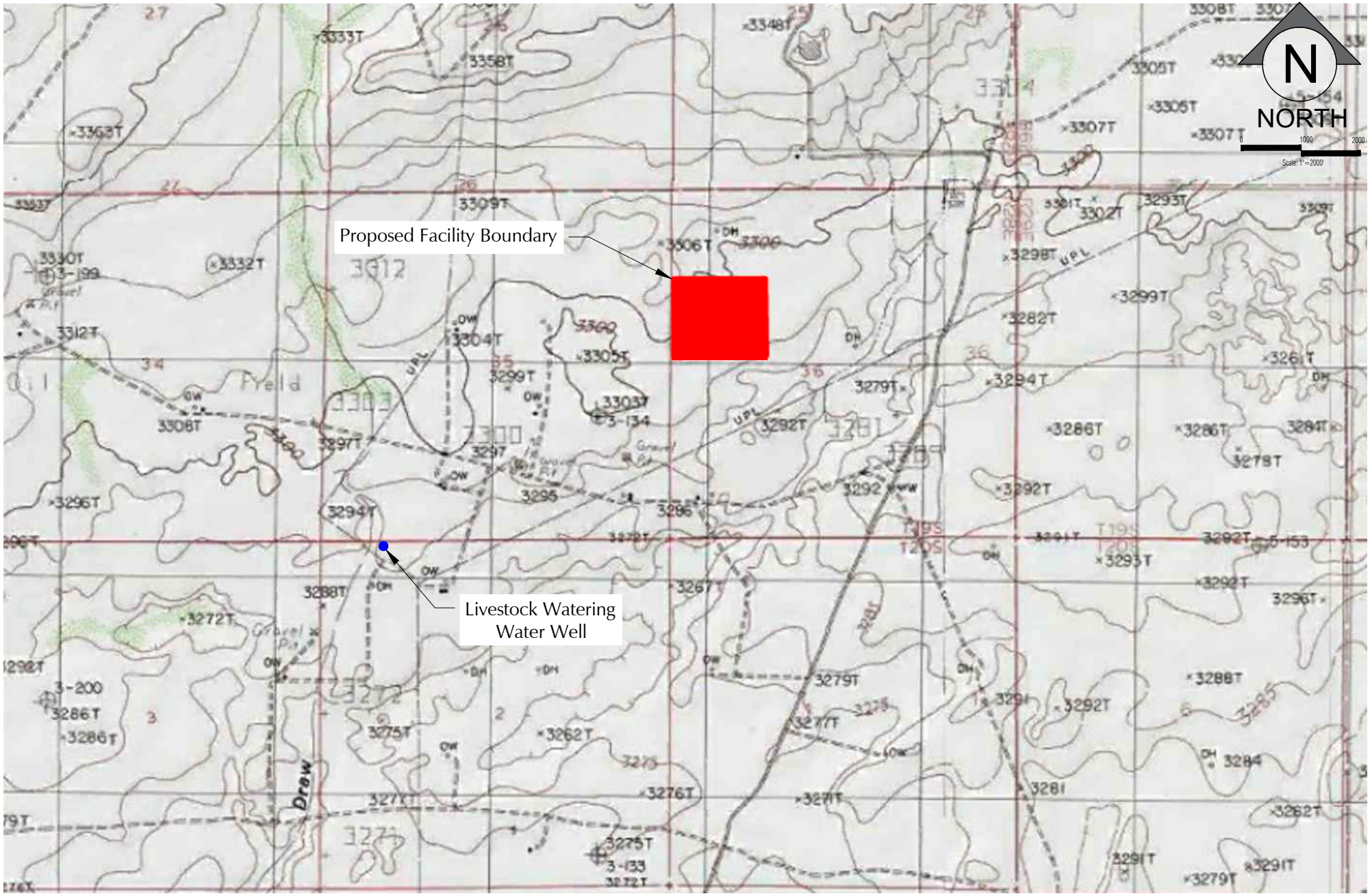
Figure 8



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Non-Public Water Supply Map

Parkway Recycle Pond
Section 36, Township 19 South, Range 28 East
Eddy County, New Mexico

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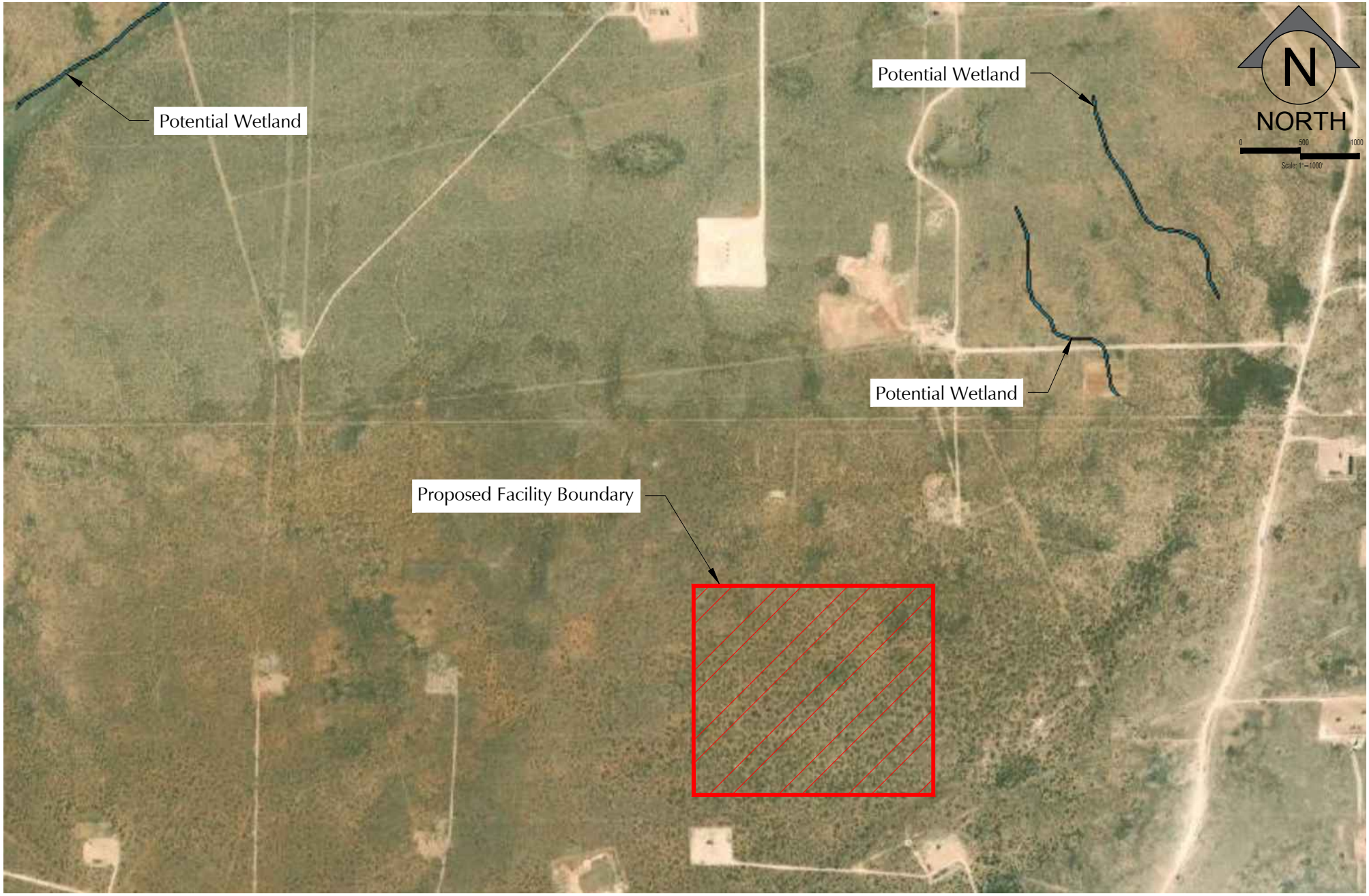
Figure 9



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NWI Wetlands Map

Parkway Recycle Pond
Section 36, Township 19 South, Range 28 East
Eddy County, New Mexico

WATERBRIDGE

Project No.
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Figure 10

APPENDIX A
BANKS WATER WELL REPORT

Prepared for:

ENVIROTECH ENGINEERING and CONSULTING, INC
2500 North 11th
Enid, OK 73703

BANKS ENVIRONMENTAL DATA
A DIVISION OF THE BANKS GROUP

Water Well Report

WaterBridge Parkway Recycle Facility

NM

Eddy County

PO #: 022138-00

ES-140238

Thursday, July 7, 2022

Banks Environmental Data, Inc. - PO Box 12851 - Austin, TX 78711 - 800.531.5255 P - 512.478.1433 F
www.banksenvdata.com

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Banks Environmental Data, Inc. - PO Box 12851 - Austin, TX 78711 - 800.531.5255 P - 512.478.1433 F
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Geographic Summary

Location
Eddy County, NM
Target location is 0.059 square miles and has a 0.98 mile perimeter

Coordinates	
Longitude & Latitude in Degrees Minutes Seconds	NA
Longitude & Latitude in Decimal Degrees	NA
X and Y in UTM	NA

Elevation
NA

Zip Codes Searched

Search Distance	Zip Codes (historical zip codes included)
Target Property	88210, 88211, 88254, 88255
1 mile	88210, 88211, 88254, 88255

Topos Searched

Search Distance	Topo Name
Target Property	Angel Draw (1985)
1 mile	Illinois Camp (1985), Angel Draw (1985), Illinois Camp NE (1985), Illinois Camp SE (1985)

Summary Map - 1 Mile Buffer

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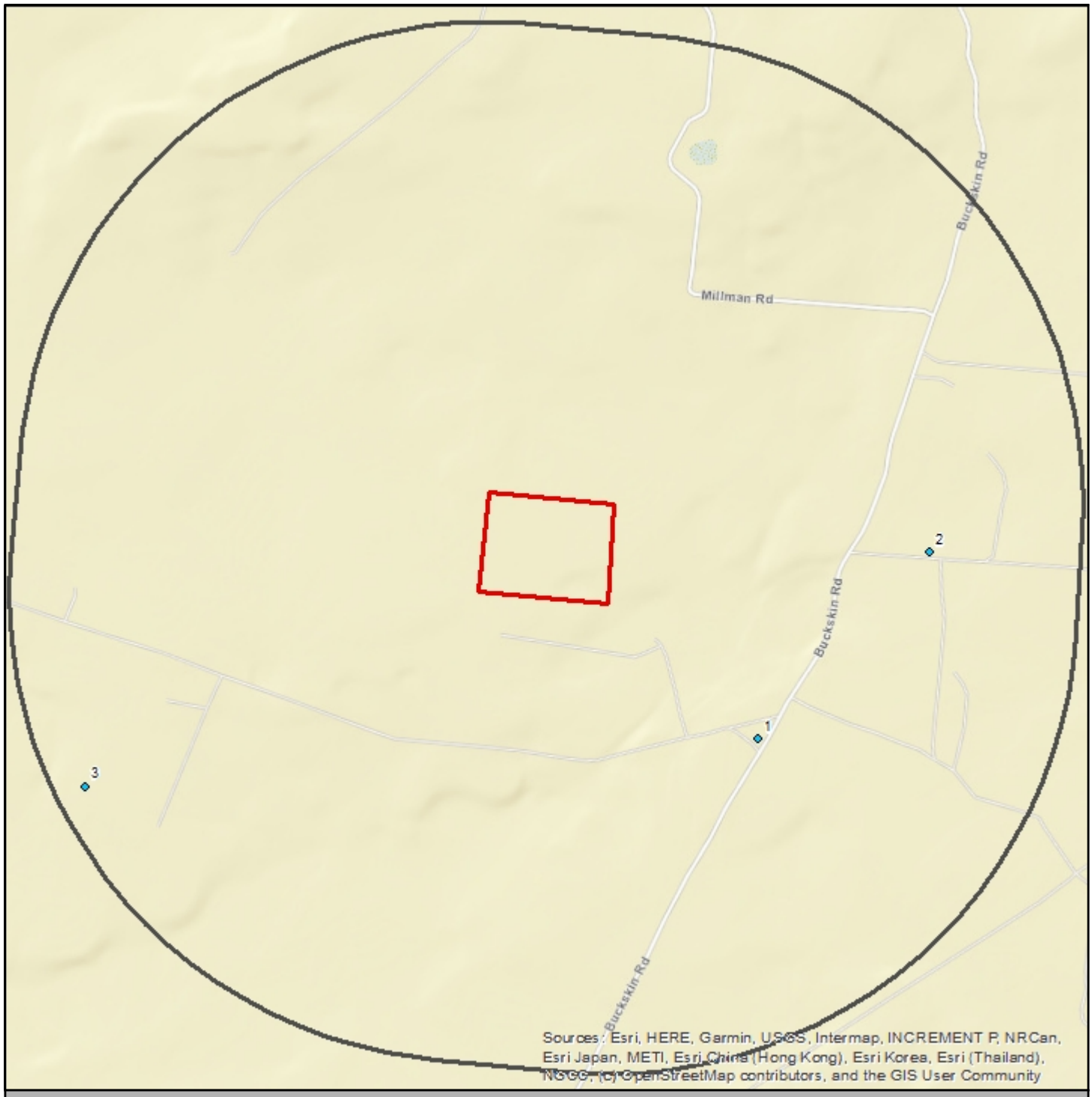
A DIVISION OF THE BANKS GROUP



WaterBridge Parkway Recycle Facility

Well
Well Cluster
Target Property
Search Buffer

1 : 19,500
1 inch = 0.308 miles
1 inch = 1625 feet
1 centimeter = 0.195 kilometers
1 centimeter = 195 meters

N

Lambert Conformal Conic Projection
1983 North American Datum
First Standard Parallel: 33 0' 00" North
Second Standard Parallel: 45 0' 00" North
Central Meridian: 96 0' 00" West
Latitude of Origin: 39 0' 00" North

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Topographic Overlay Map - 1 Mile Buffer

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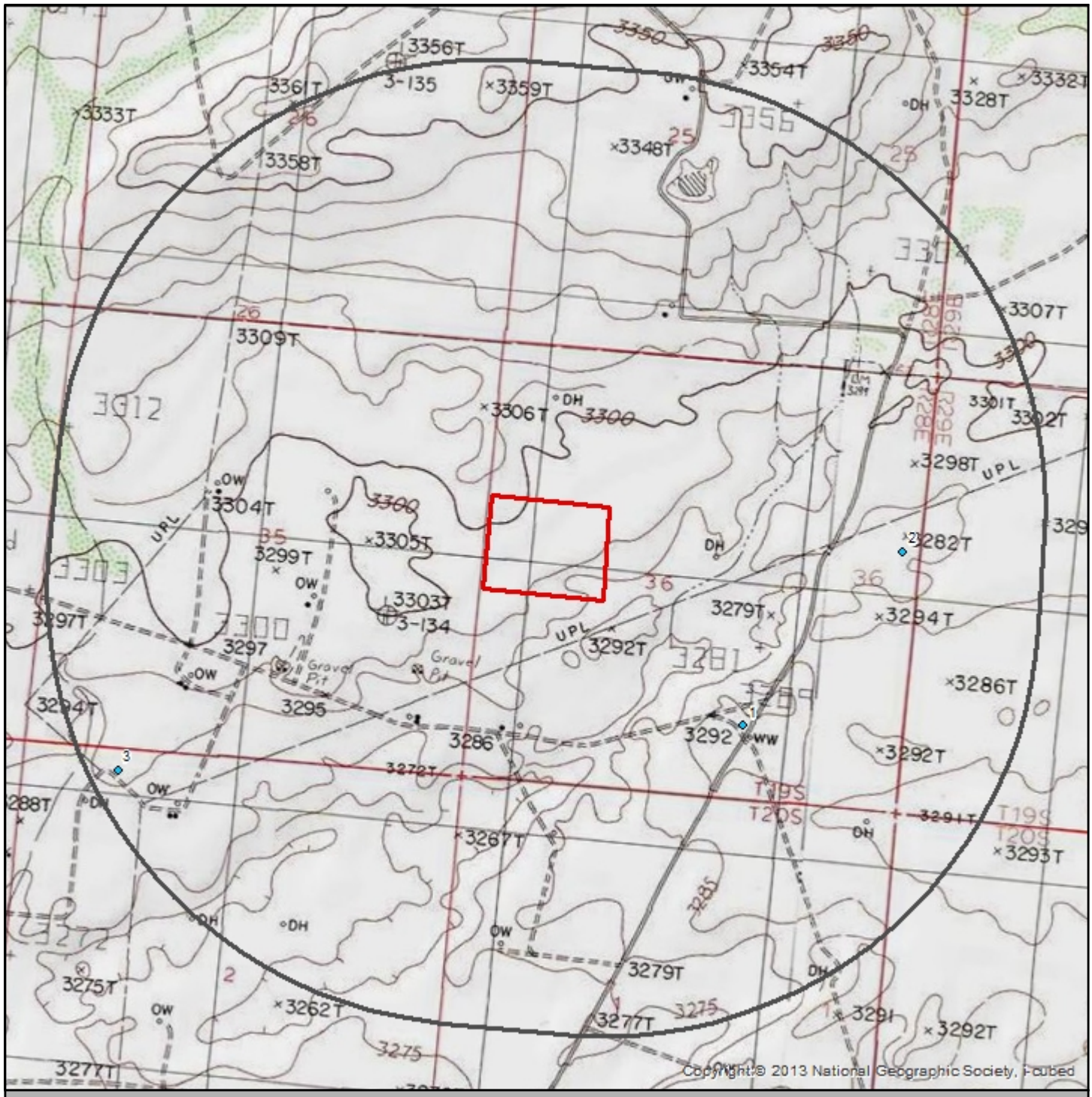

WaterBridge Parkway Recycle Facility

- Well
- Well Cluster
- Target Property
- Search Buffer

Target Property Quad Name(s)
Angel Draw (1985)

1 : 21,000
1 inch = 0.331 miles
1 inch = 1750 feet

Lambert Conformal Conic Projection
1983 North American Datum
First Standard Parallel: 33 0' 00" North
Second Standard Parallel: 45 0' 00" North
Central Meridian: 96 0' 00" West
Latitude of Origin: 39 0' 00" North

N

Banks Environmental Data, Inc. - PO Box 12851 - Austin, TX 78711 - 800.531.5255 P - 512.478.1433 F
www.banksenvdata.com

Current Imagery Overlay Map - 1 Mile Buffer

BANKS ENVIRONMENTAL DATA
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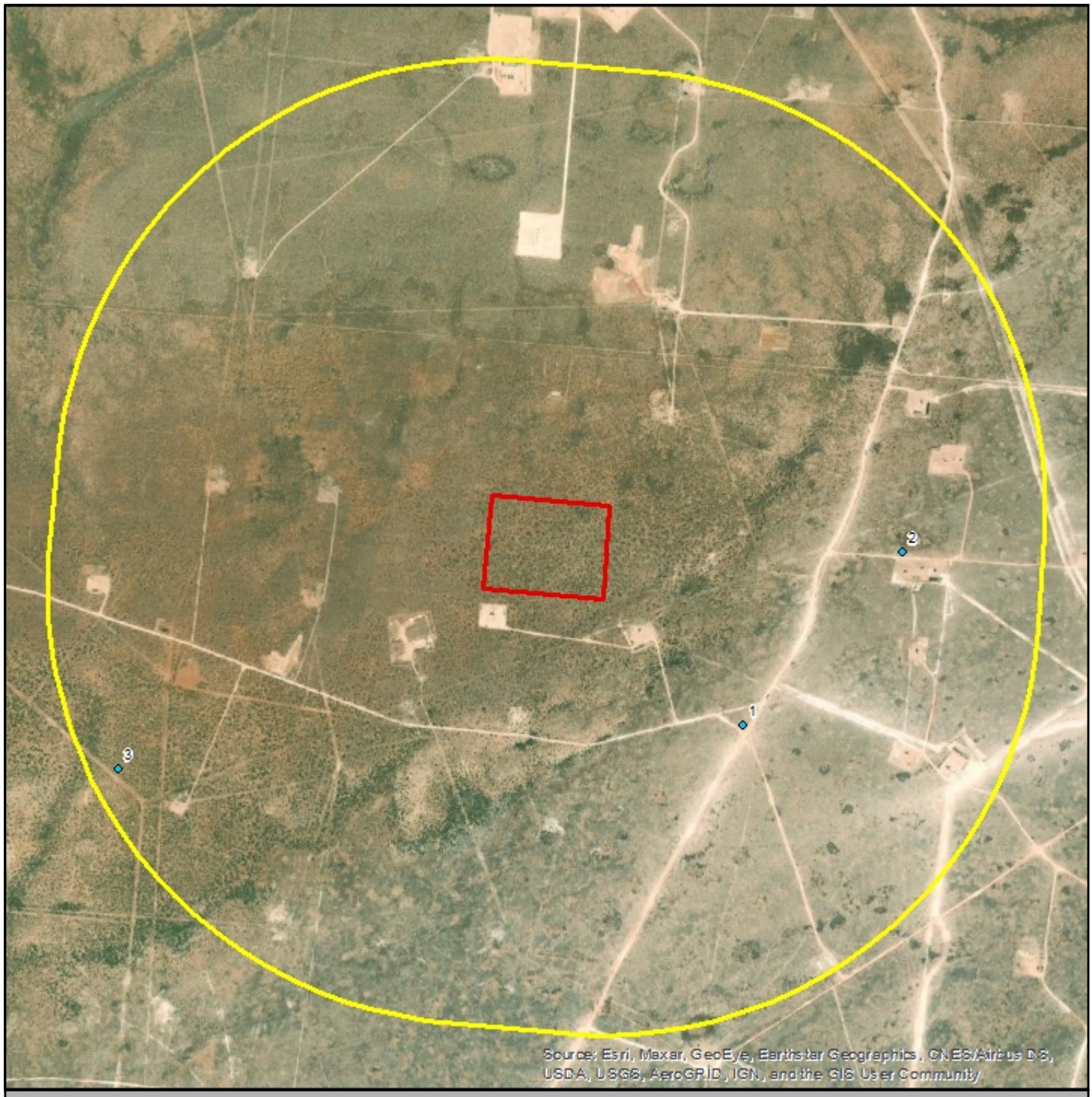

WaterBridge Parkway Recycle Facility

Well
Well Cluster
Target Property
Search Buffer

1 : 21,000
1 inch = 0.331 miles
1 inch = 1750 feet
1 centimeter = 0.210 kilometers
1 centimeter = 210 meters

N

Lambert Conformal Conic Projection
1983 North American Datum
First Standard Parallel: 33 0' 00" North
Second Standard Parallel: 45 0' 00" North
Central Meridian: 96 0' 00" West
Latitude of Origin: 39 0' 00" North

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Water Well Details

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Map ID	Source ID	Dataset	Owner of Well	Type of Well	Depth Drilled	Completion Date	Longitude	Latitude	Elevation	Driller's Logs
1	USGS323645104074001	USGS WW	USGS	Not Reported	87	N/A	-104.128289	32.612623	3292 ft	N/A
2	CP-01231-POD1	NM WW	WINSTON BALLARD	EXPLORATION	300	10/21/2013	-104.122651	32.618842	3291 ft	View
3	CP-01831-POD1	NM WW	HARLEY W BALLARD	72-12-1 LIVESTOCK WATERING	0	N/A	-104.152609	32.609305	3292 ft	N/A

Well Summary

Water Well Dataset	# of Wells
NM WW	2
USGS WW	1
Total Count	**3**

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WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

1. GENERAL AND WELL LOCATION

OSE POD NUMBER (WELL NUMBER)	OSE FILE NUMBER(S): CP-1231
WELL OWNER NAME(S): Winston Belland	PHONE (OPTIONAL)
WELL OWNER MAILING ADDRESS: 1819-2 N Canal	CITY: Carlsbad STATE: N.M ZIP: 88220

WELL LOCATION (FROM GPS): LATITUDE 32 DEGREES 37 MINUTES 07.81 SECONDS N; LONGITUDE 104 DEGREES 07 MINUTES 21.51 SECONDS W

* ACCURACY REQUIRED: ONE TENTH OF A SECOND
* DATUM REQUIRED: WGS 84

DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS – PLSS (SECTION, TOWNSHIP, RANGE) WHERE AVAILABLE: Backskin Rd - 2miles North

2. DRILLING & CASING INFORMATION

LICENSE NUMBER	NAME OF LICENSED DRILLER	NAME OF WELL DRILLING COMPANY
1654	John Sieman	Sieman Drilling Const. LLC

DRILLING STARTED	DRILLING ENDED	DEPTH OF COMPLETED WELL (FT)	BORE HOLE DEPTH (FT)	DEPTH WATER FIRST ENCOUNTERED (FT)
10/21/13	10/21/13	300'0	300'0	200

COMPLETED WELL IS: ☐ ARTESIAN ☐ DRY HOLE ☑ SHALLOW (UNCONFINED)

STATIC WATER LEVEL IN COMPLETED WELL (FT): 75-0

DRILLING FLUID: ☐ AIR ☑ MUD ☐ ADDITIVES – SPECIFY:

DRILLING METHOD: ☑ ROTARY ☐ HAMMER ☐ CABLE TOOL ☐ OTHER – SPECIFY:

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM (inches)	CASING MATERIAL AND/OR GRADE (include each casing string, and note sections of screen)	CASING CONNECTION TYPE	CASING INSIDE DIAM. (inches)	CASING WALL THICKNESS (inches)	SLOT SIZE (inches)
0	220	12"	PVC	Certa lok	8"	DR-17	BLANK
220	300	12	PVC	Certa lok	8"	DR-17	.032 S

STATE ENGINEER OFFICE ROSWELL, NM 2013 OCT 29 P 3:01

3. ANNULAR MATERIAL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM. (inches)	LIST ANNULAR SEAL MATERIAL AND GRAVEL PACK SIZE-RANGE BY INTERVAL	AMOUNT (cubic feet)	METHOD OF PLACEMENT
0	20	12"	3/8 hole plug	10 Bags	gravity
230	300	12	3/8 pea gravel	6 yds	gravity

FOR OSE INTERNAL USE

WR-20 WELL RECORD & LOG (Version 06/08/2012)

FILE NUMBER	POD NUMBER	TRN NUMBER
CP-1231		533110

LOCATION EXPL 195.28E.36.2-4-4 PAGE 1 OF 2

4. HYDROGEOLOGIC LOG OF WELL

DEPTH (feet bgl) FROM	TO	THICKNESS (feet)	COLOR AND TYPE OF MATERIAL ENCOUNTERED - INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES (attach supplemental sheets to fully describe all units)	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER-BEARING ZONES (gpm)
0	25	25	White caliche	☐Y ☒N	
25	35	10	Brown sand	☐Y ☒N	
35	145	110	White sandstone	☐Y ☒N	
175	200	25	Red sandstone & sand	☐Y ☒N	
200	300	100	gray dolomite w/ caverns	☒Y ☐N	80
				☐Y ☐N	
				☐Y ☐N	
				☐Y ☐N	
	300			☐Y ☐N	
				☐Y ☐N	
				☐Y ☐N	
				☐Y ☐N	
				☐Y ☐N	
				☐Y ☐N	
				☐Y ☐N	
				☐Y ☐N	
				☐Y ☐N	
				☐Y ☐N	
				☐Y ☐N	
				☐Y ☐N	
				☐Y ☐N	
				☐Y ☐N	

METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA: ☒ PUMP ☐ AIR LIFT ☐ BAILER ☐ OTHER – SPECIFY:

TOTAL ESTIMATED WELL YIELD (gpm): 80

5. TEST; RIG SUPERVISION

WELL TEST — TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING DISCHARGE METHOD, START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.

MISCELLANEOUS INFORMATION:

none

PRINT NAME(S) OF DRILL RIG SUPERVISOR(S) THAT PROVIDED ONSITE SUPERVISION OF WELL CONSTRUCTION OTHER THAN LICENSEE:

none

THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:

John Surman — SIGNATURE OF DRILLER / PRINT SIGNEE NAME

10/28/13 — DATE

FOR OSE INTERNAL USE

WR-20 WELL RECORD & LOG (Version 06/08/2012)

FILE NUMBER | POD NUMBER | TRN NUMBER

LOCATION

PAGE 2 OF 2

Dataset Descriptions and Sources

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Dataset	Source	Dataset Description	Update Schedule	Data Requested	Data Obtained	Data Updated	Source Updated
NM WW - New Mexico Water Wells	New Mexico Office of the State Engineer	This WATERS dataset contains all groundwater records and water rights applications compiled by New Mexico Office of the State Engineer (OSE). OSE is in the process of digitizing all records, all wells have not yet been plotted.	Quarterly	05/26/2022	05/26/2022	05/26/2022	10/26/2021
NM WW HIST - New Mexico Historical Water Wells	New Mexico Office of the State Engineer	This dataset contains all groundwater records found at the New Mexico Office of the State Engineer Water Rights Division district office. Groundwater rights are administered and filed at the district level: Albuquerque (District I), Roswell (District II),		N/A	N/A	N/A	N/A
USGS WW - USGS Water Wells	U.S. Geological Survey	This dataset contains groundwater well records from the U.S. Geological Survey.	Semi-annually	04/12/2022	04/12/2022	04/13/2022	04/12/2022

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Disclaimer

The Banks Environmental Data Water Well Report was prepared from existing state water well databases and/or additional file data/records research conducted at the state agency and the U.S. Geological Survey. Banks Environmental Data has performed a thorough and diligent search of all groundwater well information provided and recorded. All mapped locations are based on information obtained from the source. Although Banks performs quality assurance and quality control on all research projects, we recognize that any inaccuracies of the records and mapped well locations could possibly be traced to the appropriate regulatory authority or the actual driller. It may be possible that some water well schedules and logs have never been submitted to the regulatory authority by the water driller and, thus, may explain the possible unaccountability of privately drilled wells. It is uncertain if the above listing provides 100% of the existing wells within the area of review. Therefore, Banks Environmental Data cannot fully guarantee the accuracy of the data or well location(s) of those maps and records maintained by the regulatory authorities.

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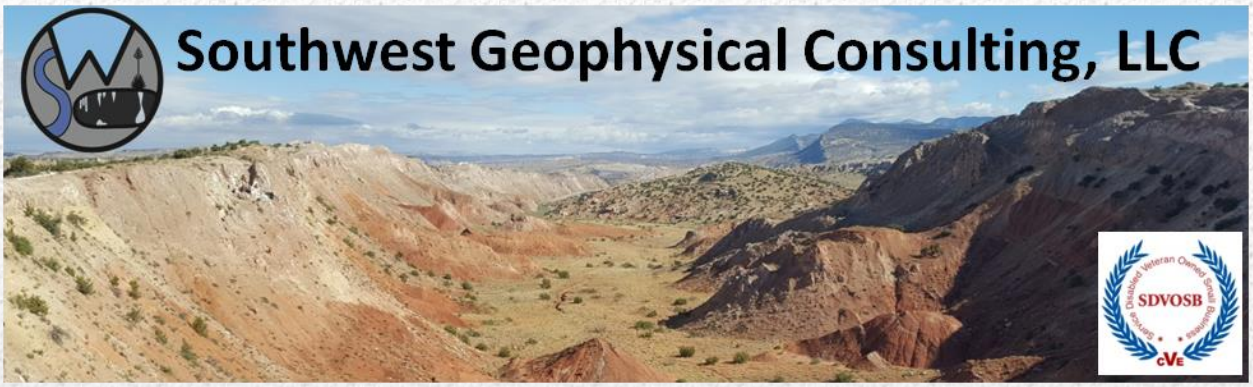
APPENDIX B
CAVE AND KARST RESOURCE INVENTORY REPORT



Cave and Karst Resource Inventory Report
WaterBridge Parkway Pond
Eddy County, New Mexico

Prepared for:

Permits West, Inc.

37 Verano Loop

Santa Fe, NM 87508

☐ **Positive**

- ☐ **Relocation/Realignment Recommended**
- ☐ **Construction Monitor Recommended**
- ☐ **Relocation/Realignment Not Required**

☑ **Negative**

July 20, 2022

PW-083B-20220512

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MMXXII

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No tables are provided with this report.

1.0 INTRODUCTION

An aerial karst survey was commissioned by Permits West (hereinafter referred to as "the client") on May 12, 2022, for the purpose of determining the presence of karst-related surface features within the WaterBridge Parkway Pond project site (hereinafter termed “WBP”).

As indicated in section ***1.3 Affected Environment***, the bedrock and overlying soil at the survey site are susceptible to sinkhole development and karst features may be hidden beneath the existing soil stratum. Risk associated with sinkhole formation can be minimized during development with proper foundation design and construction, and the control of site hydrology. The owner/developer must recognize, however, that a risk of sinkhole-induced damage to infrastructure does exist. The owner/developer must evaluate the risks and attendant costs of not performing a geophysical survey prior to development and must be willing to accept these risks if it is decided that a surface karst survey is sufficient. Southwest Geophysical Consulting, LLC, can provide a geophysical survey. If the decision is made to conduct a geophysical survey, a cost estimate and timeline will be provided upon request.

1.1 Goals of this Study

To provide the client with the location, description, photos, and boundaries of any surface karst-related features within the boundary of the WBP right-of-way and pond boundaries as provided by the client via e-mail (**WB_Parkway_karst_review_area_051722.shp**) on May 17, 2022.

1.2 Summary of Findings

No surface karst features are located within the aerial survey area.

The lack of surface karst features does not mean the area is not karstified and the survey area may still contain buried karst features. Caution should be exercised while clearing brush and during any excavation, trenching, or construction operations. Employing a karst monitor on-site during these operations should be considered.

1.3 Affected Environment

The proposed WBP project is located in evaporite karst terrain, a landform that is characterized by underground drainage through solutionally enlarged conduits. Evaporite karst terrain may contain sinkholes, sinking streams, caves, and springs. Sinkholes leading to underground drainages and voids are common. These karst features, as well as occasional

fissures and discontinuities in the bedrock, provide the primary sources for rapid recharge of the groundwater aquifers of the region.

Karst features are delicate resources that are often of geological, hydrological, biological, and archeological importance, and should be protected. The three primary concerns in these types of terrain are environmental issues, worker safety, and infrastructure integrity.

The Bureau of Land Management (BLM) categorizes all areas within the Carlsbad Field Office (CFO) zone of responsibility as having either low, medium, or high cave potential based on geology, occurrence of known caves, density of karst features, and potential impacts to freshwater aquifers[1]. These designations are also recognized by the New Mexico State Land Office (NMSLO). This project occurs within a **HIGH** karst occurrence zone (**HKOZ**, **Figure 1**).

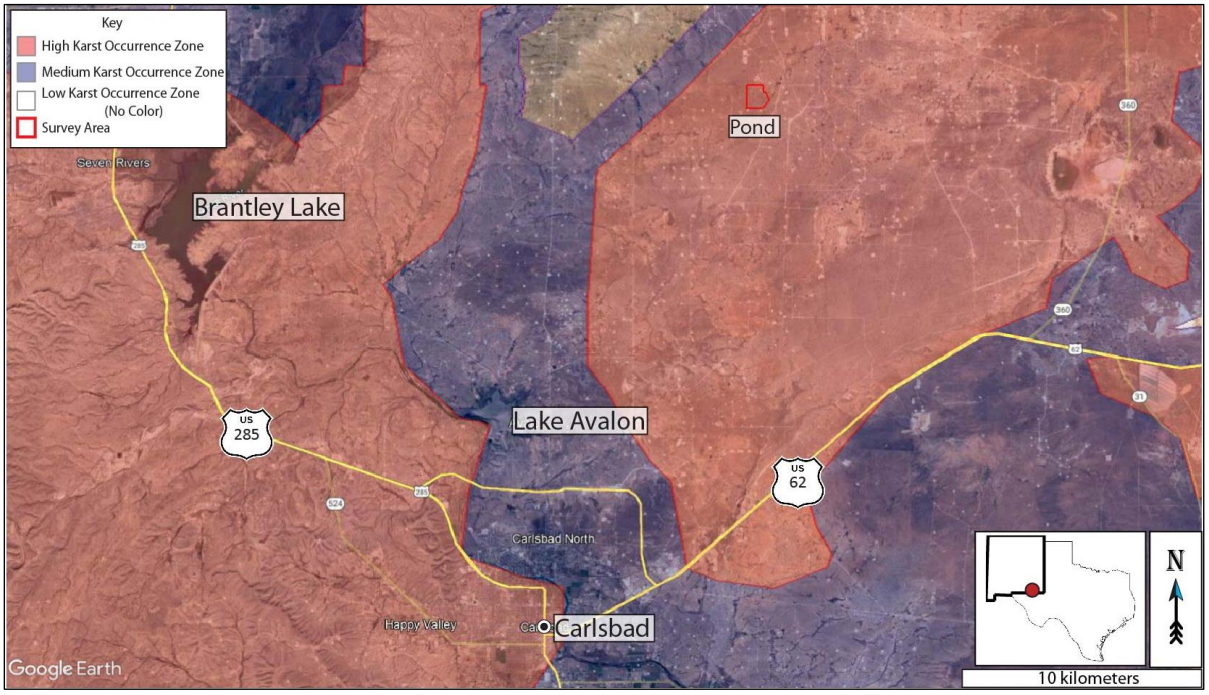

Figure 1: Karst occurrence overview. Background image: Google Earth. Image date: December 21, 2019. Datum: WGS-84.

A high karst occurrence zone is defined as an area in known soluble rock types that contains a high frequency of significant caves and karst features such as sinkholes, bedrock fractures that provide rapid recharge of karst aquifers, and springs that provide riparian habitat[2].

2.0 LOCATION AND DESCRIPTION OF STUDY AREA

2.1 Description of Site

The WBP project site is located in Eddy County, New Mexico, 26.1 kilometers (16.2 miles) northeast of Carlsbad, New Mexico, south of Curry Comb Road. The site is located west of Buckskin Road and south of Curry Comb Road within the NW ¼ of section 36, NM T19S R28E[3] (**Figure 1** and **Figure 2**). The region is semi-arid with an average annual precipitation of approximately 13 inches, of which about two-thirds falls as rain during summer thunderstorms from June to October. Summers are hot and sunny while winters are generally mild, with an average maximum temperature of 96°F in July and an average minimum temperature of 28°F in January[4]. This area is within the Chihuahuan Desert Thornscrub as defined by the Southwestern Regional ReGAP Vegetation map[5] and the vegetation consists mostly of areas of grass, sparse creosote, and sparse yucca, with very good visibility in most locations. See section ***2.2 Local Geology*** for the geology of the area. Both project sites are located entirely within an HKOZ[1] (**Figure 1**). The pond project site is located entirely within privately managed (fee surface) land and the parkway project site is located entirely within NMSLO managed land[6] (**Figure 2**).

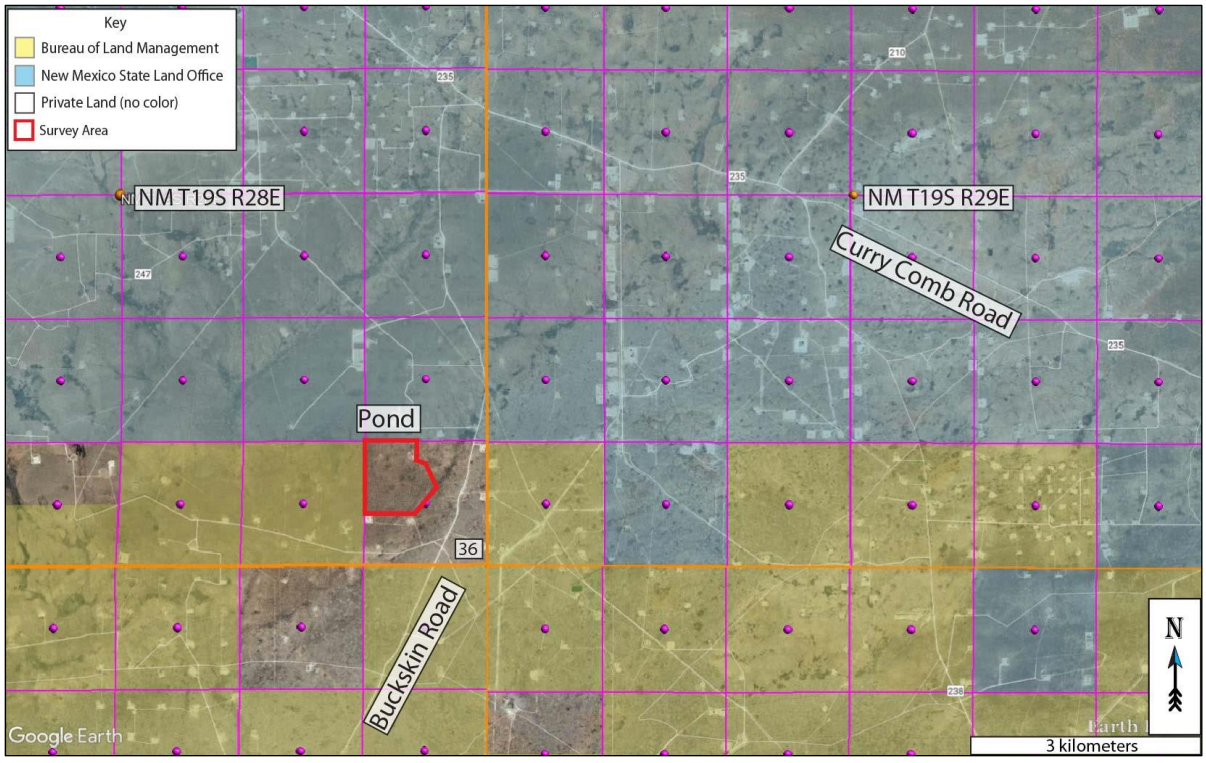

Figure 2: Land ownership overview[3,6]. Background image credit: Google Earth. Image date: December 21, 2019. Datum: WGS-84.

2.2 Local Geology

The area surveyed for the WBP project is located in a region locally known as Burton Flats at an elevation of 1,012 meters (3,319 feet), ± 12 meters (39 feet), and is underlain by the Permian Rustler (Pru) and Salado (Psl) Formations. The area is mantled by thin gypsiferous soils and Quaternary aeolian sands (Qal) and alluvial sands and gravels (Qp)[7] between 0 and 6 meters in depth (**Figure 3**).

The Rustler Formation is composed mainly of thin siltstones and sandstones interbedded with claystones, dolomite, and gypsum, and contains both karst-forming strata (the Forty-niner and Tamarisk members) and two shallow aquifers (the Magenta and Culebra Dolomite members)[8].

The Salado contains a layer of extremely soluble halite which can readily dissolve to create caves, sinkholes and other karst features; however, due to its extremely soluble nature, only non-soluble silt and sand remain from the dissolution of this layer at the surface[8]. The Rustler Formation may be subject to collapse if a void has developed beneath it in the Salado Formation[9].

This area is heavily karstified and has numerous sinkholes, swallets, caves, and other karst features within the survey area. Extreme caution is recommended during any surface activities including surface inspection, brush clearing, and trenching. The survey area is covered by the easily accessible Geologic Map of New Mexico (2003) at 1:500,000 scale[5].

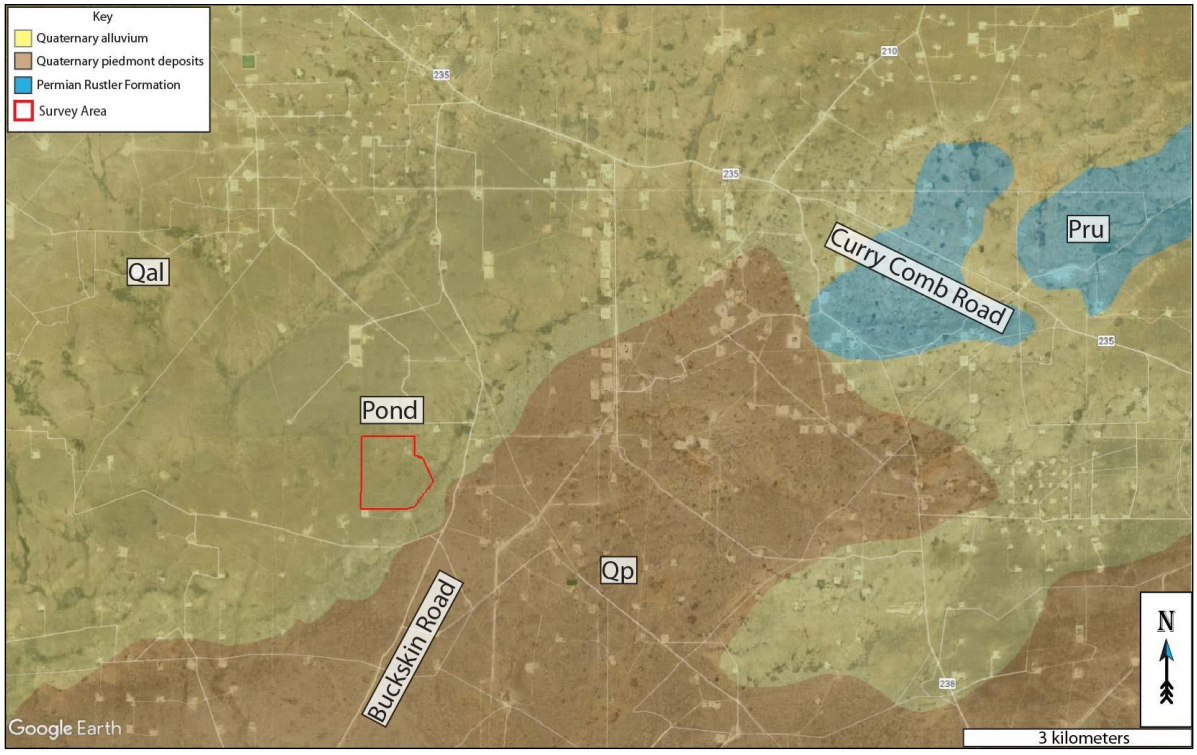

Figure 3: Geology overview. Map credit: The Digital Geologic Map of New Mexico in ARC/INFO Format[10], and Google Earth. Image date: December 21, 2019. Datum: WGS-84.

2.3 Description of Survey

Southwest Geophysical Consulting, in partnership with SWCA Environmental Consultants, provides aerial karst surveys using drones that are flown by qualified, FAA licensed drone pilots and that meet the stringent Bureau of Land Management – Carlsbad Field Office requirements for both pedestrian and aerial karst surveys. The BLM-CFO requirements are recognized by the NMSLO for aerial karst surveys.

Aerial karst surveys are conducted at low elevation following a preplanned raster pattern flightpath designed for the purpose of generating at least 75% imagery overlap. The collected high-resolution, georeferenced imagery is stitched together to develop orthomosaic imagery which is further developed into a digital elevation model (DEM); the DEM is then processed into a local relief model (LRM). This LRM is color coded to enhance differences in elevation of as little as five centimeters. The orthoimagery, DEM, and LRM are uploaded to a server where they are analyzed by a highly qualified karst geologist. Finally, the data is reviewed by a senior karst geologist for quality assurance and downloaded into a table for inclusion in a written report[11].

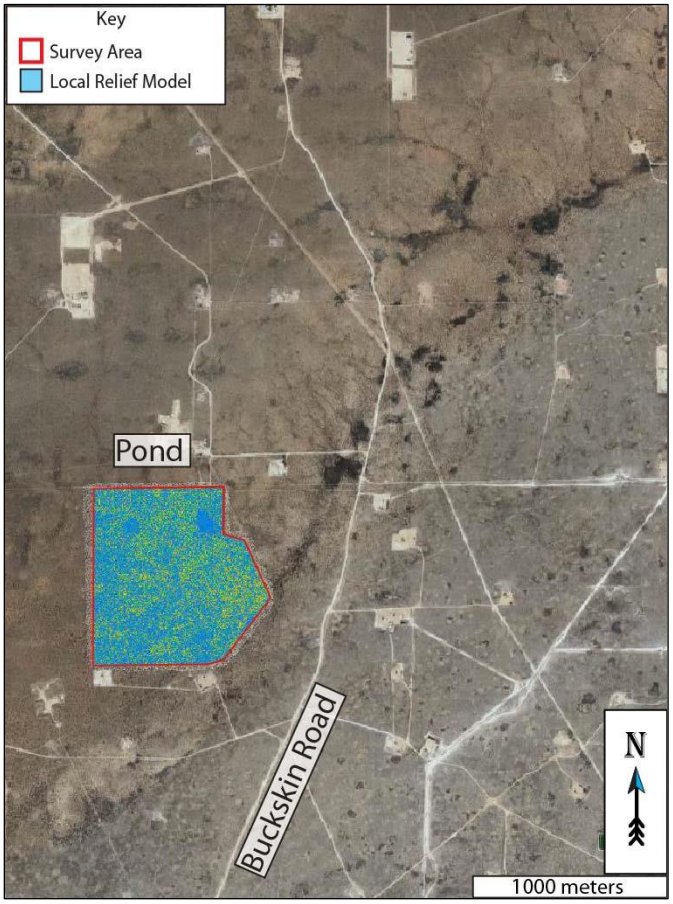

Figure 4: Survey overview. Background image credit: Google Earth. Image date: December 21, 2019. Datum: WGS-84.

Resolution of the orthoimagery is clear enough that features as small as 10 centimeters can be positively identified in most circumstances. Occasionally there are ambiguous features identified during an aerial survey that will need to be checked in the field if they impact the facility's location. Specifically, it is difficult to tell the difference between solution tubes, abandoned uncased well bores, and some burrows in drone imagery[12]. These features are marked with yellow dots in **Figure 4**. If a feature is subsequently verified in the field prior to publication of the report, the dot color will be changed to red if confirmed as a karst feature or deleted if not.

The imagery for this study was collected via aerial survey by Pat Lagodney of SWCA on June 3, 2022. Surface karst features may have developed after these dates and will not be noted in this report. Imagery analysis was completed by Dave Decker of Southwest Geophysical Consulting, LLC, on June 9, 2022.

2.4 Description of Karst Features

No surface karst features were located during this survey.

The lack of surface karst features does not mean the area is not karstified and the survey area may still contain buried karst features. Caution should be exercised while clearing brush and during any excavation, trenching, or construction operations. Employing a karst monitor on-site during these operations should be considered.

3.0 RECOMMENDATIONS

No surface karst features were located during this aerial survey.

The lack of surface karst features does not mean the area is not karstified and the survey area may still contain buried karst features. Caution should be exercised while clearing brush and during any excavation, trenching, or construction operations. Employing a karst monitor on-site during these operations should be considered.

This area may be prone to rapid karst formation in the underlying stratigraphy and warrants careful planning and engineering to mitigate karst-forming processes that could be accelerated by poor design considerations. Proper engineering of petroleum-related facilities following karst guidelines should be implemented during both excavation and construction. Mitigation measures for any karst features revealed during excavation shall be approved by the Bureau of Land Management – Carlsbad Field Office and follow the Natural Resources Conservation Service Conservation Practice Standard for Karst Sinkhole Treatment, Code 527, or the Bureau of Land Management Cave and Karst Management Handbook, H-8380-1.

Keep in mind that any flow of gypsum-undersaturated waters into a small crack or crevice can rapidly dissolve any underlying gypsum and cause failure of an impoundment or infrastructure within a matter of months to a few years. It is imperative that any dikes, buffers, or liners installed are checked regularly for integrity, with repairs made immediately upon discovery of failure.

Vigilance during construction is paramount. If voids are encountered during excavation, contact the Bureau of Land Management Karst Division at (575) 234-5972, the New Mexico State Land Office Surface Resources Division at (505) 827-5768, or a BLM-CFO-approved karst vendor and request an on-site investigation from a karst expert if one is not already on site. A karst consultant can generally be available in Eddy County within five hours.

Approved karst monitors should have karst feature identification training, at least two years of supervised experience identifying karst features, wilderness first aid training, SRT training, confined space training, gas monitor training, and a minimum of SPAR cave rescue training through NCRC. They should have with them the proper gear and be prepared both physically and mentally to enter a collapse feature within minutes to perform a rescue if needed. Monitoring services with qualified karst monitors, as well as cave surveys and geophysical surveys, are available from Southwest Geophysical Consulting.

Under no circumstances should an untrained, inexperienced person enter a cave, pit, sinkhole, or collapse feature. All field employees of Southwest Geophysical Consulting have extensive caving experience and the ability to determine whether entry into a karst feature is safe or presents a

hazard. In the event it is necessary to enter a karst feature, Southwest Geophysical Consulting can provide these services on request.

Cave and karst resource inventory reports for the BLM-CFO should be submitted to:

blm_nm_karst@blm.gov

Cave and karst resource inventory reports for the NMSLO should be submitted to the respective project manager.

4.0 REFERENCES

1 Rybacki, K. (Bureau of Land Management - Carlsbad Field Office, 2020).

2 Goodbar, J. R. Vol. BLM Management Handbook H-8380-1 (ed Carlsbad Field Office) 59 (Bureau of Land Management, Denver, CO, 2015).

3 Earthpoint. *Earthpoint Tools for Google Earth*, 2022).

4 Center, W. R. C. *National Climate Data Center 1981-2010 Normal Climate Summary for Carlsbad, New Mexico (291469)*, 2010).

5 Whitehead, W. & Flynn, C. *Plant Utilization in Southeastern New Mexico: Botany, Ethnobotany, and Archaeology*. (Bureau of Land Management, Carlsbad Field Office, 2017).

6 NMSLO. (New Mexico State Land Office, 2016).

7 Scholle, P. A. Geologic Map of New Mexico. (2003).

8 Goodbar, J. R. in *20th National Cave and Karst Management Symposium* Vol. 3 (eds Lewis Land & Mark Joop) 13 - 18 (National Cave and Karst Research Institute, Carlsbad, NM, 2013).

9 Martinez, J. D., Johnson, K. S. & Neal, J. T. Sinkholes in Evaporite Rocks. *American Scientist* **86**, 38-51 (1998).

10 Green, G. N. & Jones, G. E. *The Digital Geologic Map of New Mexico in ARC/INFO Format*, <https://mrdata.usgs.gov/geology/state/state.php?state=NM> (1997).

11 Whitehead, W., Bandy, M. & Decker, D. Protocol for Using UAV Photography for Rapid Assessment of Karst Features in Southeast New Mexico. *Proceedings of the 2022 Cave and Karst Management Symposium* (2022).

12 Decker, D. D. & Jorgensen, G. L. (ed LLC Southwest Geophysical Consulting) (Private Correspondence, 2020).

5.0 GLOSSARY OF TERMS AND ABBREVIATIONS

BLM-CFO	Bureau of Land Management - Carlsbad Field Office
caprock-collapse sinkhole	Collapse of roof-spanning rock into a cave or void.
cave	Natural opening at the surface large enough for a person to enter.
cover-collapse sinkhole	Collapse of roof-spanning soil or clay ground cover into a subsurface void.
GPS	Global Positioning System
(H)	High confidence modifier for a PKF. This is typically reserved for a feature that is definitely karst, but has not been confirmed in the field.
HKOZ	High Karst Occurrence Zone
(L)	Low confidence modifier for a PKF. This is typically a feature that cannot be ruled out as karst but is most likely NOT karst related. This modifier may also be used for pseudokarst features.
LED	Locally enclosed depression. A natural depression on the surface that collects rainwater. Some contain swallets and/or caves, others do not.
LKOZ	Low Karst Occurrence Zone
(M)	Medium confidence modifier for PKF. This is an ambiguous feature that can't be positively identified as karst without a field visit (e.g., burrows, abandoned unlined wells, solution tubes).
MKOZ	Medium Karst Occurrence Zone
NCRC	National Cave Rescue Commission
NKF	Non-karst feature. Used for features originally identified as PKF that have been subsequently identified in the field as non-karst related. This term may also be used for pseudokarst features.
NMSLO	New Mexico State Land Office
Pdl	Permian Dewey Lake Formation
PKF	Possible karst feature. This term is reserved for features identified in satellite or aerial imagery that have NOT been visited in the field. Further modifiers include (H) for high confidence, (M) for medium confidence, and (L) for low confidence. These confidence levels are based on field experience.
Pr	Permian Rustler Formation
Psl	Permian Salado Formation
pseudokarst	Karst-like features (sinkholes, conduits, voids etc.) that are not formed by dissolution. These types of features include soil piping, lava tubes, and some cover-collapse and suffosion sinkholes.
Qal	Quaternary alluvium

Qp	Quaternary piedmont deposits
Qpl	Quaternary playa lake deposits
RKF	Recognized karst feature. This term is reserved for karst features that have been physically verified in the field.
SKF	Surface Karst Feature
SPAR	Small Party Assisted Rescue
suffosion sinkhole	Raveling of soil into a pre-existing void or fracture.
swallet	A natural opening in the surface, too small for a person, that drains water to an aquifer. Some are "open," meaning a void can be seen below; some are "closed, "meaning they are full of sediment.
SWG	Southwest Geophysical Consulting, LLC
UTM	Universal Transverse Mercator (projected coordinates)
WGS	World Geodetic System (geographic coordinates)

6.0 ATTESTATION

David D. Decker, PhD, PG, CPG
Chief Executive Officer, Principal Geologist
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5117 Fairfax Dr. NW
Albuquerque, NM 87114
dave@swgeophys.com
(505) 585-2550

CERTIFICATE OF AUTHOR

I, David D. Decker, a Licensed Professional Geologist and a Certified Professional Geologist, do certify that:

- I am currently employed as a consulting geologist in the specialty of caves and karst with an office address of 5117 Fairfax Dr. NW, Albuquerque, NM, USA, 87114.
- I graduated with a Master of Science in Applied Physics with a specialization in Sensor Systems from the Naval Post Graduate School in Monterey, California, in 2003, and a Doctor of Philosophy in Earth and Planetary Sciences from the University of New Mexico, Albuquerque, New Mexico, in 2018.
- I am a Licensed Professional Geologist in the State of Texas, USA (PG-15242) and have been since 2021. I am a Certified Professional Geologist through the American Institute of Professional Geologists (CPG-12123) and have been since 2021.
- I have been employed as a geologist continuously since 2016. I was previously employed as a Fire Controlman, Naval Flight Officer, and Aerospace Engineering Duty Officer in the U.S. Navy and operated, maintained, and installed various sensor systems including magnetic, electromagnetic, radar, communications, and acoustic systems in various capacities from 1986 through 2010.
- I have been involved in various aspects of cave and karst studies continuously since 1985, including exploration, mapping, and scientific studies.
- I have read the definition of “qualified karst professional” set out in the ASTM Standard (currently in review). I meet the definition of “qualified professional” for the purposes of ASTM E-1527.
- I am responsible for the content, compilation, and editing of all sections of the report entitled “PW-083B-20220512 Cave and Karst Resource Inventory Report, WaterBridge Parkway Pond, Eddy County, New Mexico.” I or a duly authorized and qualified representative of Southwest Geophysical Consulting, LLC, have personally visited this site on the date or dates mentioned in section ***2.3 Description of Survey***.

- I have no prior involvement nor monetary interest in the described property or project, save for my fee for conducting this investigation and providing the report.

Dated in Albuquerque, New Mexico, July 20, 2022.

David D. Decker
PhD, CPG-12123

APPENDIX C
GEOTECHNICAL ENGINEERING REPORT

COZ Engineering, LLC

GEOTECHNICAL ENGINEERING REPORT

PARKWAY RECYCLING FACILITY

EDDY COUNTY, NEW MEXICO
Project No. 4222084-P
July 10, 2022

Prepared for:

ENVIROTECH ENGINEERING & CONSULTING, INC.
Enid, Oklahoma

Prepared by:

COZ ENGINEERING, LLC
Las Cruces, New Mexico

COZ Engineering, LLC

PO Box 13331
Las Cruces, New Mexico 88013
Cell: 575.642.7671
Email: thecoz42@gmail.com

July 10, 2022

Envirotech Engineering & Consulting, Inc.
2500 North Eleventh Street
Enid, OK 73701

Attn. Tyler Williams, PE
P: 580.234.8780
E: twilliams@envirotechconsulting.com

Re: Geotechnical Engineering Report
Parkway Recycling Facility
Lat.: 32.617622° Long.: -104.138994°
Eddy County, New Mexico
COZ Report No. 4222084-P

Dear Mr. Williams:

The following is a geotechnical engineering report for the proposed Parkway Recycling Facility in Eddy County, New Mexico. Recommendations for earthwork, construction, embankments and other geotechnical considerations are presented in the report.

Thank you for the opportunity to provide this geotechnical engineering report. If you have any questions or concerns, please contact me at (575)-642-7671.

Sincerely,
COZ Engineering, LLC

Dan Cosper, P.E.

Parkway Recycling Facility
July 10, 2022
COZ Report No. 4222084-P

Appendix:

Site Plan
Boring Logs
Laboratory Results

Parkway Recycling Facility
July 10, 2022
COZ Report No. 4222084-P

Site Investigation:

A subsurface investigation was performed for the proposed Parkway Recycling Facility to be located at Lat.: 32.617622° Long.: -104.138994° in Eddy County, New Mexico (about 15 miles northeast of Carlsbad, New Mexico). Five (5) test borings were advanced within the proposed facility near client requested locations. The borings were terminated at depths of 20 and 75 feet below ground surface (bgs).

Site Conditions:

The project area contained exposed subgrade and sparse to dense vegetation (brush and native grasses) at the time of the field exploration. Soils investigated at this site were comprised of carbonate indurated silty sand with varying amounts of gravel from the surface to the total explored depths of 20 and 75 feet bgs.

The groundwater table was encountered at a depth of 70 feet bgs during the field investigation.

Planned Construction:

Based on the information provided, the project will include the construction of a recycling facility.

Site Grading:

Areas for planned construction should be clear of debris, vegetation and any oversized or deleterious material prior to grading operations. Fill construction shall not be allowed on surfaces that contain vegetation or rocks larger than four inches in greatest dimension. No fill shall be placed that contains vegetative material as decomposition of that material can cause voids and possibly result in surface settlement. Voids in the soil matrix created or encountered during grading operations shall be backfilled with compacted fill material.

Positive drainage away from embankments should be provided throughout the life of the project. Areas adjacent to embankments that could retain water should be sealed or eliminated.

Soil Improvements:

Subgrade preparation (beneath embankments and engineered fills) should consist of scarifying the native soil surface a minimum thickness of 10 inches, moisture conditioning (+/- 2% of optimum moisture content per ASTM D-698) and compaction to a minimum of 95% of standard Proctor density (per ASTM D-698). Engineered fill materials should be placed in 10-inch maximum lifts, moisture conditioned to within 2% of optimum moisture content (per ASTM D-698) and compacted to a minimum of 95% of standard Proctor density (per ASTM D-698).

Fill Material:

Engineered fill material for this project should meet the following gradation criteria:

Sieve	% Passing
4″	100
¾	70-100
#4	50-100
#200	50 max.

The plasticity index of the minus #40 sieve portion should not exceed fifteen (15). On-site soils meet the above specifications.

Excavation of Embankment Areas:

The soils below the new embankments should be scarified ten inches, moisture conditioned and compacted. The interior/exterior width of subgrade preparation should extend to the intersection of the slopes of the embankment fill. Once the subgrade preparation has been observed and approved by the geotechnical engineer, embankment fill operations can initiate.

Embankment Placement:

On-site embankment material stockpiles should be moisture conditioned in preparation for lift placement. The embankments should be constructed as a unit from the bottom elevation to the rim elevation.

The distal slopes of the embankments should be overbuilt and cut to final grade to provide compaction to these edges of the embankments. The embankments should be constructed in strict accordance with the project plans and specifications.

Seismic Site Classification:

The seismic site classification is based upon the soil profile in the upper 100 feet as defined by the weighted average of standard penetration blow-counts or shear wave velocity in accordance with Section 20.4 of the ASCE 7 and the International Building Code (IBC). Based upon my field investigation, it is my opinion that the Seismic Site Classification is **C ("Very Dense Soil or Soft Rock")**. The maximum depth of the borings advanced at the site was 75 feet. Therefore, soil properties below the maximum boring depth to 100 feet were estimated based on my experience with the general area. Deeper borings or geophysical testing would be required to confirm the conditions below the current boring depth.

Testing and Inspection:

It is recommended that all site grading operations be inspected by a geotechnical engineer. The inspecting engineer should be responsible for immediately reporting any site or soil conditions that vary significantly from this report.

The testing of materials should be made at the following:

1) One (1) soil density every 5,000 square feet of prepared subgrade and embankment fill areas (ASTM D-1556, ASTM D-2167, or ASTM D-2922, ASTM D-3017).

2) One (1) sieve analysis and plasticity index per material used according to ASTM D-422 and ASTM D-4318.

3) One (1) proctor per each type of material used according to ASTM D-698.

Report Limitations:

The conclusions, recommendations and opinions presented herein are:

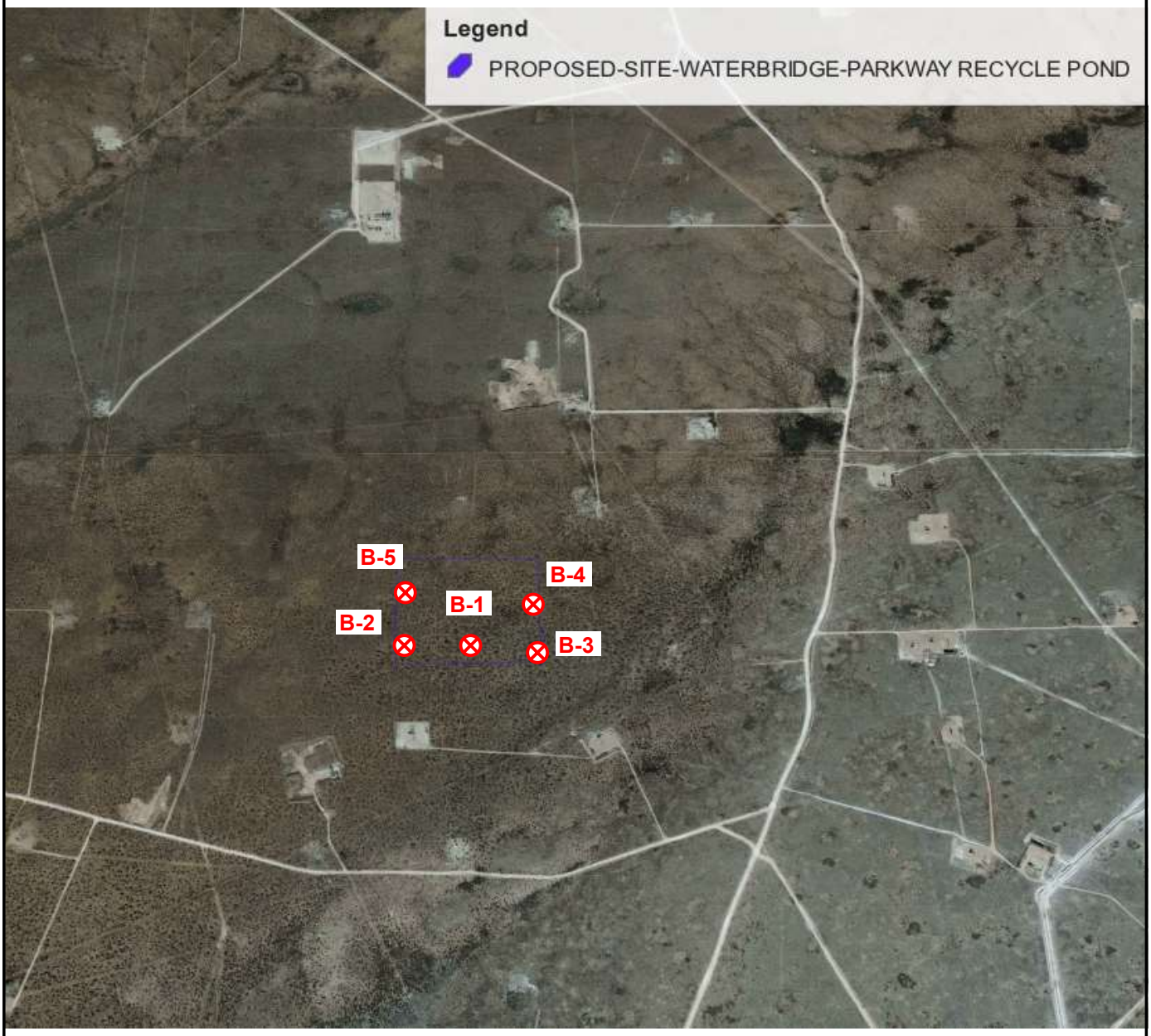
1) Based upon evaluation and interpretation of the findings of the field and laboratory program.

2) Based upon an interpolation of soil conditions between and beyond the explorations.

3) Subject to confirmation of the conditions encountered during construction.

4) Based upon the assumption that sufficient observation and testing will be provided during construction.

There is no other warranty, either express or implied. Any person using this report for bidding or construction purposes should perform such independent investigation as he deems necessary to satisfy himself as to the surface and subsurface conditions to be encountered and the procedures to be used in the performance of work on this project. If conditions are encountered during construction that appear to differ from those indicated in this report, I should be notified immediately.

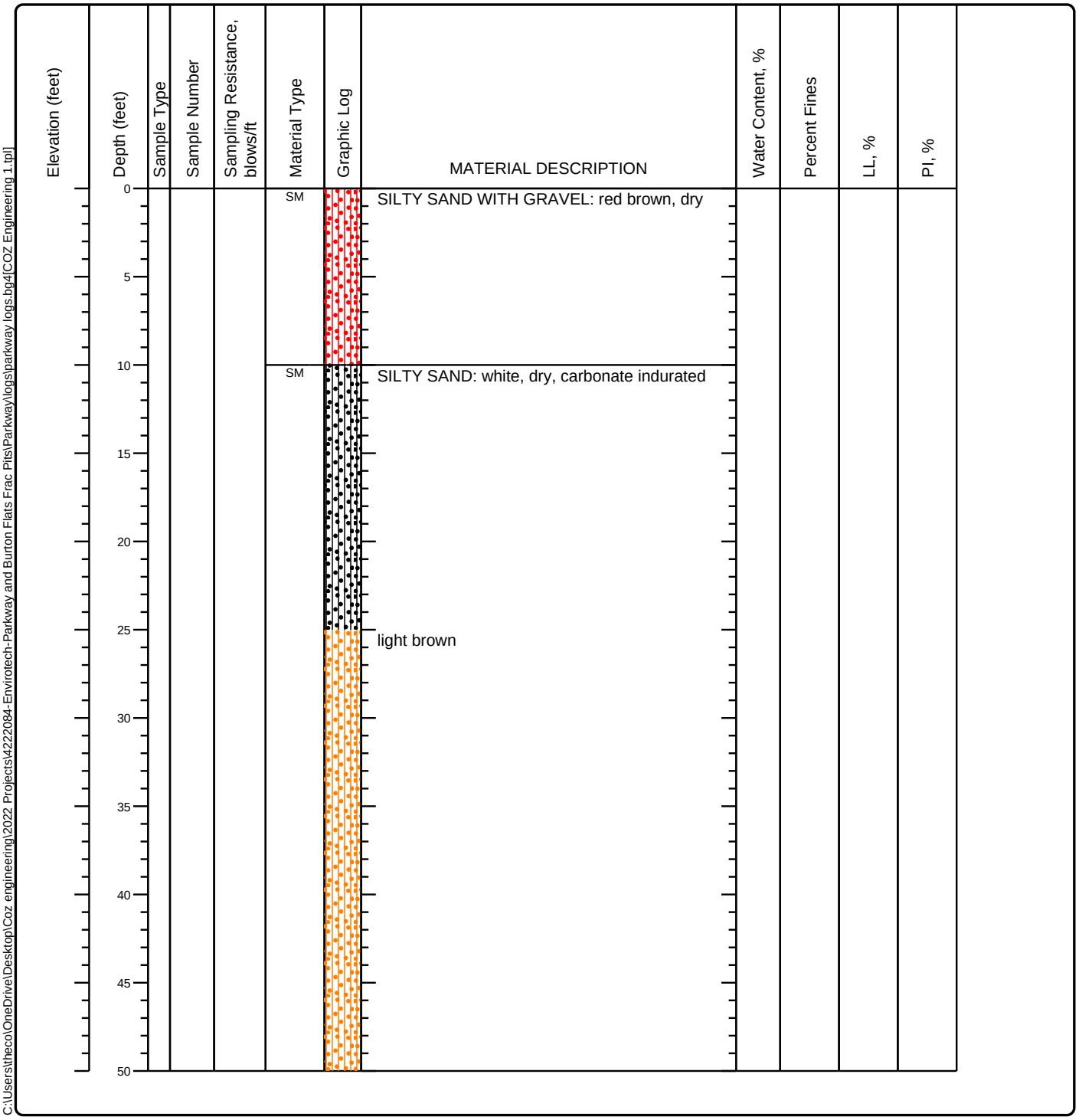


⊗ Approximate Boring Location

Project Manager: DC Drawn by: DC Checked by: DC Approved by: DC	Project No. 4222084-F Scale: AS SHOWN File Name: Figures Date: 7-10-22	COZ Engineering, LLC PO Box 13331 Las Cruces, NM 88013	BORING LOCATION PLAN Parkway Recycling Facility Lat.: 32.617622° Long.: -104.138994° Eddy County, New Mexico	Exhibit 1

Project: **Parkway Recycling Facility** Project Location: **Buckskin Road, Eddy County, NM** Project Number: **4222084-P**	Log of Boring B-1 **Sheet 1 of 2**

Date(s) Drilled **6-16-22**	Logged By **JS**	Checked By **COZ**
Drilling Method **hollow-stem auger**	Drill Bit Size/Type	Total Depth of Borehole **75 feet bgs**
Drill Rig Type **CME-75**	Drilling Contractor **Southlands**	Approximate Surface Elevation
Groundwater Level and Date Measured **70 feet, 6-16-22**	Sampling Method(s)	Hammer Data
Borehole Backfill **cuttings**	Location **see boring plan**	



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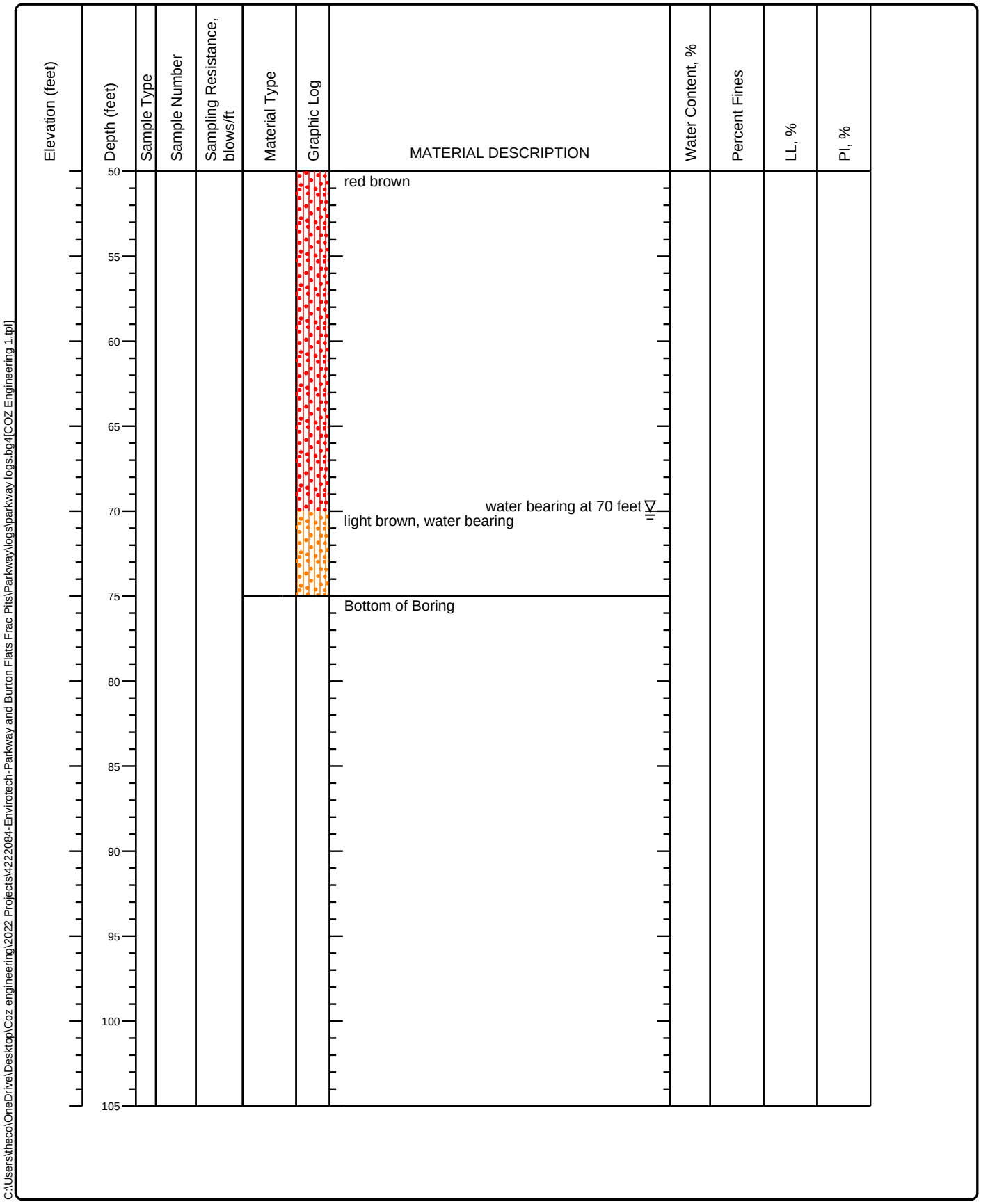
Project: **Parkway Recycling Facility**
Project Location: **Buckskin Road, Eddy County, NM**
Project Number: **4222084-P**

Log of Boring B-1
Sheet 2 of 2



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Project: **Parkway Recycling Facility**
Project Location: **Buckskin Road, Eddy County, NM**
Project Number: **4222084-P**

Log of Boring B-2
Sheet 1 of 1

Date(s) Drilled **6-16-22**	Logged By **JS**	Checked By **COZ**
Drilling Method **hollow-stem auger**	Drill Bit Size/Type	Total Depth of Borehole **21.5 feet bgs**
Drill Rig Type **CME-75**	Drilling Contractor **Southlands**	Approximate Surface Elevation
Groundwater Level and Date Measured **not encountered**	Sampling Method(s) **SPT**	Hammer Data
Borehole Backfill **cuttings**	Location **see boring plan**	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Percent Fines	LL, %	PI, %
	0				SM		SILTY SAND WITH GRAVEL: red brown, dry, dense				
	5		1	12\18\17				5.5	24.5		NP
	10		2	10\15\20			white, carbonate indurated				
	15		3	18\20\13	SM		SILTY SAND: white, dry, dense, carbonate indurated				
	20		4	10\33\50			very dense				
							Bottom of Boring				
	25										
	30										
	35										
	40										
	45										
	50										

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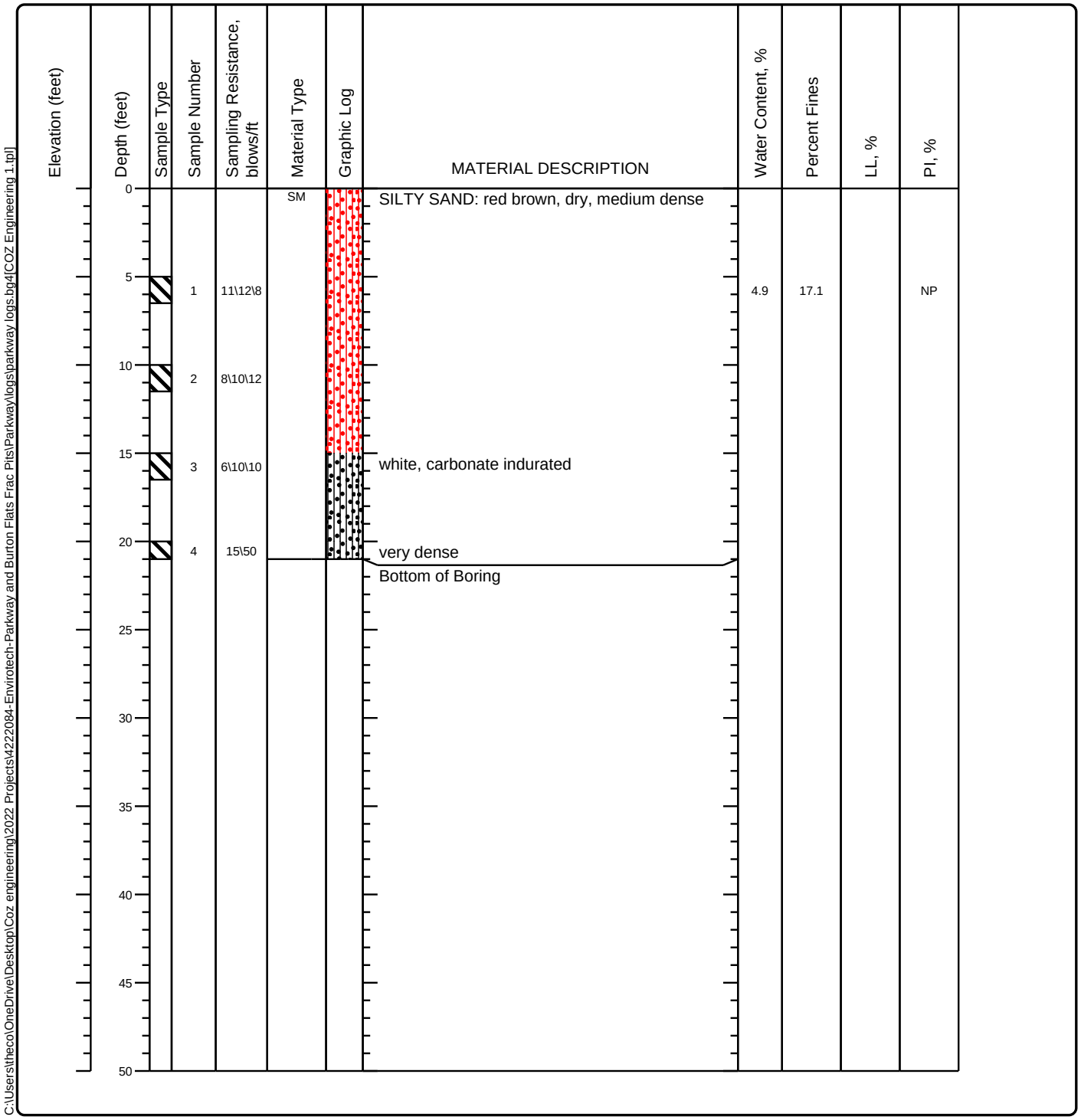
Project: **Parkway Recycling Facility**
Project Location: **Buckskin Road, Eddy County, NM**
Project Number: **4222084-P**

Log of Boring B-3
Sheet 1 of 1

Date(s) Drilled **6-16-22**	Logged By **JS**	Checked By **COZ**
Drilling Method **hollow-stem auger**	Drill Bit Size/Type	Total Depth of Borehole **21 feet bgs**
Drill Rig Type **CME-75**	Drilling Contractor **Southlands**	Approximate Surface Elevation
Groundwater Level and Date Measured **not encountered**	Sampling Method(s) **SPT**	Hammer Data
Borehole Backfill **cuttings**	Location **see boring plan**	



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Project: **Parkway Recycling Facility** Project Location: **Buckskin Road, Eddy County, NM** Project Number: **4222084-P**	Log of Boring B-4 **Sheet 1 of 1**

Date(s) Drilled **6-16-22**	Logged By **JS**	Checked By **COZ**
Drilling Method **hollow-stem auger**	Drill Bit Size/Type	Total Depth of Borehole **21.5 feet bgs**
Drill Rig Type **CME-75**	Drilling Contractor **Southlands**	Approximate Surface Elevation
Groundwater Level and Date Measured **not encountered**	Sampling Method(s) **SPT**	Hammer Data
Borehole Backfill **cuttings**	Location **see boring plan**	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Percent Fines	LL, %	PI, %
	0				SM		SILTY SAND: white, dry, loose, carbonate indurations				
	5		1	2\2\3				0.9	45.9		NP
	10		2	6\12\50			very dense				
	15		3	13\16\28			dense				
	20		4	10\15\50			very dense				
							Bottom of Boring				
	25										
	30										
	35										
	40										
	45										
	50										

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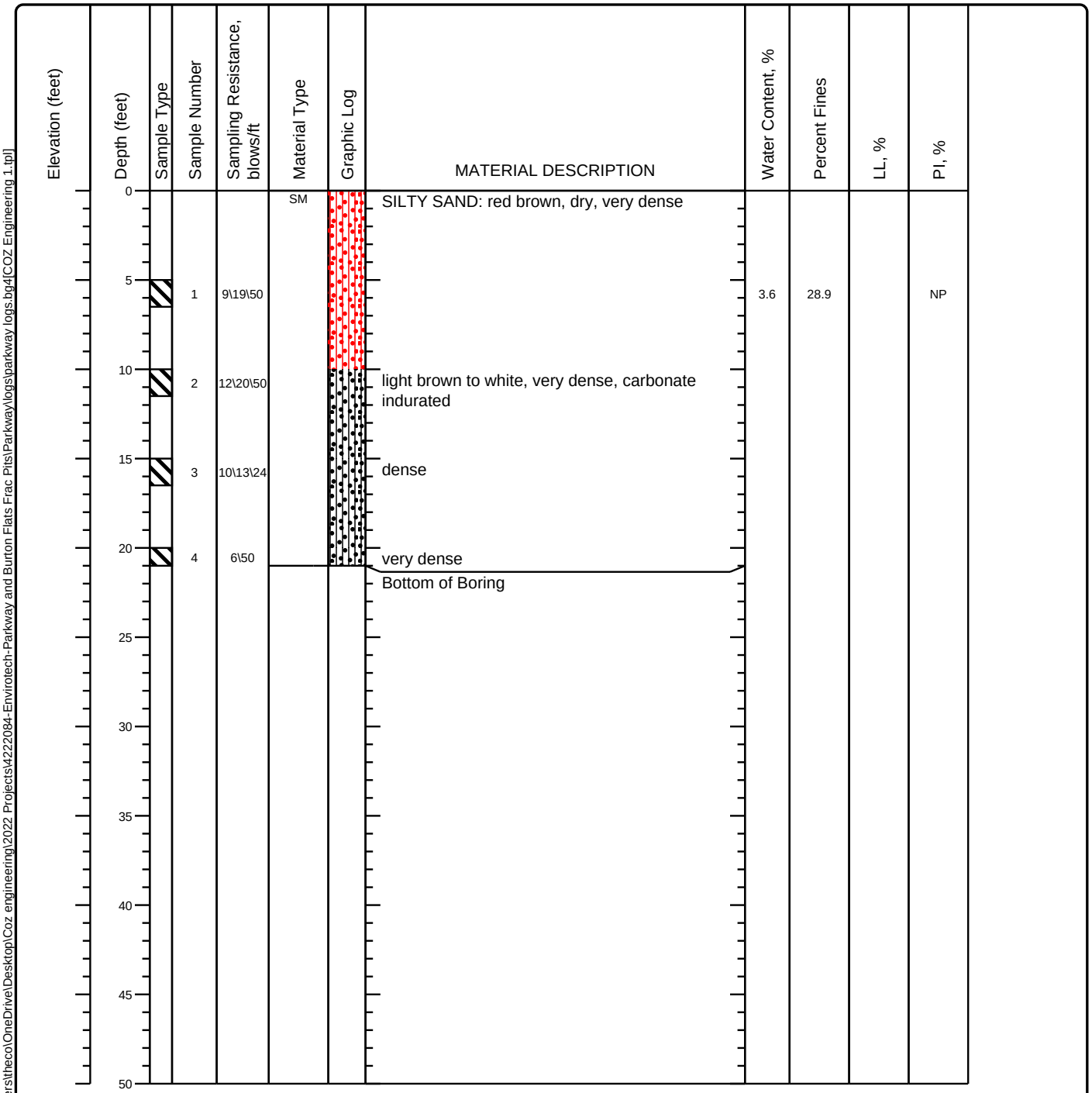
Project: **Parkway Recycling Facility** Project Location: **Buckskin Road, Eddy County, NM** Project Number: **4222084-P**	Log of Boring B-5 **Sheet 1 of 1**

Date(s) Drilled **6-16-22**	Logged By **JS**	Checked By **COZ**
Drilling Method **hollow-stem auger**	Drill Bit Size/Type	Total Depth of Borehole **21 feet bgs**
Drill Rig Type **CME-75**	Drilling Contractor **Southlands**	Approximate Surface Elevation
Groundwater Level and Date Measured **not encountered**	Sampling Method(s) **SPT**	Hammer Data
Borehole Backfill **cuttings**	Location **see boring plan**	



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Project: **Parkway Recycling Facility**
Project Location: **Buckskin Road, Eddy County, NM**
Project Number: **4222084-P**

Key to Log of Boring
Sheet 1 of 1

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Percent Fines	LL, %	PI, %
1	2	3	4	5	6	7	8	9	10	11	12

COLUMN DESCRIPTIONS

1 Elevation (feet): Elevation (MSL, feet).
2 Depth (feet): Depth in feet below the ground surface.
3 Sample Type: Type of soil sample collected at the depth interval shown.
4 Sample Number: Sample identification number.
5 Sampling Resistance, blows/ft: Number of blows to advance driven sampler one foot (or distance shown) beyond seating interval using the hammer identified on the boring log.
6 Material Type: Type of material encountered.
7 Graphic Log: Graphic depiction of the subsurface material encountered.
8 MATERIAL DESCRIPTION: Description of material encountered. May include consistency, moisture, color, and other descriptive text.
9 Water Content, %: Water content of the soil sample, expressed as percentage of dry weight of sample.
10 Percent Fines: The percent fines (soil passing the No. 200 Sieve) in the sample. WA indicates a Wash Sieve, SA indicates a Sieve Analysis.
11 LL, %: Liquid Limit, expressed as a water content.
12 PI, %: Plasticity Index, expressed as a water content.

FIELD AND LABORATORY TEST ABBREVIATIONS

CHEM: Chemical tests to assess corrosivity
COMP: Compaction test
CONS: One-dimensional consolidation test
LL: Liquid Limit, percent
PI: Plasticity Index, percent
SA: Sieve analysis (percent passing No. 200 Sieve)
UC: Unconfined compressive strength test, Qu, in ksf
WA: Wash sieve (percent passing No. 200 Sieve)

MATERIAL GRAPHIC SYMBOLS

Silty SAND (SM)

TYPICAL SAMPLER GRAPHIC SYMBOLS

Auger sampler
Bulk Sample
3-inch-OD California w/ brass rings
CME Sampler
Grab Sample
2.5-inch-OD Modified California w/ brass liners
Pitcher Sample
2-inch-OD unlined split spoon (SPT)
Shelby Tube (Thin-walled, fixed head)

OTHER GRAPHIC SYMBOLS

Water level (at time of drilling, ATD)
Water level (after waiting)
Minor change in material properties within a stratum
Inferred/gradational contact between strata
Queried contact between strata

GENERAL NOTES

1: Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive, and actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
2: Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

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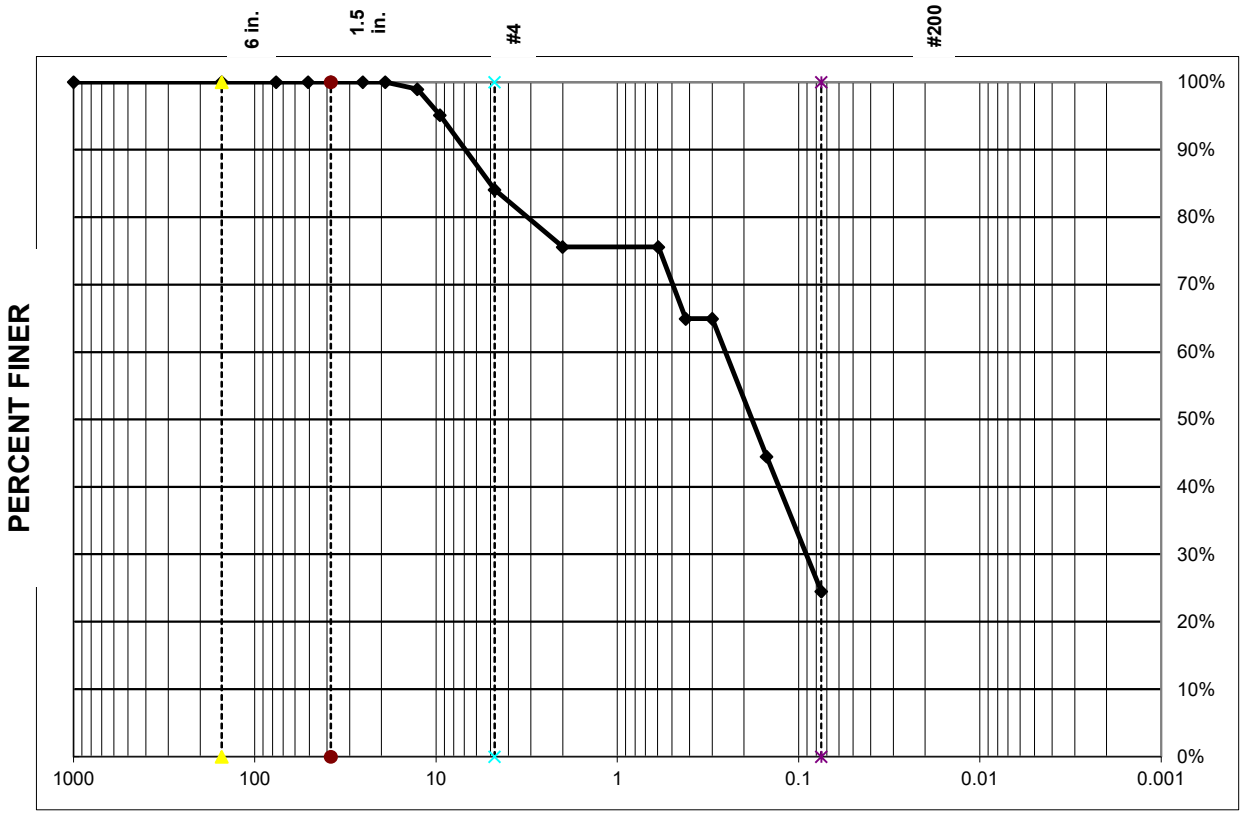
Figure B-1

GRAIN SIZE DISTRIBUTION GRAPH



TEST SUMMARY (ASTM C136)

Sieve Size	1 1/2"	3/4"	3/8"	#4	#10	#40	#100	#200
% Passing (Cumulative)	100%	100%	95%	84%	76%	65%	44%	24.5%
Specification								

% GRAVEL =	16%	**D_{85} =** 5.0	**D_{15} =**
% SAND =	60%	**D_{60} =** 0.3	**D_{10} =**
% SILT & CLAY =	25%	**D_{50} =** 0.2	**C_U =**
		D_{30} = 0.1	**C_C =**

Sample Date: 6/16/22
Project No.: 4222084
Project Name: Parkway Recycling Facility
Report Date: 7/10/22
Sample Location: B-2 at 5'
Liquid Limit: **Plasticity Index:** NP
USCS Classification: SM
Material Description: Silty Sand with Gravel
Moisture Content: 5.5%

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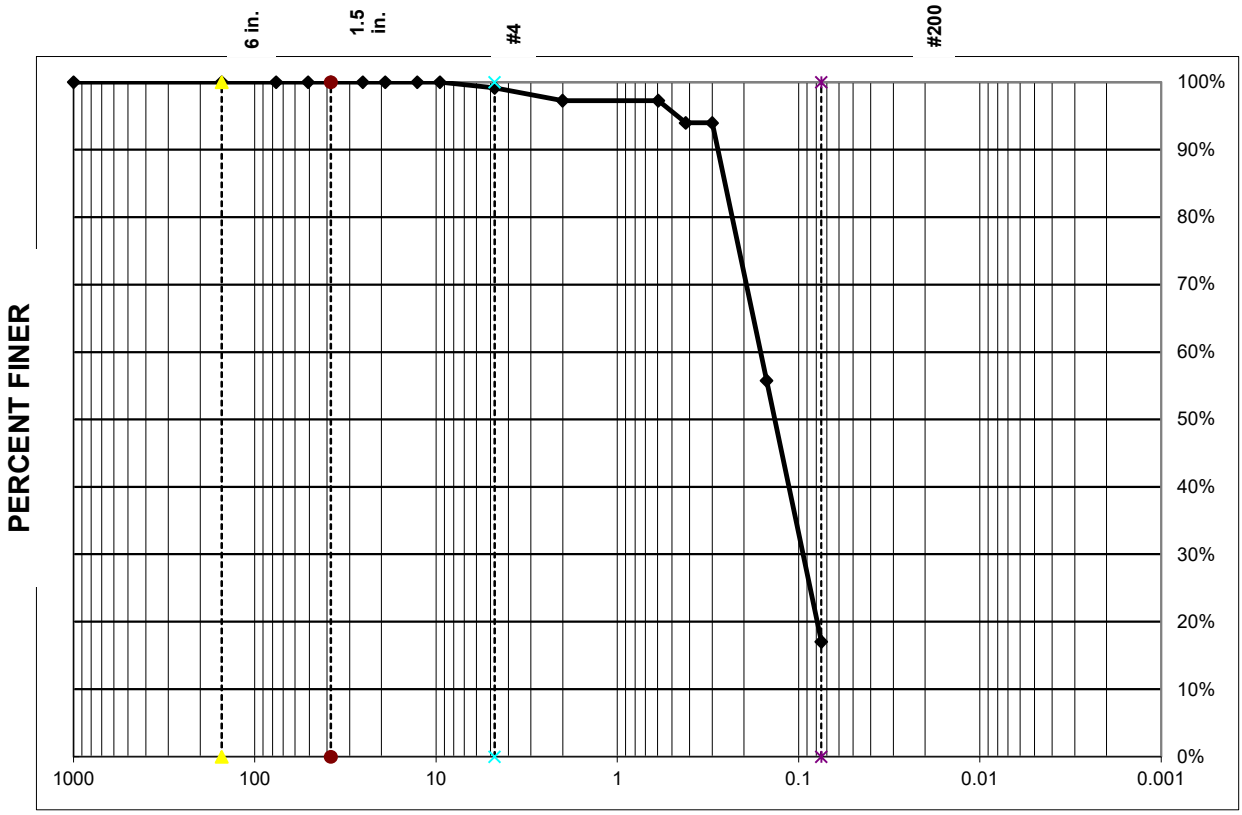
Las Cruces, NM 88013
(575) 642-7671

GRAIN SIZE DISTRIBUTION GRAPH



TEST SUMMARY (ASTM C136)

Sieve Size	1 1/2"	3/4"	3/8"	#4	#10	#40	#100	#200
% Passing (Cumulative)	100%	100%	100%	99%	97%	94%	56%	17.1%
Specification								

% GRAVEL =	1%	**D_{85} =** 0.3	**D_{15} =**
% SAND =	82%	**D_{60} =** 0.2	**D_{10} =**
% SILT & CLAY =	17%	**D_{50} =** 0.1	**C_U =**
		D_{30} = 0.1	**C_C =**

Sample Date: 6/16/22
Project No.: 4222084
Project Name: Parkway Recycling Facility
Report Date: 7/10/22
Sample Location: B-3 at 5'
Liquid Limit: **Plasticity Index:** NP
USCS Classification: SM
Material Description: Silty Sand
Moisture Content: 4.9%

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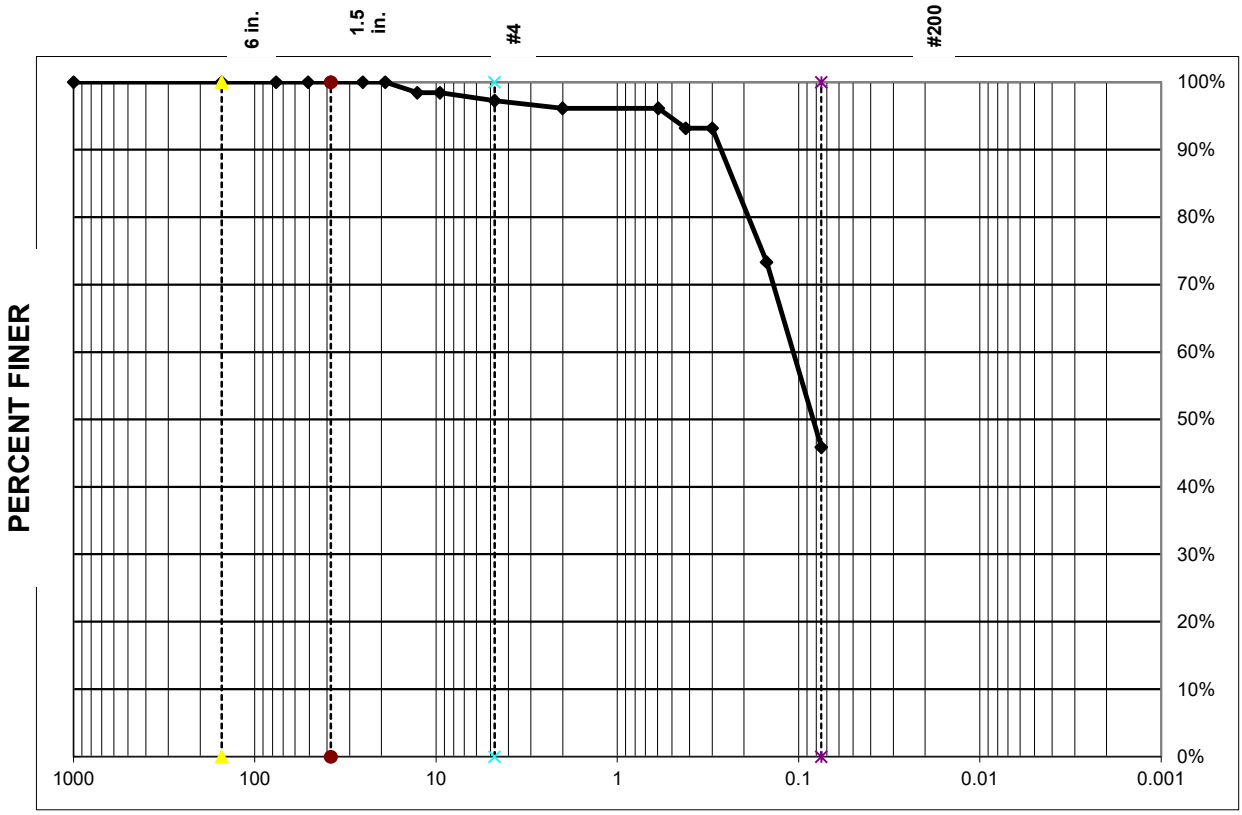
Las Cruces, NM 88013
(575) 642-7671

GRAIN SIZE DISTRIBUTION GRAPH



TEST SUMMARY (ASTM C136)

Sieve Size	1 1/2"	3/4"	3/8"	#4	#10	#40	#100	#200
% Passing (Cumulative)	100%	100%	98%	97%	96%	93%	73%	45.9%
Specification								

% GRAVEL =	3%		**D_{85} =** 0.2	**D_{15} =**	
% SAND =	51%		**D_{60} =** 0.1	**D_{10} =**	
% SILT & CLAY =	46%		**D_{50} =** 0.1	**C_U =**	
			D_{30} =	**C_C =**	

Sample Date: 6/16/22
Project No.: 4222084
Project Name: Parkway Recycling Facility
Report Date: 7/10/22
Sample Location: B-4 at 5'
Liquid Limit: **Plasticity Index:** NP
USCS Classification: SM
Material Description: Silty Sand
Moisture Content: 0.9%

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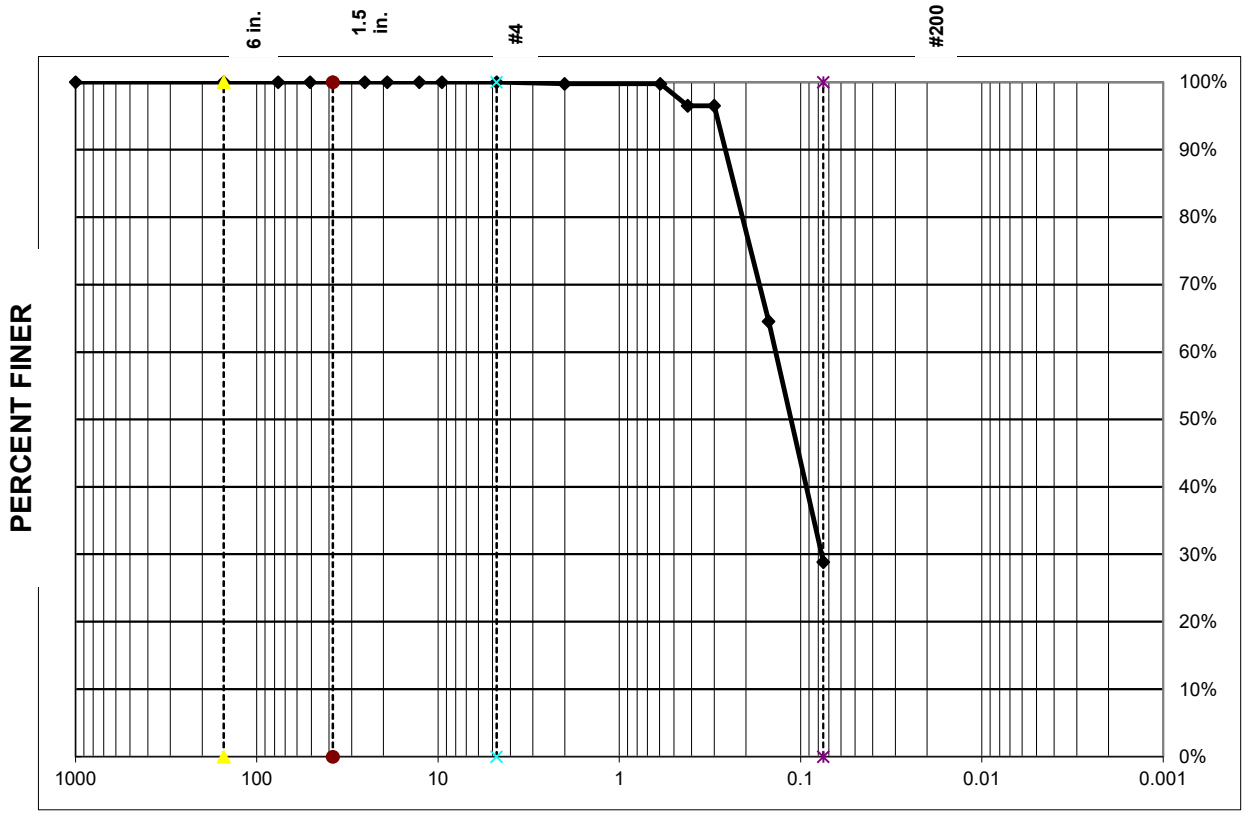
Las Cruces, NM 88013
(575) 642-7671

GRAIN SIZE DISTRIBUTION GRAPH



TEST SUMMARY (ASTM C136)

Sieve Size	1 1/2"	3/4"	3/8"	#4	#10	#40	#100	#200
% Passing (Cumulative)	100%	100%	100%	100%	100%	96%	65%	28.9%
Specification								

% GRAVEL =	0%	**D_{85} =** 0.2	**D_{15} =**
% SAND =	71%	**D_{60} =** 0.1	**D_{10} =**
% SILT & CLAY =	29%	**D_{50} =** 0.1	**C_U =**
		D_{30} = 0.1	**C_C =**

Sample Date: 6/16/22
Project No.: 4222084
Project Name: Parkway Recycling Facility
Report Date: 7/10/22
Sample Location: B-5 at 5'
Liquid Limit: **Plasticity Index:** NP
USCS Classification: SM
Material Description: Silty Sand
Moisture Content: 3.6%

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Laboratory Compaction Characteristics of Soil

COZ Engineering, LLC
P. O. Box 13331
Las Cruces, NM 88013
575-642-7671

Client Name: Envirotech
Project Name: Parkway Recycling Facility
Location: Lat.: 32.617622, Long.: -104.138994
Eddy County, New Mexico

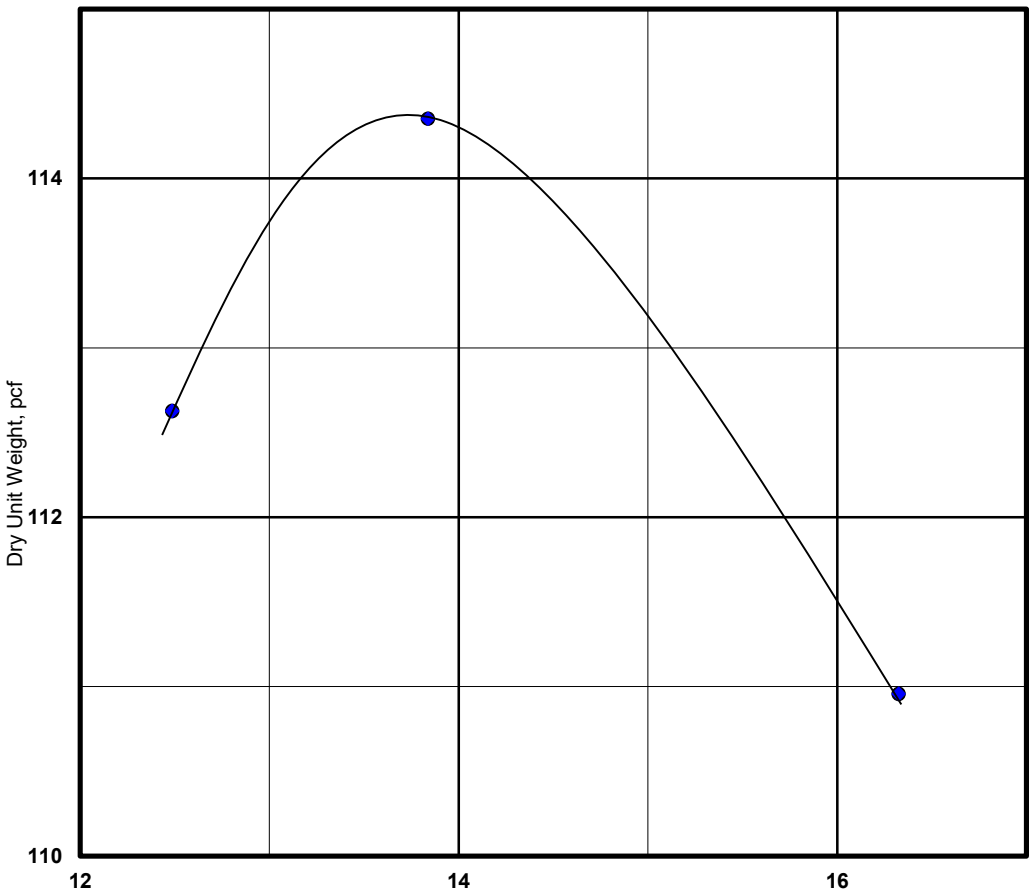
Source Material: B-2 at 0-10'
Sample Description: Silty Sand with Gravel
Proctor #1
Material Designation: SM Sample date: 6/16/2022
Test Method: ASTM-698
Test Procedure: A
Sample Preparation: D. Parrack
Rammer: ___ Mechanical X Manual

Project No.: 4222084 Date: 7/10/2022

TEST RESULTS
Maximum Dry Unit Wt.: 114.4 pcf
Optimum Water Content: 13.7 %

Liquid Limit: ___ Plastic Limit: ___
Plasticity Index: NP
% passing # 200 sieve: 25

Reviewed by: Dan Cosper, P. E.



Laboratory Compaction Characteristics of Soil

COZ Engineering, LLC
P. O. Box 13331
Las Cruces, NM 88013
575-642-7671

Client Name: Envirotech
Project Name: Parkway Recycling Facility
Location: Lat.: 32.617622, Long.: -104.138994
Eddy County, New Mexico

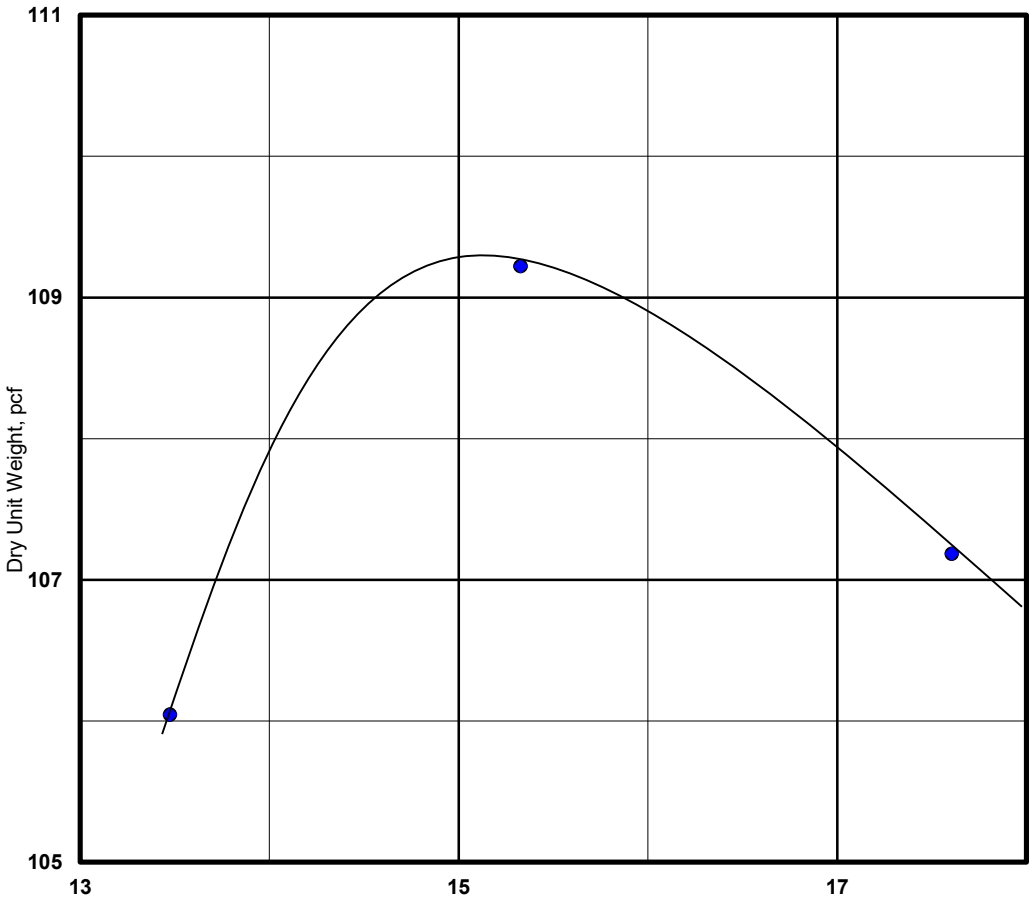
Source Material: B-5 at 0-10'
Sample Description: Silty Sand
Proctor #2
Material Designation: SM Sample date: 6/16/2022
Test Method: ASTM-698
Test Procedure: A
Sample Preparation: D. Parrack
Rammer: ___ Mechanical X Manual

Project No.: 4222084 Date: 7/10/2022

TEST RESULTS
Maximum Dry Unit Wt.: 109.2 pcf
Optimum Water Content: 15.2 %

Liquid Limit: ___ Plastic Limit: ___
Plasticity Index: NP
% passing # 200 sieve: 29

Reviewed by: Dan Cosper, P. E.



APPENDIX D
ENGINEERING DRAWINGS

PARKWAY RECYCLE
WATERBRIDGE STATELINE, LLC

Section 36, Township 19 South, Range 28 East

32° 37' 6.89", -104° 8' 10.96"
32.618580°, -104.136378°

Index to Drawings
11X17

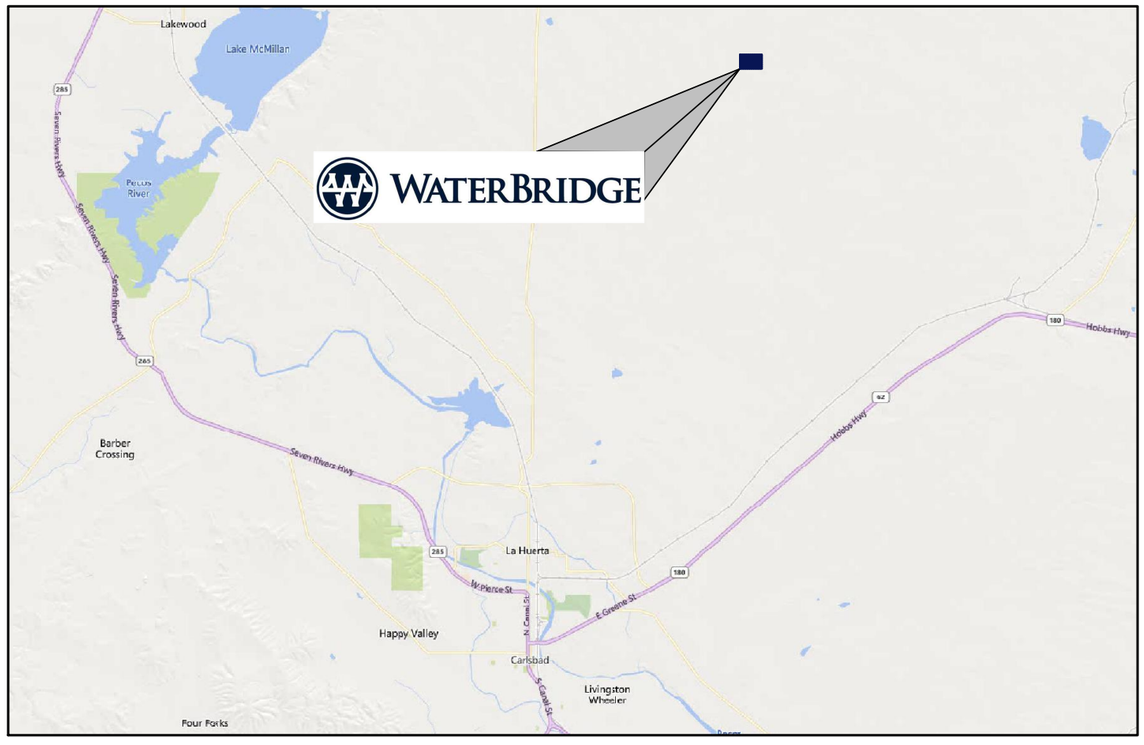
Contacts

Jake Ferenz - WaterBridge Stateline, LLC - (214) 733-9919

Envirotech Engineering Consulting - Mitchell Ratke, EIT (580)-234-8780 (Design Engineer)

Envirotech Engineering Consulting - Tyler Williams, PE (580)-234-8780 (Supervising Engineer)

nm811 Professional Resources for Damage Prevention



TYLER JOE WILLIAMS
NEW MEXICO
23432
PROFESSIONAL ENGINEER

07/20/2022

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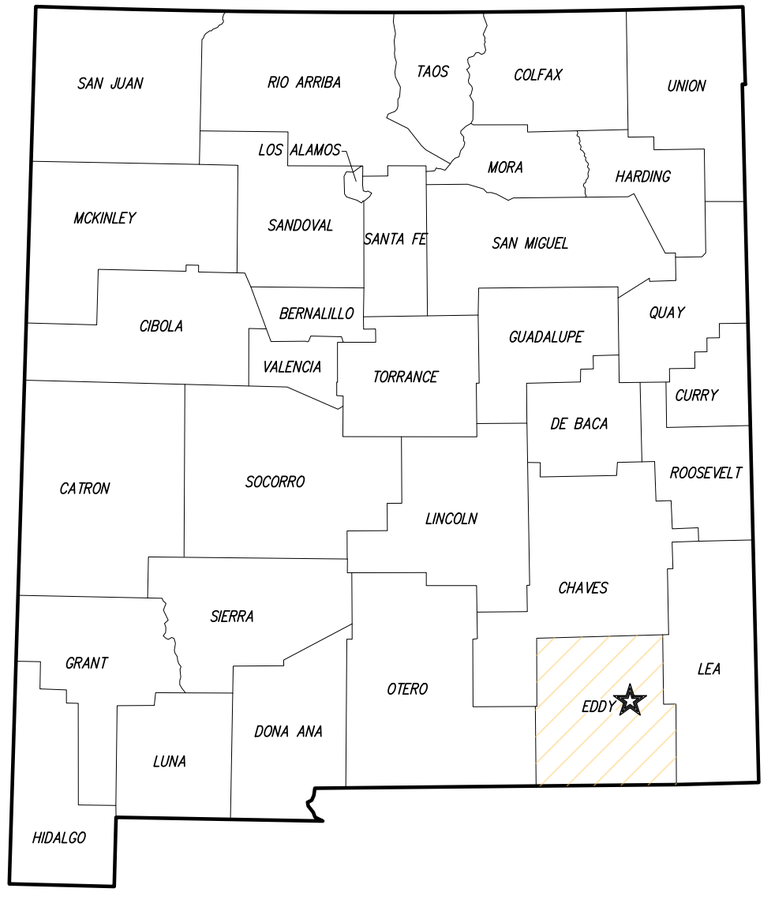

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NO.	DATE	DESCRIPTION

WATERBRIDGE

TYLER JOE WILLIAMS
NEW MEXICO
26432
PROFESSIONAL ENGINEER

07/20/2022

PROJECT LOCATION

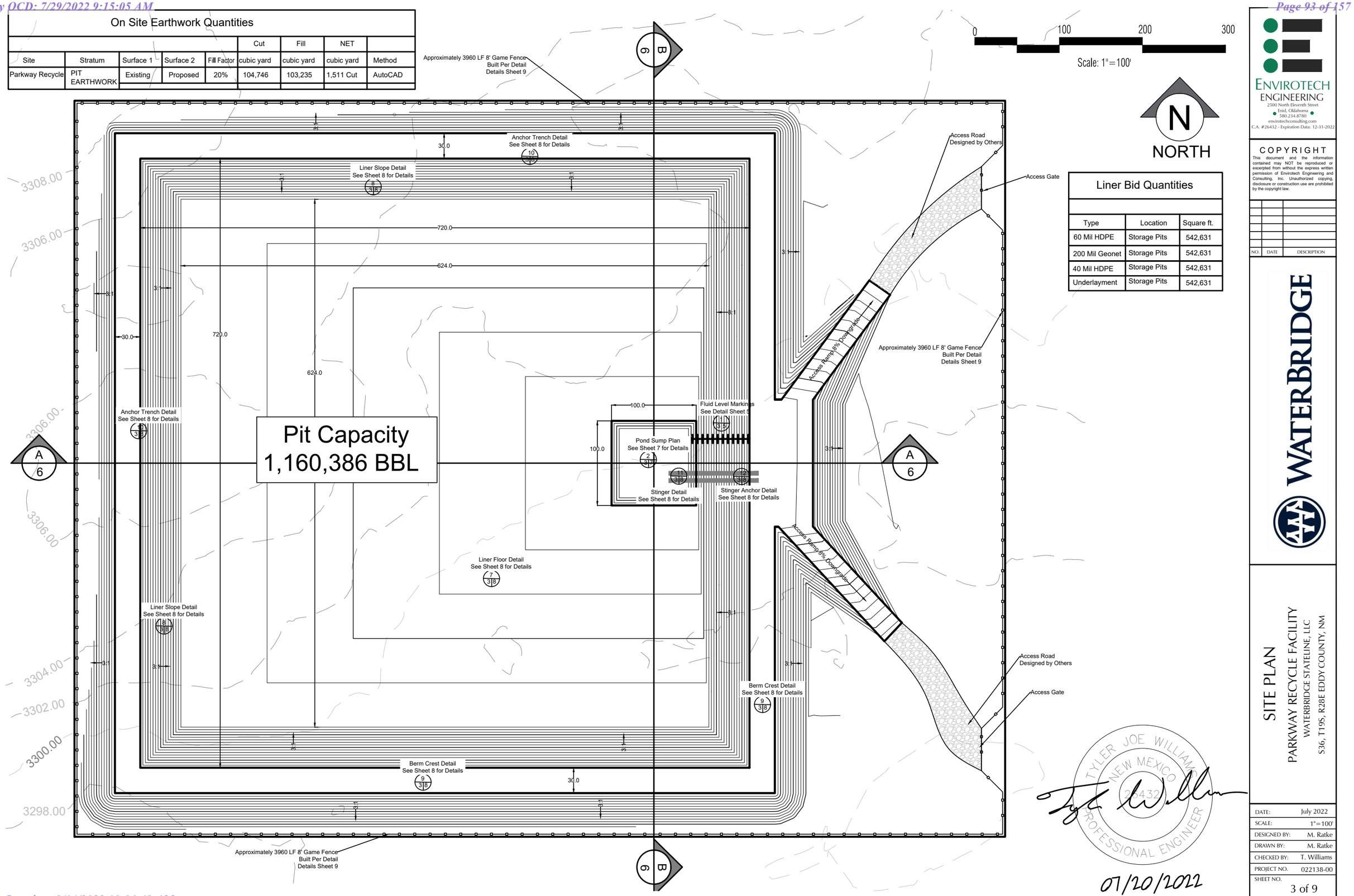
PARKWAY RECYCLE FACILITY

WATERBRIDGE STATELINE, LLC
S.36, T.19S, R.28E EDDY COUNTY, NM

DATE:	July 2022
SCALE:	NTS
DESIGNED BY:	M. Ratke
DRAWN BY:	M. Ratke
CHECKED BY:	T. Williams
PROJECT NO.	022138-00
SHEET NO.	2 of 9

On Site Earthwork Quantities

					Cut	Fill	NET	
Site	Stratum	Surface 1	Surface 2	Fill Factor	cubic yard	cubic yard	cubic yard	Method
Parkway Recycle	PIT EARTHWORK	Existing	Proposed	20%	104,746	103,235	1,511 Cut	AutoCAD



Liner Bid Quantities

Type	Location	Square ft.
60 Mil HDPE	Storage Pits	542,631
200 Mil Geonet	Storage Pits	542,631
40 Mil HDPE	Storage Pits	542,631
Underlayment	Storage Pits	542,631

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NO.	DATE	DESCRIPTION

WATERBRIDGE

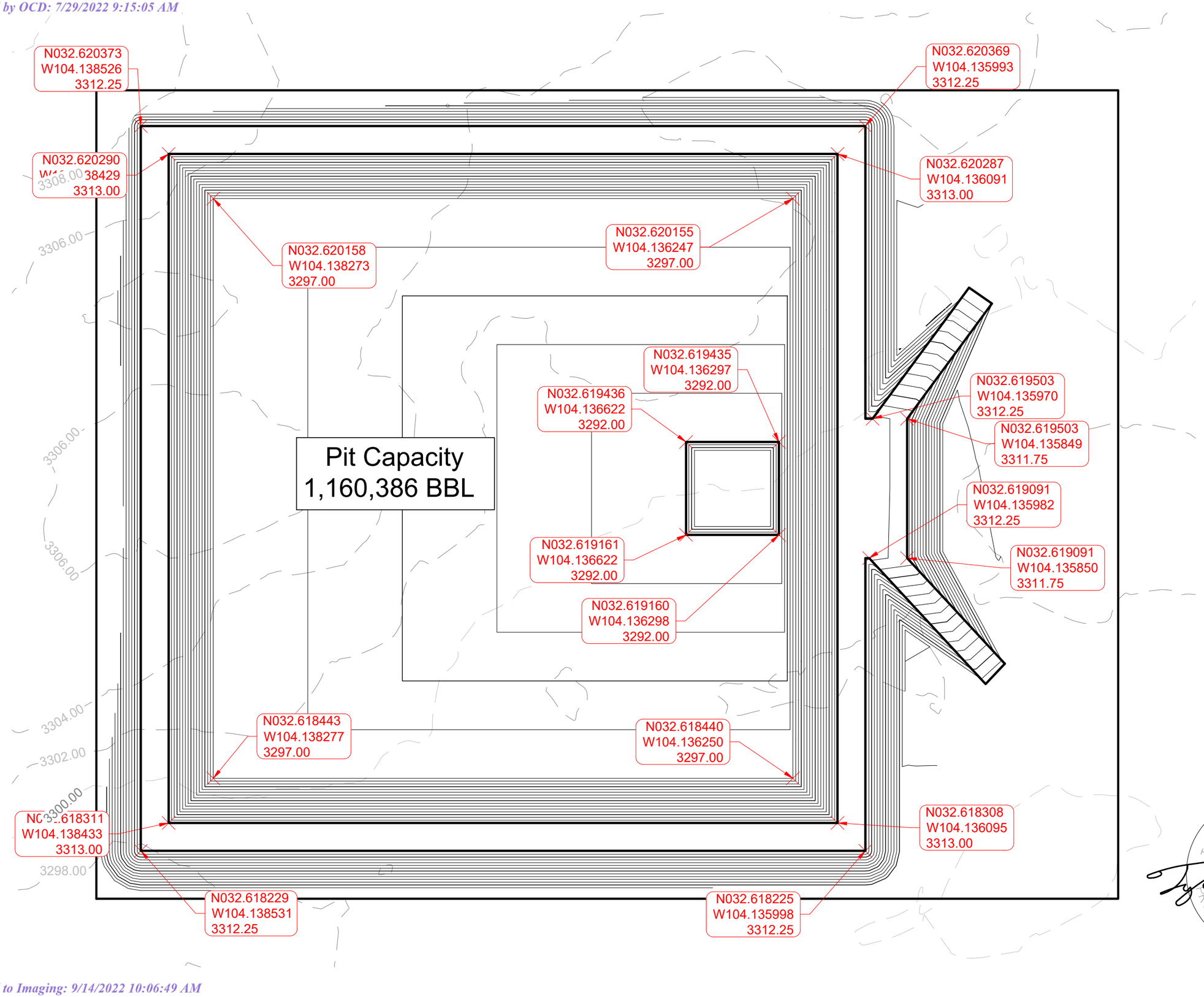
SITE PLAN

PARKWAY RECYCLE FACILITY

WATERBRIDGE STATELINE, LLC
S36, T19S, R28E EDDY COUNTY, NM

07/20/2022

DATE:	July 2022
SCALE:	1"=100'
DESIGNED BY:	M. Ratke
DRAWN BY:	M. Ratke
CHECKED BY:	T. Williams
PROJECT NO.	022138-00
SHEET NO.	3 of 9



N
NORTH

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NO.	DATE	DESCRIPTION

WATERBRIDGE

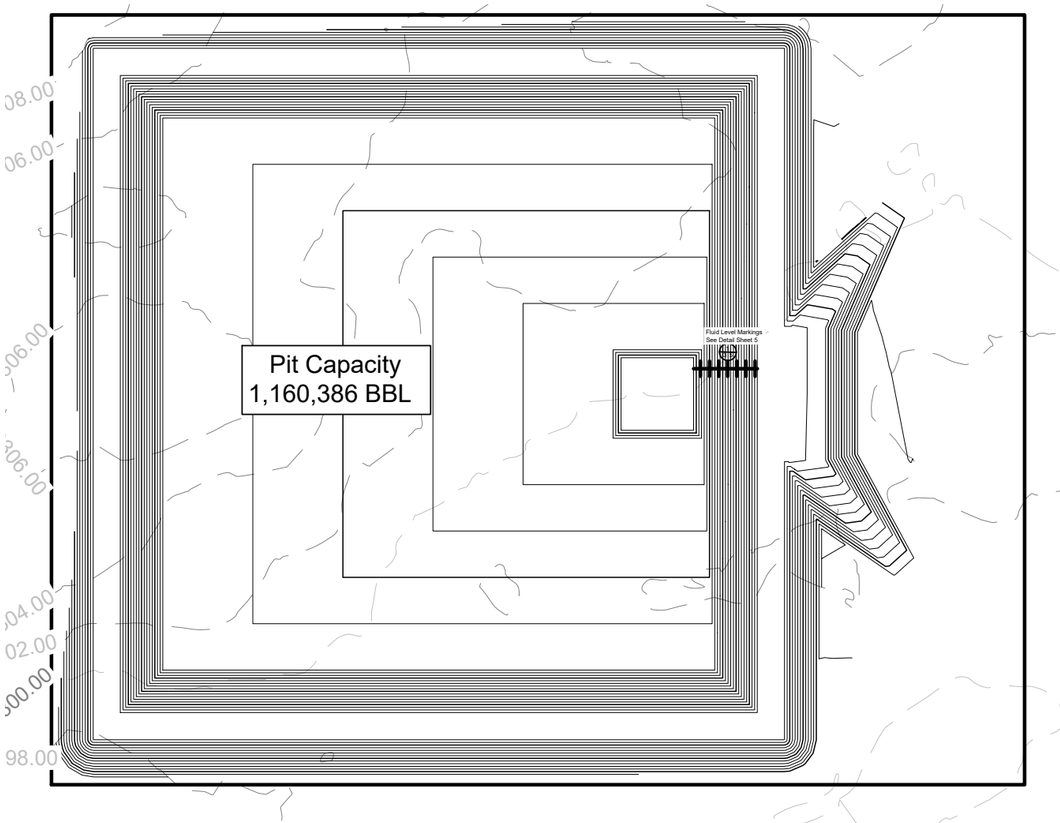
STAKING PLAN

PARKWAY RECYCLE FACILITY
WATERBRIDGE STATELINE, LLC
S.36, T.19S, R.28E EDDY COUNTY, NM

TYLER JOE WILLIAMS
NEW MEXICO
26432
PROFESSIONAL ENGINEER

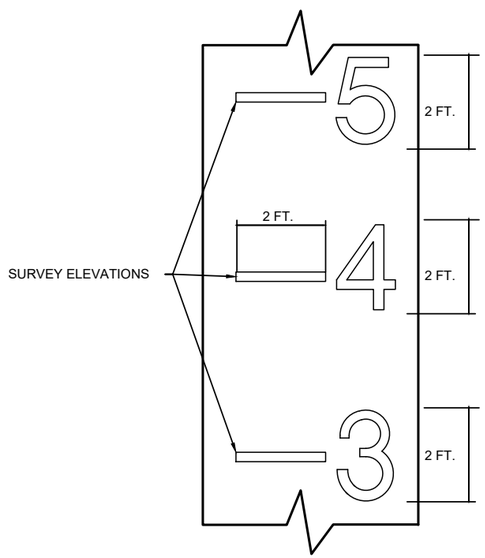
07/20/2022

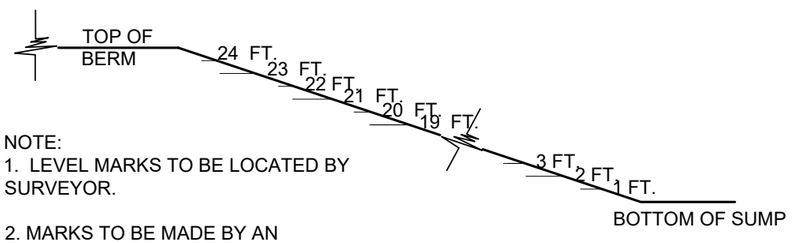
DATE:	July 2022
SCALE:	NTS
DESIGNED BY:	M. Ratke
DRAWN BY:	M. Ratke
CHECKED BY:	T. Williams
PROJECT NO.	022138-00
SHEET NO.	4 of 9



Owner	WaterBridge Operating		
Site Name	Parkway Recycle Facility		
Lagoon Features	Top FB	Bottom	Max Liq. Level
Side slope Ratio	3		3
Maximum Depth (ft)	24.0		21.0
Lagoon Top Width (ft)	720	624	702
Lagoon Top Length (ft)	720	624	702
Maximum Total Vol (ft^3)	8,032,182		6,515,538
Maximum Total Vol (bbls)	1,430,493		1,160,386

Lagoon Liq Depth ft	Elevation ft	Surface Area ac	Remaining Stor Vol ft3	Gallons Storage gal	BBLS Storage bbls	Percent of Total Volume %	Vol in lagoon ft^3	Gallons Storage gal	Vol in Lagoon bbls	Vol in Lagoon ac-ft	Percent Total Vol %
24.0	3313.00	11.90	-	-	-	0.0%	8,032,182	60,080,721	1,430,493	184.39	100%
23.0	3312.00	11.70	514,092	3,845,408	91,557	6.4%	7,518,090	56,235,313	1,338,936	172.59	94%
22.0	3311.00	11.51	1,019,616	7,626,728	181,589	12.7%	7,012,566	52,453,994	1,248,905	160.99	87%
21.0	**3310.00**	**11.31**	**1,516,644**	**11,344,497**	**270,107**	**18.9%**	**6,515,538**	**48,736,224**	**1,160,386**	**149.58**	**81%**
20.0	3309.00	11.12	2,005,248	14,999,255	357,125	25.0%	6,026,934	45,081,466	1,073,368	138.36	75%
19.0	3308.00	10.93	2,485,500	18,591,540	442,656	30.9%	5,546,682	41,489,181	987,838	127.33	69%
18.0	3307.00	10.74	2,957,472	22,121,891	526,712	36.8%	5,074,710	37,958,831	903,782	116.50	63%
17.0	3306.00	10.55	3,421,236	25,590,845	609,306	42.6%	4,610,946	34,489,876	821,188	105.85	57%
16.0	3305.00	10.37	3,876,864	28,998,943	690,451	48.3%	4,155,318	31,081,779	740,042	95.39	52%
15.0	3304.00	10.18	4,324,428	32,346,721	770,160	53.8%	3,707,754	27,734,000	660,333	85.12	46%
14.0	3303.00	10.00	4,764,000	35,634,720	848,446	59.3%	3,268,182	24,446,001	582,048	75.03	41%
13.0	3302.00	9.82	5,195,652	38,863,477	925,321	64.7%	2,836,530	21,217,244	505,172	65.12	35%
12.0	3301.00	9.64	5,619,456	42,033,531	1,000,798	70.0%	2,412,726	18,047,190	429,695	55.39	30%
11.0	3300.00	9.46	6,035,484	45,145,420	1,074,891	75.1%	1,996,698	14,935,301	355,602	45.84	25%
10.0	3299.00	9.29	6,443,808	48,199,684	1,147,612	80.2%	1,588,374	11,881,038	282,882	36.46	20%
9.0	3298.00	9.11	6,844,500	51,196,860	1,218,973	85.2%	1,187,682	8,883,861	211,521	27.27	15%
8.0	3297.00	8.94	7,237,632	54,137,487	1,288,988	90.1%	794,550	5,943,234	141,506	18.24	10%
7.0	3296.00	6.17	7,565,274	56,588,250	1,347,339	94.2%	466,908	3,492,472	83,154	10.72	6%
6.0	3295.00	3.94	7,784,091	58,225,001	1,386,310	96.9%	248,091	1,855,721	44,184	5.70	3%
5.0	3294.00	2.20	7,916,050	59,212,054	1,409,811	98.6%	116,132	868,667	20,683	2.67	1%
4.0	3293.00	0.96	7,983,117	59,713,715	1,421,755	99.4%	49,065	367,006	8,738	1.13	1%
3.0	3292.00	0.23	8,007,258	59,894,290	1,426,055	99.7%	24,924	186,432	4,439	0.57	0%
2.0	3291.00	0.20	8,016,670	59,964,692	1,427,731	99.8%	15,512	116,030	2,763	0.36	0%
1.0	3290.00	0.18	8,024,954	60,026,656	1,429,206	99.9%	7,228	54,065	1,287	0.17	0%
0.0	3289.00	0.15	8,032,182	60,080,721	1,430,493	100.0%	-	-	-	-	0%





NOTE:
1. LEVEL MARKS TO BE LOCATED BY SURVEYOR.

2. MARKS TO BE MADE BY AN EXTRUSION WELDER USING BLACK FILAMENT (OR WHITE FILAMENT ON BLACK LINER).

3. MARKS SHOULD BEGIN AT THE TOP OF BERM AND CONTINUE TO THE BOTTOM OF THE SUMP.

4. *ELEVATIONS SHOWN ABOVE ARE NOT ACCURATE. ELEVATIONS VARY BETWEEN PONDS

5. REFERENCE PIT CAPACITY TABLES FOR ACCURATE ELEVATIONS

WATER LEVEL MARKS
Not to Scale

1
3 5

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NO.	DATE	DESCRIPTION

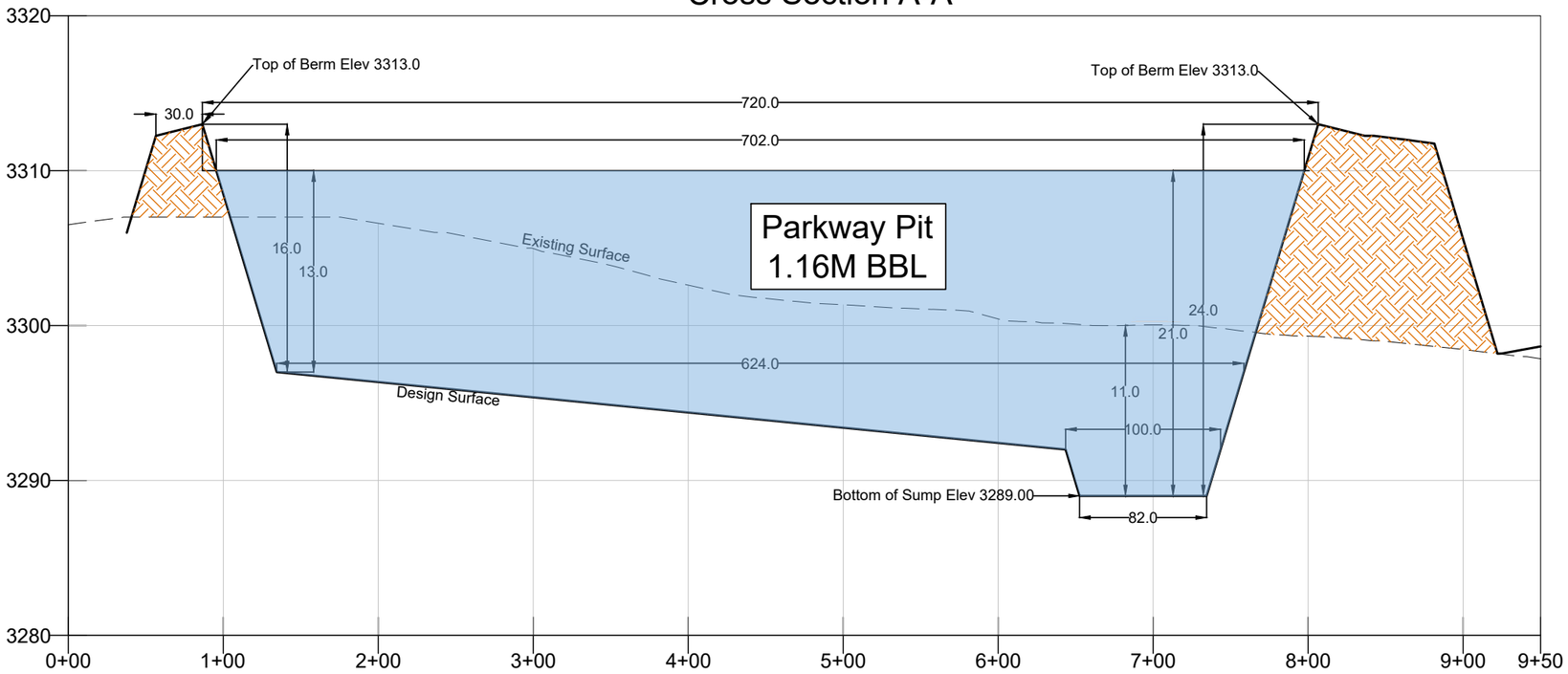
WATERBRIDGE

PIT CAPACITIES

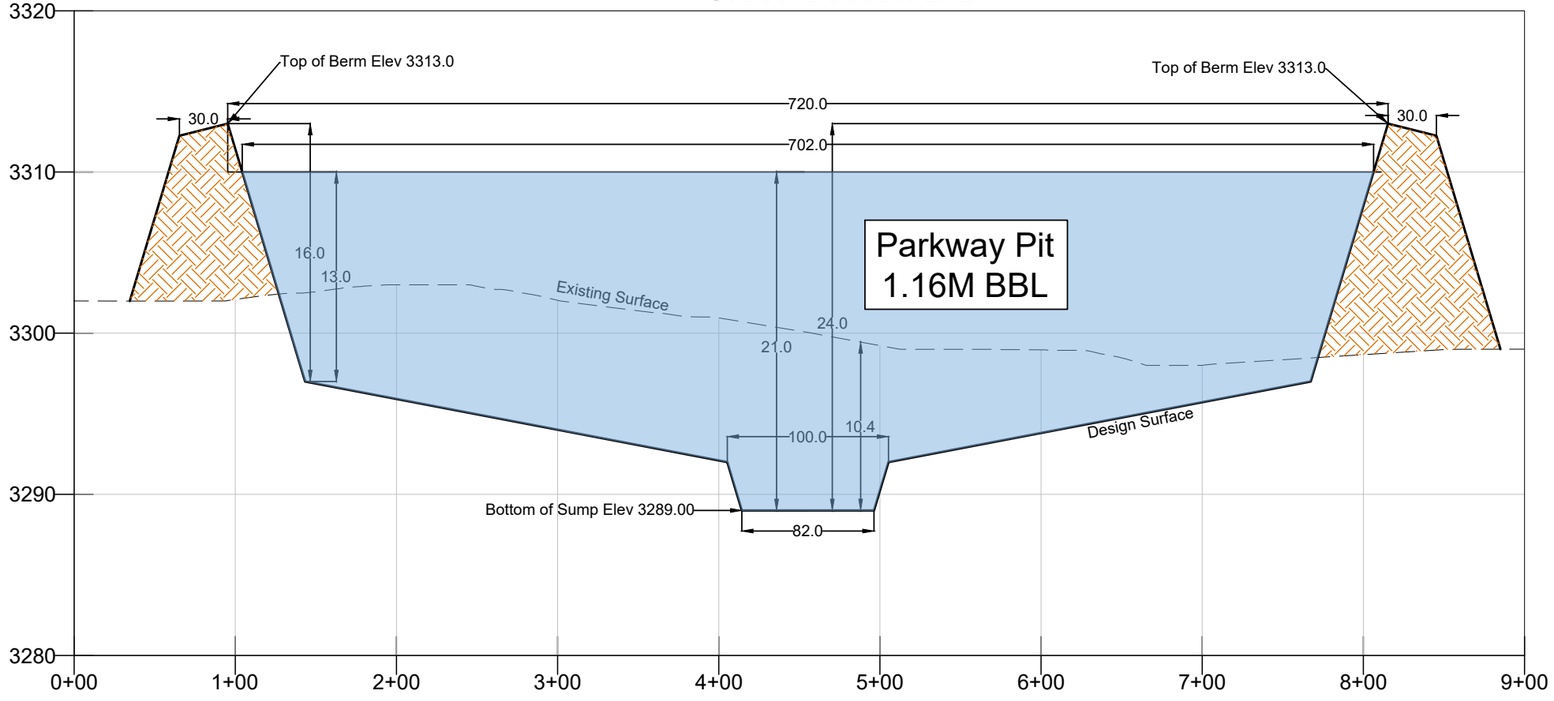
PARKWAY RECYCLE FACILITY
WATERBRIDGE STATELINE, LLC
S36, T19S, R28E EDDY COUNTY, NM

DATE:	July 2022
SCALE:	NTS
DESIGNED BY:	M. Ratke
DRAWN BY:	M. Ratke
CHECKED BY:	T. Williams
PROJECT NO.	022138-00
SHEET NO.	5 of 9

Cross Section A-A



Cross Section B-B



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NO.	DATE	DESCRIPTION

WATERBRIDGE

TYLER JOE WILLIAMS
NEW MEXICO
26432
PROFESSIONAL ENGINEER

07/20/2022

CROSS SECTIONS

PARKWAY RECYCLE FACILITY
WATERBRIDGE STATELINE, LLC
S36, T19S, R28E EDDY COUNTY, NM

DATE:	July 2022
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DESIGNED BY:	M. Ratke
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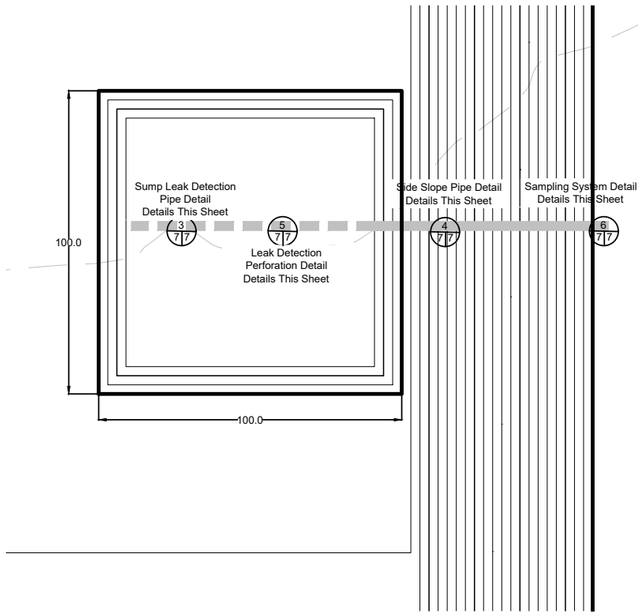
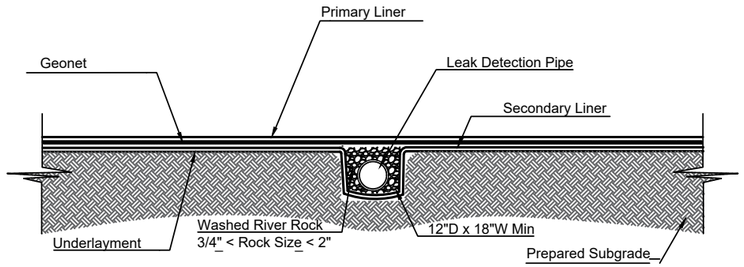
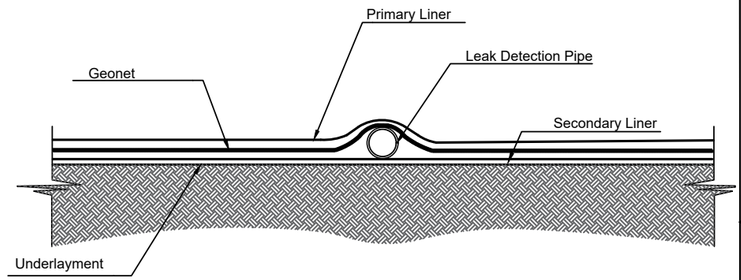
CHECKED BY:	T. Williams
PROJECT NO.	022138-00
SHEET NO.	6 of 9



POND SUMP PLAN DETAIL (2 / 3 7)
Not to Scale



SUMP LEAK DETECTION PIPE DETAIL (3 / 7 7)
Not to Scale



SIDE SLOPE LEAK DETECTION PIPE DETAIL (4 / 7 7)
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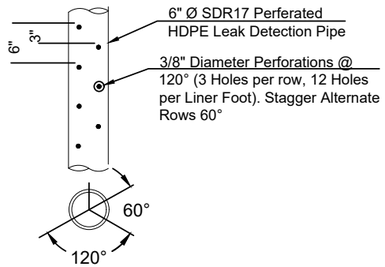

PERFORATED PIPE DETAIL (5 / 7 7)
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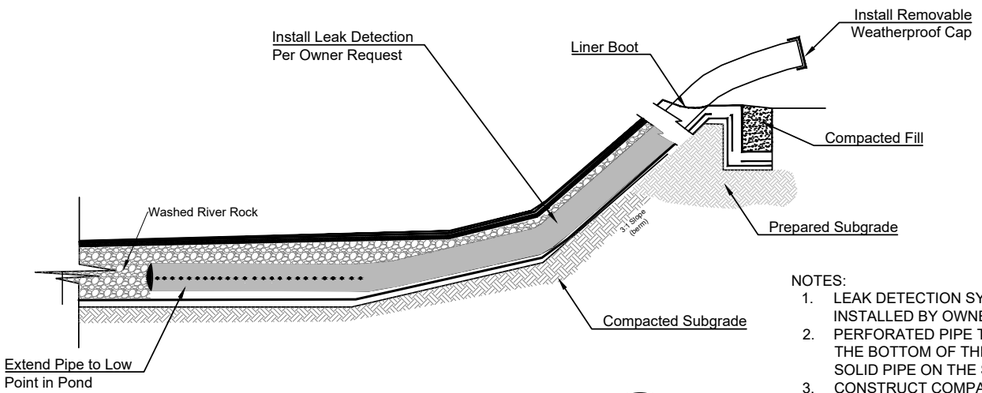
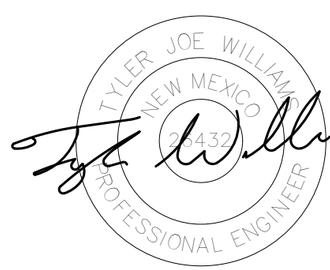


LEAK DETECTION/SAMPLING SYSTEM DETAIL (6 / 7 7)
Not to Scale

NOTES:
1. LEAK DETECTION SYSTEM TO BE INSTALLED BY OWNER.
2. PERFORATED PIPE TO BE ALONG THE BOTTOM OF THE POND. SOLID PIPE ON THE SIDE SLOPE.
3. CONSTRUCT COMPACTED SUBGRADE TO 95% STANDARD PROCTOR AS PER ASTM D-698.
4. EXTEND 60 MIL. RUB SHEET 1.0-FT PAST TOP OF SHOULDER OF SUMP.
5. WASH RIVER ROCK SHALL BE 3/4" MIN. & 2" MAX.

PROPOSED PIT REFERENCE TABLE

DETAIL	DESCRIPTION
PRIMARY LINER	60 mil HDPE LINER
LEAK DETECTION	200 mil Geonet
SECONDARY LINER	40 mil HDPE LINER
UNDERLAYMENT	Compacted Subgrade/10 oz Geotextile
SUMP	3289.0 ft ELEVATION
BERM (ROAD CREST)	DESIGN ELEV. 3313.0-ft - ROAD CREST 30-ft
LEAK DETECTION PIPING	8-in DR11.X PERFORATED HDPE PIPE LEAK DETECTION PIPE



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Enid, Oklahoma
580.234.8780
envirotechconsulting.com
C.A. #26432 - Expiration Data: 12-31-2022

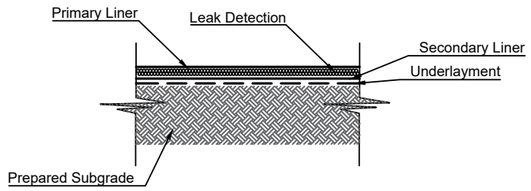
NO.	DATE	DESCRIPTION

WATERBRIDGE

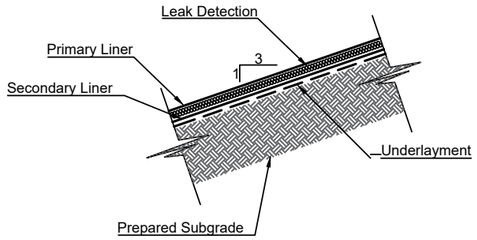
Pit Sump Details

PARKWAY RECYCLE FACILITY
WATERBRIDGE STATELINE, LLC
S36, T19S, R28E EDDY COUNTY, NM

DATE:	July 2022
SCALE:	NTS
DESIGNED BY:	M. Ratke
DRAWN BY:	M. Ratke
CHECKED BY:	T. Williams
PROJECT NO.	022138-00
SHEET NO.	7 of 9



LINER SYSTEM FLOOR DETAIL (7 / 3 8)
Not to Scale



LINER SYSTEM SIDE SLOPE DETAIL (8 / 3 8)
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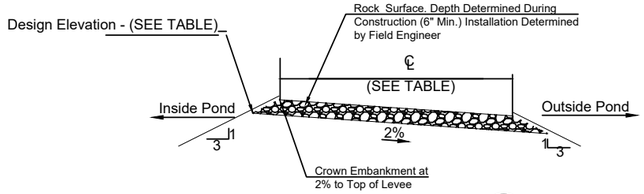

TYPICAL CREST DETAIL (9 / 3 8)
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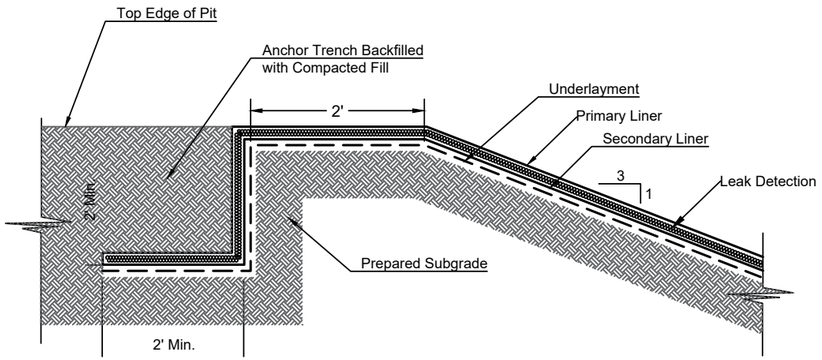

ANCHOR TRENCH DETAIL (10 / 3 8)
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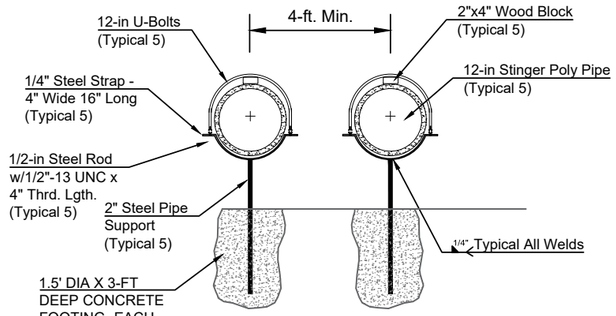


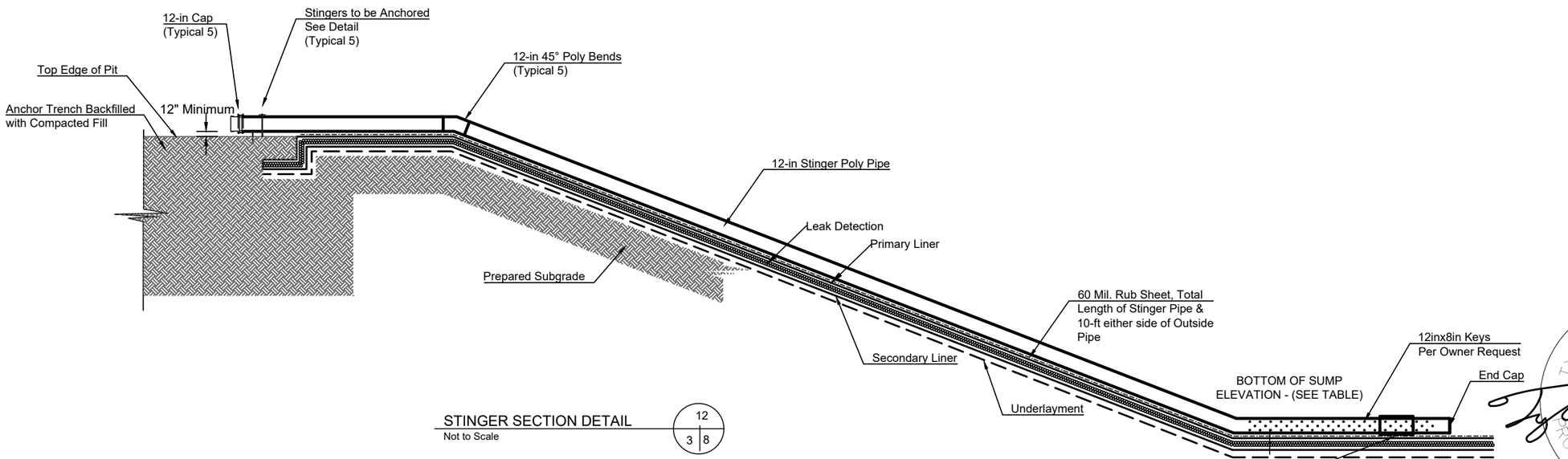
Stinger System Anchor Detail (11 / 3 8)
Not to Scale

GENERAL NOTES:

1. PREPARED SUBGRADE MEANS COMPACTED SMOOTH SUBGRADE FREE OF ROCK, ROOTS, WOOD DEBRIS, CONCRETE RUBBLE AND ANY SHARP OBJECTS THAT MIGHT PUNCTURE THE HDPE LINER.
2. ALL INTERIOR SLOPES AND TOP OF BERMS TO BE SMOOTH DRUM ROLLED.
3. ALL EMBANKMENT SLOPES SHALL HAVE A RATIO OF 3:1, COMPACTED EARTH EMBANKMENTS TO BE CONSTRUCTED WITH 12 INCH (MAXIMUM LOOSE LIFTS, COMPACTED TO 95% STANDARD PROCTOR DENSITY.
4. PERFORM GEOTECHNICAL ANALYSIS ON EXISTING SOIL TO CONFIRM SOIL IS SUITABLE FOR USE IN THE LEVEE.
5. ALL BOTTOM OF PITS SHALL SLOPE TO THE SUMP @ 1%.

NOTE:

1. SEE REFRENCE TABLES SHEET 7 FOR LINER SPECIFICATIONS



STINGER SECTION DETAIL (12 / 3 8)
Not to Scale

07/20/2022

TYLER JOE WILLIAMS NEW MEXICO 26432 PROFESSIONAL ENGINEER

ENVIROTECH ENGINEERING
2500 North Eleventh Street
Enid, Oklahoma
580.234.8780
envirotechconsulting.com
C.A. #26432 - Expiration Data: 12-31-2022

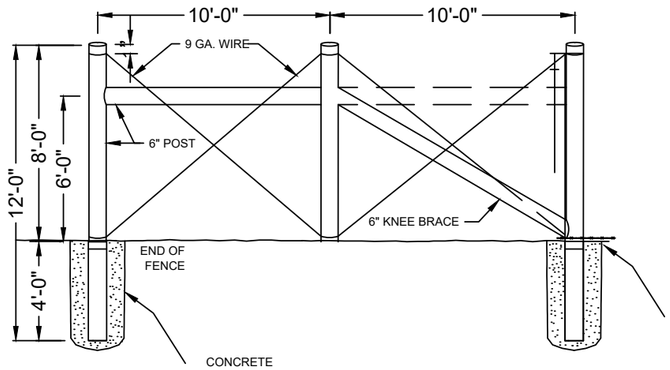
NO.	DATE	DESCRIPTION

WATERBRIDGE

Liner Details
PARKWAY RECYCLE FACILITY
WATERBRIDGE STATELINE, LLC
S36, T19S, R28E EDDY COUNTY, NM

DATE:	July 2022
SCALE:	NTS
DESIGNED BY:	M. Ratke
DRAWN BY:	M. Ratke
CHECKED BY:	T. Williams
PROJECT NO.	022138-00
SHEET NO.	8 of 9

END POST



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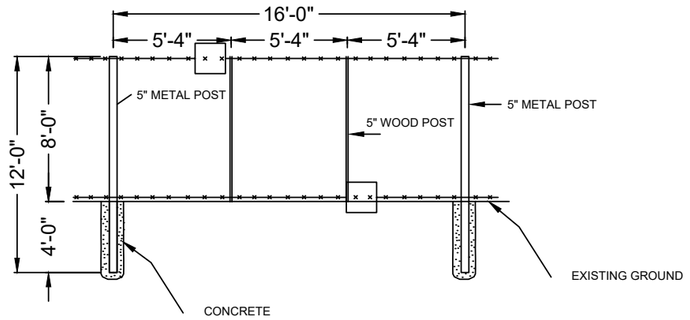

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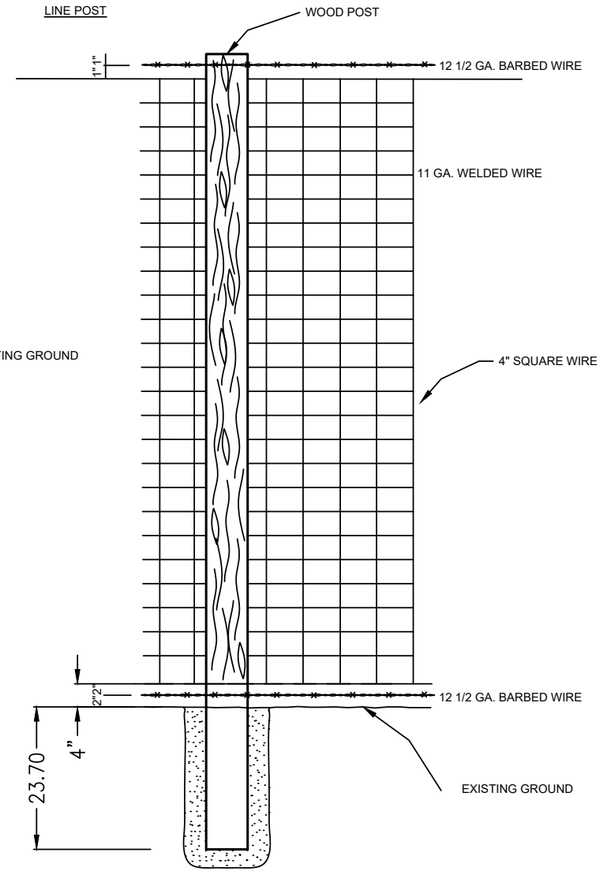

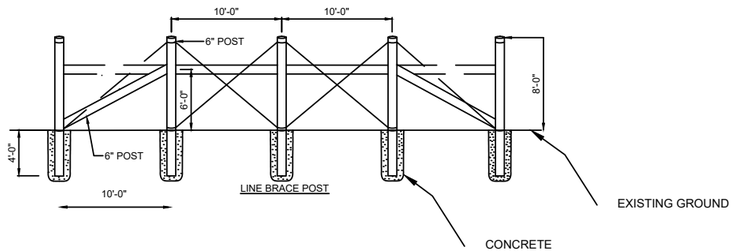

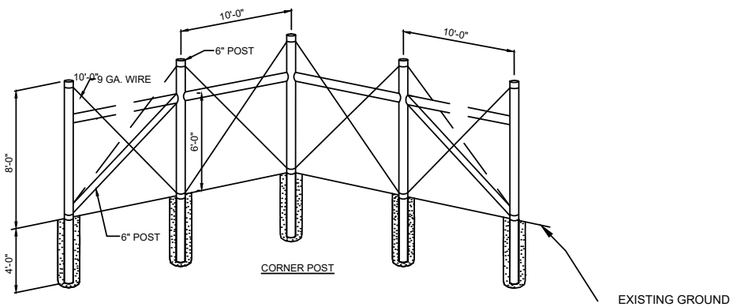

ENVIROTECH
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WATERBRIDGE

Fence Details

PARKWAY RECYCLE FACILITY
WATERBRIDGE STATELINE, LLC
S36, T19S, R28E EDDY COUNTY, NM

TYLER JOE WILLIAMS
NEW MEXICO
26432
PROFESSIONAL ENGINEER

07/20/2022

DATE:	July 2022
SCALE:	NTS
DESIGNED BY:	M. Ratke
DRAWN BY:	M. Ratke
CHECKED BY:	T. Williams
PROJECT NO.	022138-00
SHEET NO.	9 of 9

APPENDIX E
DESIGN AND CONSTRUCTION PLAN

WaterBridge Operating (WaterBridge) is proposing to construct one (1) storage pit in Section 36, Township 19 South, Range 28 East, Eddy County, New Mexico. The Parkway Recycle shall consist of one basin with a total operational volume of approximately 1,160,000-bbl.

OPERATION AND MAINTENANCE PROCEDURES

Applicable mandates in Rule 34 are underlined. This plan addresses construction of lined earthen containments. *Appendix D* presents Engineering Design Plans. *Appendix F* provides liner and geotextile specifications.

Field conditions may create the need for minor modification of the containment design (e.g. changing the length, width, or depth.)

Dike Protection and Structural Integrity

Design elements are addressed in the section of this submission containing the foundation recommendations. The recommendations are based on site-specific data. The operator, engineer, and selected contractor will review the recommendations prior to beginning the earthwork and adhere to the specific recommendations.

The design and operation provide for the confinement of produced water to prevent releases and to prevent overtopping due to wave action or rainfall. Additionally, the design prevents run-on of surface water as the containment is surrounded by an above-grade levee (berm) and diversion ditch to prevent run-on of surface water.

Stockpile Topsoil

Where topsoil is present, prior to constructing containment, the operator will strip and stockpile the topsoil for use as the final cover or fill at the time of closure. The topsoil will be stockpiled adjacent to perimeter fence surrounding the containment or incorporated into the levee.

Signage

The design calls for an upright sign no less than 12-in by 24-in with lettering not less than two inches in height in a conspicuous place on the fence surrounding the containment. The sign is posted in a manner and location such that a person can easily read the legend. The sign will provide the following information:

1. The operator's name,
2. The location of the site by quarter-quarter or unit letter, section, township and range, and
3. Emergency telephone numbers.

Fencing

The design provides for a fence to enclose the Recycling Containment in a manner that deters unauthorized wildlife and human access. The design calls for a 8-ft tall wire mesh game fence around the containment to exclude wildlife (see detail on last page of engineering design). This fence provides greater wildlife (and human) deterrence than the minimum required barbed wire fence with four strands evenly spaced in the interval between one foot and four feet above ground level. The fence will be gated to provide access for maintenance and placement of pumps and other necessary equipment. As stated in the O&M plan, the operator will ensure that all gates associated with the fence are closed and locked when responsible personnel are not onsite.

Netting and Protection of Wildlife

The game fence on the containment levee will be effective in excluding antelope, deer, coyotes, and most other terrestrial wildlife.

The Recycling Containment is otherwise protective of wildlife, including migratory birds. The containment will contain treated produced water that has not shown to be a material threat to birds due to hydrogen sulfide gas or floating, free-phase hydrocarbons. The O&M plan calls for the operator to inspect for and, within 30 days of discovery, report the discovery of dead migratory birds or other wildlife to the appropriate wildlife agency ad to the division district office in order to facilitate assessment and implementation of measures to prevent incidents from reoccurring.

The containment will have a properly constructed foundation and interior slopes consisting of a firm, unyielding base, smooth and free of rocks, debris, sharp edges or irregularities to prevent the liner's rupture or tear. Geotextile may be placed under the liner when needed to reduce localized stress-strain or protuberances that otherwise may compromise the liner's integrity.

Appendix D shows:

1. The levee has an inside grade no steeper than three horizontal feet to one vertical foot (3H:1V).
2. The levee outside grade is no steeper than three horizontal feet to one vertical foot (3H:1V).
3. The top of the levee is wide enough to install an anchor trench and provide adequate room for inspection and maintenance.
4. The caliche gravel placed on the outside levee provides additional erosion control.

Field conditions may create the need for changes to the design. Any changes to the construction or grade requirements due to unforeseen conditions will be reviewed and approved prior to initiating installation of the liner system. Any design change that does not conform to the NMOCD Rule will be the subject of a variance request and will be submitted **to the OCD for review and approval.**

LINER AND DRAINAGE GEOTEXTILE INSTALLATION

The containment has a primary (upper) liner and a secondary (lower) liner with a leak detection system appropriate to the site's conditions.

The primary (upper) liner is a geomembrane liner composed of an impervious, synthetic material that is resistant to ultraviolet light, petroleum hydrocarbons, salts and acidic and alkaline solutions. It is 60-mil HDPE. The secondary liner is 40-mil LLDPE. Liner compatibility meets or exceeds a subsequent relevant publication to EPA SW-846 method 9090A.

The Recycling Containment design has a leak detection system between the upper and lower geomembrane liners of 200-mil geonet to facilitate drainage. The leak detection system consists of a properly designed drainage and collection and removal system placed above the lower geomembrane liner in depressions and sloped to facilitate the earliest possible leak detection. The containment floor design calls for a slope of approximately 0.5% toward the sump. This slope, combined with the highly transmissive geonet drainage layer, provides for the earliest possible leak detection.

The liners and drainage material will be installed consistent with the manufacture's specifications (See *Appendix F*). In addition to any specifications of the manufacturer, protocols for liner installation include measures to:

1. Minimize liner seams and orient them up and down, not across, a slope of the levee.
2. Use factory welded seams where possible.
3. Field seams in geosynthetic material are thermally seamed; prior to field seaming, overlap liner four to six inches.
4. Minimize the number of field seams and corners and irregularly shaped areas.
5. Provide for no horizontal seams within five feet of the slope's toe.
6. Use qualified personnel to perform field welding and testing.
7. Avoid excessive stress-strain on the liner.
8. The edges of all liners are anchored in the bottom of a compacted earth-filled trench that is at least 18-in deep.

At points of discharge into the lined earthen containment, the pipe configuration effectively protects the liner from excessive hydrostatic force or mechanical damage during filling. The design shows that at any point of discharge into or suction from the recycling containment, the liner is protected from excessive hydrostatic force or mechanical damage. External discharge or suction lines do not penetrate the liner.

Pumping from the containment to hydraulic fracturing operations is the responsibility of stimulation contractors. Typically, numerous lines are permanently placed in the containment with floats attached to prevent damage to the liner system. The containment may be equipped with permanent HDPE stinger (supported by a sacrificial liner or geotextile) for withdrawal of fluid during operations, if the owner deems necessary. External discharge or suction lines do not penetrate the liner.

LEAK DETECTION AND FLUID REMOVAL SYSTEM INSTALLATION

The leak detection system, contains the following design elements:

1. The 200-mil geonet drainage material between the primary and secondary liner is sufficiently permeable to allow the transport of fluids to the observation ports (*Appendix D*).
2. The containment floor, sloped towards the monitoring riser pipe, facilitates the earliest possible leak detection of the containment bottom. A pump may be placed in an observation port to provide for fluid removal.
3. Piping will withstand chemical attack from any seepage, structural loading from stresses and disturbances from overlying water, cover materials, equipment operation, and expansion or contraction (see *Appendix D*).
4. The slope of the interior subgrade is approximately 0.5%.

APPENDIX F
MATERIAL SPECIFICATIONS

WaterBridge Stateline, LLC (WaterBridge) is proposing to construct one (1) storage pit in Section 36, Township 19 South, Range 28 East, Eddy County, New Mexico. The Parkway Recycle shall consist of one basin with a total operational volume of approximately 1,160,000-bbl.

GEOMEMBRANE SPECIFICATION

This specification covers the technical requirements for the Manufacturing and Installation of the geomembrane. All materials meet or exceed the requirements of this specification, and all work will be performed in accordance with the procedures provided in these project specifications

1.1 REFERENCES

A. American Society for Testing and Materials (ASTM)
   1. D 1004 Test Method for Initial Tear Resistance of Plastic Film and Sheeting
   2. D 1238 Standard Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer
   3. D 1505 Test Method for Density of Plastics by the Density-Gradient Technique
   4. D 1603 Test Method for Carbon Black in Olefin Plastics
   5. D 3895 Standard Test Method for Oxidative-Induction Time of Polyolefins by Differential Scanning Calorimetry
   6. D 4218 Standard Test Method for Determination of Carbon Black in Polyethylene Compounds
   7. D 4833 Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
   8. D 5199 Standard Test Method for Measuring Nominal Thickness of Geotextiles and Geomembranes
   9. D 5397 Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test
   10. D 5596 Standard Test Method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics
   11. D 5994 Standard Test Method for Measuring Core Thickness of Textured Geomembranes
   12. D 6392 Standard Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods
   13. D 6693 Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes
   14. D 7240 Standard Practice for Leak Location using Geomembranes with an Insulating Layer in Intimate Contact with a Conductive Layer via Electrical Capacitance Technique (Conductive Geomembrane Spark Test)

B. Geosynthetic Research Institute
   1. GRI GM 13 Test Properties, Testing Frequency and Recommended Warranty for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes
   2. GRI GM 17 Test Properties, Testing Frequency and Recommended Warranty for Linear Low Density Polyethylene (LLDPE) Smooth and Textured Geomembranes

1.2 DEFINITIONS

A. Lot - A quantity of resin (usually the capacity of one rail car) used in the manufacture of geomembranes. Finished roll will be identified by a roll number traceable to the resin lot used.
B. Construction Quality Assurance Consultant (CONSULTANT) – The Party, independent from MANUFACTURER and INSTALLER, that is responsible for observing and documenting activities related to quality assurance during the lining system construction.
C. ENGINEER- The individual or firm responsible for the design and preparation of the project's Contract Drawings and Specifications.
D. Geomembrane Manufacturer (MANUFACTURER) - The party responsible for manufacturing the geomembrane rolls.
E. Geosynthetic Quality Assurance Laboratory (TESTING LABORATORY) – The Party, independent from the OWNER, MANUFACTURER, and INSTALLER, responsible for conducting laboratory tests on samples of geosynthetics obtained at the site or during manufacturing, usually under the direction of the OWNER.
F. INSTALLER- The Party responsible for field handling, transporting, storing, deploying, seaming, and testing of the geomembrane seams.
G. Panel- Unit area of geomembrane that will be seamed in the field that is larger than 100-ft^2.
H. Patch - Unit area of geomembrane that will be seamed in the field that is less than 100-ft^2.
I. Subgrade Surface - Soil layer surface which immediately underlies the geosynthetic material(s).

1.3 SUBMITTALS POST-AWARD

A. Furnish the following product data, in writing, to ENGINEER prior to installation of the geomembrane material:
    1. Resin Data shall include the following:
    a. Certification stating that the resin meets the specification requirements (see *Table 1.9B*).
    2. Geomembrane Roll
    a. Statement certifying no recycled polymer and no more than 10% rework of the same type of material is added to the resin (product run may be recycled).
B. The INSTALLER shall furnish the following information to the ENGINEER and OWNER prior to installation:
    1. Installation layout drawings
    2. Must show proposed panel layout including field seams and details
    3. Must be approved prior to installing the geomembrane
    4. Approved drawings will be for concept only; actual panel placement will be determined by site conditions.
    5. Installer's Geosynthetic Field Installation Quality Assurance Plan

C. The INSTALLER will submit the following to the ENGINEER upon completion of installation:
    1. Certificate stating the geomembrane has been installed in accordance with the Contract Documents
    2. Material and installation warranties
    3. As-built drawings showing actual geomembrane placement and seams including typical anchor trench detail

1.4 QUALITY ASSURANCE

A. The OWNER will engage and pay for the services of a Geosynthetic Quality Assurance Consultant and Laboratory to monitor geomembrane installation.

1.5 QUALIFICATIONS

A. MANUFACTURER
    1. Geomembrane shall be manufactured by the following:
        a. GSE Lining Technology, LLC
        b. approved equal
    2. MANUFACTURER shall have manufactured a minimum of 10,000,000 square feet of polyethylene geomembrane during the last year.

B. INSTALLER
    1. Installation shall be performed by one of the following installation companies (or approved equal)
        a. GSE Lining Technology, LLC
        b. GSE Approved Installers
    2. INSTALLER shall have installed a minimum of 5,000,000-ft^2 of HDPE geomembrane during the last two years.
    3. INSTALLER shall have worked in a similar capacity on at least 5 projects similar in complexity to the project described in the contract documents, and with at least 500,000-ft^2 of HDPE geomembrane installation on each project.
    4. The Installation Supervisor shall have worked in a similar capacity on projects similar in size and complexity to the project described in the Contract Documents.
    5. The INSTALLER shall provide a minimum of one Master Seamer for work on the project.
    6. Must have completed a minimum of 1,000,000-ft^2 of geomembrane seaming work using the type of seaming apparatus proposed for the use on this Project.

1.6 MATERIAL LABELING, DELIVERY, STORAGE AND HANDLING

A. LABELING - Each roll of geomembrane delivered to the site shall be labeled by the MANUFACTURER. The label will identify:
    1. manufacturer's name
    2. product identification
    3. thickness
    4. length
    5. width
    6. roll number

B. DELIVERY - Rolls of liner will be prepared to ship by appropriate means to prevent damage to the material and to facilitate off-loading.
C. STORAGE - The on-site storage location for geomembrane material, provided by the CONTRACTOR to protect the geomembrane from punctures, abrasions and excessive dirt and moisture, should have the following characteristics:
    1. level (no wooden pallets)
    2. smooth
    3. dry
    4. protected from theft and vandalism
    5. adjacent to the area being lined
D. Handling- Materials are to be handled so as to prevent damage.

1.7 WARRANTY

A. Material shall be warrantied, on a pro-rata basis, against Manufacturer's defects for a period of 5 years from the date of geomembrane installation.
B. Installation shall be warrantied against defects in workmanship for a period of 1 year from the date of geomembrane completion.

1.8 GEOMEMBRANE PROPERTIES

A. Material shall be smooth/textured polyethylene geomembrane as shown on the drawings.
B. Resin
    1. Resin shall be new, first quality, compounded and manufactured specifically for producing geomembrane.
    2. Natural resin (without carbon black) shall meet the following requirements:

Table 1.9B RAW MATERIAL PROPERTIES			
Property	Test Method	HDPE	LLDPE
Density (g/cm3)	ASTM D 1505	$\geq$0.932	$\geq$0.915
Melt Flow Index (g/10 min)	ASTM D 1238 (190/2.16)	$\leq$1.0	$\leq$1.0
OIT (minutes)	ASTM D 3895 (1 atm/200^{0}C)	$\geq$100	$\geq$100

C. Geomembrane Rolls
    1. Do not exceed a combined maximum total of 1 percent by weight of additives other than carbon black.
    2. Geomembrane shall be free of holes, pinholes as verified by on-line electrical detection, bubbles, blisters, excessive contamination by foreign matter, and nicks and cuts on roll edges.
    3. Geomembrane material is to be supplied in roll form. Each roll is to be identified with labels indicating roll number, thickness, length, width, and MANUFACTURER.

4. All liner sheets produced at the factory shall be inspected prior to shipment for compliance with the physical property requirements listed in section 1.09 D and be tested by an acceptable method of inspecting for pinholes. If pinholes are located, identified and indicated during manufacturing, these pinholes may be corrected during installation.

D. Smooth surfaced geomembrane shall meet the requirements shown in the following data sheets below:

1. *Table 1.1* for Black HDPE
2. *Table 1.2* for Green HDPE
3. *Table 1.3* for White HDPE
    a. The geomembrane shall be a white-surfaced, coextruded geomembrane.
    b. The white surface shall be installed upwards.
4. *Table 1.4* for Smooth Leak Location Liner HDPE
    a. The geomembrane shall have a coextruded, electrically conductive layer.
    b. The conductive layer is installed downward.
    c. Electrical testing shall be performed after liner installation by the INSTALLER.
5. *Table 1.5* for Smooth White Leak Location Liner HDPE
    a. The geomembrane shall have a coextruded, electrically conductive layer.
    b. The conductive layer is installed downward.
    c. The geomembrane shall be a white-surfaced, coextruded geomembrane.
    d. The white surface shall be installed upwards.
    e. Electrical testing shall be performed after liner installation by the INSTALLER.
6. *Table 1.6* for Black LLDPE
7. *Table 1.7* for White-surfaced LLDPE
    a. The geomembrane shall be a white-surfaced, coextruded geomembrane.
    b. The white surface shall be installed upwards.
8. *Table 1.8* for Leak Location Liner LLDPE
    a. The geomembrane shall have a coextruded, electrically conductive layer.
    b. The conductive layer is installed downward.
    c. Electrical testing shall be performed after liner installation by the INSTALLER.
9. *Table 1.9* for White Leak Location Liner LLDPE
    a. The geomembrane shall be a white-surfaced, coextruded geomembrane.
    b. The white surface shall be installed upwards.
    c. The geomembrane shall have a coextruded, electrically conductive layer.
    d. The conductive layer is installed downward.
    e. Electrical testing shall be performed after liner installation by the INSTALLER.

TABLE 1.1: GSE HD SMOOTH GEOMEMBRANE							
Tested Property	Test Method	Frequency	Minimum Average Values				
			30 mil	40 mil	60 mil	80 mil	100 mil
Thickness, mil Lowest individual reading	ASTM D 5199	every roll	30 27	40 36	60 54	80 72	100 90
Density, g/cm^3, (min.)	ASTM D 1505	200,000 lbs	0.940	0.940	0.940	0.940	0.940
Tensile Properties (each direction) Strength at Break, lb/in-width Strength at Yield, lb/in-width Elongation at Break, % Elongation at Yield, %	ASTM D 6693, Type IV Dumbbell, 2 ipm G.L. 2.0 in G.L. 1.3 in	20,000 lbs	 114 63 700 12	 152 84 700 12	 228 126 700 12	 304 168 700 12	 380 210 700 12
Tear Resistance, lb	ASTM D 1004	45,000 lbs	21	28	42	56	70
Puncture Resistance, lb	ASTM D 4833	45,000 lbs	54	72	108	144	180
Carbon Black Content, % (Range)	ASTM D 1603*/4218	20,000 lbs	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
Carbon Black Dispersion	ASTM D 5596	45,000 lbs	Note[1]	Note[1]	Note[1]	Note[1]	Note[1]
Notch Constant Tensile Load, hr	ASTM D 5397, Appendix	200,000 lbs	300	300	300	300	300
Oxidative Induction Time, min	ASTM D 3895, 200°C; O_2, 1 atm	200,000 lbs	>100	>100	>100	>100	>100
Typical Roll Dimensions							
Roll Length[2], ft			1,120	870	560	430	340
Roll Width[2], ft			22.5	22.5	22.5	22.5	22.5
Roll Area, ft^2			25,200	19,575	12,600	9,675	7,650

- NOTES:
  - [1]Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
  - [2]Roll lengths and widths have a tolerance of ± 1%.
  - GSE HD Smooth is available in rolls weighing approximately 4,000 lb.
  - All GSE geomembranes have dimensional stability of ±2% when tested according to ASTM D 1204 and LTB of <-77° C when tested according to ASTM D 746.
  - *Modified.

TABLE 1.2: GSE GREEN SMOOTH GEOMEMBRANE							
Tested Property	Test Method	Frequency	Minimum Average Values				
			30 mil	40 mil	60 mil	80 mil	100 mil
Thickness, mil Lowest individual reading	ASTM D 5199	every roll	30 27	40 36	60 54	80 72	100 90
Density, g/cm^3 , (min.)	ASTM D 1505	200,000 lbs	0.940	0.940	0.940	0.940	0.940
Tensile Properties (each direction) Strength at Break, lb/in-width Strength at Yield, lb/in-width Elongation at Break, % Elongation at Yield, %	ASTM D 6693, Type IV Dumbbell, 2 ipm G.L. 2.0 in G.L. 1.3 in	20,000 lbs	 114 63 700 12	 152 84 700 12	 228 126 700 12	 304 168 700 12	 380 210 700 12
Tear Resistance, lb	ASTM D 1004	45,000 lbs	21	28	42	56	70
Puncture Resistance, lb	ASTM D 4833	45,000 lbs	54	72	108	144	180
Carbon Black Content[(1)], % (Range)	ASTM D 1603*/4218	20,000 lbs	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
Carbon Black Dispersion	ASTM D 5596	45,000 lbs	Note[(2)]	Note[(2)]	Note[(2)]	Note[(2)]	Note[(2)]
Notch Constant Tensile Load, hr	ASTM D 5397, Appendix	200,000 lbs	300	300	300	300	300
Oxidative Induction Time, min	ASTM D 3895, 200°C; O_2, 1 atm	200,000 lbs	>100	>100	>100	>100	>100
Typical Roll Dimensions							
Roll Length[(3)], ft			1,120	870	560	430	340
Roll Width[(3)], ft			22.5	22.5	22.5	22.5	22.5
Roll Area, ft^2			25,200	19,575	12,600	9,675	7,650

- NOTES:
  - [(1)]GSE Green Smooth may have an overall ash content of 3.0% due to the green layer. These values apply to the black layer only.
  - [(2)]Dispersion applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
  - [(3)]Roll lengths and widths have a tolerance of ± 1%.
  - GSE Green Smooth is available in rolls weighing approximately 4,000 lb.
  - All GSE geomembranes have dimensional stability of ±2% when tested according to ASTM D 1204 and LTB of <-77° C when tested according to ASTM D 746.
  - *Modified.

TABLE 1.3: GSE WHITE SMOOTH GEOMEMBRANE							
Tested Property	Test Method	Frequency	Minimum Average Values				
			30 mil	40 mil	60 mil	80 mil	100 mil
Thickness, mil Lowest individual reading	ASTM D 5199	every roll	30 27	40 36	60 54	80 72	100 90
Density, g/cm^3 , (min.)	ASTM D 1505	200,000 lbs	0.940	0.940	0.940	0.940	0.940
Tensile Properties (each direction) Strength at Break, lb/in-width Strength at Yield, lb/in-width Elongation at Break, % Elongation at Yield, %	ASTM D 6693, Type IV Dumbbell, 2 ipm G.L. 2.0 in G.L. 1.3 in	20,000 lbs	 114 63 700 12	 152 84 700 12	 228 126 700 12	 304 168 700 12	 380 210 700 12
Tear Resistance, lb	ASTM D 1004	45,000 lbs	21	28	42	56	70
Puncture Resistance, lb	ASTM D 4833	45,000 lbs	54	72	108	144	180
Carbon Black Content[(1)], % (Range)	ASTM D 1603*/4218	20,000 lbs	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
Carbon Black Dispersion	ASTM D 5596	45,000 lbs	Note[(2)]	Note[(2)]	Note[(2)]	Note[(2)]	Note[(2)]
Notch Constant Tensile Load, hr	ASTM D 5397, Appendix	200,000 lbs	300	300	300	300	300
Oxidative Induction Time, min	ASTM D 3895, 200°C; O_2, 1 atm	200,000 lbs	>100	>100	>100	>100	>100
Typical Roll Dimensions							
Roll Length[(3)], ft			1,120	870	560	430	340
Roll Width[(3)], ft			22.5	22.5	22.5	22.5	22.5
Roll Area, ft^2			25,200	19,575	12,600	9,675	7,650

- NOTES:
  - [(1)]GSE White Smooth may have an overall ash content of 3.0% due to the white layer. These values apply to the black layer only.
  - [(2)]Dispersion applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
  - [(3)]Roll lengths and widths have a tolerance of ± 1%.
  - GSE White Smooth is available in rolls weighing approximately 4,000 lb.
  - All GSE geomembranes have dimensional stability of ±2% when tested according to ASTM D1204 and LTB of <-77° C when tested according to ASTM D 746.
  - *Modified.

TABLE 1.4: GSE LEAK LOCATION SMOOTH GEOMEMBRANE						
Tested Property	Test Method	Frequency	Minimum Average Values			
			40 mil	60 mil	80 mil	100 mil
Thickness, mil Lowest individual reading	ASTM D 5199	every roll	40 36	60 54	80 72	100 90
Density, g/cm^3 , (min.)	ASTM D 1505	200,000 lbs	0.940	0.940	0.940	0.940
Tensile Properties (each direction) Strength at Break, lb/in-width Strength at Yield, lb/in-width Elongation at Break, % Elongation at Yield, %	ASTM D 6693, Type IV Dumbbell, 2 ipm G.L. 2.0 in G.L. 1.3 in	20,000 lbs	 152 84 700 12	 228 126 700 12	 304 168 700 12	 380 210 700 12
Tear Resistance, lb	ASTM D 1004	45,000 lbs	28	42	56	70
Puncture Resistance, lb	ASTM D 4833	45,000 lbs	72	108	144	180
Carbon Black Content[(1)], % (Range)	ASTM D 1603*/4218	20,000 lbs	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
Carbon Black Dispersion	ASTM D 5596	45,000 lbs	Note[(2)]	Note[(2)]	Note[(2)]	Note[(2)]
Notch Constant Tensile Load, hr	ASTM D 5397, Appendix	200,000 lbs	300	300	300	300
Oxidative Induction Time, min	ASTM D 3895, 200°C; O_2, 1 atm	200,000 lbs	>100	>100	>100	>100
Typical Roll Dimensions						
Roll Length[(3)], ft			870	560	430	340
Roll Width[(3)], ft			22.5	22.5	22.5	22.5
Roll Area, ft^2			19,575	12,600	9,675	7,650

- NOTES:
  - [(1)]GSE Leak Location Smooth may have an overall ash content of 3.0% due to the conductive layer. These values apply to the non-conductive black layer only.
  - [(2)]Dispersion applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
  - [(3)]Roll lengths and widths have a tolerance of ± 1%.
  - GSE Leak Location Smooth is available in rolls weighing approximately 4,000 lb.
  - All GSE geomembranes have dimensional stability of ±2% when tested according to ASTM D 1204 and LTB of <-77° C when tested according to ASTM D746.
  - *Modified.

TABLE 1.5: GSE LEAK LOCATION WHITE SMOOTH GEOMEMBRANE						
Tested Property	Test Method	Frequency	Minimum Average Values			
			40 mil	60 mil	80 mil	100 mil
Thickness, mil Lowest individual reading	ASTM D 5199	every roll	40 36	60 54	80 72	100 90
Density, g/cm^3, (min.)	ASTM D 1505	200,000 lbs	0.940	0.940	0.940	0.940
Tensile Properties (each direction) Strength at Break, lb/in-width Strength at Yield, lb/in-width Elongation at Break, % Elongation at Yield, %	ASTM D 6693, Type IV Dumbbell, 2 ipm G.L. 2.0 in G.L. 1.3 in	20,000 lbs	 152 84 700 12	 228 126 700 12	 304 168 700 12	 380 210 700 12
Tear Resistance, lb	ASTM D 1004	45,000 lbs	28	42	56	70
Puncture Resistance, lb	ASTM D 4833	45,000 lbs	72	108	144	180
Carbon Black Content[(1)], % (Range)	ASTM D 1603*/4218	20,000 lbs	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
Carbon Black Dispersion	ASTM D 5596	45,000 lbs	Note[(2)]	Note[(2)]	Note[(2)]	Note[(2)]
Notch Constant Tensile Load, hr	ASTM D 5397, Appendix	200,000 lbs	300	300	300	300
Oxidative Induction Time, min	ASTM D 3895, 200°C; O_2, 1 atm	200,000 lbs	>100	>100	>100	>100
Typical Roll Dimensions						
Roll Length[(3)], ft			870	560	430	340
Roll Width[(3)], ft			22.5	22.5	22.5	22.5
Roll Area, ft^2			19,575	12,600	9,675	7,650

- NOTES:
  - [(1)]GSE Leak Location White Smooth may have an overall ash content of 3.0% due to the white and conductive layers. These values apply to the black layer only.
  - [(2)]Dispersion applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
  - [(3)]Roll lengths and widths have a tolerance of ± 1%.
  - GSE Leak Location White Smooth is available in rolls weighing approximately 4,000 lb.
  - All GSE geomembranes have dimensional stability of ±2% when tested according to ASTM D 1204 and LTB of <-77° C when tested according to ASTM D 746.
  - *Modified.

TABLE 1.6: GSE ULTRAFLEX SMOOTH GEOMEMBRANE						
Tested Property	Test Method	Frequency	Minimum Average Value			
			40 mil	60 mil	80 mil	100 mil
Thickness, mil Lowest individual reading	ASTM D 5199	every roll	40 36	60 54	80 72	100 90
Density, g/cm^3 (max.)	ASTM D 1505	200,000 lbs	0.939	0.939	0.939	0.939
Tensile Properties (each direction) Strength at Break, lb/in-width Elongation at Break, %	ASTM D 6693, Type IV Dumbbell, 2 ipm G.L. 2.0 in	20,000 lbs	152 800	228 800	304 800	380 800
Tear Resistance, lb	ASTM D 1004	45,000 lbs	22	33	44	55
Puncture Resistance, lb	ASTM D 4833	45,000 lbs	56	84	112	140
Carbon Black Content, % (Range)	ASTM D 1603*/4218	20,000 lbs	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
Carbon Black Dispersion	ASTM D 5596	45,000 lbs	Note[(1)]	Note[(1)]	Note[(1)]	Note[(1)]
Oxidative Induction Time, min	ASTM D 3895, 200°C; O_2, 1 atm	200,000 lbs	>100	>100	>100	>100
Typical Roll Dimensions						
Roll Length[(2)], ft			870	560	430	340
Roll Width[(2)], ft			22.5	22.5	22.5	22.5
Roll Area, ft^2			19,575	12,600	9,675	7,650

- NOTES:
  - [(1)]Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
  - [(2)]Roll lengths and widths have a tolerance of ±1 %.
  - GSE UltraFlex is available in rolls weighing approximately 4,000 lb.
  - All GSE geomembranes have dimensional stability of ±2% when tested according to ASTM D 1204 and LTB of <-77°C when tested according to ASTM D 746.
  - *Modified.

TALBE 1.7: GSE ULTRAFLEX WHITE SMOOTH GEOMEMBRANE						
Tested Property	Test Method	Frequency	Minimum Average Value			
			40 mil	60 mil	80 mil	100 mil
Thickness, mil Lowest individual reading	ASTM D 5199	every roll	40 36	60 54	80 72	100 90
Density, g/cm^3 (max.)	ASTM D 1505	200,000 lbs	0.939	0.939	0.939	0.939
Tensile Properties (each direction) Strength at Break, lb/in-width Elongation at Break, %	ASTM D 6693, Type IV Dumbbell, 2 ipm G.L. 2.0 in	20,000 lbs	152 800	228 800	304 800	380 800
Tear Resistance, lb	ASTM D 1004	45,000 lbs	22	33	44	55
Puncture Resistance, lb	ASTM D 4833	45,000 lbs	56	84	112	140
Carbon Black Content[(1)], % (Range)	ASTM D 1603*/4218	20,000 lbs	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
Carbon Black Dispersion	ASTM D 5596	45,000 lbs	Note[(2)]	Note[(2)]	Note[(2)]	Note[(2)]
Oxidative Induction Time, min	ASTM D 3895, 200°C; O_2, 1 atm	200,000 lbs	>100	>100	>100	>100
Typical Roll Dimensions						
Roll Length[(3)], ft			870	560	430	340
Roll Width[(3)], ft			22.5	22.5	22.5	22.5
Roll Area, ft^2			19,575	12,600	9,675	7,650

- NOTES:
  - [(1)]GSE UltraFlex White Smooth may have an overall ash content greater than 3.0% due to the white layer. These values apply to the black layer only.
  - [(2)] Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
  - [(3)]Roll lengths and widths have a tolerance of ±1%.
  - GSE UltraFlex White Smooth is available in rolls weighing approximately 4,000 lb.
  - All GSE geomembranes have dimensional stability of ±2% when tested according to ASTM D 1204 and LTB of <-77°C when tested according to ASTM D 746.
  - *Modified.

TABLE 1.8: GSE ULTRAFLEX LEAK LOCATION LINER SMOOTH GEOMEMBRANE						
Tested Property	Test Method	Frequency	Minimum Average Value			
			40 mil	60 mil	80 mil	100 mil
Thickness, mil Lowest individual reading	ASTM D 5199	every roll	40 36	60 54	80 72	100 90
Density, g/cm^3 (max.)	ASTM D 1505	200,000 lbs	0.939	0.939	0.939	0.939
Tensile Properties (each direction) Strength at Break, lb/in-width Elongation at Break, %	ASTM D 6693, Type IV Dumbbell, 2 ipm G.L. 2.0 in	20,000 lbs	152 800	228 800	304 800	380 800
Tear Resistance, lb	ASTM D 1004	45,000 lbs	22	33	44	55
Puncture Resistance, lb	ASTM D 4833	45,000 lbs	56	84	112	140
Carbon Black Content[(1)], % (Range)	ASTM D 1603*/4218	20,000 lbs	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
Carbon Black Dispersion	ASTM D 5596	45,000 lbs	Note[(2)]	Note[(2)]	Note[(2)]	Note[(2)]
Oxidative Induction Time, min	ASTM D 3895, 200°C; O_2, 1 atm	200,000 lbs	>100	>100	>100	>100
Typical Roll Dimensions						
Roll Length[(3)], ft			870	560	430	340
Roll Width[(3)], ft			22.5	22.5	22.5	22.5
Roll Area, ft^2			19,575	12,600	9,675	7,650

- NOTES:
  - [(1)]GSE UltraFlex Leak Location Smooth may have an overall ash content greater than 3.0% due to the conductive layer. These values apply to the non-conductive black layer only.
  - [(2)]Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
  - [(3)]Roll lengths and widths have a tolerance of ±1%.
  - GSE UltraFlex Leak Location Smooth is available in rolls weighing approximately 4,000 lb.
  - All GSE geomembranes have dimensional stability of ±2% when tested according to ASTM D 1204 and LTB of <-77°C when tested according to ASTM D 746.
  - *Modified.

TABLE 1.9: GSE ULTRAFLEX LEAK LOCATION LINER WHITE SMOOTH GEOMEMBRANE						
Tested Property	Test Method	Frequency	Minimum Average Value			
			40 mil	60 mil	80 mil	100 mil
Thickness, mil Lowest individual reading	ASTM D 5199	every roll	40 36	60 54	80 72	100 90
Density, g/cm^3 (max.)	ASTM D 1505	200,000 lbs	0.939	0.939	0.939	0.939
Tensile Properties (each direction) Strength at Break, lb/in-width Elongation at Break, %	ASTM D 6693, Type IV Dumbbell, 2 ipm G.L. 2.0 in	20,000 lbs	152 800	228 800	304 800	380 800
Tear Resistance, lb	ASTM D 1004	45,000 lbs	22	33	44	55
Puncture Resistance, lb	ASTM D 4833	45,000 lbs	56	84	112	140
Carbon Black Content[(1)], % (Range)	ASTM D 1603*/4218	20,000 lbs	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
Carbon Black Dispersion	ASTM D 5596	45,000 lbs	Note[(2)]	Note[(2)]	Note[(2)]	Note[(2)]
Oxidative Induction Time, min	ASTM D 3895, 200°C; O_2, 1 atm	200,000 lbs	>100	>100	>100	>100
Typical Roll Dimensions						
Roll Length[(3)], ft			870	560	430	340
Roll Width[(3)], ft			22.5	22.5	22.5	22.5
Roll Area, ft^2			19,575	12,600	9,675	7,650

- NOTES:
  - [(1)]GSE UltraFlex Leak Location White Smooth may have an overall ash content greater than 3.0% due to the white and conductive layers. These values apply to the non-conductive black layer only.
  - [(2)]Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
  - [(3)]Roll lengths and widths have a tolerance of ±1%.
  - GSE UltraFlex Leak Location White Smooth is available in rolls weighing approximately 4,000 lb.
  - All GSE geomembranes have dimensional stability of ±2% when tested according to ASTM D 1204 and LTB of <-77°C when tested according to ASTM D 746.
  - *Modified.

E. Textured surfaced geomembrane shall meet the requirements shown in the following data sheets below.
   1. *Table 2.1* for Black coextruded textured HDPE
   2. *Table 2.2* for Green coextruded textured HDPE
   3. *Table 2.3* for White coextruded textured HDPE
      a. The geomembrane shall be a white-surfaced, coextruded geomembrane.
      b. The white surface shall be installed upwards.
   4. *Table 2.4* for Leak Location Liner coextruded textured HDPE
      a. The geomembrane shall be a white-surfaced, coextruded geomembrane.
      b. The white surface shall be installed upwards.
   5. *Table 2.5* for White Leak Location Liner coextruded textured HDPE
      a. The geomembrane shall be a white-surfaced, coextruded geomembrane.
      b. The white surface shall be installed upwards.
   6. *Table 2.6* for Black coextruded textured LLDPE
   7. *Table 2.7* for White coextruded textured LLDPE
      a. The geomembrane shall be a white-surfaced, coextruded geomembrane.
      b. The white surface shall be installed upwards.
   8. *Table 2.8* for Leak Location Liner coextruded textured LLDPE
      a. The geomembrane shall have a coextruded, electrically conductive layer.
      b. The conductive layer is installed downward.
      c. Electrical testing shall be performed after liner installation by the INSTALLER.
   9. *Table 2.9* for White Leak Location Liner coextruded textured LLDPE
      a. The geomembrane shall be a white-surfaced, coextruded geomembrane.
      b. The white surface shall be installed upwards.
      c. The geomembrane shall have a coextruded, electrically conductive layer.
      d. The conductive layer is installed downward.
      e. Electrical testing shall be performed after liner installation by the INSTALLER.

TABLE 2.1: GSE HD TEXTURED GEOMEMBRANE							
Tested Property	Test Method	Frequency	Minimum Average Values				
			30 mil	40 mil	60 mil	80 mil	100 mil
Thickness, mil Lowest individual reading	ASTM D 5994	every roll	30 27	40 36	60 54	80 72	100 90
Density, g/cm^3, (min.)	ASTM D 1505	200,000 lbs	0.940	0.940	0.940	0.940	0.940
Tensile Properties (each direction) Strength at Break, lb/in-width Strength at Yield, lb/in-width Elongation at Break, % Elongation at Yield, %	ASTM D 6693, Type IV Dumbbell, 2 ipm G.L. 2.0 in G.L. 1.3 in	20,000 lbs	 45 63 100 12	 60 84 100 12	 90 126 100 12	 120 168 100 12	 150 210 100 12
Tear Resistance, lb	ASTM D 1004	45,000 lbs	21	28	42	56	70
Puncture Resistance, lb	ASTM D 4833	45,000 lbs	45	60	90	120	150
Carbon Black Content, % (Range)	ASTM D 1603*/4218	20,000 lbs	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
Carbon Black Dispersion	ASTM D 5596	45,000 lbs	Note(1)	Note(1)	Note(1)	Note(1)	Note(1)
Asperity Height, mil	ASTM D 7466	second roll	16	18	18	18	18
Notch Constant Tensile Load(2), hr	ASTM D 5397, Appendix	200,000 lbs	300	300	300	300	300
Oxidative Induction Time, min	ASTM D 3895, 200°C; O_2, 1 atm	200,000 lbs	>100	>100	>100	>100	>100
Typical Roll Dimensions							
Roll Length(3), ft	Double-Sided Textured Single-Sided Textured		830 1,010	700 780	520 540	400 410	330 330
Roll Width(3), ft			22.5	22.5	22.5	22.5	22.5
Roll Area, ft^2	Double-Sided Textured Single-Sided Textured		18,675 22,725	15,750 17,550	11,700 12,150	9,000 9,225	7,425 7,425

- NOTES:
  - (1)Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
  - (2)NCTL for GSE HD Textured is conducted on representative smooth geomembrane samples.
  - (3)Roll lengths and widths have a tolerance of ± 1%.
  - GSE HD Textured is available in rolls weighing approximately 4,000 lb.
  - All GSE geomembranes have dimensional stability of ±2% when tested according to ASTM D1204 and LTB of <-77° C when tested according to ASTM D 746.
  - *Modified.

TABLE 2.2 GSE GREEN TEXTURED GEOMEMBRANE							
Tested Property	Test Method	Frequency	Minimum Average Values				
			30 mil	40 mil	60 mil	80 mil	100 mil
Thickness, mil Lowest individual reading	ASTM D 5994	every roll	30 27	40 36	60 54	80 72	100 90
Density, g/cm^3, (min.)	ASTM D 1505	200,000 lbs	0.940	0.940	0.940	0.940	0.940
Tensile Properties (each direction) Strength at Break, lb/in-width Strength at Yield, lb/in-width Elongation at Break, % Elongation at Yield, %	ASTM D 6693, Type IV Dumbbell, 2 ipm G.L. 2.0 in G.L. 1.3 in	20,000 lbs	 45 63 100 12	 60 84 100 12	 90 126 100 12	 120 168 100 12	 150 210 100 12
Tear Resistance, lb	ASTM D 1004	45,000 lbs	21	28	42	56	70
Puncture Resistance, lb	ASTM D 4833	45,000 lbs	45	60	90	120	150
Carbon Black Content[(1)], % (Range)	ASTM D 1603*/4218	20,000 lbs	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
Carbon Black Dispersion	ASTM D 5596	45,000 lbs	Note[(2)]	Note[(2)]	Note[(2)]	Note[(2)]	Note[(2)]
Asperity Height, mil	ASTM D 7466	second roll	16	18	18	18	18
Notch Constant Tensile Load[(3)], hr	ASTM D 5397, Appendix	200,000 lbs	300	300	300	300	300
Oxidative Induction Time, min	ASTM D 3895, 200°C; O_2, 1 atm	200,000 lbs	>100	>100	>100	>100	>100
Typical Roll Dimensions							
Roll Length[(4)], ft	Double-Sided Textured Single-Sided Textured		830 1,010	700 780	520 540	400 410	330 330
Roll Width[(4)], ft			22.5	22.5	22.5	22.5	22.5
Roll Area, ft^2	Double-Sided Textured Single-Sided Textured		18,675 22,725	15,750 17,550	11,700 12,150	9,000 9,225	7,425 7,425

- NOTES:
  - [1]GSE Green may have an overall ash content greater than 3.0% due to the green layer. These values apply to the black layer only.
  - [2]Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
  - [3]NCTL for GSE Green Textured is conducted on representative smooth geomembrane samples.
  - [4]Roll lengths and widths have a tolerance of ±1%.
  - GSE Green Textured is available in rolls weighing approximately 4,000 lb.
  - All GSE geomembranes have dimensional stability of ±2% when tested according to ASTM D 1204 and LTB of <-77° C when tested according to ASTM D 746.
  - *Modified.

TABLE 2.3: GSE WHITE TEXTURED GEOMEMBRANE							
Tested Property	Test Method	Frequency	Minimum Average Values				
			30 mil	40 mil	60 mil	80 mil	100 mil
Thickness, mil Lowest individual reading	ASTM D 5994	every roll	30 27	40 36	60 54	80 72	100 90
Density, g/cm3 , (min.)	ASTM D 1505	200,000 lbs	0.940	0.940	0.940	0.940	0.940
Tensile Properties (each direction) Strength at Break, lb/in-width Strength at Yield, lb/in-width Elongation at Break, % Elongation at Yield, %	ASTM D 6693, Type IV Dumbbell, 2 ipm G.L. 2.0 in G.L. 1.3 in	20,000 lbs	 45 63 100 12	 60 84 100 12	 90 126 100 12	 120 168 100 12	 150 210 100 12
Tear Resistance, lb	ASTM D 1004	45,000 lbs	21	28	42	56	70
Puncture Resistance, lb	ASTM D 4833	45,000 lbs	45	60	90	120	150
Carbon Black Content[1], % (Range)	ASTM D 1603*/4218	20,000 lbs	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
Carbon Black Dispersion	ASTM D 5596	45,000 lbs	Note[2]	Note[2]	Note[2]	Note[2]	Note[2]
Asperity Height, mil	ASTM D 7466	second roll	16	18	18	18	18
Notch Constant Tensile Load[3], hr	ASTM D 5397, Appendix	200,000 lbs	300	300	300	300	300
Oxidative Induction Time, min	ASTM D 3895, 200°C; O_2, 1 atm	200,000 lbs	>100	>100	>100	>100	>100
Typical Roll Dimensions							
Roll Length[4], ft	Double-Sided Textured Single-Sided Textured		830 1,010	700 780	520 540	400 410	330 330
Roll Width[4], ft			22.5	22.5	22.5	22.5	22.5
Roll Area, ft^2	Double-Sided Textured Single-Sided Textured		18,675 22,725	15,750 17,550	11,700 12,150	9,000 9,225	7,425 7,425

- NOTES:
  - [1]GSE White may have an overall ash content greater than 3.0% due to the white layer. These values apply to the black layer only.
  - [2]Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
  - [3]NCTL for GSE White Textured is conducted on representative smooth geomembrane samples.
  - [4]Roll lengths and widths have a tolerance of ±1%.
  - GSE White Textured is available in rolls weighing approximately 4,000 lb.
  - All GSE geomembranes have dimensional stability of ±2% when tested according to ASTM D 1204 and LTB of <-77° C when tested according to ASTM D 746.
  - *Modified.

TABLE 2.4: GSE LEAK LOCATION LINER TEXTURED GEOMEMBRANE						
Tested Property	Test Method	Frequency	Minimum Average Values			
			40 mil	60 mil	80 mil	100 mil
Thickness, mil Lowest individual reading	ASTM D 5994	every roll	40 36	60 54	80 72	100 90
Density, g/cm^3, (min.)	ASTM D 1505	200,000 lbs	0.940	0.940	0.940	0.940
Tensile Properties (each direction) Strength at Break, lb/in-width Strength at Yield, lb/in-width Elongation at Break, % Elongation at Yield, %	ASTM D 6693, Type IV Dumbbell, 2 ipm G.L. 2.0 in G.L. 1.3 in	20,000 lbs	 60 84 100 12	 90 126 100 12	 120 168 100 12	 150 210 100 12
Tear Resistance, lb	ASTM D 1004	45,000 lbs	28	42	56	70
Puncture Resistance, lb	ASTM D 4833	45,000 lbs	60	90	120	150
Carbon Black Content[(1)], % (Range)	ASTM D 1603*/4218	20,000 lbs	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
Carbon Black Dispersion	ASTM D 5596	45,000 lbs	Note[(2)]	Note[(2)]	Note[(2)]	Note[(2)]
Asperity Height, mil	ASTM D 7466	second roll	18	18	18	18
Notch Constant Tensile Load[(3)], hr	ASTM D 5397, Appendix	200,000 lbs	300	300	300	300
Oxidative Induction Time, min	ASTM D 3895, 200°C; O_2, 1 atm	200,000 lbs	>100	>100	>100	>100
Typical Roll Dimensions						
Roll Length[(4)], ft	Double-Sided Textured Single-Sided Textured		700 780	520 540	400 410	330 330
Roll Width[(4)], ft			22.5	22.5	22.5	22.5
Roll Area, ft^2	Double-Sided Textured Single-Sided Textured		15,750 17,550	11,700 12,150	9,000 9,225	7,425 7,425

- NOTES:
  - (1)GSE Leak Location may have an overall ash content greater than 3.0% due to the conductive layer. These values apply to the non-conductive layer only.
  - (2)Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
  - (3)NCTL for GSE Leak Location Textured is conducted on representative smooth geomembrane samples.
  - (4)Roll lengths and widths have a tolerance of ±1%.
  - GSE Leak Location Textured is available in rolls weighing approximately 4,000 lb.
  - All GSE geomembranes have dimensional stability of ±2% when tested according to ASTM D 1204 and LTB of <-77° C when tested according to ASTM D 746.
  - *Modified.

TABLE 2.5: GSE LEAK LOCATION LINER WHITE TEXTURED GEOMEMBRANE						
Tested Property	Test Method	Frequency	Minimum Average Values			
			40 mil	60 mil	80 mil	100 mil
Thickness, mil Lowest individual reading	ASTM D 5994	every roll	40 36	60 54	80 72	100 90
Density, g/cm3 , (min.)	ASTM D 1505	200,000 lbs	0.940	0.940	0.940	0.940
Tensile Properties (each direction) Strength at Break, lb/in-width Strength at Yield, lb/in-width Elongation at Break, % Elongation at Yield, %	ASTM D 6693, Type IV Dumbbell, 2 ipm G.L. 2.0 in G.L. 1.3 in	20,000 lbs	 60 84 100 12	 90 126 100 12	 120 168 100 12	 150 210 100 12
Tear Resistance, lb	ASTM D 1004	45,000 lbs	28	42	56	70
Puncture Resistance, lb	ASTM D 4833	45,000 lbs	60	90	120	150
Carbon Black Content[(1)], % (Range)	ASTM D 1603*/4218	20,000 lbs	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
Carbon Black Dispersion	ASTM D 5596	45,000 lbs	Note[(2)]	Note[(2)]	Note[(2)]	Note[(2)]
Asperity Height, mil	ASTM D 7466	second roll	18	18	18	18
Notch Constant Tensile Load[(2)], hr	ASTM D 5397, Appendix	200,000 lbs	300	300	300	300
Oxidative Induction Time, min	ASTM D 3895, 200°C; O_2, 1 atm	200,000 lbs	>100	>100	>100	>100
Typical Roll Dimensions						
Roll Length[(4)], ft	Double-Sided Textured Single-Sided Textured		700 780	520 540	400 410	330 330
Roll Width[(4)], ft			22.5	22.5	22.5	22.5
Roll Area, ft^2	Double-Sided Textured Single-Sided Textured		15,750 17,550	11,700 12,150	9,000 9,225	7,425 7,425

- NOTES:
  - [(1)]GSE Leak Location White may have an overall ash content greater than 3.0% due to the conductive and white layers. These values apply to the non-conductive black layer only.
  - [(2)]Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
  - [(3)]NCTL for GSE Leak Location White Textured is conducted on representative smooth geomembrane samples.
  - [(4)]Roll lengths and widths have a tolerance of ±1%.
  - GSE Leak Location White Textured is available in rolls weighing approximately 4,000 lb.
  - All GSE geomembranes have dimensional stability of ±2% when tested according to ASTM D 1204 and LTB of <-77° C when tested according to ASTM D 746.
  - *Modified.

TABLE 2.6: GSE ULTRAFLEX TEXTURED GEOMEMBRANE						
Tested Property	Test Method	Frequency	Minimum Average Values			
			40 mil	60 mil	80 mil	100 mil
Thickness, mil Lowest individual reading	ASTM D 5199	every roll	40 36	60 54	80 72	100 90
Density, g/cm^3 (max.)	ASTM D 1505	200,000 lbs	0.939	0.939	0.939	0.939
Tensile Properties (each direction) Strength at Break, lb/in-width Elongation at Break, %	ASTM D 6693, Type IV Dumbbell, 2 ipm G.L. 2.0 in	20,000 lbs	60 250	90 250	120 250	150 250
Tear Resistance, lb	ASTM D 1004	45,000 lbs	22	33	44	55
Puncture Resistance, lb	ASTM D 4833	45,000 lbs	44	66	88	110
Carbon Black Content, % (Range)	ASTM D 1603*/4218	20,000 lbs	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
Carbon Black Dispersion	ASTM D 5596	45,000 lbs	Note(1)	Note(1)	Note(1)	Note(1)
Asperity Height, mil	ASTM D 7466	second roll	18	18	18	18
Oxidative Induction Time, min	ASTM D 3895, 200°C; O_2, 1 atm	200,000 lbs	>100	>100	>100	>100
Typical Roll Dimensions						
Roll Length(2), ft	Double-Sided Textured Single-Sided Textured		700 650	520 420	400 320	330 250
Roll Width(2), ft			22.5	22.5	22.5	22.5
Roll Area, ft^2	Double-Sided Textured Single-Sided Textured		15,750 14,625	11,700 9,450	9,000 7,200	7,425 5,625

- NOTES:
  - (1)Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
  - (2)Roll lengths and widths have a tolerance of ±1%.
  - GSE UltraFlex Textured is available in rolls weighing approximately 4,000 lb.
  - All GSE geomembranes have dimensional stability of ±2% when tested according to ASTM D 1204 and LTB of <-77°C when tested according to ASTM D 746.
  - *Modified.

TABLE 2.7: GSE ULTRAFLEX WHITE TEXTURED GEOMEMBRANE						
Tested Property	Test Method	Frequency	Minimum Average Values			
			40 mil	60 mil	80 mil	100 mil
Thickness, mil Lowest individual reading	ASTM D 5199	every roll	40 36	60 54	80 72	100 90
Density, g/cm^3 (max.)	ASTM D 1505	200,000 lbs	0.939	0.939	0.939	0.939
Tensile Properties (each direction) Strength at Break, lb/in-width Elongation at Break, %	ASTM D 6693, Type IV Dumbbell, 2 ipm G.L. 2.0 in	20,000 lbs	60 250	90 250	120 250	150 250
Tear Resistance, lb	ASTM D 1004	45,000 lbs	22	33	44	55
Puncture Resistance, lb	ASTM D 4833	45,000 lbs	44	66	88	110
Carbon Black Content[(1)], % (Range)	ASTM D 1603*/4218	20,000 lbs	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
Carbon Black Dispersion	ASTM D 5596	45,000 lbs	Note[(2)]	Note[(2)]	Note[(2)]	Note[(2)]
Asperity Height, mil	ASTM D 7466	second roll	18	18	18	18
Oxidative Induction Time, min	ASTM D 3895, 200°C; O_2, 1 atm	200,000 lbs	>100	>100	>100	>100
Typical Roll Dimensions						
Roll Length[(3)], ft	Double-Sided Textured Single-Sided Textured		700 650	520 420	400 320	330 250
Roll Width[(3)], ft			22.5	22.5	22.5	22.5
Roll Area, ft^2	Double-Sided Textured Single-Sided Textured		15,750 14,625	11,700 9,450	9,000 7,200	7,425 5,625

- NOTES:
  - [(1)]GSE UltraFlex White Textured may have an overall ash content greater than 3.0% due to the white layer. These values apply to the black layer only.
  - [(2)]Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
  - [(3)]Roll lengths and widths have a tolerance of ±1%.
  - GSE UltraFlex White Textured is available in rolls weighing approximately 4,000 lb.
  - All GSE geomembranes have dimensional stability of ±2% when tested according to ASTM D 1204 and LTB of <-77°C when tested according to ASTM D 746.
  - *Modified.

TABLE 2.8: GSE ULTRAFLEX LEAK LOCATION TEXTURED GEOMEMBRANE						
Tested Property	Test Method	Frequency	Minimum Average Values			
			40 mil	60 mil	80 mil	100 mil
Thickness, mil Lowest individual reading	ASTM D 5199	every roll	40 36	60 54	80 72	100 90
Density, g/cm^3 (max.)	ASTM D 1505	200,000 lbs	0.939	0.939	0.939	0.939
Tensile Properties (each direction) Strength at Break, lb/in-width Elongation at Break, %	ASTM D 6693, Type IV Dumbbell, 2 ipm G.L. 2.0 in	20,000 lbs	60 250	90 250	120 250	150 250
Tear Resistance, lb	ASTM D 1004	45,000 lbs	22	33	44	55
Puncture Resistance, lb	ASTM D 4833	45,000 lbs	44	66	88	110
Carbon Black Content[(1)], % (Range)	ASTM D 1603*/4218	20,000 lbs	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
Carbon Black Dispersion	ASTM D 5596	45,000 lbs	Note[(2)]	Note[(2)]	Note[(2)]	Note[(2)]
Asperity Height, mil	ASTM D 7466	second roll	18	18	18	18
Oxidative Induction Time, min	ASTM D 3895, 200°C; O_2, 1 atm	200,000 lbs	>100	>100	>100	>100
Typical Roll Dimensions						
Roll Length[(3)], ft	Double-Sided Textured Single-Sided Textured		700 650	520 420	400 320	330 250
Roll Width[(3)], ft			22.5	22.5	22.5	22.5
Roll Area, ft^2	Double-Sided Textured Single-Sided Textured		15,750 14,625	11,700 9,450	9,000 7,200	7,425 5,625

- NOTES:
  - [(1)]GSE UltraFlex Leak Location Textured may have an overall ash content greater than 3.0% due to the conductive layer. These values apply to the non-conductive black layer only.
  - [(2)]Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
  - [(3)]Roll lengths and widths have a tolerance of ±1%.
  - GSE UltraFlex Leak Location Textured is available in rolls weighing approximately 4,000 lb.
  - All GSE geomembranes have dimensional stability of ±2% when tested according to ASTM D 1204 and LTB of <-77°C when tested according to ASTM D 746.
  - *Modified.

TABLE 2.9: GSE ULTRAFLEX LEAK LOCATION WHITE TEXTURED GEOMEMBRANE						
Tested Property	Test Method	Frequency	Minimum Average Values			
			40 mil	60 mil	80 mil	100 mil
Thickness, mil Lowest individual reading	ASTM D 5199	every roll	40 36	60 54	80 72	100 90
Density, g/cm^3 (max.)	ASTM D 1505	200,000 lbs	0.939	0.939	0.939	0.939
Tensile Properties (each direction) Strength at Break, lb/in-width Elongation at Break, %	ASTM D 6693, Type IV Dumbbell, 2 ipm G.L. 2.0 in	20,000 lbs	60 250	90 250	120 250	150 250
Tear Resistance, lb	ASTM D 1004	45,000 lbs	22	33	44	55
Puncture Resistance, lb	ASTM D 4833	45,000 lbs	44	66	88	110
Carbon Black Content[(1)], % (Range)	ASTM D 1603*/4218	20,000 lbs	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
Carbon Black Dispersion	ASTM D 5596	45,000 lbs	Note[(2)]	Note[(2)]	Note[(2)]	Note[(2)]
Asperity Height, mil	ASTM D 7466	second roll	18	18	18	18
Oxidative Induction Time, min	ASTM D 3895, 200°C; O_2, 1 atm	200,000 lbs	>100	>100	>100	>100
Typical Roll Dimensions						
Roll Length[(3)], ft	Double-Sided Textured Single-Sided Textured		700 650	520 420	400 320	330 250
Roll Width[(3)], ft			22.5	22.5	22.5	22.5
Roll Area, ft^2	Double-Sided Textured Single-Sided Textured		15,750 14,625	11,700 9,450	9,000 7,200	7,425 5,625

- NOTES:
  - [(1)]GSE UltraFlex Leak Location White Textured may have an overall ash content greater than 3.0% due to the white and conductive layers. These values apply to the non-conductive black layer only.
  - [(2)]Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
  - [(3)]Roll lengths and widths have a tolerance of ±1%.
  - GSE UltraFlex Leak Location White Textured is available in rolls weighing approximately 4,000 lb.
  - All GSE geomembranes have dimensional stability of ±2% when tested according to ASTM D 1204 and LTB of <-77°C when tested according to ASTM D 746.
  - *Modified.

F. Extrudate Rod or Bead
    1. Extrudate material shall be made from same type resin as the geomembrane.
    2. Additives shall be thoroughly dispersed.
    3. Materials shall be free of contamination by moisture or foreign matter.

1.9 EQUIPMENT

A. Welding equipment and accessories shall meet the following requirements:
    1. Gauges showing temperatures in apparatus such as extrusion welder or fusion welder shall be present.
    2. An adequate number of welding apparatus shall be available to avoid delaying work.
    3. Power source must be capable of providing constant voltage under combined line load.

1.10 DEPLOYMENT

A. Assign each panel a simple and logical identifying code. The coding system shall be subject to approval and shall be determined at the job site.
B. Visually inspect the geomembrane during deployment for imperfections and mark faulty or suspect areas.
C. Deployment of geomembrane panels shall be performed in a manner that will comply with the following guidelines:
    1. Geomembranes shall be installed according to site-specific specifications, and GSE Conductive should be installed with the Conductive layer down.
        i. Note: A spark tester or ohm meter can be used to determine Conductive layer.
    2. Unroll geomembrane using methods that will not damage geomembrane and will protect underlying surface from damage (spreader bar, protected equipment bucket).
    3. Place ballast (commonly sandbags) on geomembrane which will not damage geomembrane to prevent wind uplift.
    4. Personnel walking on geomembrane shall not engage in activities or wear shoes that could damage it. Smoking will not be permitted on the geomembrane.
    5. Do not allow heavy vehicular traffic directly on geomembrane. Rubber-tired ATV's and trucks are acceptable if wheel contact is less than 8 psi.
    6. Protect geomembrane in areas of heavy traffic by placing protective cover over the geomembrane.
D. Sufficient material (slack) shall be provided to allow for thermal expansion and contraction of the material.

1.11 FIELD SEAMING

A. Seams shall meet the following requirements:
    1. To the maximum extent possible, orient seams parallel to the line of the slope, i.e., down and not across slope.

2. Minimize number of field seams in corners, odd-shaped geometric locations and outside corners.
3. Slope seams (panels) shall extend a minimum of 5-ft beyond the grade break into the flat area.
4. Use a sequential seam numbering system compatible with panel numbering system that is agreeable to the CONSULTANT and INSTALLER.
5. Align seam overlaps consistent with the requirements of the welding equipment being used. A 6-in overlap is commonly suggested.

B. During Welding Operations
1. Provide at least one Master Seamer who shall provide direct supervision over other welders as necessary.

C. Extrusion Welding
1. Hot-air tack adjacent pieces together using procedures that do not damage the geomembrane.
2. Clean geomembrane surfaces by disc grinder or equivalent.
3. Purge welding apparatus of heat-degraded extrudate before welding.

D. Hot Wedge Welding
1. Welding apparatus shall be a self-propelled device equipped with an electronic controller which displays applicable temperatures.
2. Clean seam area of dust, mud, moisture and debris immediately ahead of hot wedge welder.
3. Protect against moisture build-up between sheets.

E. Trial Welds
1. Perform trial welds on geomembrane samples to verify welding equipment is operating properly.
2. Make trial welds under the same surface and environmental conditions as the production welds, i.e., in contact with subgrade and similar ambient temperature.
3. Minimum of two trial welds per day, per welding apparatus, one made prior to the start of work and one completed at mid shift.
4. Cut four, one-inch wide by six-inch long test strips from the trial weld.
5. Quantitatively test specimens for peel adhesion, and then for shear strength.
6. Trial weld specimens shall pass when the results shown in the following tables for HDPE and LLDPE are achieved in both peel and shear test.

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TABLE 1.12.6A: MINIMUM WELD VALUES FOR HDPE GEOMEMBRANES							
Property	Test Method	30	40	60	80	100	120
Peel Strength (fusion), ppi Peel Strength (extrusion), ppi	ASTM D 6392 ASTM D 6392	49 39	65 52	98 78	130 104	162 130	196 157
Shear Strength (fusion & ext.), ppi	ASTM D 6392	61	81	121	162	203	242

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TABLE 1.2.6B: MINIMUM WELD VALUES FOR LLDPE GEOMEMBRANES						
Property	Test Method	30	40	60	80	100
Peel Strength (extrusion), ppi Peel Strength (fusion), ppi	ASTM D 6392 ASTM D 6392	36 38	48 50	72 75	96 100	120 125
Shear Strength (fusion & ext.), ppi	ASTM D 6392	45	60	90	120	150

7. The break, when peel testing, occurs in the liner material itself, not through peel separation (FTB).
8. The break is ductile.
9. Repeat the trial weld, in its entirety, when any of the trial weld samples fail in either peel or shear.
10. No welding equipment or welder shall be allowed to perform production welds until equipment and welders have successfully completed trial weld.

F. Seaming shall not proceed when ambient air temperature or adverse weather conditions jeopardize the integrity of the liner installation. INSTALLER shall demonstrate that acceptable seaming can be performed by completing acceptable trial welds.

G. Defects and Repairs
1. Examine all seams and non-seam areas of the geomembrane for defects, holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter.
2. Repair and non-destructively test each suspect location in both seam and non-seam areas. Do not cover geomembrane at locations that have been repaired until test results with passing values are available.

1.12 FIELD QUALITY ASSURANCE

A. MANUFACTURER and INSTALLER shall participate in and conform to all terms and requirements of the Owner's quality assurance program. CONTRACTOR shall be responsible for assuring this participation.
B. Quality assurance requirements are as specified in this Section and in the Field Installation Quality Assurance Manual if it is included in the contract.
C. Field Testing
    1. Non-destructive testing may be carried out as the seaming progresses or at completion of all field seaming.
        b. Vacuum Testing
            1) Shall be performed in accordance with ASTM D 5641, Standard Practice for Geomembrane Seam Evaluation by Vacuum Chamber.
        b. Air Pressure Testing
            1) Shall be performed in accordance with ASTM D 5820, Standard Practice for Pressurized Air Channel Evaluation of Dual Seamed Geomembranes.
        c. Spark Testing
            1. Shall be performed accordance with ASTM D 7240 Standard Practice for Leak Location using Geomembranes with an Insulating Layer in Intimate Contact with a Conductive Layer via Electrical Capacitance Technique (Conductive Geomembrane Spark Test).
        d. Other approved methods.
    2. Destructive Testing (performed by CONSULTANT with assistance from INSTALLER)
        b. Location and Frequency of Testing
            1) Collect destructive test samples at a frequency of one per every 500 lineal feet of seam length.
            2) Test locations will be determined after seaming.
            3) Exercise Method of Attributes as described by GRI GM-14 (Geosynthetic Research Institute, http://www.geosynthetic-institute.org) to minimize test samples taken.

        c. Sampling Procedures are performed as follows:
            1) INSTALLER shall cut samples at locations designated by the CONSULTANT as the seaming progresses in order to obtain field laboratory test results before the geomembrane is covered.
            2) CONSULTANT will number each sample, and the location will be noted on the installation as-built.
                a) Samples shall be 12-in wide by minimal length with the seam centered lengthwise.
                b) Cut a 2-in wide strip from each end of the sample for field-testing.
                c) Cut the remaining sample into two parts for distribution as follows:
                d) One portion for INSTALLER, 12-in by 12-in
                e) One portion for the Third-Party laboratory, 12-in by 18-in

f) Additional samples may be archived if required.

3) Destructive testing shall be performed in accordance with ASTM D 6392, Standard Test Method for Determining the Integrity of Non-Reinforced Geomembrane Seams Produced Using Thermo-Fusion Methods.
   a) INSTALLER shall repair all holes in the geomembrane resulting from destructive sampling.

4) Repair and test the continuity of the repair in accordance with these Specifications.

3. Failed Seam Procedures
   a. If the seam fails, INSTALLER shall follow one of two options:
      1) Reconstruct the seam between any two passed test locations.
      2) Trace the weld to intermediate location at least 10-ft minimum or where the seam ends in both directions from the location of the failed test.
      b) The next seam welded using the same welding device is required to obtain an additional sample, i.e., if one side of the seam is less than 10-ft long.
      c) If sample passes, then the seam shall be reconstructed or capped between the test sample locations.
      d) If any sample fails, the process shall be repeated to establish the zone in which the seam shall be reconstructed.

1.13 REPAIR PROCEDURES

A. Remove damaged geomembrane and replace with acceptable geomembrane materials if damage cannot be satisfactorily repaired.
B. Repair any portion of unsatisfactory geomembrane or seam area failing a destructive or non-destructive test.
C. INSTALLER shall be responsible for repair of defective areas.
D. Agreement upon the appropriate repair method shall be decided between
   1. CONSULTANT and INSTALLER by using one of the following repair methods:
      a. Patching- Used to repair large holes, tears, undispersed raw materials and contamination by foreign matter.
      b. Abrading and Re-welding- Used to repair short section of a seam.
      c. Spot Welding- Used to repair pinholes or other minor, localized flaws or where geomembrane thickness has been reduced.
      d. Capping- Used to repair long lengths of failed seams.
      e. Flap Welding- Used to extrusion weld the flap (excess outer portion) of a fusion weld in lieu of a full cap.
         1) Remove the unacceptable seam and replace with new material.
E. The following procedures shall be observed when a repair method is used:
   1. All geomembrane surfaces shall be clean and dry at the time of repair.
   2. Surfaces of the polyethylene which are to be repaired by extrusion welds shall be lightly abraded to assure cleanliness.
   3. Extend patches or caps at least 6 inches for extrusion welds and 4 inches for wedge welds beyond the edge of the defect, and around all corners of patch material.

F. Repair Verification
    1. Number and log each patch repair (performed by CONSULTANT).
    2. Non-destructively test each repair using methods specified in this Specification.

1.1 SCOPE

This specification covers the technical requirements for the Manufacturing and Installation of the nonwoven geotextile. All materials meet or exceed the requirements of this specification, and all work will be performed in accordance with the procedures provided in these project specifications.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM)
1. ASTM D 5261, Standard Test Method for Measuring Mass per Unit Area of Geotextiles
2. ASTM D 4632, Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
3. ASTM D 4533, Standard Test Method for Index Trapezoidal Tearing Strength of Geotextiles
4. ASTM D 4833, Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products
5. ASTM D 4491, Standard Test Method for Water Permeability of Geotextiles by Permittivity
6. ASTM D 4751, Standard Test Method for Determining Apparent Opening Size of a Geotextile
7. ASTM D 4354, Standard Practice for Sampling of Geosynthetics for Testing
8. ASTM D 4759, Standard Practice for Determining the Specifications Conformance of Geosynthetics

1.3 SUBMITTALS

A. Prior to material delivery to project site, the contractor shall provide the engineer with a written certification or manufacturers quality control data which displays that the geotextile meets or exceeds minimum average roll values (MARV) specified herein.
B. The contractor shall submit, if required by the engineer, manufacturer's quality control manual for the geotextile to be delivered to the site.

2. PRODUCT

2.1 GEOTEXTILE

A. The nonwoven needle-punched geotextile specified herein shall be made from staple fiber.
B. The geotextile shall be manufactured from prime quality virgin polymer.
C. The geotextile shall be able to withstand direct exposure to ultraviolet radiation from Sun for up to 30 days without any noticeable effect on index or performance properties.
D. Geotextile shall meet or exceed all material properties listed in *Table 1*.

TABLE 1: GEOTEXTILE PROPERTIES			
Property	**Test Method**	**Test Frequency**	**Value**
Mass per Unit Area, oz/yd^2	ASTM D 5261	90,000-ft^2	12
Grab Tensile Strength, lb	ASTM D 4632	90,000-ft^2	320
CBR Puncture Strength, lb	ASTM D 6241	540,000-ft^2	925
Grab Elongation, %	ASTM D 4632	90,000-ft^2	50
Trapezoidal Tear Strength, lb	ASTM D 4533	90,000-ft^2	125
UV Resistance, % retained after 500 hours	ASTM D 4355	per formulation	70

2.2 MANUFACTURE

A. All rolls of the geotextile shall be identified with permanent marking on the roll or packaging, with the manufacturers name, product identification, roll number, and roll dimensions.

2.3 TRANSPORT

A. Transportation of the geotextile shall be the responsibility of the contractor.
B. During shipment, the geotextile shall be protected from ultraviolet light exposure, precipitation, mud, dirt, dust, puncture, or other damaging or deleterious conditions.
C. Upon delivery at the job site, the contractor shall ensure that the geotextile rolls are handled and stored in accordance with the manufacturer's instructions as to prevent damage.

3. EXECUTION

3.1 QUALITY ASSURANCE

A. The engineer shall examine the geotextile rolls upon delivery to the site and report any deviations from project specifications to the contractor.

3.2 INSTALLATION

A. The geotextile shall be handled in such a manner as to ensure that it is not damaged in any way. Should the contractor damage the geotextile to the extent that it is no longer usable as determined by these specifications or by the engineer, the contractor shall replace the geotextile at his own cost.
B. The geotextile shall be installed to the lines and grades as shown on the contract drawings and as described herein.
C. The geotextile shall be rolled down the slope in such a manner as to continuously keep the geotextile in tension by self-weight. The geotextile shall be securely anchored in an anchor trench where applicable, or by other approved or specified methods.
D. In the presence of wind, all geotextiles shall be weighted by sandbags or approved equivalent. Such anchors shall be installed during placement and shall remain in place until replaced with cover material.
E. The contractor shall take necessary precautions to prevent damage to adjacent or underlying materials during placement of the geotextile. Should damage to such material occur due to the fault of the contractor, the latter shall repair the damaged materials at his own cost and to the satisfaction of the engineer.
F. During placement of the geotextile, care shall be taken not to entrap soil, stones or excessive moisture that could hamper subsequent seaming of the geotextile as judged by the engineer.
G. The geotextile shall not be exposed to precipitation prior to being installed and shall not be exposed to direct sunlight for more than 15 days after installation.
H. The geotextile shall be seamed using heat seaming or stitching methods as recommended by the manufacturer and approved by the engineer. Sewn seams shall be made using polymeric thread with chemical resistance equal to or exceeding that of the geotextile. All sewn seams shall be continuous. Seams shall be oriented down slopes perpendicular to grading contours unless otherwise specified. For heat-seaming, fusion welding techniques recommended by the manufacturer shall be used.
I. The contractor shall not use heavy equipment to traffic above the geotextile without approved protection.
J. The geotextile shall be covered as soon as possible after installation and approval. Installed geotextile shall not be left exposed for more than 15 days.
K. Material overlying the geotextile shall be carefully placed to avoid wrinkling or damage to the geotextile.

SINGLE SIDED GEOCOMPOSITE

1.1 SCOPE

This specification covers the technical requirements for the manufacturing and installation of the geocomposite drainage layer. All materials meet or exceed the requirements of this specification, and all work will be performed in accordance with the procedures provided in these project specifications.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM)

1. ASTM D 1238 Standard Test Method for Melt Flow Rates of Thermoplastics
2. by Extrusion Plastometer
3. D 1505-98 Standard Test Method for Density of Plastics by the Density-Gradient Technique
4. ASTM D 4218, Standard Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle Furnace Technique D 1603-94 Standard Test Method for Carbon Black in Olefin Plastics
5. D 4355-02 Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus
6. D 4491-99 Standard Test Method for Water Permeability of Geotextiles by Permittivity
7. D4533 Standard Test Method for Trapezoid Tearing Strength of Geotextiles
8. D 4716-00 Standard Test Method for Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head
9. D 4751-99 Standard Test Method for Determining Apparent Opening Size of a Geotextile
10. D 6241 Standard Test Method for the Static Puncture Strength of Geotextiles and Geotextile- Related Products Using a 50-mm Probe D 4833-88 (1996) Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products
11. D 5261-92 (1996) Standard Test Method for Measuring the Mass Per Unit Area of Geotextiles
12. D7005-03 Determining The Bond Strength (Ply-Adhesion) of Geocomposites
13. D 7179 Standard Test Method for Determining Geonet Breaking Force

B. Relevant publications from the Environmental Protection Agency (EPA):
   1. Daniel, D.E. and R.M. Koerner, (1993), Technical Guidance Document: Quality Assurance and Quality Control for Waste Containment Facilities, EPA/600/R-93/182.

1.3 DEFINITIONS

A. Construction Quality Assurance Consultant (CONSULTANT) – The Party, independent from MANUFACTURER and INSTALLER, that is responsible for observing and documenting activities related to quality assurance during the lining system construction.
B. ENGINEER - The individual or firm responsible for the design and preparation of the project's Contract Drawings and Specifications.
C. Geocomposite Manufacturer (MANUFACTURER) - The party responsible for manufacturing the geocomposite rolls.
D. Geosynthetic Quality Assurance Laboratory (TESTING LABORATORY) -The Party, independent from the MANUFACTURER and INSTALLER, responsible for conducting laboratory tests on samples of geosynthetics obtained at the site or during manufacturing, usually under the direction of the OWNER.
E. INSTALLER- Party responsible for field handling, transporting, storing and deploying the geocomposite.
F. Lot- A quantity of resin (usually the capacity of one rail car) used to manufacture polyethylene geocomposite rolls. The finished rolls will be identified by a roll number traceable to the resin lot.

1.4 QUALIFICATIONS

A. MANUFACTURER
    1. Geocomposite shall be manufactured by the following:
    a. GSE Lining Technology, Inc.
    b. Approved Equal
    2. MANUFACTURER shall have manufactured a minimum of 10,000,000-ft^2 of polyethylene geocomposite material during the last year.
B. INSTALLER
    1. INSTALLER shall have installed a minimum of 500,000 square feet of geocomposite in the last 3 years.
    2. INSTALLER shall have worked in a similar capacity on at least 5 projects similar in complexity to the project described in the contract documents, and within at least 50,000 square feet of geonet installation on each project.
    3. The Installation Supervisor shall have worked in a similar capacity on projects similar in size and complexity to the project described in the Contract Documents.

1.5 MATERIAL LABELING, DELIVERY, STORAGE AND HANDLING

A. Labeling- Each roll delivered to the site shall be wrapped and labeled by the MANUFACTURER. The label will identify:
    1. Manufacturer's name
    2. Product identification
    3. Length
    4. Width
    5. Roll number

C. Delivery- Rolls will be prepared to ship by appropriate means to prevent damage to the material and to facilitate off-loading.
D. Storage- The on-site storage location provided by the CONTRACTOR to protect the geonet from abrasions, excessive dirt and moisture, shall have the following characteristics:
    1. Level (no wooden pallets)
    2. Smooth
    3. Dry
    4. Protected from theft and vandalism
    5. Adjacent to the area being lined

E. Handling
    1. The CONTRACTOR and INSTALLER shall handle all rolls in such a manner to ensure they are not damaged in any way.
    2. The INSTALLER shall take any necessary precautions to prevent damage to underlying layers during placement of the drainage material.

1.6 WARRANTY

A. Material shall be warranted, on a pro-rata basis against defects for a period of 1-year from the date of the geocomposite installation.
B. Installation shall be warranted against defects in workmanship for a period of 1-year from the date of geocomposite completion.

2. PRODUCTS

2.1 GEOCOMPOSITE PROPERTIES

A. A geocomposite shall be manufactured by extruding two crossing strands to form a bi-planar drainage net structure with a non-woven geotextile bonded to one or both sides.
B. The geocomposite specified shall have properties that meet or exceed the values listed in the following data sheets below.

TABLE 1: GEOCOMPOSITE PROPERTIES			
Property	**Test Method**	**Frequency**	**Value**
Geocomposite			
Transmissivity (1), gal/min/ft (m2/sec) Single-Sided Composite	ASTM D 4716	1/540,000-ft^2	6.2 (1.3 x 10-3)
Ply Adhesion, lb/in	ASTM D 7005	1/50,000-ft^2	0.5
Geonet			
Geonet Core Thickness, mil (1)	ASTM D 5199	1/50,000-ft^2	270
Transmissivity (2), gal/min/ft (m2/sec)	ASTM D 4716	1/540,000-ft^2	19 (4 x 10-3)
Compressive Strength, lbs/ft	ASTM D 6364	1/540,000-ft^2	40,000
Density, g/cm3	ASTM D 1505	1/50,000-ft^2	0.94
Tensile Strength (MD), lb/in	ASTM D 7179	1/50,000-ft^2	100
Carbon Black Content, %	ASTM D 4218	1/50,000-ft^2	2.0
8 oz. Geotextile (prior to lamination)			
Mass per Unit Area, oz/yd2	ASTM D 5261	1/90,000-ft^2	8
Grab Tensile Strength, lb	ASTM D 4632	1/90,000-ft^2	220
Grab Elongation	ASTM D 4632	1/90,000-ft^2	50%
CBR Puncture Strength, lb	ASTM D 6241	1/540,000-ft^2	575
Trapezoidal Tear Strength, lb	ASTM D 4533	1/90,000-ft^2	90
AOS, US Sieve (mm)	ASTM D 4751	1/540,000-ft^2	80 (0.180)
Permittivity, sec-1	ASTM D 4491	1/540,000-ft^2	1.3
Water Flow Rate, gpm/ft2	ASTM D 4491	1/540,000-ft^2	95
UV Resistance, % Retained	ASTM D 4355 (after 500 hours)	per formulation	70

- *Note: The design engineer shall prepare the table above based on the GSE product data sheet and then delete this note*

C. Resin
1. Resin shall be new first quality, compounded polyethylene resin.
2. Natural resin (without carbon black) shall meet the following additional
a. minimum requirements:

TABLE 2: RAW MATERIAL PROPERTIES		
Property	**Test Method[(1)]**	**Value**
Density (g/cm^3)	ASTM D 1505	>0.94
Melt Flow Index (g/10 min)	ASTM D 1238	$\leq$ 1.0

[1]GSE utilizes test equipment and procedures that enable effective and economical confirmation that the product will conform to specifications based on the noted procedures. Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.

2.2 MANUFACTURING QUALITY CONTROL

The geocomposite shall be manufactured in accordance with the Manufacturer's Quality Control Plan submitted to and approved by the ENGINEER.
The geocomposite shall be tested according to the test methods and frequencies listed on *Table 1* which has been prepared based on product data sheets.

3. EXECUTION

3.1 FAMILIARIZATION

A. Inspection
1. Prior to implementing any of the work in the Section to be lined, the INSTALLER shall carefully inspect the installed work of all other Sections and verify that all Work is complete to the point where the installation of the Section may properly commence without adverse impact.
2. If the INSTALLER has any concerns regarding the installed work of other Sections, he shall notify the Project ENGINEER.

3.2 MATERIAL PLACEMENT

A. The geocomposite roll should be installed in the direction of the slope and in the intended direction of flow unless otherwise specified by the ENGINEER.
1. If the project contains long, steep slopes, special care should be taken so that only full length rolls are used at the top of the slope.
B. In the presence of wind, all geocomposites shall be weighted down with sandbags or the equivalent. Such sandbags shall be used during placement and remain until replaced with cover material.

C. If the project includes an anchor trench at the top of the slopes, the geocomposite shall be properly anchored to resist sliding. Anchor trench compacting equipment shall not come into direct contact with the geocomposite.
D. In applying fill material, no equipment can drive directly across the geocomposite. The specified fill material shall be placed and spread utilizing vehicles with a low ground pressure.
E. The cover soil shall be placed in the geocomposite in a manner that prevents damage to the geocomposite. Placement of the cover soil shall proceed immediately following the placement and inspection of the geocomposite.

3.3 SEAMS AND OVERLAPS

A. Each component of the geocomposite will be secured or seamed to the like component at overlaps.
B. Geonet Components
    1. Adjacent edges of the geonet along the length of the geocomposite roll shall be placed with the edges of each geonet butted against each other.
    2. The overlaps shall be joined by tying the geonet structure with cable ties. These ties shall be spaced every 5-ft along the roll length.
    3. Adjoining geocomposite rolls (end to end) across the roll width should be shingled down in the direction of the slope, with the geonet portion of the top overlapping the geonet portion of the bottom geocomposite a minimum of 12-in across the roll width.
    4. The geonet portion should be tied every 6-in in the anchor trench or as specified by the ENGINEER.

3.4 REPAIR

A. Prior to covering the deployed geocomposite, each roll shall be inspected for damage resulting from construction.
B. Any rips, tears or damaged areas on the deployed geocomposite shall be removed and patched. The patch shall be secured to the original geonet by tying every 6-in with the approved tying devices. If the area to be repaired is more than 50 percent of the width of the panel, the damaged area shall be cut out and the two portions of the geonet shall be cut out and the two portions of the geonet shall be joined in accordance with *Subsection 3.03*.

APPENDIX G
OPERATION AND MAINTENANCE PLAN

WaterBridge Stateline, LLC (WaterBridge) is proposing to construct one (1) storage pit in Section 36, Township 19 South, Range 28 East, Eddy County, New Mexico. The Parkway Recycle shall consist of one basin with a total operational volume of approximately 1,160,000-bbl.

OPERATION AND MAINTENANCE PROCEDURES

In this plan, underlined text represents the language of the Rule.

The operator will operate and maintain the lined earthen containments to contain liquids and solids (blow sand and minimal precipitates from the treated produced water) and maintain the integrity of the liner system in a manner that prevents contamination of fresh water and protects public health and the environment as described below. The purpose of the lined earthen containment is to facilitate recycling, reuse, and reclamation of produced water derived from nearby oil and gas wells. During periods when water for E&P operations is not needed, produced water will discharge to one of the injection wells in the operator's SWD system. The containment will not be used for the disposal of produced water or other oilfield waste.

The operation of the Recycling Containment is summarized below:

1. Via pipeline, produced water generated from nearby oil and gas wells is delivered to a treatment system located as indicated in the C-147.
2. After treatment, the produced water discharges into the containment.
3. When required, treated produced water is removed from the containment for E&P operations. At this time, treated produced water will be used for drilling beneath the fresh water zones (beneath surface casing), for well stimulation (e.g. hydraulic fracturing) and other E&P uses as approved by OCD.
4. Whenever the maximum fluid capacity of the containment is reached, treatment and discharge to the containment ceases (see Freeboard and Overtopping Plan, below).
5. The operator will keep accurate records and shall report monthly to the division the total volume of water received for recycling, with the amount of fresh water received listed separately, and the total volume of water leaving the facility for disposition by use on form C-148.
6. The operator will maintain accurate records that identify the sources and disposition of all recycled water that shall be made available for review by the division upon request.
7. The containment shall be deemed to have ceased operations if less than 20 % of the total fluid capacity is used every six months following the first withdrawal of produced water for use. The operator will report cessation of operations to the appropriate division district office. The appropriate division district office may grant an extension to this determination of cessation of operations not to exceed six months.

The operation of the lined earthen containment will follow the mandates listed below:

1. The operator will not discharge into or store any hazardous waste (as defined by 40 CFR 261 and NMAC 19.15.2.7.H.3) in the containments.
2. If the containment's primary liner is compromised above the fluid's surface, the operator will repair the damage or initiate replacement of the primary liner within 48 hours of discovery or seek an extension of time from the Division District office.

3. If the primary liner is compromised below the fluid's surface, the operator will remove all fluid above the damage or leak within 48 hours of discover, notify the division district office, and repair the damage or replace the primary liner.
4. If any penetration of the containment liner is confirmed by sampling of fluid in the leak detection system (see Inspection and Monitoring Plan), the operator will:
    a. Begin and maintain fluid removal from the leak detection/pump-back system,
    b. Notify the District office within 48 hours (phone or email) of the discovery,
    c. Identify the location of the leak, and
    d. Repair the damage or, if necessary, replace the containment liner.
5. The operator will install, or maintain onsite, an oil absorbent boom or other device to contain an unanticipated release and the operator will remove any visible layer of oil from the surface of the recycling containment.
6. The operator will report releases of fluid in a manner consistent with NMAC 19.15.29.
7. The containment will be operated to prevent the collection of surface water run-on.
8. The operator will maintain the containment free of miscellaneous solid waste or debris.
9. The operator will maintain at least 3-ft of freeboard for the containment and will use a free-standing staff gauge to allow easy determination of the required 3-ft of freeboard.
10. As described in the design/construction plan, the injection or withdrawal of fluids from the containment is accomplished through hardware that prevents damage to the liner by erosion, fluid jets, or impact from installation and removal of hoses or pipes.
11. The operator shall ensure that all gates associated with the fence are closed and locked when responsible personnel are not onsite.
12. The operator will maintain the fences in good repair.

MONITORING, INSPECTION, AND REPORTING PLAN

The operator will inspect the recycling containment and associated leak detection systems weekly while it contains fluids. The operator shall maintain a current log of such inspections and make the log available for review by the division upon request.

Weekly inspections consist of:

1. Reading and recording the fluid height of staff gauges,
2. Recording any evidence that the pond surface shows visible oil,
3. Visually inspecting the containment's exposed liners, and
4. Checking the leak detection system for any evidence of a loss of integrity of the primary liner.

As stated above, if a liner's integrity is compromised, or if any penetration of the liner occurs above the water surface, then the operator will notify the District office within 48 hours (phone or email).

Monthly, the operator will:

1. Inspect diversion ditches and berms around the containment to check for erosion and collection of surface water run-on.
2. Inspect the leak detection system for evidence of damage or malfunction and monitor for leakage.
3. Inspect the containment for migratory birds and other wildlife. Within 30 days of discovery, report the discovery of dead migratory birds or other wildlife to the appropriate wildlife agency

and to the division district office in order to facilitate assessment and implementation of measures to prevent incidents from reoccurring.

4. Report to the division the total volume of water received for recycling, with the amount of fresh water received listed separately, and the total volume of water leaving the facility for disposition by use on form C-148.
5. Record sources and disposition of all recycled water.

The operator will maintain a log of all inspections and make the log available for the appropriate Division District office's review upon request. An example of the log is attached to this section of the permit application.

FREEBOARD AND OVERTOPPING PREVENTION PLAN

The method of operation of the containment allows for maintaining freeboard with very few potential problems. When the capacity of the containment is reached (3-ft of freeboard), the discharge of treated produced water ceases and the produced water generated by nearby oil and gas wells is managed by disposing of fluid at a local injection well.

If rising water levels suggest that 3-ft of freeboard will not be maintained, the operator will implement one or more of the following options:

1. Cease discharging treated produced water to the containment.
2. Accelerate re-use of the treated produced water for purposes approved by the Division.
3. Transfer treated produced water from the containment to a Division approved injection well.

The reading of the staff gauge typically occurs daily when treatment operations are ongoing and weekly when discharge to the containment is not occurring.

PROTOCOL FOR LEAK DETECTION MONITORING, FLUID REMOVAL, AND REPORTING

As shown in *Appendix D*, the leak detection system includes a monitoring system. Any fluid released from the primary liner will flow to the collection sump, where fluid level monitoring is possible at the monitoring riser pipe associated with the leak detection system.

Staff may employ a portable electronic water level meter to determine if fluid exists in the monitoring riser pipe. Obtaining accurate readings of water levels in a sloped pipe beneath a containment can be a challenge. An electrician's wire snake may be required to push the probe to the bottom of the port and the probe may be fixed in a 2-in pipe "dry housing" to avoid false readings due to water condensation on the pipe. There are many techniques to determine the existence of water in the sumps, including low-flow pumps and a simple small bailer affixed to an electrician's snake. The operator will use the method that works best for this containment.

If seepage from the containment into the leak detection system is suspected by a positive fluid level measurement, the operator will:

1. Re-measure fluid levels in the monitoring riser pipe on a daily basis for one week to determine the rate of seepage.
2. Collect a water sample from the monitoring riser pipe to confirm the seepage is treated produced water from the containment via field conductivity and chloride measurements.

3. Notify NMOCD of a confirmed positive detection in the system within 48 hours of sampling (initial notification).
4. Install a pump into the monitoring riser pipe sump to continually (manually on a daily basis or via automatic timers) remove fluids from the leak detection system into the containment until the liner is repaired or replaced.
5. Dispatch a liner professional to inspect the portion of the containment suspected of leakage during a "low water" monitoring event.
6. Provide NMOCD a second report describing the inspection and/or repair within 20 days of the initial notification.

If the point of release is obvious from a low water inspection, the liner professional will repair the loss of integrity. If the point of release cannot be determined by the inspection, the liner professional will develop a more robust plan to identify the point(s) of release. The inspection plan and schedule will be submitted to OCD with the second report. The operator will implement the plan upon OCD approval.

APPENDIX H
CLOSURE PLAN

WaterBridge Stateline, LLC (WaterBridge) is proposing to construct one (1) storage pit in Section 36, Township 19 South, Range 28 East, Eddy County, New Mexico. The Parkway Recycle shall consist of one basin with a total operational volume of approximately 1,160,000-bbl.

CLOSURE PLAN

In this plan, underlined text represents the language of the Rule.

After operations cease, the operator will remove all fluids within 60 days and close the containment within six months from the date the operator ceases operations from the containment for use.

The operator shall substantially restore the impacted surface area to

1. The condition that existed prior to the construction of the recycling containment or
2. To a condition imposed by federal, state trust land, or tribal agencies on lands managed by those agencies as these provisions govern the obligations of any operator subject to those provisions.

EXCAVATION AND REMOVAL CLOSURE PLAN - PROTOCOLS AND PROCEDURES

The storage pit is expected to contain a small volume of solids, the majority of which will be windblown sand and dust with some mineral precipitates from the water.

The operator will remove all liquids from the pits and either:

a. Dispose of the liquids in a division-approved facility, or
b. Recycle, reuse, or reclaim the water for reuse in drilling and stimulation

The operator will close the recycling containment by first removing all fluids, contents, and synthetic liners and transferring these materials to a Division approved facility.

After the removal of the pit contents and liners, soils beneath the workover pit will be tested by collection of a five-point (minimum) composite sample, which includes stained or wet soils, if any. That sample shall be analyzed for the constituents listed in *Table 1* of *19.15.34.14*.

After review of the laboratory results:

a. If any contaminant concentration is higher than the parameters listed in *Table 1*, additional delineation may be required, and the operator must receive approval before proceeding with closure.
b. If all contaminant concentrations are less than or equal to the parameters listed in *Table 1*, then the operator will proceed to:
    i. Backfill with non-waste containing, uncontaminated earthen material or
    ii. Undertake an alternative closure process pursuant to a variance request after approval by OCD.

The operator will reclaim the containment's location to a safe and stable condition that blends with the surrounding undisturbed area.

Topsoils and subsoils shall be replaced to their original relative positions and contoured so as to achieve erosion control, long-term stability, and preservation of surface water flow patterns.

The disturbed area shall then be reseeded in the first favorable growing season following closure of a recycling containment.

CLOSURE DOCUMENTATION

Within 60 days of closure completion, the operator shall submit a closure report on Form C-147, including required attachments, to document all closure activities including sampling results and the details on any backfilling, capping or covering, where applicable. The closure report shall certify that all information in the report and attachments is correct and that the operator has complied with all applicable closure requirements and conditions specified in division rules or directives.

The operator shall notify the division when reclamation and re-vegetation are complete. Specifically, the notice will document that all ground surface disturbing activities at the site have been completed, and a uniform vegetative cover has been established that reflects a life-form ratio of plus or minus fifty percent (50%) of pre-disturbance levels and a total percent plant cover of at least seventy percent (70%) of pre-disturbance levels, excluding noxious weeds.

WaterBridge Operating
Parkway Recycle
Closure Cost Estimate

	Item	Units	Quanity	$/Unit	Estimate Cost
	Facility Closure				
1	Fluid removal				
	Parkway Recycle (1.16M bbls)	bbls	1,160,386	$ 0.50	$ 580,193.00
2	Vac truck (final fluid removal)	hrs	16	$ 125.00	$ 2,000.00
3	Liner removal (fold-in-place)				
	Covers removal and disposal	SF	2,170,524	$ 0.18	$ 390,694.32
4	Equipment removal				
	Pit clean-out and residue haul-off	LS	1	$ 7,500.00	$ 7,500.00
	Equipment removal (tanks, gun barrel, FWKO)	LS	1	$ 5,000.00	$ 5,000.00
	Electrical decomissioning (pumps and panels)	LS	1	$ 1,500.00	$ 1,500.00
	Misc equipment clean-up and removal	hr	120	$ 125.00	$ 15,000.00
5	Site Restoration				
	Dozer - push in berms (bid) and final grading of the site	CY	104,750	$ 2.00	$ 209,500.00
	Re-vegetation	ea	1	$ 4,800.00	$ 4,800.00
	Estimated Total				**$ 1,216,187.32**

Assumptions

No Remediation will be necessary
Pit is full at time of closure
Pit berms above natural grade will be used to fill voids below natural grade

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 129736

CONDITIONS

Operator: WaterBridge Stateline LLC 5555 San Felipe Houston, TX 77056	OGRID: 330129
	Action Number: 129736
	Action Type: [C-147] Water Recycle Long (C-147L)

CONDITIONS

Created By	Condition	Condition Date
vvenegas	NMOCD has approved the recycling containment permit application and related documents, submitted by [330129] WaterBridge Stateline LLC, for 2RF-181 - PARKWAY RECYCLE FACILITY ID [fVV2223648269] in Unit Letter E, Section 36, Township 19S, Range 28E, Eddy County, New Mexico.	9/14/2022