BOND RECYCLE FACILITY

WATERBRIDGE STATELINE, LLC.

C-147 FLUID RECYCLING FACILITY APPLICATION

SECTION 20, TOWNSHIP 21 SOUTH, RANGE 28 EAST, EDDY COUNTY, NEW MEXICO

WATERBRIDGE

MITCHELL JOSEPH RATKE
NEW MEXICO
29736
PROFESSIONAL ENGINEER
10-18-2024

OCTOBER 2024

024264-00

ENVIROTECH
ENGINEERING
2500 North Eleventh Street ■ Post Office Box 6029 ■ Enid, Oklahoma 73702 ■ (580) 234-8780 ■ Fax (580) 237-4302

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: [X] Recycling Facility [X] Recycling Containment*

Type of action: [X] 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): WaterBridge Bond Recycle Facility
OCD Permit Number: 2RF-210 (For new facilities the permit number will be assigned by the district office)
U/L or Qtr/Qtr _____ Section 20 Township 21 South Range 28 East County: Eddy
Surface Owner: [ ] Federal [ ] State [X] Private [ ] Tribal Trust or Indian Allotment

2.
[X] **Recycling Facility:**
Location of recycling facility (if applicable): Latitude 32.473678° Longitude -104.105515° NAD83
Proposed Use: [X] Drilling* [X] Completion* [X] Production* [X] 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.***
[X] Fluid Storage
[X] Above ground tanks [X] 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.
[X] **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 32.469774° Longitude -104.104034° NAD83
[ ] For multiple or additional recycling containments, attach design and location information of each containment
[X] Lined [ ] Liner type: Thickness 60/40 mil [ ] LLDPE [X] HDPE [ ] PVC [ ] Other _____
[ ] String-Reinforced
Liner Seams: [X] Welded [ ] Factory [ ] Other _____ Volume: 1,647,628 bbl Dimensions: L 1160 x W 1180 x D 17
[ ] 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 $2,549,709.44 **(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 Wire Mesh 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): Jake Ferenz Title: Director, Environmental Stewardship
Signature: Jake Ferenz Date: 10.21.24
e-mail address: Jake.ferenz@hzobridge.com Telephone: (214) 733-9919

11.
OCD Representative Signature: Victoria Venegas **Approval Date:** 11/14/2024

Title: Environmental Specialist **OCD Permit Number:** RF-210

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

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: [X] Recycling Facility [X] Recycling Containment*

Type of action: [X] 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): WaterBridge Bond Recycle Facility East AST
OCD Permit Number: 2RF-210 (For new facilities the permit number will be assigned by the district office)
U/L or Qtr/Qtr _____ Section 20 Township 21 South Range 28 East County: Eddy
Surface Owner: [ ] Federal [ ] State [X] Private [ ] Tribal Trust or Indian Allotment

2.
[X] **Recycling Facility:**
Location of recycling facility (if applicable): Latitude 32.473678° Longitude -104.105515° NAD83
Proposed Use: [X] Drilling* [X] Completion* [X] Production* [X] 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.***
[X] Fluid Storage
[X] Above ground tanks [X] 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.
[X] **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 32.474002° Longitude -104.104949° NAD83
[ ] For multiple or additional recycling containments, attach design and location information of each containment
[X] Lined [ ] Liner type: Thickness 40/40 mil [X] LLDPE [ ] HDPE [ ] PVC [ ] Other _____
[ ] String-Reinforced
Liner Seams: [X] Welded [ ] Factory [ ] Other _____ Volume: 60,000 bbl Dimensions: L_____ x W 191 x D 12
[ ] 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 $2,549,709.44 **(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 Wire Mesh 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): Jake Ferenz Title: Director, Environmental Stewardship
Signature: Jake Ferenz Date: 10.21.24
e-mail address: jake.ferenz@lrzobridge.com Telephone: (214) 733-9919

11.
OCD Representative Signature: Victoria Venegas **Approval Date:** 11/14/2024
Title: Environmental Specialist **OCD Permit Number:** 2RF-210 -
[x] OCD Conditions
[x] Additional OCD Conditions on Attachment

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: [X] Recycling Facility [X] Recycling Containment*

Type of action: [X] 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): WaterBridge Bond Recycle Facility West AST

OCD Permit Number: 2RF-210 (For new facilities the permit number will be assigned by the district office)

U/L or Qtr/Qtr _____ Section 20 Township 21 South Range 28 East County: Eddy

Surface Owner: [ ] Federal [ ] State [X] Private [ ] Tribal Trust or Indian Allotment

2.

[X] **Recycling Facility:**

Location of recycling facility (if applicable): Latitude 32.473678° Longitude -104.105515° NAD83

Proposed Use: [X] Drilling* [X] Completion* [X] Production* [X] 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.***

[X] Fluid Storage

[X] Above ground tanks [X] 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.

[X] **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 32.474003° Longitude -104.105715° NAD83

[ ] For multiple or additional recycling containments, attach design and location information of each containment

[X] Lined [ ] Liner type: Thickness 40/40 mil [X] LLDPE [ ] HDPE [ ] PVC [ ] Other _____

[ ] String-Reinforced

Liner Seams: [X] Welded [ ] Factory [ ] Other _____ Volume: 60,000 bbl Dimensions: L_____ x W 191 x D 12

[ ] 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 $2,549,709.44 **(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 Wire Mesh 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): JAKE FERENZ Title: Director, Environmental Stewardship
Signature: [signature] Date: 10.21.24
e-mail address: Jake.ferenz@hzobridge.com Telephone: (214) 733-9919

11.
OCD Representative Signature: Victoria Venegas **Approval Date:** 11/14/2024

Title: Environmental Specialist **OCD Permit Number:** 2RF-210

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

ENVIROTECH
ENGINEERING

October 18, 2024

Ms. Victoria Venegas
New Mexico EMNRD
Oil Conservation Division

RE: Rule 34 Variance Request –Produced Water Recycling Containment

Ms. Venegas:

WaterBridge Stateline is requesting a variance to Rule 34 Part 12(A)(2) requiring "… *The operator shall construct the containment in a levee with an inside grade no steeper than two horizontal feet to one vertical foot (2H:1V).*"

WaterBridge is requesting approval to use two Above Ground Storage Tanks (AST's) as containment structures at the WaterBridge Bond Recycle Facility. Based on our experience AST's work well for this purpose, they are structurally sound and easy to maintain. This AST's will have vertical walls on both interior and exterior sides and thus requires a variance for use. The AST's will, however, be double lined like other containments to limit the risk of leakage. 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 mratke@envirotechconsulting.com at your convenience.

Thank you for your consideration.
Best regards,

Envirotech Engineering & Consulting, Inc.

Mitchell Ratke, P.E.
Senior Project Engineer, Energy Infrastructure

MITCHELL JOSEPH RATKE
NEW MEXICO
29736
PROFESSIONAL ENGINEER
10-18-2024

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

ENVIROTECH
ENGINEERING

October 18, 2024

Ms. Victoria Venegas
New Mexico EMNRD
Oil Conservation Division

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

Ms. Venegas:

WaterBridge Stateline is requesting a variance to Rule 34 Part 12(A)(4) requiring primary liners to be 45-mil string reinforced LLDPE. WaterBridge is requesting approval to use 40-mil LLDPE in place of the specified material in an above ground storage tank (AST). Based on our experience, we feel that the requested material will allow us to provide equal environmental protection in our impoundments.

Due to the construction of the 45-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 45-mil reinforced LLDPE.

The proposed new liner system for the ASTs cross-section is as follows: prepare subgrade, 10 oz. geotextile, 40-mil LLDPE, 200 mil geonet, 40-mil LLDPE. This will replace the cross-section required by the current rule. 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 mratke@envirotechconsulting.com at your convenience.

Thank you for your consideration.
Best regards,

ENVIROTECH ENGINEERING & CONSULTING, INC.

MITCHELL JOSEPH RATKE
NEW MEXICO
29736
PROFESSIONAL ENGINEER
10-18-2024

Mitchell Ratke, P.E.
Senior Project Engineer, Energy Infrastructure

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

ENVIROTECH
ENGINEERING

October 18, 2024

Ms. Victoria Venegas
New Mexico EMNRD
Oil Conservation Division

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

Ms. Venegas:

WaterBridge Stateline 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 HDPE in place of the specified material in the proposed Recycle Containment and 40-mil LLDPE Liner in the proposed ASTs. Based on our experience, we feel that the requested material will allow us to provide equal 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 HDPE and 40-mil LLDPE will be seamed in a manner that will allow nondestructive pressure testing of the seams to ensure proper sealing.

The proposed HDPE and LLDPE are appropriate material for the proposed use in the impoundments 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.

The proposed new liner system cross-section for the earthen containment is as follows: prepared subgrade, 10 oz. geotextile, 40-mil HDPE, 200-mil geonet, 60-mil HDPE. This will replace the cross-section required by the current rule. It should also be noted that this variance has been granted on past sites.

The proposed new liner system cross-section for the ASTs is as follows: prepared subgrade, 10 oz. geotextile, 40-mil LLDPE, 200-mil geonet, 40-mil LLDPE. This will replace the cross-section required by the current rule. 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 mratke@envirotechconsulting.com at your convenience.

Thank you for your consideration.
Best regards,

Envirotech Engineering & Consulting, Inc.

MITCHELL JOSEPH RATKE
NEW MEXICO
29736
PROFESSIONAL ENGINEER
10-18-2024

Mitchell Ratke, P.E.
Senior Project Engineer, Energy Infrastructure

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

ENVIROTECH
ENGINEERING

October 18, 2024

Ms. Victoria Venegas
New Mexico EMNRD
Oil Conservation Division

RE: Rule 34 Variance Request –Produced Water Recycling Containment

Ms. Venegas:

WaterBridge Stateline is requesting a variance to Rule 34 Part 12(A)(3) requiring "The edges of all liners shall be anchored in the bottom of a compacted earth-filled trench."

WaterBridge is requesting approval to use Above Ground Storage Tanks (AST) as containment structures at the WaterBridge Bond Recycle Facility. Based on our experience AST's work well for this purpose, they are structurally sound and easy to maintain. Clips will be used at the top of the steel walls to secure the liner. These clips are specifically designed to hold the AST liner in place and provide the same type of liner security as an anchor trench. 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 mratke@envirotechconsulting.com at your convenience.

Thank you for your consideration.
Best regards,

Envirotech Engineering & Consulting, Inc.

MITCHELL JOSEPH RATKE
NEW MEXICO
29736
PROFESSIONAL ENGINEER
10-18-2024

Mitchell Ratke, P.E.
Senior Project Engineer, Energy Infrastructure

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

ENVIROTECH
ENGINEERING

October 18, 2024

Ms. Victoria Venegas
New Mexico EMNRD
Oil Conservation Division

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

Ms. Venegas:

WaterBridge Stateline 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. This system will replace the netting required by the current rule. It should be noted that this variance has been granted on previous sites.

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

Thank you for your consideration.
Best regards,

ENVIROTECH ENGINEERING & CONSULTING, INC.

MITCHELL JOSEPH RATKE
NEW MEXICO
29736
PROFESSIONAL ENGINEER
10-18-2024

Mitchell Ratke, P.E.
Senior Project Engineer, Energy Infrastructure

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

ENVIROTECH
ENGINEERING

October 18, 2024

Ms. Victoria Venegas
New Mexico EMNRD
Oil Conservation Division

RE: Rule 34 Variance Request –Produced Water Recycling Containment

Ms. Venegas:

WaterBridge Stateline is requesting a variance to Rule 34 Part 12(A)(2) requiring "*...The levee shall have an outside grade no steeper than three horizontal feet to one vertical foot (3H:1V).*"

WaterBridge is requesting approval to use two Above Ground Storage Tanks (AST's) as containment structures at the WaterBridge Bond Recycle Facility. Based on our experience AST's work well for this purpose, they are structurally sound and easy to maintain. This AST will have vertical walls on both interior and exterior sides and thus requires a variance for use. The AST will, however, be double lined like other containments to limit the risk of leakage. 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 mratke@envirotechconsulting.com at your convenience.

Thank you for your consideration.
Best regards,

Envirotech Engineering & Consulting, Inc.

MITCHELL JOSEPH RATKE
NEW MEXICO
29736
PROFESSIONAL ENGINEER

10-18-2024

Mitchell Ratke, P.E.
Senior Project Engineer, Energy Infrastructure

ENVIROTECH
ENGINEERING

October 18, 2024

Ms. Victoria Venegas
New Mexico EMNRD
Oil Conservation Division

RE: Rule 34 Variance Request –Produced Water Impoundment Fencing

Ms. Venegas:

WaterBridge Stateline 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 11 of 13 in Appendix D Engineering Drawings.

The proposed fencing has been approved for other C-147 facilities and used extensively on similar projects in New Mexico and Texas with outstanding success in deterring unauthorized entry by both humans and wildlife. It should be noted that this variance request has been approved on previous sites.

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

Thank you for your consideration.
Best regards,

ENVIROTECH ENGINEERING & CONSULTING, INC.

MITCHELL JOSEPH RATKE
NEW MEXICO
29736
PROFESSIONAL ENGINEER
10-18-2024

Mitchell Ratke, P.E.
Senior Project Engineer, Energy Infrastructure

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

TABLE OF CONTENTS

APPENDICES:

SITE CRITERIA FOR RECYCLING CONTAINMENT

1.0 LOCATION

WaterBridge Stateline, LLC. is proposing to construct a recycle facility, Bond Recycle Facility, located in Section 20, Township 21 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 whether 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, 21 water wells were identified within a 1.0-mi radius of the proposed facility. The average groundwater depth that was recorded in the Banks Water Well Report is 79-ft. below ground surface. It should be noted that the report shows one well within the facility boundary, however this well is labeled as "Exploration." The Banks Water Well Report is included as *Appendix A*, and *Figure 2.1* illustrates that there are 21 water wells located within the 1.0-mi. radius 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) Indian Flats quadrangle, 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 21 water wells located within a 1.0-mi radius from the boundary of the proposed facility.

During onsite investigation, conducted by COZ Engineering, LLC. on August 28, 2024, five (5) total borings were advanced on the proposed facility location. Four (4) borings were drilled to a total depth of approximately 26-ft. bgs., and one (1) boring was drilled to a total depth of approximately 65-ft. bgs. The groundwater table was not encountered during the field investigation. The geotechnical engineering report prepared by COZ Engineering, LLC is included in *Appendix B*.

2.2 AQUIFERS

Information reviewed from the Bureau of Land Management (BLM) Carlsbad Field Office shows the proposed facility is located within an aquifer system labeled "Other". *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 proposed facility lies within the Eolian Deposits and the Piedmont Alluvial Deposits. The Piedmont Alluvial deposits include deposits of higher gradient tributaries bordering major stream valleys, alluvial veneers of the piedmont slope, and alluvial fans. They may locally include uppermost Pliocene deposits.

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 approximately 65-ft. bgs. was obtained from five (5) geotechnical borings conducted on the site by COZ Engineering, LLC on August 28, 2024. The borings identified the site conditions to be composed of silty sands. Soils were composed of silty sand, sandy silt, and clayey sands.

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 1.75-mi. to the west.
2. The closest freshwater field to the proposed facility is the Carlsbad Municipal Water System, located approximately 16.9-mi. to the southwest of the facility.

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 National Potash Eddy Mine, an active mining site. The subsurface potash mine is located approximately 6.9-mi. to the northeast 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 "medium" karst potential area.

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 35015C1100D and was effective on 06/04/2010. *Figure 6* demonstrates the area of the site is not located within a flood plain.

1. The proposed facility is located approximately 2-mi east of the nearest flood plain area mapped by FEMA.

7.0 DISTANCE TO SURFACE WATER

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

1. The closest continuously flowing surface waters or other water bodies defined by NMOCD are located 3.75-mi to the south of the proposed facility.

8.0 DISTANCE TO PERMANENT RESIDENCE OR STRUCTURES

The aerial image provided in *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. The only items of interest found were existing oil and gas infrastructure. No churches, schools, or residential structures were identified.
2. *Figure 8* and *Figure 1* show that the nearest structure to the site is oil and gas infrastructure.
3. It should be noted that there are some permanent residence structures west of the facility's western boundary, however they fall outside of the 1,000-ft. buffer area.

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. The New Mexico OSE POD GIS database shows an "exploration well" to be within the facility boundary. Since this well is not a spring or freshwater well used for domestic or stock water purposes, it clears the requirements set forth by the NMAC 19.15.34.11 Section A4. Figure 9 demonstrates the following:

1. The proposed facility is not located within 500-ft. horizontally of a spring or freshwater well.
2. No springs were identified within the proposed facility location.

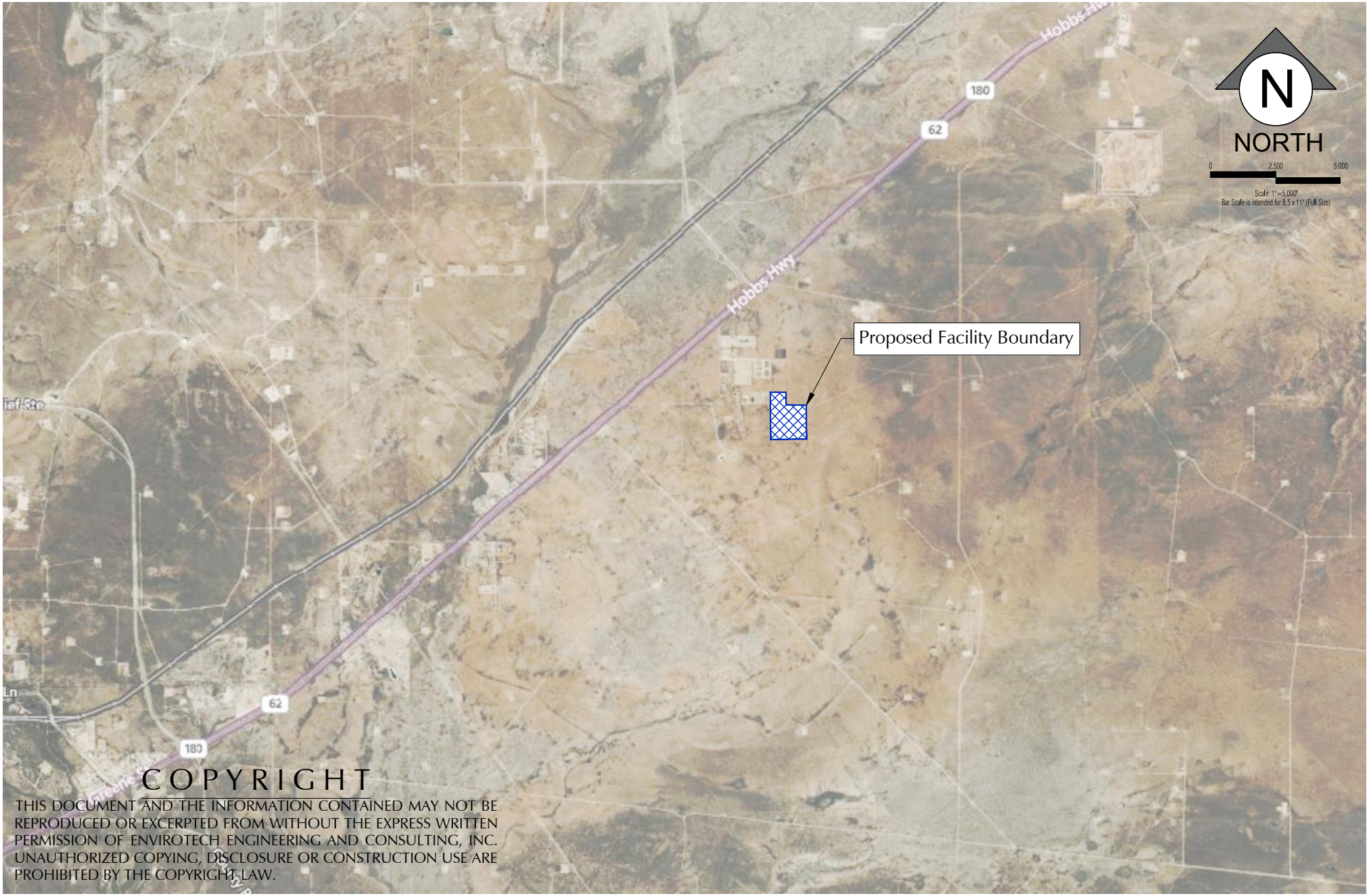
In addition, *Figure 2.1 (Groundwater Wells Map)* illustrates that the proposed facility location is not located within 500-ft. of known domestic or stock water wells.

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* depicts the proposed facility located within an area of a potential wetland. An on-site wetlands delineation was conducted, and it was determined that the area is not considered a wetland due to no presence of soils and plants associated to wetlands. See Appendix C for the Wetland Delineation Report. In addition, *Figure 10* illustrates the following:

1. The nearest potential wetland is located approximately 625-ft. to the southwest of the proposed facility location. The potential wetland closest to the proposed facility is labeled as a "Freshwater Pond" with a wetland code "PUBF."
2. The National Wetlands Inventory Maps do not show a potential wetland located within 500-ft. of the proposed facility location aside from the delineated wetland.

It should be noted the United States Fish and Wildlife Service generates the NWI maps through infrared aerial imagery and aerial photograph interpretation; 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 and a on-site investigation was used to final classification of the area.



ENVIROTECH
ENGINEERING
2500 N. Eleventh Street Enid, OK 73701 ● 580.234.8780 ● envirotechconsulting.com
PE #29736 - Expiration Date: 12-31-2024

Site Map

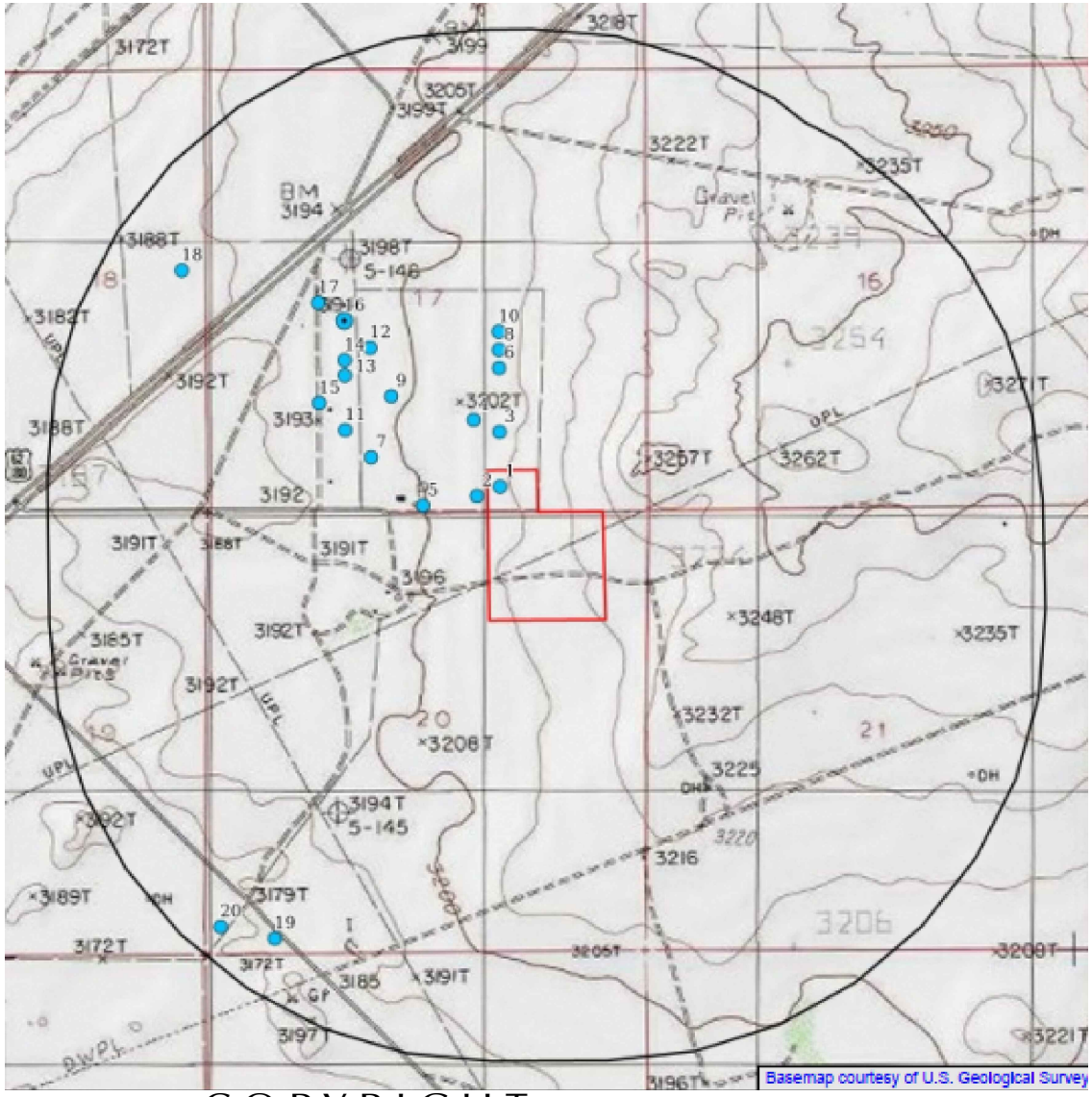
Bond Recycle Facility
Section 20, Township 21 South, Range 28 East,
Eddy County, New Mexico

WATERBRIDGE

Project No.
24.264-00

Figure 1

9/12/2024 9:49:59 AM
X:\Projects\2024\024078-00-000 Pilot Aguayo Recycle\Permit Package\AAApplication Figures\CAD\FIGURE 1 - SITE MAP.dwg



N

NORTH

Bond Recycle Facility

Single Water Well
Water Well Cluster
US WW,NM WW

Subject Site
Search Buffer

ENVIROTECH
ENGINEERING
2500 N. Eleventh Street Enid, OK 73701 ● 580.234.8780 ● envirotechconsulting.com
PE #29736 - Expiration Date: 12-31-2024

Groundwater Wells Map

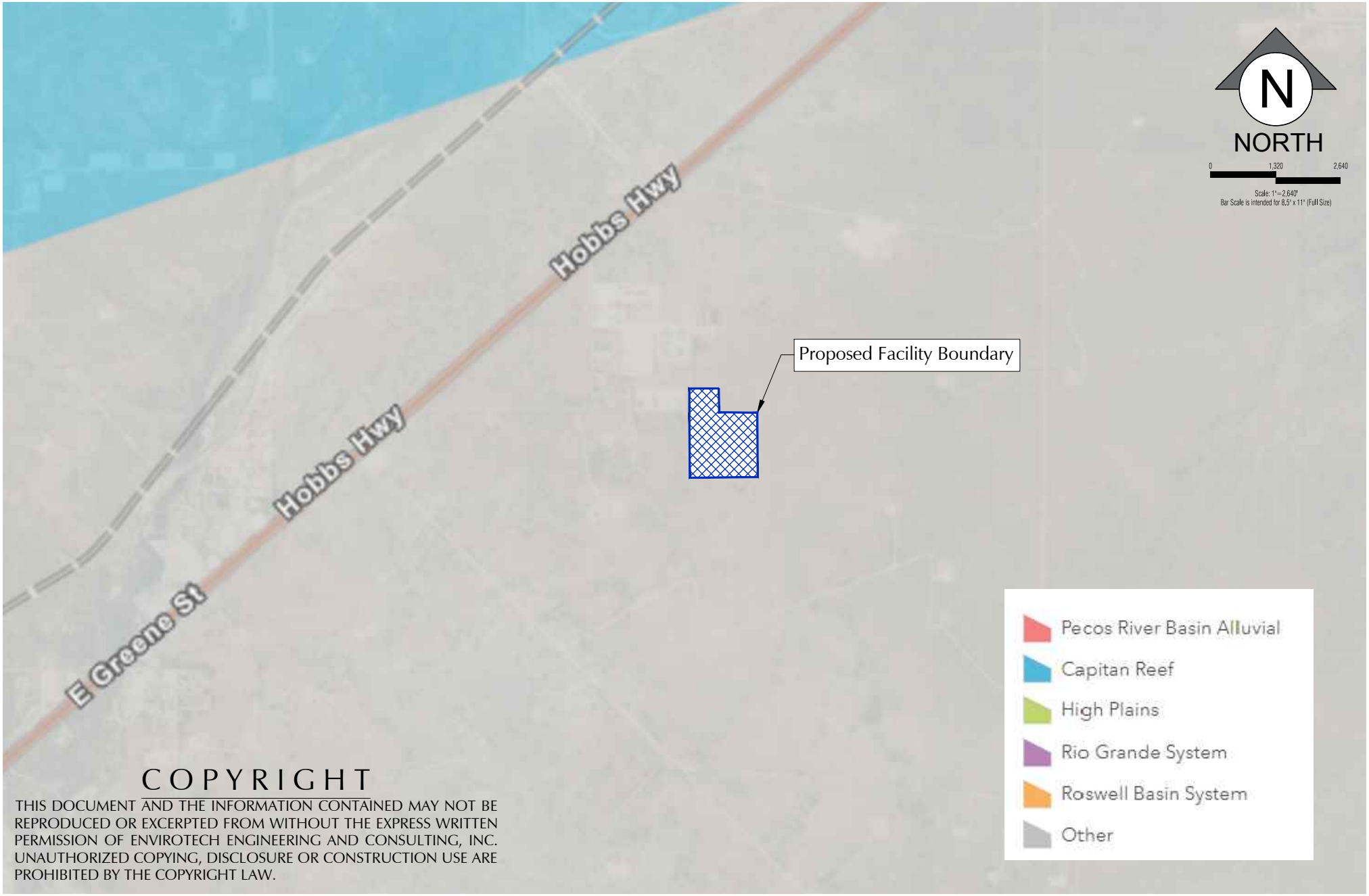
Bond Recycle Facility
Section 20, Township 21 South, Range 28 East,
Eddy County, New Mexico

WATERBRIDGE

Project No. 24.264-00

Figure 2.1

9/24/2024 12:43:30 PM
X:\Projects\2024\024.264-00-000 WaterBridge Bond Recycle\PERMIT PACKAGE\AA\plication Figures\CAD\FIGURE 2.1 - GROUNDWATER WELL MAP.dwg



ENVIROTECH
ENGINEERING
2500 N. Eleventh Street Enid, OK 73701 ● 580.234.8780 ● envirotechconsulting.com
PE #29736 - Expiration Date: 12-31-2024

New Mexico Aquifers Map

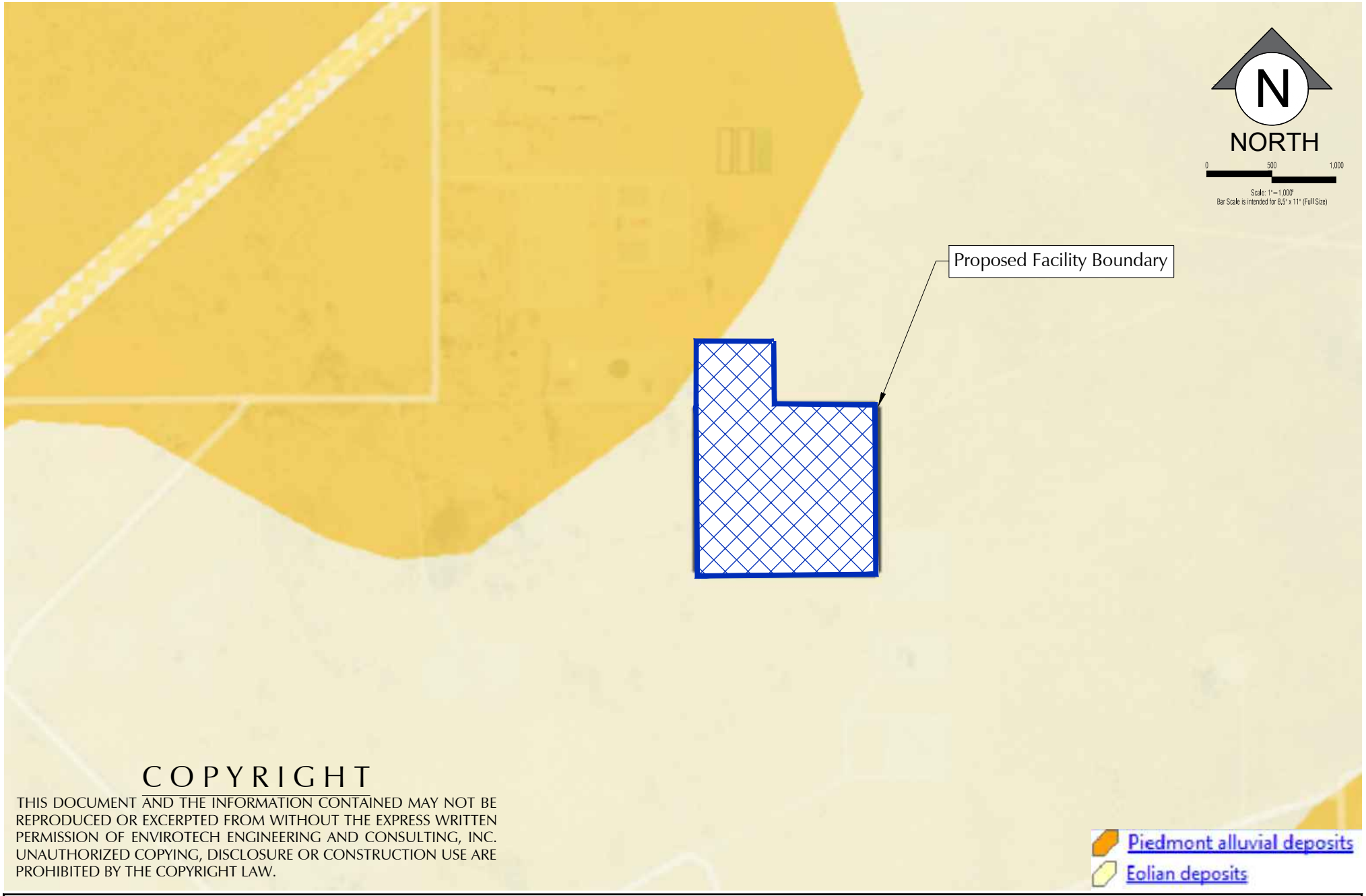
Bond Recycle Facility
Section 20, Township 21 South, Range 28 East,
Eddy County, New Mexico

WATERBRIDGE

Project No.
24.264-00

Figure 2.2

9/12/2024 9:50:10 AM
X:\Projects\2024\024078-000 Pilot Aguayo Recycle\Permit Package\AAApplication Figures\CAD\FIGURE 2.2 - NEW MEXICO AQUIFERS MAP.dwg



ENVIROTECH
ENGINEERING
2500 N. Eleventh Street Enid, OK 73701 ● 580.234.8780 ● envirotechconsulting.com
PE #29736 - Expiration Date: 12-31-2024

New Mexico Geological Map

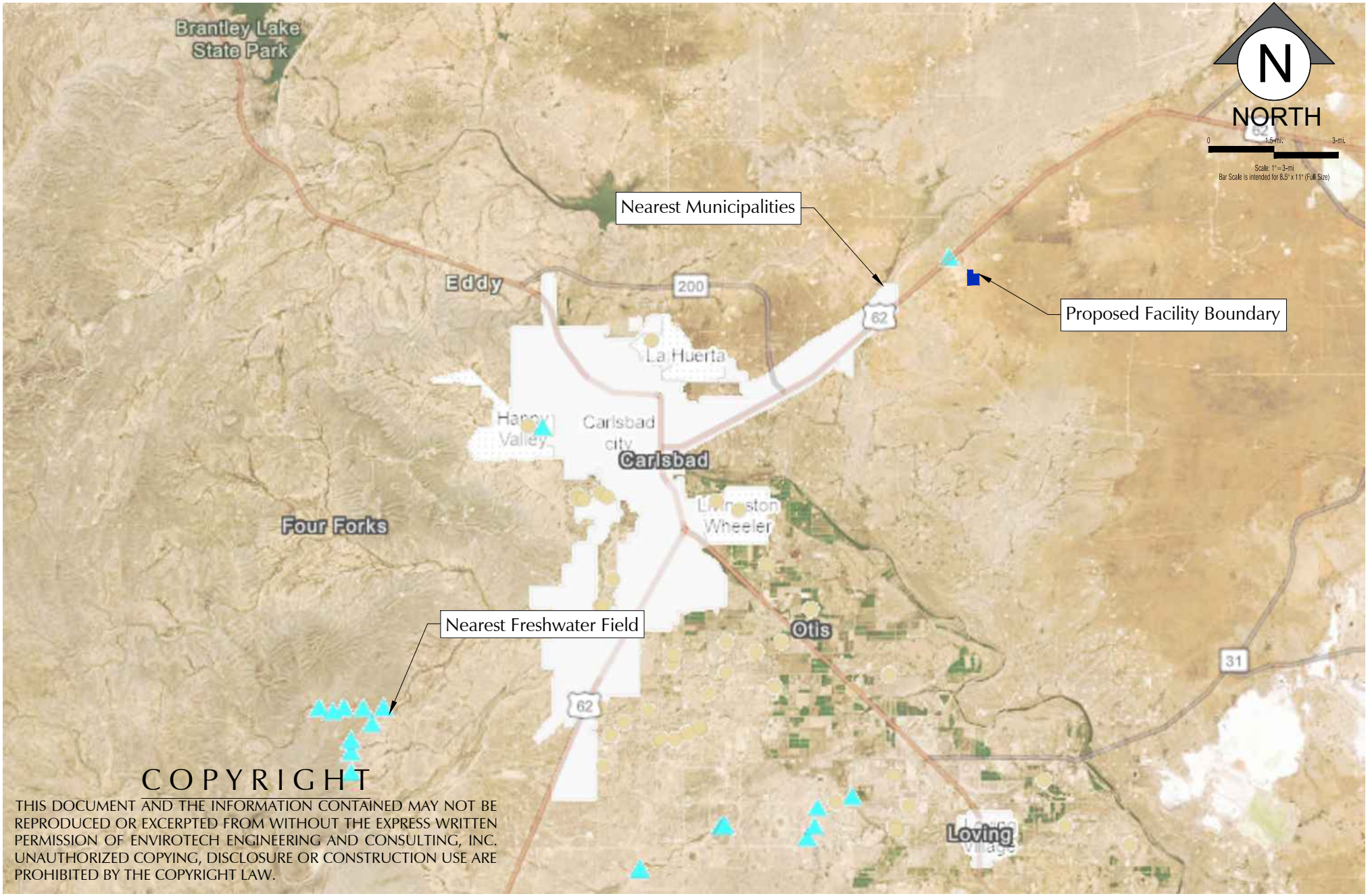
Bond Recycle Facility
Section 20, Township 21 South, Range 28 East,
Eddy County, New Mexico

WATERBRIDGE

Project No.
24.264-00

Figure 2.3

9/12/2024 9:50:15 AM
X:\Projects\2024\024078-000 Pilot Aguayo Recycle\Permit Package\AAApplication Figures\CAD\FIGURE 2.3 - NEW MEXICO GEOLOGICAL MAP.dwg



ENVIROTECH
ENGINEERING
2500 N. Eleventh Street Enid, OK 73701 ● 580.234.8780 ● envirotechconsulting.com
PE #29736 - Expiration Date: 12-31-2024

Municipalities & Freshwater Fields Map

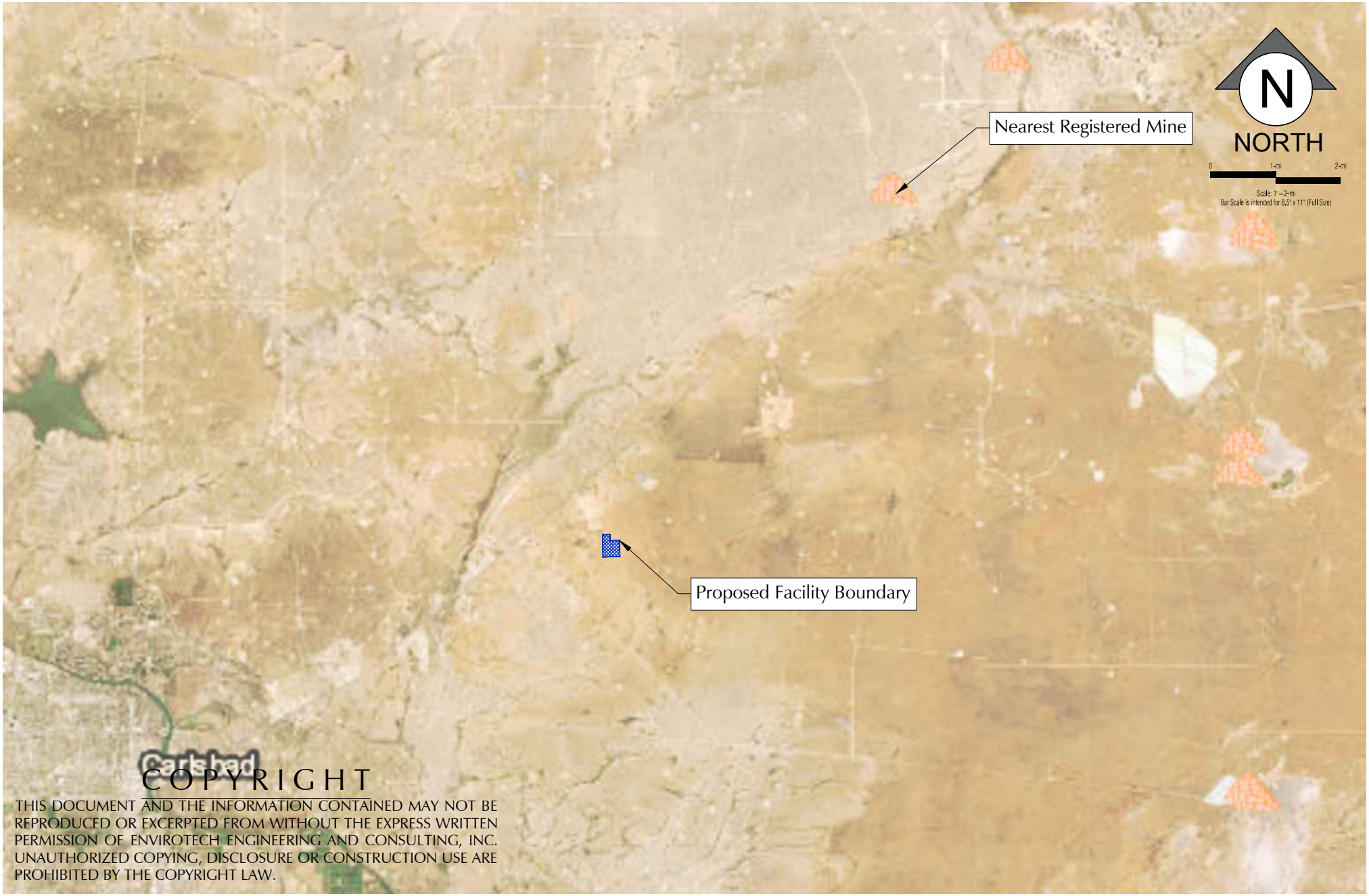
Bond Recycle Facility
Section 20, Township 21 South, Range 28 East,
Eddy County, New Mexico

WATERBRIDGE

Project No. 24.264-00

Figure 3

9/12/2024 9:50:20 AM
X:\Projects\2024\024078-000 Pilot Aguayo Recycle\Permit Package\AAApplication Figures\CAD\FIGURE 3 - MUNICIPALITIES & FRESHWATER FIELDS MAP.dwg



ENVIROTECH
ENGINEERING
2500 N. Eleventh Street Enid, OK 73701 ● 580.234.8780 ● envirotechconsulting.com
PE #29736 - Expiration Date: 12-31-2024

New Mexico Registered Mines Map

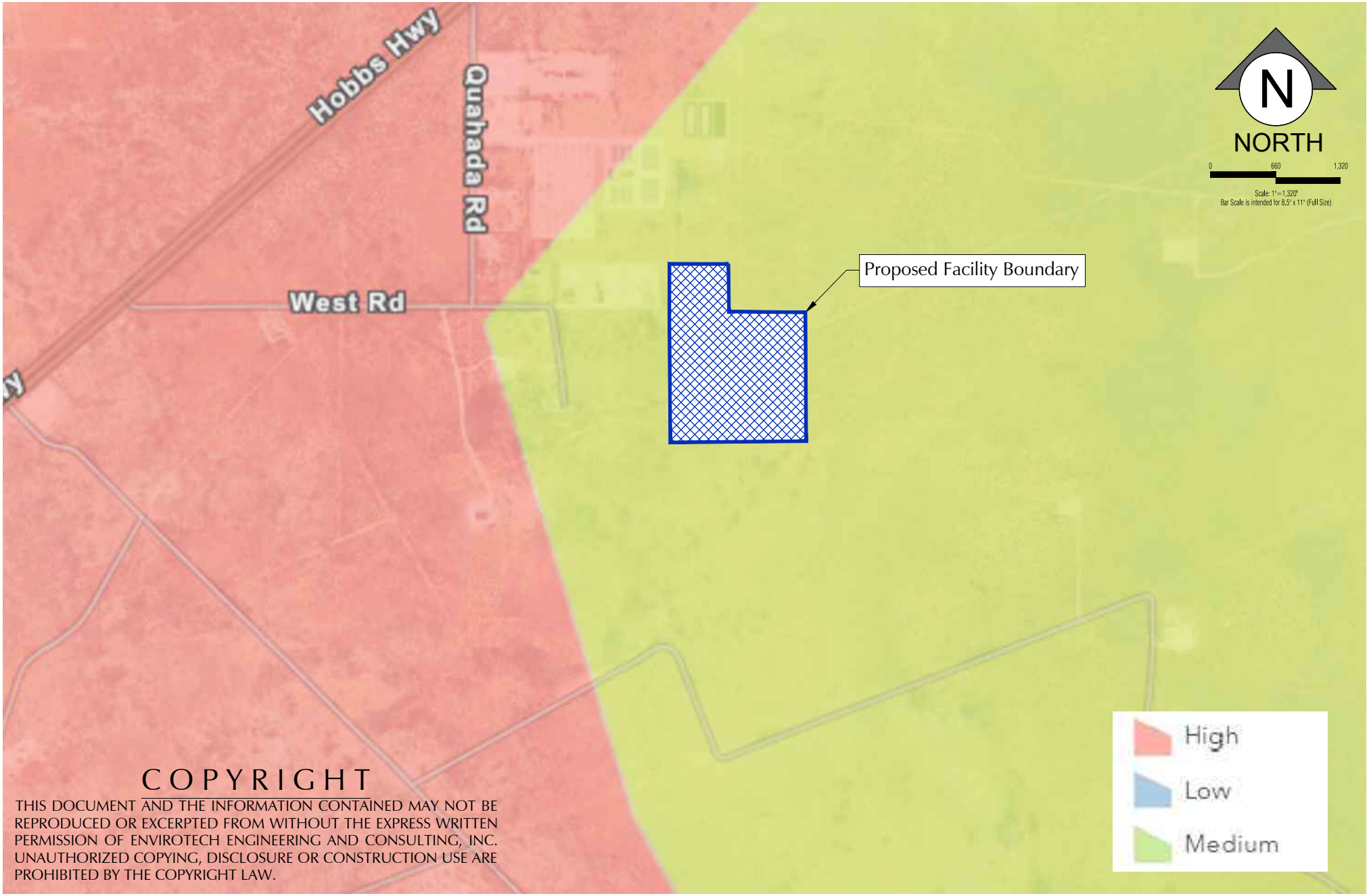
Bond Recycle Facility
Section 20, Township 21 South, Range 28 East,
Eddy County, New Mexico

WATERBRIDGE

Project No. 24.264-00

Figure 4

9/12/2024 9:50:25 AM
X:\Projects\2024\024078-000 Pilot Aguayo Recycle\Permit Package\AAApplication Figures\CAD\FIGURE 4 - NEW MEXICO REGISTERED MINES MAP .dwg



ENVIROTECH
ENGINEERING
2500 N. Eleventh Street Enid, OK 73701 ● 580.234.8780 ● envirotechconsulting.com
PE #29736 - Expiration Date: 12-31-2024

Karst and Cave Potential Map

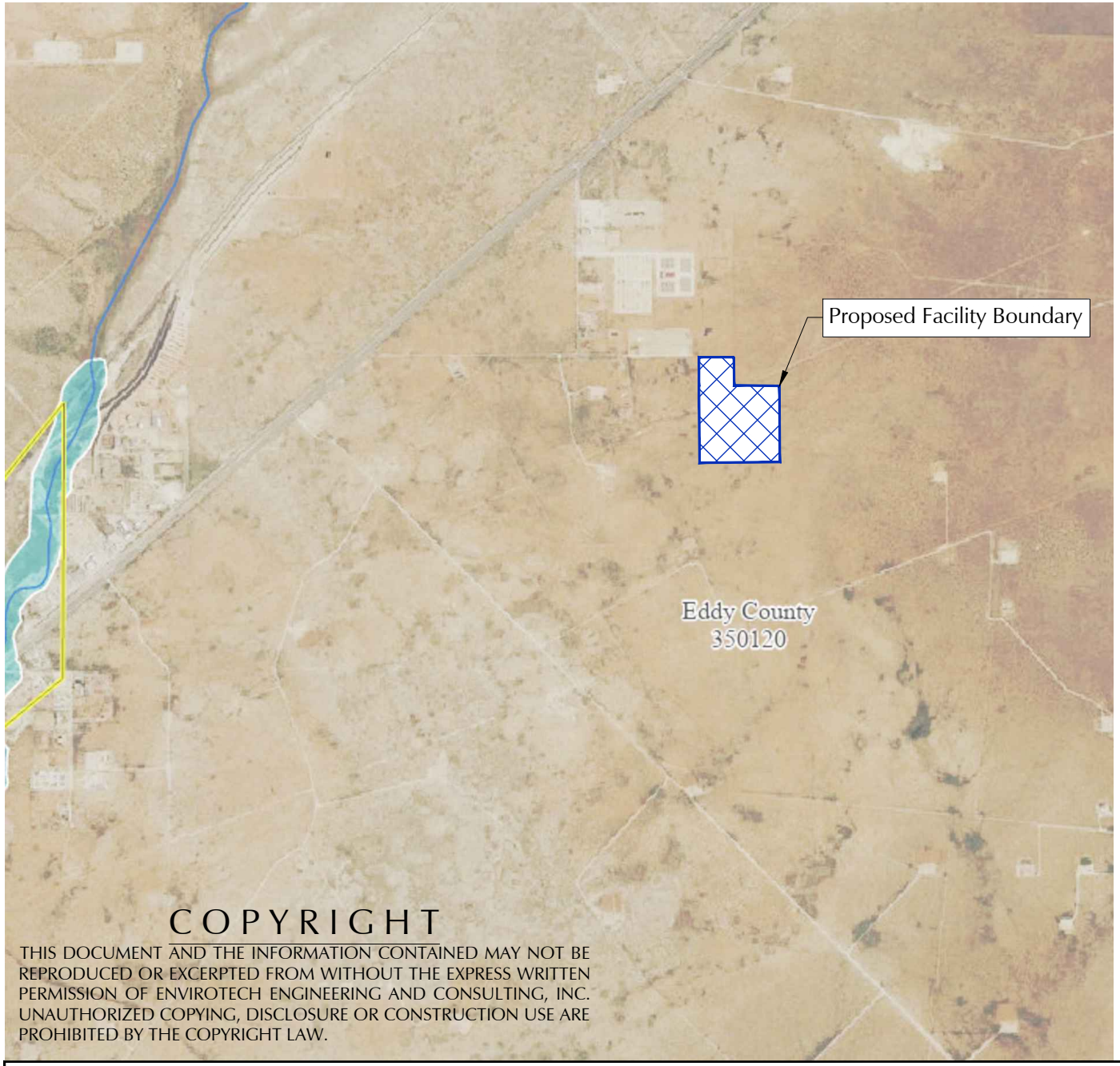
Bond Recycle Facility
Section 20, Township 21 South, Range 28 East,
Eddy County, New Mexico

WATERBRIDGE

Project No. 24.264-00

Figure 5

9/12/2024 9:50:31 AM
X:\Projects\2024\024-264-00-000 WaterBridge Bond Recycle\PERMIT PACKAGE\AAApplication Figures\CAD\ FIGURE 5 - KARST AND CAVE MAP.dwg



N
NORTH

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, V, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee. See Notes. Zone X
- Area with Flood Risk due to Levee Zone D

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard Zone X
- Effective LOMRs
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

ENVIROTECH
ENGINEERING
2500 N. Eleventh Street Enid, OK 73701 ● 580.234.8780 ● envirotechconsulting.com
PE #29736 - Expiration Date: 12-31-2024

FEMA Flood Map

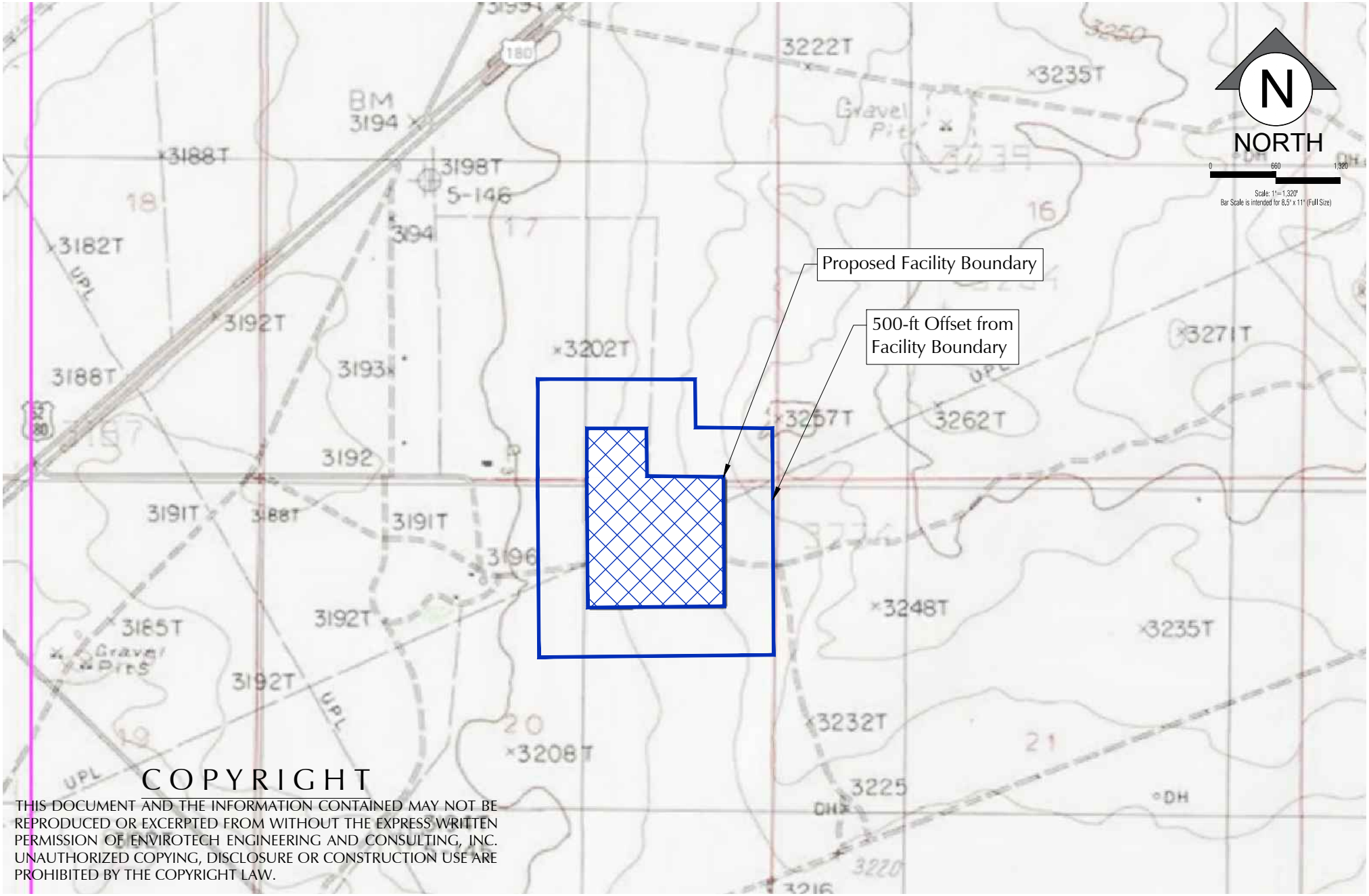
Bond Recycle Facility
Section 20, Township 21 South, Range 28 East,
Eddy County, New Mexico

WATERBRIDGE

Project No. 24.264-00

Figure 6

9/12/2024 9:50:36 AM
X:\Projects\2024\024078-00-000 Pilot Aguayo Recycle\Permit Package\AAApplication Figures\CAD\FIGURE 6 - FEMA FLOOD MAP.dwg



ENVIROTECH
ENGINEERING
2500 N. Eleventh Street Enid, OK 73701 ● 580.234.8780 ● envirotechconsulting.com
PE #29736 - Expiration Date: 12-31-2024

Surface Water Map

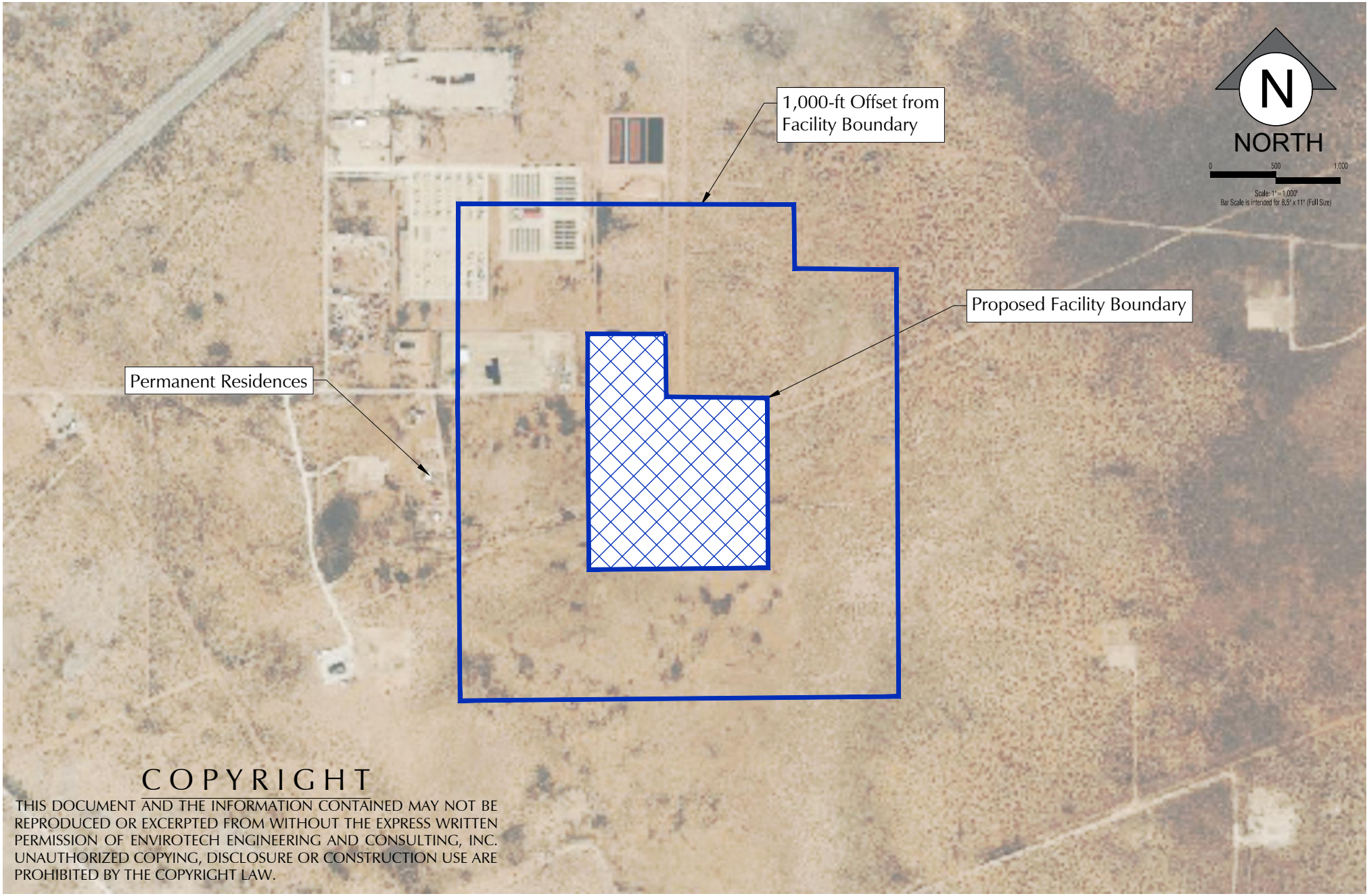
Bond Recycle Facility
Section 20, Township 21 South, Range 28 East,
Eddy County, New Mexico

WATERBRIDGE

Project No. 24.264-00

Figure 7

9/12/2024 9:50:41 AM
X:\Projects\2024\024078-00-000 Pilot Aguayo Recycle\Permit Package\AAApplication Figures\CAD\FIGURE 7 - SURFACE WATER MAP.dwg



ENVIROTECH
ENGINEERING
2500 N. Eleventh Street Enid, OK 73701 ● 580.234.8780 ● envirotechconsulting.com
PE #29736 - Expiration Date: 12-31-2024

Permanent Residences & Structures Map

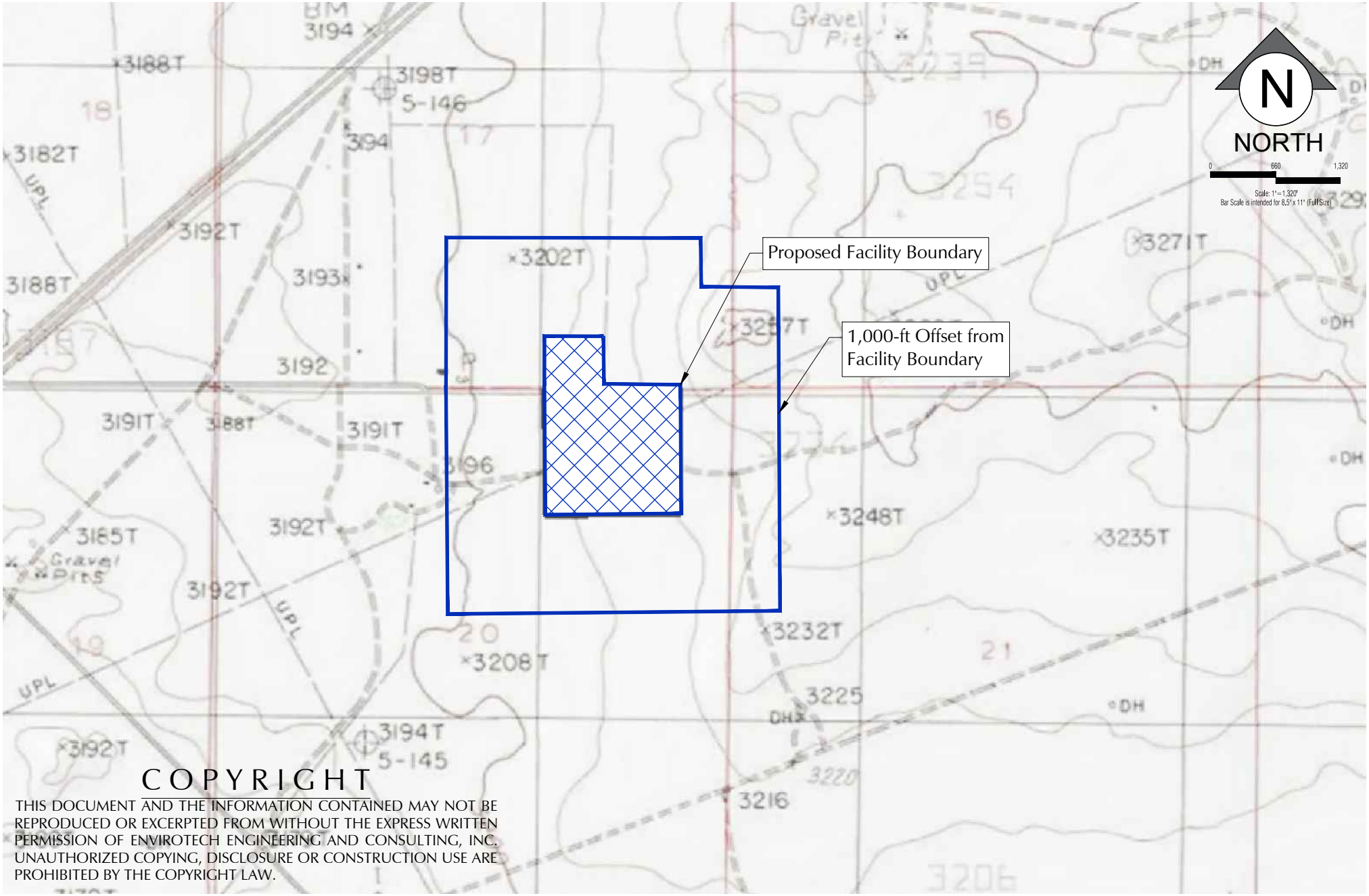
Bond Recycle Facility
Section 20, Township 21 South, Range 28 East,
Eddy County, New Mexico

WATERBRIDGE

Project No. 24.264-00

Figure 8

9/26/2024 3:21:07 PM
X:\Projects\2024\024078-000 Pilot Aguayo Recycle\Permit Package\AAApplication Figures\CAD\FIGURE 8 - PERMANENT RESIDENCE AND STRUCTURES MAP.dwg



ENVIROTECH
ENGINEERING
2500 N. Eleventh Street Enid, OK 73701 ● 580.234.8780 ● envirotechconsulting.com
PE #29736 - Expiration Date: 12-31-2024

Non-Public Water Supply Map

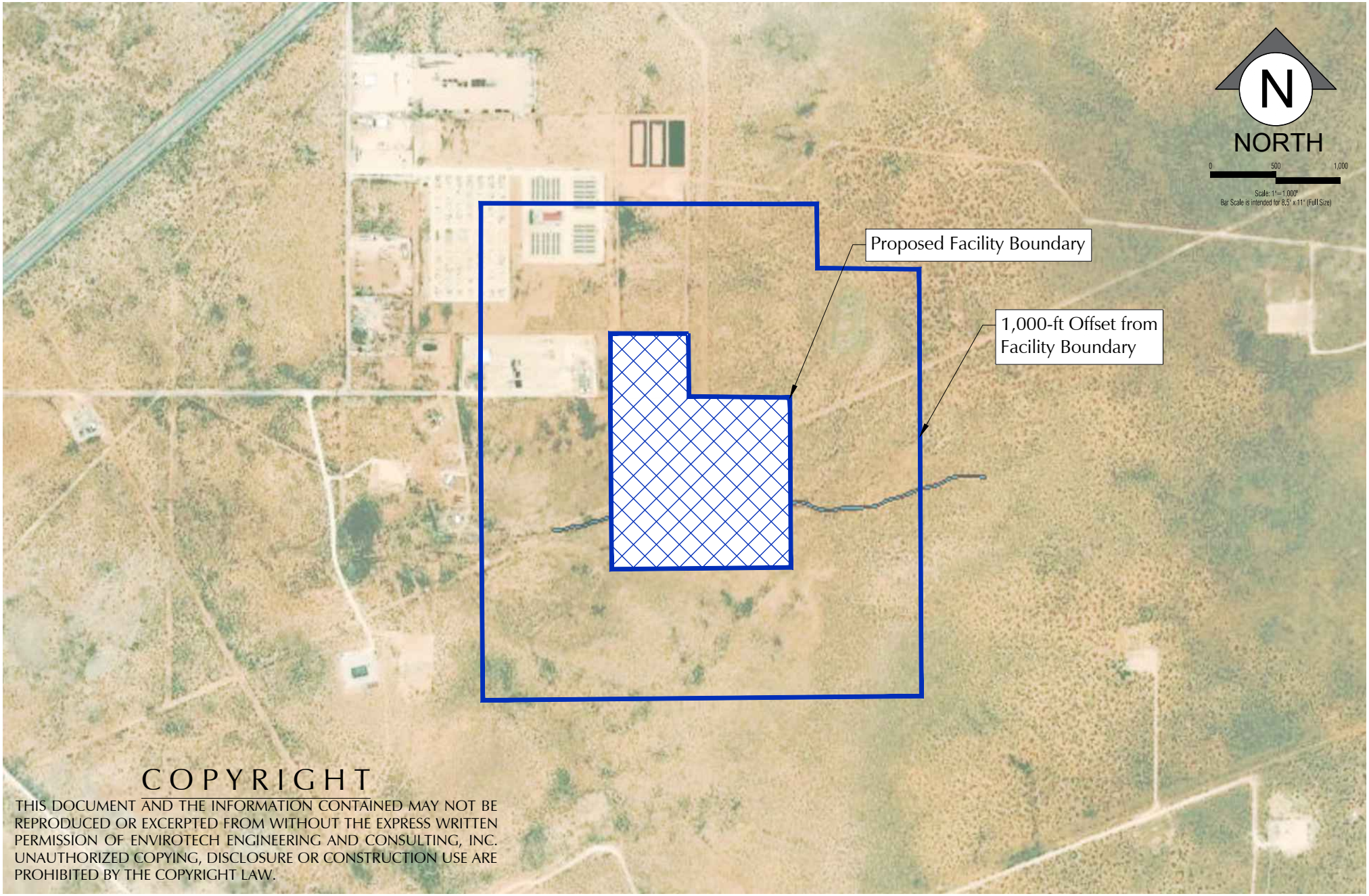
Bond Recycle Facility
Section 20, Township 21 South, Range 28 East,
Eddy County, New Mexico

WATERBRIDGE

Project No. 24.264-00

Figure 9

9/12/2024 9:50:52 AM
X:\Projects\2024\02407\400-000 Pilot Aguayo Recycle\Permit Package\AAApplication Figures\CAD\FIGURE 9 - NON-PUBLIC WATER SUPPLY MAP.dwg



ENVIROTECH
ENGINEERING
2500 N. Eleventh Street Enid, OK 73701 ● 580.234.8780 ● envirotechconsulting.com
PE #29736 - Expiration Date: 12-31-2024

NWI Wetlands Map

Bond Recycle Facility
Section 20, Township 21 South, Range 28 East,
Eddy County, New Mexico

WATERBRIDGE

Project No. 24.264-00

Figure 10

9/12/2024 9:50:57 AM
X:\Projects\2024\024078-00-000 Pilot Aguayo Recycle\Permit Package\AAA\plication Figures\CAD\FIGURE 10 - NWI WETLANDS MAP.dwg

APPENDIX A

BANKS WATER WELL REPORT

Prepared for:
ENVIROTECH ENGINEERING & CONSULTING, INC. - OKC
2500 N. 11th St
Enid, OK 73701

BANKS ENVIRONMENTAL DATA
A DIVISION OF THE BANKS GROUP

Water Well Report

Bond Recycle Facility

NM

Eddy County

PO #: 024264-00

ES-144626

Monday, September 23, 2024

Table of Contents

Geographic Summary

Location
Eddy County, NM
Subject property is 47.95 acres, 0.075 square miles, and has a 1.20 mile perimeter

Coordinates (centroid)	
Lat/Long in Degrees Minutes Seconds	32° 28' 18.73", -104° 6' 15.19"
Lat/Long in Decimal Degrees	32.47187030952681, -104.10422004639301
X/Y in NAD83 / UTM Zone 13N	584176.4805435049, 3593093.69591195

Elevation (centroid)
Subject Property lies 3216.24 feet above sea level.

Zip Codes Searched	
Search Distance	**Zip Codes**
Subject Property	88220
1.0 miles	88210, 88220

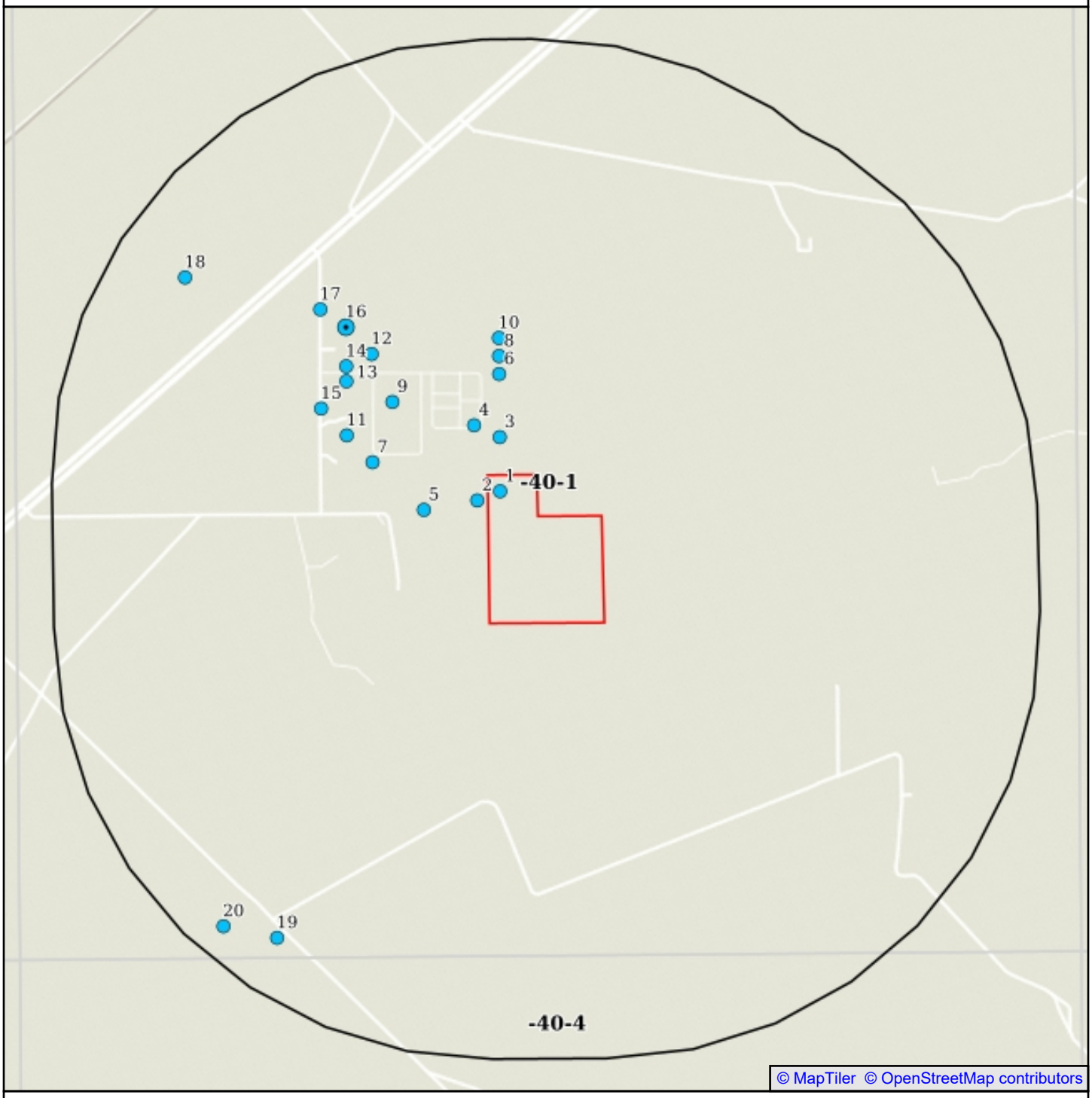
Topos Searched	
Search Distance	**Topo Name**
Subject Property	Indian Flats
1.0 miles	Indian Flats

Water Well Summary

Datasets Searched	Distance	Total
US Water Well (WW)	1.0	4
NM Water Well (WW)	1.0	17
Total Wells Found		**21**

Summary Map - 1.0 Mile Radius

BANKS ENVIRONMENTAL DATA
A DIVISION OF THE BANKS GROUP



Bond Recycle Facility

Single Water Well
Water Well Cluster
US WW,NM WW

Subject Site
Search Buffer
Texas Quad Index

0' 1167' 2333'

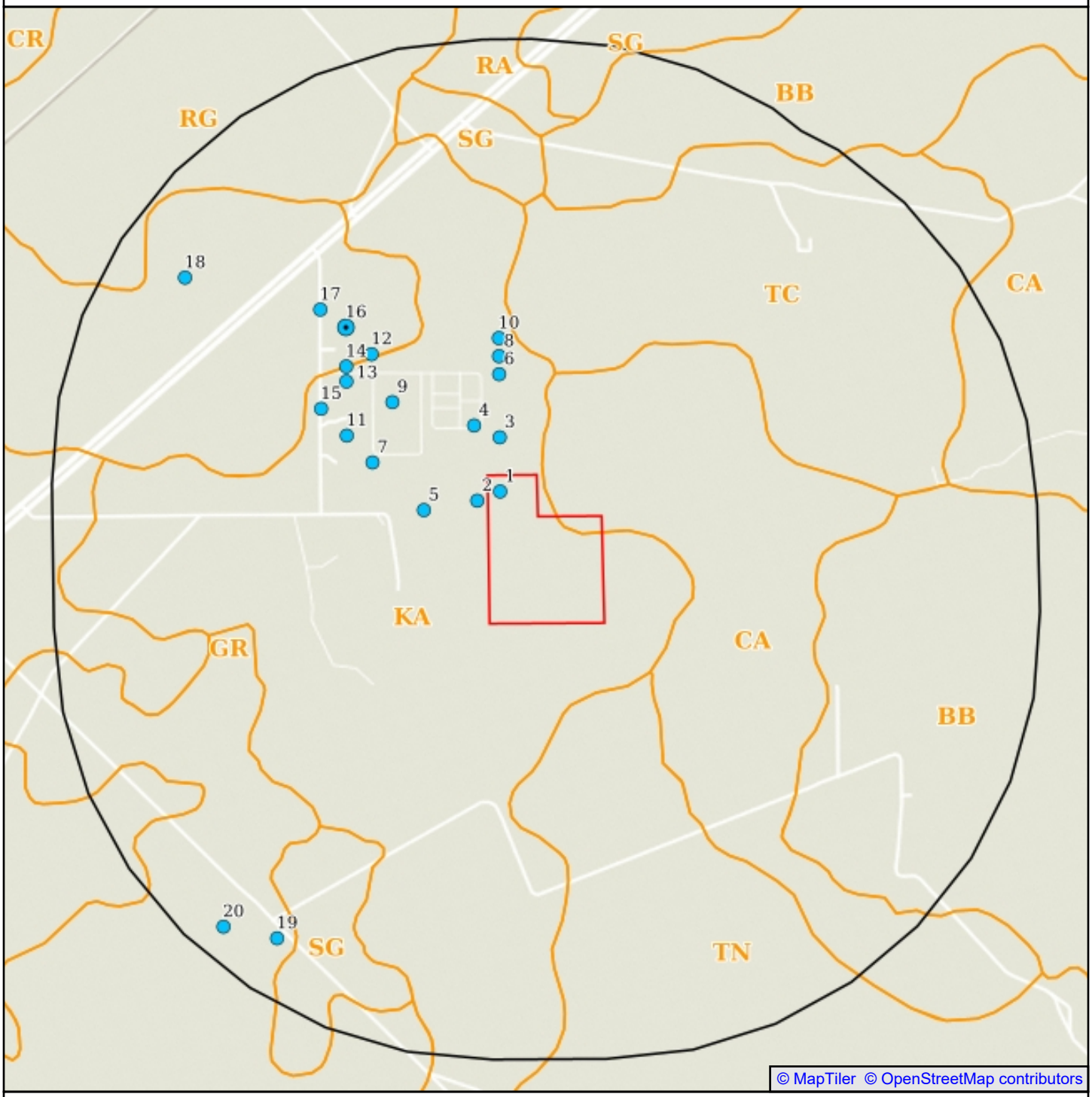
1:21000
1 in = 1750 ft
1 in = 0.331 mi
1 cm = 210 m
1 cm = 0.210 km

N

NAD83 / UTM Zone 13N
North American Datum 1983
Western Meridian: 108 0' 00" West
Eastern Meridian: 102 0' 00" West
Latitude of Origin: 0 0' 00" North

Soil Survey Map - 1.0 Mile Radius

BANKS ENVIRONMENTAL DATA
A DIVISION OF THE BANKS GROUP



Bond Recycle Facility

Single Water Well
Water Well Cluster
US WW,NM WW

Subject Site
Search Buffer
Soils Boundary

0' 1167' 2333'

1:21000
1 in = 1750 ft
1 in = 0.331 mi
1 cm = 210 m
1 cm = 0.210 km

N

NAD83 / UTM Zone 13N
North American Datum 1983
Western Meridian: 108 0' 00" West
Eastern Meridian: 102 0' 00" West
Latitude of Origin: 0 0' 00" North

Soils Details

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Soil Types Found	
Subject Property	CA, KA
Within 1.0 miles of Subject Property	BB, GR, RA, RG, SG, TC, TN

Soil Type Descriptions

CA - Cacique loamy sand, 0 to 3 percent slopes, eroded

Percent Hydric	0
Minimum Depth to Bedrock	

Cacique (97%)

Hydrologic Group	Moderately high runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	Moderate
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loamy sand	0 cm	13 cm	A-2	SM
H2	Sandy clay loam	13 cm	61 cm	A-2, A-6	SC
H3	Indurated	61 cm	152 cm		

Berino (1%)

Hydrologic Group	Moderately low runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loamy fine sand	0 cm	43 cm	A-2	SM
H2		43 cm	127 cm	A-4, A-6	CL, CL-ML, SC, SC-SM
H3	Loamy sand	127 cm	152 cm	A-2	SM

Berino (1%)

Hydrologic Group	Moderately low runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Fine sandy loam	0 cm	43 cm	A-2, A-4	SM
H2		43 cm	127 cm	A-4, A-6	CL, CL-ML, SC, SC-SM
H3	Loamy sand	127 cm	152 cm	A-2	SM

Dune land (1%)

Hydrologic Group	Low runoff potential
Soil Drainage Class	Excessively drained
Corrosion Potential - Uncoated Steel	
Depth to Restrictive Feature	

Soils Details

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Fine sand	0 cm	15 cm	A-2, A-3	SM, SP, SP-SM
H2		15 cm	152 cm	A-2, A-3	SM, SP, SP-SM

KA - Karro fine sandy loam, 0 to 3 percent slopes	
Percent Hydric	0
Minimum Depth to Bedrock	

Karro (98%)	
Hydrologic Group	Moderately high runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	Moderate
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Fine sandy loam	0 cm	25 cm	A-4	ML
H2	Loam	25 cm	229 cm	A-4, A-6	CL, CL-ML

Reagan (1%)	
Hydrologic Group	Moderately low runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loam	0 cm	20 cm	A-6	CL
H2		20 cm	152 cm	A-6, A-7-6	CL

Russler (1%)	
Hydrologic Group	Moderately high runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loam	0 cm	28 cm	A-6	CL
H2		28 cm	114 cm	A-6	CL
H3	Gypsiferous material	114 cm	152 cm		

BB - Berino complex, 0 to 3 percent slopes, eroded	
Percent Hydric	0
Minimum Depth to Bedrock	

Berino (60%)	
Hydrologic Group	Moderately low runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	Moderate
Depth to Restrictive Feature	

Soils Details

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Fine sand	0 cm	43 cm	A-2	SM
H2	Sandy clay loam	43 cm	147 cm	A-4, A-6	CL, CL-ML, SC, SC-SM
H3	Loamy sand	147 cm	152 cm	A-2	SM

Pajarito (25%)	
Hydrologic Group	Low runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	Moderate
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loamy fine sand	0 cm	23 cm	A-2	SM
H2	Fine sandy loam	23 cm	183 cm	A-2, A-4	SM

Cacique (4%)	
Hydrologic Group	Moderately high runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loamy sand	0 cm	13 cm	A-2	SM
H2	Sandy clay loam	13 cm	61 cm	A-2, A-6	SC
H3	Indurated	61 cm	71 cm		

Pajarito (4%)	
Hydrologic Group	Moderately low runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loamy fine sand	0 cm	33 cm	A-2	SM
H2		33 cm	91 cm	A-2, A-4	SM
H3		91 cm	152 cm	A-2, A-4	ML, SM

Wink (4%)	
Hydrologic Group	Moderately low runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loamy fine sand	0 cm	20 cm	A-2-4	SC-SM, SM
H2		20 cm	97 cm	A-2-4, A-4	SC-SM, SM
H3	Variable	97 cm	152 cm	A-4	CL-ML, GC, SC, SC-SM

Soils Details

Kermit (3%)	
Hydrologic Group	Low runoff potential
Soil Drainage Class	Excessively drained
Corrosion Potential - Uncoated Steel	Moderate
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Fine sand	0 cm	18 cm	A-2, A-3	SM, SP-SM
H2		18 cm	152 cm	A-3	SP, SP-SM

GR - Gypsum land-Reeves complex, 0 to 3 percent slopes, eroded	
Percent Hydric	0
Minimum Depth to Bedrock	

Gypsum land (55%)	
Hydrologic Group	
Soil Drainage Class	
Corrosion Potential - Uncoated Steel	
Depth to Restrictive Feature	

Reeves (35%)	
Hydrologic Group	Moderately low runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Sandy loam	0 cm	20 cm	A-6	CL
H2	Clay loam	20 cm	81 cm	A-6	CL
H3	Gypsiferous material	81 cm	152 cm		

Unnamed soils (10%)	
Hydrologic Group	
Soil Drainage Class	
Corrosion Potential - Uncoated Steel	
Depth to Restrictive Feature	

RA - Reagan loam, 0 to 3 percent slopes	
Percent Hydric	0
Minimum Depth to Bedrock	

Reagan (98%)	
Hydrologic Group	Moderately low runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Soils Details

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loam	0 cm	20 cm	A-6	CL
H2	Loam	20 cm	152 cm	A-6, A-7-6	CL

Atoka (1%)	
Hydrologic Group	Moderately high runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loam	0 cm	20 cm	A-4	CL-ML
H2		20 cm	84 cm	A-4, A-6	CL, CL-ML
H3	Indurated	84 cm	94 cm		

Upton (1%)	
Hydrologic Group	Moderately high runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Gravelly loam	0 cm	20 cm	A-4, A-6	CL, GC, SC
H2		20 cm	30 cm	A-4, A-6	CL, GC, SC
H3	Cemented	30 cm	53 cm		
H4		53 cm	152 cm	A-2, A-4, A-6	GC, GP-GC, SC, SP-SC

RG - Reeves-Gypsum land complex, 0 to 3 percent slopes	
Percent Hydric	0
Minimum Depth to Bedrock	

Reeves (55%)	
Hydrologic Group	Moderately low runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loam	0 cm	20 cm	A-6	CL
H2	Clay loam	20 cm	81 cm	A-6	CL
H3	Gypsiferous material	81 cm	152 cm		

Gypsum land (30%)	
Hydrologic Group	
Soil Drainage Class	
Corrosion Potential - Uncoated Steel	
Depth to Restrictive Feature	

Soils Details

Cottonwood (5%)	
Hydrologic Group	Moderately high runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loam	0 cm	23 cm	A-4, A-6	CL, CL-ML
H2	Bedrock	23 cm	152 cm		

Largo (5%)	
Hydrologic Group	Moderately low runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loam	0 cm	10 cm	A-4	CL-ML
H2		10 cm	119 cm	A-4	CL-ML
H3		119 cm	152 cm	A-6	CL

Reagan (5%)	
Hydrologic Group	Moderately low runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loam	0 cm	20 cm	A-6	CL
H2		20 cm	152 cm	A-6, A-7-6	CL

SG - Simona gravelly fine sandy loam, 0 to 3 percent slopes	
Percent Hydric	1
Minimum Depth to Bedrock	

Simona (95%)	
Hydrologic Group	High runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	Moderate
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Gravelly fine sandy loam	0 cm	48 cm	A-2, A-4	GM, SM
H2	Indurated	48 cm	58 cm		

Soils Details

Simona (4%)	
Hydrologic Group	High runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Sandy loam	0 cm	15 cm	A-4	SM
H2		15 cm	51 cm	A-2, A-4	GM, ML, SM
H3	Indurated	51 cm	61 cm		

Playa (1%)	
Hydrologic Group	Moderately low runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	Moderate
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Fine sandy loam	0 cm	94 cm	A-4	SC, SC-SM, CL, CL-ML
H2	Sandy clay loam	94 cm	152 cm	A-4, A-6	CL, SC, SC-SM

TC - Tonuco loamy sand, 0 to 3 percent slopes, eroded	
Percent Hydric	0
Minimum Depth to Bedrock	

Tonuco (98%)	
Hydrologic Group	High runoff potential
Soil Drainage Class	Excessively drained
Corrosion Potential - Uncoated Steel	Low
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loamy sand	0 cm	13 cm	A-1	SM, SP-SM
H2	Loamy fine sand	13 cm	38 cm	A-1, A-2, A-3	SM, SP-SM
H3	Indurated	38 cm	48 cm		

Dune land (1%)	
Hydrologic Group	Low runoff potential
Soil Drainage Class	Excessively drained
Corrosion Potential - Uncoated Steel	
Depth to Restrictive Feature	

Tonuco (1%)	
Hydrologic Group	High runoff potential
Soil Drainage Class	Excessively drained
Corrosion Potential - Uncoated Steel	Moderate
Depth to Restrictive Feature	

Soils Details

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loamy sand	0 cm	13 cm		SM, SP-SM
H2		13 cm	38 cm		SM, SP-SM
H3	Indurated	38 cm	48 cm		

TN - Tonuco loamy fine sand, 0 to 3 percent slopes, eroded	
Percent Hydric	0
Minimum Depth to Bedrock	

Tonuco (98%)	
Hydrologic Group	High runoff potential
Soil Drainage Class	Excessively drained
Corrosion Potential - Uncoated Steel	Low
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loamy fine sand	0 cm	13 cm	A-1, A-2, A-3	SM, SP-SM
H2	Loamy fine sand	13 cm	38 cm	A-1, A-2, A-3	SM, SP-SM
H3	Indurated	38 cm	48 cm		

Dune land (1%)	
Hydrologic Group	Low runoff potential
Soil Drainage Class	Excessively drained
Corrosion Potential - Uncoated Steel	
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Fine sand	0 cm	15 cm	A-2, A-3	SM, SP, SP-SM
H2		15 cm	152 cm	A-2, A-3	SM, SP, SP-SM

Tonuco (1%)	
Hydrologic Group	High runoff potential
Soil Drainage Class	Excessively drained
Corrosion Potential - Uncoated Steel	Moderate
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loamy sand	0 cm	13 cm	A-1	SM, SP-SM
H2		13 cm	38 cm	A-1, A-2, A-3	SM, SP-SM
H3	Indurated	38 cm	48 cm		

Soils Descriptions

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

AASHTO Classification Definitions	
A-1, A-1-a, A-1-b	Granular materials (35% or less passing No. 200 sieve), sonte fragments, gravel and sand
A-2, A-2-4, A-2-5, A-2-6, A-2-7	Granular materials (35% or less passing No. 200 sieve), silty or clayey gravel and sand
A-3	Granular materials (35% or less passing No. 200 sieve), fine sand
A-4	Silt-Clay materials (more than 35% passing No. 200 sieve), silty soils
A-5	Silt-Clay materials (more than 35% passing No. 200 sieve), silty soils
A-6	Silt-Clay materials (more than 35% passing No. 200 sieve), clayey soils
A-7, A-7-5, A-7-6	Silt-Clay materials (more than 35% passing No. 200 sieve), clayey soils
A-8	Silt-Clay materials (more than 35% passing No. 200 sieve), clayey soils

Unified Classification Definitions	
CH	Fine-grained soils, silts and clays (liquid limit is 50% or more), Fat Clay
CL, CL-A (proposed), CL-K (proposed), CL-ML, CL-O (proposed), CL-T (proposed)	Fine-grained soils, silts and clays (liquid limit is less than 50%), Lean Clay
GC, GC-GM	Coarse-grained soils, Gravels, gravel with fines, Clayey Gravel
GM	Coarse-grained soils, Gravels, gravel with fines, Silty Gravel
GP, GP-GC, GP-GM	Coarse-grained soils, Gravels, clean gravels, Poorly Graded Gravel
GW, GW-GC, GW-GM	Coarse-grained soils, Gravels, clean gravels, Well-Graded Gravel
MH, MH-A, MH-K, MH-O, MH-T	Fine-grained soils, silts and clays (liquid limit is 50% or more), Elastic Silt
ML, ML-A (proposed), ML-K (proposed), ML-O (proposed), ML-T (proposed)	Fine-grained soils, silts and clays (liquid limit is less than 50%), Silt
OH, OH-T (proposed)	Fine-grained soils, silts and clays (liquid limit is 50% or more), Organic Clay or Organic Silt
OL	Fine-grained soils, silts and clays (liquid limit is less than 50%), Organic Clay or Organic Silt
PT	Highly organic soils, Peat
SC, SC-SM	Coarse-grained soils, Sands, sands with fines, Clayey Sand
SM	Coarse-grained soils, Sands, sands with fines, Silty Sand
SP, SP-SC, SP-SM	Coarse-grained soils, Sands, clean sands, Poorly Graded Sand
SW, SW-SC, SW-SM	Coarse-grained soils, Sands, clean sands, Well-Graded Sand

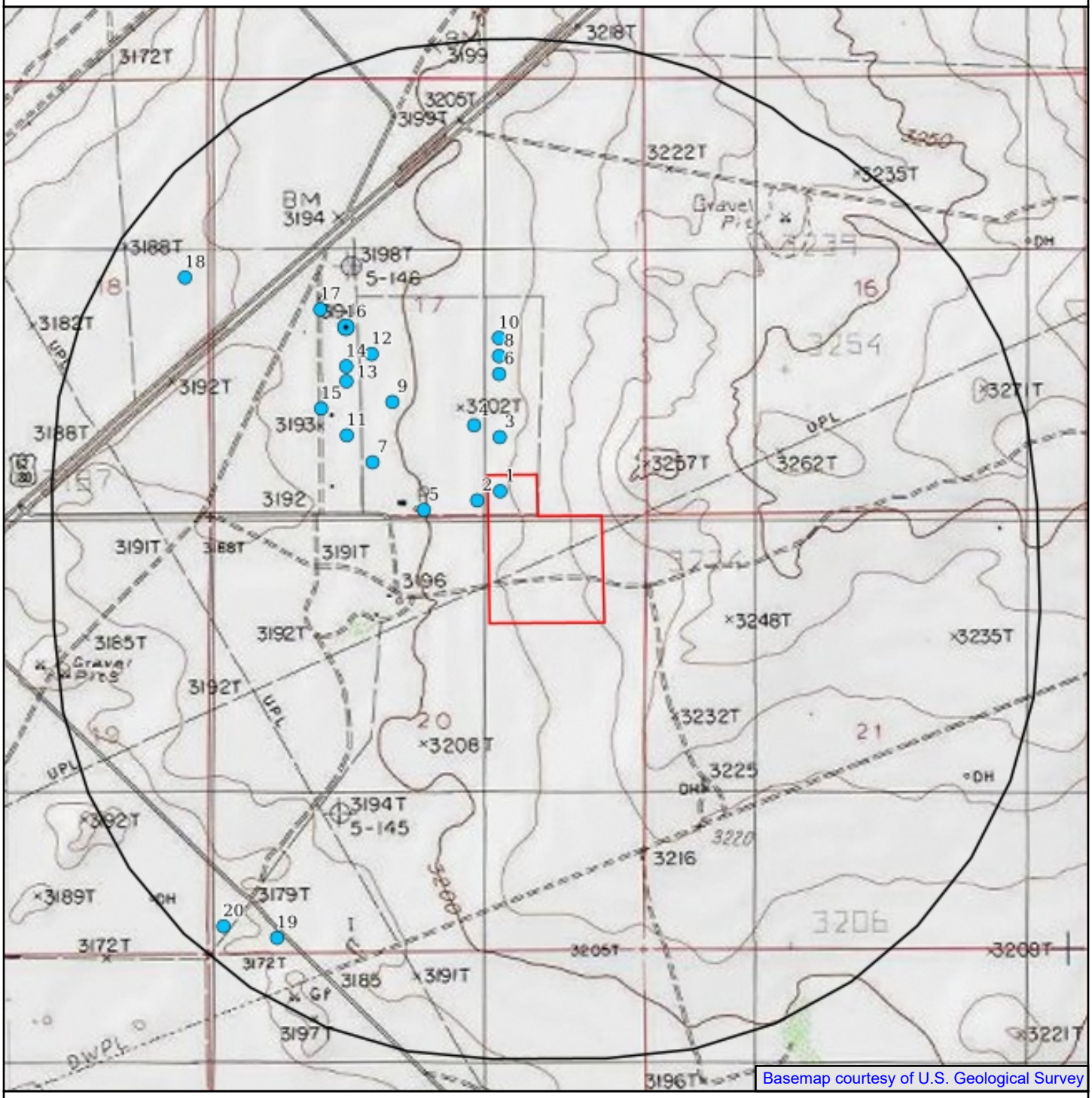
Source
Natural Resources Conservation Service, Soil Survey Geographic (SSURGO) Database.

Disclaimer

This Soils Survey from Banks Environmental Data, Inc. has searched Natural Resources Conservation Service (NRCS) and the Soil Survey Geographic Database (SSURGO). All soil data presented on the map and in the details section are based on information obtained from NRCS. Although Banks performs quality assurance and quality control on all data, inaccuracies of the data and mapped locations could possibly be traced to the source. Banks Environmental Data, Inc. cannot fully guarantee the accuracy of the SSURGO database maintained by NRCS.

Topographic Overlay Map - 1.0 Mile Radius

BANKS ENVIRONMENTAL DATA
A DIVISION OF THE BANKS GROUP



Bond Recycle Facility

Subject Property Quad Name(s)
See Geographic Summary

Single Water Well
Water Well Cluster
US WW,NM WW

Subject Site
Search Buffer

0' 1167' 2333'

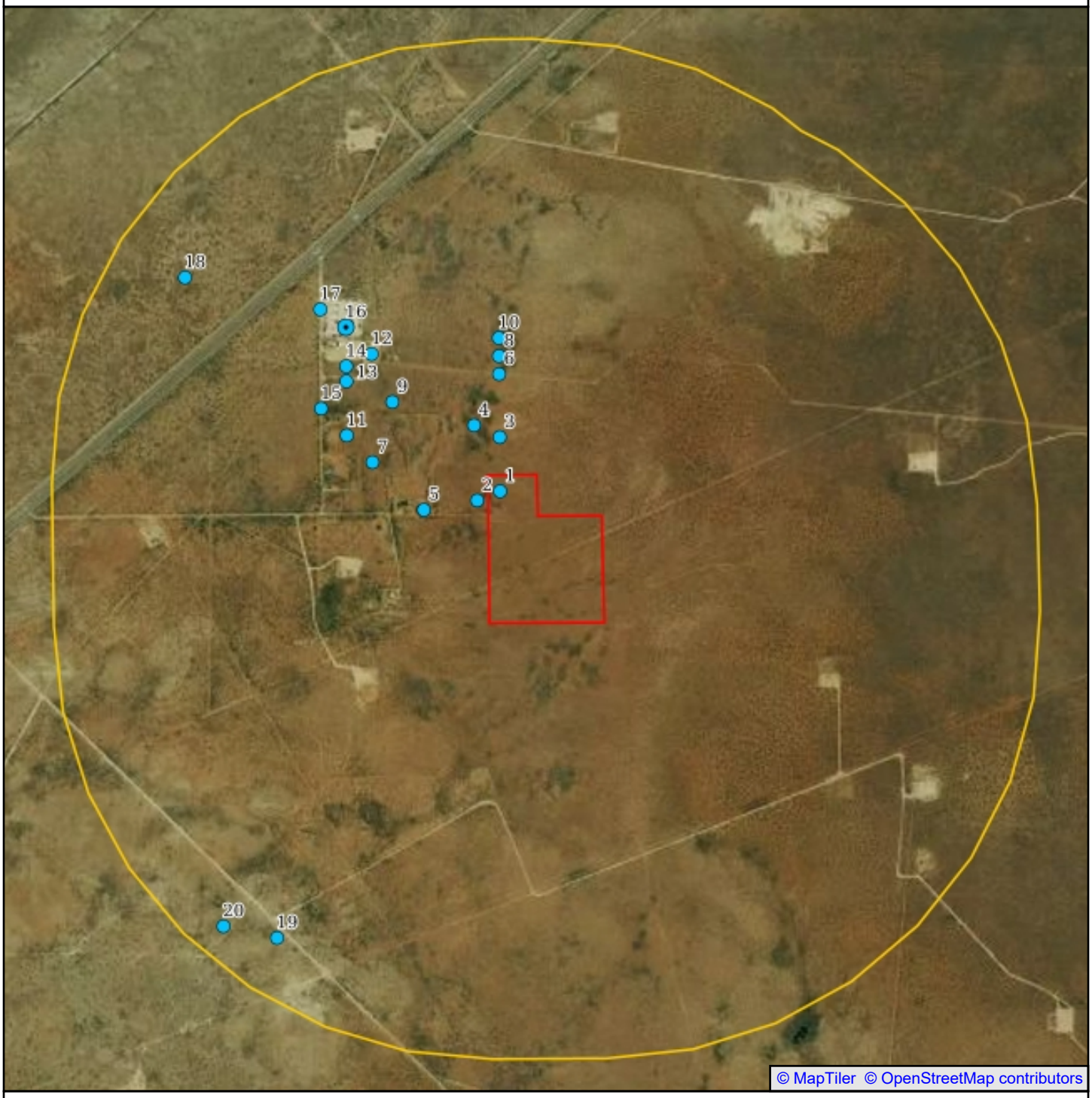
1:21000
1 in = 1750 ft
1 in = 0.331 mi
1 cm = 210 m
1 cm = 0.210 km

N

NAD83 / UTM Zone 13N
North American Datum 1983
Western Meridian: 108 0' 00" West
Eastern Meridian: 102 0' 00" West
Latitude of Origin: 0 0' 00" North

Current Imagery Overlay Map - 1.0 Mile Radius

BANKS ENVIRONMENTAL DATA
A DIVISION OF THE BANKS GROUP



Bond Recycle Facility

Single Water Well
Water Well Cluster
US WW,NM WW

Subject Site
Search Buffer

0' 1167' 2333'

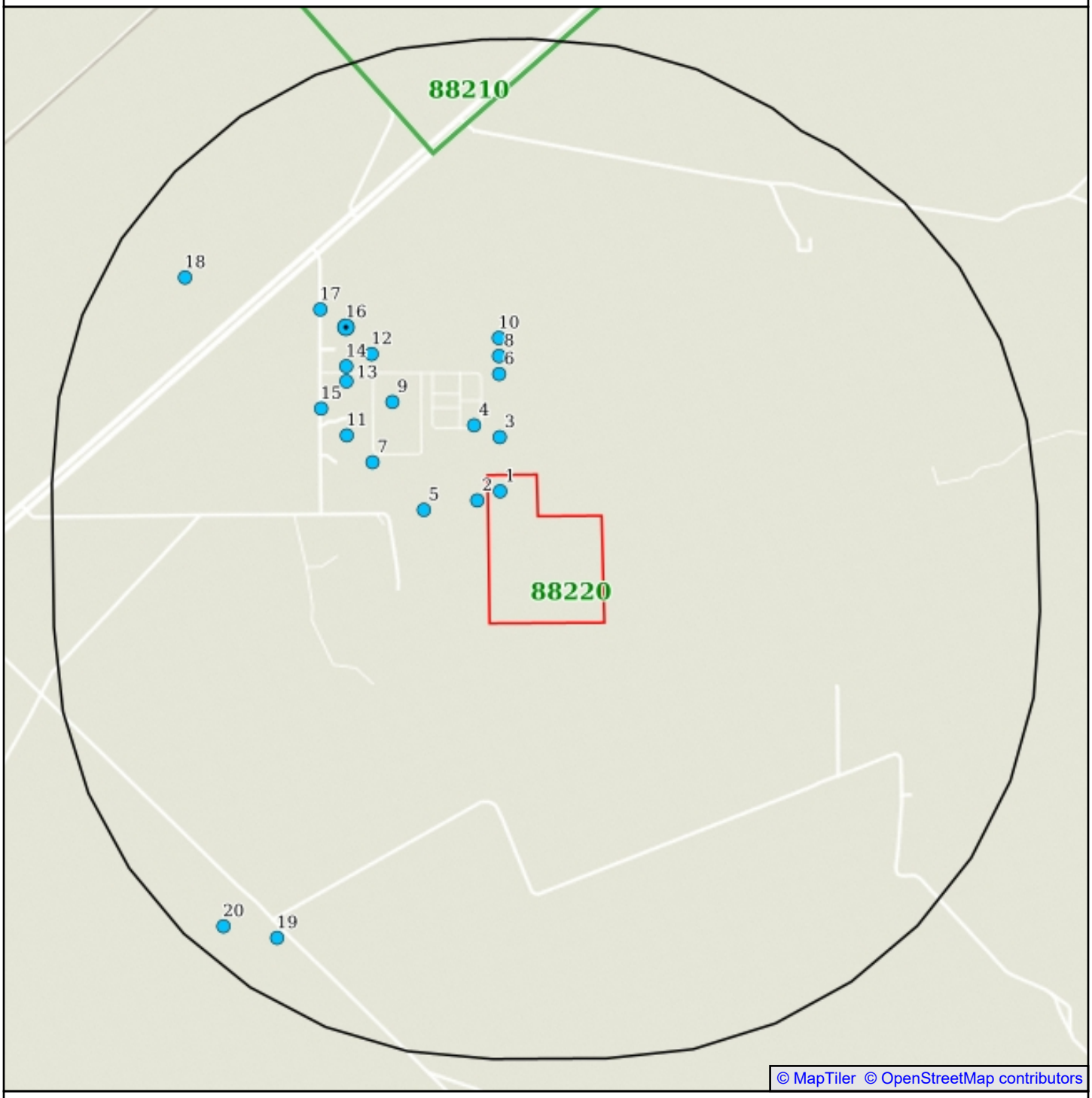
1:21000
1 in = 1750 ft
1 in = 0.331 mi
1 cm = 210 m
1 cm = 0.210 km

N

NAD83 / UTM Zone 13N
North American Datum 1983
Western Meridian: 108 0' 00" West
Eastern Meridian: 102 0' 00" West
Latitude of Origin: 0 0' 00" North

Zip Code Map - 1.0 Mile Radius

BANKS ENVIRONMENTAL DATA
A DIVISION OF THE BANKS GROUP



Bond Recycle Facility

Single Water Well
Water Well Cluster
US WW,NM WW

Subject Site
Search Buffer
Zip Code Boundary

0' 1167' 2333'

1:21000
1 in = 1750 ft
1 in = 0.331 mi
1 cm = 210 m
1 cm = 0.210 km

N

NAD83 / UTM Zone 13N
North American Datum 1983
Western Meridian: 108 0' 00" West
Eastern Meridian: 102 0' 00" West
Latitude of Origin: 0 0' 00" North

Water Well Summary

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID	Source ID	Dataset	Owner	Well Type	Drill Depth	Static Level	Completion Date	Distance	Elevation	Details Page #
1	CP-01914-POD1	WW	EA ENGINEERING SCI & TECH, INC				2022-08-19	Subject Property	-4.30 ft	21
2	USGS322824104062301	WW	USGS	Not Reported	500			0.02mi W	-7.58 ft	22
3	CP-01710-POD2	WW	ELLIPSE GLOBAL		160	149	2018-09-19	0.09mi N	-7.58 ft	23
4	CP-01710-POD1	WW	ELLIPSE GLOBAL		160	151	2018-09-22	0.12mi N	-7.58 ft	24
5	CP-00660	WW	HAROLD B. TAPP					0.15mi W	-14.14 ft	25
6	CP-01893-POD1	WW	ANDERSEN BROTHERS CONSTRUCTION		92	86	2021-11-04	0.23mi N	-4.30 ft	26
7	CP-00569	WW	BOB JABLONSKI	DOL	71	50	1978-02-17	0.27mi W	-17.42 ft	27
8	CP-01893-POD2	WW	INCIDENT CATERING LLC DBA ELLIPSE GLOBAL		90	75	2021-11-04	0.27mi N	-4.30 ft	28
9	USGS322836104063501	WW	USGS	Not Reported	160			0.28mi NW	-14.14 ft	29
10	CP-01893-POD3	WW	INCIDENT CATERING LLC DBA ELLIPSE GLOBAL		120	100	2021-11-05	0.31mi N	-7.58 ft	30
11	CP-00576	WW	GEORGE WEST	DOL	295	32	1987-01-29	0.34mi W	-20.70 ft	31
12	CP-00627	WW	CLINTON C. WEST	DOL	154	30	1982-05-15	0.38mi NW	-17.42 ft	32
13	CP-00527-POD1	WW	CLAUDE C. WEST		100			0.39mi NW	-17.42 ft	33
14	CP-01744-POD1	WW	ELLIPSE GLOBAL		90	82	2018-09-20	0.41mi NW	-17.42 ft	34
15	CP-00650	WW	SETH D. BROWN	DOM	155	35	1982-05-19	0.41mi NW	-20.70 ft	35
16	CP-00528-POD1	WW	CLAUDE C. WEST					0.47mi NW	-20.70 ft	36
16	CP-00529-POD1	WW	CLAUDE C. WEST		100			0.47mi NW	-20.70 ft	37
17	CP-00627-POD2	WW	CLINTON C. WEST		175			0.54mi NW	-20.70 ft	38
18	USGS322851104070401	WW	USGS	Not Reported	25			0.83mi NW	-30.54 ft	39
19	USGS322732104065201	WW	USGS	Not Reported	45			0.87mi SW	-30.54 ft	40
20	CP-00519-POD1	WW	DEVON ENERGY					0.93mi SW	-37.11 ft	41

Water Well Summary

End of Water Well Summary

Map ID 1: WW

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

WW - Water Well

Map ID: 1 — **Source: New Mexico Office of the State Engineer**

POD File Number: CP-01914-POD1 — **WW - Water Well** — **Banks ID: CP-01914-POD1**

Well Address: NM — **Subject Property**

Completion Date: 2022-08-19 — **Drill Depth:**

Owner: EA ENGINEERING SCI & TECH, INC — **Elevation: 3211.94 ft (-4.30 ft)**

Well Description:	EXPLORATION
Owner Address:	320 GOLD AVE. SW SUITE 1300
Owner City:	ALBUQUERQUE
Owner State:	NM
Owner Zip:	87102
Contact Last Name:	BOCKISCH
Contact First Name:	BERNARD
Pod Status:	ACT
Digital Log:	Go to webpage
Well Status:	PMT
Plug Date:	
Aquifer:	
Other Location:	

Map ID 2: WW

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 2		**Source: U.S. Geological Survey**
State ID: USGS322824104062301	**WW - Water Well**	**Banks ID: USGS322824104062301**
Well Address: US		**Rel. Loc.: 0.02mi W**
Completion Date:		**Drill Depth: 500.0**
Owner: USGS		**Elevation: 3208.66 ft (-7.58 ft)**

Agency Cd:	USGS
Site No:	322824104062301
Station Nm:	21S.28E.17.34444
Site Tp Cd:	GW

Map ID 3: WW

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 3		**Source: New Mexico Office of the State Engineer**
POD File Number: CP-01710-POD2	**WW - Water Well**	**Banks ID: CP-01710-POD2**
Well Address: NM		**Rel. Loc.: 0.09mi N**
Completion Date: 2018-09-19		**Drill Depth: 160.0**
Owner: ELLIPSE GLOBAL		**Elevation: 3208.66 ft (-7.58 ft)**

Well Description:	MULTIPLE DOMESTIC HOUSEHOLDS
Owner Address:	1429 AVE D #166
Owner City:	SNOHOMISH
Owner State:	WA
Owner Zip:	98290
Contact Last Name:	BEALL
Contact First Name:	GLEN
Pod Status:	ACT
Digital Log:	Go to webpage
Well Status:	PMT
Plug Date:	
Aquifer:	
Other Location:	SUPPL WELL TO CP-1710 POD1

Map ID 4: WW

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 4		**Source: New Mexico Office of the State Engineer**
POD File Number: CP-01710-POD1	**WW - Water Well**	**Banks ID: CP-01710-POD1**
Well Address: NM		**Rel. Loc.: 0.12mi N**
Completion Date: 2018-09-22		**Drill Depth: 160.0**
Owner: ELLIPSE GLOBAL		**Elevation: 3208.66 ft (-7.58 ft)**

Well Description:	MULTIPLE DOMESTIC HOUSEHOLDS
Owner Address:	1429 AVE D #166
Owner City:	SNOHOMISH
Owner State:	WA
Owner Zip:	98290
Contact Last Name:	BEALL
Contact First Name:	GLEN
Pod Status:	ACT
Digital Log:	Go to webpage
Well Status:	PMT
Plug Date:	
Aquifer:	
Other Location:	EAST SIDE OF PROPERTY

Map ID 5: WW

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 5		**Source: New Mexico Office of the State Engineer**
POD File Number: CP-00660	**WW - Water Well**	**Banks ID: CP-00660**
Well Address: NM		**Rel. Loc.: 0.15mi W**
Completion Date:		**Drill Depth:**
Owner: HAROLD B. TAPP		**Elevation: 3202.10 ft (-14.14 ft)**

Well Description:	Not Reported
Owner Address:	BOX 6
Owner City:	WHITE'S CITY
Owner State:	NM
Owner Zip:	88268
Contact Last Name:	
Contact First Name:	
Pod Status:	
Digital Log:	Go to webpage
Well Status:	PMT
Plug Date:	
Aquifer:	
Other Location:	

Map ID 6: WW

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 6		**Source: New Mexico Office of the State Engineer**
POD File Number: CP-01893-POD1	**WW - Water Well**	**Banks ID: CP-01893-POD1**
Well Address: NM		**Rel. Loc.: 0.23mi N**
Completion Date: 2021-11-04		**Drill Depth: 92.0**
Owner: ANDERSEN BROTHERS CONSTRUCTION		**Elevation: 3211.94 ft (-4.30 ft)**

Well Description:	MONITORING WELL
Owner Address:	616 QUEENS HWY
Owner City:	CARLSBAD
Owner State:	NM
Owner Zip:	88220
Contact Last Name:	ANDERSEN
Contact First Name:	DAVE
Pod Status:	ACT
Digital Log:	Go to webpage
Well Status:	PMT
Plug Date:	
Aquifer:	
Other Location:	MW#1

Map ID 7: WW

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 7		**Source: New Mexico Office of the State Engineer**
POD File Number: CP-00569	**WW - Water Well**	**Banks ID: CP-00569**
Well Address: NM		**Rel. Loc.: 0.27mi W**
Completion Date: 1978-02-17		**Drill Depth: 71.0**
Owner: BOB JABLONSKI		**Elevation: 3198.82 ft (-17.42 ft)**

Well Description:	Not Reported
Owner Address:	202 HAMILTON AVE.
Owner City:	CARLSBAD
Owner State:	NM
Owner Zip:	88220
Contact Last Name:	
Contact First Name:	
Pod Status:	ACT
Digital Log:	Go to webpage
Well Status:	PMT
Plug Date:	
Aquifer:	
Other Location:	ADD/LOC: PO BOX 233, HOBBS,HWY

Map ID 8: WW

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 8		**Source: New Mexico Office of the State Engineer**
POD File Number: CP-01893-POD2	**WW - Water Well**	**Banks ID: CP-01893-POD2**
Well Address: NM		**Rel. Loc.: 0.27mi N**
Completion Date: 2021-11-04		**Drill Depth: 90.0**
Owner: INCIDENT CATERING LLC DBA ELLIPSE GLOBAL		**Elevation: 3211.94 ft (-4.30 ft)**

Well Description:	MONITORING WELL
Owner Address:	1429 AVE D #166
Owner City:	SNOHOMISH
Owner State:	WA
Owner Zip:	98290
Contact Last Name:	BEAL
Contact First Name:	GLEN M
Pod Status:	ACT
Digital Log:	Go to webpage
Well Status:	PMT
Plug Date:	
Aquifer:	
Other Location:	MW#2

Map ID 9: WW

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 9		**Source: U.S. Geological Survey**
State ID: USGS322836104063501	**WW - Water Well**	**Banks ID: USGS322836104063501**
Well Address: US		**Rel. Loc.: 0.28mi NW**
Completion Date:		**Drill Depth: 160.0**
Owner: USGS		**Elevation: 3202.10 ft (-14.14 ft)**

Agency Cd:	USGS
Site No:	322836104063501
Station Nm:	21S.28E.17.34112
Site Tp Cd:	GW

Map ID 10: WW

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 10		**Source: New Mexico Office of the State Engineer**
POD File Number: CP-01893-POD3	**WW - Water Well**	**Banks ID: CP-01893-POD3**
Well Address: NM		**Rel. Loc.: 0.31mi N**
Completion Date: 2021-11-05		**Drill Depth: 120.0**
Owner: INCIDENT CATERING LLC DBA ELLIPSE GLOBAL		**Elevation: 3208.66 ft (-7.58 ft)**

Well Description:	MONITORING WELL
Owner Address:	1429 AVE D #166
Owner City:	SNOHOMISH
Owner State:	WA
Owner Zip:	98290
Contact Last Name:	BEAL
Contact First Name:	GLEN M
Pod Status:	ACT
Digital Log:	Go to webpage
Well Status:	PMT
Plug Date:	
Aquifer:	
Other Location:	MW#3

Map ID 11: WW

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 11		**Source: New Mexico Office of the State Engineer**
POD File Number: CP-00576	**WW - Water Well**	**Banks ID: CP-00576**
Well Address: NM		**Rel. Loc.: 0.34mi W**
Completion Date: 1987-01-29		**Drill Depth: 295.0**
Owner: GEORGE WEST		**Elevation: 3195.54 ft (-20.70 ft)**

Well Description:	Not Reported
Owner Address:	ROUTE 2, BOX 5E
Owner City:	CARLSBAD
Owner State:	NM
Owner Zip:	88220
Contact Last Name:	
Contact First Name:	
Pod Status:	ACT
Digital Log:	Go to webpage
Well Status:	PMT
Plug Date:	
Aquifer:	
Other Location:	

Map ID 12: WW

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 12		**Source: New Mexico Office of the State Engineer**
POD File Number: CP-00627	**WW - Water Well**	**Banks ID: CP-00627**
Well Address: NM		**Rel. Loc.: 0.38mi NW**
Completion Date: 1982-05-15		**Drill Depth: 154.0**
Owner: CLINTON C. WEST		**Elevation: 3198.82 ft (-17.42 ft)**

Well Description:	DOMESTIC ONE HOUSEHOLD
Owner Address:	P.O. BOX 532
Owner City:	CARLSBAD
Owner State:	NM
Owner Zip:	88220
Contact Last Name:	
Contact First Name:	
Pod Status:	ACT
Digital Log:	Go to webpage
Well Status:	PMT
Plug Date:	
Aquifer:	
Other Location:	

Map ID 13: WW

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 13		**Source: New Mexico Office of the State Engineer**
POD File Number: CP-00527-POD1	**WW - Water Well**	**Banks ID: CP-00527-POD1**
Well Address: NM		**Rel. Loc.: 0.39mi NW**
Completion Date:		**Drill Depth: 100.0**
Owner: CLAUDE C. WEST		**Elevation: 3198.82 ft (-17.42 ft)**

Well Description:	EXPLORATION
Owner Address:	201 S. ALAMEDA
Owner City:	CARLSBAD
Owner State:	NM
Owner Zip:	
Contact Last Name:	
Contact First Name:	
Pod Status:	INC
Digital Log:	Go to webpage
Well Status:	PMT
Plug Date:	
Aquifer:	
Other Location:	

Map ID 14: WW

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 14		**Source: New Mexico Office of the State Engineer**
POD File Number: CP-01744-POD1	**WW - Water Well**	**Banks ID: CP-01744-POD1**
Well Address: NM		**Rel. Loc.: 0.41mi NW**
Completion Date: 2018-09-20		**Drill Depth: 90.0**
Owner: ELLIPSE GLOBAL		**Elevation: 3198.82 ft (-17.42 ft)**

Well Description:	MULTIPLE DOMESTIC HOUSEHOLDS
Owner Address:	1429 AVE D #166
Owner City:	SNOHOMISH
Owner State:	WA
Owner Zip:	98290
Contact Last Name:	BEALL
Contact First Name:	GLEN
Pod Status:	ACT
Digital Log:	Go to webpage
Well Status:	PMT
Plug Date:	
Aquifer:	
Other Location:	

Map ID 15: WW

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 15		**Source: New Mexico Office of the State Engineer**
POD File Number: CP-00650	**WW - Water Well**	**Banks ID: CP-00650**
Well Address: NM		**Rel. Loc.: 0.41mi NW**
Completion Date: 1982-05-19		**Drill Depth: 155.0**
Owner: SETH D. BROWN		**Elevation: 3195.54 ft (-20.70 ft)**

Well Description:	DOMESTIC ONE HOUSEHOLD
Owner Address:	1114 GEORGE ST.
Owner City:	CARLSBAD
Owner State:	NM
Owner Zip:	88220
Contact Last Name:	
Contact First Name:	
Pod Status:	ACT
Digital Log:	Go to webpage
Well Status:	PMT
Plug Date:	
Aquifer:	
Other Location:	E 1/2

Map ID 16: WW

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 16		**Source: New Mexico Office of the State Engineer**
POD File Number: CP-00528-POD1	**WW - Water Well**	**Banks ID: CP-00528-POD1**
Well Address: NM		**Rel. Loc.: 0.47mi NW**
Completion Date:		**Drill Depth:**
Owner: CLAUDE C. WEST		**Elevation: 3195.54 ft (-20.70 ft)**

Well Description:	EXPLORATION
Owner Address:	201 SO. ALAMEDA
Owner City:	CARLSBAD
Owner State:	NM
Owner Zip:	88220
Contact Last Name:	
Contact First Name:	
Pod Status:	CAP
Digital Log:	Go to webpage
Well Status:	PMT
Plug Date:	
Aquifer:	
Other Location:	

Sites in Map ID 16 Cluster

Dataset	Well Name	Well Address	Page #
WW	CLAUDE C. WEST	NM	36
WW	CLAUDE C. WEST	NM	37

Map ID 16: WW

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 16		**Source: New Mexico Office of the State Engineer**
POD File Number: CP-00529-POD1	**WW - Water Well**	**Banks ID: CP-00529-POD1**
Well Address: NM		**Rel. Loc.: 0.47mi NW**
Completion Date:		**Drill Depth: 100.0**
Owner: CLAUDE C. WEST		**Elevation: 3195.54 ft (-20.70 ft)**

Well Description:	EXPLORATION
Owner Address:	201 SO. ALAMEDA ST.
Owner City:	CARLSBAD
Owner State:	NM
Owner Zip:	88220
Contact Last Name:	
Contact First Name:	
Pod Status:	INC
Digital Log:	Go to webpage
Well Status:	PMT
Plug Date:	
Aquifer:	
Other Location:	

Sites in Map ID 16 Cluster

Dataset	Well Name	Well Address	Page #
WW	CLAUDE C. WEST	NM	36
WW	CLAUDE C. WEST	NM	37

Map ID 17: WW

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 17		**Source: New Mexico Office of the State Engineer**
POD File Number: CP-00627-POD2	**WW - Water Well**	**Banks ID: CP-00627-POD2**
Well Address: NM		**Rel. Loc.: 0.54mi NW**
Completion Date:		**Drill Depth: 175.0**
Owner: CLINTON C. WEST		**Elevation: 3195.54 ft (-20.70 ft)**

Well Description:	DOMESTIC ONE HOUSEHOLD
Owner Address:	P.O. BOX 532
Owner City:	CARLSBAD
Owner State:	NM
Owner Zip:	88220
Contact Last Name:	
Contact First Name:	
Pod Status:	PEN
Digital Log:	Go to webpage
Well Status:	PMT
Plug Date:	
Aquifer:	
Other Location:	

Map ID 18: WW

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 18		**Source: U.S. Geological Survey**
State ID: USGS322851104070401	**WW - Water Well**	**Banks ID: USGS322851104070401**
Well Address: US		**Rel. Loc.: 0.83mi NW**
Completion Date:		**Drill Depth: 25.0**
Owner: USGS		**Elevation: 3185.70 ft (-30.54 ft)**

Agency Cd:	USGS
Site No:	322851104070401
Station Nm:	21S.28E.18.13333
Site Tp Cd:	GW

Map ID 19: WW

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 19		**Source: U.S. Geological Survey**
State ID: USGS322732104065201	**WW - Water Well**	**Banks ID: USGS322732104065201**
Well Address: US		**Rel. Loc.: 0.87mi SW**
Completion Date:		**Drill Depth: 45.0**
Owner: USGS		**Elevation: 3185.70 ft (-30.54 ft)**

Agency Cd:	USGS
Site No:	322732104065201
Station Nm:	21S.28E.20.333333
Site Tp Cd:	GW

Map ID 20: WW

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 20		**Source: New Mexico Office of the State Engineer**
POD File Number: CP-00519-POD1	**WW - Water Well**	**Banks ID: CP-00519-POD1**
Well Address: NM		**Rel. Loc.: 0.93mi SW**
Completion Date:		**Drill Depth:**
Owner: DEVON ENERGY		**Elevation: 3179.13 ft (-37.11 ft)**

Well Description:	72-12-1 PROSPECTING OR DEVELOPMENT OF NATURAL RESOURCE
Owner Address:	1108 W PIERCE ST
Owner City:	CARLSBAD
Owner State:	NM
Owner Zip:	88220
Contact Last Name:	STAPLETON LLC
Contact First Name:	M
Pod Status:	
Digital Log:	Go to webpage
Well Status:	PMT
Plug Date:	
Aquifer:	
Other Location:	

End of WW Section

End of Water Well Details Section

Dataset Descriptions and Sources

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Dataset	Source	Dataset Description	Update Schedule	Requested Date	Received Date	Update Date	Source Update Date
WW - Water Well (US)	U.S. Geological Survey	This dataset contains groundwater well records from the U.S. Geological Survey.	Quarterly	2024-09-10	2024-09-10	2024-09-10	2024-09-10
WW - Water Well (NM)	New Mexico Office of the State Engineer	The NM Office of the State Engineer (OSE) "Point of Diversions" (POD) layer includes well locations, surface declarations, or surface permits updated on a monthly basis. These data were extracted from the OSE W.A.T.E.R.S. (Water Administration Technical Engineering Resource System) database and geo-located (mapped). These data have varying degrees of accuracy and have not been validated. Data included in this dataset only includes PODs that have coordinates located within the State of New Mexico.	Quarterly	2024-09-23	2024-09-23	2024-09-23	2024-01-16

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.

Prepared for:
ENVIROTECH ENGINEERING & CONSULTING, INC. - OKC
2500 N. 11th St
Enid, OK 73701

BANKS ENVIRONMENTAL DATA
A DIVISION OF THE BANKS GROUP

Oil and Gas Report

Bond Recycle Facility

NM

Eddy County

PO #: 024264-00

ES-144626

Monday, September 23, 2024

Table of Contents

Geographic Summary

Location
Eddy County, NM
Subject property is 47.95 acres, 0.075 square miles, and has a 1.20 mile perimeter

Coordinates (centroid)	
Lat/Long in Degrees Minutes Seconds	32° 28' 18.73", -104° 6' 15.19"
Lat/Long in Decimal Degrees	32.47187030952681, -104.10422004639301
X/Y in NAD83 / UTM Zone 13N	584176.4805435049, 3593093.69591195

Elevation (centroid)
Subject Property lies 3216.24 feet above sea level.

Zip Codes Searched	
Search Distance	**Zip Codes**
Subject Property	88220
1.0 miles	88210, 88220

Topos Searched	
Search Distance	**Topo Name**
Subject Property	Indian Flats
1.0 miles	Indian Flats

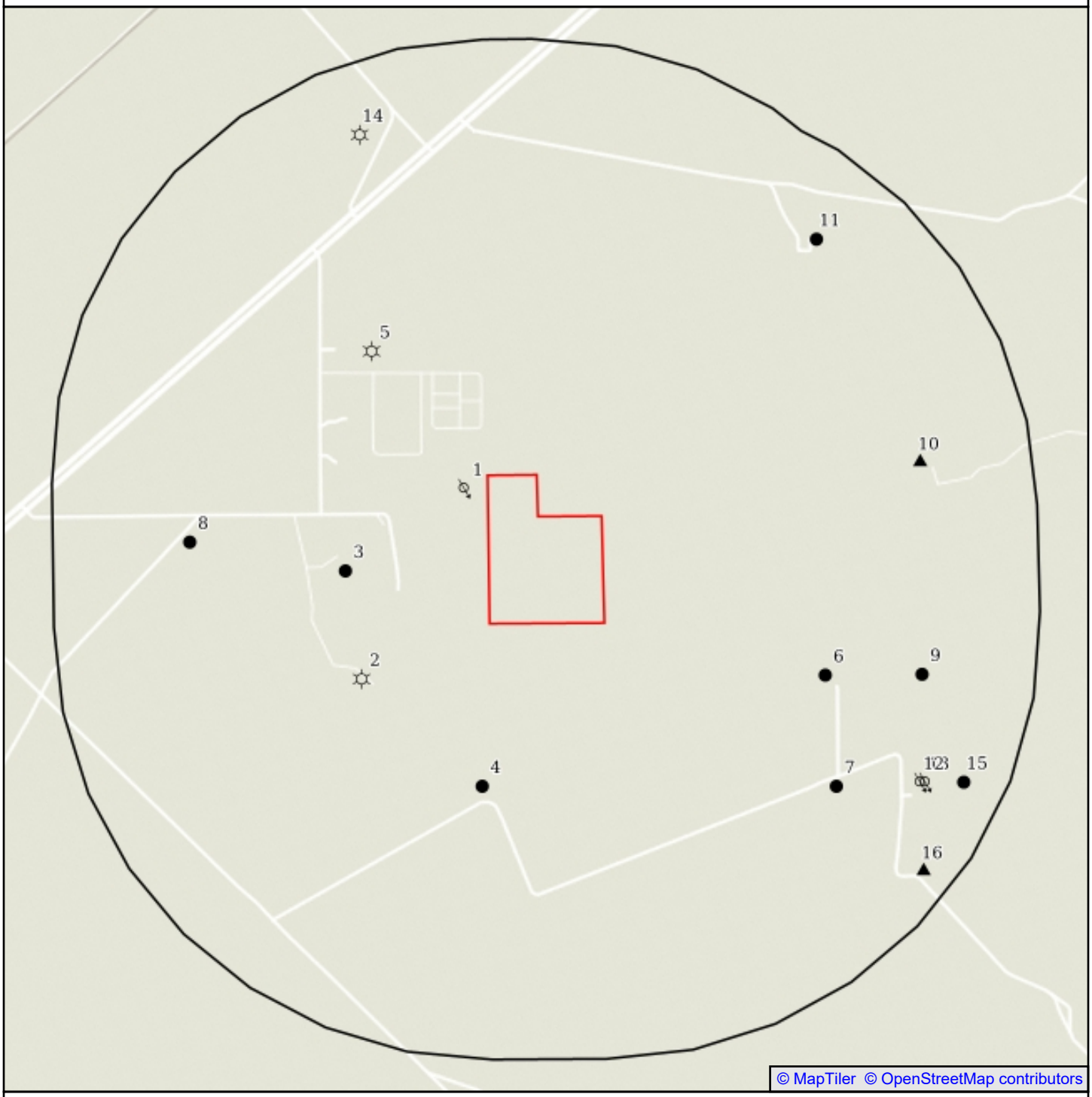
Oil and Gas Summary

Wells Found	Total
Oil Wells	10
Gas Wells	5
Injection Wells	3
Other Types of Wells*	0
Total Wells Found	**18**

*May include dry holes, abandoned locations, disposal, injection, domestic, water supply wells, surface locations, etc.

Summary Map - 1.0 Mile Radius

BANKS ENVIRONMENTAL DATA
A DIVISION OF THE BANKS GROUP



Bond Recycle Facility

Injection / Disposal
Gas
Oil
Oil and Gas Cluster
Subject Site
Search Buffer
Land Survey

0' 1167' 2333'

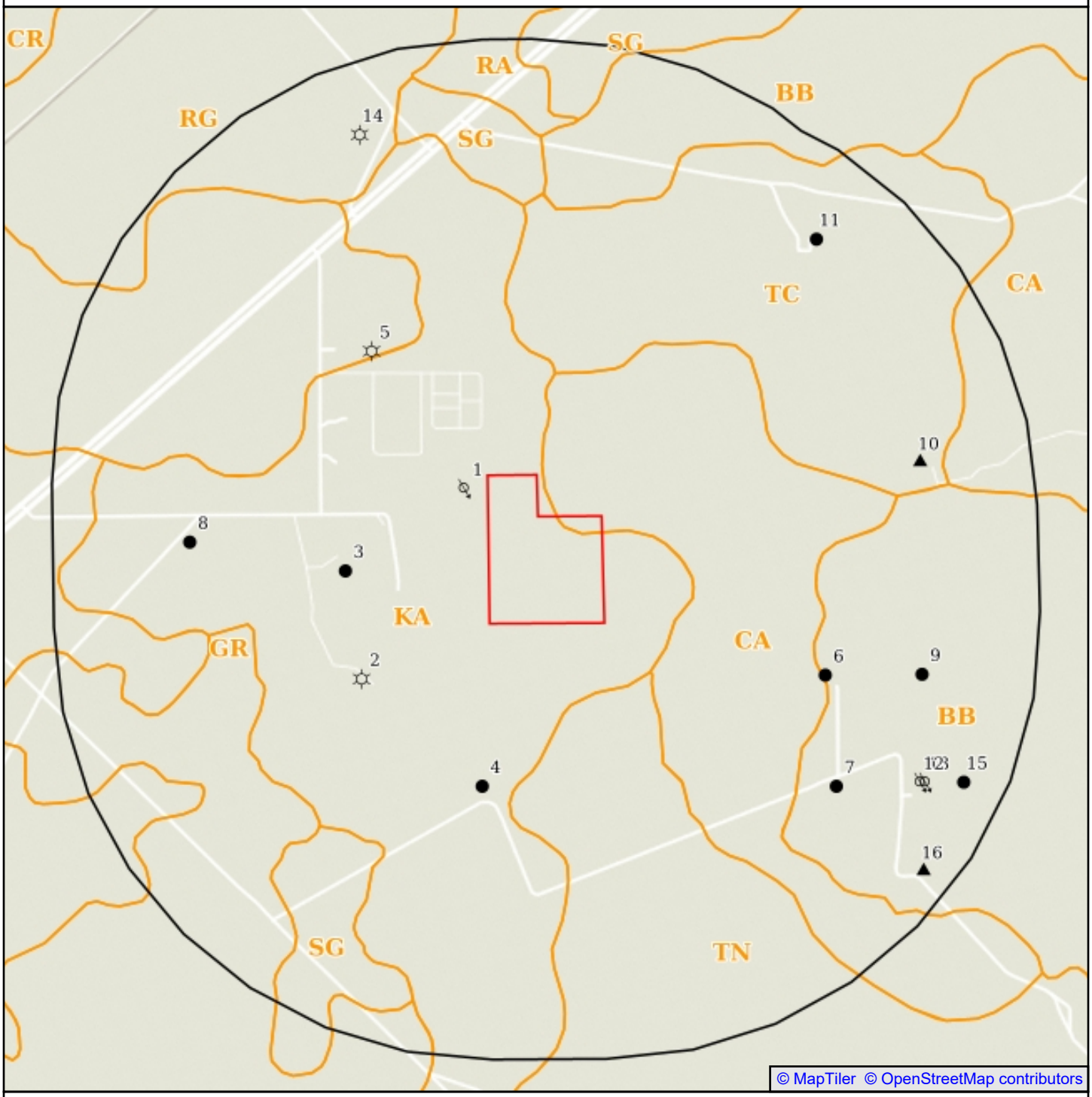
1:21000
1 in = 1750 ft
1 in = 0.331 mi
1 cm = 210 m
1 cm = 0.210 km

N

NAD83 / UTM Zone 13N
North American Datum 1983
Western Meridian: 108 0' 00" West
Eastern Meridian: 102 0' 00" West
Latitude of Origin: 0 0' 00" North

Soil Survey Map - 1.0 Mile Radius

BANKS ENVIRONMENTAL DATA
A DIVISION OF THE BANKS GROUP



Bond Recycle Facility

Injection / Disposal
Gas
Oil
Oil and Gas Cluster
Subject Site
Search Buffer
Soils Boundary
Land Survey

0' 1167' 2333'

1:21000
1 in = 1750 ft
1 in = 0.331 mi
1 cm = 210 m
1 cm = 0.210 km

N

NAD83 / UTM Zone 13N
North American Datum 1983
Western Meridian: 108 0' 00" West
Eastern Meridian: 102 0' 00" West
Latitude of Origin: 0 0' 00" North

Soils Details

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Soil Types Found	
Subject Property	CA, KA
Within 1.0 miles of Subject Property	BB, GR, RA, RG, SG, TC, TN

Soil Type Descriptions

CA - Cacique loamy sand, 0 to 3 percent slopes, eroded

Percent Hydric	0
Minimum Depth to Bedrock	

Cacique (97%)

Hydrologic Group	Moderately high runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	Moderate
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loamy sand	0 cm	13 cm	A-2	SM
H2	Sandy clay loam	13 cm	61 cm	A-2, A-6	SC
H3	Indurated	61 cm	152 cm		

Berino (1%)

Hydrologic Group	Moderately low runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loamy fine sand	0 cm	43 cm	A-2	SM
H2		43 cm	127 cm	A-4, A-6	CL, CL-ML, SC, SC-SM
H3	Loamy sand	127 cm	152 cm	A-2	SM

Berino (1%)

Hydrologic Group	Moderately low runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Fine sandy loam	0 cm	43 cm	A-2, A-4	SM
H2		43 cm	127 cm	A-4, A-6	CL, CL-ML, SC, SC-SM
H3	Loamy sand	127 cm	152 cm	A-2	SM

Dune land (1%)

Hydrologic Group	Low runoff potential
Soil Drainage Class	Excessively drained
Corrosion Potential - Uncoated Steel	
Depth to Restrictive Feature	

Soils Details

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Fine sand	0 cm	15 cm	A-2, A-3	SM, SP, SP-SM
H2		15 cm	152 cm	A-2, A-3	SM, SP, SP-SM

KA - Karro fine sandy loam, 0 to 3 percent slopes	
Percent Hydric	0
Minimum Depth to Bedrock	

Karro (98%)	
Hydrologic Group	Moderately high runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	Moderate
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Fine sandy loam	0 cm	25 cm	A-4	ML
H2	Loam	25 cm	229 cm	A-4, A-6	CL, CL-ML

Reagan (1%)	
Hydrologic Group	Moderately low runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loam	0 cm	20 cm	A-6	CL
H2		20 cm	152 cm	A-6, A-7-6	CL

Russler (1%)	
Hydrologic Group	Moderately high runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loam	0 cm	28 cm	A-6	CL
H2		28 cm	114 cm	A-6	CL
H3	Gypsiferous material	114 cm	152 cm		

BB - Berino complex, 0 to 3 percent slopes, eroded	
Percent Hydric	0
Minimum Depth to Bedrock	

Berino (60%)	
Hydrologic Group	Moderately low runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	Moderate
Depth to Restrictive Feature	

Soils Details

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Fine sand	0 cm	43 cm	A-2	SM
H2	Sandy clay loam	43 cm	147 cm	A-4, A-6	CL, CL-ML, SC, SC-SM
H3	Loamy sand	147 cm	152 cm	A-2	SM

Pajarito (25%)	
Hydrologic Group	Low runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	Moderate
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loamy fine sand	0 cm	23 cm	A-2	SM
H2	Fine sandy loam	23 cm	183 cm	A-2, A-4	SM

Cacique (4%)	
Hydrologic Group	Moderately high runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loamy sand	0 cm	13 cm	A-2	SM
H2	Sandy clay loam	13 cm	61 cm	A-2, A-6	SC
H3	Indurated	61 cm	71 cm		

Pajarito (4%)	
Hydrologic Group	Moderately low runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loamy fine sand	0 cm	33 cm	A-2	SM
H2		33 cm	91 cm	A-2, A-4	SM
H3		91 cm	152 cm	A-2, A-4	ML, SM

Wink (4%)	
Hydrologic Group	Moderately low runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loamy fine sand	0 cm	20 cm	A-2-4	SC-SM, SM
H2		20 cm	97 cm	A-2-4, A-4	SC-SM, SM
H3	Variable	97 cm	152 cm	A-4	CL-ML, GC, SC, SC-SM

Soils Details

Kermit (3%)	
Hydrologic Group	Low runoff potential
Soil Drainage Class	Excessively drained
Corrosion Potential - Uncoated Steel	Moderate
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Fine sand	0 cm	18 cm	A-2, A-3	SM, SP-SM
H2		18 cm	152 cm	A-3	SP, SP-SM

GR - Gypsum land-Reeves complex, 0 to 3 percent slopes, eroded	
Percent Hydric	0
Minimum Depth to Bedrock	

Gypsum land (55%)	
Hydrologic Group	
Soil Drainage Class	
Corrosion Potential - Uncoated Steel	
Depth to Restrictive Feature	

Reeves (35%)	
Hydrologic Group	Moderately low runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Sandy loam	0 cm	20 cm	A-6	CL
H2	Clay loam	20 cm	81 cm	A-6	CL
H3	Gypsiferous material	81 cm	152 cm		

Unnamed soils (10%)	
Hydrologic Group	
Soil Drainage Class	
Corrosion Potential - Uncoated Steel	
Depth to Restrictive Feature	

RA - Reagan loam, 0 to 3 percent slopes	
Percent Hydric	0
Minimum Depth to Bedrock	

Reagan (98%)	
Hydrologic Group	Moderately low runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Soils Details

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loam	0 cm	20 cm	A-6	CL
H2	Loam	20 cm	152 cm	A-6, A-7-6	CL

Atoka (1%)	
Hydrologic Group	Moderately high runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loam	0 cm	20 cm	A-4	CL-ML
H2		20 cm	84 cm	A-4, A-6	CL, CL-ML
H3	Indurated	84 cm	94 cm		

Upton (1%)	
Hydrologic Group	Moderately high runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Gravelly loam	0 cm	20 cm	A-4, A-6	CL, GC, SC
H2		20 cm	30 cm	A-4, A-6	CL, GC, SC
H3	Cemented	30 cm	53 cm		
H4		53 cm	152 cm	A-2, A-4, A-6	GC, GP-GC, SC, SP-SC

RG - Reeves-Gypsum land complex, 0 to 3 percent slopes	
Percent Hydric	0
Minimum Depth to Bedrock	

Reeves (55%)	
Hydrologic Group	Moderately low runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loam	0 cm	20 cm	A-6	CL
H2	Clay loam	20 cm	81 cm	A-6	CL
H3	Gypsiferous material	81 cm	152 cm		

Gypsum land (30%)	
Hydrologic Group	
Soil Drainage Class	
Corrosion Potential - Uncoated Steel	
Depth to Restrictive Feature	

Soils Details

Cottonwood (5%)	
Hydrologic Group	Moderately high runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loam	0 cm	23 cm	A-4, A-6	CL, CL-ML
H2	Bedrock	23 cm	152 cm		

Largo (5%)	
Hydrologic Group	Moderately low runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loam	0 cm	10 cm	A-4	CL-ML
H2		10 cm	119 cm	A-4	CL-ML
H3		119 cm	152 cm	A-6	CL

Reagan (5%)	
Hydrologic Group	Moderately low runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loam	0 cm	20 cm	A-6	CL
H2		20 cm	152 cm	A-6, A-7-6	CL

SG - Simona gravelly fine sandy loam, 0 to 3 percent slopes	
Percent Hydric	1
Minimum Depth to Bedrock	

Simona (95%)	
Hydrologic Group	High runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	Moderate
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Gravelly fine sandy loam	0 cm	48 cm	A-2, A-4	GM, SM
H2	Indurated	48 cm	58 cm		

Soils Details

Simona (4%)	
Hydrologic Group	High runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	High
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Sandy loam	0 cm	15 cm	A-4	SM
H2		15 cm	51 cm	A-2, A-4	GM, ML, SM
H3	Indurated	51 cm	61 cm		

Playa (1%)	
Hydrologic Group	Moderately low runoff potential
Soil Drainage Class	Well drained
Corrosion Potential - Uncoated Steel	Moderate
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Fine sandy loam	0 cm	94 cm	A-4	SC, SC-SM, CL, CL-ML
H2	Sandy clay loam	94 cm	152 cm	A-4, A-6	CL, SC, SC-SM

TC - Tonuco loamy sand, 0 to 3 percent slopes, eroded	
Percent Hydric	0
Minimum Depth to Bedrock	

Tonuco (98%)	
Hydrologic Group	High runoff potential
Soil Drainage Class	Excessively drained
Corrosion Potential - Uncoated Steel	Low
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loamy sand	0 cm	13 cm	A-1	SM, SP-SM
H2	Loamy fine sand	13 cm	38 cm	A-1, A-2, A-3	SM, SP-SM
H3	Indurated	38 cm	48 cm		

Dune land (1%)	
Hydrologic Group	Low runoff potential
Soil Drainage Class	Excessively drained
Corrosion Potential - Uncoated Steel	
Depth to Restrictive Feature	

Tonuco (1%)	
Hydrologic Group	High runoff potential
Soil Drainage Class	Excessively drained
Corrosion Potential - Uncoated Steel	Moderate
Depth to Restrictive Feature	

Soils Details

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loamy sand	0 cm	13 cm		SM, SP-SM
H2		13 cm	38 cm		SM, SP-SM
H3	Indurated	38 cm	48 cm		

TN - Tonuco loamy fine sand, 0 to 3 percent slopes, eroded	
Percent Hydric	0
Minimum Depth to Bedrock	

Tonuco (98%)	
Hydrologic Group	High runoff potential
Soil Drainage Class	Excessively drained
Corrosion Potential - Uncoated Steel	Low
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loamy fine sand	0 cm	13 cm	A-1, A-2, A-3	SM, SP-SM
H2	Loamy fine sand	13 cm	38 cm	A-1, A-2, A-3	SM, SP-SM
H3	Indurated	38 cm	48 cm		

Dune land (1%)	
Hydrologic Group	Low runoff potential
Soil Drainage Class	Excessively drained
Corrosion Potential - Uncoated Steel	
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Fine sand	0 cm	15 cm	A-2, A-3	SM, SP, SP-SM
H2		15 cm	152 cm	A-2, A-3	SM, SP, SP-SM

Tonuco (1%)	
Hydrologic Group	High runoff potential
Soil Drainage Class	Excessively drained
Corrosion Potential - Uncoated Steel	Moderate
Depth to Restrictive Feature	

Horizon	Soil Texture	Upper Boundary	Lower Boundary	AASHTO	Unified
H1	Loamy sand	0 cm	13 cm	A-1	SM, SP-SM
H2		13 cm	38 cm	A-1, A-2, A-3	SM, SP-SM
H3	Indurated	38 cm	48 cm		

Soils Descriptions

BANKS ENVIRONMENTAL DATA
A DIVISION OF THE BANKS GROUP

AASHTO Classification Definitions	
A-1, A-1-a, A-1-b	Granular materials (35% or less passing No. 200 sieve), sonte fragments, gravel and sand
A-2, A-2-4, A-2-5, A-2-6, A-2-7	Granular materials (35% or less passing No. 200 sieve), silty or clayey gravel and sand
A-3	Granular materials (35% or less passing No. 200 sieve), fine sand
A-4	Silt-Clay materials (more than 35% passing No. 200 sieve), silty soils
A-5	Silt-Clay materials (more than 35% passing No. 200 sieve), silty soils
A-6	Silt-Clay materials (more than 35% passing No. 200 sieve), clayey soils
A-7, A-7-5, A-7-6	Silt-Clay materials (more than 35% passing No. 200 sieve), clayey soils
A-8	Silt-Clay materials (more than 35% passing No. 200 sieve), clayey soils

Unified Classification Definitions	
CH	Fine-grained soils, silts and clays (liquid limit is 50% or more), Fat Clay
CL, CL-A (proposed), CL-K (proposed), CL-ML, CL-O (proposed), CL-T (proposed)	Fine-grained soils, silts and clays (liquid limit is less than 50%), Lean Clay
GC, GC-GM	Coarse-grained soils, Gravels, gravel with fines, Clayey Gravel
GM	Coarse-grained soils, Gravels, gravel with fines, Silty Gravel
GP, GP-GC, GP-GM	Coarse-grained soils, Gravels, clean gravels, Poorly Graded Gravel
GW, GW-GC, GW-GM	Coarse-grained soils, Gravels, clean gravels, Well-Graded Gravel
MH, MH-A, MH-K, MH-O, MH-T	Fine-grained soils, silts and clays (liquid limit is 50% or more), Elastic Silt
ML, ML-A (proposed), ML-K (proposed), ML-O (proposed), ML-T (proposed)	Fine-grained soils, silts and clays (liquid limit is less than 50%), Silt
OH, OH-T (proposed)	Fine-grained soils, silts and clays (liquid limit is 50% or more), Organic Clay or Organic Silt
OL	Fine-grained soils, silts and clays (liquid limit is less than 50%), Organic Clay or Organic Silt
PT	Highly organic soils, Peat
SC, SC-SM	Coarse-grained soils, Sands, sands with fines, Clayey Sand
SM	Coarse-grained soils, Sands, sands with fines, Silty Sand
SP, SP-SC, SP-SM	Coarse-grained soils, Sands, clean sands, Poorly Graded Sand
SW, SW-SC, SW-SM	Coarse-grained soils, Sands, clean sands, Well-Graded Sand

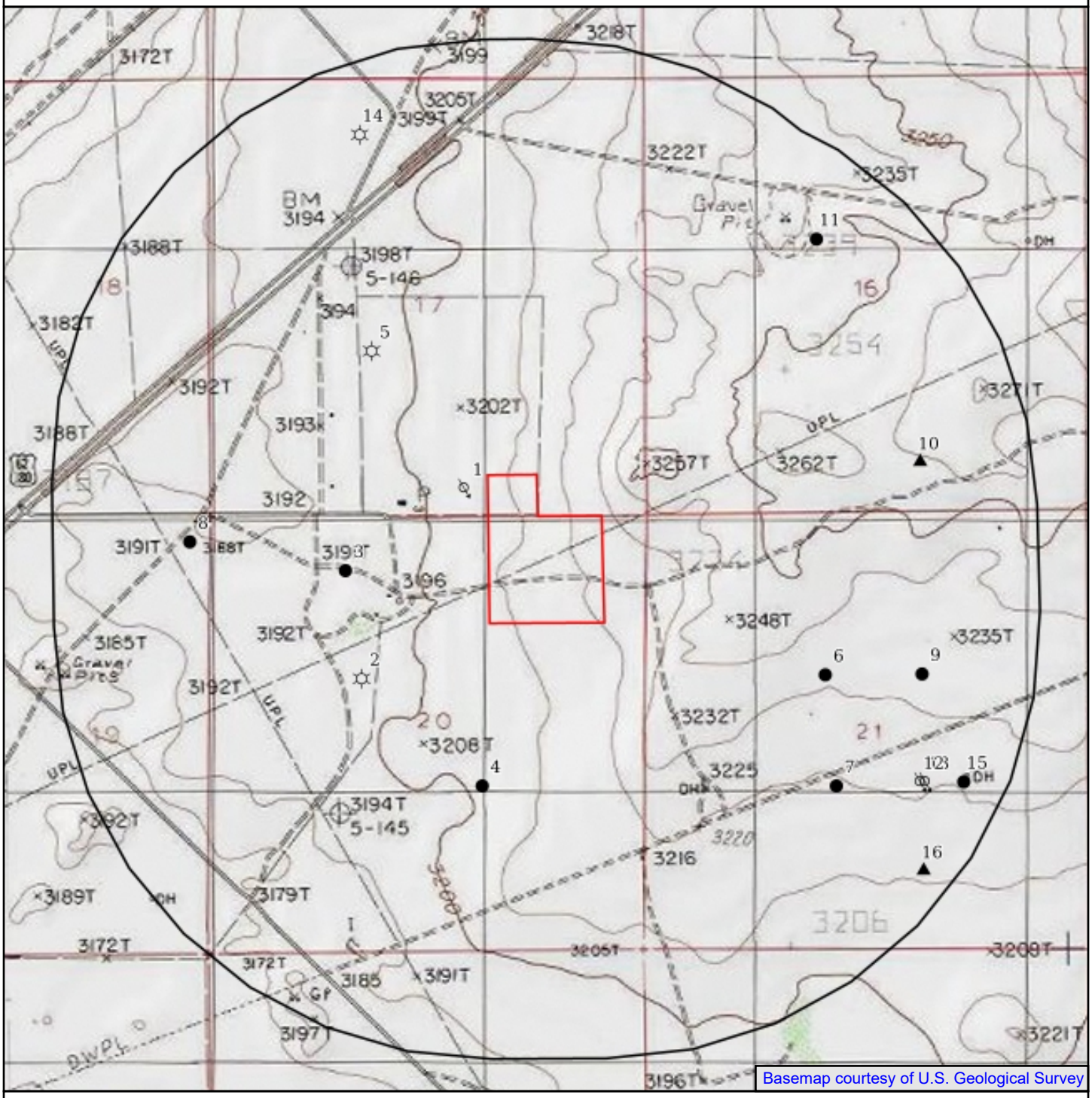
Source
Natural Resources Conservation Service, Soil Survey Geographic (SSURGO) Database.

Disclaimer

This Soils Survey from Banks Environmental Data, Inc. has searched Natural Resources Conservation Service (NRCS) and the Soil Survey Geographic Database (SSURGO). All soil data presented on the map and in the details section are based on information obtained from NRCS. Although Banks performs quality assurance and quality control on all data, inaccuracies of the data and mapped locations could possibly be traced to the source. Banks Environmental Data, Inc. cannot fully guarantee the accuracy of the SSURGO database maintained by NRCS.

Topographic Overlay Map - 1.0 Mile Radius

BANKS ENVIRONMENTAL DATA
A DIVISION OF THE BANKS GROUP



Basemap courtesy of U.S. Geological Survey

Bond Recycle Facility

Subject Property Quad Name(s)
See Geographic Summary

0' 1167' 2333'

1:21000
1 in = 1750 ft
1 in = 0.331 mi
1 cm = 210 m
1 cm = 0.210 km

N

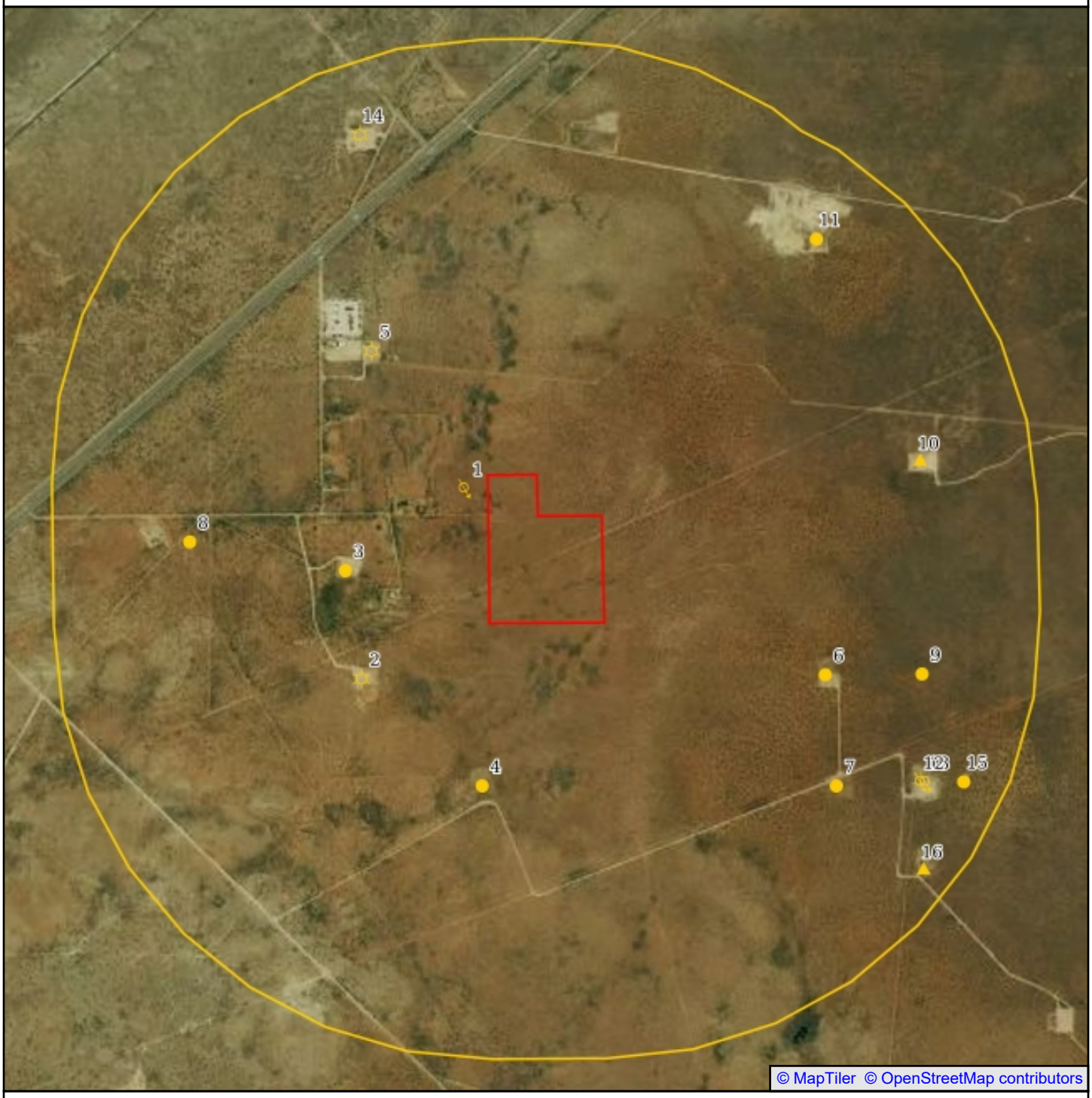
Subject Site
Search Buffer

Injection / Disposal
Gas
Oil
Oil and Gas Cluster

NAD83 / UTM Zone 13N
North American Datum 1983
Western Meridian: 108 0' 00" West
Eastern Meridian: 102 0' 00" West
Latitude of Origin: 0 0' 00" North

Current Imagery Overlay Map - 1.0 Mile Radius

BANKS ENVIRONMENTAL DATA
A DIVISION OF THE BANKS GROUP



Bond Recycle Facility

Injection / Disposal
Gas
Oil
Oil and Gas Cluster
Subject Site
Search Buffer

0' 1167' 2333'

1:21000
1 in = 1750 ft
1 in = 0.331 mi
1 cm = 210 m
1 cm = 0.210 km

N

NAD83 / UTM Zone 13N
North American Datum 1983
Western Meridian: 108 0' 00" West
Eastern Meridian: 102 0' 00" West
Latitude of Origin: 0 0' 00" North

Zip Code Map - 1.0 Mile Radius

Bond Recycle Facility

Injection / Disposal
Gas
Oil
Oil and Gas Cluster
Subject Site
Search Buffer
Land Survey
Zip Code Boundary

0' 1167' 2333'

1:21000
1 in = 1750 ft
1 in = 0.331 mi
1 cm = 210 m
1 cm = 0.210 km

N

NAD83 / UTM Zone 13N
North American Datum 1983
Western Meridian: 108 0' 00" West
Eastern Meridian: 102 0' 00" West
Latitude of Origin: 0 0' 00" North

Oil and Gas Summary

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID	Operator Name	Lease Name	Well #	Completion Date	Plug Date	T. D.	API #	Rel. Loc.	Well Type	Elev.	Page #
1	[330129] WaterBridge Stateline LLC	RAMROD FEE SWD	#001	2022-05-13		0	30-015-49301	0.05mi W	Salt Water Disposal	3208 ft (-7 ft)	21
2	[372098] MARATHON OIL PERMIAN LLC	BOND	#001	2002-09-27	2018-10-24	10770	30-015-32451	0.32mi W	Gas	3198 ft (-17 ft)	22
3	[372098] MARATHON OIL PERMIAN LLC	BOND FEE	#002	2006-06-08		12270	30-015-34861	0.33mi W	Oil	3195 ft (-20 ft)	23
4	[260737] BOPCO, L.P.	BIG EDDY UNIT	#060		2009-08-15	12208	30-015-22398	0.37mi S	Oil	3202 ft (-14 ft)	24
5	[373075] XTO PERMIAN OPERATING LLC.	BIG EDDY UNIT	#150	2004-01-28	2020-11-19	12310	30-015-33231	0.39mi NW	Gas	3198 ft (-17 ft)	25
6	[214263] PRE-ONGARD WELL OPERATOR	PRE-ONGARD WELL	#003	1900-01-01	1900-01-01	0	30-015-27404	0.52mi E	Oil	3234 ft (+18 ft)	26
7	[25575] EOG Y RESOURCES, INC.	GARRETSON AMI FEDERAL	#001		2009-12-21	6050	30-015-27284	0.65mi SE	Oil	3221 ft (+5 ft)	27
8	[372098] MARATHON OIL PERMIAN LLC	BOND 20 FEE	#001C			0	30-015-44072	0.69mi W	Oil	3192 ft (-23 ft)	28
9	[214263] PRE-ONGARD WELL OPERATOR	PRE-ONGARD WELL	#004	1900-01-01	1901-01-01	0	30-015-27413	0.74mi E	Oil	3234 ft (+18 ft)	29
10	[1801] BEPCO, LP	BIG EDDY UNIT	#168C			0	30-015-35275	0.74mi E	Gas	3261 ft (+44 ft)	30
10	[373075] XTO PERMIAN OPERATING LLC.	BIG EDDY	#168	2008-04-04	2020-12-03	12397	30-015-36021	0.74mi E	Gas	3261 ft (+44 ft)	31
11	[214263] PRE-ONGARD WELL OPERATOR	PRE-ONGARD WELL	#099	1900-01-01	1900-01-01	0	30-015-24808	0.80mi NE	Oil	3244 ft (+28 ft)	32
12	[214263] PRE-ONGARD WELL OPERATOR	PRE-ONGARD WELL	#079	1980-06-08	1980-06-24	1646	30-015-23268	0.81mi SE	Salt Water Disposal	3225 ft (+8 ft)	33

Oil and Gas Summary

13	[308339] OWL SWD OPERATING, LLC	BIG EDDY UNIT	#079Y	1980-07-06		12377	30-015-23385	0.82mi SE	Salt Water Disposal	3225 ft (+8 ft)	34
14	[373075] XTO PERMIAN OPERATING LLC.	BIG EDDY UNIT	#169	2007-01-30	2021-04-19	12112	30-015-35169	0.83mi N	Gas	3198 ft (-17 ft)	35
15	[214263] PRE-ONGARD WELL OPERATOR	PRE-ONGARD WELL	#001	1900-01-01	1901-01-01	0	30-015-02471	0.90mi SE	Oil	3225 ft (+8 ft)	36
16	[25575] EOG Y RESOURCES, INC.	BIG EDDY UNIT	#109Y		2006-11-20	0	30-015-25234	0.92mi SE	Oil	3215 ft (-1 ft)	37
16	[214263] PRE-ONGARD WELL OPERATOR	PRE-ONGARD WELL	#109	1900-01-01	1900-01-01	0	30-015-25215	0.92mi SE	Oil	3215 ft (-1 ft)	38

*UNKNOWN appears where digital data does not exist. Further research can be requested to obtain this data.
*N/A (not applicable) appears in the Completion Date row only when there is a Dry Hole because a Dry Hole does not constitute a completion.
*NOT AVAILABLE appears where digital data does not exist. However, this data may exist within hard copy well files. Further research is required to obtain this data. Please call 512-478-0059 to request a file review.
*THIS REPORT IDENTIFIES WELLHEAD SURFACE LOCATIONS ONLY AND IN NO WAY ATTEMPTS TO IDENTIFY ANY DEVIATED BOTTOM HOLE LOCATIONS.

End of Oil and Gas Summary

Map ID 1: OG

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

OG - Oil and Gas Well

Map ID: 1		**Source: Oil Conservation Division, State of New Mexico, New Mexico Taxation and Revenue Department**
API Number: 30-015-49301	**OG - Oil and Gas Well**	**Banks ID: 30-015-49301**
Well Address: NM	**Well Type: Salt Water Disposal**	**Rel. Loc.: 0.05mi W**
Well Name: RAMROD FEE SWD	**Completion Date: 2022-05-13**	**Total Depth:**
Well #: #001	**Plug Date:**	**Elevation: 3208.66 ft (-7.58 ft)**
Operator: [330129] WaterBridge Stateline LLC		

Mineral Owner:	Federal
Surface Owner:	Private
Status:	New
Last Production:	23-Dec
Measured Depth:	
Elevation:	3207
Drilling Floor:	

Map ID 2: OG

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 2		**Source: Oil Conservation Division, State of New Mexico, New Mexico Taxation and Revenue Department**
API Number: 30-015-32451	**OG - Oil and Gas Well**	**Banks ID: 30-015-32451**
Well Address: NM	**Well Type: Gas**	**Rel. Loc.: 0.32mi W**
Well Name: BOND	**Completion Date: 2002-09-27**	**Total Depth: 10770.0**
Well #: #001	**Plug Date: 2018-10-24**	**Elevation: 3198.82 ft (-17.42 ft)**
Operator: [372098] MARATHON OIL PERMIAN LLC		

Mineral Owner:	Private
Surface Owner:	Private
Status:	Plugged, Site Released
Last Production:	6-Aug
Measured Depth:	10770
Elevation:	3195
Drilling Floor:	

Map ID 3: OG

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 3		**Source: Oil Conservation Division, State of New Mexico, New Mexico Taxation and Revenue Department**
API Number: 30-015-34861	**OG - Oil and Gas Well**	**Banks ID: 30-015-34861**
Well Address: NM	**Well Type: Oil**	**Rel. Loc.: 0.33mi W**
Well Name: BOND FEE	**Completion Date: 2006-06-08**	**Total Depth: 12270.0**
Well #: #002	**Plug Date:**	**Elevation: 3195.54 ft (-20.70 ft)**
Operator: [372098] MARATHON OIL PERMIAN LLC		

Mineral Owner:	Private
Surface Owner:	Private
Status:	Plugged, Not Released
Last Production:	20-Jan
Measured Depth:	12270
Elevation:	3194
Drilling Floor:	

Map ID 4: OG

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 4		**Source: Oil Conservation Division, State of New Mexico, New Mexico Taxation and Revenue Department**
API Number: 30-015-22398	**OG - Oil and Gas Well**	**Banks ID: 30-015-22398**
Well Address: NM	**Well Type: Oil**	**Rel. Loc.: 0.37mi S**
Well Name: BIG EDDY UNIT	**Completion Date:**	**Total Depth: 12208.0**
Well #: #060	**Plug Date: 2009-08-15**	**Elevation: 3202.10 ft (-14.14 ft)**
Operator: [260737] BOPCO, L.P.		

Mineral Owner:	State
Surface Owner:	Private
Status:	Plugged, Site Released
Last Production:	Dec-82
Measured Depth:	12208
Elevation:	3204
Drilling Floor:	

Map ID 5: OG

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 5		**Source: Oil Conservation Division, State of New Mexico, New Mexico Taxation and Revenue Department**
API Number: 30-015-33231	**OG - Oil and Gas Well**	**Banks ID: 30-015-33231**
Well Address: NM	**Well Type: Gas**	**Rel. Loc.: 0.39mi NW**
Well Name: BIG EDDY UNIT	**Completion Date: 2004-01-28**	**Total Depth: 12310.0**
Well #: #150	**Plug Date: 2020-11-19**	**Elevation: 3198.82 ft (-17.42 ft)**
Operator: [373075] XTO PERMIAN OPERATING LLC.		

Mineral Owner:	Federal
Surface Owner:	Private
Status:	Plugged, Site Released
Last Production:	16-Apr
Measured Depth:	12310
Elevation:	3196
Drilling Floor:	

Map ID 6: OG

BANKS ENVIRONMENTAL DATA
A DIVISION OF THE BANKS GROUP

Map ID: 6		**Source: Oil Conservation Division, State of New Mexico, New Mexico Taxation and Revenue Department**
API Number: 30-015-27404	**OG - Oil and Gas Well**	**Banks ID: 30-015-27404**
Well Address: NM	**Well Type: Oil**	**Rel. Loc.: 0.52mi E**
Well Name: PRE-ONGARD WELL	**Completion Date: 1900-01-01**	**Total Depth:**
Well #: #003	**Plug Date: 1900-01-01**	**Elevation: 3234.91 ft (+18.67 ft)**
Operator: [214263] PRE-ONGARD WELL OPERATOR		

Mineral Owner:	Federal
Surface Owner:	Federal
Status:	Plugged, Site Released
Last Production:	
Measured Depth:	
Elevation:	
Drilling Floor:	

Map ID 7: OG

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 7		**Source: Oil Conservation Division, State of New Mexico, New Mexico Taxation and Revenue Department**
API Number: 30-015-27284	**OG - Oil and Gas Well**	**Banks ID: 30-015-27284**
Well Address: NM	**Well Type: Oil**	**Rel. Loc.: 0.65mi SE**
Well Name: GARRETSON AMI FEDERAL	**Completion Date:**	**Total Depth: 6050.0**
Well #: #001	**Plug Date: 2009-12-21**	**Elevation: 3221.78 ft (+5.54 ft)**
Operator: [25575] EOG Y RESOURCES, INC.		

Mineral Owner:	Federal
Surface Owner:	Federal
Status:	Plugged, Site Released
Last Production:	9-Dec
Measured Depth:	6050
Elevation:	
Drilling Floor:	

Map ID 8: OG

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 8		**Source: Oil Conservation Division, State of New Mexico, New Mexico Taxation and Revenue Department**
API Number: 30-015-44072	**OG - Oil and Gas Well**	**Banks ID: 30-015-44072**
Well Address: NM	**Well Type: Oil**	**Rel. Loc.: 0.69mi W**
Well Name: BOND 20 FEE	**Completion Date:**	**Total Depth:**
Well #: #001C	**Plug Date:**	**Elevation: 3192.26 ft (-23.98 ft)**
Operator: [372098] MARATHON OIL PERMIAN LLC		

Mineral Owner:	Private
Surface Owner:	Federal
Status:	Cancelled Apd
Last Production:	
Measured Depth:	
Elevation:	3192
Drilling Floor:	

Map ID 9: OG

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 9		**Source: Oil Conservation Division, State of New Mexico, New Mexico Taxation and Revenue Department**
API Number: 30-015-27413	**OG - Oil and Gas Well**	**Banks ID: 30-015-27413**
Well Address: NM	**Well Type: Oil**	**Rel. Loc.: 0.74mi E**
Well Name: PRE-ONGARD WELL	**Completion Date: 1900-01-01**	**Total Depth:**
Well #: #004	**Plug Date: 1901-01-01**	**Elevation: 3234.91 ft (+18.67 ft)**
Operator: [214263] PRE-ONGARD WELL OPERATOR		

Mineral Owner:	Federal
Surface Owner:	Federal
Status:	Plugged, Site Released
Last Production:	
Measured Depth:	
Elevation:	
Drilling Floor:	

Map ID 10: OG

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 10		**Source: Oil Conservation Division, State of New Mexico, New Mexico Taxation and Revenue Department**
API Number: 30-015-35275	**OG - Oil and Gas Well**	**Banks ID: 30-015-35275**
Well Address: NM	**Well Type: Gas**	**Rel. Loc.: 0.74mi E**
Well Name: BIG EDDY UNIT	**Completion Date:**	**Total Depth:**
Well #: #168C	**Plug Date:**	**Elevation: 3261.15 ft (+44.91 ft)**
Operator: [1801] BEPCO, LP		

Mineral Owner:	State
Surface Owner:	State
Status:	Cancelled Apd
Last Production:	
Measured Depth:	
Elevation:	3255
Drilling Floor:	

Sites in Map ID 10 Cluster

API #	Operator Name	Well Name	Well Number	Well Address	Page #
30-015-35275	[1801] BEPCO, LP	BIG EDDY UNIT	#168C	NM	30
30-015-36021	[373075] XTO PERMIAN OPERATING LLC.	BIG EDDY	#168	NM	31

Map ID 10: OG

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 10		**Source: Oil Conservation Division, State of New Mexico, New Mexico Taxation and Revenue Department**
API Number: 30-015-36021	**OG - Oil and Gas Well**	**Banks ID: 30-015-36021**
Well Address: NM	**Well Type: Gas**	**Rel. Loc.: 0.74mi E**
Well Name: BIG EDDY	**Completion Date: 2008-04-04**	**Total Depth: 12397.0**
Well #: #168	**Plug Date: 2020-12-03**	**Elevation: 3261.15 ft (+44.91 ft)**
Operator: [373075] XTO PERMIAN OPERATING LLC.		

Mineral Owner:	State
Surface Owner:	State
Status:	Plugged, Site Released
Last Production:	19-May
Measured Depth:	12397
Elevation:	3255
Drilling Floor:	

Sites in Map ID 10 Cluster

API #	Operator Name	Well Name	Well Number	Well Address	Page #
30-015-35275	[1801] BEPCO, LP	BIG EDDY UNIT	#168C	NM	30
30-015-36021	[373075] XTO PERMIAN OPERATING LLC.	BIG EDDY	#168	NM	31

Map ID 11: OG

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 11		**Source: Oil Conservation Division, State of New Mexico, New Mexico Taxation and Revenue Department**
API Number: 30-015-24808	**OG - Oil and Gas Well**	**Banks ID: 30-015-24808**
Well Address: NM	**Well Type: Oil**	**Rel. Loc.: 0.80mi NE**
Well Name: PRE-ONGARD WELL	**Completion Date: 1900-01-01**	**Total Depth:**
Well #: #099	**Plug Date: 1900-01-01**	**Elevation: 3244.75 ft (+28.51 ft)**
Operator: [214263] PRE-ONGARD WELL OPERATOR		

Mineral Owner:	State
Surface Owner:	State
Status:	Plugged, Site Released
Last Production:	
Measured Depth:	
Elevation:	
Drilling Floor:	

Map ID 12: OG

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 12		**Source: Oil Conservation Division, State of New Mexico, New Mexico Taxation and Revenue Department**
API Number: 30-015-23268	**OG - Oil and Gas Well**	**Banks ID: 30-015-23268**
Well Address: NM	**Well Type: Salt Water Disposal**	**Rel. Loc.: 0.81mi SE**
Well Name: PRE-ONGARD WELL	**Completion Date: 1980-06-08**	**Total Depth: 1646.0**
Well #: #079	**Plug Date: 1980-06-24**	**Elevation: 3225.07 ft (+8.83 ft)**
Operator: [214263] PRE-ONGARD WELL OPERATOR		

Mineral Owner:	Federal
Surface Owner:	Federal
Status:	Plugged, Site Released
Last Production:	
Measured Depth:	1646
Elevation:	3220
Drilling Floor:	

Map ID 13: OG

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 13		**Source: Oil Conservation Division, State of New Mexico, New Mexico Taxation and Revenue Department**
API Number: 30-015-23385	**OG - Oil and Gas Well**	**Banks ID: 30-015-23385**
Well Address: NM	**Well Type: Salt Water Disposal**	**Rel. Loc.: 0.82mi SE**
Well Name: BIG EDDY UNIT	**Completion Date: 1980-07-06**	**Total Depth: 12377.0**
Well #: #079Y	**Plug Date:**	**Elevation: 3225.07 ft (+8.83 ft)**
Operator: [308339] OWL SWD OPERATING, LLC		

Mineral Owner:	Federal
Surface Owner:	Federal
Status:	Active
Last Production:	23-Aug
Measured Depth:	12377
Elevation:	3221
Drilling Floor:	

Map ID 14: OG

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 14		**Source: Oil Conservation Division, State of New Mexico, New Mexico Taxation and Revenue Department**
API Number: 30-015-35169	**OG - Oil and Gas Well**	**Banks ID: 30-015-35169**
Well Address: NM	**Well Type: Gas**	**Rel. Loc.: 0.83mi N**
Well Name: BIG EDDY UNIT	**Completion Date: 2007-01-30**	**Total Depth: 12112.0**
Well #: #169	**Plug Date: 2021-04-19**	**Elevation: 3198.82 ft (-17.42 ft)**
Operator: [373075] XTO PERMIAN OPERATING LLC.		

Mineral Owner:	Federal
Surface Owner:	Federal
Status:	Plugged, Site Released
Last Production:	20-Jan
Measured Depth:	12112
Elevation:	3197
Drilling Floor:	

Map ID 15: OG

BANKS ENVIRONMENTAL DATA
A DIVISION OF THE BANKS GROUP

Map ID: 15		**Source: Oil Conservation Division, State of New Mexico, New Mexico Taxation and Revenue Department**
API Number: 30-015-02471	**OG - Oil and Gas Well**	**Banks ID: 30-015-02471**
Well Address: NM	**Well Type: Oil**	**Rel. Loc.: 0.90mi SE**
Well Name: PRE-ONGARD WELL	**Completion Date: 1900-01-01**	**Total Depth:**
Well #: #001	**Plug Date: 1901-01-01**	**Elevation: 3225.07 ft (+8.83 ft)**
Operator: [214263] PRE-ONGARD WELL OPERATOR		

Mineral Owner:	
Surface Owner:	Federal
Status:	Plugged, Site Released
Last Production:	
Measured Depth:	
Elevation:	
Drilling Floor:	

Map ID 16: OG

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 16		**Source: Oil Conservation Division, State of New Mexico, New Mexico Taxation and Revenue Department**
API Number: 30-015-25234	**OG - Oil and Gas Well**	**Banks ID: 30-015-25234**
Well Address: NM	**Well Type: Oil**	**Rel. Loc.: 0.92mi SE**
Well Name: BIG EDDY UNIT	**Completion Date:**	**Total Depth:**
Well #: #109Y	**Plug Date: 2006-11-20**	**Elevation: 3215.22 ft (-1.02 ft)**
Operator: [25575] EOG Y RESOURCES, INC.		

Mineral Owner:	Federal
Surface Owner:	Federal
Status:	Plugged, Site Released
Last Production:	5-Aug
Measured Depth:	
Elevation:	
Drilling Floor:	

Sites in Map ID 16 Cluster

API #	Operator Name	Well Name	Well Number	Well Address	Page #
30-015-25234	[25575] EOG Y RESOURCES, INC.	BIG EDDY UNIT	#109Y	NM	37
30-015-25215	[214263] PRE-ONGARD WELL OPERATOR	PRE-ONGARD WELL	#109	NM	38

Map ID 16: OG

BANKS ENVIRONMENTAL DATA A DIVISION OF THE BANKS GROUP

Map ID: 16		**Source: Oil Conservation Division, State of New Mexico, New Mexico Taxation and Revenue Department**
API Number: 30-015-25215	**OG - Oil and Gas Well**	**Banks ID: 30-015-25215**
Well Address: NM	**Well Type: Oil**	**Rel. Loc.: 0.92mi SE**
Well Name: PRE-ONGARD WELL	**Completion Date: 1900-01-01**	**Total Depth:**
Well #: #109	**Plug Date: 1900-01-01**	**Elevation: 3215.22 ft (-1.02 ft)**
Operator: [214263] PRE-ONGARD WELL OPERATOR		

Mineral Owner:	Federal
Surface Owner:	Federal
Status:	Plugged, Site Released
Last Production:	
Measured Depth:	
Elevation:	
Drilling Floor:	

Sites in Map ID 16 Cluster

API #	Operator Name	Well Name	Well Number	Well Address	Page #
30-015-25234	[25575] EOG Y RESOURCES, INC.	BIG EDDY UNIT	#109Y	NM	37
30-015-25215	[214263] PRE-ONGARD WELL OPERATOR	PRE-ONGARD WELL	#109	NM	38

End of OG Section

End of Oil and Gas Details Section

Dataset Descriptions and Sources

Dataset	Source	Dataset Description	Update Schedule	Requested Date	Received Date	Update Date	Source Update Date
OG - Oil and Gas Well (NM)	Oil Conservation Division, State of New Mexico, New Mexico Taxation and Revenue Department	Oil & Gas wells provided by the state agency.	Quarterly	2024-09-23	2024-09-23	2024-09-23	2024-09-23

Disclaimer

The Banks Environmental Data Oil and Gas Well Report was prepared from existing state databases obtained from applicable state agencies. Banks Environmental Data (Banks) provides mapping data sets for informational purposes only. These datasets are continually being updated and refined. Although Banks performs quality assurance and quality control on all research projects, we recognize that any inaccuracies of the well locations and well data could possibly be traced to the appropriate regulatory authority. Therefore, Banks cannot guarantee the accuracy of the data or well location(s) of those maps and records maintained by the oil and gas regulatory agencies. Banks recommends obtaining the actual construction and abandonment records from the appropriate oil and gas regulatory agency to identify possible sources of surface or below surface contamination and/or identify any improperly plugged or abandoned wells that can contribute to the possible upward migration of subsurface drilling fluids. Obtaining the actual well records can provide closure for plugging questions, verify locations, or obtain missing information for many of the historical wells.

APPENDIX B

GEOTECHNICAL ENGINEERING REPORT

COZ Engineering, LLC

GEOTECHNICAL ENGINEERING REPORT

WATERBRIDGE BOND RECYCLING FACILITY

EDDY COUNTY, NEW MEXICO
Project No. 4224112
September 17, 2024

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

September 17, 2024

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

Attn. Mitchell Ratke, P.E.
P: 580.234.8780
E: mratke@envirotechconsulting.com

Re: Geotechnical Engineering Report
WaterBridge Bond Recycling Facility
Lat.: 32.473029° Long.: -104.106770°, West Road
Eddy County, New Mexico
COZ Report No. 4224112

Dear Mr. Ratke:

The following is a geotechnical engineering report for the proposed WaterBridge Bond Recycling Facility in Eddy County, New Mexico. Recommendations for earthwork, 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.

WaterBridge Bond Recycling Facility
September 17, 2024
COZ Report No. 4224112

Appendix:

WaterBridge Bond Recycling Facility
September 17, 2024
COZ Report No. 4224112

Site Investigation:

A subsurface investigation was performed for the proposed WaterBridge Bond Recycling Facility to be located at Lat.: 32.473029° Long.: -104.106770° south of US Highway 62 and West Road in Eddy County, New Mexico. Five (5) test borings were advanced within the proposed facility near client requested locations. The borings were advanced to depths of 25 and 65 feet below ground surface (bgs).

Site Conditions:

The ground surface was exposed native subgrade with dense vegetation consisting of brush and grasses. Soils investigated at this site were comprised of silty sand with varying amounts of gravel from the surface to depths of about 5 to 10 feet bgs. The upper soils were underlain by sandy silt to a depth of about 30 feet bgs. Clayey sand was then encountered to the total explored depth of 65 feet bgs.

The groundwater table was not encountered 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	60 max.

The plasticity index of the minus #40 sieve portion should not exceed twenty (20). The on-site soils tested meet the above specifications.

Excavation of Embankment Areas:

Difficult excavations due to very dense soils will require particular attention in the design and construction.

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:

Once the subgrade has been prepared, 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 Soils or Soft Rock")**. The maximum depth of the borings advanced at the site was 65 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:

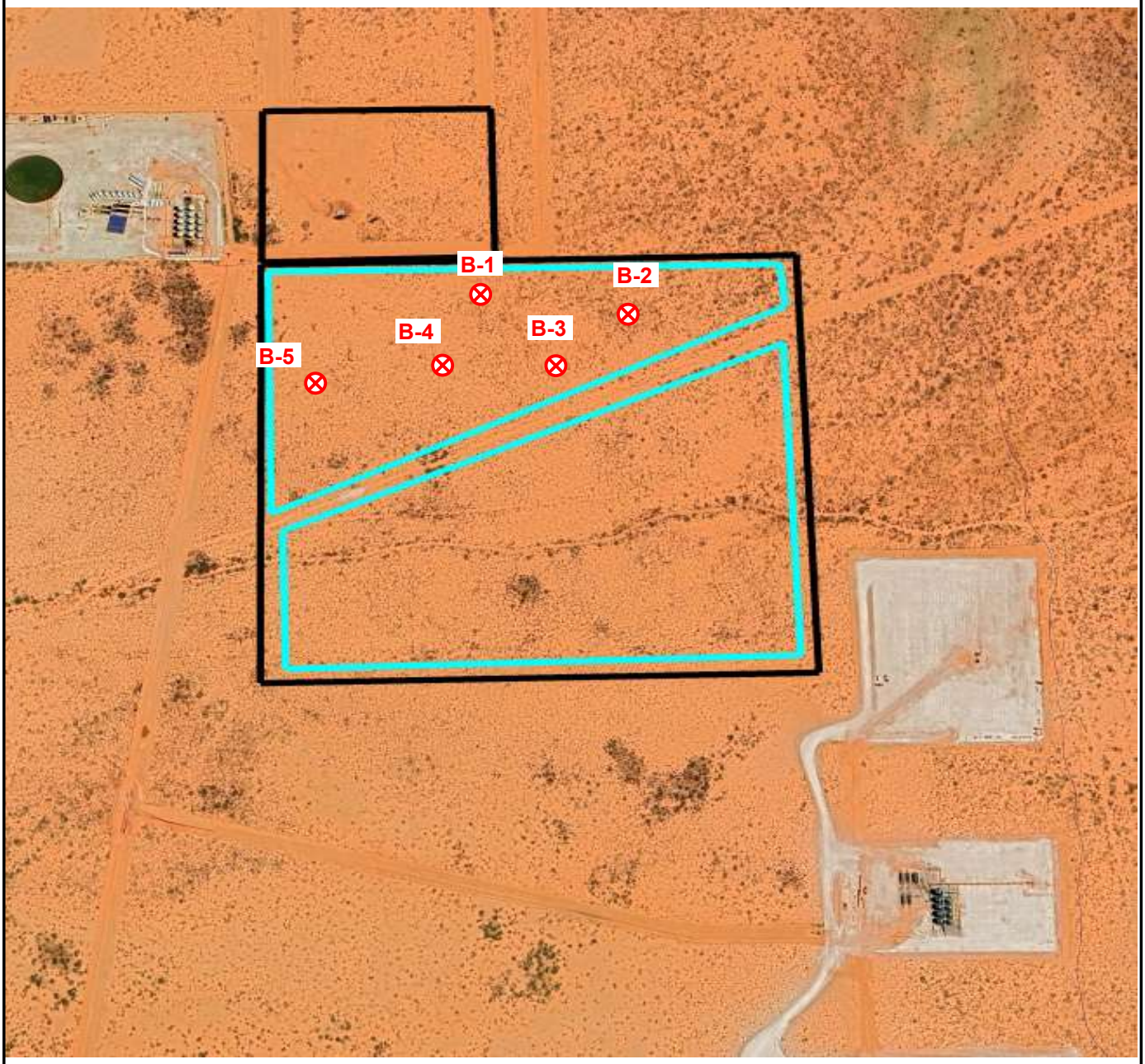
1) Based upon evaluation and interpretation of the findings of the field and laboratory program.

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.



Project Manager: DC Drawn by: DC Checked by: DC Approved by: DC	Project No. 4224112 Scale: AS SHOWN File Name: Figures Date: 9-16-24	COZ Engineering, LLC PO Box 13331 Las Cruces, NM 88013	BORING LOCATION PLAN WaterBridge Bond Recycling Facility 32.473029, -104.106770 Eddy County, New Mexico	Exhibit 1

Project: **WaterBridge Bond Recycling Facility**
Project Location: **32.473029 -104.106770, Carlsbad, NM**
Project Number: **4224112**

Log of Boring B-1
Sheet 1 of 1

Date(s) Drilled **8-28-24**	Logged By **RS**	Checked By **COZ**
Drilling Method **hollow-stem auger**	Drill Bit Size/Type	Total Depth of Borehole **26.5 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, %
	0–9		18	8\9\13	SM		SILTY SANDY: red brown, dry, medium dense				
	10–11		2	16\50	ML		SANDY SILT: red brown, dry, hard	2.4	54.7	22	2
	15		3	50							
	20		4	50							
	25–26		5	23\30\50							
	27						Bottom of Boring				

C:\Users\theco\OneDrive\Desktop\Coz engineering\2024 Projects\4224112-Envirotech-Waterbridge Bond Recycling Facility Carlsbad\logs\bond logs.bg4[COZ Engineering 1.tpl]

Project: **WaterBridge Bond Recycling Facility** Project Location: **32.473029 -104.106770, Carlsbad, NM** Project Number: **4224112**	Log of Boring B-2 **Sheet 1 of 1**

Date(s) Drilled **8-28-24**	Logged By **RS**	Checked By **COZ**
Drilling Method **hollow-stem auger**	Drill Bit Size/Type	Total Depth of Borehole **26 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: red brown, dry, medium dense				
	5		1	12\14\11							
	10		2	25\50			very dense, trace gravel				
	15		3	50	ML		SANDY SILT: red brown, dry, hard				
	20		4	50							
	25		5	25\50				5.5	63.4	25	4
	26						Bottom of Boring				
	40										

C:\Users\theco\OneDrive\Desktop\Coz engineering\2024 Projects\4224112-Envirotech-Waterbridge Bond Recycling Facility Carlsbad\logs\bond logs.bg4[COZ Engineering 1.tpl]

Project: **WaterBridge Bond Recycling Facility** Project Location: **32.473029 -104.106770, Carlsbad, NM** Project Number: **4224112**	Log of Boring B-3 **Sheet 1 of 2**

Date(s) Drilled **8-28-24**	Logged By **RS**	Checked By **COZ**
Drilling Method **hollow-stem auger**	Drill Bit Size/Type	Total Depth of Borehole **65 feet bgs**
Drill Rig Type **CME-75**	Drilling Contractor **Southlands**	Approximate Surface Elevation
Groundwater Level and Date Measured **not encountered**	Sampling Method(s)	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: light brown, dry				
	5				ML		SANDY SILT: red brown, dry				
	30				SC		CLAYEY SAND: red brown, dry				
	40										

C:\Users\theco\OneDrive\Desktop\Coz engineering\2024 Projects\4224112-Envirotech-Waterbridge Bond Recycling Facility Carlsbad\logs\bond logs.bg4[COZ Engineering 1.tpl]

Project: **WaterBridge Bond Recycling Facility**
Project Location: **32.473029 -104.106770, Carlsbad, NM**
Project Number: **4224112**

Log of Boring B-3
Sheet 2 of 2

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Percent Fines	LL, %	PI, %
	40				SC		CLAYEY SAND: red brown, dry				
	45										
	50										
	55										
	60										
	65						Bottom of Boring				
	70										
	75										
	80										

C:\Users\theco\OneDrive\Desktop\Coz engineering\2024 Projects\4224112-Envirotech-Waterbridge Bond Recycling Facility Carlsbad\logs\bond logs.bg4[COZ Engineering 1.tpl]

Project: **WaterBridge Bond Recycling Facility** Project Location: **32.473029 -104.106770, Carlsbad, NM** Project Number: **4224112**	Log of Boring B-4 **Sheet 1 of 1**

Date(s) Drilled **8-28-24**	Logged By **RS**	Checked By **COZ**
Drilling Method **hollow-stem auger**	Drill Bit Size/Type	Total Depth of Borehole **26 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: red brown, dry, medium dense				
	5		1	5\6\8				2.0	49.5	22	3
	10		2	30\50	ML		SANDY SILT: red brown, dry, hard				
	15		3	10\15\25			trace gravel				
	20		4	10\50							
	25		5	11\50							
	26						Bottom of Boring				

C:\Users\theco\OneDrive\Desktop\Coz engineering\2024 Projects\4224112-Envirotech-Waterbridge Bond Recycling Facility Carlsbad\logs\bond logs.bg4[COZ Engineering 1.tpl]

Project: **WaterBridge Bond Recycling Facility** Project Location: **32.473029 -104.106770, Carlsbad, NM** Project Number: **4224112**	Log of Boring B-5 **Sheet 1 of 1**

Date(s) Drilled **8-28-24**	Logged By **RS**	Checked By **COZ**
Drilling Method **hollow-stem auger**	Drill Bit Size/Type	Total Depth of Borehole **25.5 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: light brown, dry, medium dense, trace gravel				
	5		1	5\8\12							
	10		2	10\23\50	MH		SANDY SILT: red brown, dry, hard	3.2	56.3		NP
	15		3	50							
	20		4	50							
	25		5	50			Bottom of Boring				
	40										

C:\Users\theco\OneDrive\Desktop\Coz engineering\2024 Projects\4224112-Envirotech-Waterbridge Bond Recycling Facility Carlsbad\logs\bond logs.bg4[COZ Engineering 1.tpl]

Project: **WaterBridge Bond Recycling Facility**
Project Location: **32.473029 -104.106770, Carlsbad, NM**
Project Number: **4224112**

Key to Log of Boring
Sheet 1 of 1

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

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

SILT, SILT w/SAND, SANDY SILT (MH)
SILT, SILT w/SAND, SANDY SILT (ML)
Clayey SAND (SC)
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

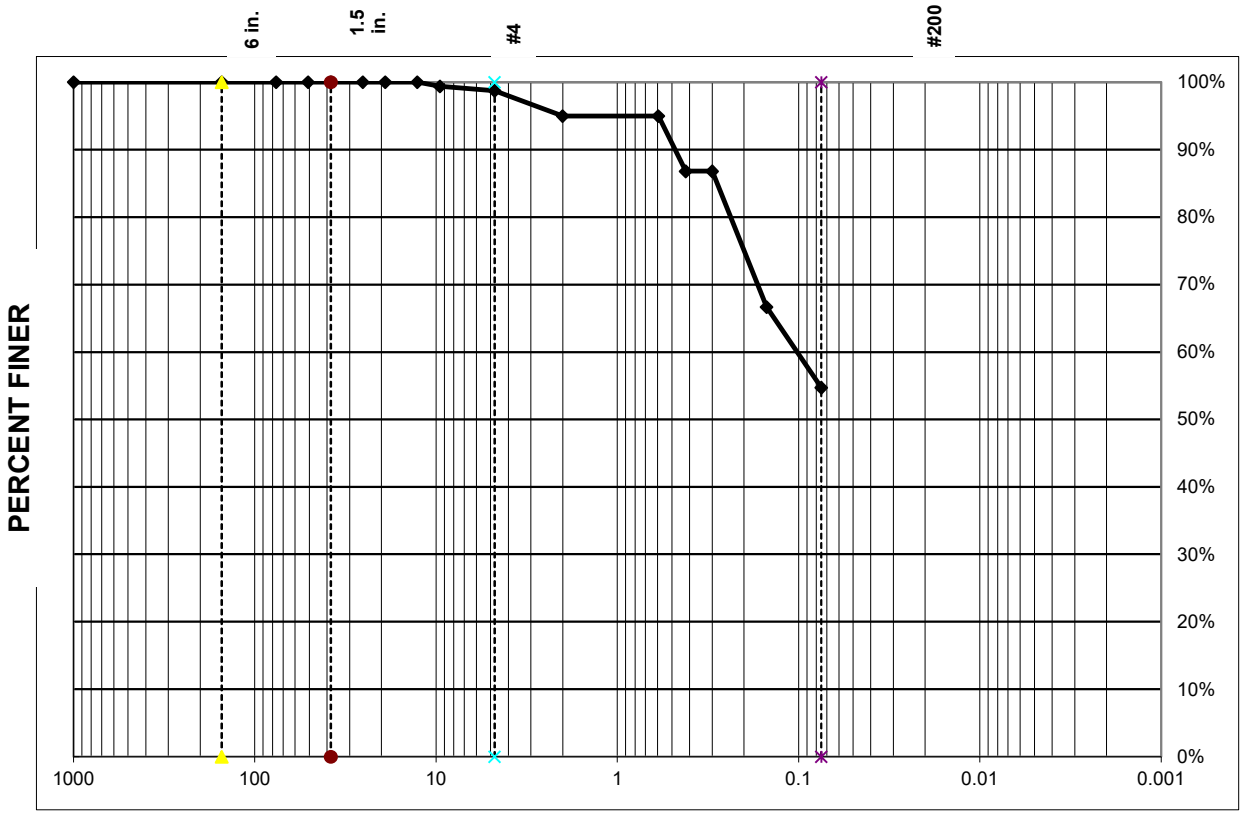
GENERAL NOTES

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.

C:\Users\theco\OneDrive\Desktop\Coz engineering\2024 Projects\4224112-Envirotech-Waterbridge Bond Recycling Facility Carlsbad\logs\bond logs.bg4|COZ Engineering 1.tpl

Figure B-1

GRAIN SIZE DISTRIBUTION GRAPH



TEST SUMMARY (ASTM C136)

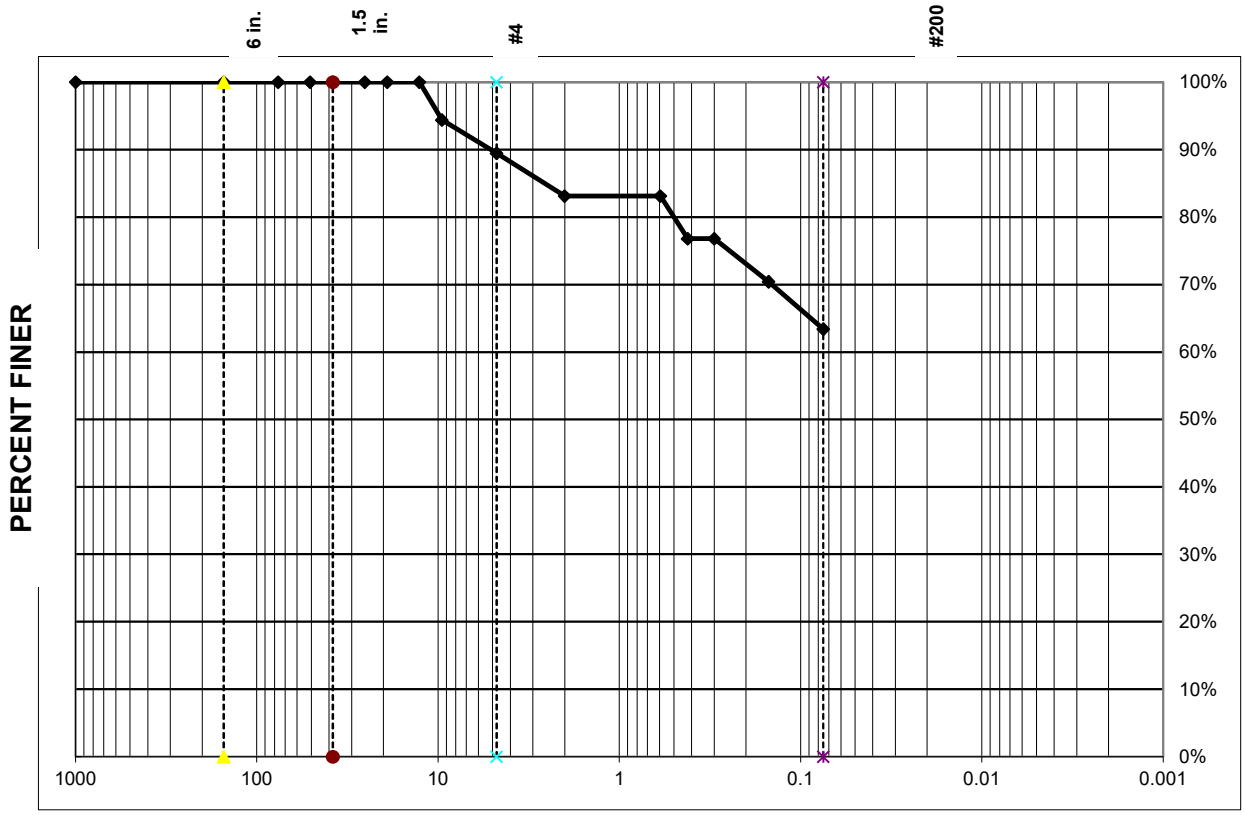
Sieve Size	1 1/2"	3/4"	3/8"	#4	#10	#40	#100	#200
% Passing (Cumulative)	100%	100%	99%	99%	95%	87%	67%	54.7%
Specification								

% GRAVEL =	1%	**D_{85} =** 0.3	**D_{15} =**
% SAND =	44%	**D_{60} =** 0.1	**D_{10} =**
% SILT & CLAY =	55%	**D_{50} =**	**C_U =**
		D_{30} =	**C_C =**

Sample Date: 8/28/24
Project No.: 4224112
Project Name: Waterbridge Bond Recycling Facility
Report Date: 9/16/24
Sample Location: B-1 at 10'
Liquid Limit: 22 **Plasticity Index:** 2
USCS Classification: ML
Material Description: Sandy Silt
Moisture Content: 2.4%

COZ Engineering, LLC
PO Box 13331
Las Cruces, NM 88013
(575) 642-7671

GRAIN SIZE DISTRIBUTION GRAPH



TEST SUMMARY (ASTM C136)

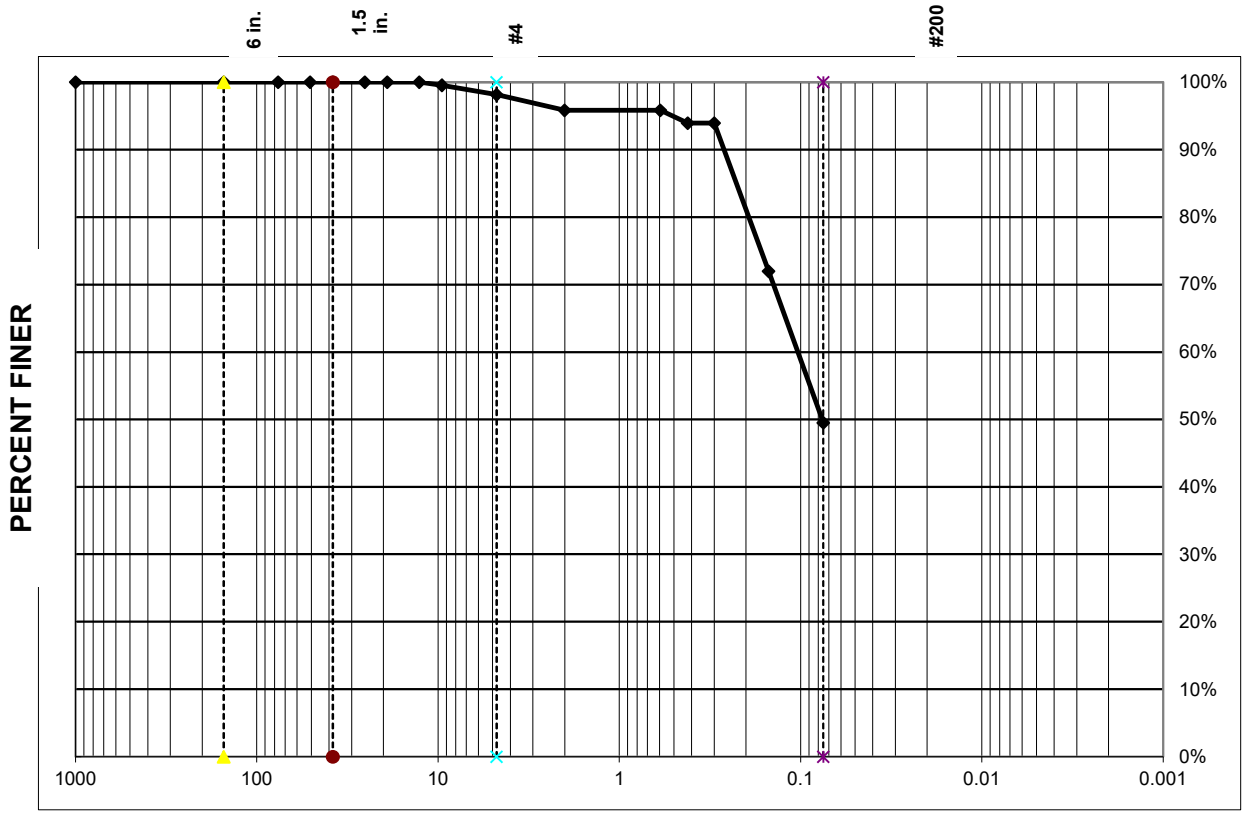
Sieve Size	1 1/2"	3/4"	3/8"	#4	#10	#40	#100	#200
% Passing (Cumulative)	100%	100%	94%	89%	83%	77%	70%	63.4%
Specification								

% GRAVEL =	11%	**D_{85} =** 2.6	**D_{15} =**
% SAND =	26%	**D_{60} =**	**D_{10} =**
% SILT & CLAY =	63%	**D_{50} =**	**C_U =**
		D_{30} =	**C_C =**

Sample Date: 8/28/24
Project No.: 4224112
Project Name: Waterbridge Bond Recycling Facility
Report Date: 9/16/24
Sample Location: B-2 at 25.0'
Liquid Limit: 25 **Plasticity Index:** 4
USCS Classification: ML
Material Description: Sandy Silt
Moisture Content: 5.5%

COZ Engineering, LLC
PO Box 13331
Las Cruces, NM 88013
(575) 642-7671

GRAIN SIZE DISTRIBUTION GRAPH



TEST SUMMARY (ASTM C136)

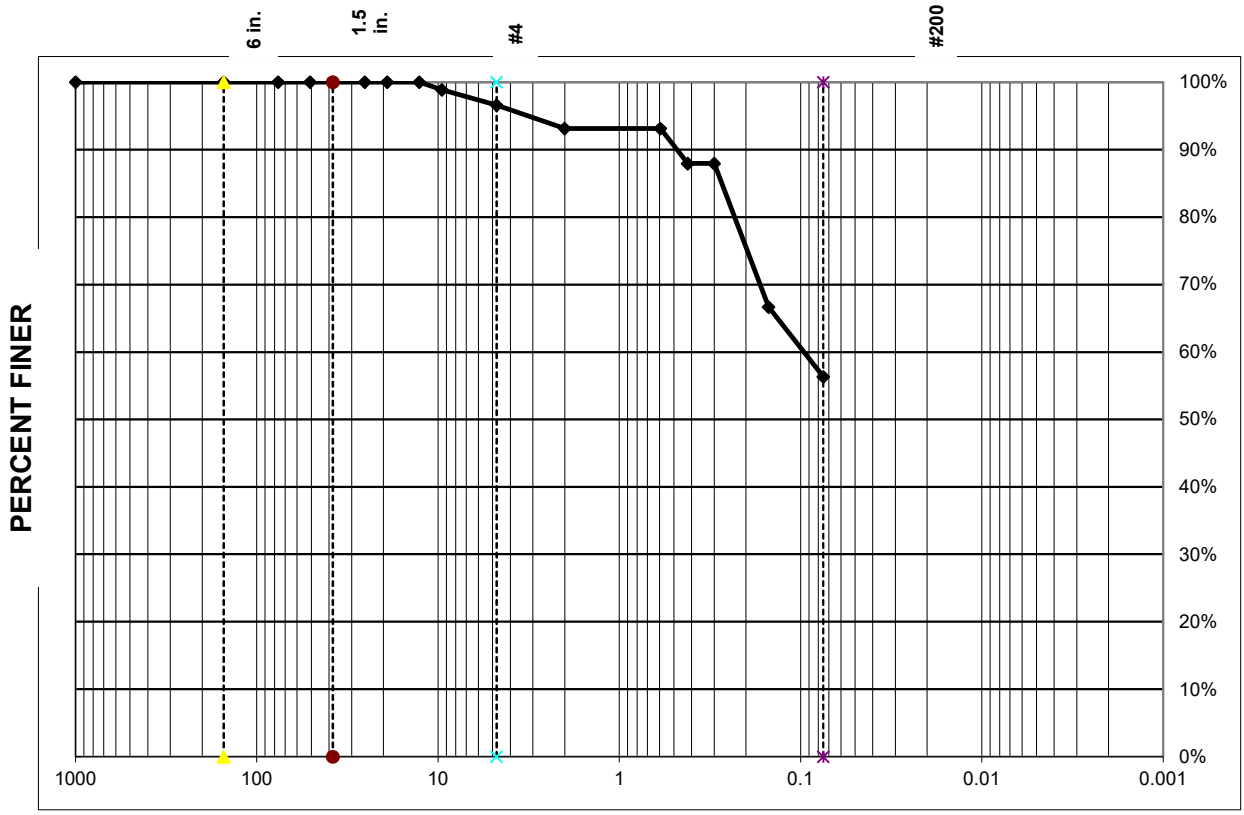
Sieve Size	1 1/2"	3/4"	3/8"	#4	#10	#40	#100	#200
% Passing (Cumulative)	100%	100%	100%	98%	96%	94%	72%	49.5%
Specification								

% GRAVEL =	2%	**D_{85} =** 0.2	**D_{15} =**
% SAND =	49%	**D_{60} =** 0.1	**D_{10} =**
% SILT & CLAY =	50%	**D_{50} =** 0.1	**C_U =**
		D_{30} =	**C_C =**

Sample Date: 8/28/24
Project No.: 4224112
Project Name: Waterbridge Bond Recycling Facility
Report Date: 9/16/24
Sample Location: B-4 at 5.0'
Liquid Limit: 22 **Plasticity Index:** 3
USCS Classification: SM
Material Description: Silty Sand
Moisture Content: 2.0%

COZ Engineering, LLC
PO Box 13331
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%	99%	97%	93%	88%	67%	56.3%
Specification								

% GRAVEL =	3%		**D_{85} =** 0.3	**D_{15} =**	
% SAND =	40%		**D_{60} =** 0.1	**D_{10} =**	
% SILT & CLAY =	56%		**D_{50} =**	**C_U =**	
			D_{30} =	**C_C =**	

Sample Date: 8/28/24
Project No.: 4224112
Project Name: Waterbridge Bond Recycling Facility
Report Date: 9/16/24
Sample Location: B-5 at 10.0'
Liquid Limit: **Plasticity Index:** NP
USCS Classification: ML
Material Description: Sandy Silt
Moisture Content: 3.2%

COZ Engineering, LLC
PO Box 13331
Las Cruces, NM 88013
(575) 642-7671

Laboratory Compaction Characteristics of Soil

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

Client Name: Envirotech
Project Name: Waterbridge Bond Recycling Facility
Location: 32.473029, -104.106770, West Road
Eddy County, NM

Source Material: B-4 at 0-5'
Sample Description: Silty Sand
Proctor #1

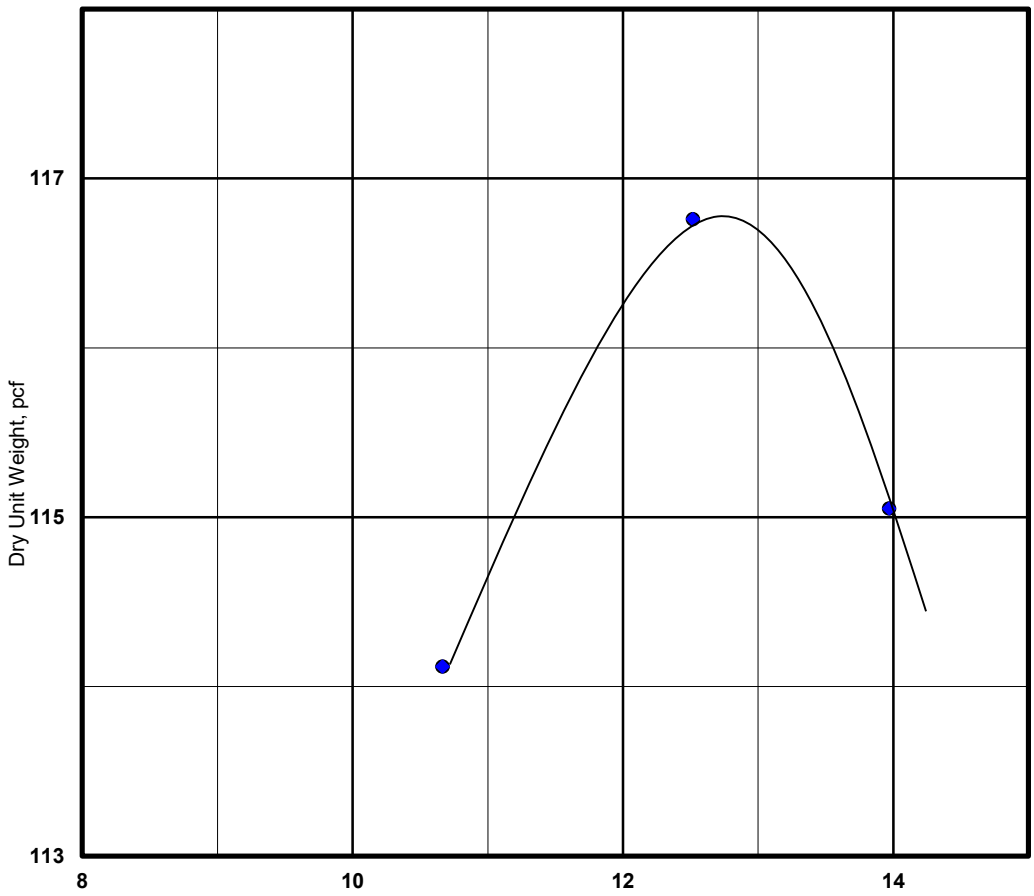
Material Designation: SM Sample date: 8/28/2024
Test Method: ASTM-698
Test Procedure: A
Sample Preparation: COZ
Rammer: ___ Mechanical X Manual

Project No.: 4224112 Date: 9/16/2024

TEST RESULTS
Maximum Dry Unit Wt.: 116.7 pcf
Optimum Water Content: 12.7 %

Liquid Limit: 22 Plastic Limit: 20
Plasticity Index: 2
% passing # 200 sieve: 49

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: Waterbridge Bond Recycling Facility
Location: 32.473029, -104.106770, West Road
Eddy County, NM

Source Material: B-5 at 5'-10'
Sample Description: Sandy Silt
Proctor #2

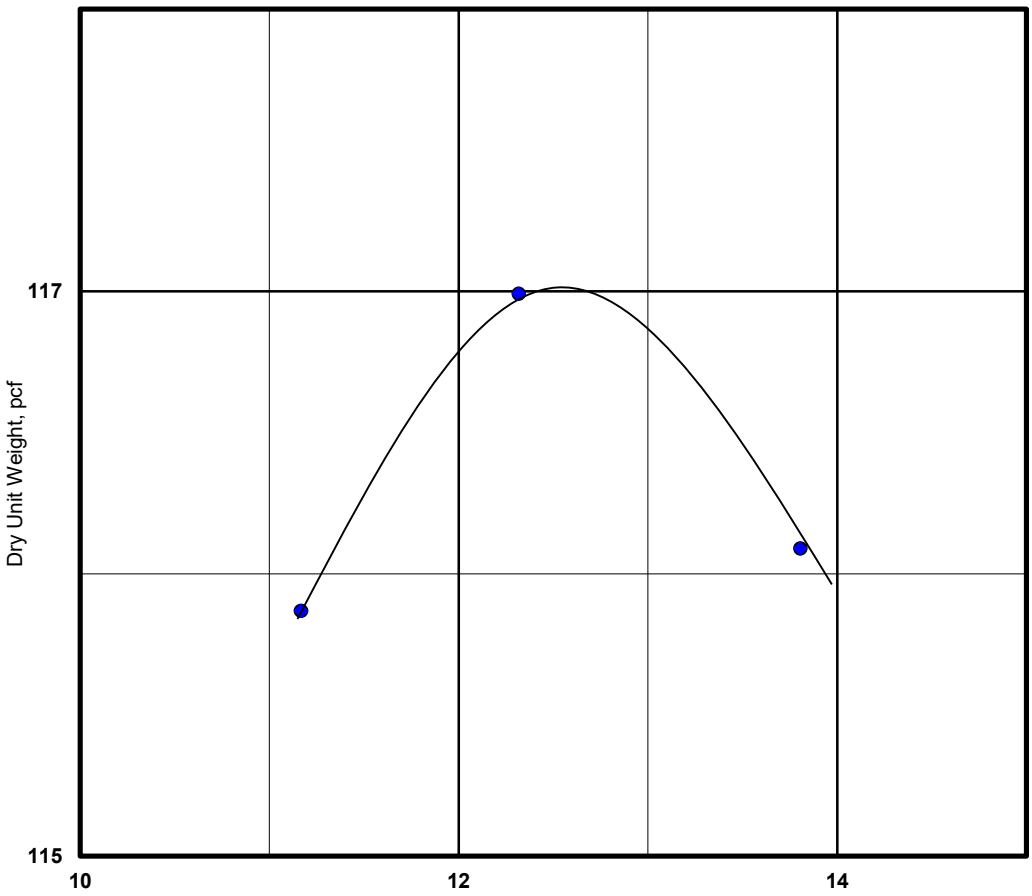
Material Designation: ML Sample date: 8/28/2024
Test Method: ASTM-698
Test Procedure: A
Sample Preparation: COZ
Rammer: ___ Mechanical X Manual

Project No.: 4224112 Date: 9/16/2024

TEST RESULTS
Maximum Dry Unit Wt.: 117.0 pcf
Optimum Water Content: 12.5 %

Liquid Limit: ___ Plastic Limit: ___
Plasticity Index: NP
% passing # 200 sieve: 56

Reviewed by: Dan Cosper, P. E.



APPENDIX C

WETLANDS DELINEATION REPORT

ENVIROTECH

ENGINEERING

WETLANDS DELINEATION

BOND WATER RECYCLE FACILITY

EDDY COUNTY, NEW MEXICO

PREPARED FOR

WATERBRIDGE STATELINE, LLC

OCTOBER 1, 2024

TABLE OF CONTENTS

1. INTRODUCTION

ENVIROTECH ENGINEERING & CONSULTING, INC., is pleased to submit the results of the wetlands delineation performed for the proposed Bond Water Recycle Facility located near Carlsbad, Eddy County, New Mexico. The site encompasses approximately 40 acres of undeveloped land located in Section 20, Township 21 South, Range 28 East, northeast of the town of Carlsbad, New Mexico. The wetlands delineation was performed in accordance with the 2008 Aird West Regional Supplement (Version 2.0) to the 1987 United States Army Corps of Engineers (USACE) Wetland Delineation Manual.

The purpose of the wetlands delineation was to determine if wetlands were located on the site that would require mitigation measures for development. Such mitigation measures would require consultation and approval from the US Army Corps of Engineers. In addition, available aerial photographs, National Wetlands Inventory (NWI) maps, soil survey maps, and floodplain maps were reviewed.

2. SITE DESCRIPTION AND OBSERVATIONS

The project area encompasses approximately 40 acres of land located in Section 20, Township 21 South, Range 28 East, northeast of Carlsbad in Eddy County, New Mexico. The project area is currently undeveloped land, covered with shrubs and natural drainage. Surrounding lands have been developed for oil and gas exploration.

The site is located within the United States Geological Survey (USGS) Level III Chihuahuan Desert Ecoregion within the Interior Deserts of New Mexico. Characteristics of this ecoregion include hot summers, cool winters, intermittent rainfall, grassland and desert scrub vegetation, riparian forests, and closed basins.

2.1 Site Observations. The project area was observed to be undeveloped covered with sparse shrubs and a drainage path flowing from west to east across the southern portion of the site. A Site Map depicting the area studied as well as potential wetland boundaries (as determined by the field assessment discussed in Section 4, if any) is contained in *Appendix A*.

3. PHYSICAL SETTING REVIEW

A review of the physical setting and characteristics of the site and surrounding area was performed by reviewing aerial photographs, National Wetlands Inventory Maps, United States Department of Agriculture (USDA) Soil Survey information, United States Geological Survey (USGS) Topographic Maps, and Federal Emergency Management Agency (FEMA) Flood Maps. This information was utilized to aid in identification of wetlands, watercourses, and other aquatic features.

3.1 Aerial Photographs. Aerial photographs for the years 2005, 2009, 2011, 2016, and 2019 were obtained from the Google Earth database and were reviewed to identify potential wetland area, or other features. The site appears to be undeveloped with sparse vegetation. Density of the vegetation changes throughout the years but stays relatively consistent across the site. The

drainage area across the southern portion of the site that flows from the west to the east appears to stay consistent throughout the years.

3.2 National Wetlands Inventory Maps. The National Wetlands Inventory (NWI) maps were reviewed to aid in the identification of potential wetland areas within the Project Area. The NWI map identified one (1) potential wetland area on the southern portion of the site. This wetland area is classified as follows, and a reproduction of the NWI Map including the location of the Project Area is contained in *Appendix A*.

Table 3.2
NWI Onsite Wetland Classification

Wetland Area	NWI Wetland Code	Wetland Code Description
Riverine	R4SBJ	Riverine, Intermittent, Streambed, Intermittently Flooded

The United States Fish and Wildlife Service generates the NWI maps through infrared aerial imagery and aerial photograph interpretation; no actual field reconnaissance was conducting 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. Field reconnaissance is necessary to determine the actual presence of wetlands within the Project Area.

3.3 USGS Topographic Maps. According to the United States Geological Survey (USGS) Topographic Map obtained from the United States Geological Survey online database, the subject site is located on the Indian Flats Quadrangle, USGS 7.5-Minute Series Topographic Map. The general topography of the majority of the site is flat to gently sloping with an approximate elevation of 3,220 to 3,230-ft. above Mean Sea Level (MSL). The general topography of the site slopes to the south, towards the onsite drainage area.

The apparent topographic gradient appears to flow generally to the south and southeast. A reproduction of the Indian Flats Quadrangle, USGS 7.5-Minute Series Topographic Map of the subject site is presented in *Appendix A*.

3.4 FEMA Flood Maps. A review of FEMA floodplain data was conducted to determine the location, and zone of floodplains within the project area, if any. Flood Insurance Rate Maps (FIRM) produced by FEMA show floodplain areas categorized by the following: 100-yr. (1% chance of annual flood), the 500-yr. (0.2% chance of annual flood), and the height of the base flood (if determined).

The Project Area is located on the FEMA map panel 35015C1100D, dated June 4, 2010, and is located in an area mapped "Zone X," "Area of Minimal Flood Hazard." A "Zone X"

designation is assigned to areas considered to be outside the 0.2% annual chance floodplain with minimal flood hazards.

3.5 Soil Survey. According to the USDA Soil Survey for Eddy County, New Mexico multiple soil types are present within the Project Area and are listed in Table 3.5 below. No soils identified on the site are noted to be hydric (soil favors growth and regeneration of wetland vegetation by its ability to hold water for extended periods of time) by the USDA. A copy of the USDA soil report for the site is contained in *Appendix B*.

Table 3.5
Project Area Soils

USDA Symbol	Soil Description
KA	Karro fine sandy loam, 0-3% slopes, located on plains and alluvial fans, well drained, no hydric soil rating.
CA	Cacique loamy sand, 0-3% slopes, eroded, located on plains and basin floors, well drained, no hydric soil rating.

4. WETLAND METHODOLOGY AND FIELD ASSESSMENT

The purpose of the field investigation of the site was to identify and delineate wetlands that may be subject to regulatory jurisdiction under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act. This wetlands determination was conducted with the standards and procedures defined in the US Army Corps of Engineers (USACE) Wetland Delineation Manual using the 2008 Arid West Regional Supplement.

Based on the methodology set forth by the USACE, identification of wetlands is based on a three factor method. This method involves the identification and presence of three wetlands indicators including the dominance of hydrophytic vegetation, presence of hydric soil, and wetland hydrology. The field work performed and described below addresses these three indicators at each sampling point on the site.

4.1 Wetlands Assessment Methodology. Missy Harmon, Senior Geologist with Envirotech Engineering & Consulting, Inc., and Katelyn Clark, Geologist with Envirotech Engineering & Consulting, Inc., conducted a detailed inspection of the subject site on September 10, 2024, to identify and document the presence of wetlands and their approximate boundaries (if any). This boundary occurs where wetland vegetation is no longer dominant, and upland vegetation becomes more prevalent. Soil and hydrology were also assessed at each sample point to determine the presence of hydric soil and wetland hydrology, or the absence thereof.

Sampling Points that exhibited all three wetland indicators (hydrophytic vegetation, hydric soil, and wetland hydrology) were identified as wetlands. A Site Area Map depicting the approximate wetland boundaries (if any), and the Sampling Points are included as *Appendix A*.

Photographs depicting conditions at the time of the field assessment are included in *Appendix C*, and the USACE Wetlands Data forms for each Sampling Point are included in *Appendix D*.

Vegetation Assessment. At each sample point, a vegetation analysis (percent ground cover based on identifiable species) was performed based on strata (herbaceous layer, tree stratum, sapling/shrub stratum, and woody vine stratum). Once the vegetation within the sampling area was identified, the wetland indicator status was determined based on plant species (obligate, facultative wet, facultative, facultative upland, or upland). The Rapid Test, Dominance Test, and Prevalence Index were utilized based on estimated percent plant cover to determine if the dominant vegetation was hydrophilic or upland species. Hydrophytic vegetation was considered dominant if more than 50% of the dominant plant species were either obligate (OBL), facultative wet (FacW), or facultative (Fac). The USACE 2012 National Wetland Plant List for the Arid West region was referenced to determine wetland indicator status.

Hydric Soil Assessment. To assess soil type at each Sampling Point, a soil pit was dug to an approximate depth of 18-to 20-in., or to the presence of shallow groundwater. The soil was inspected for presence of hydric soil indicators, texture, soil type, and assessed for color, including hue, value, and chroma utilizing the Munsell Soil Color Chart.

Wetland Hydrology Assessment. To satisfy wetland hydrology at each Sampling Point either one primary hydrology indicator must be present, or two secondary indicators. In addition, saturation, surface water, and the presence of a shallow water table were noted if present. A shallow water table is considered to be the presence of groundwater at a depth below ground surface of 12-in or less (12- to 24-in. during the dry season).

4.2 Field Sampling Results.

During the field assessment, four (4) Sampling Points were utilized to assess the presence and approximate boundaries of wetlands on the site, if any. Sampling points were positioned in lowland areas where the presence of wetlands was most likely to occur. A summary of the findings at each location is presented in the table below.

Table 4.2
Wetland Sampling Point Summary

Sampling Point	Hydrophytic Vegetation Present	Hydric Soil Indicators Present	Wetland Hydrology Present	Classification
1	No	No	Yes	Upland
2	No	No	Yes	Upland
3	No	No	Yes	Upland
4	No	No	Yes	Upland

Sampling Point 1. Dominant vegetation identified at Sampling Point 1 consisted of *Prosopis* (mesquite) *and Larrea tridentata* (Creosote Bush) which include facultative upland species. No surface water was observed; however, two (2) secondary hydrology indicators were present. The secondary hydrological indicators present include water marks (riverine) and drainage patterns; these secondary hydrological indicators meet the minimum of two required to have wetland hydrology present. The soil was dry to 17-in. with a color of 5YR 4/6 and texture of fine sandy loam with few ash nodules. No hydric soil indicators were present. In our professional opinion, this sampling point does not satisfy the criteria to be a wetland due to the lack of hydric soils and dominant wetland vegetation.

Sampling Point 2. Dominant vegetation identified at Sampling Point 2 consisted of *Prosopis* (mesquite) *and Larrea tridentata* (Creosote Bush) which include facultative upland species. No surface water was observed; however, two (2) secondary hydrology indicators were present. The secondary hydrological indicators present include water marks (riverine) and drainage patterns; these secondary hydrological indicators meet the minimum of two required to have wetland hydrology present. The soil was dry to 18-in. with a color of 5YR 4/6 and texture of fine sandy loam. No hydric soil indicators were present. In our professional opinion, this sampling point does not satisfy the criteria to be a wetland due to the lack of hydric soils and dominant wetland vegetation.

Sampling Point 3. Dominant vegetation identified at Sampling Point 3 consisted of *Prosopis* (mesquite) *and Larrea tridentata* (Creosote Bush) which include facultative upland species. No surface water was observed; however, two (2) secondary hydrology indicators were present. The secondary hydrological indicators present include water marks (riverine) and drainage patterns; these secondary hydrological indicators meet the minimum of two required to have wetland hydrology present. The soil was dry to 18-in. with a color of 5YR 4/6 from 0-16-in. and texture of sandy loam with medium gravel at 12-in. From 16-18-in. the soil color was identified at 5YR 5/6 with a texture of coarse sand with medium gravel. No hydric soil indicators were present. In our professional opinion, this sampling point does not satisfy the criteria to be a wetland due to the lack of hydric soils and dominant wetland vegetation.

Sampling Point 4. Dominant vegetation identified at Sampling Point 1 consisted of *Prosopis* (mesquite) *and Larrea tridentata* (Creosote Bush) which include facultative upland species. No surface water was observed; however, two (2) secondary hydrology indicators were present. The secondary hydrological indicators present include water marks (riverine) and drainage patterns; these secondary hydrological indicators meet the minimum of two required to have wetland hydrology present. The soil was dry to 18-in. with a color of 5YR 5/6 from 0-12-in. and texture of fine to medium sand. From 12-17-in. the soil color was identified at 5YR 5/6 with a texture of fine to medium sand and a redox feature of 5YR 4/6 clay. No hydric soil indicators were present. In our professional opinion, this sampling point does not satisfy the criteria to be a wetland due to the lack of hydric soils and dominant wetland vegetation.

4.3 Limiting Factors. This assessment was conducted in late spring, and vegetation was undisturbed. No limiting factors inhibiting the assessment of wetlands were observed for the site.

5. CONCLUSIONS

In our professional opinion, wetlands were not identified for the site based on the four (4) sampling points assessed. The sampling point locations were located in the lowest onsite areas and within the area of the potential wetland identified on NWI maps. These areas were the most likely location for wetlands to be present.

6. GENERAL COMMENTS

This report was intended to provide general information regarding the Project Area, using readily available public information, agency databases, and through an onsite reconnaissance and assessment. This study is of limited scope, and cannot eliminate the potential of additional environmental concerns associated with the Project Area. In addition, ENVIROTECH does not guarantee the work of regulatory agencies or other parties supplying information used in this study.

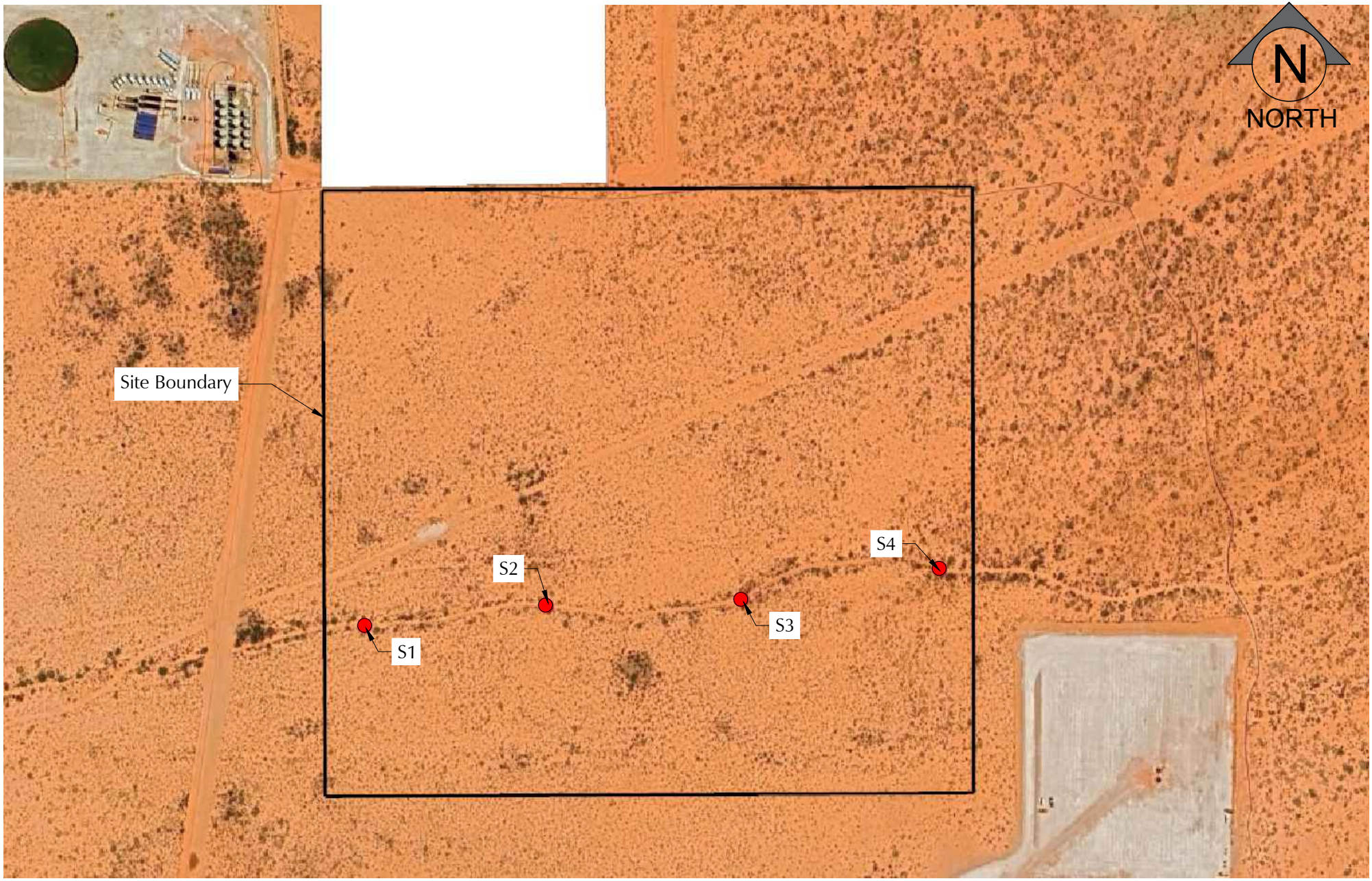
The report was performed in accordance with generally accepted practices for wetlands delineation.

7. REFERENCES

- ❒ Aerial Photographs, National Agricultural Imagery Program (NAIP), made available through Google Earth.
- ❒ FEMA Flood plain map panel 35015C1100D, dated June 4, 2010
- ❒ US Army Corps of Engineers Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2).
- ❒ US Department of Agricultural – National Resource Conservation Service, 2012, Web Soil Survey
- ❒ US Fish and Wildlife Service, National Wetland Inventory, 2011
- ❒ US Geological Survey, Indian Flats 7.5 Minute Series Topographic Quadrangle.
- ❒ USACE Wetlands Delineation Method, Richard Chinn, 2017

APPENDIX A.

SITE MAPS



ENVIROTECH
ENGINEERING
2500 N. Eleventh Street Enid, OK 73701 ● 580.234.8780 ● envirotechconsulting.com
C.A. #1960 - Expiration Date: 6-30-2024

Site Map

Wetlands Delineation
Bond Water Recycle Facility
Eddy County, New Mexico

WATERBRIDGE

Project No.
024279-00

Figure 1

ENVIROTECH
ENGINEERING
2500 N. Eleventh Street Enid, OK 73701 ● 580.234.8780 ● envirotechconsulting.com
C.A. #1960 - Expiration Date: 6-30-2024

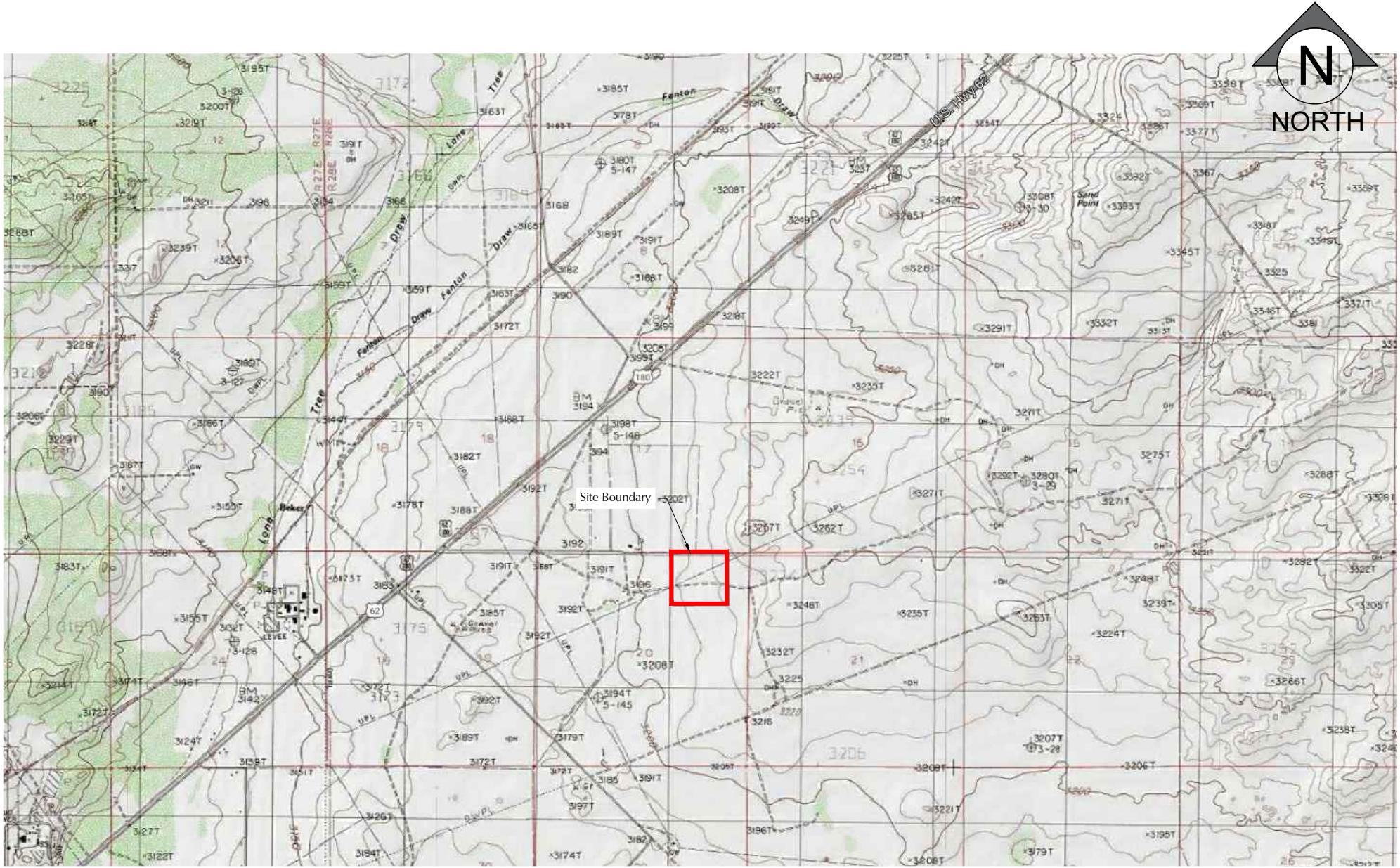
National Wetlands Inventory Map

Wetlands Delineation
Bond Water Recycle Facility
Eddy County, New Mexico

WATERBRIDGE

Project No.
024279-00

Figure 2



ENVIROTECH
ENGINEERING
2500 N. Eleventh Street Enid, OK 73701 ● 580.234.8780 ● envirotechconsulting.com
C.A. #1960 - Expiration Date: 6-30-2024

Topographic Map

Wetlands Delineation
Bond Water Recycle Facility
Eddy County, New Mexico

WATERBRIDGE

Project No.
024279-00

Figure 3

APPENDIX B.

USDA SOIL REPORT

United States Department of Agriculture

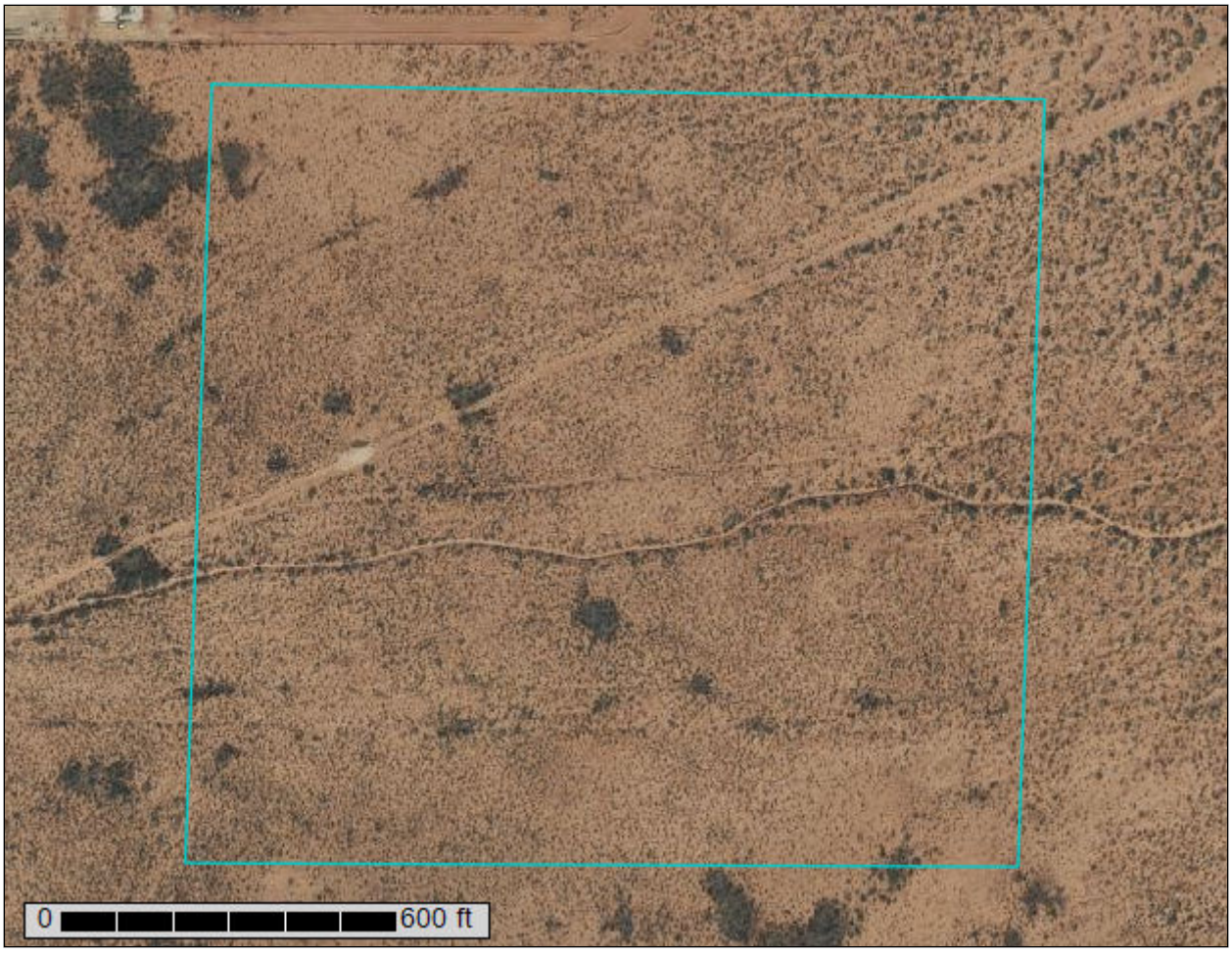
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Eddy Area, New Mexico

Bond Pond



September 6, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

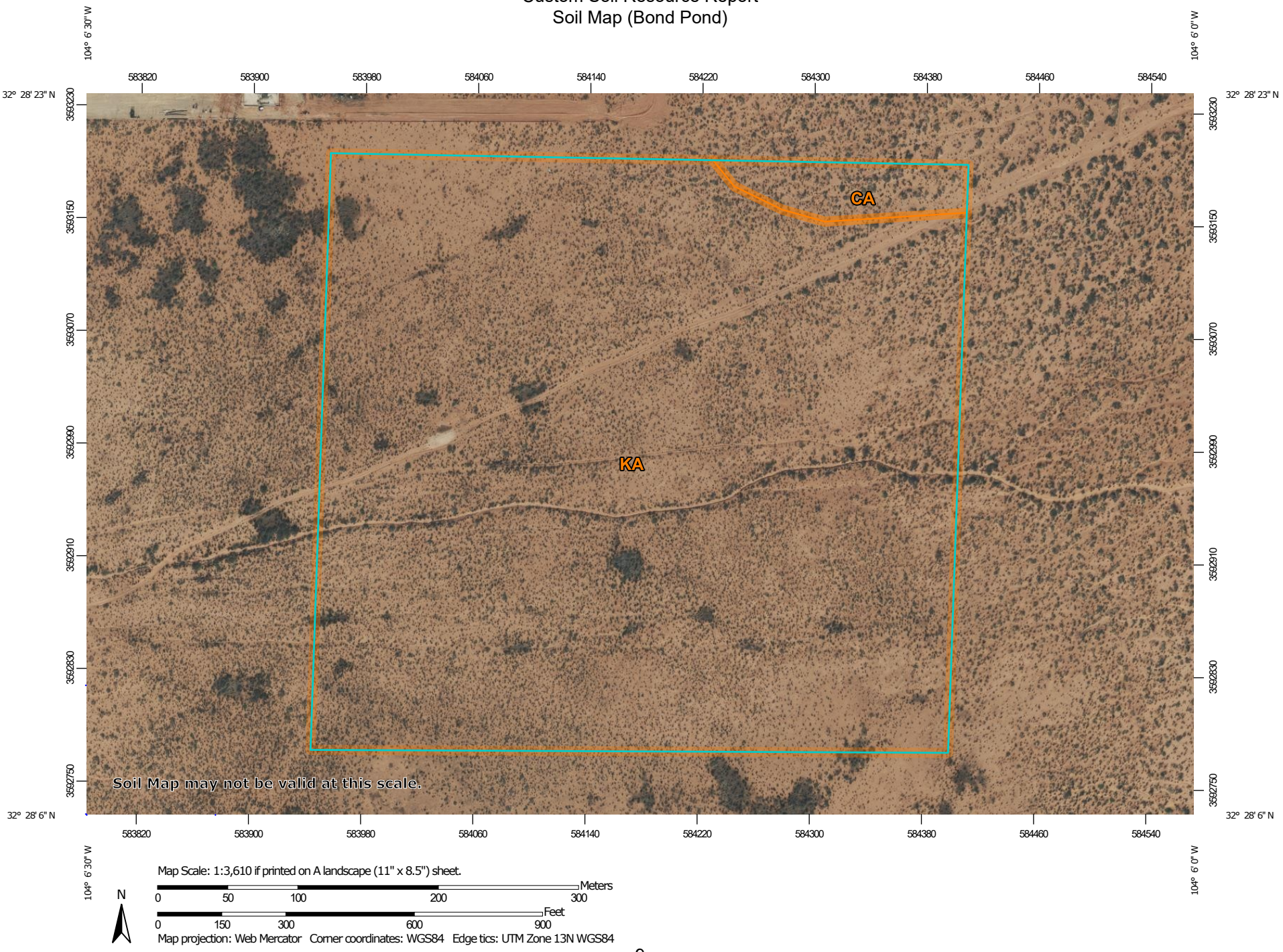
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map (Bond Pond)



MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

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

Special Point Features

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

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

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

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

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

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

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

Soil Survey Area: Eddy Area, New Mexico
Survey Area Data: Version 19, Sep 7, 2023

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

Date(s) aerial images were photographed: Nov 12, 2022—Dec 2, 2022

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

Map Unit Legend (Bond Pond)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CA	Cacique loamy sand, 0 to 3 percent slopes, eroded	1.5	3.2%
KA	Karro fine sandy loam, 0 to 3 percent slopes	45.9	96.8%
Totals for Area of Interest		**47.5**	**100.0%**

Map Unit Descriptions (Bond Pond)

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

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

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

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

onsite investigation is needed to define and locate the soils and miscellaneous areas.

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

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

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

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

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

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

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

Eddy Area, New Mexico

CA—Cacique loamy sand, 0 to 3 percent slopes, eroded

Map Unit Setting

National map unit symbol: 1w46
Elevation: 3,000 to 5,500 feet
Mean annual precipitation: 7 to 14 inches
Mean annual air temperature: 57 to 68 degrees F
Frost-free period: 180 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition

Cacique and similar soils: 97 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cacique

Setting

Landform: Plains, basin floors
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 5 inches: loamy sand
H2 - 5 to 24 inches: sandy clay loam
H3 - 24 to 60 inches: indurated

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 40 inches to petrocalcic
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: R070BD004NM - Sandy
Hydric soil rating: No

Minor Components

Berino

Percent of map unit: 1 percent

Ecological site: R070BC007NM - Loamy
Hydric soil rating: No

Dune land
Percent of map unit: 1 percent
Hydric soil rating: No

Berino
Percent of map unit: 1 percent
Ecological site: R070BC007NM - Loamy
Hydric soil rating: No

KA—Karro fine sandy loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 1w4n
Elevation: 2,150 to 3,800 feet
Mean annual precipitation: 10 to 15 inches
Mean annual air temperature: 60 to 70 degrees F
Frost-free period: 200 to 235 days
Farmland classification: Not prime farmland

Map Unit Composition
Karro and similar soils: 98 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Karro

Setting
Landform: Plains, alluvial fans
Landform position (three-dimensional): Riser, talf, rise
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile
H1 - 0 to 10 inches: fine sandy loam
H2 - 10 to 90 inches: loam

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 60 percent

Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: R070BC030NM - Limy
Hydric soil rating: No

Minor Components

Russler

Percent of map unit: 1 percent
Ecological site: R042CY153NM - Loamy
Hydric soil rating: No

Reagan

Percent of map unit: 1 percent
Ecological site: R070BC007NM - Loamy
Hydric soil rating: No

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

APPENDIX C.

PHOTOGRAPHIC LOG

Photo #1
Sampling Point 1 – soil test pit

Photo #2
Sampling Point 1 – soil test pit

Photo # 3
Sampling Point 1

Photo # 4
Sampling Point 1

Photo # 5
Sampling Point 1

Photo # 6
Sampling Point 1

Photo #7
Sampling Point 2 – soil test pit

Photo #8
Sampling Point 2 – soil test pit

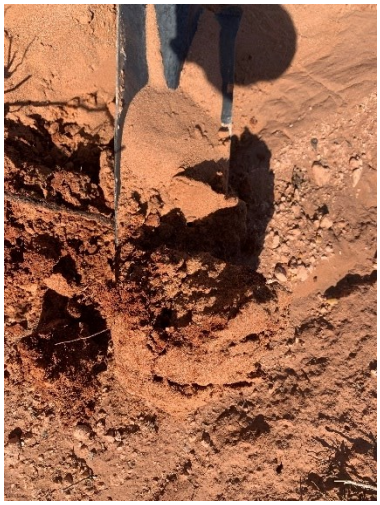


Photo # 9
Sampling Point 2 - soil

Photo # 10
Sampling Point 2

Photo # 11
Sampling Point 2

Photo # 12
Sampling Point 3 – soil test pit

Photo #13
Sampling Point 3 – soil test pit

Photo #14
Sampling Point 3

Photo # 15
Sampling Point 3

Photo # 16
Sampling Point 3

Photo # 17
Sampling Point 3 - soil

Photo # 18
Sampling Point 3 - soil

Photo #19
Sampling Point 4 – soil test pit

Photo #20
Sampling Point 4 – soil test pit

Photo # 21
Sampling Point 4

Photo # 22
Sampling Point 4

Photo #23
Sampling Point 4

Intentionally Left Blank

APPENDIX D.

WETLAND DATASHEETS

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Arid West Region
See ERDC/EL TR-08-28; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 06/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Bond Water Recycle Facility City/County: Eddy County Sampling Date: 9/10/2024
Applicant/Owner: WaterBridge Stateline LLC State: NM Sampling Point: S1
Investigator(s): Missy Harmon & Katelyn Clark Section, Township, Range: Section 20, Township 21 South, Range 28 East
Landform (hillside, terrace, etc.): Plains Local relief (concave, convex, none): Convex Slope (%): 0-3
Subregion (LRR): LRR D Lat: 32.470439 Long: -104.106191 Datum: NAD83
Soil Map Unit Name: Karro fine sandy loam, 0-3% slopes NWI classification: Riverine
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No X
Hydric Soil Present? Yes ____ No X
Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? Yes ____ No X

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10x10)	Absolute % Cover	Dominant Species?	Indicator Status
1. Prosopis (mesquite)	10	Y	UPL
2. Larrea tridentata (creosote bush)	15	Y	N/A
3.			
4.			
	25	=Total Cover	

Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	

Herb Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	

Woody Vine Stratum (Plot size: ____)			
1.			
2.			
		=Total Cover	

% Bare Ground in Herb Stratum 75 % Cover of Biotic Crust ____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	1	x 5 =	5
Column Totals:	1 (A)		5 (B)

Prevalence Index = B/A = 5

Hydrophytic Vegetation Indicators:
___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: S1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-17	5YR 4/6	100					Sandy loam	with Ash nodules

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Iron-Manganese Masses (F12) **(LRR D)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Arid West Region
See ERDC/EL TR-08-28; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 06/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Bond Water Recycle Facility City/County: Eddy County Sampling Date: 9/10/2024
Applicant/Owner: WaterBridge Stateline LLC State: NM Sampling Point: S2
Investigator(s): Missy Harmon & Katelyn Clark Section, Township, Range: Section 20, Township 21 South, Range 28 East
Landform (hillside, terrace, etc.): Plains Local relief (concave, convex, none): Convex Slope (%): 0-3
Subregion (LRR): LRR D Lat: 32.470557 Long: -104.104936 Datum: NAD83
Soil Map Unit Name: Karro fine sandy loam, 0-3% slopes NWI classification: Riverine
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No X
Hydric Soil Present? Yes ____ No X
Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? Yes ____ No X

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10x10)	Absolute % Cover	Dominant Species?	Indicator Status
1. Prosopis (mesquite)	10	Y	UPL
2. Larrea tridentata (creosote bush)	15	Y	N/A
3.			
4.			
	25	=Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
Herb Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
		=Total Cover	

% Bare Ground in Herb Stratum 75 % Cover of Biotic Crust ____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	1	x 5 =	5
Column Totals:	1 (A)		5 (B)

Prevalence Index = B/A = 5

Hydrophytic Vegetation Indicators:
___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: S2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18	5YR 4/6	100					Fine sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Iron-Manganese Masses (F12) **(LRR D)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Arid West Region
See ERDC/EL TR-08-28; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 06/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Bond Water Recycle Facility City/County: Eddy County Sampling Date: 9/10/2024
Applicant/Owner: WaterBridge Stateline LLC State: NM Sampling Point: S3
Investigator(s): Missy Harmon & Katelyn Clark Section, Township, Range: Section 20, Township 21 South, Range 28 East
Landform (hillside, terrace, etc.): Plains Local relief (concave, convex, none): Convex Slope (%): 0-3
Subregion (LRR): LRR D Lat: 32.470598 Long: -104.103585 Datum: NAD83
Soil Map Unit Name: Karro fine sandy loam, 0-3% slopes NWI classification: Riverine
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No X
Hydric Soil Present? Yes ____ No X
Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? Yes ____ No X

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10x10)	Absolute % Cover	Dominant Species?	Indicator Status
1. Prosopis (mesquite)	5	Y	UPL
2. Larrea tridentata (creosote bush)	10	Y	N/A
3.			
4.			
	15	=Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
Herb Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
		=Total Cover	

% Bare Ground in Herb Stratum 85 % Cover of Biotic Crust ____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	1	x 5 =	5
Column Totals:	1 (A)		5 (B)

Prevalence Index = B/A = 5

Hydrophytic Vegetation Indicators:
____ Dominance Test is >50%
____ Prevalence Index is ≤3.0[1]
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: S3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-16	5YR 5/6	100					Fine-medium sand	12-in. - medium gravel
16-18	5YR 5/6	100					Coarse sand	w/ medium gravel

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Iron-Manganese Masses (F12) **(LRR D)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Arid West Region
See ERDC/EL TR-08-28; the proponent agency is CECW-COR

OMB Control #: 0710-0024, Exp: 06/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Bond Water Recycle Facility City/County: Eddy County Sampling Date: 9/10/2024
Applicant/Owner: WaterBridge Stateline LLC State: NM Sampling Point: S4
Investigator(s): Missy Harmon & Katelyn Clark Section, Township, Range: Section 20, Township 21 South, Range 28 East
Landform (hillside, terrace, etc.): Plains Local relief (concave, convex, none): Convex Slope (%): 0-3
Subregion (LRR): LRR D Lat: 32.470776 Long: -104.102225 Datum: NAD83
Soil Map Unit Name: Karro fine sandy loam, 0-3% slopes NWI classification: Riverine
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No X
Hydric Soil Present? Yes ____ No X
Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? Yes ____ No X

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10x10)	Absolute % Cover	Dominant Species?	Indicator Status
1. Prosopis (mesquite)	15	Y	UPL
2. Larrea tridentata (creosote bush)	15	Y	N/A
3.			
4.			
	30	=Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
Herb Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
		=Total Cover	

% Bare Ground in Herb Stratum 70 % Cover of Biotic Crust ____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	1	x 5 =	5
Column Totals:	1 (A)		5 (B)

Prevalence Index = B/A = 5

Hydrophytic Vegetation Indicators:
____ Dominance Test is >50%
____ Prevalence Index is ≤3.0[1]
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: S4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	5YR 5/6	100					Fine-medium sand	
12-17	5YR 5/6	75	5YR 4/6	25		M	Fine-medium sand	with clay

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Iron-Manganese Masses (F12) **(LRR D)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

APPENDIX D

ENGINEERING DRAWINGS

BOND RECYCLE FACILITY
WATERBRIDGE STATELINE, LLC.

SECTION 20, TOWNSHIP 21 SOUTH, RANGE 28 EAST

EDDY COUNTY, NEW MEXICO

32° 28' 11.1864" N, 104° 06' 14.5218" W
32.469774°, -104.104034°

WATERBRIDGE

CONTACTS

JAKE FERENZ - WATERBRIDGE STATELINE, LLC. - (214)-733-9919

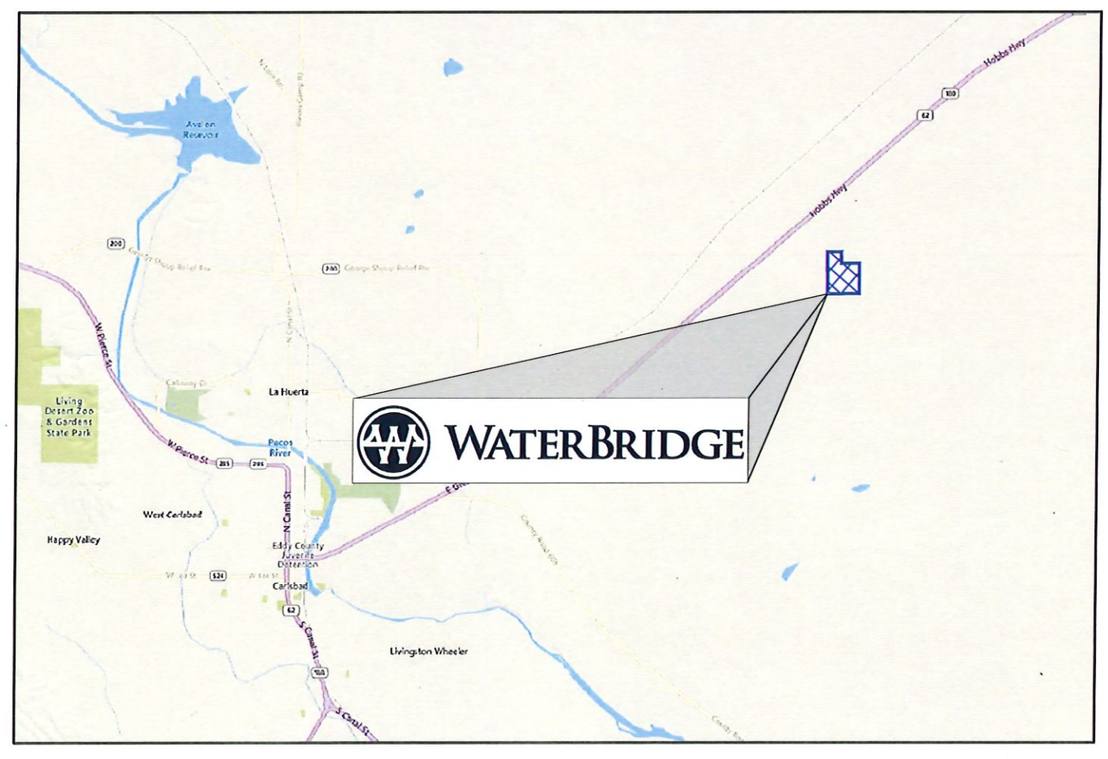
ENVIROTECH ENGINEERING & CONSULTING - ROSHAN MOHAN (580)-234-8780 (DESIGN ENGINEER)

ENVIROTECH ENGINEERING & CONSULTING - MITCHELL RATKE, PE (580)-234-8780 (SUPERVISING ENGINEER)

nm811 Professional Resources for Damage Prevention

UTILITY CAUTION

THE CONTRACTOR IS CAUTIONED THE LOCATION AND DEPTH OF EXISTING UTILITIES AS SHOWN ON THESE PLANS ARE BASED ON PUBLICLY AVAILABLE RECORDS OF THE VARIOUS UTILITY COMPANIES AND FIELD MEASUREMENTS. THE INFORMATION PROVIDED IS NOT TO BE RELIED ON AS BEING PRECISE OR COMPLETE. THE CONTRACTOR MUST CONTACT THE LOCAL UTILITY LOCATION CENTER AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATIONS OF THE UTILITIES.



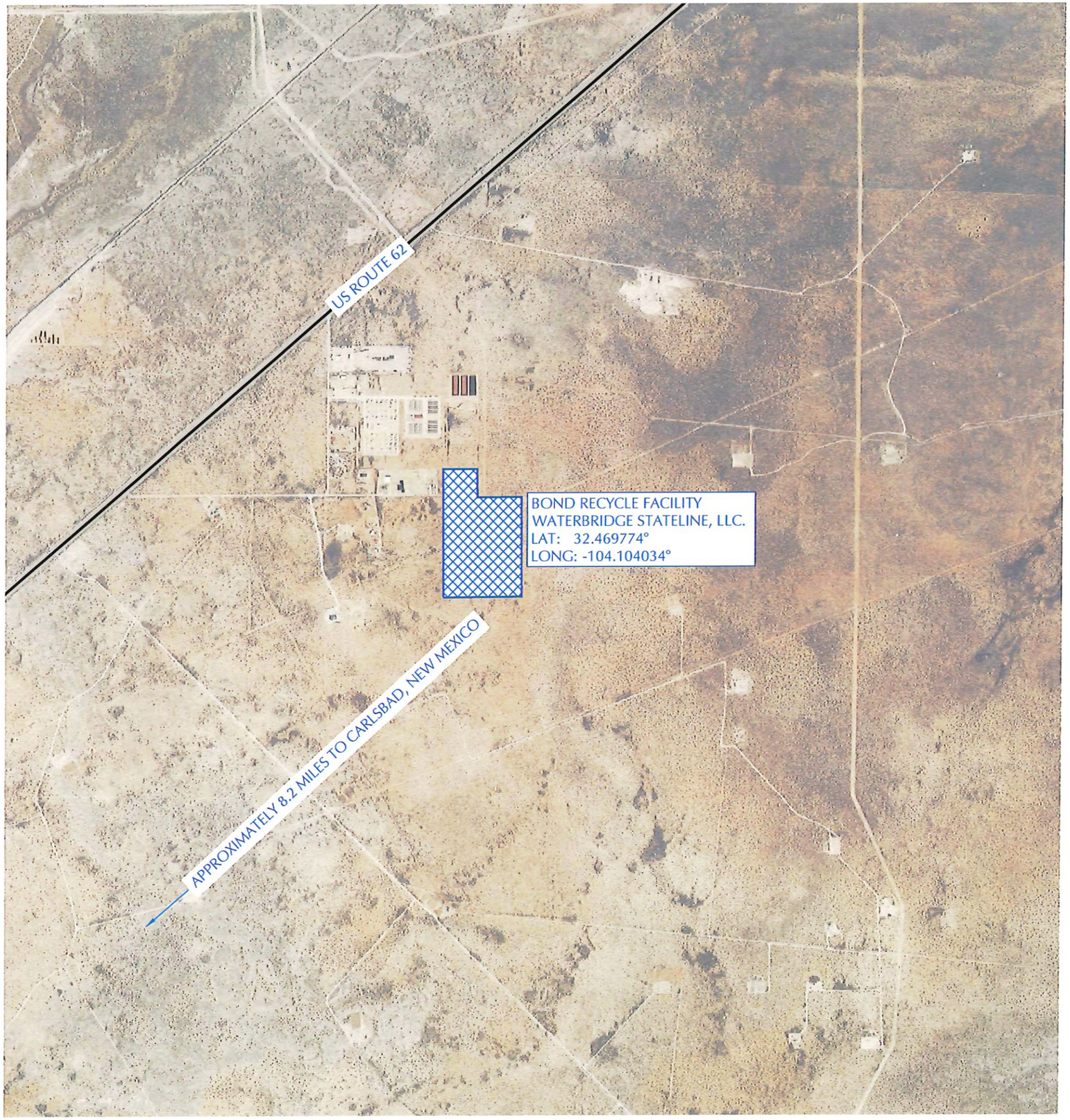
INDEX TO DRAWINGS

MITCHELL JOSEPH RATKE
NEW MEXICO
29736
PROFESSIONAL ENGINEER

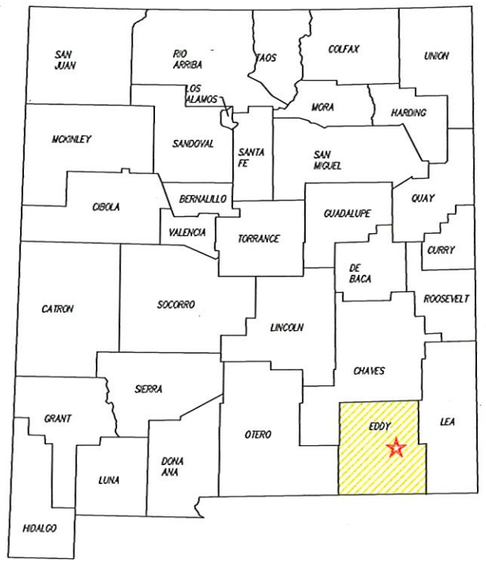
10-18-2024

ENVIROTECH
ENGINEERING

2500 N. Eleventh Street Enid, OK 73701 • 580.234.8780 • envirotechconsulting.com
P.E. # 29736 - Expiration Date: 12-31-2024



N
NORTH



ENVIROTECH ENGINEERING
2500 North Eleventh Street
Enid, Oklahoma
580.234.8760
envirotechconsulting.com
P.E. #29736 - Expiration Date: 12-31-2024

NO.	DATE	DESCRIPTION

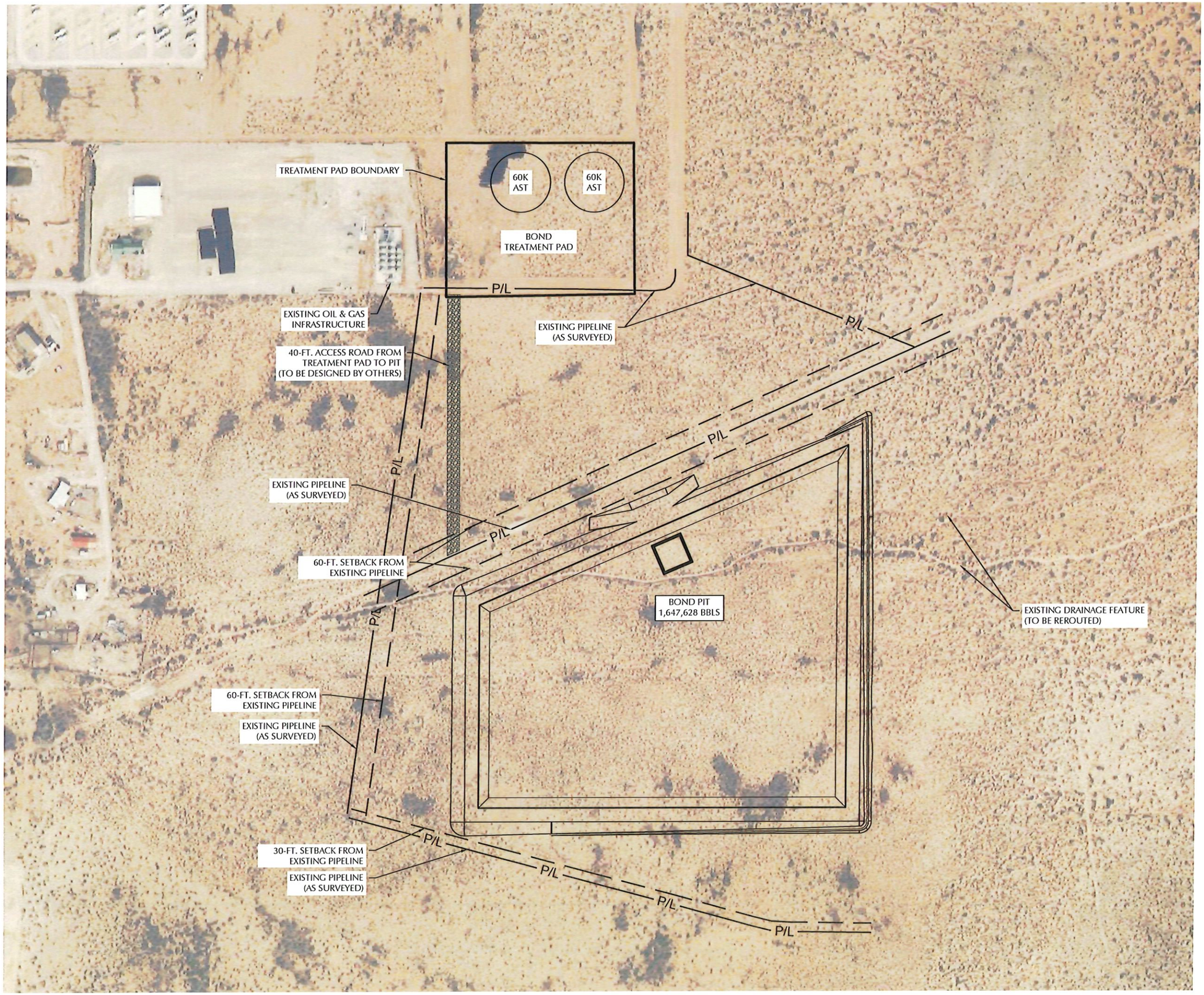
WATERBRIDGE

PROJECT LOCATION
BOND RECYCLE FACILITY
WATERBRIDGE STATELINE, LLC.
SECTION 20, TOWNSHIP 21 SOUTH, RANGE 28 EAST
EDDY COUNTY, NEW MEXICO

MITCHELL JOSEPH RATKE
NEW MEXICO
29736
PROFESSIONAL ENGINEER
10/18/2024

DATE:	OCTOBER 2024
SCALE:	NOT TO SCALE
DESIGNED BY:	R. MOHAN
DRAWN BY:	R. MOHAN
CHECKED BY:	M. RATKE
PROJECT NO.	024264-00
SHEET NO.	2 OF 13

10/10/2024 2:31:05 PM



N
NORTH
0 150 300
Scale: 1"=300'
Bar Scale is intended for 11" x 17" (Full Size)

ENVIROTECH ENGINEERING
2500 North Eleventh Street
Enid, Oklahoma
580.234.8780
envitechconsulting.com
P.E. #29736 - Expiration Date: 12-31-2024

NO.	DATE	DESCRIPTION

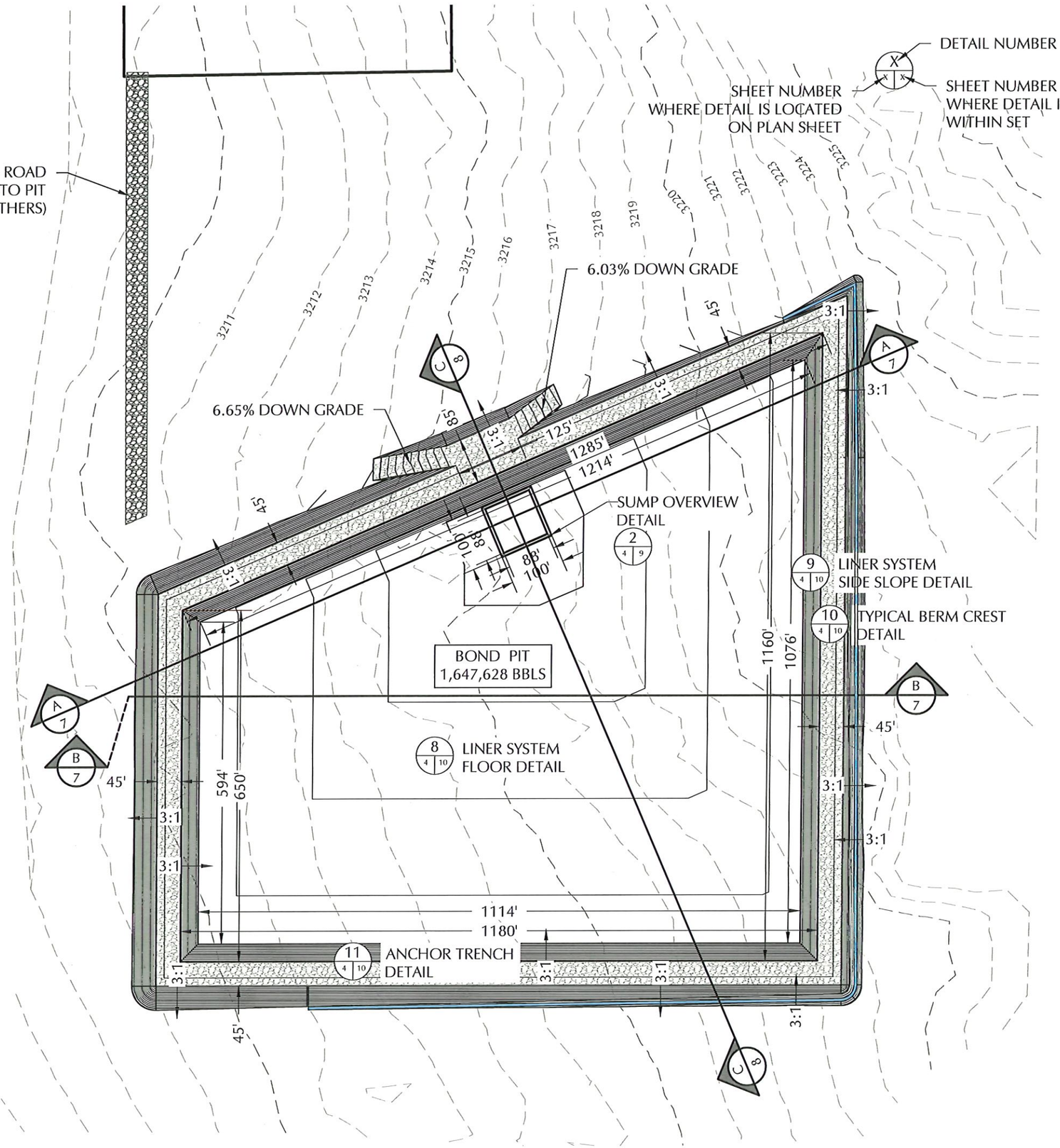
WATERBRIDGE

EXISTING SITE FEATURES
BOND RECYCLE FACILITY
WATERBRIDGE STATELINE, LLC.
SECTION 20, TOWNSHIP 21 SOUTH, RANGE 28 EAST
EDDY COUNTY, NEW MEXICO

MITCHELL JOSEPH RATKE
NEW MEXICO
29736
PROFESSIONAL ENGINEER
10-18-2024

DATE:	OCTOBER 2024
SCALE:	1" = 300'
DESIGNED BY:	R. MOHAN
DRAWN BY:	R. MOHAN
CHECKED BY:	M. RATKE
PROJECT NO.	024264-00
SHEET NO.	3 OF 13

10/18/2024 2:31:10 PM



N
NORTH
0 100 200
Scale: 1"=200'
Bar Scale is intended for 11" x 17" (Full Size)

ENVIROTECH ENGINEERING
2500 North Eleventh Street
Enid, Oklahoma
580.234.8780
envirotechconsulting.com
P.E. #29736 - Expiration Date: 12-31-2024

NO.	DATE	DESCRIPTION

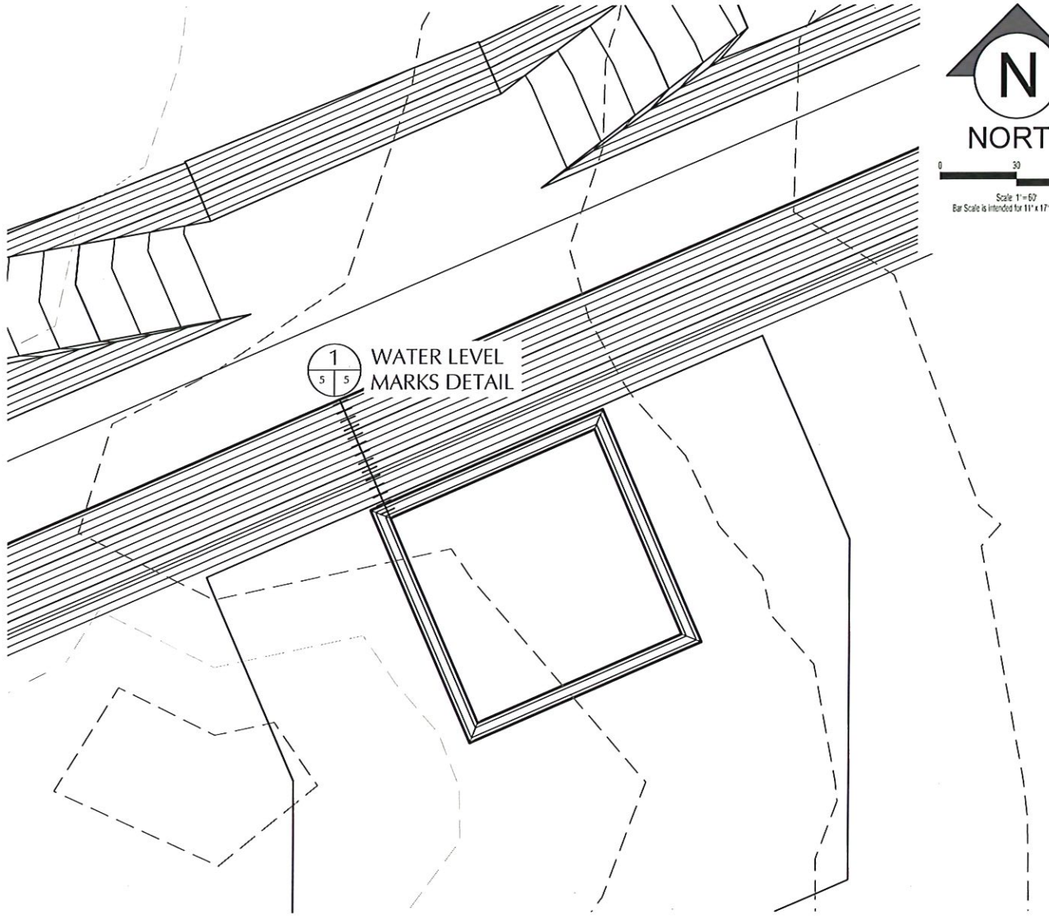
WATERBRIDGE

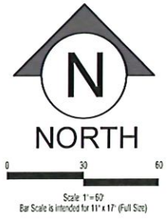
SITE PLAN
BOND RECYCLE FACILITY
WATERBRIDGE STATELINE, LLC.
SECTION 20, TOWNSHIP 21 SOUTH, RANGE 28 EAST
EDDY COUNTY, NEW MEXICO

MITCHELL JOSEPH RATKE
NEW MEXICO
29736
PROFESSIONAL ENGINEER
10-18-2024

DATE:	OCTOBER 2024
SCALE:	1" = 200'
DESIGNED BY:	R. MOHAN
DRAWN BY:	R. MOHAN
CHECKED BY:	M. RATKE
PROJECT NO.	024264-00
SHEET NO.	4 OF 13

10/18/2024 2:31:18 PM

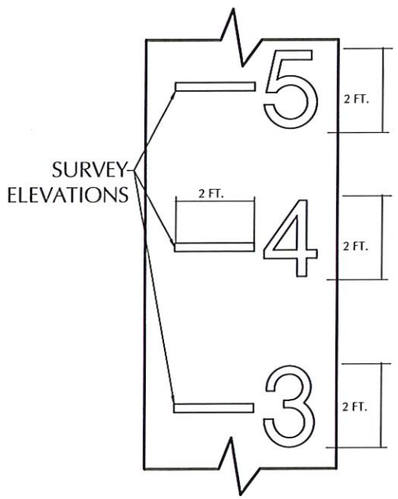


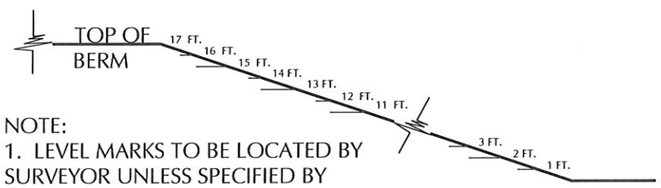


Owner	WaterBridge Stateline, LLC		
Site Name	Bond Recycle Facility		
Lagoon Features	Top	Bottom	Max Liq. Level
Side slope Ratio	3		2
Maximum Depth (ft)	17.0		15.0
Lagoon Top Width (ft)	1180	1114	1168
Lagoon Top Length (ft)	1160	1076	1148
Maximum Total Vol (ft^3)	12,392,907		9,250,148
Maximum Total Vol (bbls)	2,207,413		1,647,628

Freeboard
Maximum Capacity
Storage Volume
Floor
Sump

Elevation ft	Lagoon Liq Depth ft	Storage ft	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 %
3224.50	17.0	0.0	-	-	-	0.0%	12,392,907	92,711,336	2,207,413	284.50	100%
3223.50	16.0	1.0	1,057,876	7,913,968	188,428	8.5%	11,335,031	84,797,367	2,018,985	260.22	91%
3222.50	15.0	2.0	2,107,866	15,768,948	375,451	17.0%	10,285,040	76,942,388	1,831,962	236.11	83%
3221.50	**14.0**	**3.0**	**3,142,758**	**23,510,975**	**559,785**	**25.4%**	**9,250,148**	**69,200,360**	**1,647,628**	**212.35**	**75%**
3220.50	13.0	4.0	4,165,057	31,158,789	741,876	33.6%	8,227,850	61,552,547	1,465,537	188.89	66%
3219.50	12.0	5.0	5,174,836	38,712,951	921,737	41.8%	7,218,070	53,998,384	1,285,676	165.70	58%
3218.50	11.0	6.0	6,172,173	46,174,024	1,099,382	49.8%	6,220,734	46,537,312	1,108,031	142.81	50%
3217.50	10.0	7.0	7,157,141	53,542,571	1,274,823	57.8%	5,235,766	39,168,765	932,590	120.20	42%
3216.50	9.0	8.0	8,129,816	60,819,155	1,448,075	65.6%	4,263,091	31,892,180	759,338	97.87	34%
3215.50	8.0	9.0	9,090,274	68,004,337	1,619,151	73.4%	3,302,633	24,706,999	588,262	75.82	27%
3214.50	7.0	10.0	10,038,589	75,098,681	1,788,064	81.0%	2,354,318	17,612,655	419,349	54.05	19%
3213.50	6.0	11.0	10,974,836	82,102,750	1,954,827	88.6%	1,418,070	10,608,585	252,585	32.55	11%
3212.50	5.0	12.0	11,715,030	87,640,138	2,086,670	94.5%	677,877	5,071,197	120,743	15.56	5%
3211.50	4.0	13.0	12,135,145	90,783,019	2,161,500	97.9%	257,762	1,928,316	45,912	5.92	2%
3210.50	3.0	14.0	12,325,200	92,204,820	2,195,353	99.5%	67,707	506,516	12,060	1.55	1%
3209.50	2.0	15.0	12,375,213	92,578,969	2,204,261	99.9%	17,694	132,367	3,152	0.41	0%
3208.50	1.0	16.0	12,384,624	92,649,372	2,205,937	99.9%	8,283	61,963	1,475	0.19	0%
3207.50	0.0	17.0	12,392,907	92,711,336	2,207,413	100.0%	-	-	-	-	0%





NOTE:
1. LEVEL MARKS TO BE LOCATED BY SURVEYOR UNLESS SPECIFIED BY OWNER

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. (TOP OF BERM SHOULD READ 17-FT, BOTTOM OF SUMP +1-FT SHOULD READ 1-FT)

4. REFERENCE PIT CAPACITY TABLES FOR ACCURATE ELEVATIONS

WATER LEVEL MARKS DETAIL (1 / 5 5)
NOT TO SCALE

ENVIROTECH ENGINEERING
2500 North Eleventh Street
Enid, Oklahoma
580.234.8780
envirotechconsulting.com
P.E. #29736 - Expiration Date: 12-31-2024

NO.	DATE	DESCRIPTION

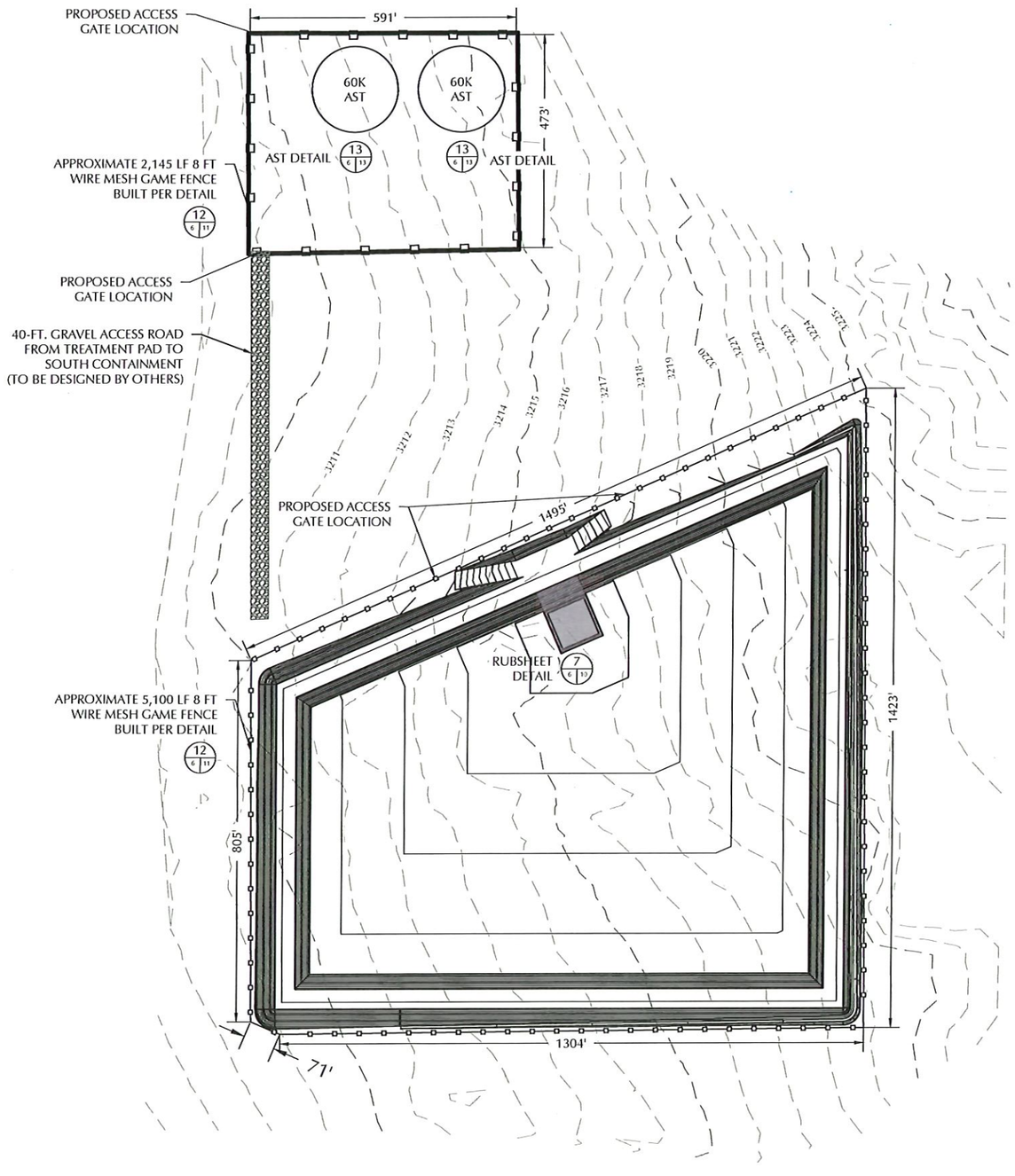
WATERBRIDGE

PIT CAPACITY
BOND RECYCLE FACILITY
WATERBRIDGE STATELINE, LLC.
SECTION 20, TOWNSHIP 21 SOUTH, RANGE 28 EAST
EDDY COUNTY, NEW MEXICO

MITCHELL JOSEPH RATKE
NEW MEXICO
29736
PROFESSIONAL ENGINEER
10-18-2024

DATE:	OCTOBER 2024
SCALE:	1" = 60'
DESIGNED BY:	R. MOHAN
DRAWN BY:	R. MOHAN
CHECKED BY:	M. RATKE
PROJECT NO.	024264-00
SHEET NO.	5 OF 13

10/18/2024 2:31:26 PM



N
NORTH
0 150 300
Scale 1"=300'
Bar Scale is intended for 11" x 17" (Full Size)

ENVIROTECH ENGINEERING
2500 North Eleventh Street
Enid, Oklahoma
580.234.8780
envirotechconsulting.com
P.E. #29736 - Expiration Date: 12-31-2024

NO.	DATE	DESCRIPTION

WATERBRIDGE

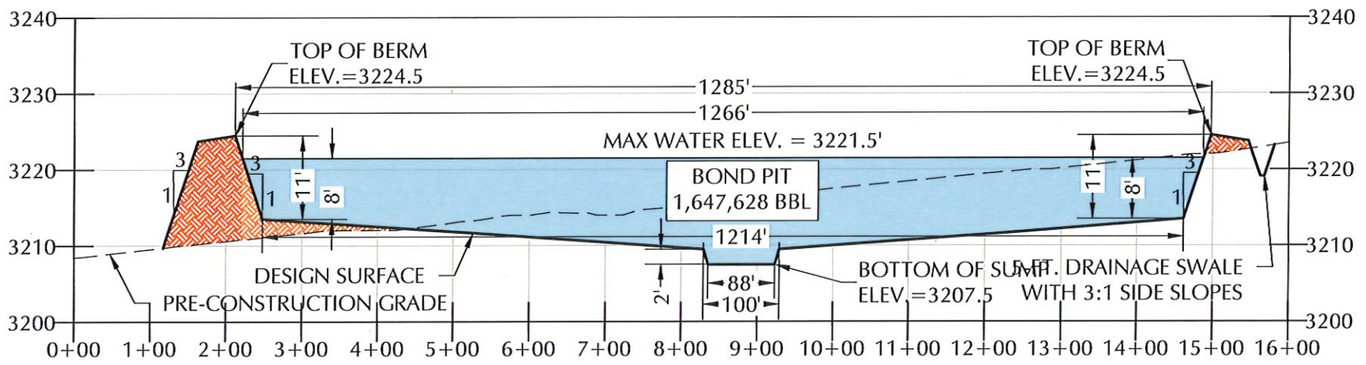
RUBSHEET & FENCE PLAN
BOND RECYCLE FACILITY
WATERBRIDGE STATELINE, LLC.
SECTION 20, TOWNSHIP 21 SOUTH, RANGE 28 EAST
EDDY COUNTY, NEW MEXICO

MITCHELL JOSEPH RATKE
NEW MEXICO
29736
PROFESSIONAL ENGINEER
10-18-2024

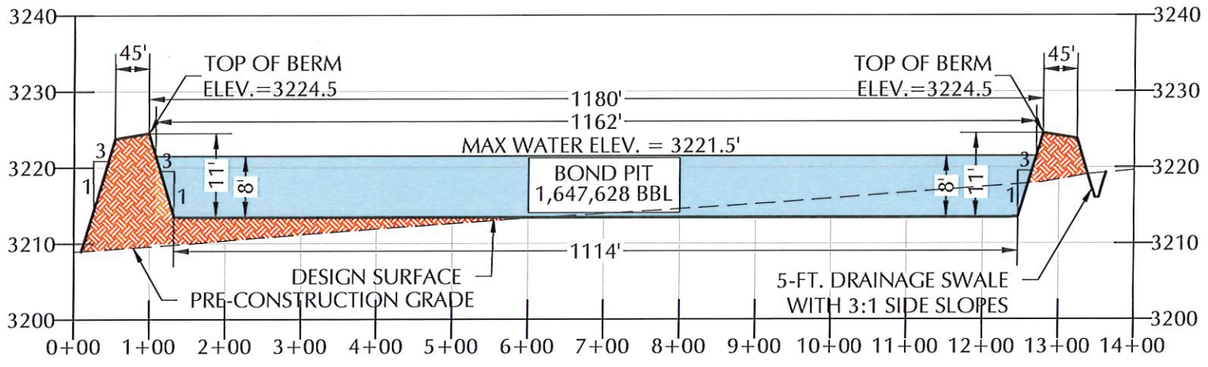
DATE:	OCTOBER 2024
SCALE:	1" = 300'
DESIGNED BY:	R. MOHAN
DRAWN BY:	R. MOHAN
CHECKED BY:	M. RATKE
PROJECT NO.	024264-00
SHEET NO.	6 OF 13

10/18/2024 2:31:36 PM

CROSS SECTION A-A



CROSS SECTION B-B



0 100 200
Horizontal Scale 1"=200'
0 10 20
Vertical Scale 1"=20'
Bar Scale is intended for 11" x 17" (Full Size)

ENVIROTECH ENGINEERING
2500 North Eleventh Street
Enid, Oklahoma
580.234.8760
envirotechconsulting.com
P.E. #29736 - Expiration Date: 12-31-2024

NO.	DATE	DESCRIPTION

WATERBRIDGE

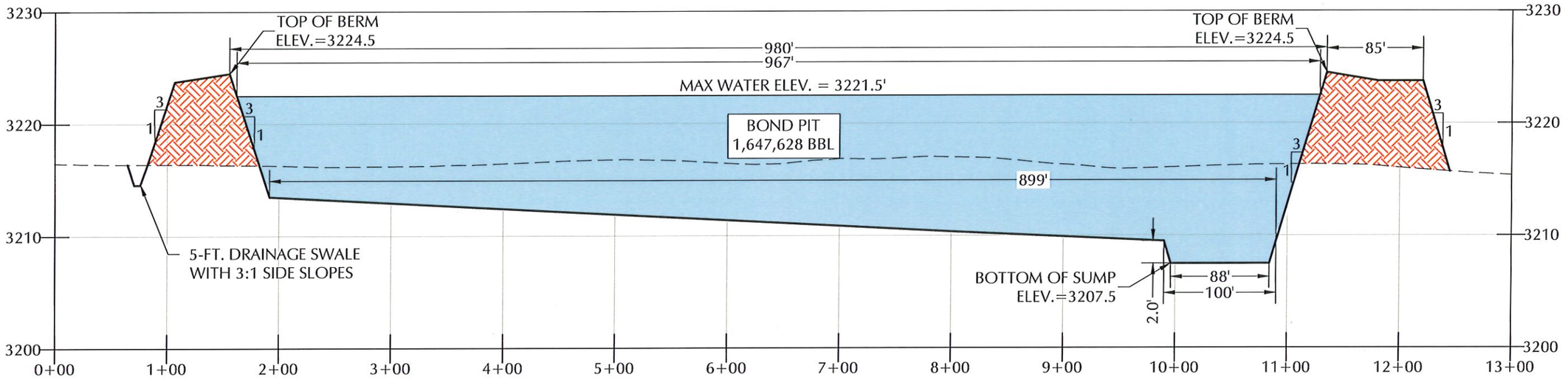
CROSS SECTIONS A & B
BOND RECYCLE FACILITY
WATERBRIDGE STATELINE, LLC.
SECTION 20, TOWNSHIP 21 SOUTH, RANGE 28 EAST
EDDY COUNTY, NEW MEXICO

MITCHELL JOSEPH RATKE
NEW MEXICO
29736
PROFESSIONAL ENGINEER
10-18-2024

DATE:	OCTOBER 2024
SCALE:	HORIZONTAL 1"=200' VERTICAL 1"=20'
DESIGNED BY:	R. MOHAN
DRAWN BY:	R. MOHAN
CHECKED BY:	M. RATKE
PROJECT NO.	024264-00
SHEET NO.	7 OF 13

10/11/2024 2:31:41 PM

CROSS SECTION C-C



Horizontal Scale: 1"=100'
Vertical Scale: 1"=10'
Bar Scale is intended for 11" x 17" (Full Size)

ENVIROTECH ENGINEERING
2500 North Eleventh Street
Enid, Oklahoma
580.234.8780
envirotechconsulting.com
P.E. #29736 - Expiration Date: 12-31-2024

NO.	DATE	DESCRIPTION

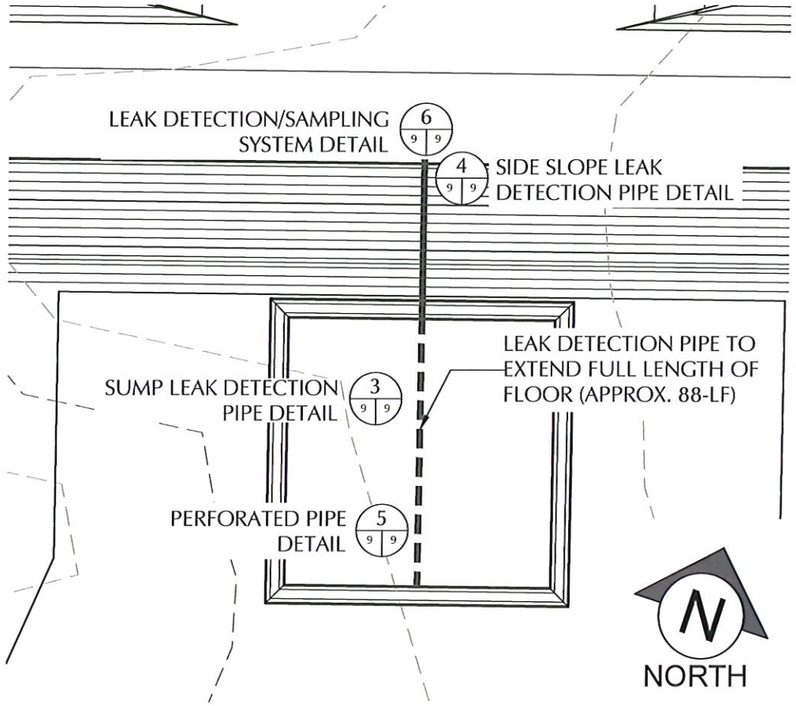
WATERBRIDGE

MITCHELL JOSEPH RATKE
NEW MEXICO
29736
PROFESSIONAL ENGINEER
10-18-2024

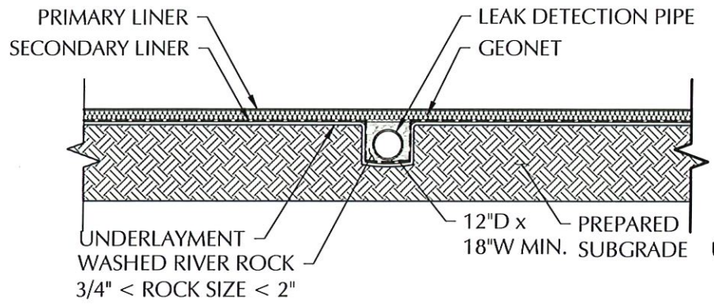
CROSS SECTION C
BOND RECYCLE FACILITY
WATERBRIDGE STATELINE, LLC.
SECTION 20, TOWNSHIP 21 SOUTH, RANGE 28 EAST
EDDY COUNTY, NEW MEXICO

DATE:	OCTOBER 2024
SCALE:	HORIZONTAL 1"=100 VERTICAL 1"=10
DESIGNED BY:	R. MOHAN
DRAWN BY:	R. MOHAN
CHECKED BY:	M. RATKE
PROJECT NO.	024264-00
SHEET NO.	8 OF 13

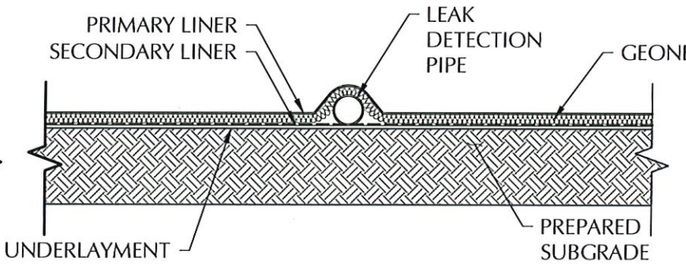
10/18/2024 2:31:42 PM



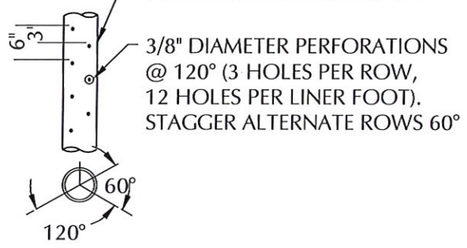
SUMP OVERVIEW DETAIL (2)
NOT TO SCALE



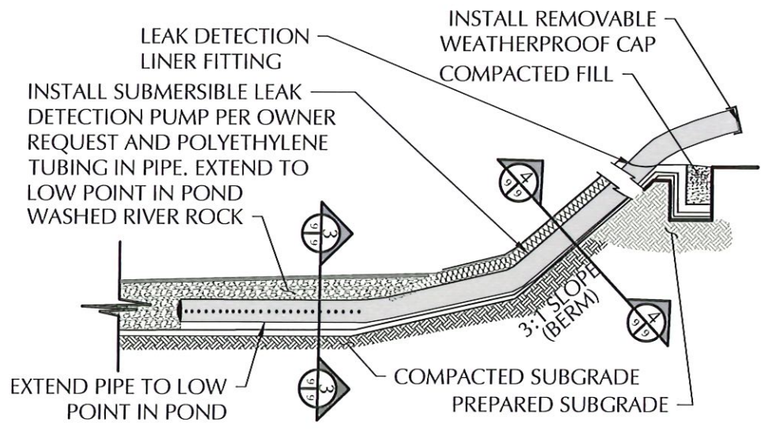
SUMP LEAK DETECTION PIPE DETAIL (3)
NOT TO SCALE



SIDE SLOPE LEAK DETECTION PIPE DETAIL (4)
NOT TO SCALE



PERFORATED PIPE DETAIL (5)
NOT TO SCALE



LEAK DETECTION/SAMPLING SYSTEM DETAIL (6)
NOT TO SCALE

PROPOSED PIT REFERENCE TABLE	
DETAIL	DESCRIPTION
PRIMARY LINER	60- MIL HDPE SMOOTH LINER
LEAK DETECTION	200-MIL GEONET
SECONDARY LINER	40-MIL HDPE SMOOTH LINER
UNDERLAYMENT	10 OZ GEOTEXTILE
SUMP	3207.50-FT ELEVATION
BERM (ROAD CREST)	DESIGN ELEV. 3224.50 FT- RD CREST (45-FT)
LEAK DETECTION PIPING	8-IN DR11.X PERFORATED HDPE LEAK DETECTION PIPE

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.

ENVIROTECH ENGINEERING
2500 North Eleventh Street
Enid, Oklahoma
580.234.8780
envirotechconsulting.com
P.E. #29736 - Expiration Date: 12-31-2024

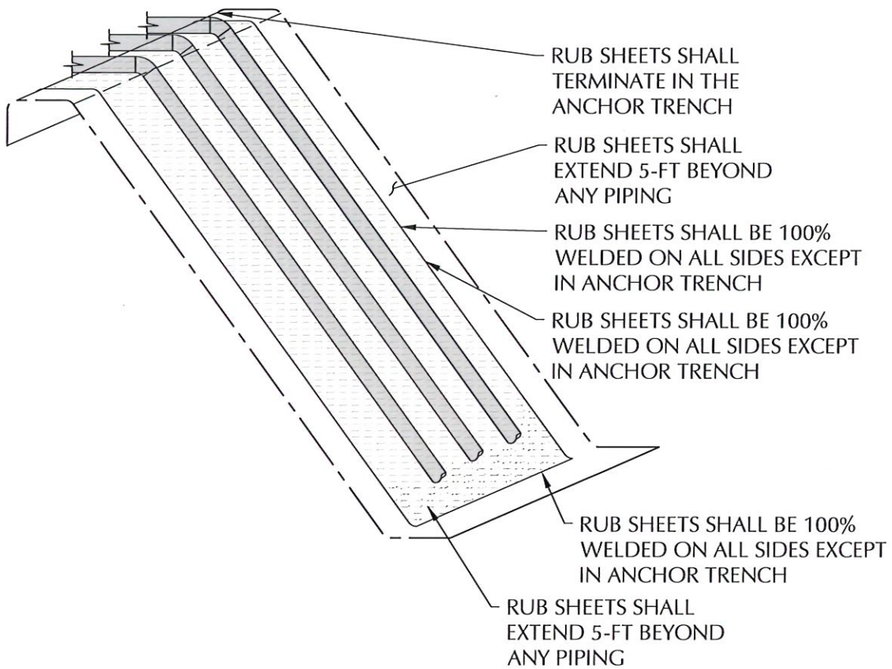
NO.	DATE	DESCRIPTION

WATERBRIDGE

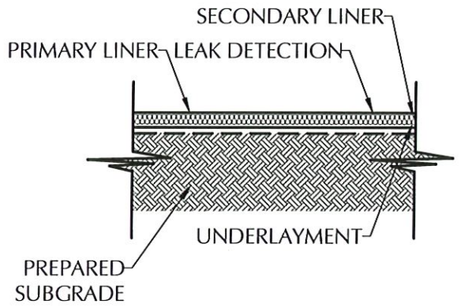
SUMP DETAILS
BOND RECYCLE FACILITY
WATERBRIDGE STATELINE, LLC.
SECTION 20, TOWNSHIP 21 SOUTH, RANGE 28 EAST
EDDY COUNTY, NEW MEXICO

DATE:	OCTOBER 2024
SCALE:	NOT TO SCALE
DESIGNED BY:	R. MOHAN
DRAWN BY:	R. MOHAN
CHECKED BY:	M. RATKE
PROJECT NO.	024264-00
SHEET NO.	9 OF 13

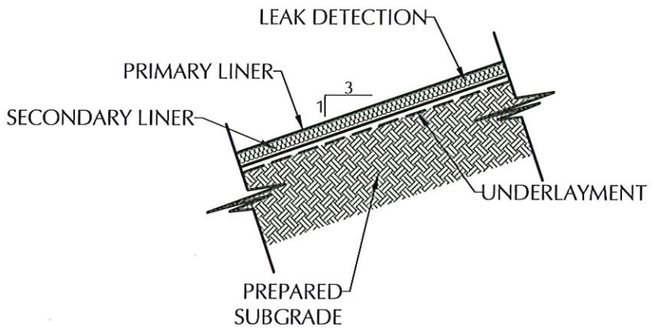
10/18/2024 2:31:50 PM



RUB SHEET DETAIL (7 | 6 | 10)
NOT TO SCALE



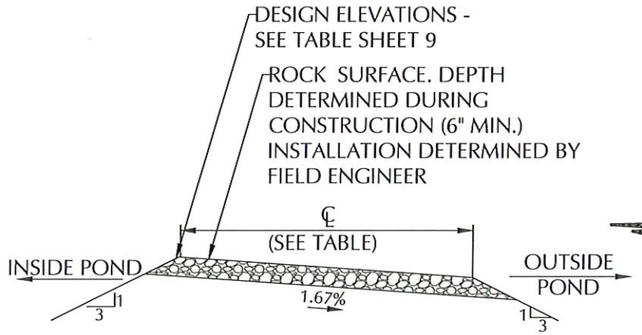
LINER SYSTEM FLOOR DETAIL (8 | 4 | 10)
Not to Scale



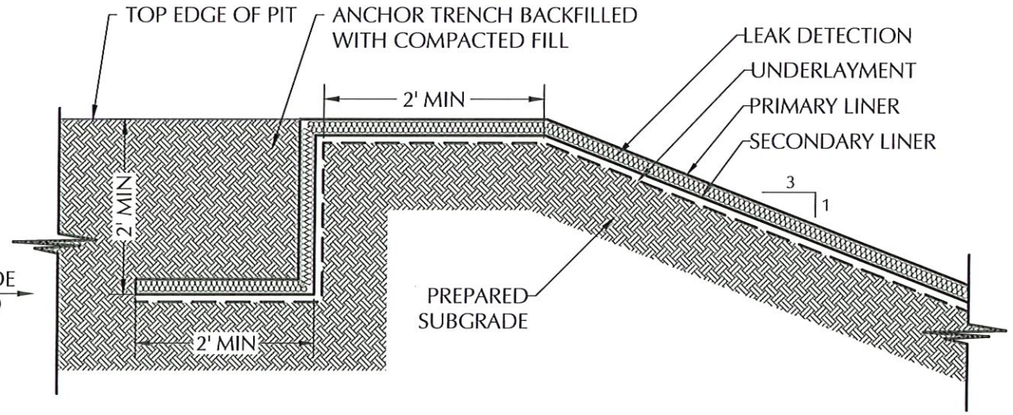
LINER SYSTEM SIDE SLOPE DETAIL (9 | 4 | 10)
Not to Scale

GENERAL NOTES:

1. SEE REFERENCE TABLES SHEET 9 FOR LINER SPECIFICATIONS
2. PREPARED SUBGRADE MEANS COMPACTED SMOOTH SUBGRADE FREE OF ROCK, ROOTS, WOOD DEBRIS, CONCRETE RUBBLE AND ANY SHARP OBJECTS THAT MIGHT PUNCTURE THE HDPE LINER.
3. ALL INTERIOR SLOPES AND TOP OF BERMS TO BE SMOOTH DRUM ROLLED.
4. ALL EMBANKMENT SLOPES SHALL HAVE A RATIO OF 3:1, COMPACTED EARTH EMBANKMENTS TO BE CONSTRUCTED WITH 8 INCH (MAXIMUM LOOSE LIFTS), COMPACTED TO 95% STANDARD PROCTOR DENSITY (ASTM D698), AND MOISTURE CONDITIONS TO +/- 2% OPTIMUM MOISTURE (ASTM D698)
5. PERFORM GEOTECHNICAL ANALYSIS ON EXISTING SOIL TO CONFIRM SOIL IS SUITABLE FOR USE IN THE LEVEE.
6. ALL BOTTOM OF PITS SHALL SLOPE TO THE SUMP.



TYPICAL BERM CREST DETAIL (10 | 4 | 10)
Not to Scale



ANCHOR TRENCH DETAIL (11 | 4 | 10)
Not to Scale

ENVIROTECH ENGINEERING
2500 North Eleventh Street
Enid, Oklahoma
580.234.8780
envirotechconsulting.com
P.E. #29736 - Expiration Date: 12-31-2024

NO.	DATE	DESCRIPTION

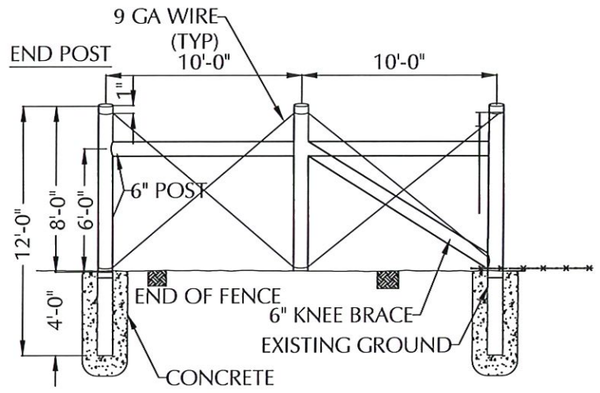
WATERBRIDGE

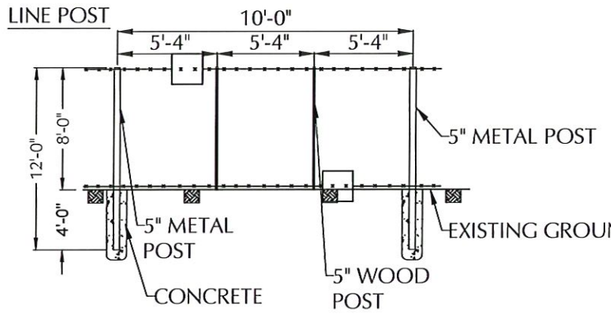
LINER DETAILS
BOND RECYCLE FACILITY
WATERBRIDGE STATELINE, LLC.
SECTION 20, TOWNSHIP 21 SOUTH, RANGE 28 EAST
EDDY COUNTY, NEW MEXICO

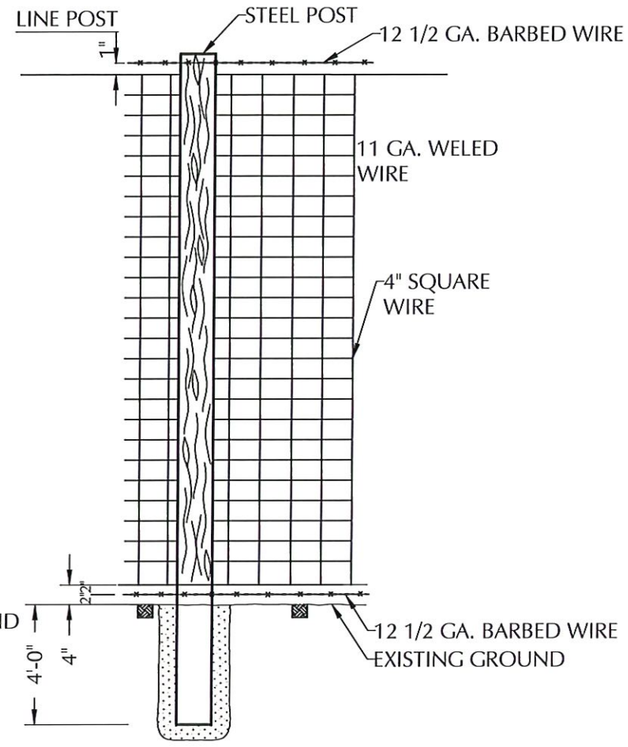
MITCHELL JOSEPH RATKE
NEW MEXICO
29736
PROFESSIONAL ENGINEER
10-18-2024

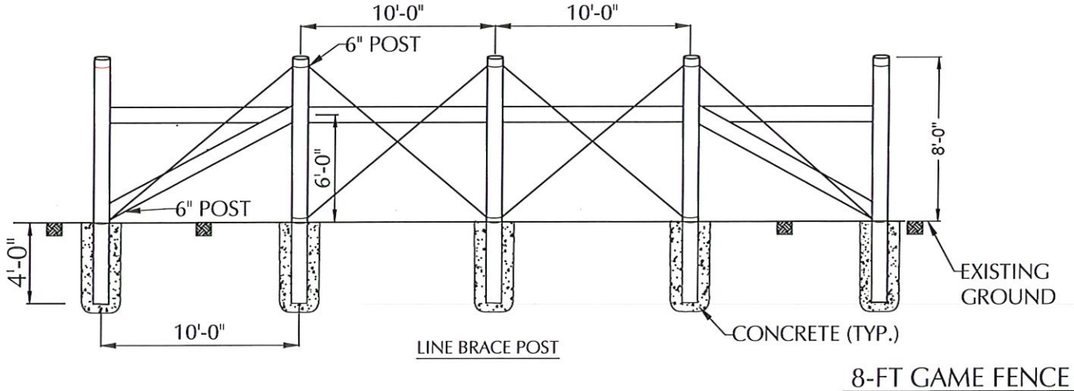
DATE:	OCTOBER 2024
SCALE:	NOT TO SCALE
DESIGNED BY:	R. MOHAN
DRAWN BY:	R. MOHAN
CHECKED BY:	M. RATKE
PROJECT NO.	024264-00
SHEET NO.	10 OF 13

10/18/2024 2:31:55 PM

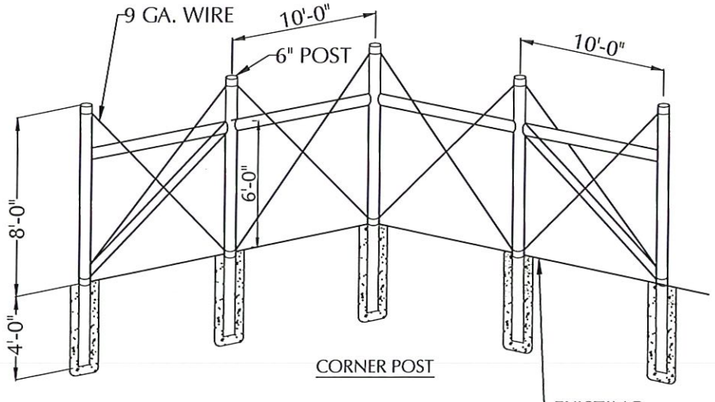








LINE BRACE POST



CORNER POST

8-FT GAME FENCE DETAIL (12 | 6 | 11)
Not to Scale

GENERAL NOTES:

1. AT EACH LOCATION WHERE AN ELECTRIC TRANSMISSION, DISTRIBUTION OR SECONDARY LINE CROSSES A BARRIER FENCE, THE CONTRACTOR SHALL FURNISH AND INSTALL A GROUND CONFORMING TO ARTICLE 250 OF THE NATIONAL ELECTRICAL CODE- THE GROUND ROD SHALL 0E A MINIMUM DIAMETER OF 1\2-IN. AND 8-FT. IN LENGTH, AND DRIVEN AT LEAST 7 1/2 FT. INTO THE GROUND. THE ROD SHALL BE CONNECTED TO EACH WIRE WITH A MINIMUM AWG NO. 8 STRANDED COPPER WIRE. GROUNDING WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK.
2. LINE BRACE POSTS SHALL BE SPACED AT 400 FT. INTERVALS, WHERE FENCING IS CONTINUOUS AND WHERE END, CORNER AND LINE BRACE POSTS ARE NOT SPECIFIED.
3. ALL LINE POSTS SHALL BE 5 IN. MIN. DIAMETER AND 12 FT. LONG. ALL END, CORNER AND LINE BRACE POSTS SHALL BE 6 IN. MIN. DIAMETER AND 12 FT. LONG.
4. BARBED WIRE SHALL BE DOUBLE WRAPPED AND TIED OFF AT END POSTS, CORNER POSTS AND LINE BRACE POSTS.
5. WOVEN WIRE SHALL BE SINGLE WRAPPED AND TIED OFF. FENCE TO BE CONTINUED, SHALL BE RESTARTED IN LIKE MANNER. WOVEN WIRE FENCE FABRIC SHALL CONFORM TO AASHTO M279 (ASTM A 116) DESIGN NO. 1047-6-11 WITH CLASS I COATING.
6. STEEL BARBED WIRE SHALL CONFORM TO AASHTO M 200 (ASTM A 121) 12-1/2 GAGE WITH CLASS 1 COATING.
7. ALL FENCE WIRE TIES, BRACE WIRES, STAPLES AND OTHER WIRE APPURTENANCES SHALL BE GALVANIZED IN CONFORMANCE WITH AASHTO M 232.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RE-ESTABLISHING DISTURBED OR DESTROYED SURVEY MONUMENTS TO THE APPROPRIATE ACCURACY.
9. ALL MISCELLANEOUS HARDWARE SHALL BE FURNISHED GALVANIZED OR ALUMINUM COATED. ALL METAL PIPE POSTS SHALL BE CAPPED.
10. READY MIX CONCRETE MAY BE USED AS A SUBSTITUTE FOR CLASS "A" CONCRETE FOR THE CONCRETE FOOTING IF APPROVED BY THE ENGINEER.

ENVIROTECH ENGINEERING
2500 North Eleventh Street
Enid, Oklahoma
580.234.8780
en-technicaseng.com
P.E. #29736 - Expiration Date: 12-31-2024

NO.	DATE	DESCRIPTION

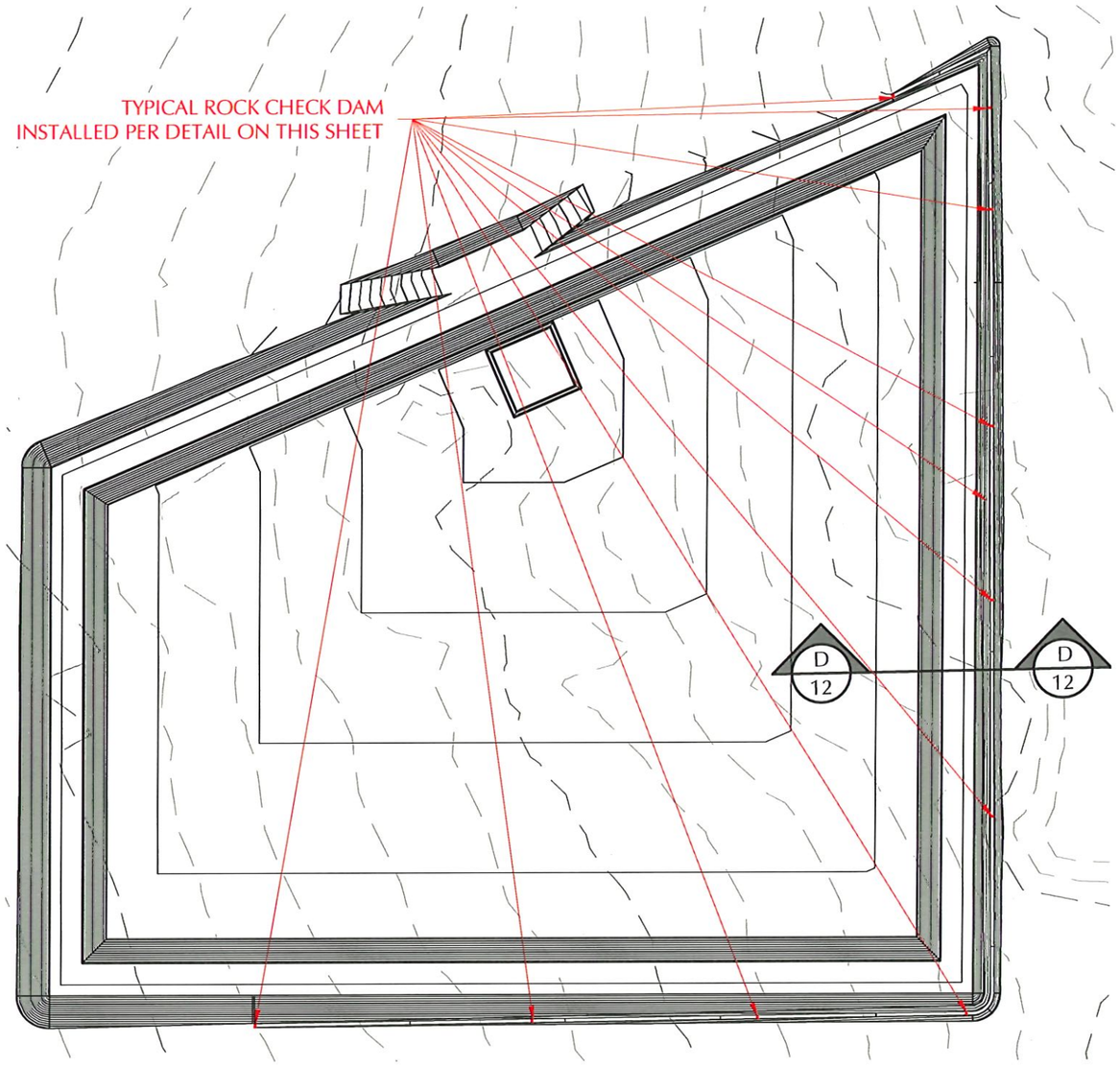
WATERBRIDGE

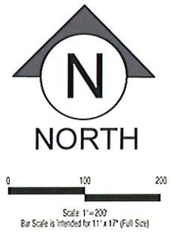
FENCE DETAILS
BOND RECYCLE FACILITY
WATERBRIDGE STATELINE, LLC.
SECTION 20, TOWNSHIP 21 SOUTH, RANGE 28 EAST
EDDY COUNTY, NEW MEXICO

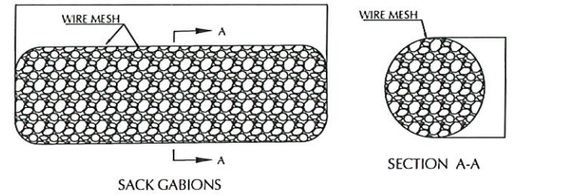
MITCHELL JOSEPH RATKE
NEW MEXICO
29736
PROFESSIONAL ENGINEER
10-18-2024

DATE:	SEPTEMBER 2024
SCALE:	NOT TO SCALE
DESIGNED BY:	R. MOHAN
DRAWN BY:	R. MOHAN
CHECKED BY:	M. RATKE
PROJECT NO.	024264-00
SHEET NO.	11 OF 13

10/18/2024 2:31:59 PM

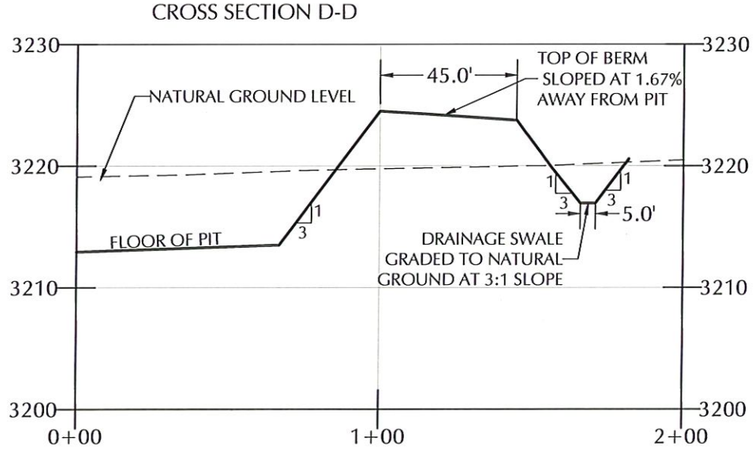


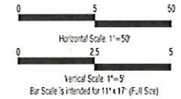




ROCK CHECK DAM DETAIL

Not to Scale





ENVIROTECH ENGINEERING
2500 North Eleventh Street
Enid, Oklahoma
580.234.8780
envirotechoneeling.com
P.E. #29736 - Expiration Date: 12-31-2024

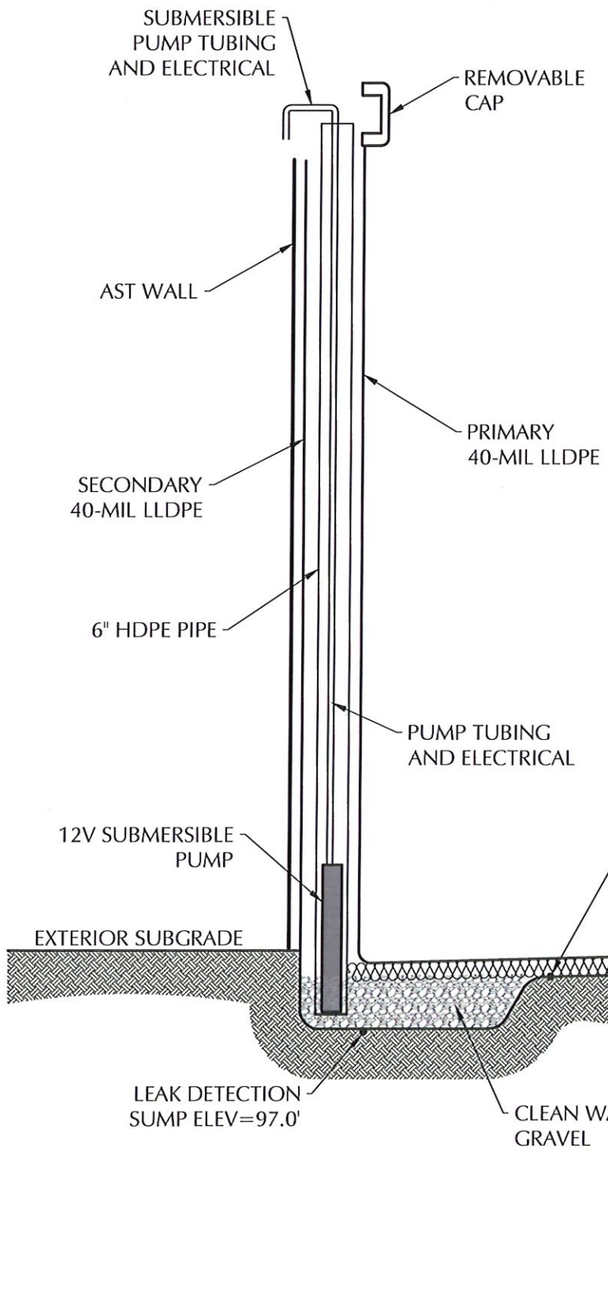
NO.	DATE	DESCRIPTION

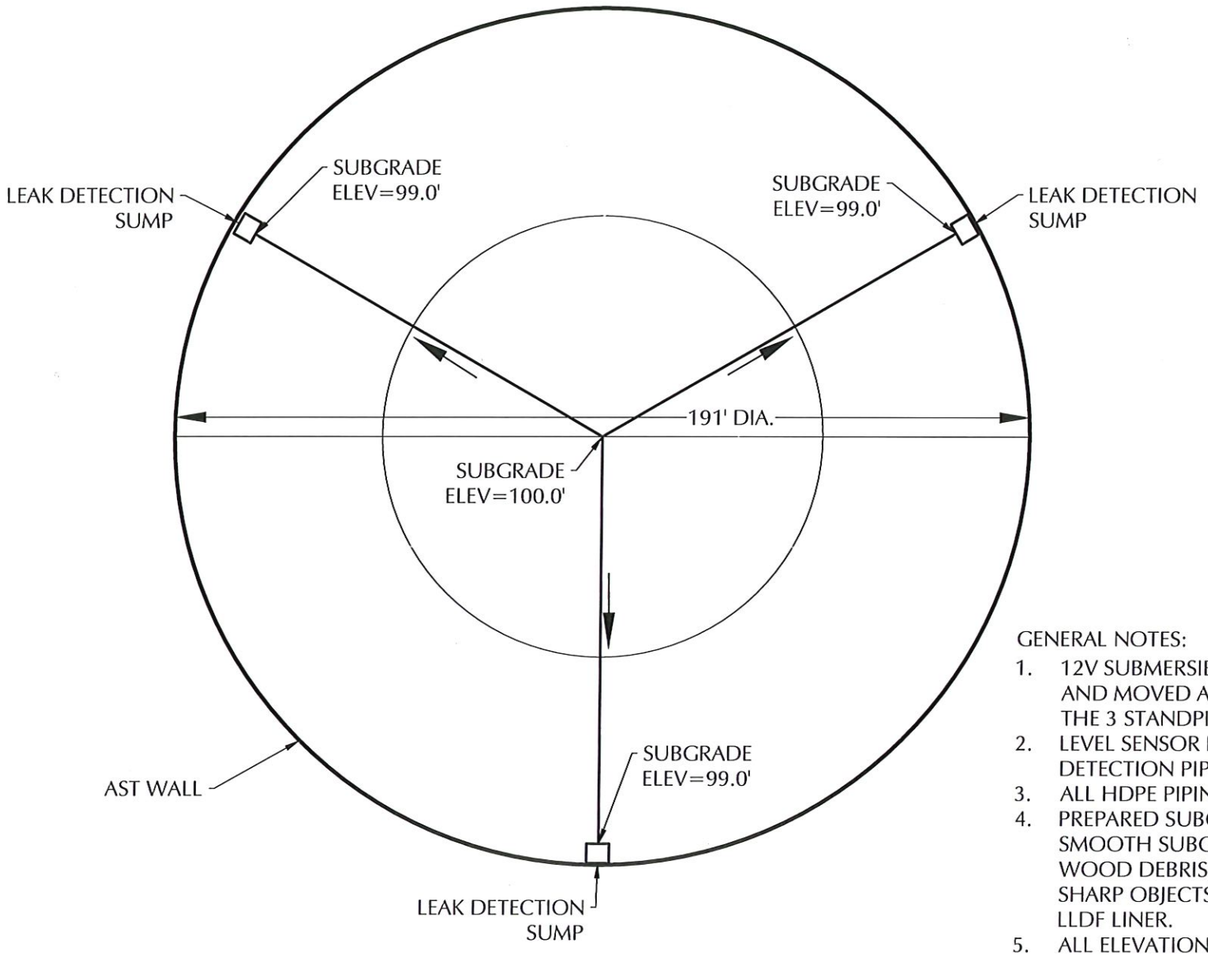
WATERBRIDGE

STORMWATER DIVERSION CHANNEL DETAIL
BOND RECYCLE FACILITY
WATERBRIDGE STATELINE, LLC.
SECTION 20, TOWNSHIP 21 SOUTH, RANGE 28 EAST
EDDY COUNTY, NEW MEXICO

DATE:	OCTOBER 2024
SCALE:	VARIES
DESIGNED BY:	R. MOHAN
DRAWN BY:	R. MOHAN
CHECKED BY:	M. RATKE
PROJECT NO.	024264-00
SHEET NO.	12 OF 13

10/18/2024 2:32:08 PM





AST LEAK DETECTION SYSTEM DETAIL 13
NOT TO SCALE 6 | 13

GENERAL NOTES:

1. 12V SUBMERSIBLE PUMP SHALL BE MOBILE AND MOVED AS NEEDED BETWEEN EACH OF THE 3 STANDPIPES AS NEEDED.
2. LEVEL SENSOR PROBE IN 1 OF 3 LEAK DETECTION PIPES.
3. ALL HDPE PIPING SHALL BE SDR 17.
4. PREPARED SUBGRADE MEANS COMPACTED SMOOTH SUBGRADE FREE OF ROCK, ROOTS, WOOD DEBRIS, CONCRETE RUBBLE AND ANY SHARP OBJECTS THAT MIGHT PUNCTURE THE LLDF LINER.
5. ALL ELEVATIONS SHALL ARE RELATIVE TO EACH OTHER BUT ARBITRARY IN NATURE.

ENVIROTECH ENGINEERING
2500 North Eleventh Street
Enid, Oklahoma
580.234.8780
envirotechconsulting.com
P.E. #29736 - Expiration Date: 12-31-2024

NO.	DATE	DESCRIPTION

WATERBRIDGE

AST LEAK DETECTION PLAN
BOND RECYCLE FACILITY
WATERBRIDGE STATELINE, LLC.
SECTION 20, TOWNSHIP 21 SOUTH, RANGE 28 EAST
EDDY COUNTY, NEW MEXICO

MITCHELL JOSEPH RATKE
NEW MEXICO
29736
PROFESSIONAL ENGINEER
10-18-2024

DATE:	OCTOBER 2024
SCALE:	NOT TO SCALE
DESIGNED BY:	R. MOHAN
DRAWN BY:	R. MOHAN
CHECKED BY:	M. RATKE
PROJECT NO.	024264-00
SHEET NO.	13 OF 13

10/16/2024 2:32:11 PM

APPENDIX E

DESIGN AND CONSTRUCTION PLAN

WaterBridge Stateline, LLC. is proposing to construct one (1) earthen containment and two (2) Above Ground Storage Tanks (AST's) in Section 20, Township 21 South, Range 28 East, Eddy County, New Mexico. The Bond Recycle Facility shall consist of three (3) containments with a total operational volume of approximately 1,767,628-bbl.

OPERATION AND MAINTENANCE PROCEDURES

Applicable mandates in Rule 34 are underlined. This plan addresses construction of lined earthen containments and an above ground storage tank. WaterBridge intends to operate the AST's the same way as an earthen containment. *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 contained in engineering design drawings). 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 around the containment 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 C shows for earthen containments;

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 HDPE. 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 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 E*). 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 C*).
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 C*).
4. The slope of the interior subgrade should be great enough to facilitate drainage.

APPENDIX F

MATERIAL SPECIFICATIONS

WaterBridge Stateline, LLC. is proposing to construct one (1) earthen containment and two (2) Above Ground Storage Tanks (AST) in Section 20, Township 21 South, Range 28 East, Eddy County, New Mexico. The Bond Recycle Facility shall consist of three (3) containments with a total operational volume of approximately 1,767,628-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	18,675	15,750	11,700	9,000	7,425
	Single-Sided Textured	22,725	17,550	12,150	9,225	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.

•

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

•

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

OPERATING AND MAINTENANCE PLAN

WaterBridge Stateline, LLC. is proposing to construct one (1) earthen containment and two (2) Above Ground Storage Tanks (AST) in Section 20, Township 21 South, Range 28 East, Eddy County, New Mexico. The Bond Recycle Facility shall consist of three (3) containments with a total operational volume of approximately 1,767,628-bbl.

OPERATION AND MAINTENANCE PROCEDURES

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

The operator will operate and maintain the lined earthen containments and AST's 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 and AST's 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 welded ladder 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.

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 C*, 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:

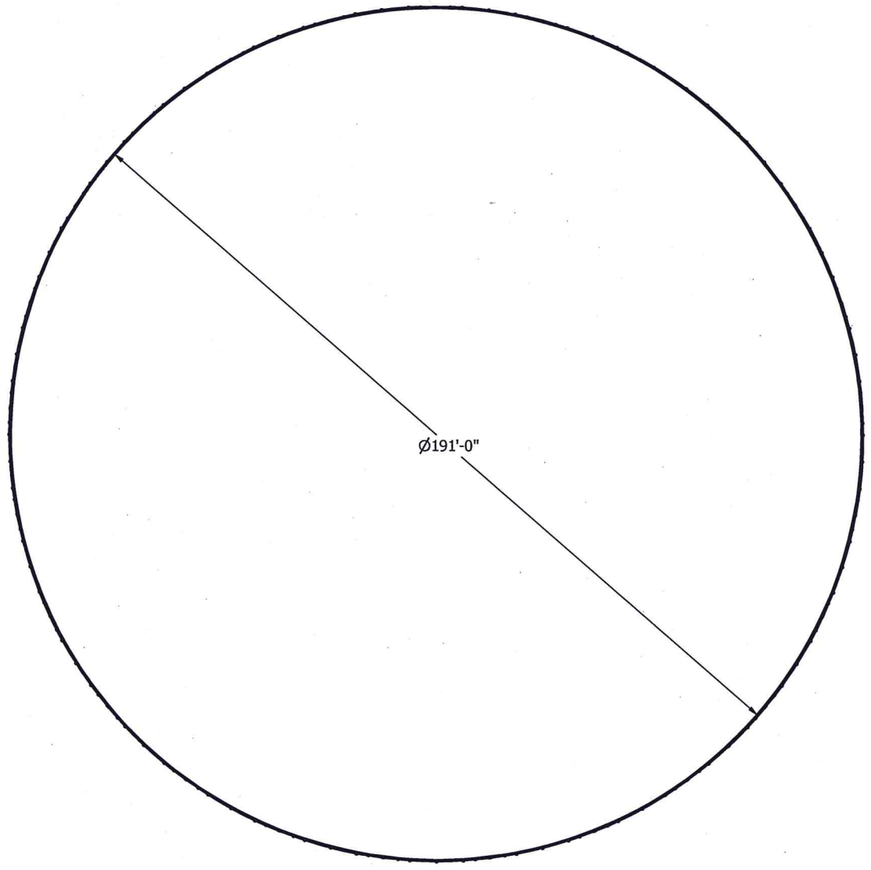
1. Re-measure fluid levels in the monitoring riser pipe on a daily basis for one week to determine the rate of seepage.
2. Collect a water sample from the monitoring riser pipe to confirm the seepage is treated produced water from the containment via field conductivity and chloride measurements.

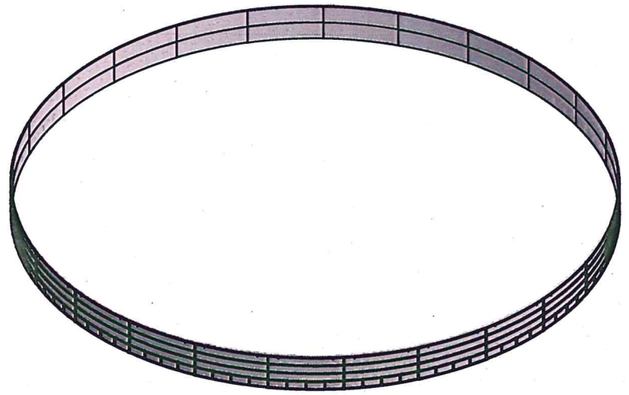
3. Notify NMOCD of a confirmed positive detection in the system within 48 hours of sampling (initial notification).
4. Install a pump into the monitoring riser pipe sump to continually (manually on a daily basis or via automatic timers) remove fluids from the leak detection system into the containment 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.

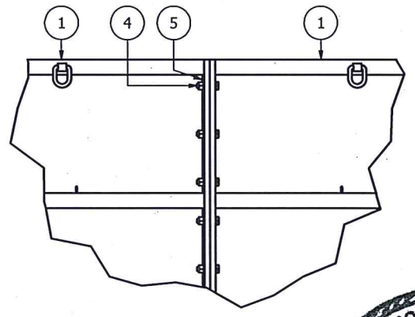
If the point of release is obvious from a low water inspection, the liner professional will repair the loss of integrity. If the point of release cannot be determined by the inspection, the liner professional will develop a more robust plan to identify the point(s) of release. The inspection plan and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

APPENDIX H

AST's







DETAIL A
SCALE 1 / 25

Reviewer's notes:

1. This drawing set replaces set previously sealed on 27 MAR 2013
2. Empty corral cannot withstand high winds.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL ENGINEER
CHARLES R. GOSS
NO. 40569-E

CR Goss
18 Dec 2013

ITEM	QTY	PART NUMBER	DESCRIPTION	REV
6	120	4X4X4 LUMBER	4" x 4" x 48" Lumber (NOT SHOWN)	-
5	850	WASH-200-1-1/4	1-1/4" ASTM F436 Galvanized Structural Washer	-
4	425	NUT-200-1-1/4-7	1-1/4"-7 ASTM A563 Gr DH Galvanized Hex Nut	-
7	425	BOLT-1-1/4-4333	1-1/4"-7 x 5" ASTM A490 Structural Bolt	-
3	25	ETC-106	.063" X 8" X 168" RUBBER SHEET (NOT SHOWN)	-
2	5	MWC-SA-008A	60,000 BBL Corral Shipping Support	-
1	25	MWC-SA-002a	60,000 BBL CORRAL WALL SECTION	-

PARTS LIST

NEXT ASSY | USED ON
APPLICATION
THIRD ANGLE PROJECTION

INTERPRET DIMENSIONS AND TOLERANCES IAW ASME Y14.5-2009 UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES (MM)
FRACTIONAL ± 1/4(6.4)
X.XX = ±.25(6.4)
X.XXX = ±.125(3.2)
X.XXXX = ±.060(1.5)
ANGULAR ± 1°
125

MATERIAL
THICKNESS NA | WEIGHT N/A

DRAWN BY mspeciale
DATE 7/12/2012
CHECKED BY dbodenshatz
DATE 11/23/2012
APPROVED mspeciale
DATE 11/23/2012

ETC
Environmental Tank & Container
JOHNSTOWN, PA
855-382-8265
www.etctank.com

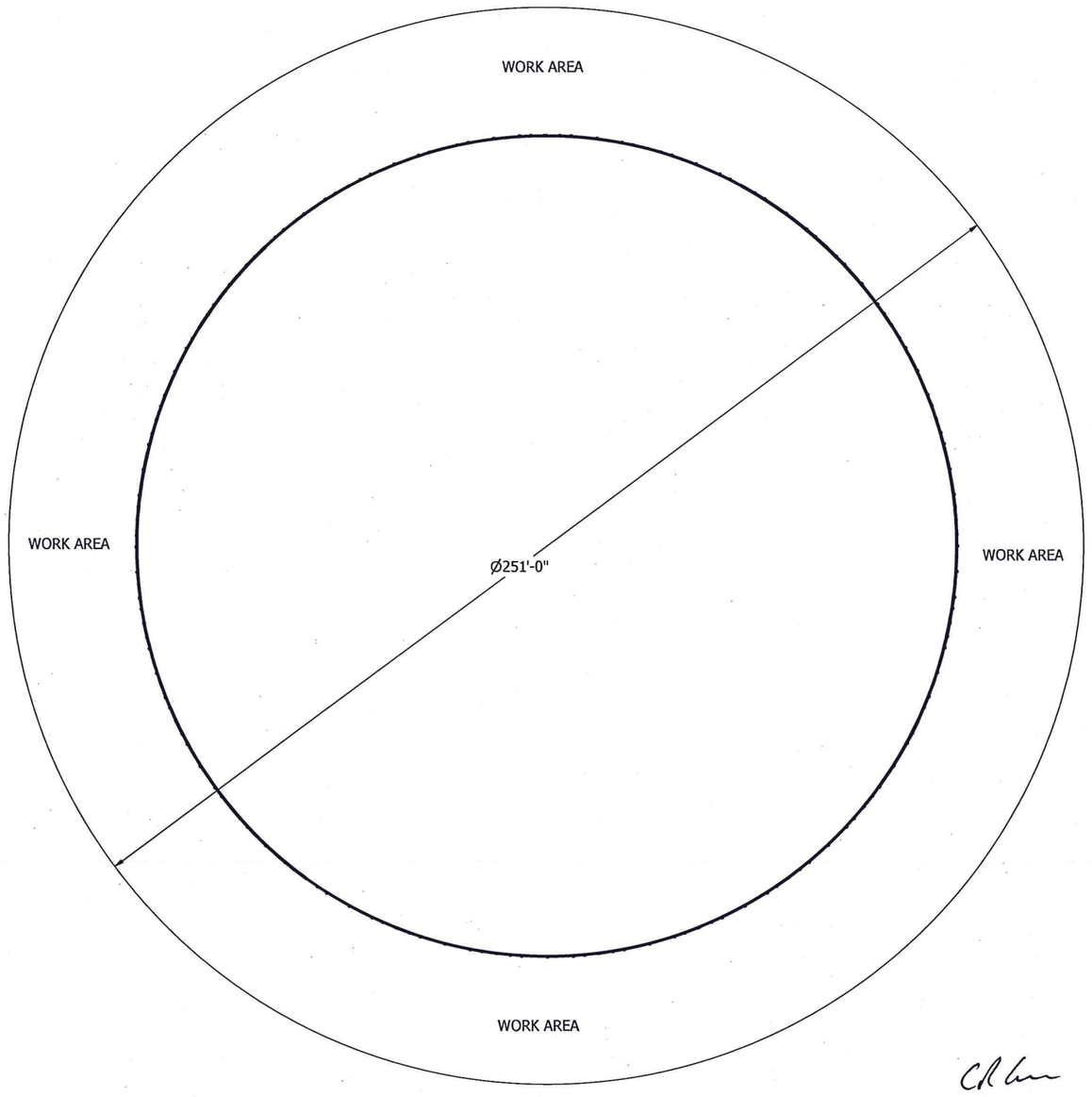
TITLE: 60,000 BBL MOBILE WATER CORRAL, BOLT-UP DESIGN

SIZE C | PRT. NO. MWC-A-002a | REV -
SCALE DO NOT SCALE | DWG. NO. MWC-A-002a | SHEET 1 OF 2

LOCATION:C:_Vault\ETCVault_Corrals\MWC-A-002a.iam

NOTES:

1. MINIMUM OF 30 FEET OF WORK AREA AROUND CORRAL
2. OVER ALL SITE MUST BE LEVEL TO +/- .50 INCH
3. RING AREA WHERE CORRAL PANELS WILL BE SETUP MUST BE LEVEL TO +/- .25 INCH
4. SOIL COMPACTION MUST MEET ASTM D-698A, 90% OR GREATER
5. BUILD A 12" X 12" SAND INSIDE CORNER RELIEF BEFORE INSTALLING LINER
6. MUST USE 1"-1/4"-7 X 4" GRADE A490 STRUCTURAL BOLTS
7. PANELS MUST HAVE ALL CONNECTING BOLTS TIGHTENED AND LINER FULLY SECURED BEFORE ADDING WATER
8. ALLOW FOR 6 INCHES OF FREEBOARD FROM TOP OF CORRAL



COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL ENGINEER
CHARLES R. GOSS
NO. 40569-E

18 Dec 2013

NEXT ASSY	USED ON
APPLICATION	
THIRD ANGLE PROJECTION	
INTERPRET DIMENSIONS AND TOLERANCES IAW ASME Y14.5-2009 UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES (MM)	FRACTIONAL ± 1/4(6.4) XXX = ±.25(6.4) XXX = ±.125(3.2) XXXX = ±.060(1.5) ANGULAR ± 1° 125
MATERIAL	
THICKNESS NA	WEIGHT N/A
DRAWN BY mspeciale	DATE 7/12/2012
CHECKED BY dbodenshatz	DATE 11/23/2012
APPROVED mspeciale	DATE 11/23/2012

ETC
Environmental Tank & Container
JOHNSTOWN, PA
855-382-8265
www.etctank.com

TITLE: 60,000 BBL MOBILE WATER CORRAL, BOLT-UP DESIGN

SIZE	PRT. NO.	REV
C	MWC-A-002a	-

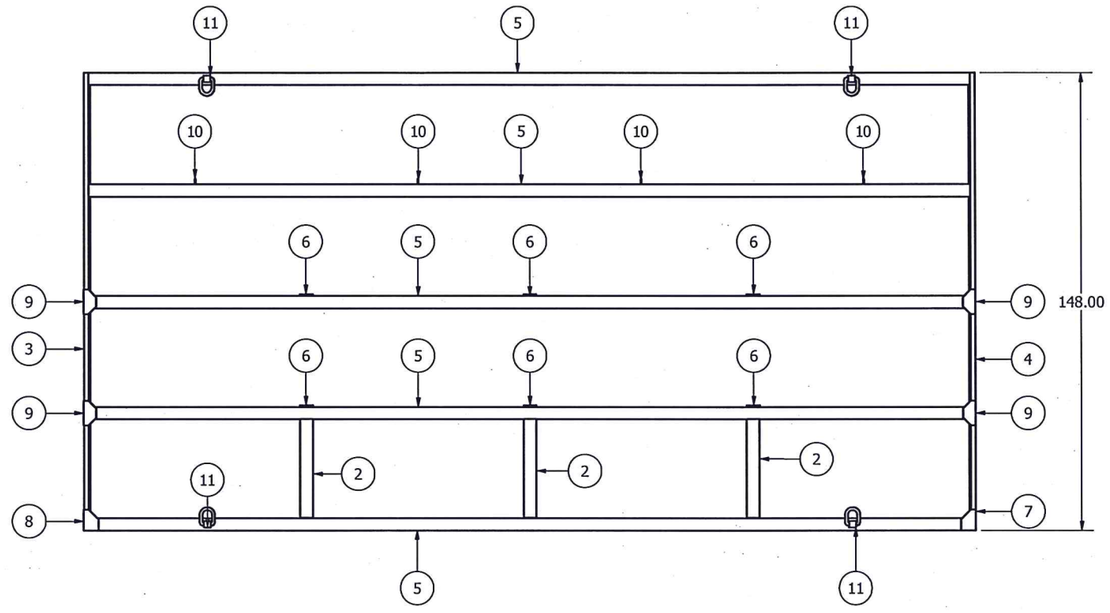
SCALE	DWG. NO.	SHEET
DO NOT SCALE	MWC-A-002a	2 OF 2

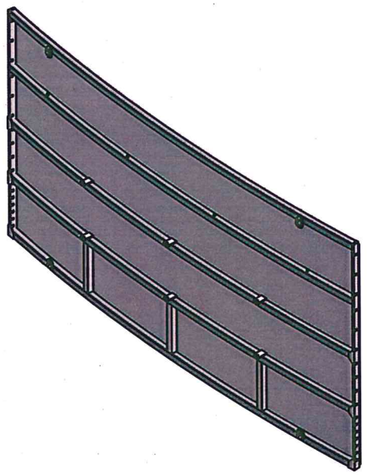
LOCATION: C:_Vault\ETCVault_Corrals\MWC-A-002a.iam

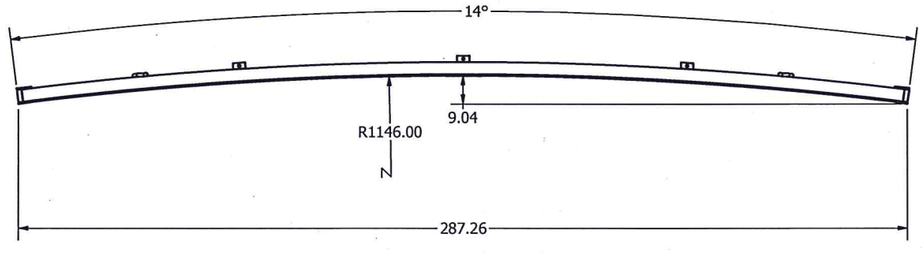
NOTES:

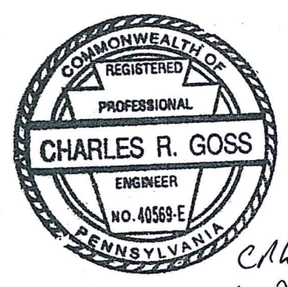
1. BLAST TO A 1 1/2 - 2 mil PROFILE
2. PAINT WITH CARBOLINE 8845, 3 - 5 mils THICK

REVISION HISTORY				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	-	INITIAL RELEASE	10/1/2012	MJS









18 Dec 2013

ITEM	QTY	PART NUMBER	DESCRIPTION	REV	STOCK NUM	UNIT QTY
PARTS LIST						
12	1	ETC-109	.062" X 4" X 288" RUBBER SHEET	-	NA	NA
11	4	ETC-079	Weld-on Lifting Ring	-	NA	NA
10	4	ETC-040	D-RING	-	NA	NA
9	4	MWC-323	PLATE, 1/2"	-		1
8	1	MWC-322	PLATE, 1/2"	-		1
7	1	MWC-321	PLATE, 1/2"	-		1
6	6	MWC-019	PLATE, 1/2"	-	010558	23.43 lbs
5	5	MWC-017a	TUBE, 4" X 4" X .25"	-	030227	120 ft
4	1	MWC-211R	1.50" X 4.00" FLAT BAR	-	020172	12.33 ft
3	1	MWC-211L	1.50" X 4.00" FLAT BAR	-	020172	12.33 ft
2	3	MWC-004	TUBE, 4" X 4" X .25"	-	030068	8 ft
1	2	MWC-001a	PLATE	-	010013	5880.72 lbs

NEXT ASSY | USED ON
APPLICATION
THIRD ANGLE PROJECTION

INTERPRET DIMENSIONS AND TOLERANCES IAW ASME Y14.5-2009 UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES (MM)
FRACTIONAL ± 1/4(6.4)
X.XX = ±.25(6.4)
X.XXX = ±.125(3.2)
X.XXXX = ±.060(1.5)
ANGULAR ± 1°
125

MATERIAL: Welded Steel Mild
THICKNESS: NA | WEIGHT: N/A

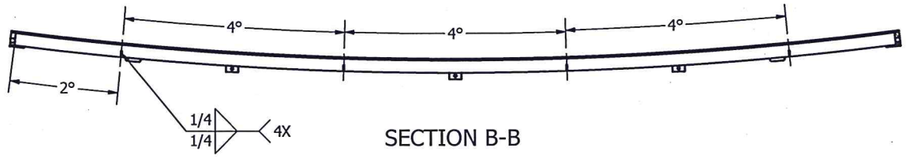
DRAWN BY: mspeciale — DATE: 4/11/2012
CHECKED BY: dbodenshatz — DATE: 8/31/2012
APPROVED: mspeciale — DATE: 8/31/2012

ETC
Environmental Tank & Container
JOHNSTOWN, PA
855-382-8265
www.etctank.com

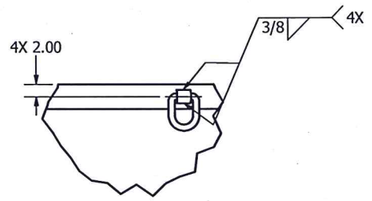
TITLE: 60,000 BBL CORRAL WALL SECTION

SIZE: C | PRT. NO.: MWC-SA-002a | REV: -
SCALE: DO NOT SCALE | DWG. NO.: MWC-SA-002a | SHEET 1 OF 2

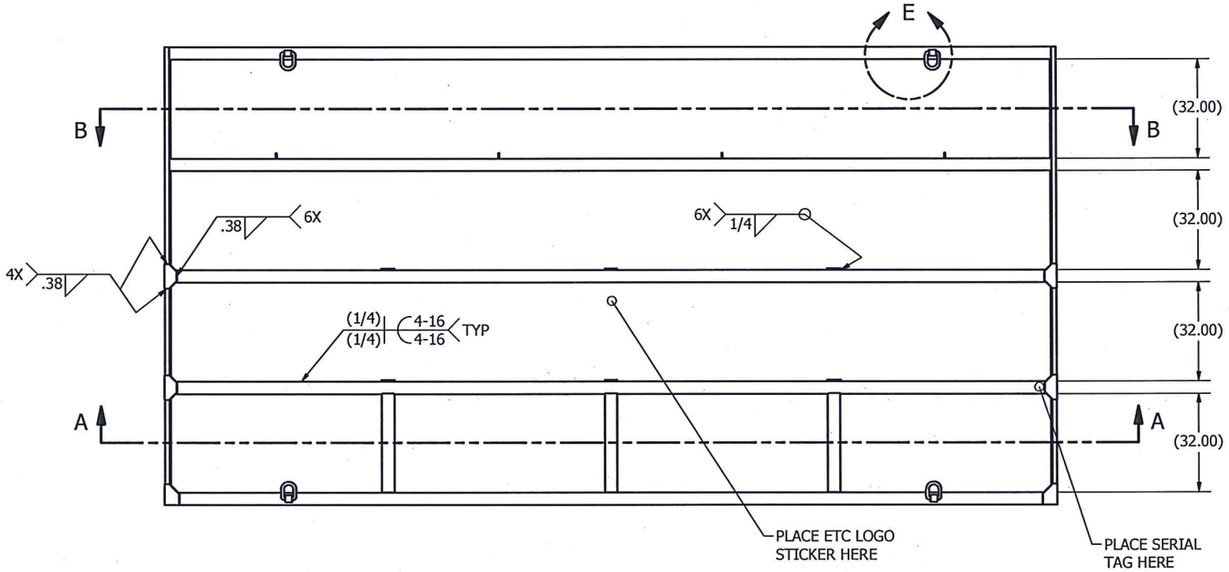
LOCATION: C:_Vault\ETCVault_Corrals\MWC-SA-002a.iam

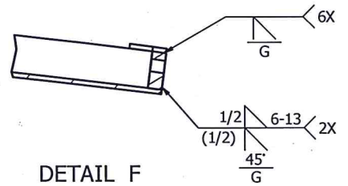


SECTION B-B

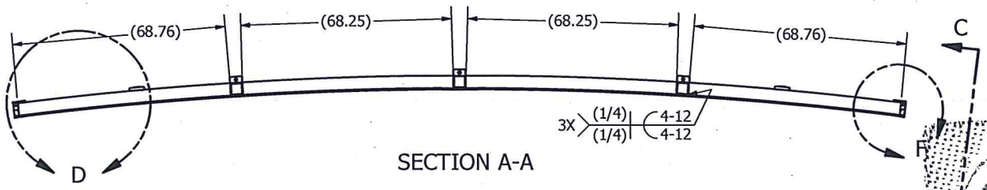


DETAIL E

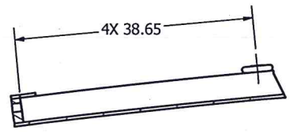




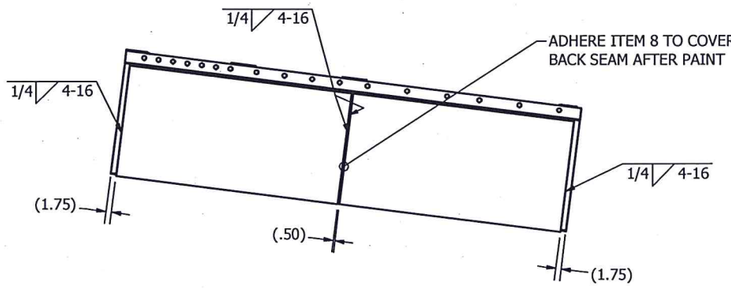
DETAIL F



SECTION A-A



DETAIL D



VIEW C-C

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
CHARLES R. GOSS
ENGINEER
NO. 40569-E

18 Dec 2013

THIS DRAWING IS PROPERTY OF JWF INDUSTRIES IT MAY NOT BE COPIED OR DISTRIBUTED IN WHOLE OR PART. WITHOUT PRIOR PERMISSION OF JWF INDUSTRIES.

NEXT ASSY | USED ON
APPLICATION
THIRD ANGLE PROJECTION

INTERPRET DIMENSIONS AND TOLERANCES IAW ASME Y14.5-2009 UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES (MM)
FRACTIONAL ± 1/4(6.4)
X.XX = ±.25(6.4)
X.XXX = ±.125(3.2)
X.XXXX = ±.060(1.5)
ANGULAR ± 1°
125

MATERIAL: Welded Steel Mild
THICKNESS: NA
WEIGHT: N/A

DRAWN BY	mspeciale
DATE	4/11/2012
CHECKED BY	dbodenshatz
DATE	8/31/2012
APPROVED	mspeciale
DATE	8/31/2012

ETC
Environmental Tank & Container
JOHNSTOWN, PA
855-382-8265
www.etctank.com

TITLE: 60,000 BBL CORRAL WALL SECTION

SIZE: C | PRT. NO.: MWC-SA-002a | REV: -
SCALE: DO NOT SCALE | DWG. NO.: MWC-SA-002a | SHEET 2 OF 2
LOCATION: C:_Vault\ETCVault_Corrals\MWC-SA-002a.iam

APPENDIX I

CLOSURE PLAN

WaterBridge Stateline, LLC. is proposing to construct one (1) earthen containment and two (2) Above Ground Storage Tanks (AST) in Section 20, Township 21 South, Range 28 East, Eddy County, New Mexico. The Bond Recycle Facility shall consist of three (3) containments with a total operational volume of approximately 1,767,628-bbl.

CLOSURE PLAN

In this plan, the 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 pits and AST's are 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 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.

10-18-2024

WaterBridge Stateline
Bond Recycle Facility
Closure Cost Estimate

	Item	Units	Quanity	$/Unit	Estimate Cost
	Facility Closure				
1	Fluid removal				
	Bond Recycle Containment (1.647M bbls)	bbls	1,647,628	$ 0.65	$ 1,070,958.20
	Bond East Recycle AST (60k bbls)	bbls	60,000	$ 0.65	$ 39,000.00
	Bond West Recycle AST (60k bbls)	bbls	60,000	$ 0.65	$ 39,000.00
2	Vac truck (final fluid removal)	hrs	40	$ 125.00	$ 5,000.00
3	Liner removal (fold-in-place)				
	Covers removal and disposal	SF	4,385,118	$ 0.18	$ 789,321.24
4	Equipment removal				
	Containment clean-out and residue haul-off	LS	1	$ 10,000.00	$ 10,000.00
	Equipment removal (tanks, gun barrel, FWKO)	LS	1	$ 7,500.00	$ 7,500.00
	Electrical decomissioning (pumps and panels)	LS	1	$ 5,000.00	$ 5,000.00
	Misc equipment clean-up and removal	hrs	120	$ 135.00	$ 16,200.00
	Removal of AST	EA	2	$ 75,000.00	$ 150,000.00
5	Site Restoration				
	Dozer - push in berms (bid) and final grading of the site	CY	137,410	$ 3.00	$ 412,230.00
	Re-vegetation	ea	1	$ 5,500.00	$ 5,500.00
	Estimated Total				**$ 2,549,709.44**

Assumptions

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

MITCHELL JOSEPH RATKE
NEW MEXICO
29736
PROFESSIONAL ENGINEER
10-18-2024

Venegas, Victoria, EMNRD

From: Venegas, Victoria, EMNRD
Sent: Thursday, November 14, 2024 10:34 AM
To: Jake Ferenz; Mitchell Ratke; Heather Soto
Subject: 2RF-210 - WATERBRIDGE BOND RECYCLE FACILITY [fVV2431851969]
Attachments: C-147 2RF-210 - WATERBRIDGE BOND RECYCLE FACILITY [fVV2431851969].pdf

2RF-210 - WATERBRIDGE BOND RECYCLE FACILITY [fVV2431851969]

Good morning, Mr. Ferenz.
NMOCD has reviewed the recycling containment permit application and related documents, submitted by [330129] WaterBridge Stateline LLC on October 21, 2024, Application ID 394295, for 2RF-210 - WATERBRIDGE BOND RECYCLE FACILITY [fVV2431851969] in A-20-21S-28E, Eddy County, New Mexico. [330129] WaterBridge Stateline LLC requested variances from 19.15.34 NMAC for 2RF-210 - WATERBRIDGE BOND RECYCLE FACILITY [fVV2431851969].

The following variances have been approved:

- The variance from 19.15.34.13.E NMAC for the installation of an audible “Bird-X Mega Blaster Pro” bird deterrence system is approved.
- The variance to NMAC 19.15.34.12.D to install a wire mesh, game fence, eight (8) feet in height is approved.
- The variance to 19.15.34.12.A.(4) NMAC for the installation of a 40-mil non-reinforced LLDPE secondary liner is approved. The proposed liner system cross-section for the earthen containment is as follows: prepare subgrade, 10 oz. geotextile, 40-mil HDPE secondary liner, 200-mil geonet, 60-mil HDPE primary liner.

The following variances, specific to the AST containments have been approved:

- The variance to 19.15.34.12.A.(2) NMAC for the no side-slope requirement for the AST containments with vertical walls is approved.
- The variance to 19.15.34.12.A.(3) NMAC for the liners to be anchored to the top of the ASTs steel walls and no anchor trenches is approved.
- The variance to 19.15.34.12.A.(4) NMAC for the installation on the AST containment of a 40-mil non-reinforced LLDPE secondary liner is approved.
- The variance to 19.15.34.12.A.(4) NMAC for the installation on the AST containment of a 40-mil non-reinforced LLDPE primary liner is approved. The proposed new liner system cross-section for the ASTs is as follows: prepare subgrade, 10 oz. geotextile, 40-mil LLDPE primary liner, 200-mil geonet, 40-mil LLDPE secondary liner.

The form C-147 and related documents for the 2RF-210 - WATERBRIDGE BOND RECYCLE FACILITY [fVV2431851969] are approved with the following conditions of conditions of approval:

- The purpose of this permit is for oil and gas activities regulated under the NMAC 19.15.34.3 STATUTORY AUTHORITY: 19.15.34 NMAC is adopted pursuant to the Oil and Gas Act, Paragraph (15) of Section 70-2-12(B) NMSA 1978, which authorizes the division to regulate the disposition of water produced or used in connection with the drilling for or producing of oil and gas or both and Paragraph (21) of Section 70-2-12(B)

NMSA 1978 which authorizes the regulation of the disposition of nondomestic wastes from the exploration, development, production or storage of crude oil or natural gas.

- [330129] WaterBridge Stateline LLC shall construct, operate, maintain, close, and reclaim the 2RF-210 - WATERBRIDGE BOND RECYCLE FACILITY [fVV2431851969] in compliance with 19.15.34 NMAC.
- 2RF-210 - WATERBRIDGE BOND RECYCLE FACILITY [fVV2431851969] is approved for five years of operation from the date of permit application. 2RF-210 - WATERBRIDGE BOND RECYCLE FACILITY [fVV2431851969] permit expires on October 21, 2029.
- The 2RF-210 - WATERBRIDGE BOND RECYCLE FACILITY [fVV2431851969] consists of one (1) earthen containment with a capacity of 1,647,628.00 bbl and two (2) AST containments with a capacity of 60,000.00 bbl each. The total operational volume of 2RF-210 - WATERBRIDGE BOND RECYCLE FACILITY [fVV2431851969] is 1,767,628.00-bbl.
- Per NMAC 19.15.34.15.A.(1) operators without existing financial assurance pursuant to NMAC 19.15.8 shall furnish financial assurance acceptable to the division in the amount of the recycling containment's estimated closure cost. The total closure cost estimate for 2RF-210 - WATERBRIDGE BOND RECYCLE FACILITY [fVV2431851969] in the amount of $2,549,709.44, meets the requirements of NMAC 19.15.34.15.A.(1).
- [330129] WaterBridge Stateline LLC cannot receive produced water in the 2RF-210 - WATERBRIDGE BOND RECYCLE FACILITY [fVV2431851969] until after the original copy of the financial assurance has been accepted by NMOCD.
- The financial assurance bond should be mailed to: Oil Conservation Division, Administration and Compliance Bureau. 1220 S. St. Francis Drive
  Santa Fe, NM 87505.
- [330129] WaterBridge Stateline LLC shall notify NMOCD when construction of the 2RF-210 - WATERBRIDGE BOND RECYCLE FACILITY [fVV2431851969] commences.
- [330129] WaterBridge Stateline LLC shall notify NMOCD when recycling operations commence and cease at 2RF-210 - WATERBRIDGE BOND RECYCLE FACILITY [fVV2431851969].
- A minimum of 3-feet freeboard must be maintained 2RF-210 - WATERBRIDGE BOND RECYCLE FACILITY [fVV2431851969] recycling containment, at all times during operations.
- If less than 20% of the total fluid capacity is utilized every six months, beginning from the first withdrawal, operation of the facility is considered ceased and notification of cessation of operations should be sent electronically to OCD Permitting. An extension to extend the cessation of operation, not to exceed six months, may be submitted using a C-147 form through OCD Permitting.
- [330129] WaterBridge Stateline LLC shall submit monthly reports of recycling and reuse of produced water, drilling fluids, and liquid oil field waste on NMOCD form C-148 even if there is zero activity.
- [330129] WaterBridge Stateline LLC shall comply with 19.15.29 NMAC Releases in the event of any release of produced water or other oil field wastes at 2RF-210 - WATERBRIDGE BOND RECYCLE FACILITY [fVV2431851969].

Please reference number 2RF-210 - WATERBRIDGE BOND RECYCLE FACILITY [fVV2431851969] in all future communications.
Regards,

Victoria Venegas ● Environmental Specialist Advanced
EMNRD - Oil Conservation Division
506 W. Texas Ave. Artesia, NM 88210
575.909.0269 | Victoria.Venegas@emnrd.nm.gov

Sante Fe Main Office
Phone: (505) 476-3441

General Information
Phone: (505) 629-6116

Online Phone Directory
https://www.emnrd.nm.gov/ocd/contact-us

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

CONDITIONS

Operator:	OGRID:
WaterBridge Stateline LLC 5555 San Felipe Houston, TX 77056	330129
	Action Number: 394295
	Action Type: [C-147] Water Recycle Long (C-147L)

CONDITIONS

Created By	Condition	Condition Date
vvenegas	[330129] WaterBridge Stateline LLC shall construct, operate, maintain, close, and reclaim the 2RF-210 - WATERBRIDGE BOND RECYCLE FACILITY [fVV2431851969] in compliance with 19.15.34 NMAC. 2RF-210 - WATERBRIDGE BOND RECYCLE FACILITY [fVV2431851969] permit expires on October 21, 2029. • [330129] WaterBridge Stateline LLC shall comply with 19.15.29 NMAC Releases in the event of any release of produced water or other oil field wastes at 2RF-210 - WATERBRIDGE BOND RECYCLE FACILITY [fVV2431851969].	11/14/2024