April 2024

Rule 34 Registration
2RF-212 (Sam Houston) Modification
Nolan Ryan East and West Containments
Tall Texan North and South Containments
Sections 34 & 35, T21S, R27E, Eddy County

Volume 1 RF and In-Ground Containments

- ***Transmittal Letter***
- ***Siting Criteria Demonstration, Plates & Appendices,***

View south southeast to the western dual containment area from northeast corner of adjacent production pad. A small swale in fore ground (with tire tracks) separates the production pad from the West Containments location.

Prepared for:
Vaughan Operating, LLC
Carlsbad, New Mexico

Prepared by:

R.T. Hicks Consultants, Ltd.
901 Rio Grande NW F-142
Albuquerque, New Mexico

Cascade Services LLC
Midland, Texas

R. T. HICKS CONSULTANTS, LTD.

901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Since 1996

April 28, 2025

Ms. Leigh Barr
EMNRD - Oil Conservation Division
1220 S. St. Francis Drive
Santa Fe, NM 87505
Via E-Mail

Ms. Victoria Venegas
NMOCD - District 2
811 S. First St.
Artesia, NM 88210
Via E-Mail

RE: Vaughan Operating, LLC -- Modification to 2RF-212 TWS RF & Containment
Sections 34& 35, T21S, R27E, Eddy County

Dear Ms. Barr and Ms. Venegas:

On behalf of Vaughan Operating LLC, R.T. Hicks Consultants and Cascade Services is pleased to submit this C-147 *modification* package for the referenced project. All documents associated with the November 2024 RF-212 submission contained a typographical error: TWS should have read TSW. This OCD-approved site is now called the TSW Sam Houston site.

Because the Nolan Ryan East and West In-Ground Containments (Volume 2) are needed quickly, Vaughan Operating commenced site preparation. Produced water will flow into the containment after OCD approval of the closure cost estimate and receipt of the bond.

The Sam Houston Containment, prior TWS, (Volume 3) is a fresh water frac pond with design and construction that meets the mandates of a Rule 34 containment. The November 2024 submission (TWS RF-212) contained a mistake relating to the location of this containment. Therefore, this containment has never held produced water – only fresh water.

The Tall Texan Recycling Facility lies between Sam Houston and Nolan Ryan West. The two small in-ground containments obviate the need for ASTs for treatment.

As is typical with our submissions, Volume 1 of the C-147 package contains:

- Transmittal Letter
- Siting Criteria Demonstration with Plates and Appendices

As you examine the maps in this Volume, note:

TSW MOD W =	Nolan Ryan East and West Containments
TSW MOD E =	Sam Houston Containment
Tall Texan RF=	Recycling Facility and North and South Containments

Volume 2 is a registration that contains:

- C-147 Form and Closure Cost Estimate for the Nolan Ryan East and West In-Ground Containments
- Stamped Design Drawings for the East and West Containments
- Recently Approved Plans for Design/Construction, O&M, Closure (Volume 1)

Volume 3 is a registration that contains:

- C-147 Form and Closure Cost Estimate for the Sam Houston (prior TWS) In-Ground Containment
- Stamped Design Drawings for the Sam Houston (prior TWS) Containment
- Recently Approved Plans for Design/Construction, O&M, Closure (Volume 1)

Volume 4 should be uploaded in 1-2 days from this submission as final stamped drawings were delivered this afternoon. This volume will include .

- C-147 Form and Closure Cost Estimate for the Tall Texan In-Ground Containment
- Stamped Design Drawings for the Containments
- Recently Approved Plans for Design/Construction, O&M, Closure

Volume 2-4 refer to the following elements that some OCD reviewers have considered variances for in-ground containments:

1. An equivalency demonstration written by experts for the proposed 40-mil HDPE secondary liner has been previously approved by OCD. We maintain that the language of the Rule is clear, and a variance is not required.
2. OCD has approved the proposed Avian Protection Plan (Bird-X Mega Blaster Pro) for other containments. Thus, the plan meets the requirement of the rule that the "otherwise protective of wildlife, including migratory birds" and a variance is not required.
3. Using the proposed deer fence in lieu of a 4-strand barbed wire fence is not a variance. Because feral pigs, javelina and deer are present in the area, a tall game fence is required to comply with Section 19.15.34.12 D.1 of the Rule. The specification for fencing provided in 19.15.34.12 D.2 contradicts D.1 because pigs will move beneath the lower strand of a 4-foot high barbed wire fence and deer will jump over. Thus, compliance with D.2 results in a violation of D.1. We maintain that compliance with D.1 is the critical component of the Rule and operators need not be required to submit a variance request to follow Best Management Practices and comply with the Rule. Nevertheless, Solaris will attach 4 strands of barbed wire to the game fence if required by OCD.

Vaughan Operating will transmit the registration package to OCD via the OCD online portal. In compliance with 19.15.34.10 of the Rule, Vaughan provided this package to the surface owner. If you have any questions or concerns regarding this permit or the attached C-147, please contact me. As always, we appreciate your work ethic and diligence.

Sincerely,
R.T. Hicks Consultants

Randall T. Hicks PG
Principal
Copy: Vaughan Operating LLC
Cascade Services

SITING CRITERIA DEMONSTRATION TEXT

Distance to Groundwater

Plates 1, 2a, 2b and 2c, the well logs referenced, and the discussion below demonstrates that groundwater (fresh water as defined by NMOCD Rules) at the location is greater than 50 feet beneath the lowest liner of the recycling containment.

Plate 1 is a topographic map that shows:

1. The TSW Nolan Ryan East, Nolan Ryan West and Tal Texan Containment areas within the blue polygons with a label and the TSW Sam Houston project area that was the subject of the November 2025 approved C-147 submission.
2. Water wells from the OSE database as a blue triangle inside colored circles that indicate well depth. OSE wells are often miss-located in the WATERS database as older wells are plotted in the center of the quarter, quarter, quarter, of the Section-Township-Range. OSE wells showing no depth to water and no date are typically permits issued for wells that may or not be in existence at the time of writing this submission. OSE wells showing a date and 0 depth to water are typically borings only.
3. C-985 is an application with no well log and is mis-located. We believe the actual location is USGS-9553 shown on Plate 2a
4. C-589 in the southwest corner of Plate 1 has no log and there is no evidence that this well was drilled.

Appendix-Well Logs & USGS Data has OSE drillers' logs of one well shown on Plate 1:

Plate 2a is a 1:2500 scale topographic and geologic map that shows:

A. The TSW Containments identified by the blue striped triangle with a label with the surface elevation.
B. Water wells measured by the USGS, the date of the measurement and the calculated elevation of the groundwater elevation surface.
C. Water wells measured by professionals and documented in published reports or by staff of Hicks Consultants (Misc-506)
D. Mapped watercourses are shown on the west edge of the Plate.

Plate 2b is a 1:20000 scale topographic map and Plate 2c is the same scale as Plate 2b with a recent air photograph as the base.

Hydrogeology

Quaternary Alluvium (Qa) covers bedrock in the central map area and underlies the proposed TSW (MOD containments. In the Statewide geologic map shown in Platte 2a, the Permian Salado Formation (Psl) crops out on the northern portion of the Plate and on the eastern margin. Quaternary Piedmont deposits shown on the eastern margin of Plate 2a and the Rustler Formation peeks out of the southeast corner of the Plate.

Plate 2a does not agree with the 7.5-minute geologic map for Carlsbad East[1] that is a DRAFT map, and the hand-written labels of geologic units are difficult to decipher. As best we can see,

[1] https://geoinfo.nmt.edu/publications/maps/geologic/ofgm/downloads/60/OFGM-60_CarlsbadEast.pdf

The 7.5 minute map shows all the middle area of Plate 2a is mapped as Quaternary (Pleistocene) alluvial gravel of the mainstem of the Pecos River. About 2.5 miles north of the TSW MOD E containment, the 7.5 minute quadrangle maps Rustler Formation outcrop. This large scale map does not identify Rustler where the State map shows it in the southeast corner of Plate 2a. The 7.5 minute quadrangle states that the Ruster Formation Culebra Member is the outcrop observed in the area.

The logs from the borings and water wells provide a clearer image than is shown on Plate 2a or the 7.5 minute quadrangle. The data in the logs of OSE wells and MISC wells/borings support the statement that the Culebra Dolomite facies of the Rustler is present in the area. Presented from north to south are summaries of the lithology in the logs.

- C-4841 (MISC-550) records the following in the driller's log
  - 0-26 feet is rock (caliche) underlain by red sand with clay, which is probably alluvium derived from weathering of the Rustler
  - 26-65 feet is gray/yellow broken limestone, which is probably regolith, underlain by gray limestone with a void or fracture causing lost circulation while drilling. This horizon may also be gypsum beds that were misidentified by the driller.
  - 65-103 is "soft" and we can only guess that it is fractured water-bearing dolomite or anhydrite of the Rustler
  - 103-180 is probably well-cemented dolomite or gypsum of the Rustler that is not subject to dissolution and "softening".
- SB-2 (MISC-551)
  - 0-5 Carbonate indurated silty sand with gravel is caliche or similar alluvial sediments.
  - 5-20 feet is the same red sand as above that is regolith/weathering of the underlying red shale
  - 20-75 feet is red-brown shale. We trust the professional engineer who logged the boring more than we typically trust logs generated by drillers. This shale is like the Los Medaños Member of the Rustler that underlies the Culebra Dolomite Member
  - No groundwater is observed in this boring.
- SB-1 (MISC-552) is adjacent to a drainage and displays a significantly different lithology from SB-2
  - 0-15 Carbonate indurated brown/white silty sand that is caliche
  - 15-35 Sandy silt, red brown and dry. This is probably Pleistocene overbank deposits from this drainage
  - 35-70 is poorly graded light brown sand with silt. Typical of alluvium that may be derived from the ancestral Pecos River. Groundwater is observed at 66 feet in this alluvium.
- SB-3 (MISC-553)
  - 0-5 feet is the white caliche/alluvium described above
  - 5-25 is light red-brown and red-brown silty sand (perhaps with some gravel.) This is typical Quaternary alluvium that may be part of the ancestral Pecos River sediments described in the 7.5 minute geologic map.

  - 25-35 feet describes gypsum crystals in the clayey sand described in the log mean Rustler Formation in this boring. The clay-rich strata is typical of the Los Medaños.
  - 35-75 the shale and underlying clayey sand is, like clayey sand described above, probably the Los Medaños Member of the Rustler.
  - No groundwater is observed in this boring.
- C-2127 is a good driller's log from a reliable driller. This 1985 log shows
  - 0-29 feet is soil and alluvium
  - 29-80 is red sandy clay that is like the Los Medaños Member of the Rustler.
  - 80-119 feet is described as water-bearing broken lime that could may be Culebra Dolomite
  - 119-160 is red clay that may be Los Medaños.
  - According to the log, groundwater is encountered at about 80 feet and static groundwater in the completed well is 30-feet below surface, a 50-foot rise due to confining pressure beneath the 51-feet of red sandy-clay.

The described litho-stratigraphic horizons illustrates carbonate deposition prior to the formation of the overlying thick and massive Culebra Dolomite. The interbedding of clay and silt clastic sediments with dolomite horizons may reflect facies changes throughout the depositional history where some strata is typical of the Los Medaños, and dolomite is typical of the Culebra facies. The carbonate strata yield groundwater to wells and the clay/shale is an aquiclude. Alluvial sediments of the ancestral mainstream of the Pecos River comprise cover Permian bedrock throughout the middle area of Plate 2a.

From these data we conclude:

1. The project area is underlain by Los Medaños facies red shale and clay to a depth of at more than 70 feet. The shale/clay is unsaturated.
2. The Culebra Dolomite facies (or anhydrite in the Los Medaños) exists north of the project area as it is penetrated by C-4841 that describes saturated "lime" and "soft". If the driller's log is correct.

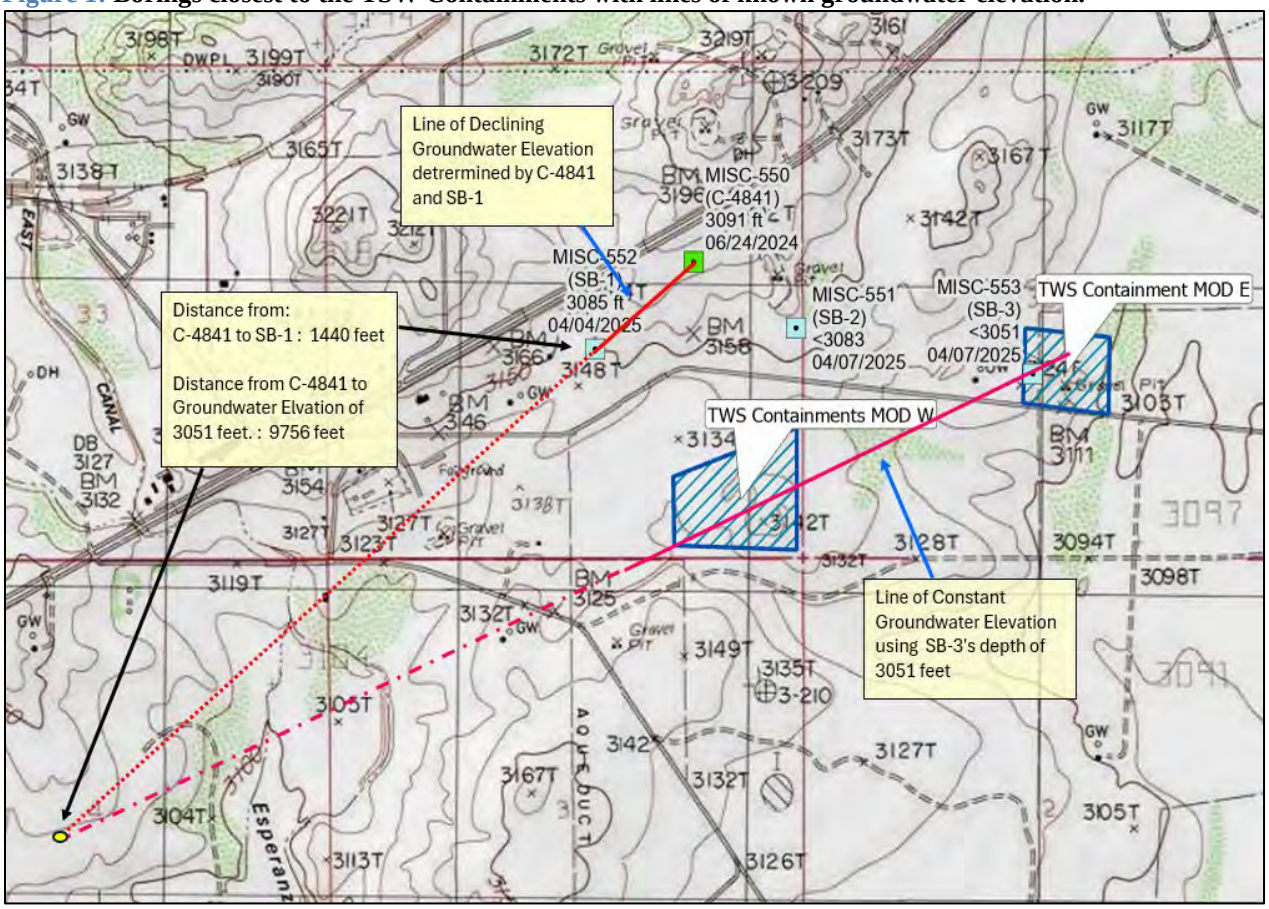
Groundwater Data

The USGS database presents data from wells that draw water from alluvium. Because groundwater near the site (in C-4841) resided in Permian dolomite, the USGS historic water level must be evaluated with care. Because borings are present close to the project area, we have elected to use these data to determine depth of groundwater.

Figure 1 shows SB-1, C-4841, SB-2, and SB-3 with the site locations on a topo map. These are the closest borings to the site and all of them were drilled within the last 9 months. Of the four borings, C-4841 and SB-1 encountered groundwater and the water table occurred at the respective elevations of 3091 feet and 3085 feet. The two wells are 1440 feet apart. We assumed a linear decline in groundwater elevation (-6 feet/1440 feet to the southwest) along the line connecting the two wells. Because both borings show no evidence of pressurized groundwater, a linear decline assumption is fully appropriate.

SB-3 was drilled within the eastern TSW Containment location in early April 2025. The total depth of the boring is an elevation of 3051 feet. Groundwater was not encountered. If groundwater is present beneath this location, it is at a lower elevation than 3051 feet.

Figure 1: Borings closest to the TSW Containments with lines of known groundwater elevation.



The line connecting C-4841 and SB-3 shows a 6-foot decline in groundwater elevation to the southwest. From C-4841 groundwater elevation declines by more than 8 feet to SB-2 and more than 40 feet to SB-3. Because C-4841 and SB-1 have known groundwater elevations, we used simple geometry to calculate the distance from C-4841 that groundwater elevation of 3051 feet lies along the dotted line discussed above - a distance is 9756 feet. The extension of the C-4841/SB-1 line to this distance from C-4841 is shown with red dots. From this point, we constructed a line directly to SB-3 (dashed, red line and solid, red line between the TSW containments). This line has a constant elevation no higher than 3051 feet – because groundwater elevation at SB-2 is below the total depth of the boring.

The 3051 maximum equipotential line passes beneath the southeastern quadrant of the western TSW Containment. Thus, data from the borings and C-4841, our assumption of a water table groundwater zone, and geometry demonstrate that:

- At the eastern TSW site, groundwater is at greater depth than (3124'-3051'=) 74 feet.
- At the western TSW site, groundwater is at greater depth than (3151'-3051'=) 100 feet.

Distance to Municipal Boundaries and Fresh Water Fields

Plate 3 demonstrates that the TSW Containments is not within incorporated municipal boundaries or within defined municipal fresh water well fields covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended.

- The closest municipality is Carlsbad, NM approximately 1000 feet north of the TSW East Containment and 2000 feet north of the West Containment.
- The closest public wells are associated with the Happy Valley public water system, about 7 miles west and. About 4 miles northeast, a system call Ellipse Global, which may be a solar farm.

Distance to Subsurface Mines

Plate 4 and our general reconnaissance of the TSW Containments demonstrate that the nearest mines are caliche pits. This location is not within an area overlying a subsurface mine.

- The closest caliche/gravel pit is about 1 mile north
- There are no subsurface mines in the area shown in Plate 4.

Distance to High or Critical Karst Areas

Plate 5 uses the 2024 BLM karst potential map to comply with the original C-147 that was submitted and approved by OCD prior to publication of the 2025 map. Plate 5 shows the TSW MOD W and MOD E lie within an area mapped as high karst.

- The proposed containment is located within a “medium” potential karst area.
- The nearest high potential karst area is approximately 2000 feet north.
- We observed no evidence of solution voids or unstable ground near the site during the field inspection.
- An aerial karst inventory conducted in the footprint of the TSW W containments found no evidence of surface karst (See *Appendix Karst Report*)
- TSW MOD W is a conversion of an existing fresh water frac pond to a Rule 34 Containment. Because the pond exists, we could not conduct an aerial survey beneath the proposed containment (the pond). Instead, an NM registered Professional Engineer supervised and logged a boring adjacent to the fresh water frac pond. The log demonstrates that 25 feet of carbonate indurated alluvium exists beneath the existing pond proposed for conversion to a containment. Beneath the alluvium is at least 50 feet of Permian (250 MYA) non-soluble shale and clayey sand (solid rock).

Hicks Consultants concludes that the indurated alluvium and 50+ feet of bedrock beneath the TSW MOD W is not vulnerable to karst development.

Distance to 100-Year Floodplain

Plate 6 demonstrates that the TSW MOD W and TSW MOD E Containment is within Zone D as designated by the Federal Emergency Management Agency with respect to the Flood Insurance Rate 100-Year Floodplain.

- The closest mapped flood risk is close to the TSW MOD E containment but does not lie within the mapped risk area.

Distance to Surface Water

Plate 7 shows that the containment is not within 300 feet of a surface water body or a significant watercourse.

- The nearest mapped watercourses is about 4000 feet west.
- No next order tributaries exist near the project area
- A lake/pond is mapped 2900 feet south.

Distance to Permanent Residence or Structures

Plate 8 and the site visit demonstrates that the location is not within 1000 feet of an occupied permanent residence, school, hospital, institution, church, or other structure in existence at the time of initial application.

- The nearest structures are oil and gas production pads.
- No residences or other structures are in the area of Plate 8.

Distance to Non-Public Water Supply

Plates 1 and 7 demonstrates that the TSW Containments (MOD E and MOD W are not within 500 horizontal feet of a spring or fresh water well used for domestic or stock watering purposes, in existence at the time of initial application.

- Plate 1 shows the locations of all active water wells.
- There well for human consumption is located 2000 feet north of TSW MOD W.
- No springs were identified within the mapping area (see Plate 8)

Distance to Wetlands

Plate 9 demonstrates the TSW location will not be within 500 feet of any mapped wetlands identified in the USA database.

- The nearest mapped wetland is a lake/pond located 1400 feet southwest. .

Errant mapping is typical of the USA Wetlands database in New Mexico. The US Fish and Wildlife Service who conducts the wetlands inventory employs areal imagery: ground surveys are not routine. In the FAQ section of the inventory is this:

> **Why is there a difference between mapped wetlands and ground conditions**?
> It is likely the base imagery date is different than the date of the imagery used for photointerpretation, and interim changes in the landscape since the wetland was mapped may result in mismatch when comparing newer imagery with ground conditions. The wetlands mapper defaults to ESRI base imagery. More information can be found on ESRI's imagery metadata webpage.
>
> Imagery can also be viewed in the ESRI map viewer to determine image dates for specific areas of interest.
>
> In addition, not all wetlands are wet throughout the year. Some wetlands may appear dry during certain times of the year while still supporting hydric soils and wetland plants characteristic of wetland areas.

Many wetlands in New Mexico mapped by the USFW Service database do not meet the NM OCD definition of a wetland. The Hicks Consultants team has more than 100 years of combined field experience in Eddy, Lea, and Chaves Counties and have rarely seen a mapped wetland with vegetation adapted for saturated soil conditions.

> "Wetlands" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions in New Mexico. This definition does not include constructed wetlands used for wastewater treatment purposes.

SITING CRITERIA DEMONSTRATION PLATES

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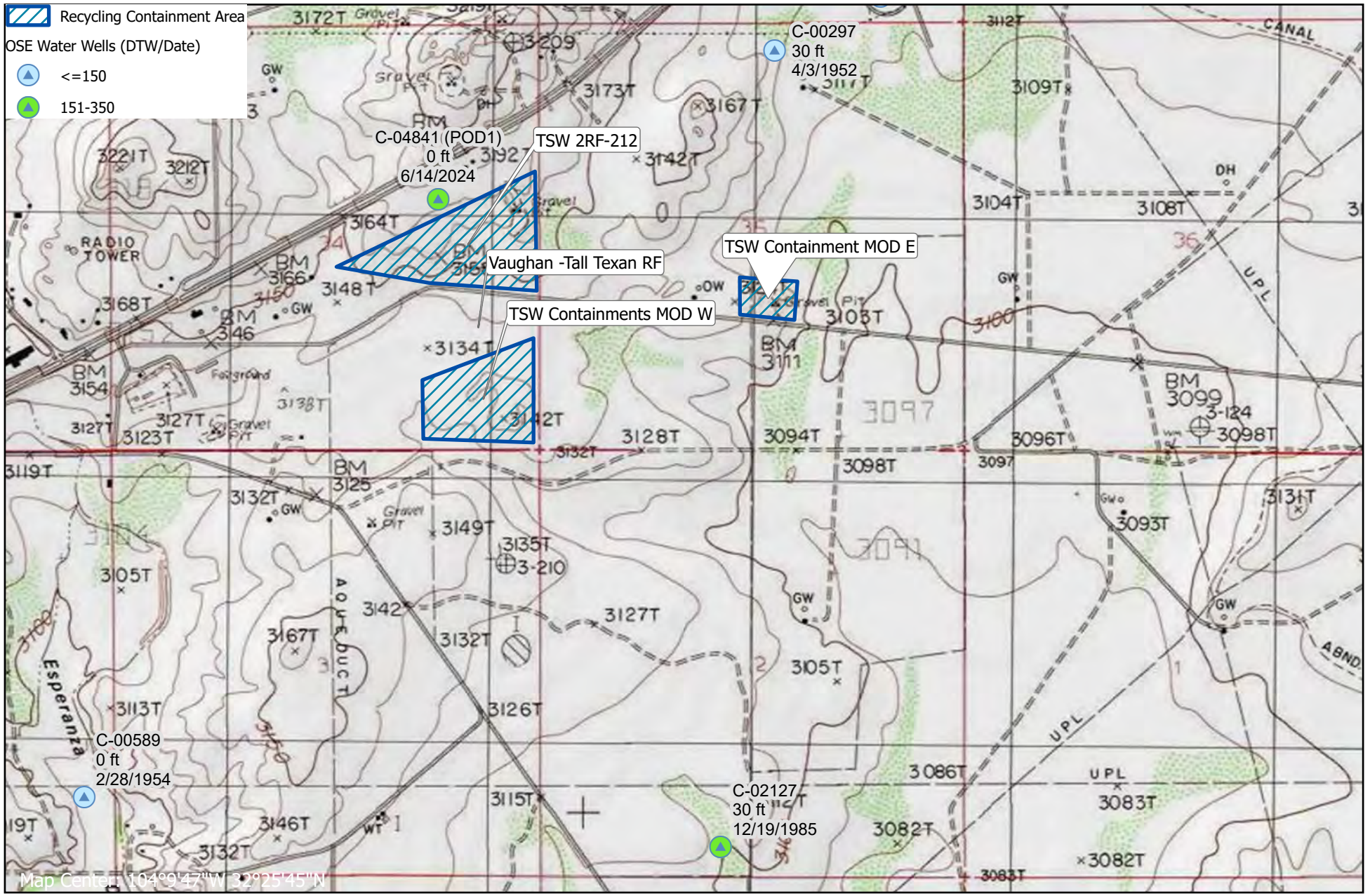

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R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby Wells and Borings with Depth to Water	Plate 1
	Vaughan Operating - TSW Containments Modification	April 2025

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Recycling Containment Area

USGS Gauging Station (GW Elev, Date)

Alluvium/Bolsom

OSE Water Wells (DTW/Date)

<=150

151-350

351-500

501-1000

<1000

Other

Misc. Water Wells (GW Elev, Date)

No Data

<= 150

151 - 350

351 - 500

> 500

NM_Geology

Psl,Paleozoic-Salado Formation; evaporite sequence; Upper Permian

Qa, Quaternary Alluvium,Qa, Quaternary Alluvium

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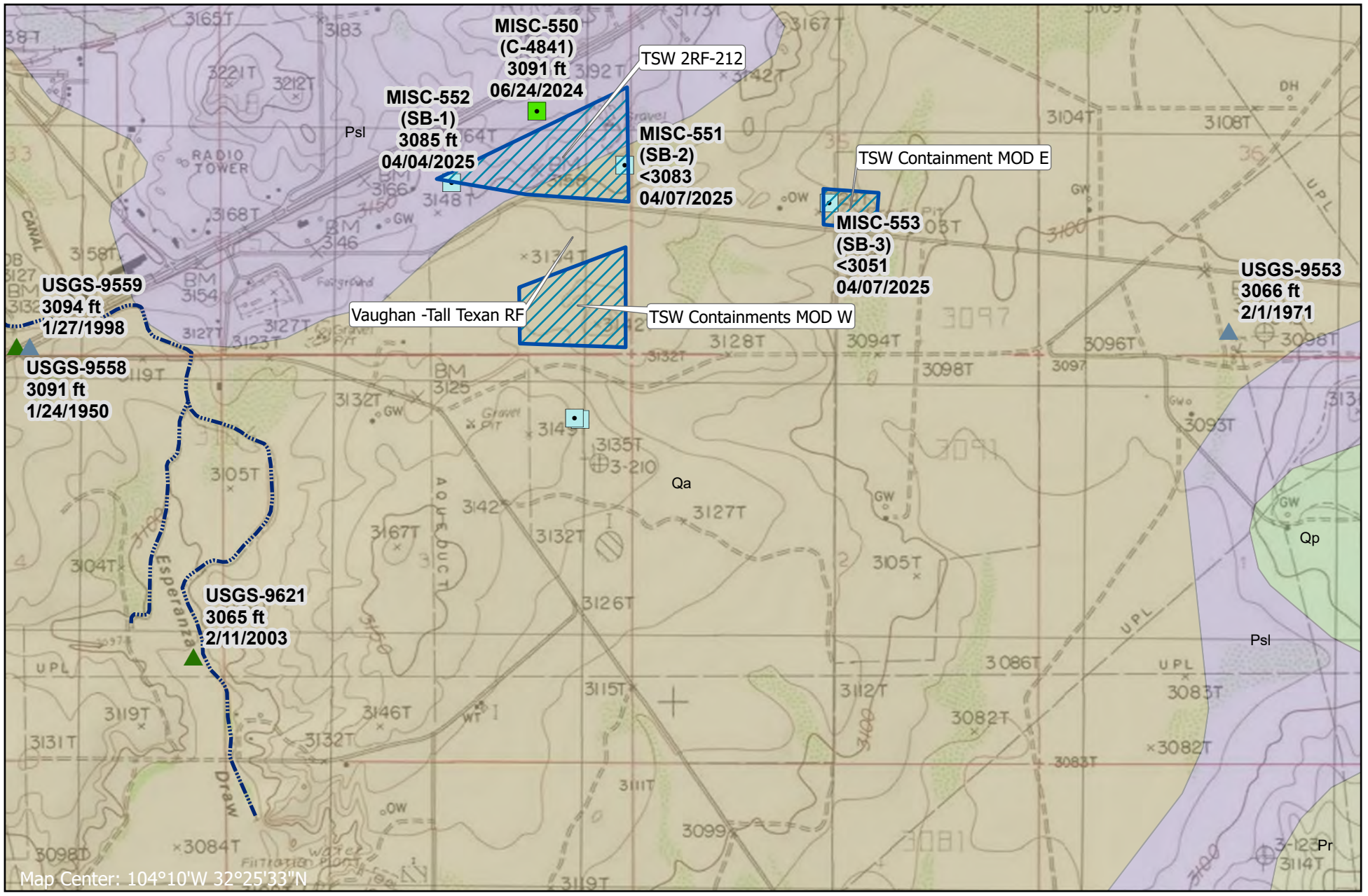

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Groundwater Elevation and Geology

Plate 2

Vaughan Operating - TSW Containments Modification

April 2025

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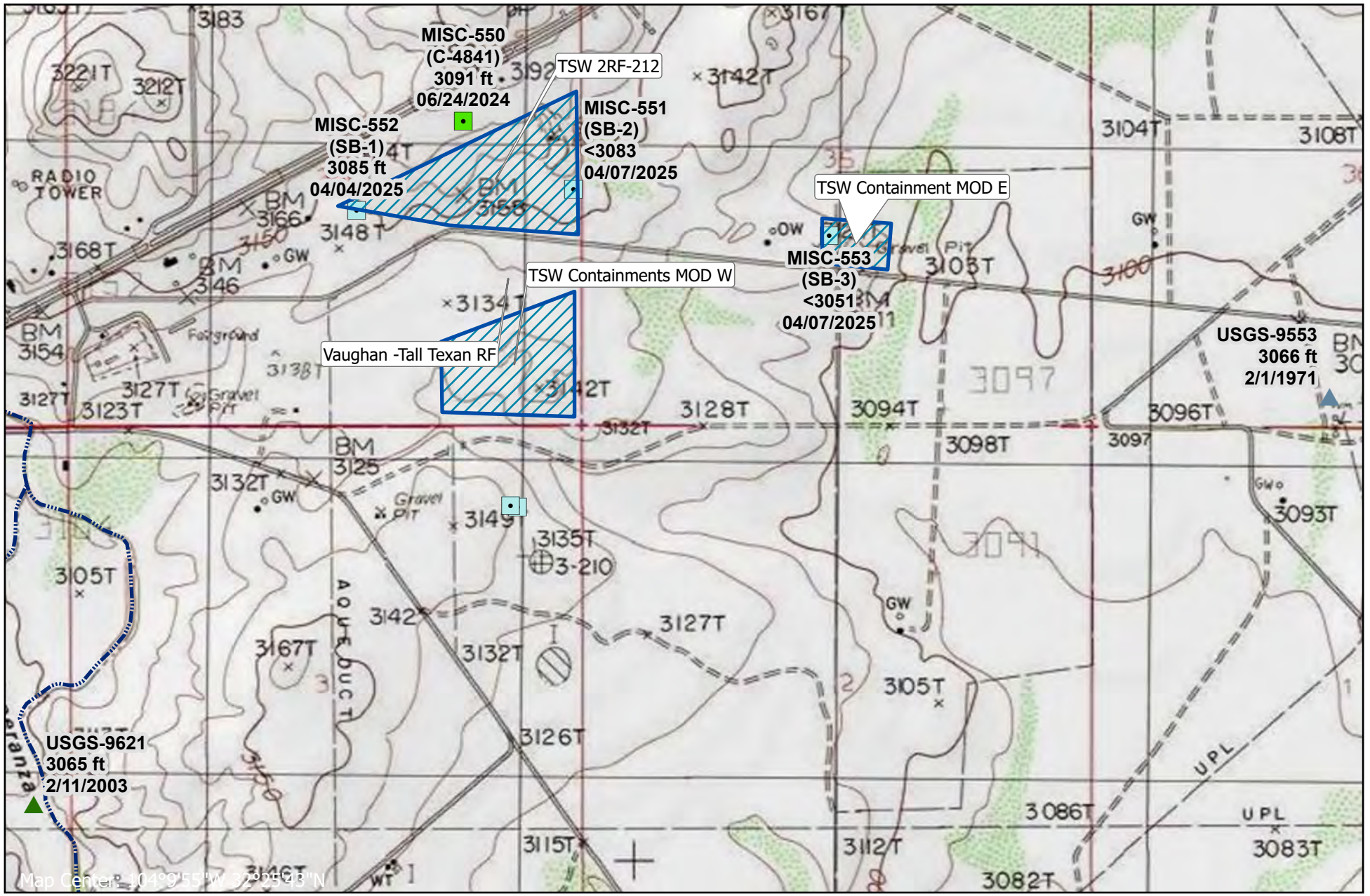

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Groundwater Elevation and Geology

Plate 2

Vaughan Operating - TSW Containments Modification

April 2025

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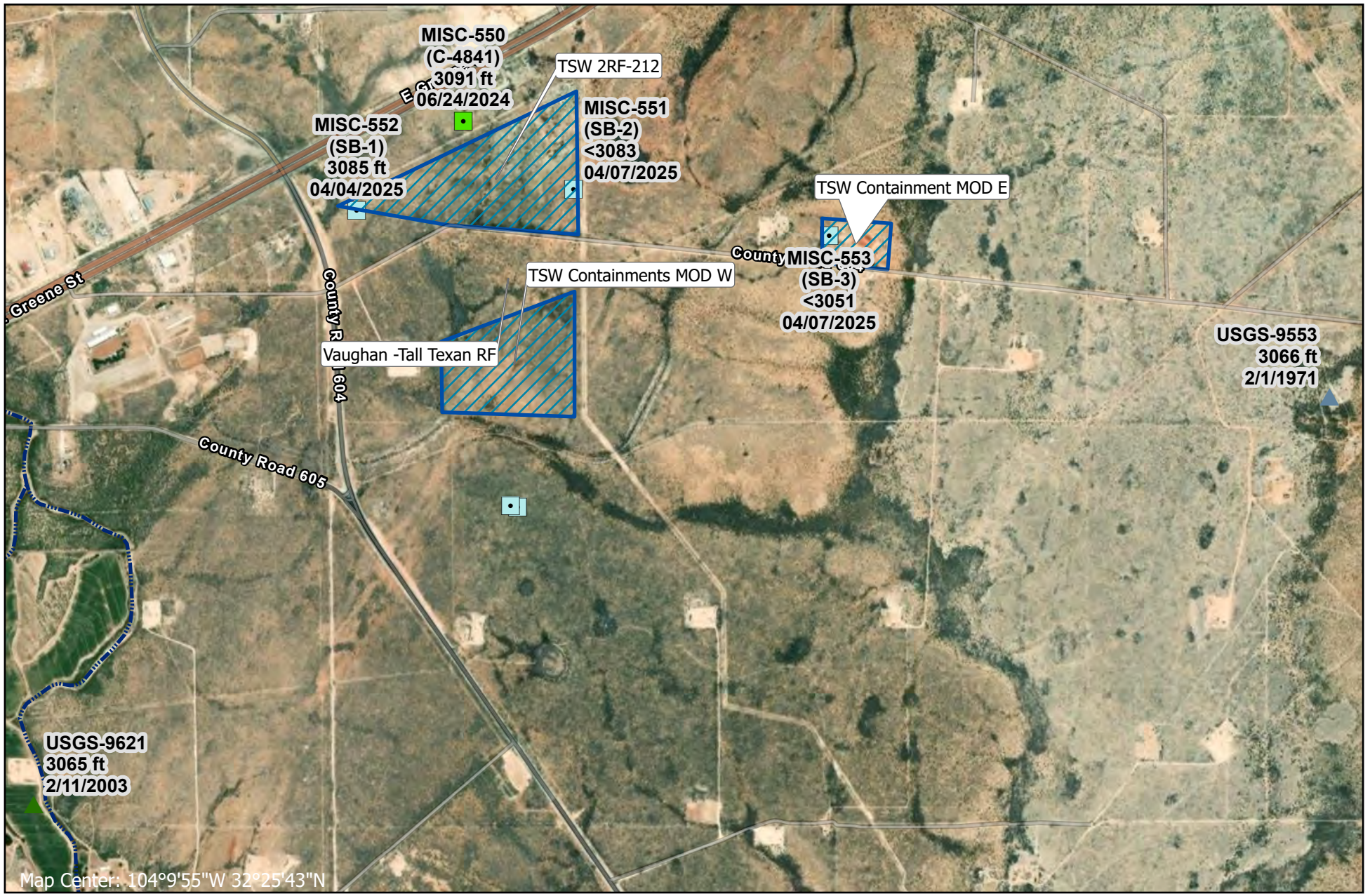

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Groundwater Elevation and Geology	Plate 2
Vaughan Operating - TSW Containments Modification	April 2025

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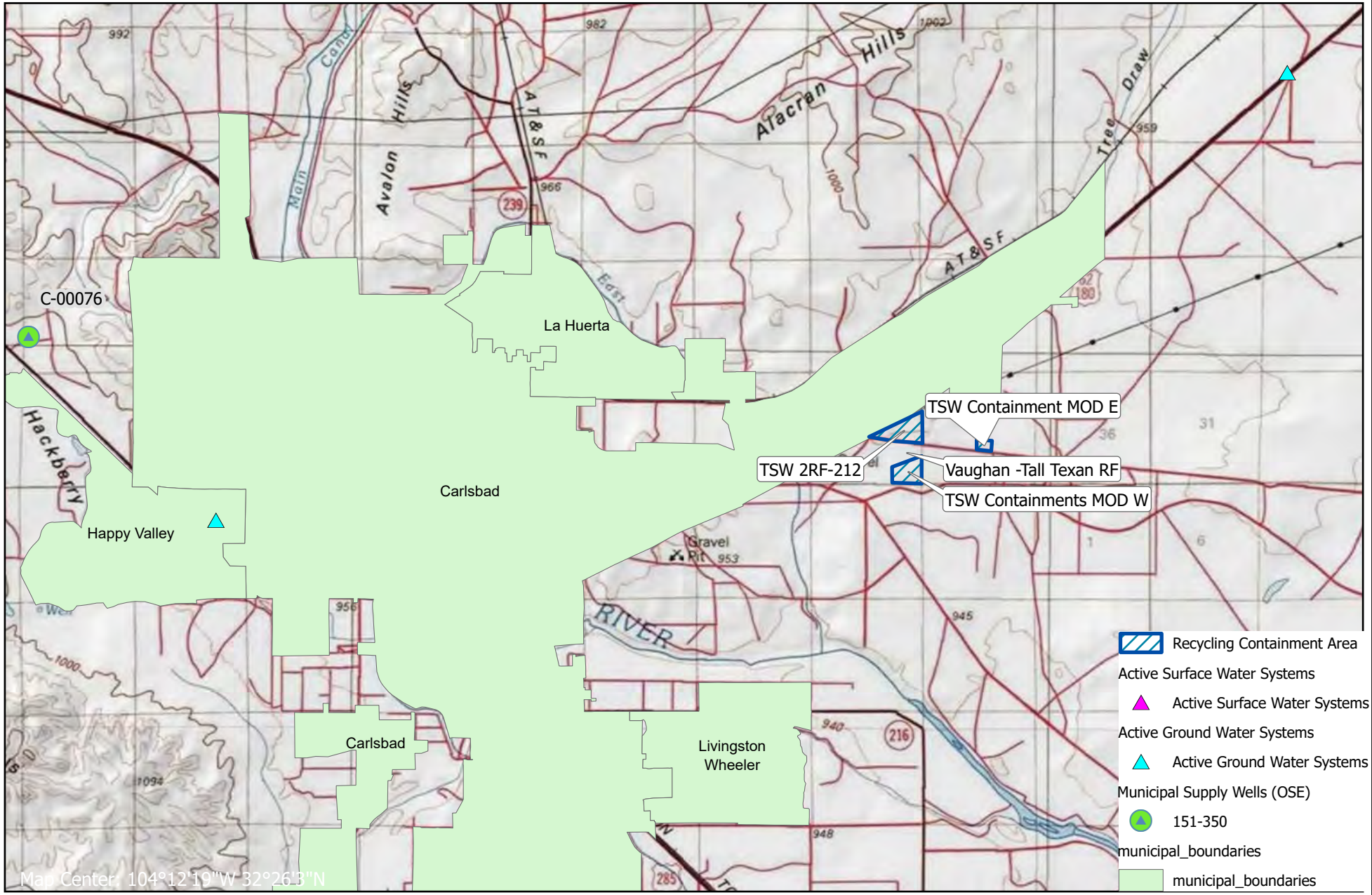

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R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearest Municipalities & Public Water Supplies	Plate 3
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Nearby Mines - Caliche Pits

Plate 4

Vaughan Operating - TSW Containments Modification

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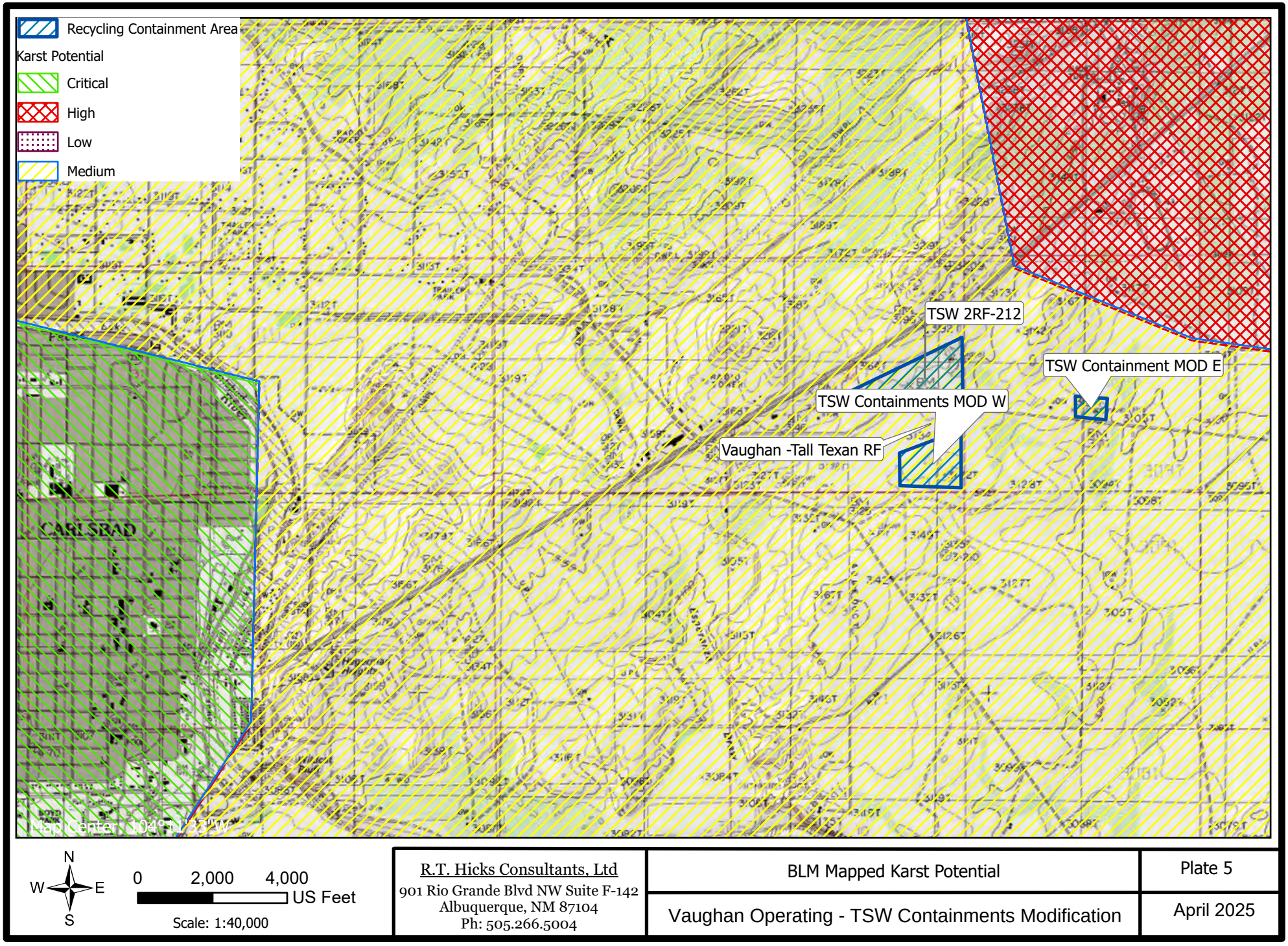

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R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	BLM Mapped Karst Potential	Plate 5
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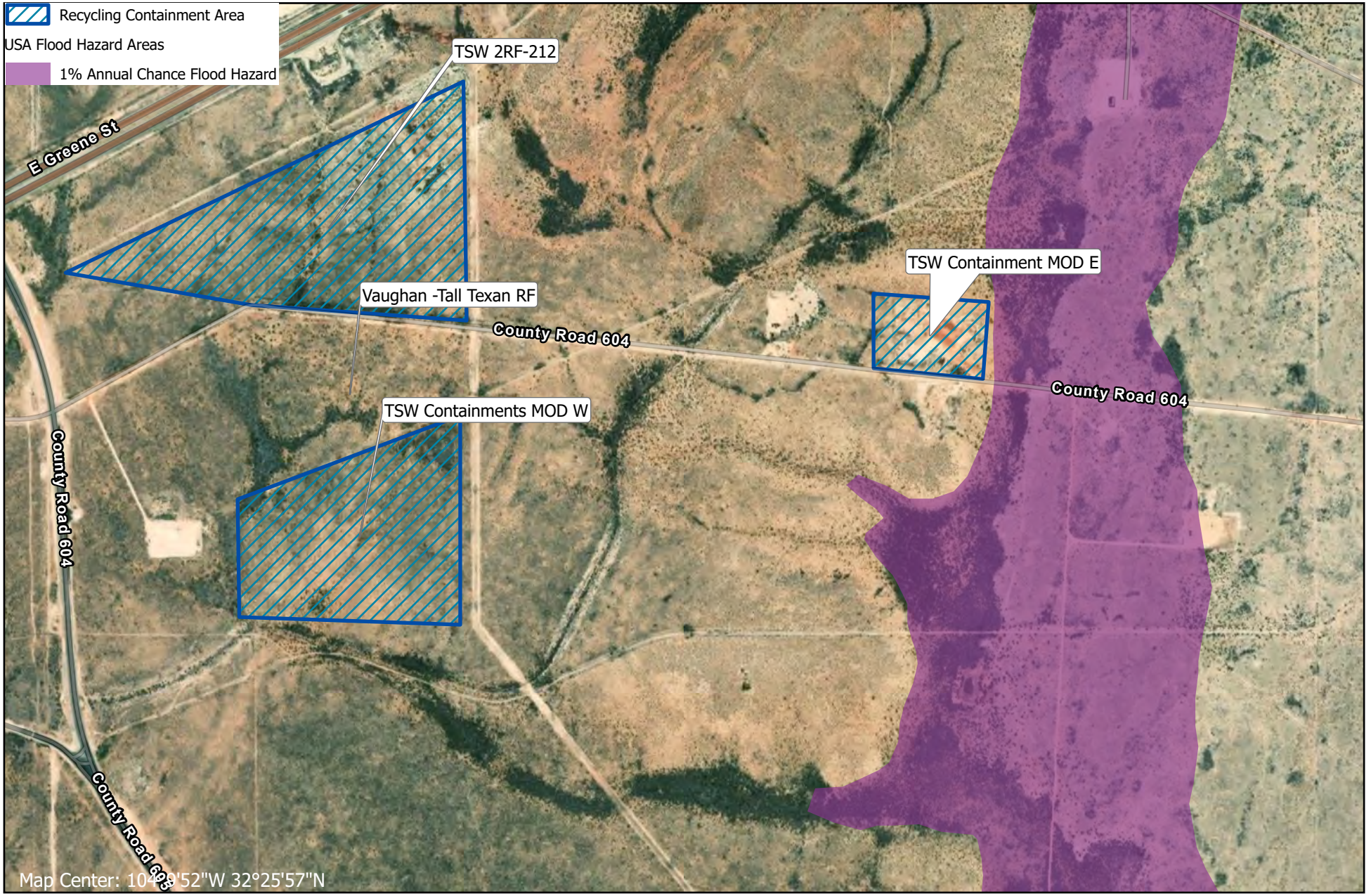

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FEMA Mapped Flood Zones

Plate 6

Vaughan Operating - TSW Containments Modification

April 2025

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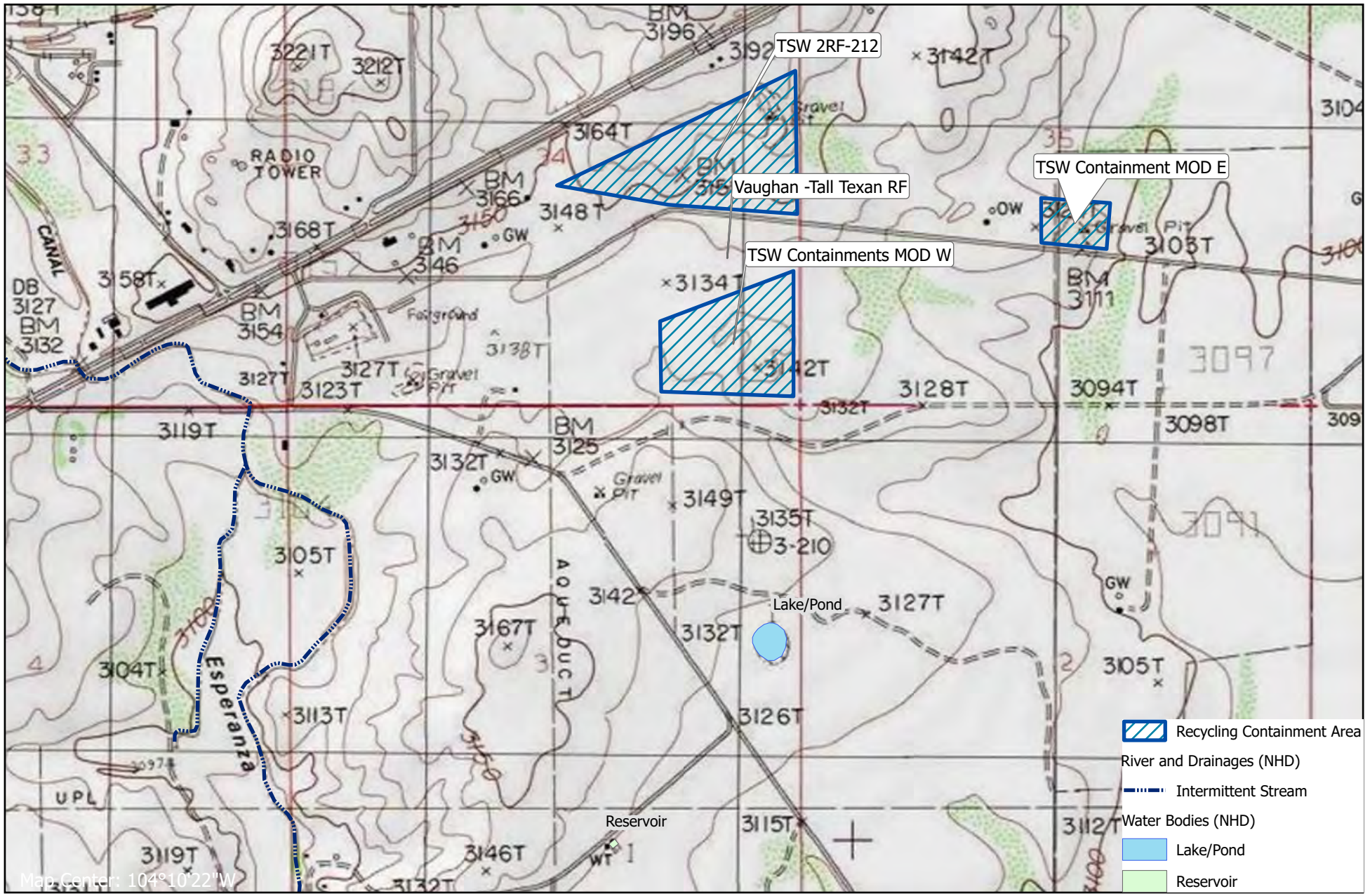

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R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Mapped Surface Water	Plate 7
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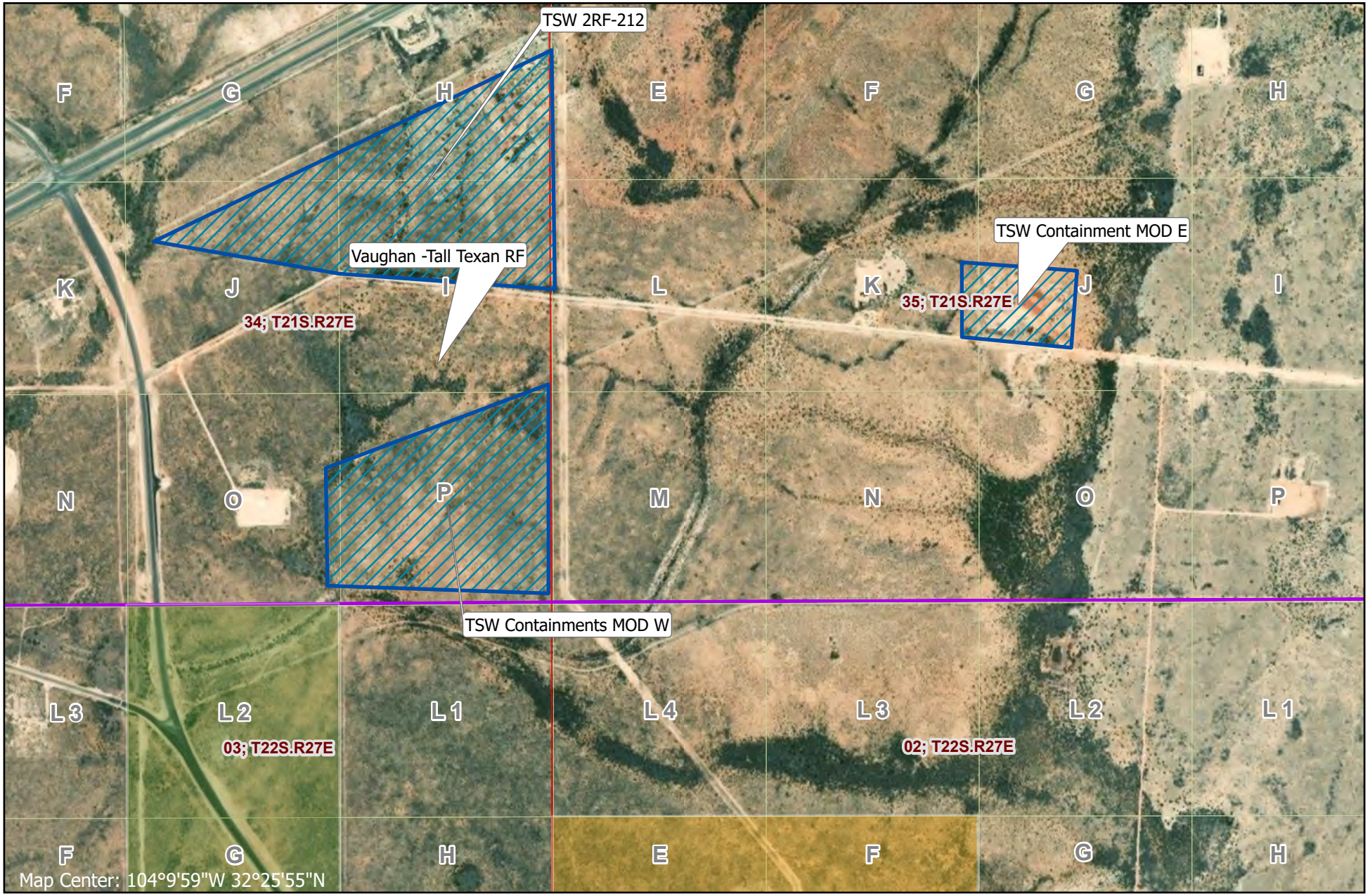

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901 Rio Grande Blvd NW Suite F-142
Albuquerque, NM 87104
Ph: 505.266.5004

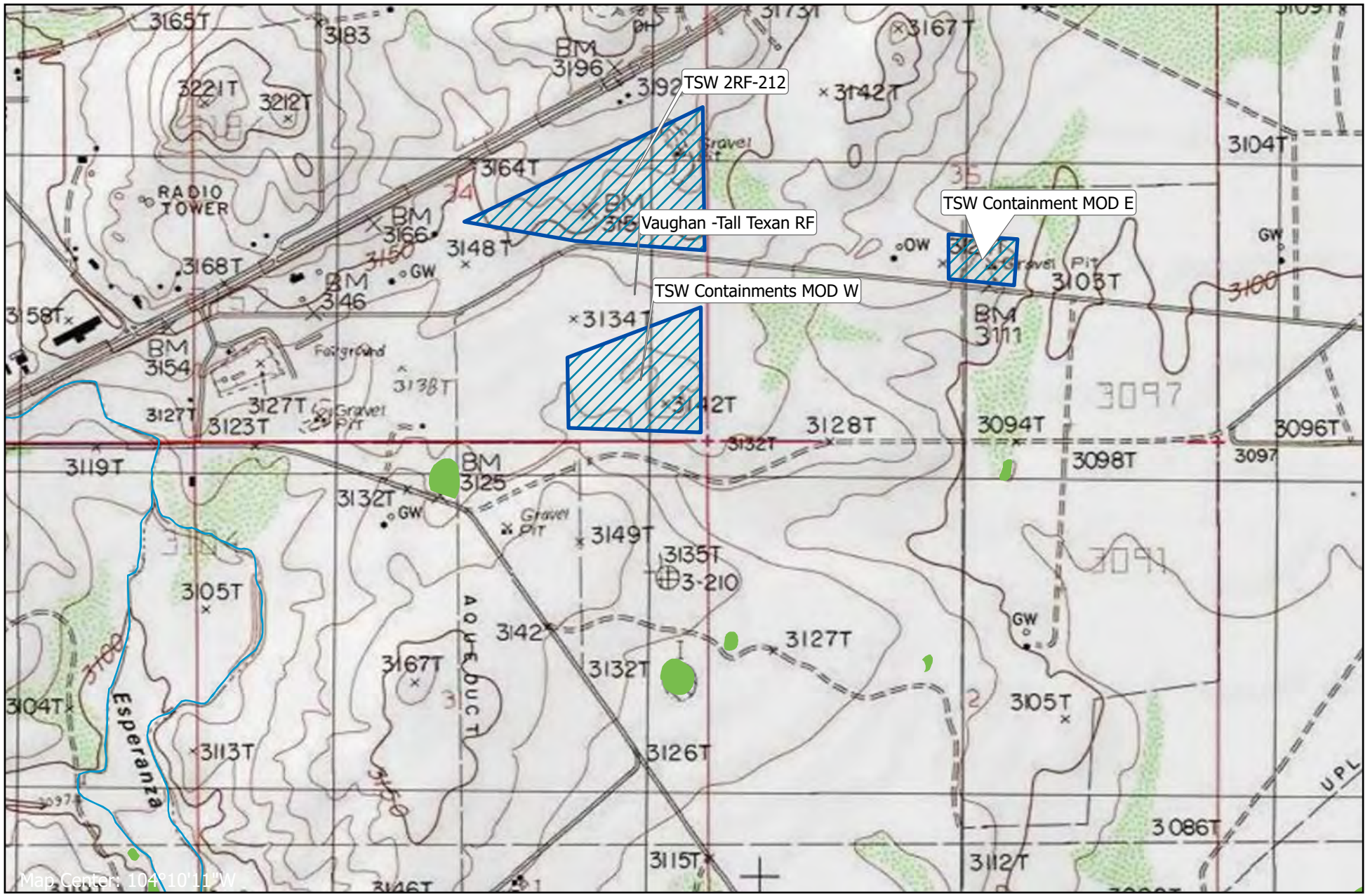
Nearest Structures

Plate 8

Vaughan Operating - TSW Containments Modification

April 2025

P:\Cascade-Vaughn-TWS2\ProjectTemplate\Vaughan-TWS_Containments-MOD.aprx



N
W E
S

0 1,000 2,000 US Feet

Scale: 1:20,000

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Mapped Wetlands	Plate 9
	Vaughan Operating - TSW Containments Modification	April 2025

APPENDIX DIGITAL VISUAL CAVE KARST SURVEY

Digital Visual Cave and Karst Survey Report

Project: TWS Recycling Facility & Containments Project
Section 34, T21S, R27E, Part of the SE Quarter
Eddy County, NM
Digital Visual Cave and Karst Survey

To: Bobbi Jo Crain
Cascade Services
3403-B E. County Road 44
Midland, TX 79705

Phone: (210) 632-8670 Mobile

Email: bobbijo@cascadeservicesllc.com

Prepared by: Richard A. Bridges
subTerra Consulting

Date: April 17, 2025

Digital Visual Cave and Karst Survey Method:

The study area for this digital visual Cave and Karst Survey (CKS) is an approximate 32 acre part of the SE Quarter of Section 34, T21S, R27E, Eddy County, NM and is the proposed site of the TWS Recycling Facility & Containments to be located in Eddy County, New Mexico, see Figure 1.

This area is referred to as the TWS Recycling Facility & Containments Project and it's final boundary was furnished to us in a digital file, TWS2_Project Boundary.kmz, by Juan Dominguez, Project Manager of Square Root Services, Hobbs NM on April 15, 2025. There were larger earlier versions of this Project area that were reviewed, see Figure 4, but this report is written on the last and smallest version of the Project area, see Figures 1 & 2.

The client, Cascade Services of Midland, TX wanted the Project area, see Figures 1 & 2, visually surveyed, using ArcGIS imagery provided by Square Root Services of Hobbs, NM, for surface expressions of cave and karst features (sinkholes, swallets and cave entrances).

Square Root Services of Hobbs, NM provided an Internet link to an ArcGIS site that contained high resolution Orthomosaic, Contours (1 & 5 Ft intervals), Hillshading, Study Limit and Karst Survey image layers. This link contain a Measurement function to allow

both linear and areal measurements of objects in the images. The quality of the Orthomosaic imagery was adequate to visually identify small rocks down to about 2' or less in diameter, in our opinion, more than sufficient to see any surface karst features, see Figures 4 & 5.

The Project area was approximately 32 acres in size and within the BLM Medium Karst Boundary, see Figure 3. The Project area is located approximately 0.5 miles SE of the intersection of the George Shoup Relief Route (New Mexico State Route 200) and Hwy 62/180 East of Carlsbad, NM., see Figures 2 & 3.

Starting April 1, 2025, at the request of Bobbie Jo Crain of Cascade Services, subTerra conducted an in-office visual examination of this ArcGIS imagery using a Lenovo Legion 9i Gen 8 laptop, with a GeForce RTX 4090 graphics card and 53" 4K video monitor to perform the visual surface karst survey.

Using the Karst Survey layer of the ArcGIS imagery provided, subTerra Consulting created karst survey corridors nominally 50 foot wide across the Project area. These were used to carefully and thoroughly examine the surface of the Project area for surface karst features. The nominal 50 wide corridors were chosen because they allowed the Orthomosaic imagery to be viewed at it's highest resolution on the 53" 4K monitor. The Contours and Hillshading layers were used where appropriate to enhance the accuracy of the visual examination.

The 1 and 5 ft Contours layer is shown in purple on Figure 6. These contours provided great detail (down to 1 ft) while conducting the CKS to determine the slope and depth of various features.

The HillShade layer shown on Figure 7 gave a visual representation of the various levels of the terrain in the Project area.

While these layers were helpful, the Project area contains very low relief with overall vertical extent of about 12 feet over the entire final Project area.

On April 7th, after the office based visual examination of the Project area and under the direct live video supervision of subTerra Consulting, Bobbi Jo Crain of Cascade Services went to the Project area and provided a real time live video feed and measurement of particular sites within the Project area. This was to physically verify and validate the observations of the office based visual examination of the data.

Using the methods described above, this in-office digital visual CKS thoroughly examined the proposed Project area, looking for surface expressions of cave and karst features (sinkholes, swallets and cave entrances). This survey was conducted solely on the ArcGIS digital data files referenced above and conducted in-office. The accuracy of this in-office CKS was field check with a live video feed as stated above. This CKS has in NO way analyzed anything in the sub-surface.

subTerra Consulting
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Monroe, UT 84754

caver1_2001@yahoo.com
(575) 361-1272 C

The suitability of the imagery for these purposes should be determined by the client and the regulatory agencies, we have only analyzed the imagery that we have been provided.

FINDINGS:

After extensive searching and careful observation, **NO Karst Features** (i.e. sinkholes, swallets or cave entrances) were found within the Project area.

Conclusions and Recommendations:

The following recommendations are needed for this CKS area:

Karst features exist in the general area of this CKS, as the BLM High Karst Area is approximately 0.75 miles NE from the Project area, see Figure 3. Since karst features are within the vicinity of this project, caution and due diligence should be exercised when working in the area.

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Figure 1 - Project Area (RED Line) Close Up

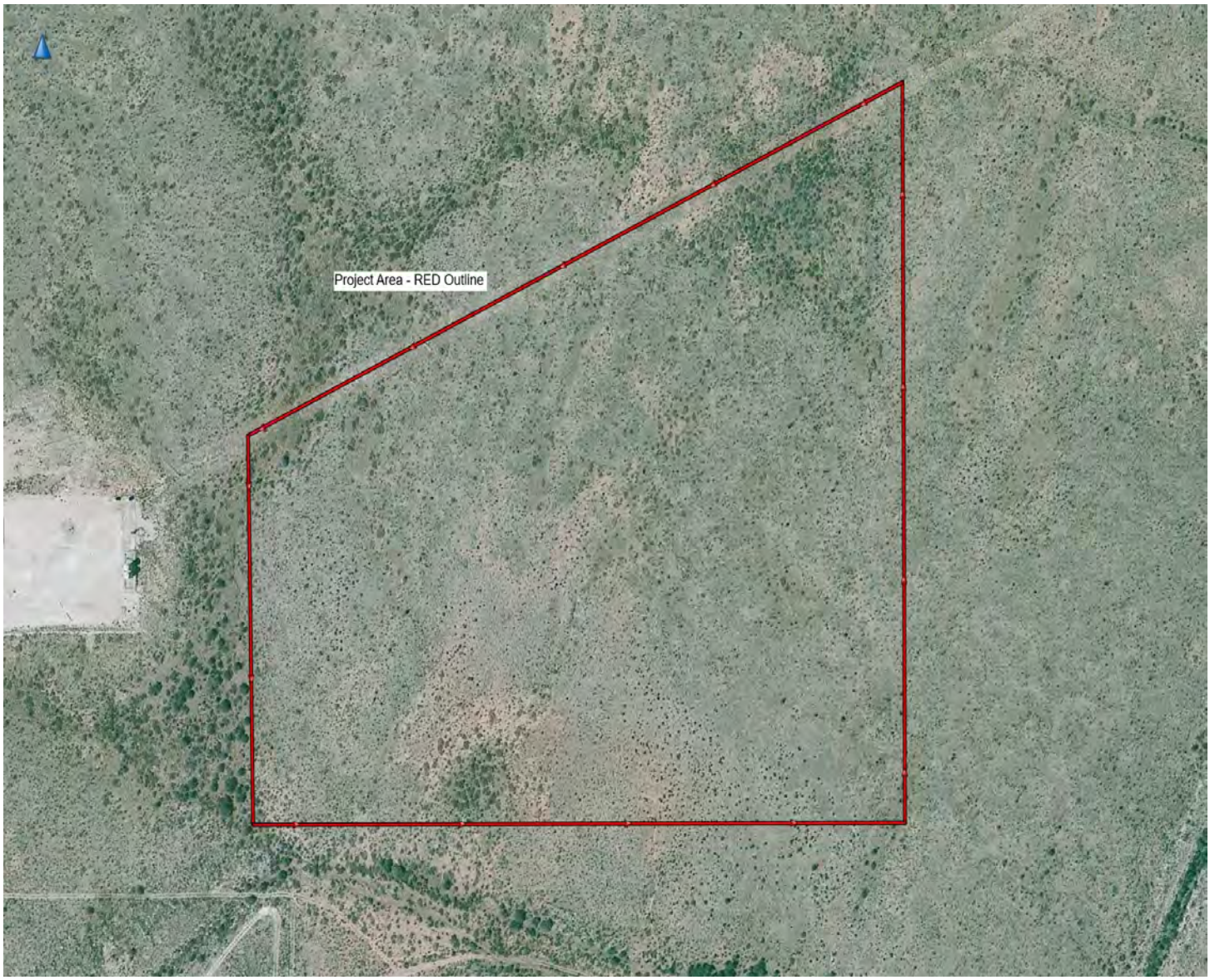

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Figure 2 - Project Area (RED Line) Wide Area View

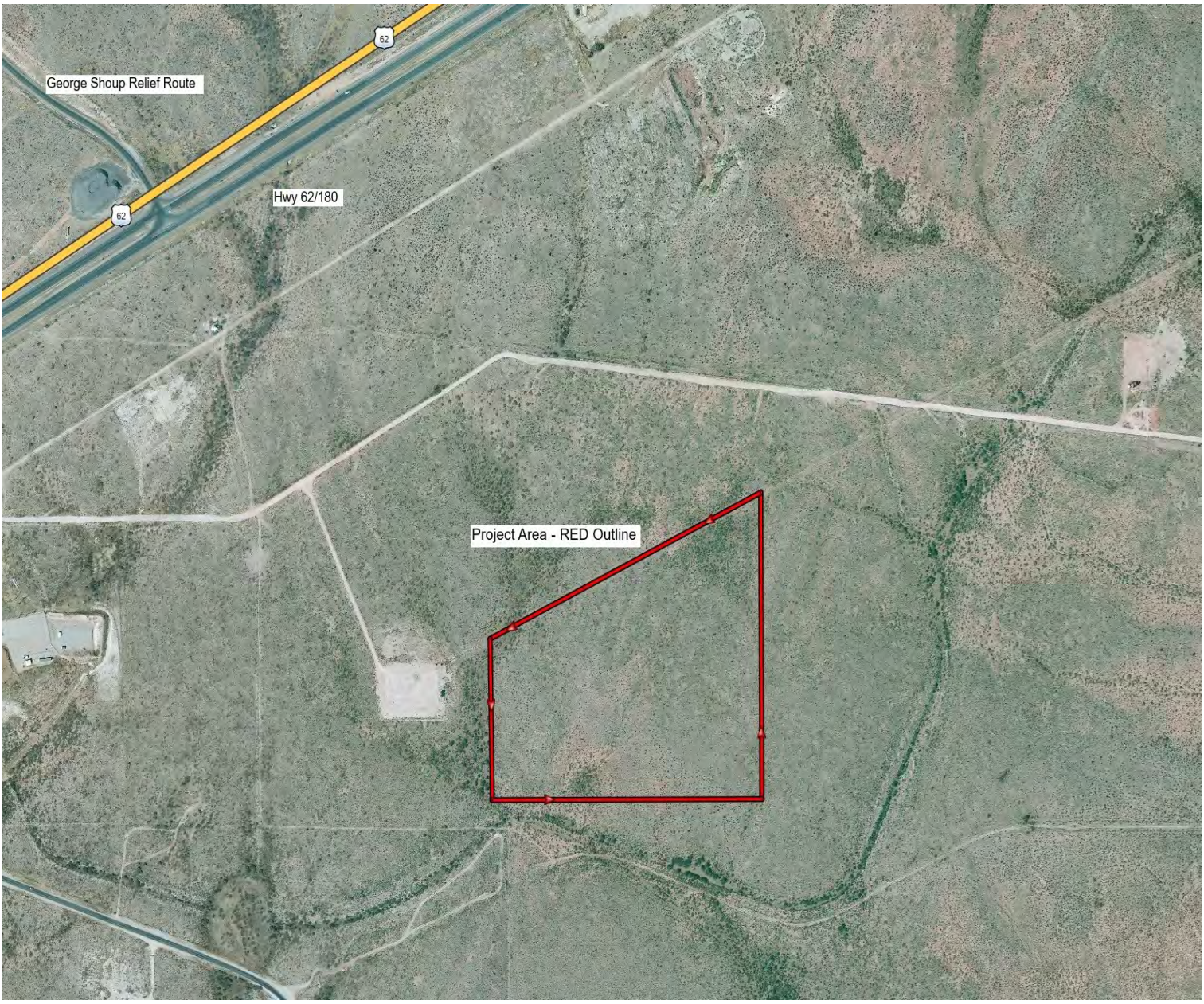

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Figure 3 - Google Earth Showing Project Area and BLM Cave & Karst Medium and High Areas

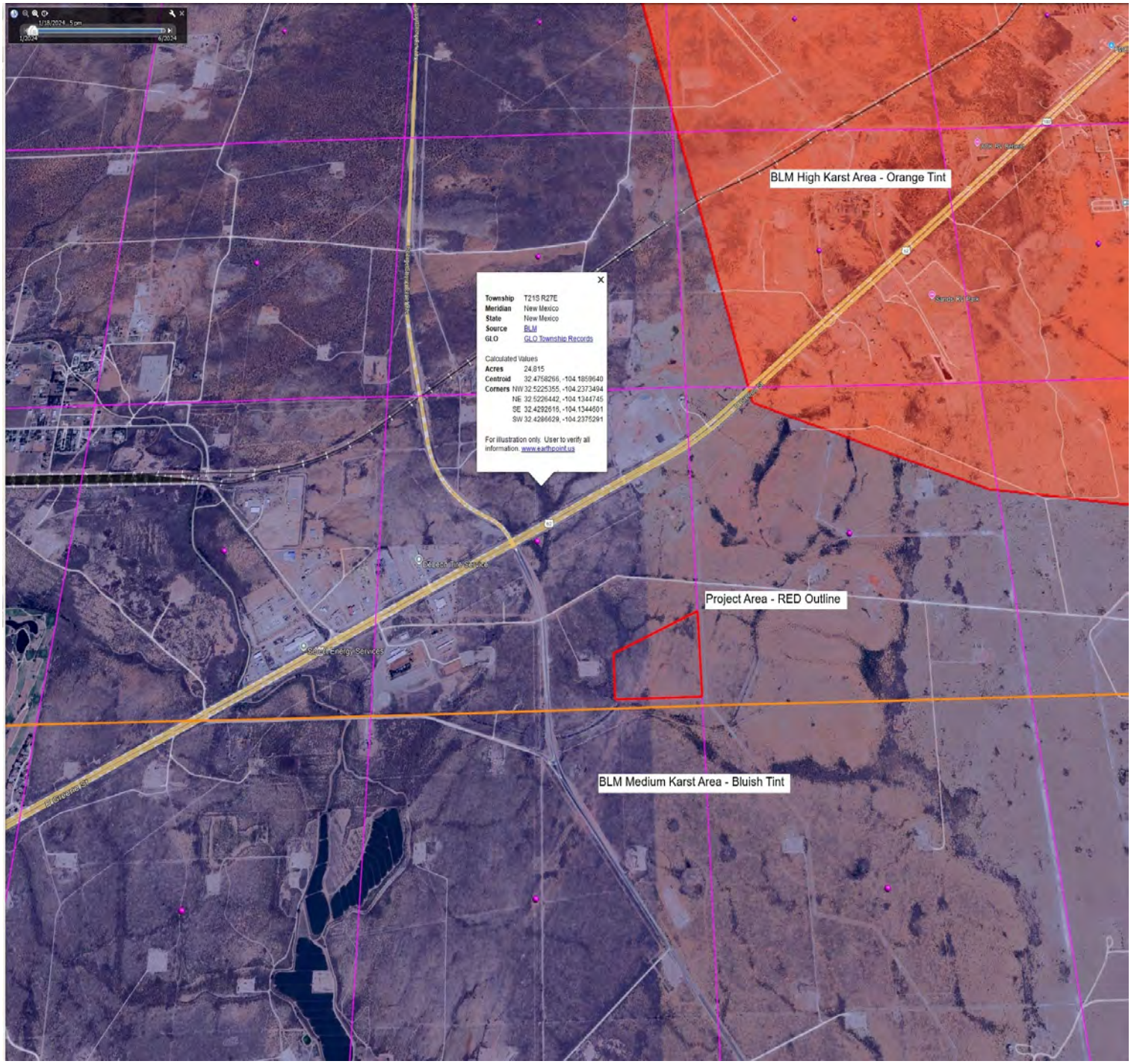

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Figure 4 - Square Root - Orthomosaic Layer Wide View

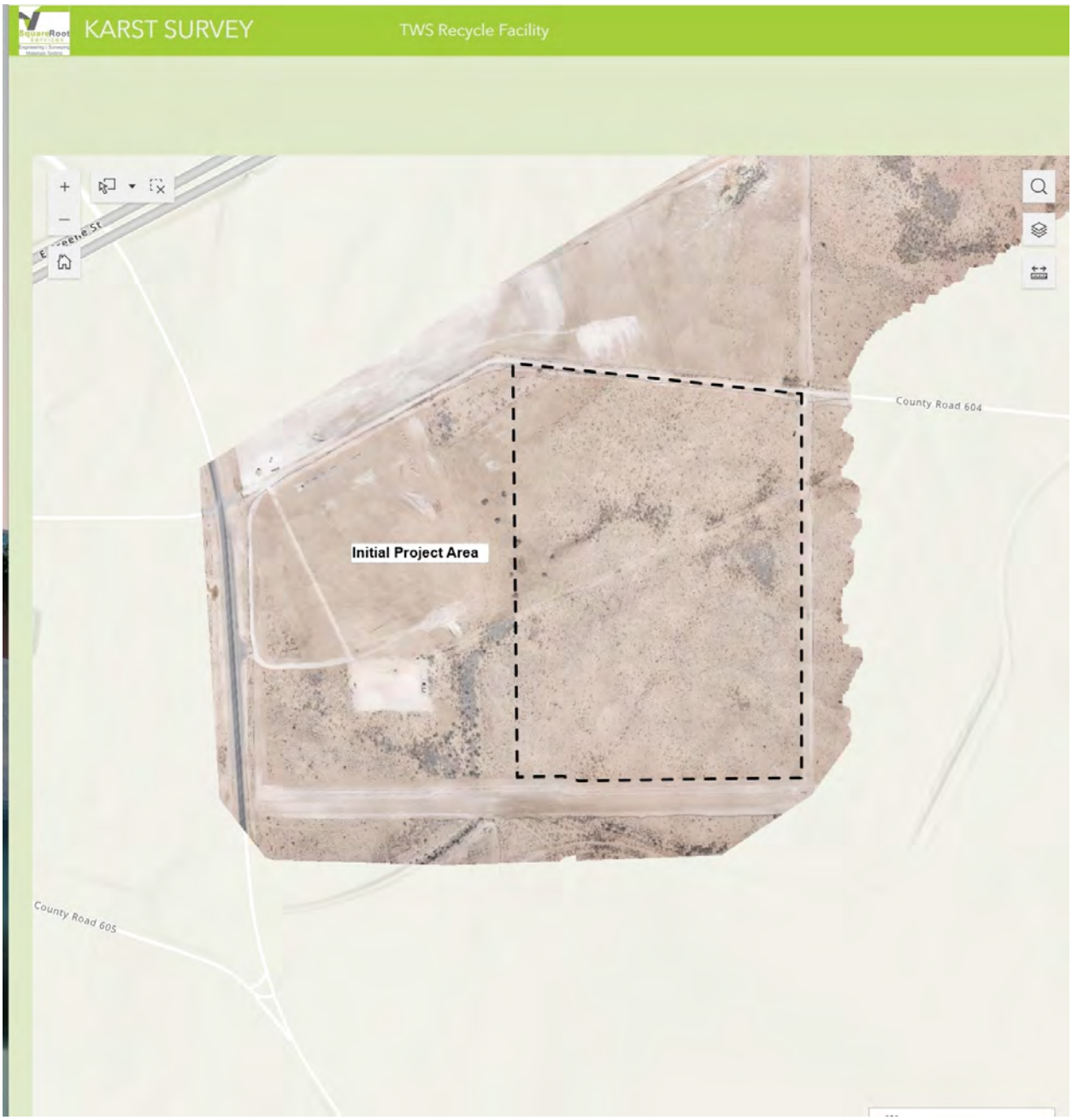

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Figure 5 - Square Root - Orthomosaic Layer Close Up

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Figure 6 - Square Root - Contours Layer

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Figure 7 - Square Root - Hillshading Layer

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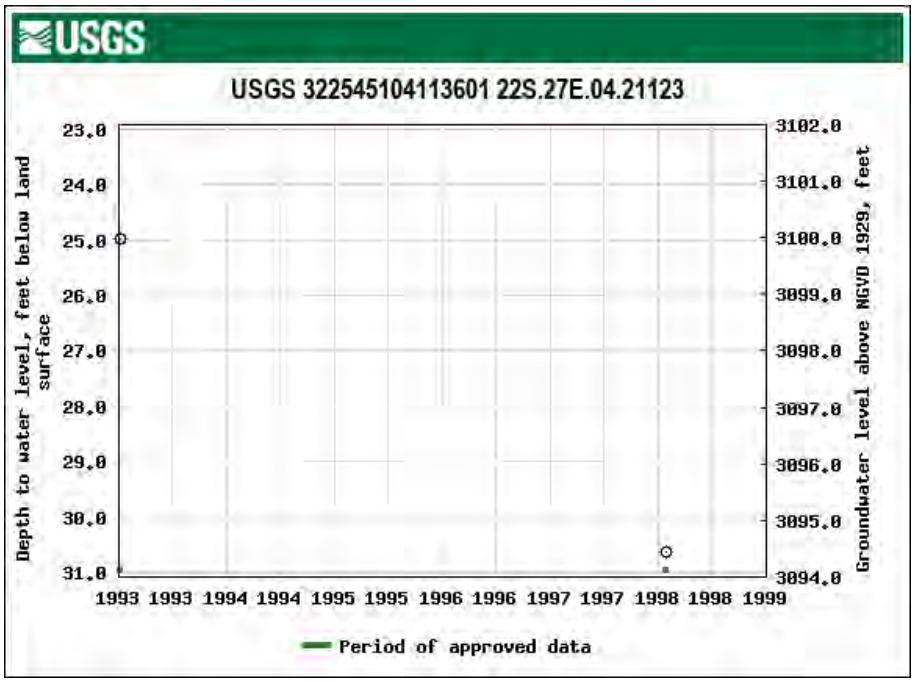
APPENDIX WELL LOGS & USGS DATA

USGS 322545104113601 22S.27E.04.21123 AKA USGS-9559

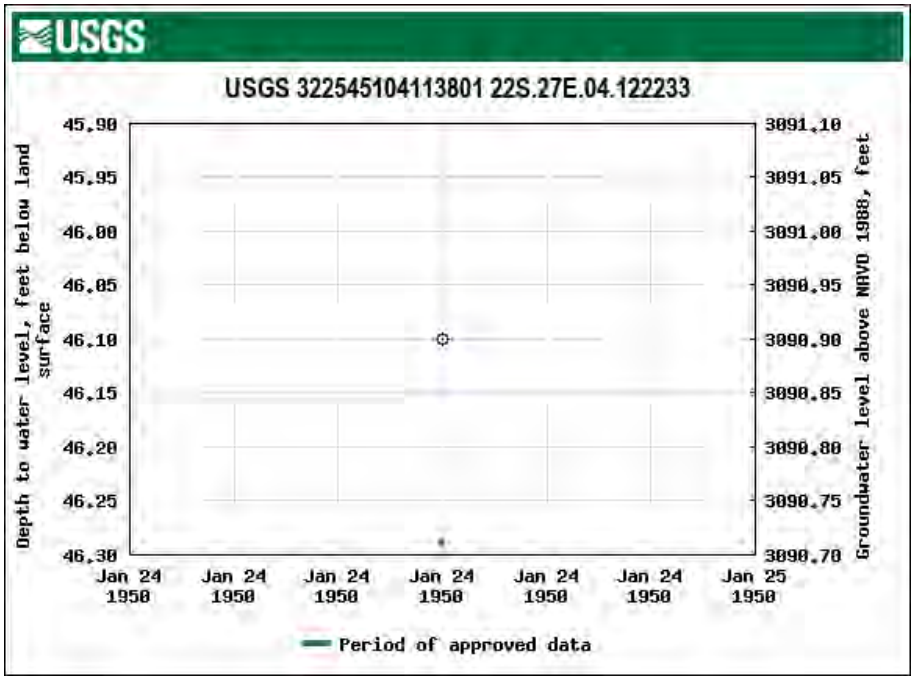
Eddy County, New Mexico
Hydrologic Unit Code 13060011
Latitude 32°25'45",
Longitude 104°11'36" NAD27
Land-surface elevation 3,125.0 feet above NGVD29
The depth of the well is 49.0 feet below land surface.
This well is completed in the Other aquifers (*N9999OTHER*) national aquifer.

Wells USGS 9559 and 9558 may not be the same well, but they are located withing the same property that is about 650 feet southeast (see Site Photos)



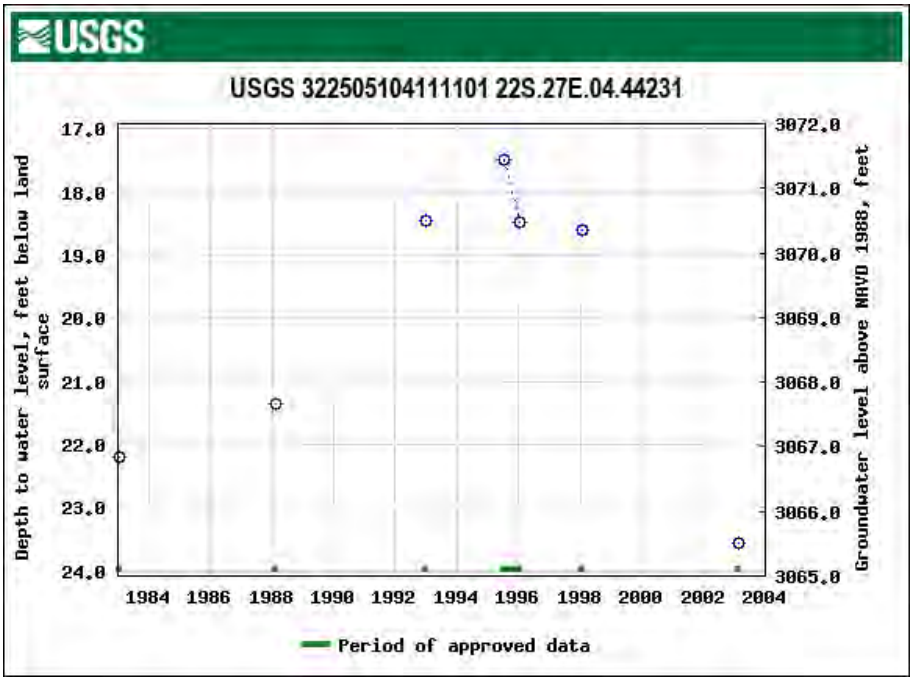
USGS 322545104113801 22S.27E.04.122233 AKA USGS-9558

Eddy County, New Mexico
Hydrologic Unit Code 13060011
Latitude 32°25'45",
Longitude 104°11'38" NAD27
Land-surface elevation 3,137 feet above NAVD88
The depth of the well is 55 feet below land surface.
This well is completed in the Other aquifers *(N9999OTHER*) national aquifer.
This well is completed in the Alluvium, Bolson Deposits and Other Surface Deposits (110AVMB) local aquifer.



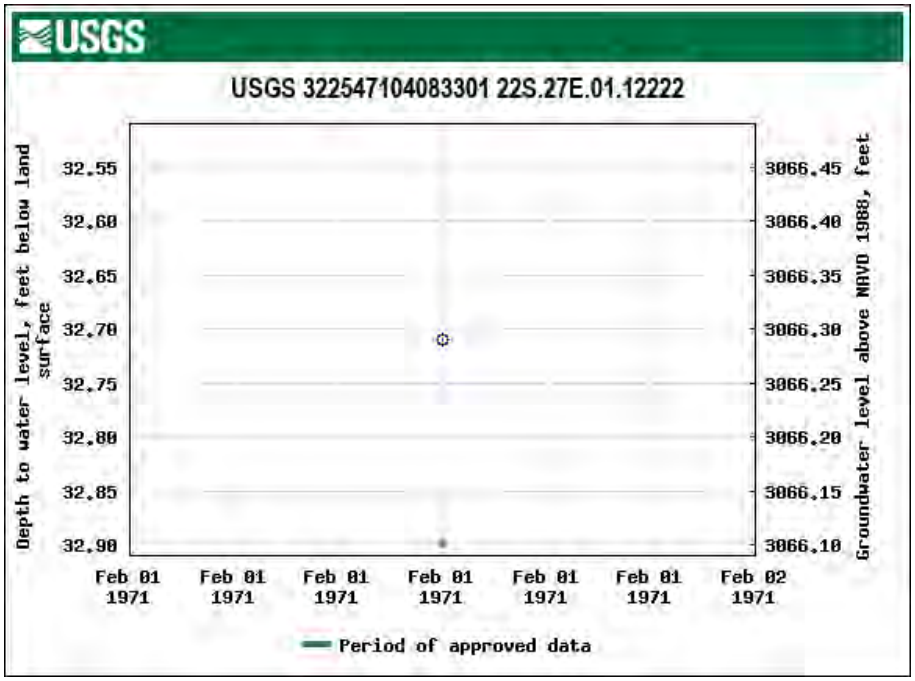
USGS 322505104111101 22S.27E.04.44231 AKA USGS-9621

Hydrologic Unit Code 13060011
Latitude 32°25'05", Longitude 104°11'11" NAD27
Land-surface elevation 3,089 feet above NAVD88
This well is completed in the Other aquifers (*N9999OTHER*) national aquifer.
This well is completed in the Alluvium, Bolson Deposits and Other Surface Deposits (110AVMB) local aquifer.



USGS 322547104083301 22S.27E.01.12222 AKA USGS-9553

Eddy County, New Mexico
Hydrologic Unit Code 13060011
Latitude 32°25'47",
Longitude 104°08'33" NAD27
Land-surface elevation 3,099 feet above NAVD88
The depth of the well is 40.0 feet below land surface.
This well is completed in the Other aquifers (*N9999OTHER*) national aquifer.



WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

1. GENERAL AND WELL LOCATION

OSE POD NO. (WELL NO.): POD 1	WELL TAG ID NO.: 215A0	OSE FILE NO(S).: C-04841
WELL OWNER NAME(S): TSW Properties, LLC, Steve McCutcheon		PHONE (OPTIONAL): 575-710-9796
WELL OWNER MAILING ADDRESS		CITY: Carlsbad STATE: NM ZIP: 88220

WELL LOCATION (FROM GPS)		DEGREES	MINUTES	SECONDS	
	LATITUDE	32	26	15.8	N
	LONGITUDE	104	10	22.6	W

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

DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS – PLSS (SECTION, TOWNSHIP, RANGE) WHERE AVAILABLE

2. DRILLING & CASING INFORMATION

LICENSE NO.: WD1058	NAME OF LICENSED DRILLER: GARY KEY		NAME OF WELL DRILLING COMPANY: KEY'S DRILLING & PUMP SERVICE, INC
DRILLING STARTED: 06/12/24	DRILLING ENDED: 06/14/24	DEPTH OF COMPLETED WELL (FT): 180	BORE HOLE DEPTH (FT): 180
DEPTH WATER FIRST ENCOUNTERED (FT): NO CIRCULATION			

COMPLETED WELL IS: ☐ ARTESIAN *add Centralizer info below ☐ DRY HOLE ☑ SHALLOW (UNCONFINED)
STATIC WATER LEVEL IN COMPLETED WELL (FT): 78'
DATE STATIC MEASURED: 6/15/2024

DRILLING FLUID: ☑ AIR ☐ MUD ADDITIVES – SPECIFY:

DRILLING METHOD: ☑ ROTARY ☐ HAMMER ☐ CABLE TOOL ☐ OTHER – SPECIFY:
CHECK HERE IF PITLESS ADAPTER IS INSTALLED ☑

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM (inches)	CASING MATERIAL AND/OR GRADE (include each casing string, and note sections of screen)	CASING CONNECTION TYPE (add coupling diameter)	CASING INSIDE DIAM. (inches)	CASING WALL THICKNESS (inches)	SLOT SIZE (inches)
-1	25	12-3/4"	STEEL		8"	1/4"	
-1	140	7-7/8"	PVC	SPLINE	4-1/2"	SCH40	
140	180	7-7/8"	PVC	SPLINE	4-1/2"	SCH40	.032

3. ANNULAR MATERIAL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM. (inches)	LIST ANNULAR SEAL MATERIAL AND GRAVEL PACK SIZE-RANGE BY INTERVAL *(if using Centralizers for Artesian wells- indicate the spacing below)	AMOUNT (cubic feet)	METHOD OF PLACEMENT
0	25	12-1/4"	NEAT CEMENT		TREMIE
0	60	7-7/8"	BENTONITE HOLE PLUG		HAND
60	180	7-7/8"	PEA GRAVEL		HAND

FOR OSE INTERNAL USE

FILE NO.	POD NO.	TRN NO.
LOCATION	WELL TAG ID NO.	PAGE 1 OF 2

WR-20 WELL RECORD & LOG (Version 09/22/2022)

4. HYDROGEOLOGIC LOG OF WELL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	THICKNESS (feet)	COLOR AND TYPE OF MATERIAL ENCOUNTERED - INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES **(attach supplemental sheets to fully describe all units)**	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER-BEARING ZONES (gpm)
0	5	5	ROCK	Y ✓N	
05	26	21	RED SAND WITH CLAY	Y ✓N	
26	30	4	GRAY AND YELLOW BROKEN LIMESTONE	Y ✓N	
30	65	35	GRAY LIMESTONE	Y ✓N	
53	65	12	CAVE-LOST CIRCULATION	Y N	
65	103	38	SOFT	✓Y N	
103	180	77	MEDIUM/HARD-ROCKY	Y ✓N	
				Y ✓N	
				Y ✓N	
				Y ✓N	
				Y ✓N	
				Y ✓N	
				Y ✓N	
				Y ✓N	
				Y ✓N	
				Y ✓N	
				Y ✓N	
				Y ✓N	
				Y ✓N	
				Y ✓N	
				Y ✓N	
				Y ✓N	

METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA:

☐ PUMP ☑ AIR LIFT ☐ BAILER ☐ OTHER – SPECIFY:

TOTAL ESTIMATED WELL YIELD (gpm): ?

5. TEST; RIG SUPERVISION

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

MISCELLANEOUS INFORMATION:

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

CASEY KEY

6. SIGNATURE

THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND THE PERMIT HOLDER WITHIN 30 DAYS AFTER COMPLETION OF WELL DRILLING:

GARY KEY — SIGNATURE OF DRILLER / PRINT SIGNEE NAME

7-8-2024 — DATE

FOR OSE INTERNAL USE

WR-20 WELL RECORD & LOG (Version 09/22/2022)

FILE NO.	POD NO.	TRN NO.
LOCATION	WELL TAG ID NO.	PAGE 2 OF 2

Project: **TWS Recycling Facility SB-2** Project Location: **32.43578 -104.16908, Eddy County, NM** Project Number: **4225058-SB2**	Log of Boring SB-2 **Sheet 1 of 1**

Date(s) Drilled **4-7-25**	Logged By **COZ**	Checked By **COZ**
Drilling Method **hollow-stem auger**	Drill Bit Size/Type	Total Depth of Borehole **75 feet bgs**
Drill Rig Type **CME-75**	Drilling Contractor **Southlands**	Approximate Surface Elevation
Groundwater Level and Date Measured **not encountered**	Sampling Method(s)	Hammer Data
Borehole Backfill **cuttings**	Location **31.43578 -104.16908**	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Percent Fines	LL, %	PI, %
	0–5				SM		SILTY SAND WITH GRAVEL: white, dry, carbonate indurated				
	5–20				SM-SC		SILTY, CLAYEY SAND: red brown, dry				
	20–75				Shale		SHALE: red brown, dry, fissle, trace sand				
	75						Bottom of Boring				

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Project: **TWS Recycling Facility SB-1** Project Location: **32.43528 -104.17645, Eddy County, NM** Project Number: **4225058-SB1**	Log of Boring SB-1 **Sheet 1 of 1**

Date(s) Drilled **4-7-25**	Logged By **COZ**	Checked By **COZ**
Drilling Method **hollow-stem auger**	Drill Bit Size/Type	Total Depth of Borehole **70 feet bgs**
Drill Rig Type **CME-75**	Drilling Contractor **Southlands**	Approximate Surface Elevation
Groundwater Level and Date Measured **66 feet, 4-7-25**	Sampling Method(s)	Hammer Data
Borehole Backfill **cuttings**	Location **31.43528 -104.17645**	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Percent Fines	LL, %	PI, %
	0–75				SM		SILTY SAND WITH GRAVEL: light brown to white, dry, carbonate indurated				
					ML		SANDY SILT: red brown, dry				
					SP-SM		POORLY GRADED SAND WITH SILT: light brown, dry				
							water bearing at 66 feet				
							Bottom of Boring				

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Project: **TWS Recycling Facility SB-3** Project Location: **32.43455 -104.16044, Eddy County, NM** Project Number: **4225058-SB3**	Log of Boring SB-3 **Sheet 1 of 1**

Date(s) Drilled **4-7-25**	Logged By **COZ**	Checked By **COZ**
Drilling Method **hollow-stem auger**	Drill Bit Size/Type	Total Depth of Borehole **75 feet bgs**
Drill Rig Type **CME-75**	Drilling Contractor **Southlands**	Approximate Surface Elevation
Groundwater Level and Date Measured **not encountered**	Sampling Method(s)	Hammer Data
Borehole Backfill **cuttings**	Location **31.43455 -104.16044**	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	Material Type	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Percent Fines	LL, %	PI, %
	0–80				SM		SILTY SAND WITH GRAVEL: white, dry, carbonate indurated				
							light red brown				
							red brown				
					SC		CLAYEY SAND: red brown, dry, gypsum crystals				
					Shale		SHALE: red brown, dry, fissle, trace sand				
					SC		CLAYEY SAND: red brown, dry				
							Bottom of Boring				

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STATE ENGINEER OFFICE

WELL RECORD

RM 46877

Section 1. GENERAL INFORMATION

(A) Owner of well TXO Prod. Owner's Well No. ____
Street or Post Office Address c/o Glenn's Water Well Service, Inc.
City and State Box 692 Tatum, N.M. 88267

Well was drilled under Permit No. C-2127 and is located in the:

a. NW ¼ SW ¼ SE ¼ SE ¼ of Section 2 Township 22-S. Range 27-E. N.M.P.M.
2180 FEL, 660 FSL,

b. Tract No. ____ of Map No. ____ of the ____

c. Lot No. ____ of Block No. ____ of the ____
Subdivision, recorded in ____ County.

G.P.S. corrected (6-2008)

d. X= 579,443 meters ~~feet~~, Y= 3,586,889 meters ~~feet~~, N.M. Coordinate System NAD 1983 Zone 13N Zone in the 32° 24' 58.47" X -104° 9' 18.44" Grant.

(B) Drilling Contractor Glenn's Water Well Service, License No. WD 421

Address Box 692 Tatum, N.M. 88267

Drilling Began 12/19/85 Completed 12/19/85 Type tools rotary Size of hole 9 7/8 in.

Elevation of land surface or ____ at well is ____ ft. Total depth of well 160 ft.

Completed well is [X] shallow [ ] artesian. Depth to water upon completion of well 30 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
80	119	39	broken lime	75

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
6 5/8	.142						70	16

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement

Section 5. PLUGGING RECORD

Plugging Contractor ____
Address ____
Plugging Method ____
Date Well Plugged ____
Plugging approved by:
____
State Engineer Representative

No.	Depth in Feet Top	Depth in Feet Bottom	Cu of
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received December 27, 1985

Quad ____ FWL ____ F

Use OWD Location No. 22.27.2.~~344~~ 44

22.27.2.

Section 6. LOG OF HOLE

Depth in Feet		Thickness in Feet	Color and Type of Material Encountered
From	To		
0	5	5	soil
5	29	24	sand and gravel
29	80	51	red sandy clay
80	119	39	broken lime
119	160	41	red clay

Section 7. REMARKS AND ADDITIONAL INFORMATION

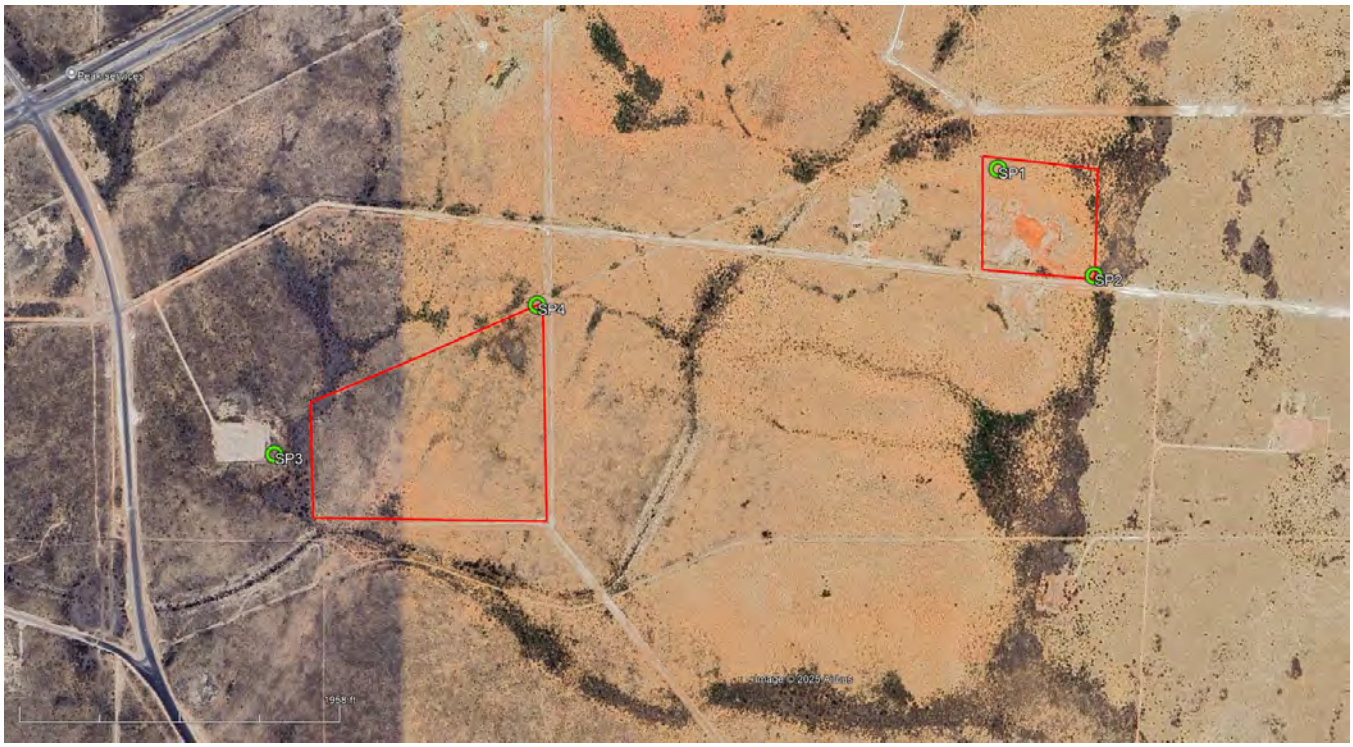
DEC 27 8 27 AM '85
STATE ENGINEER
ROSWELL, NM.

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

Corky [signature]
Driller

INSTRUCTIONS: This fo[...]uld be [...]cuted in triplicate, preferably typewritten ar[...]
of the State Engineer. A[...]ons, ex[...]t Section 5, shall [...] a[...]
[...] or deepen[...]

APPENDIX SITE PHOTOGRAPHS



Google Earth image showing locations of photographs of the project area


SP-1 View northwest from existing fresh water frac pond proposed for conversion to Rule 34 containment. Area of TWS MOD western dual containments is at the left edge of this image.

SP2 View southeast from southeast corner of existing fresh water frac pond toward location of USGS-9553. The corral area where the USGS well exist (plugged) is on the left side of the image but is not visible due to distance and vegetation.

SP3 View east from production pad showing location of western dual ponds. The proposed dual containments are east of the vegetated swale in the foreground. This is the cover photograph.

SP4 View north from northeast corner of the proposed west containments area. A north-south pipeline is in the right side of the image and development on the south side of Highway 62 is on the horizon.

SP-4 View west-southwest showing pipeline that is the northern boundary of the West Containments project area. This image shows the nature of vegetation.

April 2024

Rule 34 Registration
2RF-212 (Sam Houston) Modification
Section 34, T21S, R27E, Eddy County

Volume2 Nolan Ryan In-Ground Containments

- ***C-147 Form & Liner Equivalency Demonstration***
- ***Closure Cost Estimate for West In-Ground Containments***
- ***Stamped Design Drawings and Avian Deterrence***
- ***Recently Approved Plans for Design/Construction, O&M, and Closure***

View south southeast to the Nolan Ryan West containment area from northeast corner of adjacent production pad. A small swale in fore ground (with tire tracks) separates the production pad from the Nolan Ryan West Containments location..

Prepared for:
Vaughan Operating, LLC
Carlsbad, New Mexico

Prepared by:

R.T. Hicks Consultants Ltd.
Albuquerque, New Mexico

Cascade Services LLC
Midland, Texas

C-147

LINER EQUIVALENCY DEMONSTRATION

State of New Mexico
Energy Minerals and Natural Resources
Department Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505
https://www.emnrd.nm.gov/ocd/ocd-e-permitting/

Form C-147
Revised October 11, 2022

Recycling Facility and/or Recycling Containment

Type of Facility: ☑ Recycling Facility ☑ Recycling Containment*

Type of action: ☐ Permit ☑ Registration ☑ Modification ☐ Extension ☐ Closure ☑ Other (explain) Change name from TWS to TSW (Sam Houston)

*** 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: Vaughan Operating, LLC (For multiple operators attach page with information) OGRID #: 330307
Address: 1409 Verdel Ave, Carlsbad, NM 88220
Facility or well name (include API# if associated with a well): TSW Nolan Ryan Containments
OCD Permit Number: 2RF-212 (TSW Sam Houston) (For new facilities the permit number will be assigned by the district office)
U/L or Qtr/Qtr P Section 34 Township 21S Range 27E County: Eddy
Surface Owner: ☐ Federal ☐ State ☑ Private ☐ Tribal Trust or Indian Allotment

2.
☑ **Recycling Facility:** Tall Texan
Location of recycling facility (if applicable): Latitude 32.433586 Longitude -104.170048 NAD83
Proposed Use: ☑ Drilling* ☑ Completion* ☑ Production* ☑ Plugging *
The re-use of produced water may NOT be used until fresh water zones are cased and cemented
☐ Other, ***requires permit for other uses. Describe use, process, testing, volume of produced water and ensure there will be no adverse impact on groundwater or surface water.***
☑ Fluid Storage
☑ Above ground tanks ☐ Recycling containment ☐ Activity permitted under 19.15.17 NMAC explain type_____
☐ Activity permitted under 19.15.36 NMAC explain type:_____ ☐ Other explain _____
☐ For multiple or additional recycling containments, attach design and location information of each containment
☐ **Closure Report (required within 60 days of closure completion):** ☐ Recycling Facility Closure Completion Date:_____

3.
☑ **Recycling Containment:** West Containments A (west) & B (east)
☐ Annual Extension after initial 5 years (attach summary of monthly leak detection inspections for previous year)
Center of Recycling Containment (if applicable): Latitude 32.430851 Longitude -104.171236 NAD83
☑ For multiple or additional recycling containments, attach design and location information of each containment
☑ Lined ☐ Liner type: Thickness _____mil ☐ LLDPE ☑ HDPE ☐ PVC ☐ Other _____
☐ String-Reinforced West = 819633 East =1157895 Total = 1977528 See design drawings
Liner Seams: ☑ Welded ☐ Factory ☐ Other _____ Volume: _____bbl Dimensions: L_____ x W_____ x D_____
☐ 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 $_____ **(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 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.

- ☒ Design Plan - based upon the appropriate requirements.
- ☒ Operating and Maintenance Plan - based upon the appropriate requirements.
- ☒ Closure Plan - based upon the appropriate requirements.
- ☒ Site Specific Groundwater Data -
- ☒ Siting Criteria Compliance Demonstrations –
- ☒ **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): Steven McCutcheon Title: Managing Partne r

Signature: Date: 04/28/25

e-mail address: stevenm@mhatllc.com Telephone: 575 689-8620

11.
OCD Representative Signature: Victoria Venegas **Approval Date:** 05/13/2025

Title: Environmental Specialist **OCD Permit Number:** 2RF-212

☒ OCD Conditions

☒ Additional OCD Conditions on Attachment

R.K. FROBEL & ASSOCIATES
Consulting Engineers

Technical Memorandum: 40-mil HDPE as Alternative Secondary Liner System for In Ground Recycling Containment Facilities

NMAC 19.15.34.12 A

I have investigated the suitability of application for 40 mil HDPE geomembrane as an equivalent secondary liner to 30 mil scrim reinforced LLDPE (LLDPEr) in the application for In Ground Recycling Containment facilities. *In summary, it is my professional opinion that the specified 40 mil HDPE geomembrane will provide a secondary liner system that is equal to or better than 30 mil scrim reinforced LLDPEr and will provide the requisite protection of fresh water, public health and the environment for many years when engineering design provides requisite site/soil/slope preparation and when used in concert with requisite primary liners and drainage layers.*

It is understood that the lining system under discussion is composed of a 60 mil HDPE Primary liner, geonet drainage layer and a 40 mil HDPE Secondary liner. *In consideration of the secondary lining system application, size of impoundment and depth, design details as well as the chemical nature of typical processed water, it is my professional opinion that the 40 mil HDPE geomembrane will provide the requisite barrier against processed water loss and will function effectively as a secondary liner.*

The following are discussion points that hopefully will exhibit the equivalency of a 40 mil HDPE secondary liner to that of a 30 mil LLDPEr.

The nature and formulation of the 40 mil HDPE resin is the same as the Primary 60 mil HDPE. The major difference is that the 40 mil HDPE is lower in thickness (more flexible and less puncture resistant). However, in covered conditions, HDPE will resist aging and degradation and remain intact for many decades. In fact, a secondary liner of 40 mil HDPE will outlast an exposed 60 mil HDPE liner. According to the Geosynthetic Research Institute (GRI) study on lifetime prediction (GRI Paper No. 6), the half life of HDPE (GRI GM 13) exposed is > 36 years and the half-life of HDPE covered or buried is greater than 100 years. It is understood that in order to ensure compliance of materials, the primary 60 mil HDPE to be used must meet or exceed GRI GM 13 Standards. Likewise, the secondary liner that is not exposed to the same environmental and chemical conditions must meet or exceed GRI GM 13 for non-reinforced HDPE. Adhering to the minimum requirements of the GRI Specifications, 40 mil HDPE when used as a secondary liner will be equally as protective as the primary 60 mil HDPE liner (reference: www.geosynthetic-institute.org/grispecs) and equally as protective as a 30 mil scrim reinforced LLDPEr liner.

Durability of Geomembranes is directly affected by exposure conditions. Buried or covered geomembranes are not affected by the same degradation mechanisms (UV, Ozone, Chemical, Stress, Temperature, etc) as are fully exposed geomembranes. In this regard, the secondary liner material and thickness can be much less robust than the fully exposed primary liner which in this case is 60 mil HDPE. This is also the case for

landfill lining systems where the secondary geomembrane in a bottom landfill cell may be 40 mil HDPE.

Thermal Fusion Seaming Requirements. Thermal seaming and QC seam test requirements for geomembranes are product specific and usually prescribed by the sheet manufacturer. Dual wedge thermal fusion welding is commonly used on HDPE and QC testing by air channel (ASTM D 5820) is fully acceptable and recognized as an industry standard. In this regard, there should be no exception requirement for seaming and QC testing as both the Primary and Secondary geomembranes are HDPE. This is fully covered in comprehensive specifications for both the Primary and Secondary geomembranes (Reference: www.ASTM.org/Standards).

Potential for Leakage through the Primary and Secondary Liners. Leakage through geomembrane liners is directly a function of the height of liquid head above any hole or imperfection. The geonet drainage media provides immediate drainage to a low point or sump and thus no hydrostatic head or driving gradient is available to push leakage water through a hole in the secondary liner. In this regard, secondary geomembrane materials can be (and usually are) much less in thickness and also polymer type. Hydraulic Conductivity through the 40 mil HDPE liner material is extremely low due to the polymer type, structure and crystallinity and exceeds requirements of EPA SW-846 Method 9090A.

Chemical Attack. Chemical attack to polymeric geomembranes is directly a function of type of chemical, temperature and exposure time. Again, the HDPE Primary provides the chemically resistant liner and is QC tested to reduce potential defects or holes. If there is a small hole, the geonet drain takes any leakage water immediately to the sump for extraction. Thus, exposure time is very limited on a secondary liner in addition to low temperature, little volume and virtually no head pressure. In this regard, a chemically resistant geomembrane material such as 40 mil HDPE can be specified for the secondary and is a fully acceptable alternate to 30 mil scrim reinforced LLDPEr.

Mechanical Properties Characteristics. Geomembranes of different polymer and/or structure (i.e., reinforced vs non-reinforced) cannot be readily compared using such characteristics as tensile stress/strain, tear, puncture and polymer requirements. For a 40 mil HDPE liner material to function as a Secondary liner it should meet or exceed the manufacturers minimum requirements for Density, Tensile Properties, Tear, Puncture as well as other properties such as UV resistance. The sheet material must also meet or exceed GRI GM 13 minimum requirements. *In this regard, a 40 mil HDPE will be equivalent to a 30 mil LLDPEr as a secondary liner for the conditions listed below:*

- *The subgrade or compacted earth foundation will be smooth, free of debris or loose rocks, dry, unyielding and will support the lining system.*
- *The side slopes for the containment shall be equal to or less than 3H:1V.*
- *The physical properties and condition of the subgrade or liner foundation*

(i.e., density, slope, moisture) will be inspected and certified by a Professional Engineer that it meets or exceeds specification requirements.

- *Immediately prior to installation, the installation contractor shall inspect and sign off on the subgrade conditions that they meet or exceed the HDPE manufacturer and installers requirements.*
- *A protective geotextile will be placed on the finished and accepted subgrade between subgrade and the 40 mil HDPE Secondary liner.*
- *A 200 mil geonet will be placed over the 40 mil HDPE Secondary Liner.*
- *A 60 mil HDPE Primary liner will be placed over the 200 mil geonet drainage layer.*

If you have any questions on the above technical memorandum or require further information, give me a call at 720-289-0300 or email geosynthetics@msn.com

Sincerely Yours,

R K Frobel

Ronald K. Frobel, MSCE, PE

References:

NMAC 19.15.34.12 A DESIGN AND CONSTRUCTION SPECIFICATIONS FOR A RECYCLING CONTAINMENT

Geosynthetic Research Institute (GRI) Published Standards and Papers 2017
www.geosynthetic-institute.org

ASTM Geosynthetics Standards 2017
www.ASTM.org/Standards

CLOSURE COST ESTIMATE

Cascade Services, LLC
952 Echo Ln
Ste 375
Houston, TX 77024-2814
www.cascadeservicesllc.com

Estimate

ADDRESS
Steven McCutcheon
Vaughn Operating, LLC
3021 Hepler Rd
Carlsbad, NM 88220

SHIP TO
Steven McCutcheon
Vaughn Operating, LLC
3021 Hepler Rd
Carlsbad, NM 88220

ESTIMATE 2035
DATE 04/24/2025

PROJECT LOCATION COORDINATES
32.430874383, -104.170456507

DESCRIPTION	QTY	UNIT	RATE	AMOUNT
This is pricing a package to reclaim the 819,663 BBL & 1,157,895 BBL produced water ponds Mobilize equipment to site. Dirt reclaim of pond consist of- Bury all material (Caliche, Gypsum, Sand, ect.) below ground level, backfill pond area with uncontaminated soil from pond walls. Pond area will be reclaimed to natural elevations and water flow patterns. All stockpiled strippings will be put down last to ensure ground has been completely returned to native design.	201,958		2.00	403,916.00
Environmental soil sampling This will include digging 6 sample locations for each containment. One composite sample from 0-4 feet below surface and one discrete sample from each location at 4.25 feet Cost include trip, labor, materials, and laboratory testing	1		1,725.00	1,725.00
Environmental Soil testing Before earthwork can begin the soil must be tested for contamination in case of liner leakage. Cost include trip, labor, materials, and laboratory testing of 18 tests.	1		2,700.00	2,700.00
Broadcast seeding of pond area Seed will be a native mix for Eddy	1		3,000.00	3,000.00

County NM Includes purchase of seed mix and placement			
Fence removal and disposal Fence estimated at 4,782 ft This includes removal of all posts, braces, wire, fabric, gates, and hardware.	4,782	4.00	19,128.00
Remove and dispose of all four layers. Textile, 40 mil, net, and 60 mil	3,560,964	0.15	534,144.60

Preferred payment method: ACH/Wire
Email AR@cascadeservicesllc.com for ACH/Wire details.

Remit Checks To:
Cascade Services LLC
PO Box 200954
Dallas, TX 75320-0954
**THIS ESTIMATE IS SUBJECT TO THE TERMS & CONDITIONS ATTACHED.

**If pumping is needed due to weather conditions, a $350 daily fee will be charged on final invoice.

**Materials will be invoiced upon receipt of customer purchase order or job approval.

**This estimate may not include tax and may be added on invoice unless customer provides a valid tax exemption document.

Questions? Email AR@Cascadeservicesllc.com

SUBTOTAL	964,613.60
TAX	0.00
TOTAL	**$964,613.60**

Accepted By

Accepted Date

RECYCLING CONTAINMENT DESIGN DRAWINGS

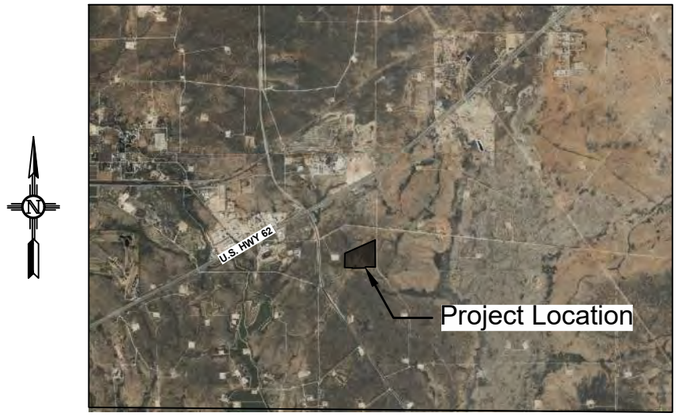
SquareRoot services
Engineering | Surveying
Materials Testing
7921 N. World Dr.
Hobbs, NM 88242
Squarerootservices.net
575-231-7347

CIVIL PLANS

VAUGHN OPERATING

TSW NOLAN EAST AND WEST RECYCLING FACILITY & CONTAINMENTS

CITY OF CARLSBAD
SECTION 34, TOWNSHIP 21 SOUTH, RANGE 27 EAST
N.M.P.M., EDDY COUNTY, NEW MEXICO
N032° 245' 51.23" W104° 10' 16.24"



VICINITY MAP
N.T.S.

INDEX OF SHEETS		
SHEET	NAME	DESCRIPTION
1	C-100	COVER SHEET
2	SU-101	TOPOGRAPH SURVEY
3	C-101	GENERAL NOTES
4	CS-101	CIVIL SITE PLAN
5	CS-102	MASTER LAYOUT
6	CS-103	FENCE LAYOUT
7	CS-104	WEST FRAC CONTAINMENT WEST TO EAST P&P
8	CS-105	WEST FRAC CONTAINMENT NORTH TO SOUTH P&P
9	CS-106	EAST FRAC CONTAINMENT WEST TO EAST P&P
10	CS-107	EAST FRAC CONTAINMENT NORTH TO SOUTH P&P
11	CS-108	VOLUME QUANITITES
12	CS-501	LEAK DETECTION DETAILS
13	CS-502	LINER DETAILS
14	CS-503	FENCE DETAILS

nm811 Know what's below. Call before you dig.

(505)-254-7310

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

JEREMY BAKER
NEW MEXICO
16207
LICENSED PROFESSIONAL ENGINEER

04/29/2025

TOPOGRAPHIC SURVEY

of GREEN STREET SUBDIVISION TRACT 33

UTILITY NOTE

UTILITIES DEPICTED WERE OBTAINED THROUGH EVIDENCE: FROM FIELD OBSERVATIONS, PLANS AND/OR REPORTS PROVIDED BY THE CLIENT, AND MARKINGS COORDINATED BY THE NEW MEXICO 811. HOWEVER, LACKING EXCAVATION, THE EXACT LOCATION OF UNDERGROUND FEATURE CANNOT BE ACCURATELY, COMPLETELY, AND RELIABLY DEPICTED. WHERE ADDITIONAL OR MORE DETAILED INFORMATION IS REQUIRED, THE CLIENT IS ADVISED THAT EXCAVATION MAY BE NECESSARY.

TOPOGRAPHIC NOTE

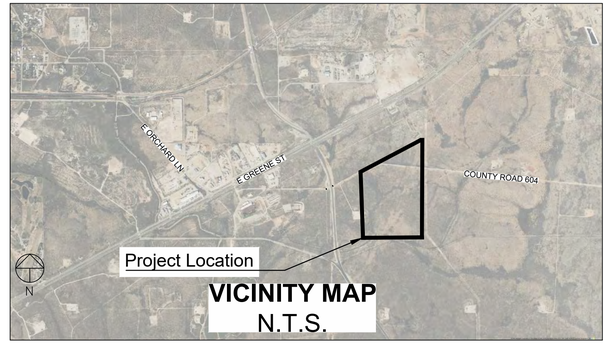
THE TOPOGRAPHY SHOWN HEREIN IS A COMBINATION OF UAV DATA AND CONVENTIONAL/GPS DATA. THE UAV DATA WAS GENERATED USING INDUSTRY STANDARD QUALITY CHECKS AND IS **WITHIN** THE INDUSTRY RECOGNIZED GROUND SAMPLING DISTANCE (GSD) STANDARD OF BELOW 2.5 CM (1 IN / 0.08 FT). THE ABSOLUTE ACCURACY LEVEL IN STANDARD UAV DATA IS EQUAL TO 3 X GSD (3 X 0.08 FT = 0.24 FT). UAV DATA WAS USED FOR MEASUREMENTS ON NATURAL GROUND AND SUPPLEMENTAL FEATURES.

BASIS OF BEARING

BEARINGS SHOWN HEREON ARE FROM GPS/GNSS OBSERVATIONS AND CONFORM TO THE NEW MEXICO STATE PLANE COORDINATE SYSTEM "***NEW MEXICO EAST ZONE***" NORTH AMERICAN DATUM OF 1983. TRUE NORTH CAN BE OBTAINED BY APPLYING A CONVERGENCE ANGLE OF ***00°05'17.3"*** AT ***CONTROL POINT #100***. DISTANCES SHOWN HEREON ARE IN GROUND AND WERE OBTAINED BY APPLYING A COMBINED GRID TO GROUND SCALE FACTOR OF ***1.0002346725*** AT THE PREVIOUSLY NOTED POINT LOCATED AT N ***521716.805, E 592042.636***. THE VERTICAL DATUM IS BASED ON GEOID18 AND IT PROVIDES ORTHOMETRIC HEIGHTS CONSISTENT WITH THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

I, JEREMY BAKER, NEW MEXICO PROFESSIONAL SURVEYOR NO. 25773, DO HEREBY CERTIFY THAT THIS TOPOGRAPHIC SURVEY PLAT AND THE ACTUAL SURVEY ON THE GROUND UPON WHICH IT IS BASED WERE PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION; THAT I AM RESPONSIBLE FOR THIS SURVEY; THAT THIS SURVEY MEETS THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO; AND THAT IT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. I FURTHER CERTIFY THAT THIS SURVEY IS NOT A LAND DIVISION OR SUBDIVISION AS DEFINED IN THE NEW MEXICO SUBDIVISION ACT AND THAT THIS INSTRUMENT IS A TOPOGRAPHIC SURVEY PLAT OF AN EXISTING TRACT OR TRACTS.

Jeremy Baker, N.M. P.S 25773 — 04/29/2025 Date



VICINITY MAP
N.T.S.

SquareRoot services
Engineering | Surveying
Materials Testing

7921 N World Dr.
Hobbs, NM 88242-9032
Squarerootservices.net
575-231-7347

TYPE OF SURVEY:
TOPOGRAPHIC SURVEY
OF
PROJECT NAME:
GREEN STREET SUBDIVISION
FOR
CLIENT:
TSW PROPERTIES

PROJECT NUMBER:
25048

PROJECT SURVEYOR:
Jeremy Baker, PS
DRAWN BY:
B. SEALY

GRAPHIC SCALE
0 150' 300'
SCALE: 1" = 150'
(IN FEET)

LEGEND

- CONTROL POINT AS NOTED
- FOUND MONUMENT AS NOTED
- PARCEL BOUNDARY
- EASEMENT BOUNDARY
- SECTION BOUNDARY
- FENCE
- EDGE OF ROAD
- PROPOSED ROAD
- UNDERGROUND WATER
- UNDERGROUND PETROLEUM
- UNKNOWN ABOVE GROUND LINE
- TOP OF BANK
- TOP OF EDGE
- CONTOUR LABEL WITH ELEVATION AS NOTED
- MAJOR CONTOUR (5FT)
- MINOR CONTOUR (1FT)

JEREMY E. BAKER NEW MEXICO 25773 PROFESSIONAL SURVEYOR

SHEET: 2 of 14
SU - 101

c:\Users\xavier.clark\onedrive - squarerootservices.net\project folder\25048 TSW Properties Green Street Subdivision\Survey\DWG\GREEN_STREET_TRACT-33_TOPO.dwg 4/29/2025 12:47 PM

GENERAL NOTES

1. NEW MEXICO ADMINISTRATIVE CODE TITLE 19, CHAPTER 15, PART 34, DESIGN CRITERIA FOR RECYCLING CONTAINMENTS SHALL APPLY TO THIS PROJECT.
2. ALL BOUNDARY, TOPOGRAPHIC AND UTILITY INFORMATION SHOWN ARE BASED ON SURVEY INFORMATION FURNISHED BY TOPOGRAPHIC.
3. THE CONTRACTOR SHALL IDENTIFY AND LOCATE UTILITY LINES, MONITORING WELLS, SURVEY MONUMENTS, AND OTHER NEARBY STRUCTURES PRIOR TO PERFORMING WORK.
4. COORDINATE INFORMATION IS BASED ON STATE PLANE COORDINATES, NEW MEXICO EAST, NAD 83.
5. THE CONTRACTOR SHALL IDENTIFY ANY DISCREPANCIES PRIOR TO PROCEEDING WITH CONSTRUCTION AND CONTACT THE ENGINEER IN WRITING.
6. THE CONTRACTOR SHALL IMPLEMENT AND MAINTAIN BEST MANAGEMENT PRACTICES (BMPS) TO MINIMIZE EROSION AND CONTROL SEDIMENT TO PROTECT SURFACE WATER QUALITY DURING STORM EVENTS.

EARTHWORK NOTES

1. THE CONTRACTOR SHALL USE WATER FOR COMPACTION AT ALL TIMES. THE CONTRACTOR SHALL ENSURE THEIR BID INCLUDES CONSTRUCTION WATER. NO EARTHWORK OPERATIONS SHALL TAKE PLACE IF CONSTRUCTION WATER IS NOT AVAILABLE ONSITE.
2. THE CONTRACTOR SHALL BUILD THE LEVEES USING COMPACTED LAYERS. UNCONTROLLED AND INCONSISTENT PUSHING AND PILING OF MATERIAL FOR LEVEE CONSTRUCTION IS NOT ACCEPTABLE. THE CONTRACTOR SHALL DEVELOP A SUCCESSFUL COMPACTION PATTERN EARLY IN THE PROCESS, VERIFIED THROUGH NUCLEAR DENSITY OR SAND CONE TESTING, AND SHALL MAINTAIN CONSISTENCY IN THE COMPACTIVE EFFORT AS LONG AS THE MATERIALS ENCOUNTERED REMAINS CONSISTENT. IF ONSITE SOILS ENCOUNTERED CHANGE, THE CONTRACTOR SHALL DEVELOP A NEW COMPACTION PATTERN.
3. FILL FOR LEVEES SHALL BE PLACED AND COMPACTED IN HORIZONTAL LIFTS WITH MAXIMUM LOOSE LIFT THICKNESS OF 10 INCHES, OR AS DIRECTED BY ENGINEER. CONSTRUCT EACH LAYER CONTINUOUSLY AND APPROXIMATELY HORIZONTAL FOR THE WIDTH AND LENGTH OF THE LEVEE. FILL SHALL BE COMPACTED TO AT LEAST 95 PERCENT OF MAXIMUM DRY DENSITY DETERMINED BY THE ASTM D698 AND AT MOISTURE CONTENT WITHIN +2% TO -2% OF OPTIMUM MOISTURE CONTENT AS DETERMINED BY A STANDARD PROCTOR SOILS TEST ON SAMPLES FROM THE SOURCE AREA.
4. FILL SHALL NOT BE PLACED AND COMPACTED WHEN THE MATERIALS ARE TOO WET TO PROPERLY COMPACT. MATERIAL WHICH IS TOO WET SHALL BE SPREAD ON THE FILL AREA AND PERMITTED TO DRY, ASSISTED BY HARROWING IF NECESSARY, UNTIL THE MOISTURE CONTENT IS REDUCED TO ALLOWABLE LIMITS. IF THE ENGINEER DETERMINED THAT ADDED MOISTURE IS REQUIRED, WATER SHALL BE APPLIED UNIFORMLY OVER THE AREA TO BE TREATED, AND GIVE COMPLETE AND ACCURATE CONTROL OF THE AMOUNT OF WATER TO BE USED. IF TOO MUCH WATER IS ADDED, THAT AREA SHALL BE PERMITTED TO DRY BEFORE COMPACTION IS CONTINUED.
5. PERFORM ONE NUCLEAR DENSITY GAGE TEST PER 2500 CY MINIMUM OR AS DIRECTED BY THE ENGINEER.
6. EARTHWORK CONTRACTOR SHALL PERFORM A VISUAL INSPECTION OF THE FINISHED COMPACTED POND BOTTOM AND SIDE SLOPES BEFORE HDPE LINER INSTALLATION, REMOVING ALL DEBRIS, SHARP OBJECTS AND GRAVEL LARGER THAN 3/4 INCH.
7. EARTHWORK CONTRACTOR SHALL ROLL SURFACE WITH A SMOOTH ROLLER TO ELIMINATE RUTS.

LINER NOTES

1. LINER CONTRACTOR SHALL INSPECT GRADED SURFACE FOR DEBRIS, ROCKS OR OTHER MATERIAL THAT MAY DAMAGE THE LINER AND COORDINATE WITH OWNER IF ADDITIONAL SUBGRADE RESURFACING IS NEEDED PRIOR TO PERFORMING WORK.
2. LINER CONTRACTOR TO PROVIDE SUBMITTAL OF LINER PANEL LAYOUT.
3. LINER CONTRACTOR TO SIGN SUBGRADE ACCEPTANCE FORM (PROVIDED BY OWNER REPRESENTATIVE) DAILY PRIOR TO INSTALLATION.
4. LINER TO BE INSTALLED PER GRI SPECIFICATIONS, GUIDES AND PRACTICES.
5. CONTRACTOR SHALL PLACE SANDBAGS ON LINER DURING INSTALLATION AS REQUIRED TO PREVENT WIND UPLIFT UNTIL POND IS FILLED TO A DEPTH OF 3 FEET.
6. CONTRACTOR SHALL USE BLACK 60 MIL HDPE SMOOTH GEOMEMBRANE AS THE PRIMARY LINER AND BLACK 40 MIL HDPE SMOOTH GEOMEMBRANE AS THE SECONDARY LINER.
7. A 3' DIAMETER MINIMUM PIECE OF 40MIL LINER SHALL BE EXTRUDED WELDED WHERE THE PIE SHAPED CORNER SECTIONS MEET FOR SEAM REINFORCEMENT.
8. INSTALL A FULL DOUBLE WIDTH SECTION OF BLACK OR WHITE 60 MIL TEXTURED HDPE GEOMEMBRANE RUB SHEET. EXTRUDE WELD TO LINER. WELDS SHALL BE 2" LONG AND SPACED EVERY 12" ALONG BOTH SIDES OF THE SHEET. DO NOT WELD END EDGES. SECTION SHALL EXTEND FROM SUMP AND INSTALLED INTO LINER ANCHOR TRENCH AS SHOWN.
9. LINER SHALL BE PROTECTED WITH A 8 OZ. NONWOVEN GEOTEXTILE IF ROCK OR OTHER ANGULAR MATERIALS WITH A DIMENSION GREATER THAN 3/4 INCH ARE PRESENT.
10. SUMPS SHALL BE BACKFILLED WITH NON-ANGULAR MAXIMUM 3/8 INCH SIZED PEA GRAVEL.
11. ALL SEAMS MUST BE WELDED WITH A 6" MINIMUM OVERLAP.
12. CONTRACTOR SHALL NON-DESTRUCTIVELY TEST ALL SEAMS THEIR FULL LENGTH USING AN AIR PRESSURE OR VACUUM TEST, THE PURPOSE OF THIS TEST IS TO CHECK THE CONTINUITY OF THE SEAM.
13. FOR AIR PRESSURE TESTING (ASTM 5820), THE FOLLOWING PROCEDURES ARE APPLICABLE TO THE SEAMS WELD WITH DOUBLE SEAM FUSION WELDER.
    a. THE EQUIPMENT USED SHALL CONSIST OF AN AIR TANK OR PUMP CAPABLE OF PRODUCING A MINIMUM 35 PSI AND A SHARP NEEDLE WITH A PRESSURE GAUGE ATTACHED TO INSERT INTO THE AIR CHAMBER.
    b. SEAL BOTH ENDS OF THE SEAM BY HEATING AND SQUEEZING THEM TOGETHER. INSERT THE NEEDLE WITH THE GAUGE INTO THE AIR CHANNEL. PRESSURIZE THE AIR CHANNEL TO A MINIMUM OF 35 PSI. NOTE TIME STARTS AND WAIT A MINIMUM OF 5 MINUTES TO CHECK. IF PRESSURE AFTER 5 MINUTES HAD DROPPED LESS THAN 2 PSI THE TEST IS SUCCESSFUL (THICKNESS OF MATERIAL MAY CAUSE VARIANCE).
    c. CUT OPPOSITE SEAM END AND LISTEN FOR PRESSURE RELEASE TO VERIFY FULL SEAM HAS BEEN TESTED.
    d. IF THE TEST FAILS, FOLLOW THESE PROCEDURES.
        I. WHILE CHANNEL IS UNDER PRESSURE WALK THE LENGTH OF THE SEAM LISTENING FOR A LEAK.
        II. WHILE CHANNEL IS UNDER PRESSURE APPLY A SOAPY SOLUTION TO THE SEAM EDGE AND LOOK FOR BUBBLES FORMED BY AIR ESCAPING.
        III. RE-TEST THE SEAM IN SMALLER INCREMENTS UNTIL THE LEAK IS FOUND.
    e. ONCE LEAK IS FOUND USING ONE OF THE PROCEDURES ABOVE, CUT OUT THE AREA AND RETEST THE PORTIONS OF THE PORTIONS OF THE SEAMS BETWEEN THE LEAK AREAS PER 6A AND 6B ABOVE. CONTINUE THIS PROCEDURE UNTIL ALL SECTIONS OF THE SEAM PASS THE PRESSURE TEST.
    f. REPAIR THE LEAK WITH A PATCH AND VACUUM TEST.
14. ALL NON-DESTRUCTIVE TESTS WILL BE NOTED IN THE NON-DESTRUCTIVE LOGS.
15. LINER GAS VENTS SHALL BE SPACED ALONG THE INSIDE SLOPE AT APPROXIMATELY 100 FEET ON CENTER OR MINIMUM 2 VENTS PER SIDE.
16. WHEN ANY PIPING EQUIPMENT, INLET, OR OUTLET IS IN DIRECT CONTACT WITH THE LINER, AN APRON CONSISTING OF 60 MIL HDPE MATERIAL SHALL BE INSTALLED BENEATH THE EQUIPMENT OR STRUCTURE TO PROTECT THE PRIMARY LINER.
17. LAY BOTH LINERS IN ANCHOR TRENCH. BACKFILL ANCHOR TRENCH IN 2 LIFTS AND COMPACT.

SUGGESTED CONSTRUCTION SEQUENCE

1. CLEAR EXISTING VEGETATION.

2. STRIP AND STOCKPILE TOPSOIL AT THE LOCATION DESIGNATED ON THESE PLANS.

3. PERFORM EARTHWORK OPERATIONS:
   3.1. CONSTRUCT STORMWATER DIVERSION CHANNEL.
   3.2. PERFORM RIPPING/EXCAVATING OPERATIONS.
   3.3. REPLACE EXCAVATED MATERIAL IN COMPACTED LAYERS ON THE LEVEE/PAD IN ACCORDANCE WITH THE DETAILS AND SPECIFICATIONS.
   3.4. FINISH SLOPES USING A SMOOTH ROLLER.
   3.5. DIG ANCHOR TRENCH.

4. INSTALL NEW GAME FENCE AND GATES.

5. INSTALL GEOMEMBRANES:
   5.1. INSTALL GEOTEXTILE AS NEEDED, SECONDARY LINER, GEONET, LEAK DETECTION SYSTEM AND PRIMARY LINER.
   5.2. INSTALL RUB SHEETS AND WATER LEVEL GAGE/LADDER.
   5.3. BACKFILL AND COMPACT ANCHOR TRENCH.

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ENGINEERING SHEET:
GENERAL NOTES
OF

PROJECT NAME:
TSW NOLAN EAST AND WEST RECYCLING FACILITY & CONTAINMENTS
FOR

CLIENT:
VAUGHN OPERATING

PROJECT NUMBER:
25084

PROJECT ENGINEER:
JEREMY BAKER, PE

DRAWN BY:
X. CLARK

REVISIONS

No.	DATE	DESCRIPTION
1	4/29/25	PROJECT NAME UPDATED

JEREMY BAKER NEW MEXICO 16207 LICENSED PROFESSIONAL ENGINEER
04/29/2025

SHEET:
3 of 14
C-101

EARTHWORK (CU.YD.)	
CUT	201,958
*FILL	199,260
NET	2,698.14 CUT
*FILL FACTOR USED FOR THIS PROJECT IS 1.2	

LINER QUANTITIES (SQFT)	
EAST CONTAINMENT	517,341
WEST CONTAINMENT	372,900

EXISTING MATADOR PIPELINE

N=521230.04
E=591972.97
FG=3152.10'

N=521183.36
E=591942.97
FG=3152.10'

N=521103.25
E=591891.49
FG=3134.94'

PROPERTY LINE

N=520931.00
E=591390.50
FG=3152.10'

N=520917.16
E=591360.20
FG=3152.10'

N=520832.63
E=591304.59
FG=3134.17'

N=520896.68
E=591442.67
FG=3134.47'

N=520646.60
E=590767.88
FG=3152.10'

N=520665.92
E=590737.95
FG=3152.10'

N=520609.69
E=590825.08
FG=3132.99'

N=520240.70
E=590822.78
FG=3133.28'

CAPACITY
819,663 BBL
AT FREEBOARD

CAPACITY
1,157,895 BBL
AT FREEBOARD

N=520309.23
E=591220.86
FG=3127.10'

N=520309.16
E=591500.98
FG=3127.10'

N=520250.23
E=591279.86
FG=3130.10'

N=520250.23
E=591441.91
FG=3130.10'

8 FOOT GAME FENCE

N=520241.33
E=591885.87
FG=3133.07'

N=520184.22
E=591942.97
FG=3152.10'

N=520154.22
E=590735.97
FG=3152.10'

N=520114.77
E=591537.32
FG=3138.95'

N=520154.22
E=591972.97
FG=3152.10'

N=520184.22
E=590766.08
FG=3152.10'

N=520087.51
E=591002.85
FG=3129.86'

N=520184.22
E=591344.46
FG=3152.10'

N=520184.22
E=591374.47
FG=3152.10'

N=520085.60
E=591530.32
FG=3138.80'

N=520095.25
E=591041.99
FG=3130.32'

N=520124.22
E=591343.29
FG=3152.00'

N=520124.22
E=591373.29
FG=3152.00'

N=520065.85
E=591047.98
FG=3129.72'

EXISTING PIPELINE

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ENGINEERING SHEET:
CIVIL SITE PLAN
OF

PROJECT NAME:
TSW NOLAN EAST AND WEST RECYCLING FACILITY & CONTAINMENTS
FOR

CLIENT:
VAUGHN OPERATING

PROJECT NUMBER:
25084

PROJECT ENGINEER:
JEREMY BAKER, PE

DRAWN BY:
X. CLARK

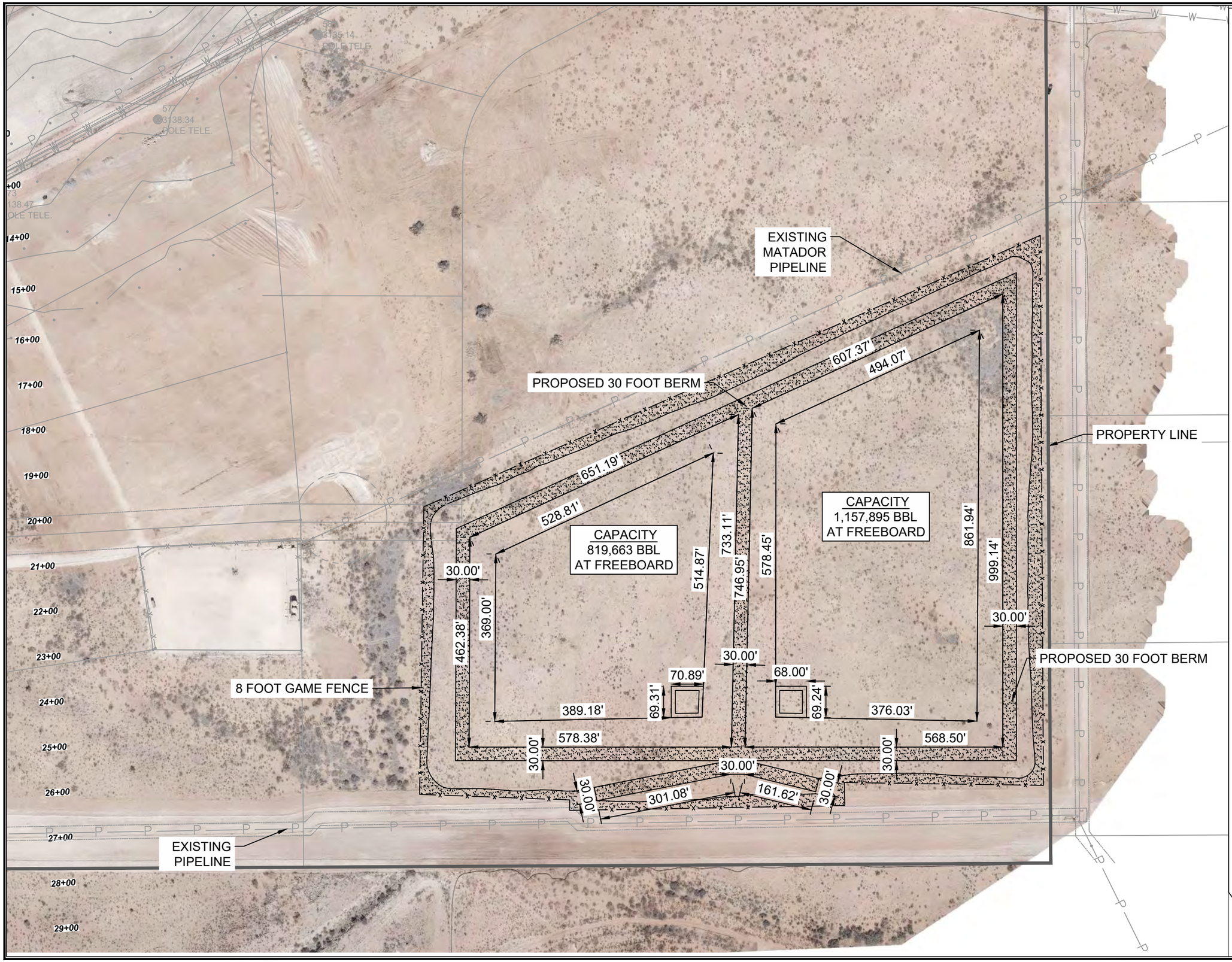
GRAPHIC SCALE
0 100' 200'
SCALE: 1" = 200'
(IN FEET)

REVISIONS

No.	DATE	DESCRIPTION
1	4/29/25	PROJECT NAME UPDATED

JEREMY BAKER
NEW MEXICO
16207
LICENSED PROFESSIONAL ENGINEER
04/29/2025

SHEET:
4 of 14
CS-101



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ENGINEERING SHEET:
MASTER LAYOUT
OF

PROJECT NAME:
TSW NOLAN EAST AND WEST RECYCLING FACILITY & CONTAINMENTS
FOR

CLIENT:
VAUGHN OPERATING

PROJECT NUMBER:
25084

PROJECT ENGINEER:
JEREMY BAKER, PE

DRAWN BY:
X. CLARK

GRAPHIC SCALE
0 100' 200'
SCALE: 1" = 200'
(IN FEET)

REVISIONS

No.	DATE	DESCRIPTION
1	4/29/25	PROJECT NAME UPDATED

JEREMY BAKER
NEW MEXICO
16207
LICENSED PROFESSIONAL ENGINEER
04/29/2025

SHEET:
5 of 14
CS-102

FENCE QUANTITIES	
FENCE LENGTH (LIN. FT)	4,782
AREA WITHIN FENCE (AC)	29.5
GATES	2

FENCE
N 521,312.42
E 592,025.55

EXISTING
MATADOR
PIPELINE

61.74'
19.85'
19.68'
23.83'
26.95'
33.42'
24.09'
18.48'
28.23'

PROPERTY LINE

FENCE
N 520,713.76
E 590,666.35

CAPACITY
819,663 BBL
AT FREEBOARD

CAPACITY
1,157,895 BBL
AT FREEBOARD

19.90'
30.63'
25.52'
19.96'
39.68'

24.83'
23.23'
17.68'

8 FOOT GAME FENCE

FENCE
N 520,106.00
E 591,593.48

FENCE
N 520,067.65
E 590,987.85

27.99'
22.53'

45.21'
15.21'
24.89'
15.88'

FENCE
N 520,079.79
E 590,656.99

PROPOSED 20 FOOT GATE

PROPOSED 20 FOOT GATE

FENCE
N 520,099.67
E 592,032.48

EXISTING
PIPELINE

FENCE
N 520,044.52
E 590,987.85

FENCE
N 520,055.14
E 591,594.37

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ENGINEERING SHEET:
FENCE LAYOUT

OF

PROJECT NAME:
TSW NOLAN EAST AND WEST RECYCLING FACILITY & CONTAINMENTS

FOR

CLIENT:
VAUGHN OPERATING

PROJECT NUMBER:
25084

PROJECT ENGINEER:
JEREMY BAKER, PE

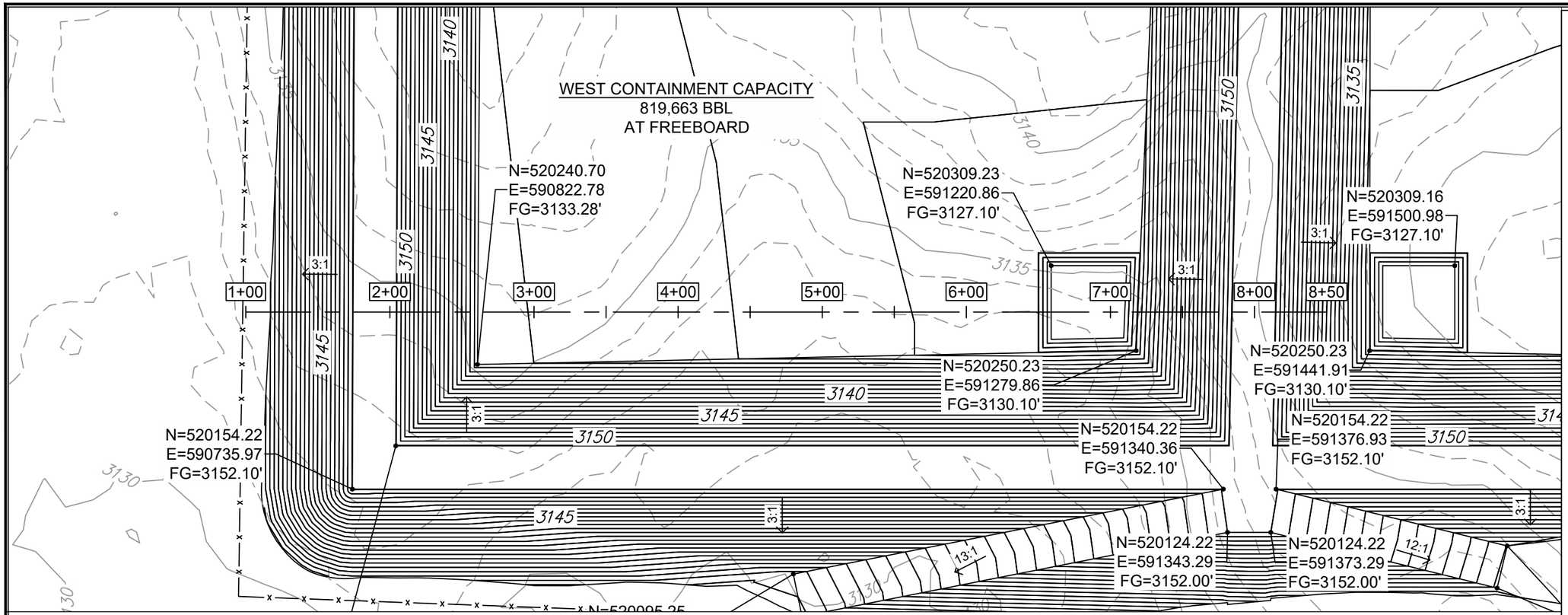
DRAWN BY:
X. CLARK

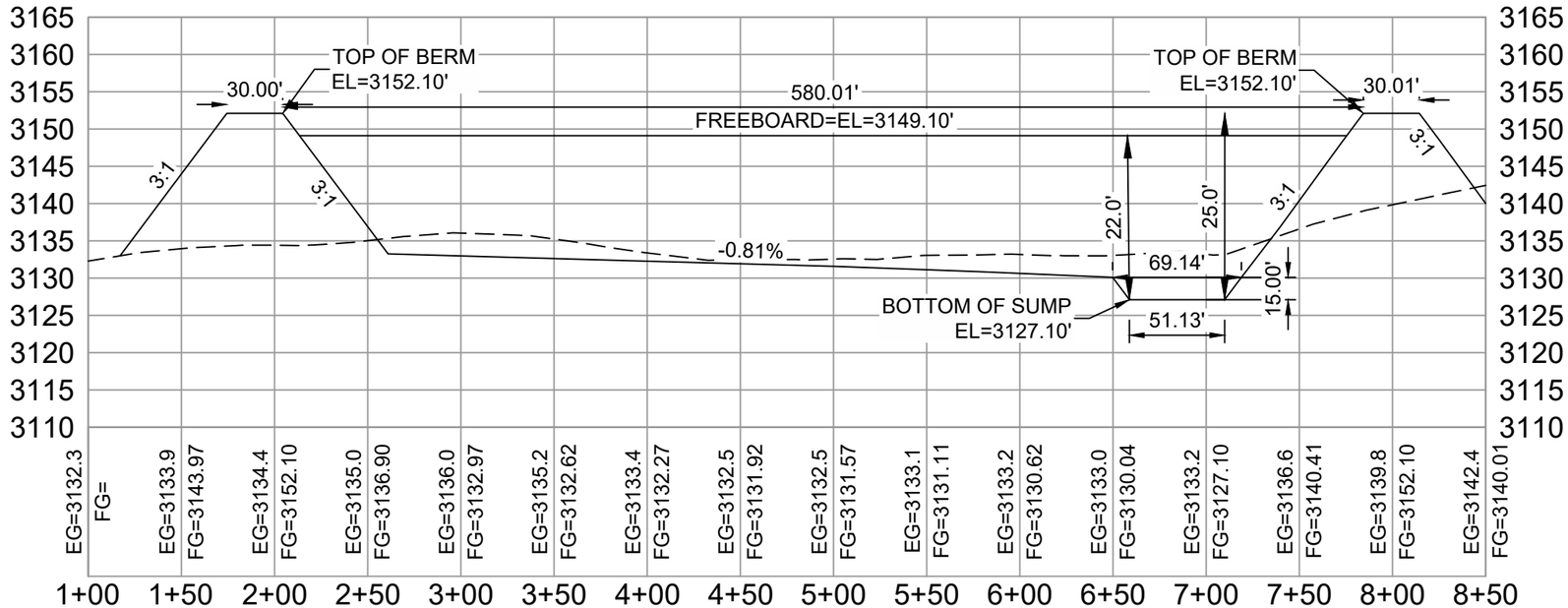
GRAPHIC SCALE
0 100' 200'
SCALE: 1" = 200'
(IN FEET)

REVISIONS		
No.	DATE	DESCRIPTION
1	4/29/25	PROJECT NAME UPDATED

JEREMY BAKER
NEW MEXICO
16207
LICENSED PROFESSIONAL ENGINEER
04/29/2025

SHEET:
6 of 14
CS-103





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ENGINEERING SHEET:
WEST FRAC CONTAINMENT WEST TO EAST P&P OF

PROJECT NAME:
TSW NOLAN EAST AND WEST RECYCLING FACILITY & CONTAINMENTS

FOR

CLIENT:
VAUGHN OPERATING

PROJECT NUMBER:
25084

PROJECT ENGINEER:
JEREMY BAKER, PE

DRAWN BY:
X.CLARK

GRAPHIC SCALE
HORIZONTAL
0 40' 80'
SCALE: 1" = 80'
(IN FEET)

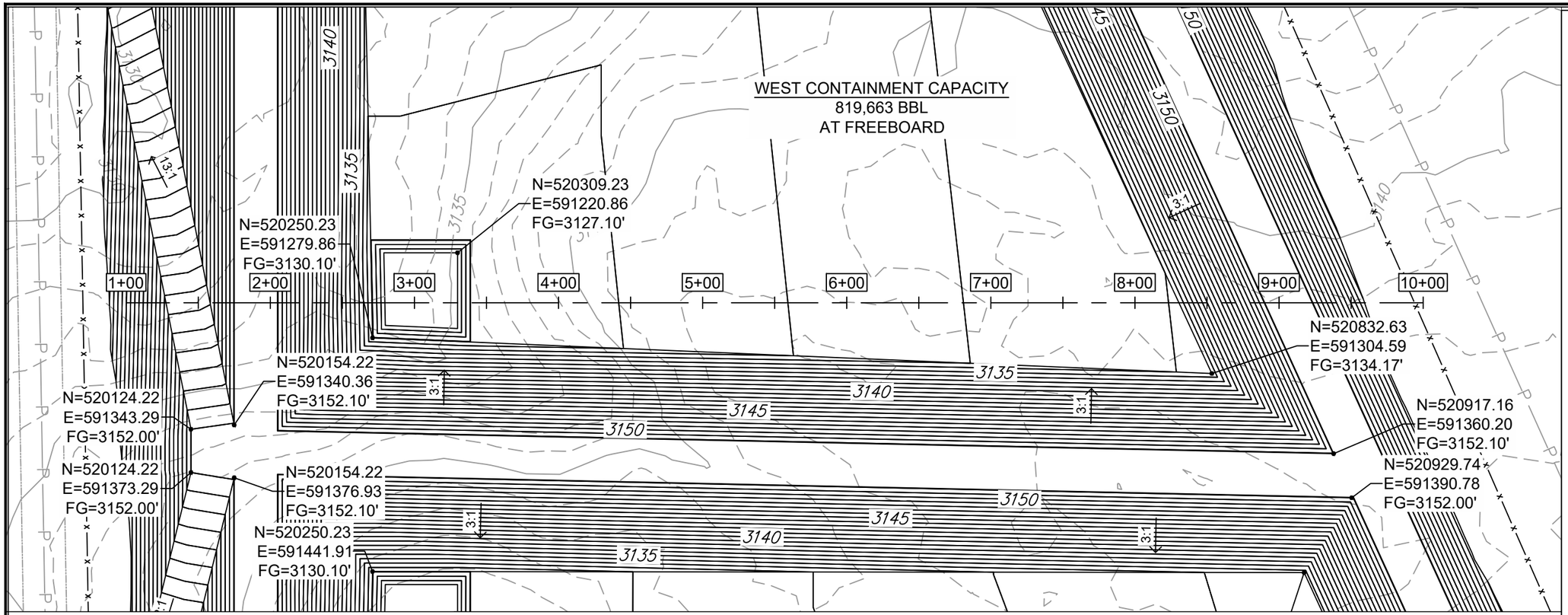
GRAPHIC SCALE
VERTICAL
0 10' 20'
SCALE: 1" = 20'
(IN FEET)

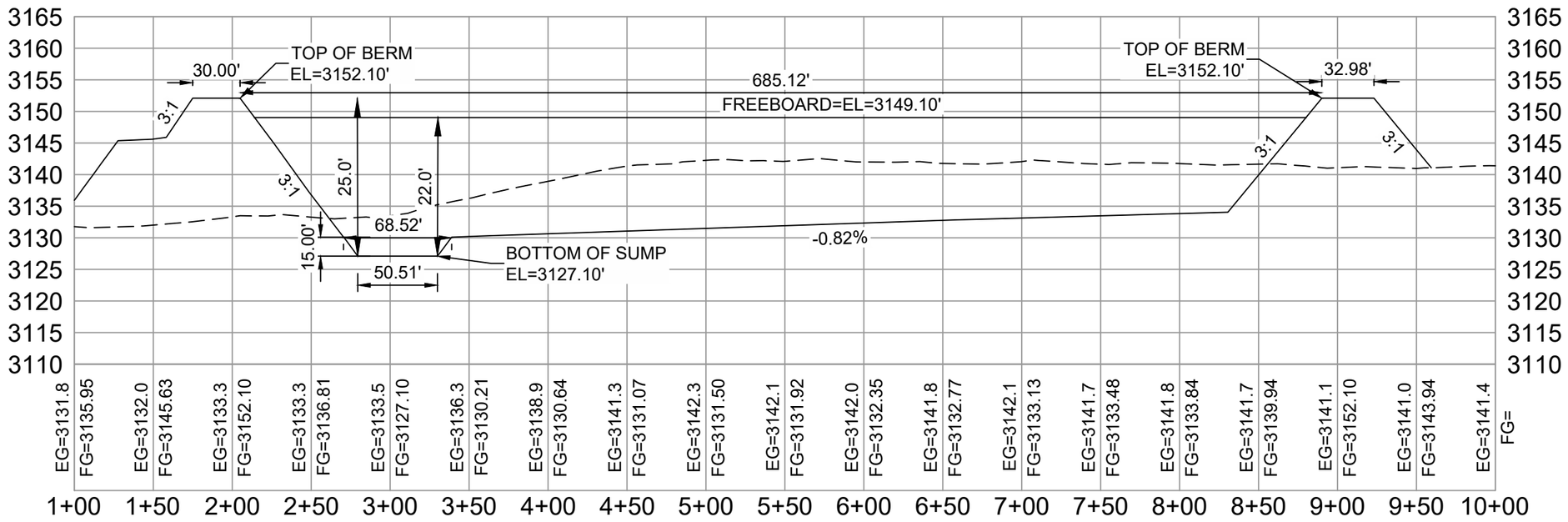
REVISIONS

No.	DATE	DESCRIPTION
1	4/29/25	PROJECT NAME UPDATED

JEREMY BAKER
NEW MEXICO
16207
LICENSED PROFESSIONAL ENGINEER
04/29/2025

SHEET:
7 of 14
CS-104





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ENGINEERING SHEET:
WEST FRAC CONTAINMENT NORTH TO SOUTH P&P
OF
PROJECT NAME:
TSW NOLAN EAST AND WEST RECYCLING FACILITY & CONTAINMENTS
FOR
CLIENT:
VAUGHN OPERATING

PROJECT NUMBER:
25084

PROJECT ENGINEER:
JEREMY BAKER, PE
DRAWN BY:
X.CLARK

GRAPHIC SCALE
HORIZONTAL
0 40' 80'
SCALE: 1" = 80'
(IN FEET)
GRAPHIC SCALE
VERTICAL
0 10' 20'
SCALE: 1" = 20'
(IN FEET)

REVISIONS

No.	DATE	DESCRIPTION
1	4/29/25	PROJECT NAME UPDATED

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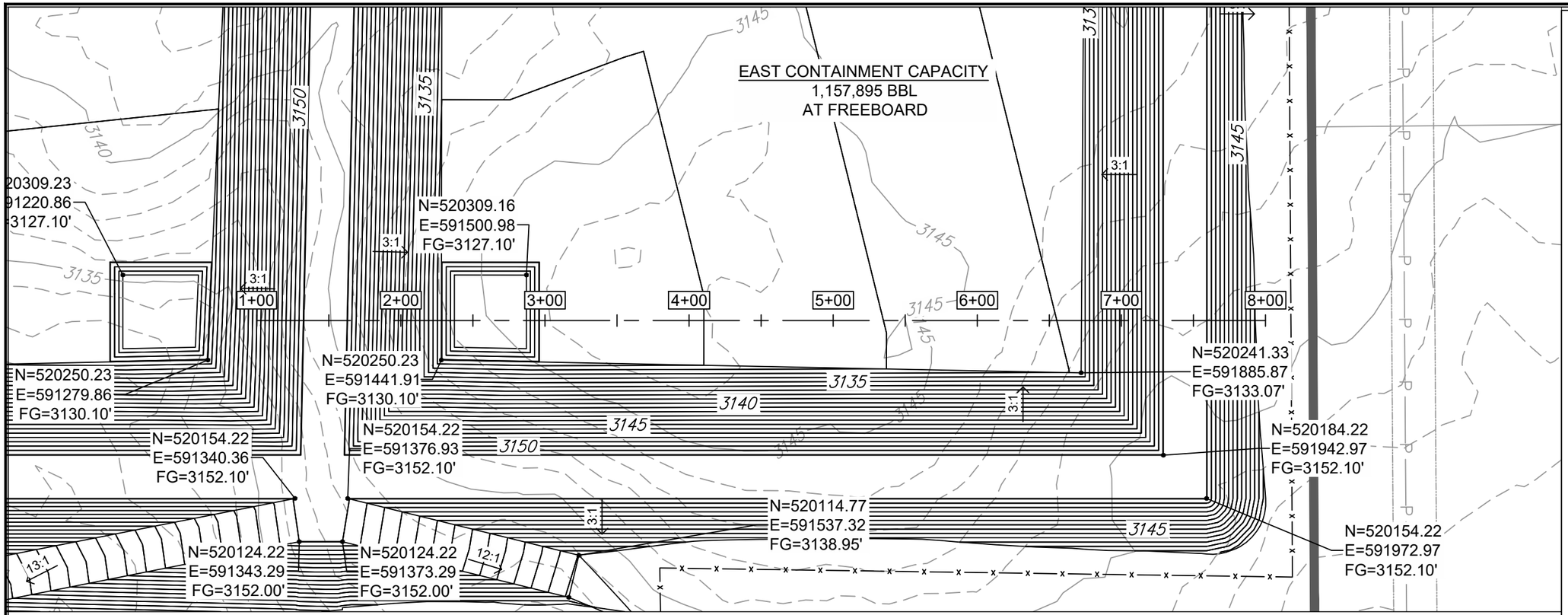
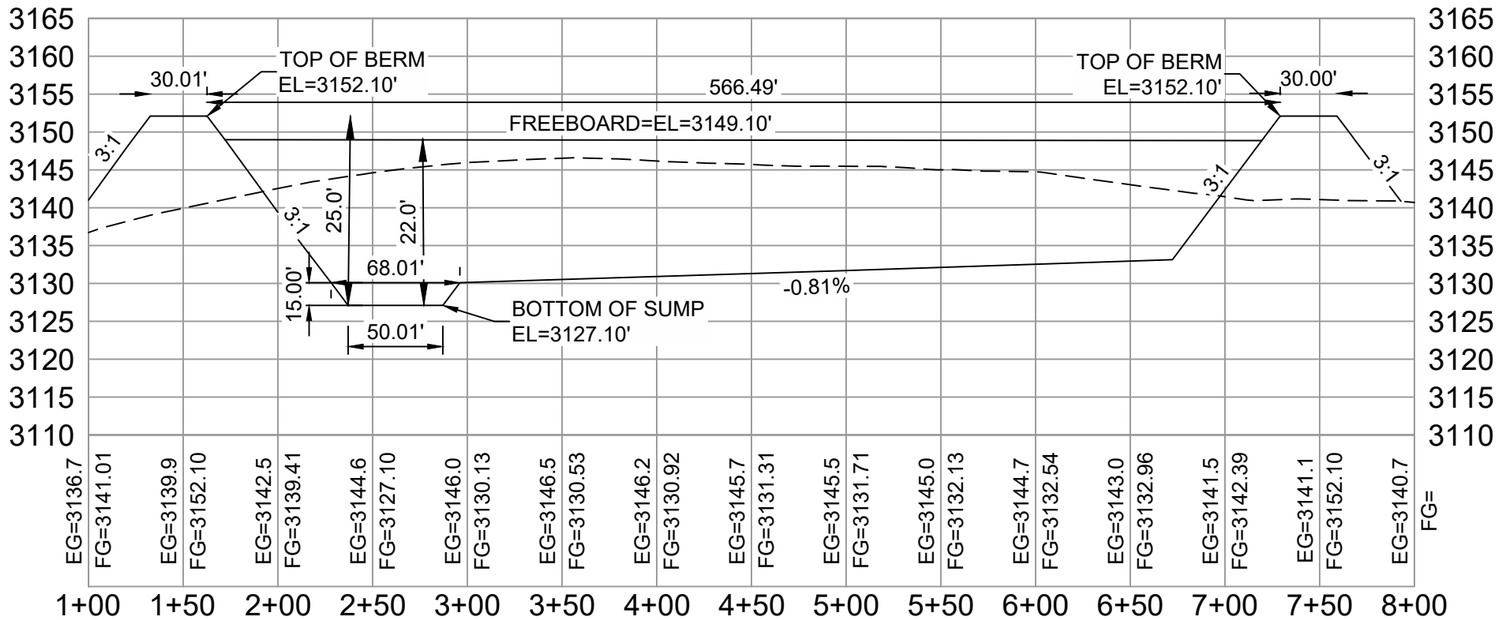
LICENSED PROFESSIONAL ENGINEER
04/29/2025

SHEET:
8 of 14
CS-105





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ENGINEERING SHEET:
EAST FRAC CONTAINMENT WEST TO EAST P&P
OF

PROJECT NAME:
TSW NOLAN EAST AND WEST RECYCLING FACILITY & CONTAINMENTS
FOR

CLIENT:
VAUGHN OPERATING

PROJECT NUMBER:
25084

PROJECT ENGINEER:
JEREMY BAKER, PE

DRAWN BY:
X.CLARK

GRAPHIC SCALE
HORIZONTAL
0 40' 80'
SCALE: 1" = 80'
(IN FEET)

GRAPHIC SCALE
VERTICAL
0 10' 20'
SCALE: 1" = 20'
(IN FEET)

REVISIONS

No.	DATE	DESCRIPTION
1	4/29/25	PROJECT NAME UPDATED

JEREMY BAKER
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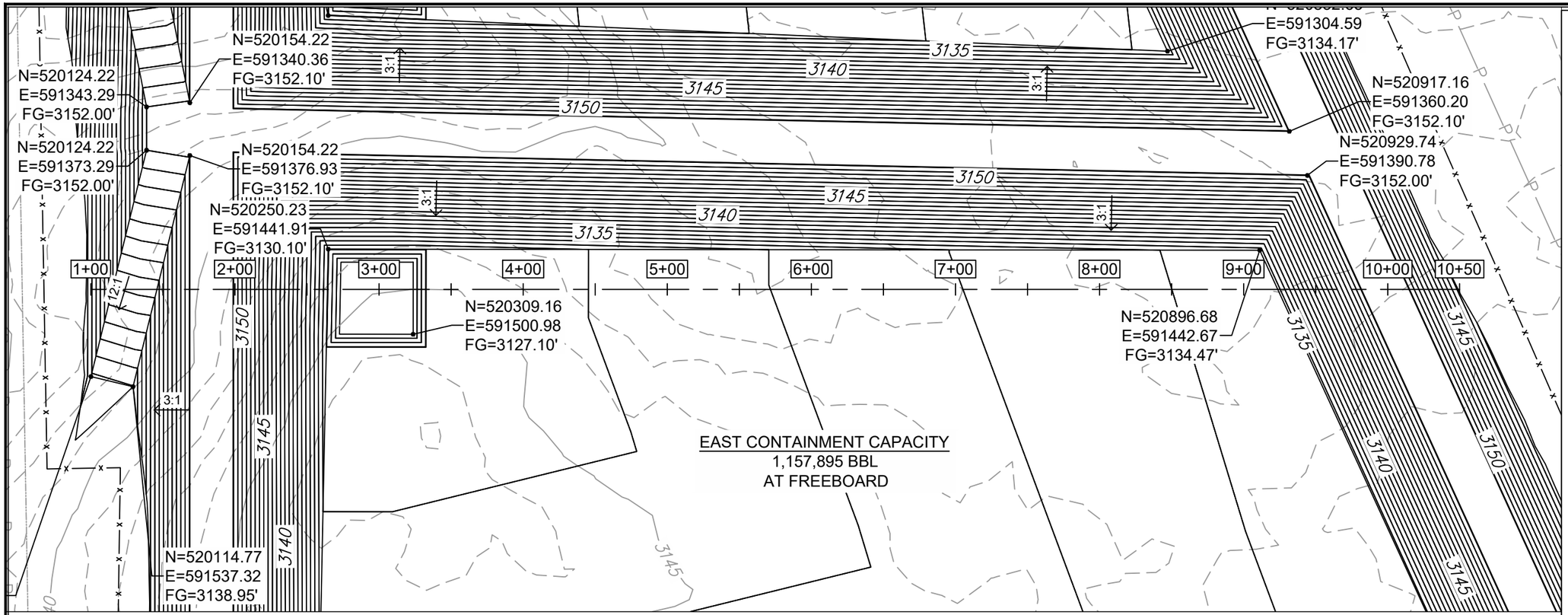
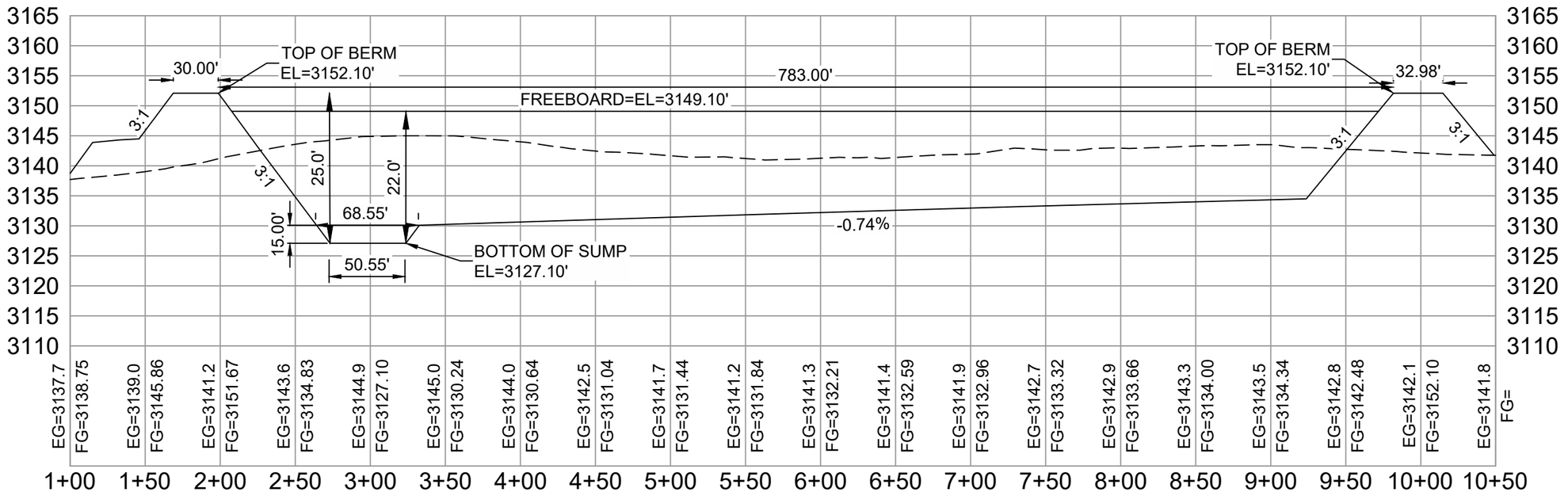
LICENSED PROFESSIONAL ENGINEER
04/29/2025

SHEET:
9 of 14
CS-106





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ENGINEERING SHEET:
EAST FRAC CONTAINMENT NORTH TO SOUTH P&P OF

PROJECT NAME:
TSW NOLAN EAST AND WEST RECYCLING FACILITY & CONTAINMENTS FOR

CLIENT:
VAUGHN OPERATING

PROJECT NUMBER:
25084

PROJECT ENGINEER:
JEREMY BAKER, PE

DRAWN BY:
X.CLARK

GRAPHIC SCALE
HORIZONTAL
0 40' 80'
SCALE: 1" = 80'
(IN FEET)

GRAPHIC SCALE
VERTICAL
0 10' 20'
SCALE: 1" = 20'
(IN FEET)

REVISIONS

No.	DATE	DESCRIPTION
1	4/29/25	PROJECT NAME UPDATED

JEREMY BAKER
NEW MEXICO
16207
LICENSED PROFESSIONAL ENGINEER
04/29/2025

SHEET:
10 of 14
CS-107

WEST CONTAINMENT

ELEVATION (FT)	CONTAINMENT DEPTH (FT)	REMAINING STORAGE (FT)	REMAINING STORAGE VOL (FT3)	REMAINING STORAGE VOL (GAL)	REMAINING STORAGE VOL (BBL)	PERCENT OF TOTAL VOL (%)	VOL IN CONTAINMENT (FT3)	VOL IN CONTAINMENT (GAL)	VOL IN CONTAINMENT (BBL)	VOL IN CONTAINMENT (AC-FT)	PERCENT OF TOTAL VOL (%)	
3,152.10	0	25	0	-	-	0%	5,615,982	42,013,159	1,000,175	128.93	100%	
3,151.10	1	24	345,030	2,581,170	61,448	6%	5,270,952	39,431,989	938,727	121.00	94%	FREEBOARD
3,150.10	2	23	682,863	5,108,496	121,614	12%	4,933,119	36,904,663	878,561	113.25	88%	
3,149.10	3	22	1,013,576	7,582,560	180,512	18%	4,602,406	34,430,599	819,663	105.66	82%	MAX VOLUME
3,148.10	4	21	1,337,247	10,003,943	238,156	24%	4,278,735	32,009,215	762,019	98.23	76%	
3,147.10	5	20	1,653,954	12,373,231	294,560	29%	3,962,028	29,639,928	705,615	90.96	71%	
3,146.10	6	19	1,963,775	14,691,001	349,737	35%	3,652,207	27,322,157	650,438	83.84	65%	
3,145.10	7	18	2,266,787	16,957,837	403,702	40%	3,349,194	25,055,322	596,473	76.89	60%	
3,144.10	8	17	2,563,069	19,174,319	456,468	46%	3,052,913	22,838,840	543,707	70.09	54%	
3,143.10	9	16	2,852,698	21,341,033	508,050	51%	2,763,284	20,672,125	492,125	63.44	49%	STORAGE
3,142.10	10	15	3,135,752	23,458,558	558,460	56%	2,480,230	18,554,601	441,715	56.94	44%	VOLUME
3,141.10	11	14	3,412,308	25,527,477	607,713	61%	2,203,674	16,485,682	392,462	50.59	39%	
3,140.10	12	13	3,682,445	27,548,371	655,823	66%	1,933,537	14,464,788	344,352	44.39	34%	
3,139.10	13	12	3,946,240	29,521,822	702,803	70%	1,669,742	12,491,337	297,372	38.33	30%	
3,138.10	14	11	4,203,771	31,448,412	748,668	75%	1,412,210	10,564,746	251,507	32.42	25%	
3,137.10	15	10	4,455,116	33,328,724	793,431	79%	1,160,866	8,684,435	206,744	26.65	21%	
3,136.10	16	9	4,700,353	35,163,337	837,106	84%	915,629	6,849,822	163,068	21.02	16%	
3,135.10	17	8	4,939,558	36,952,837	879,708	88%	676,423	5,060,322	120,467	15.53	12%	
3,134.10	18	7	5,172,808	38,697,778	921,248	92%	443,173	3,315,380	78,927	10.17	8%	
3,133.10	19	6	5,388,754	40,313,266	959,707	96%	227,228	1,699,892	40,468	5.22	4%	
3,132.10	20	5	5,527,648	41,352,332	984,443	98%	88,334	660,827	15,732	2.03	2%	FLOOR
3,131.10	21	4	5,588,346	41,806,419	995,253	100%	27,635	206,740	4,922	0.63	0%	VOLUME
3,130.10	22	3	5,605,095	41,931,715	998,236	100%	10,887	81,443	1,939	0.25	0%	
3,129.10	23	2	5,609,455	41,964,334	999,013	100%	6,526	48,824	1,162	0.15	0%	SUMP
3,128.10	24	1	5,613,060	41,991,302	999,654	100%	2,922	21,857	520	0.07	0%	VOLUME
3,127.10	25	0	5,615,982	42,013,159	1,000,175	100%	0	0	0	0.00	0%	

EAST CONTAINMENT

ELEVATION (FT)	CONTAINMENT DEPTH (FT)	REMAINING STORAGE (FT)	REMAINING STORAGE VOL (FT3)	REMAINING STORAGE VOL (GAL)	REMAINING STORAGE VOL (BBL)	PERCENT OF TOTAL VOL (%)	VOL IN CONTAINMENT (FT3)	VOL IN CONTAINMENT (GAL)	VOL IN CONTAINMENT (BBL)	VOL IN CONTAINMENT (AC-FT)	PERCENT OF TOTAL VOL (%)	
3,152.10	0	25	0	-	-	0%	7,927,283	59,304,002	1,411,805	181.99	100%	
3,151.10	1	24	483,895	3,620,022	86,179	6%	7,443,387	55,683,980	1,325,626	170.88	94%	FREEBOARD
3,150.10	2	23	959,103	7,175,051	170,811	12%	6,968,179	52,128,950	1,240,994	159.97	88%	
3,149.10	3	22	1,425,702	10,665,680	253,910	18%	6,501,580	48,638,322	1,157,895	149.26	82%	MAX VOLUME
3,148.10	4	21	1,883,771	14,092,490	335,489	24%	6,043,512	45,211,512	1,076,316	138.74	76%	
3,147.10	5	20	2,333,388	17,456,073	415,563	29%	5,593,895	41,847,929	996,241	128.42	71%	
3,146.10	6	19	2,774,631	20,757,011	494,146	35%	5,152,652	38,546,991	917,658	118.29	65%	
3,145.10	7	18	3,207,578	23,995,895	571,252	40%	4,719,704	35,308,107	840,553	108.35	60%	
3,144.10	8	17	3,632,310	27,173,310	646,894	46%	4,294,973	32,130,692	764,911	98.60	54%	
3,143.10	9	16	4,048,903	30,289,844	721,087	51%	3,878,380	29,014,158	690,718	89.04	49%	STORAGE
3,142.10	10	15	4,457,437	33,346,083	793,844	56%	3,469,846	25,957,919	617,960	79.66	44%	VOLUME
3,141.10	11	14	4,857,989	36,342,617	865,181	61%	3,069,294	22,961,385	546,624	70.46	39%	
3,140.10	12	13	5,250,639	39,280,029	935,109	66%	2,676,644	20,023,973	476,695	61.45	34%	
3,139.10	13	12	5,635,464	42,158,909	1,003,645	71%	2,291,818	17,145,093	408,160	52.61	29%	
3,138.10	14	11	6,012,544	44,979,841	1,070,800	76%	1,914,739	14,324,161	341,004	43.96	24%	
3,137.10	15	10	6,381,956	47,743,415	1,136,591	81%	1,545,326	11,560,587	275,214	35.48	19%	
3,136.10	16	9	6,743,780	50,450,219	1,201,029	85%	1,183,503	8,853,783	210,775	27.17	15%	
3,135.10	17	8	7,098,093	53,100,836	1,264,131	90%	829,189	6,203,166	147,674	19.04	10%	
3,134.10	18	7	7,431,170	55,592,586	1,323,450	94%	496,112	3,711,416	88,355	11.39	6%	
3,133.10	19	6	7,681,718	57,466,934	1,368,071	97%	245,564	1,837,068	43,734	5.64	3%	
3,132.10	20	5	7,830,117	58,577,103	1,394,500	99%	97,166	726,899	17,305	2.23	1%	FLOOR
3,131.10	21	4	7,897,932	59,084,428	1,406,577	100%	29,351	219,574	5,227	0.67	0%	VOLUME
3,130.10	22	3	7,916,650	59,224,461	1,409,911	100%	10,632	79,540	1,894	0.24	0%	
3,129.10	23	2	7,920,918	59,256,387	1,410,671	100%	6,365	47,614	1,134	0.15	0%	SUMP
3,128.10	24	1	7,924,438	59,282,721	1,411,298	100%	2,845	21,281	507	0.07	0%	VOLUME
3,127.10	25	0	7,927,283	59,304,002	1,411,805	100%	0	0	0	0.00	0%	

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ENGINEERING SHEET:
VOLUME QUANITITES OF

PROJECT NAME:
TSW NOLAN EAST AND WEST RECYCLING FACILITY & CONTAINMENTS
FOR

CLIENT:
VAUGHN OPERATING

PROJECT NUMBER:
25084

PROJECT ENGINEER:
JEREMY BAKER, PE

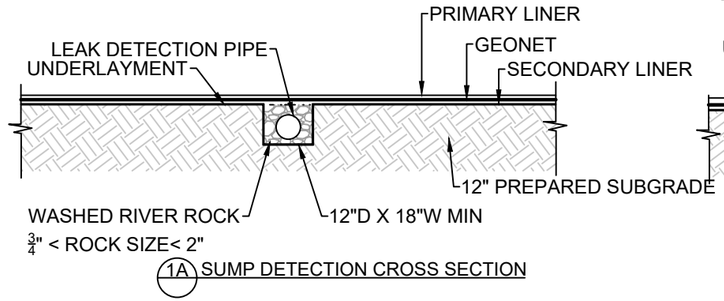
DRAWN BY:
X.CLARK

REVISIONS

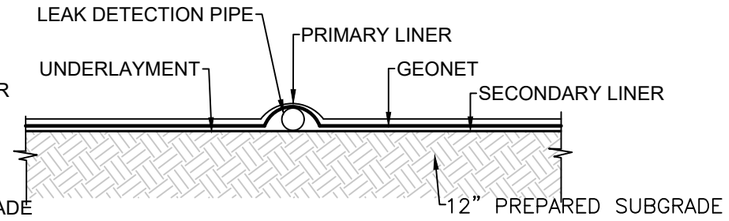
No.	DATE	DESCRIPTION
1	4/29/25	PROJECT NAME UPDATED

JEREMY BAKER
NEW MEXICO
16207
LICENSED PROFESSIONAL ENGINEER
04/29/2025

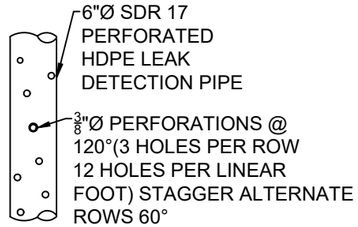
SHEET:
11 of 14
CS-108



1A SUMP DETECTION CROSS SECTION



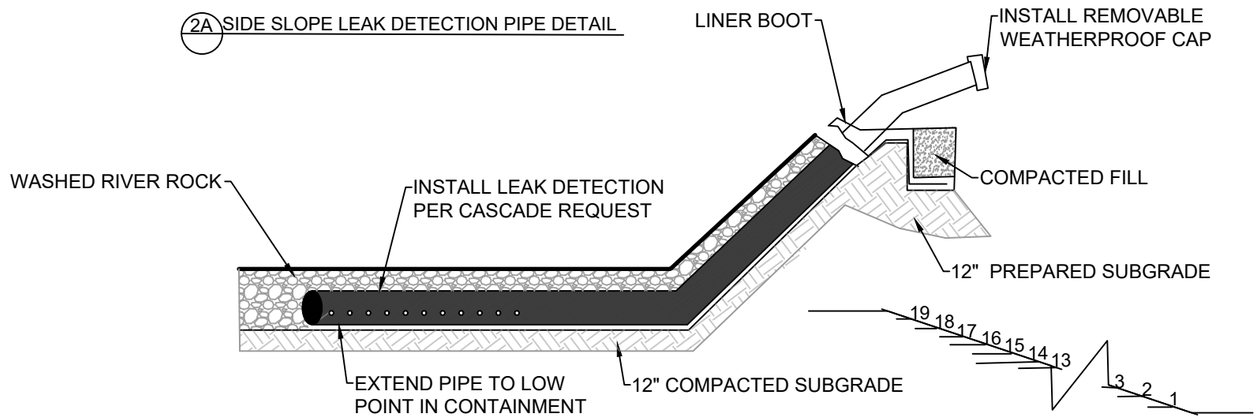
2A SIDE SLOPE LEAK DETECTION PIPE DETAIL



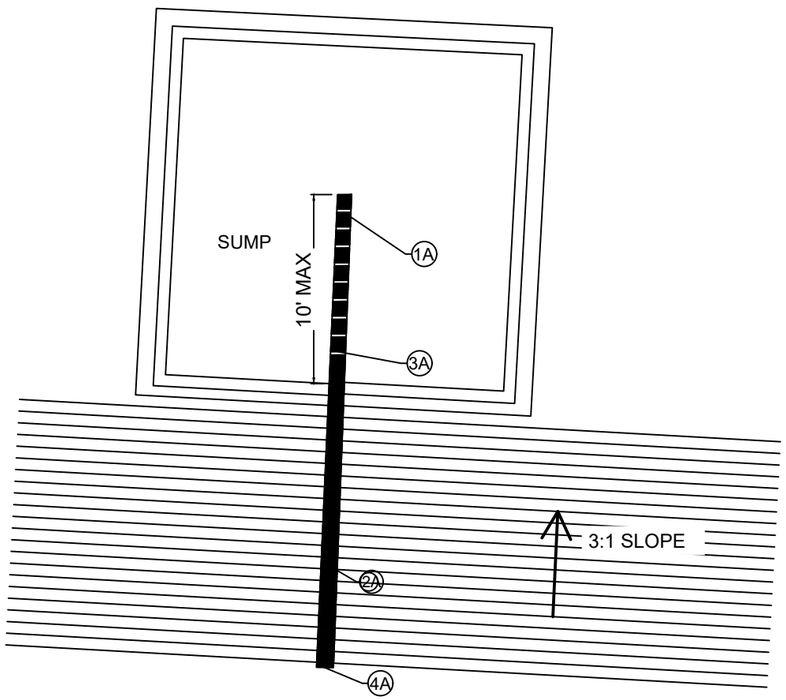
3A PERFORATED PIPE DETAIL

NOTES:

1. LEAK DETECTION SYSTEM TO BE INSTALLED BY OWNER.
2. PERFORATED PIPE TO BE ALONG THE BOTTOM OF THE CONTAINMENT. 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. WASHED RIVER ROCK SHALL BE ¾" MIN @ 2" MAX.



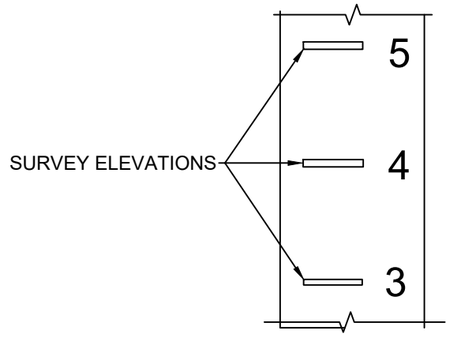
4A LEAK DETECTION/SAMPLING SYSTEM PROFILE



1 CONTAINMENT SUMP PLAN DETAIL

NOTE:

1. LEVEL MARKS TO BE LOCATED BY SURVEYOR
2. MARKS TO BE MADE BY AN EXTRUSION WELDER USING BLACK FILAMENT (OR WHITE FILAMENT ON BLACK LINER)
3. MARKS WILL BE DETERMINE ON THE FIELD BY THE OWNER AND CONTINUE TO THE TOP OF THE BERM.
4. REFERENCE PIT CAPACITY TABLES FOR ACCURATE ELEVATIONS.



2 WATER LEVEL MARKS

PROPOSED PIT REFERENCE TABLE	
DETAIL	DESCRIPTION
PRIMARY LINER	60 MIL HDPE LINER
LEAK DETECTION	200 MIL GEONET
SECONDARY LINER	40 MIL HDPE LINER
UNDERLAYMENT	COMPACTED SUBGRADE/10 OZ GEOTEXTILE
WEST CONTAINMENT	
BOTTOM OF POND	3127.10
BERM (ROAD CREST)	3152.10
EAST CONTAINMENT	
BOTTOM OF POND	3127.10
BERM (ROAD CREST)	3152.10
LEAK DETECTION PIPING	6-IN DR11 X PERFORATED HEPE PIPE LEAK DETECTION PIPE

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ENGINEERING SHEET:
LEAK DETECTION DETAILS
OF

PROJECT NAME: ⚠1
TSW NOLAN EAST AND WEST RECYCLING FACILITY & CONTAINMENTS
FOR

CLIENT:
VAUGHN OPERATING

PROJECT NUMBER:
25084

PROJECT ENGINEER:
JEREMY BAKER, PE

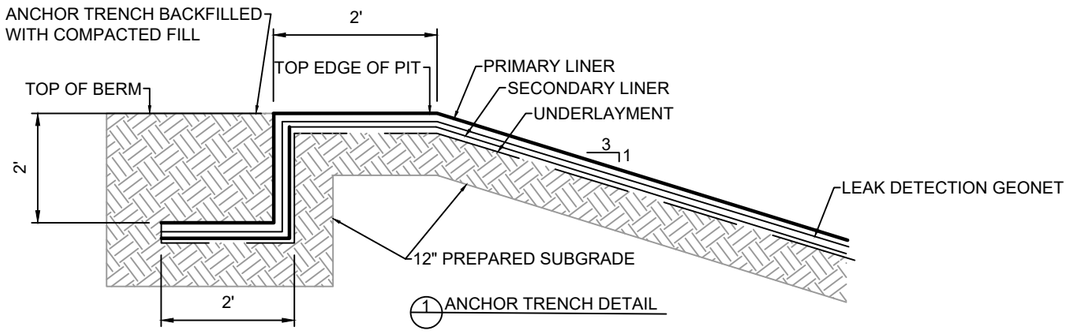
DRAWN BY:
X.CLARK

REVISIONS

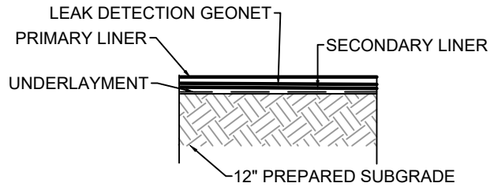
No.	DATE	DESCRIPTION
⚠1	4/29/25	PROJECT NAME UPDATED

JEREMY BAKER NEW MEXICO 16207 LICENSED PROFESSIONAL ENGINEER
04/29/2025

SHEET:
12 of 14
CS-501



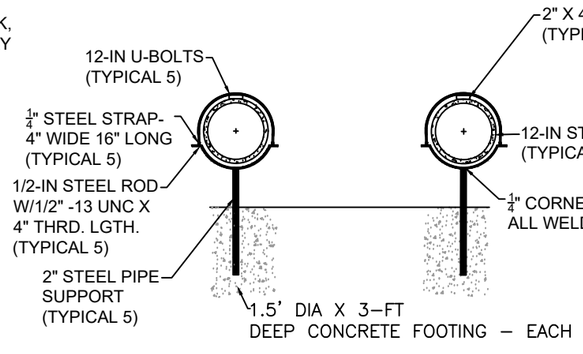
1 ANCHOR TRENCH DETAIL



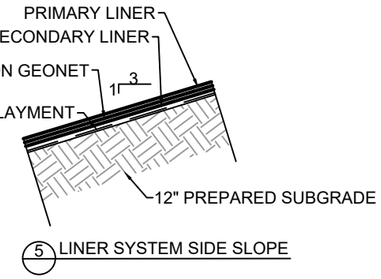
4 LINER SYSTEM FLOOR DETAIL

GENERAL NOTES:

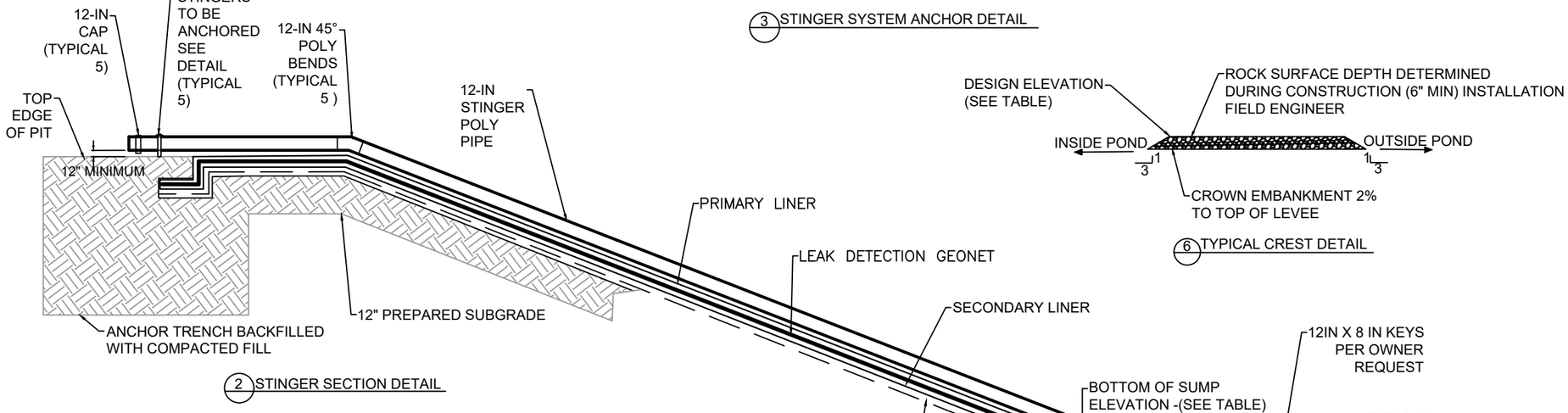
1. PREPARED SUBGRADE MEANS COMPACTED SMOOTH SUBGRADE FREE OF ROCK, ROOTS, WOOD DEBRIS, CONCRETE RUBBLE AND ANY SHARP OBJECTS THAT MAY PUNCTURE THE HDPE LINER, A MINIMUM COMPACTED DEPTH OF 12".
2. ALL INTERIOR SLOPES AND TOP OF BERMS TO BE SMOOTH DRUM ROLLED
3. ALL EMBANKMENT SLOPES SHALL HAVE A SLOPE (H:V RATIO) OF 3:1.
4. COMPACTED EARTH EMBANKMENTS TO BE CONSTRUCTED WITH 12 INCH (MAXIMUM LOOSE LIFTS, COMPACTED TO 95% STANDARD PROCTOR DENSITY)
5. PERFORM GEOTECHNICAL ANALYSIS ON EXISTING SOIL TO CONFIRM SOIL IS SUITABLE FOR USE IN THE LEVEE.
6. LINER SPECIFICATIONS PROVIDED ON SHEET CS - 501



3 STINGER SYSTEM ANCHOR DETAIL



5 LINER SYSTEM SIDE SLOPE



2 STINGER SECTION DETAIL

6 TYPICAL CREST DETAIL

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ENGINEERING SHEET:
LINER DETAILS
OF

PROJECT NAME:
TSW NOLAN EAST AND WEST RECYCLING FACILITY & CONTAINMENTS
FOR

CLIENT:
VAUGHN OPERATING

PROJECT NUMBER:
25084

PROJECT ENGINEER:
JEREMY BAKER, PE

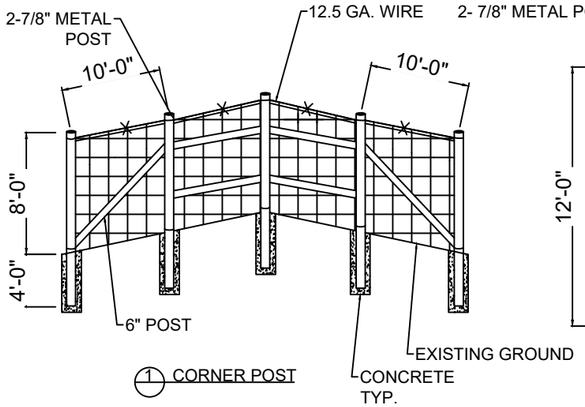
DRAWN BY:
X.CLARK

REVISIONS

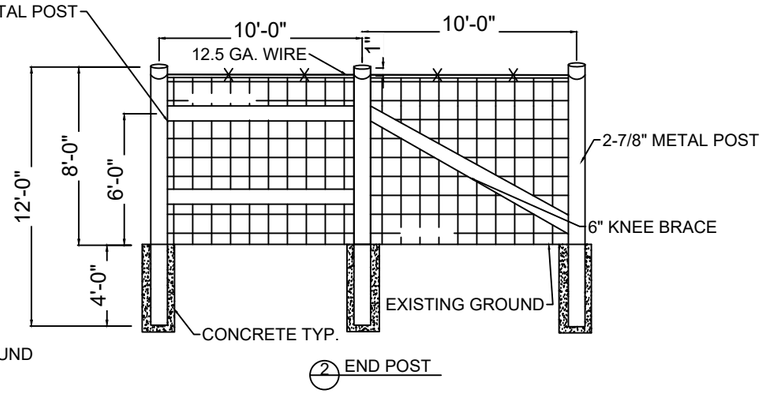
No.	DATE	DESCRIPTION
1	4/29/25	PROJECT NAME UPDATED

JEREMY BAKER NEW MEXICO 16207 LICENSED PROFESSIONAL ENGINEER
04/29/2025

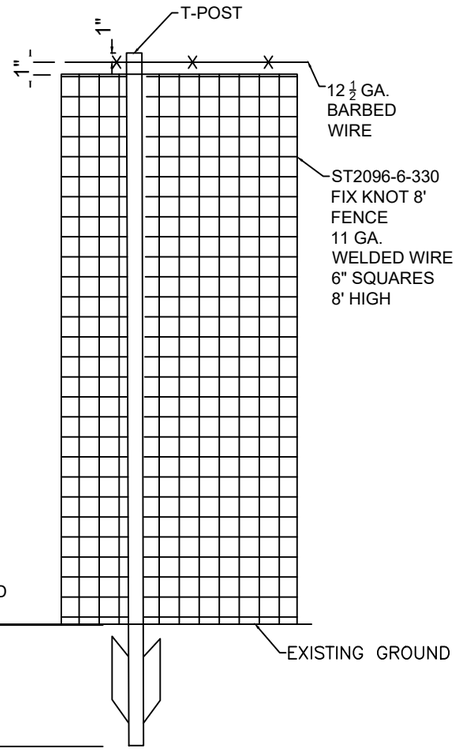
SHEET:
13 of 14
CS-502



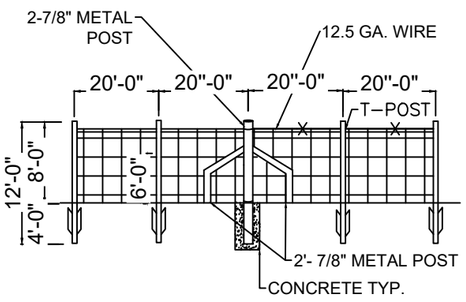
1 CORNER POST



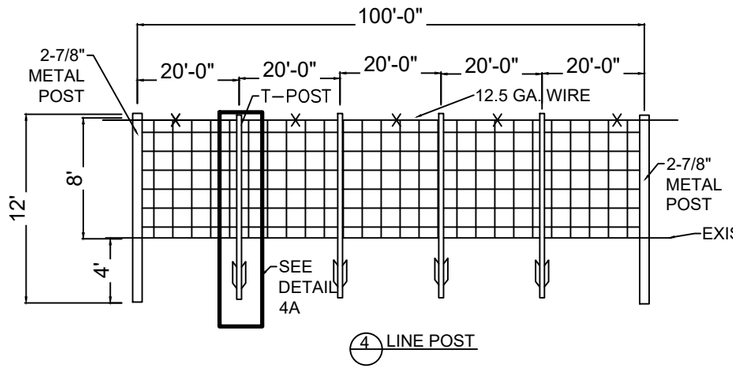
2 END POST



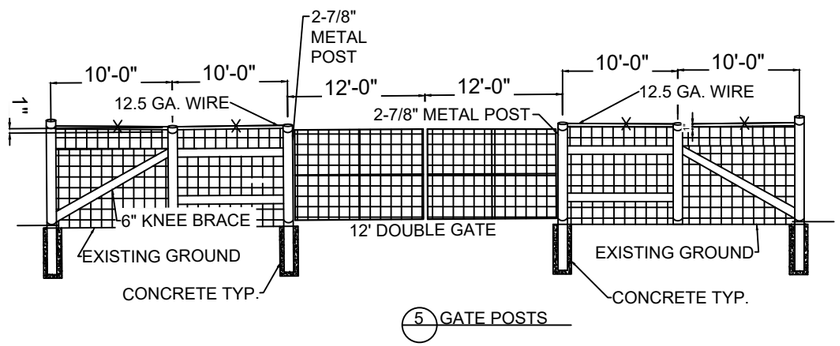
4A METAL POST



3 LINE BRACE POST



4 LINE POST



5 GATE POSTS

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ENGINEERING SHEET:
FENCE DETAILS
OF

PROJECT NAME:
TSW NOLAN EAST AND WEST RECYCLING FACILITY & CONTAINMENTS
FOR

CLIENT:
VAUGHN OPERATING

PROJECT NUMBER:
25084

PROJECT ENGINEER:
JEREMY BAKER, PE

DRAWN BY:
X.CLARK

REVISIONS

No.	DATE	DESCRIPTION
1	4/29/25	PROJECT NAME UPDATED

JEREMY BAKER NEW MEXICO 16207 LICENSED PROFESSIONAL ENGINEER
04/29/2025

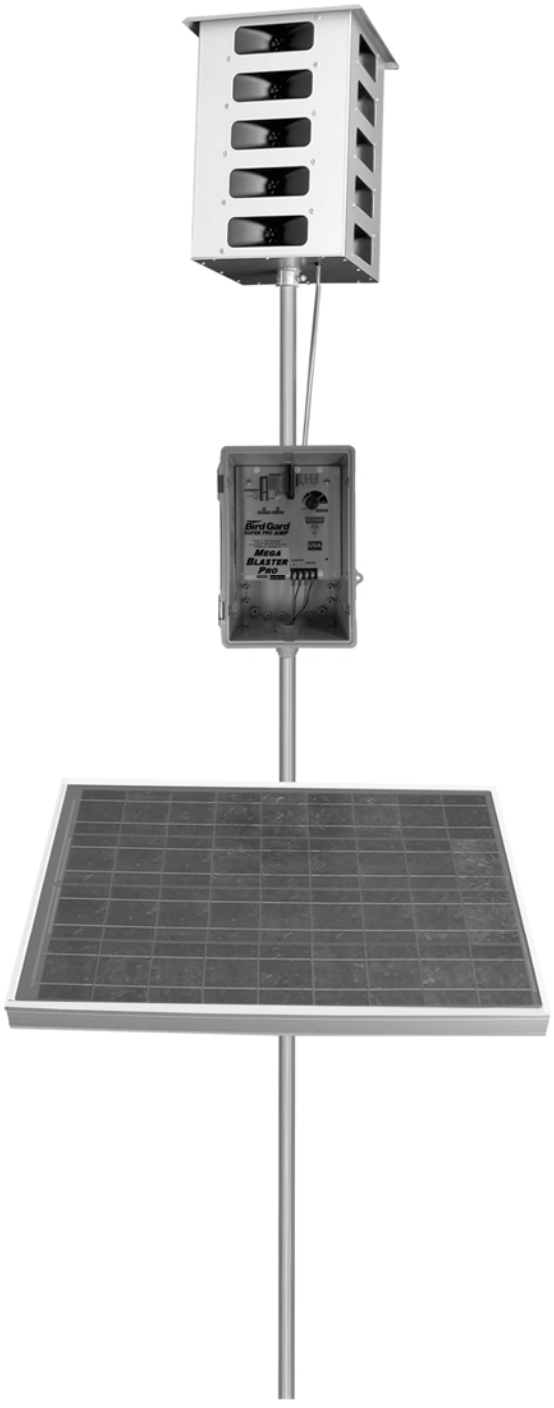
SHEET:
14 of 14
CS-503

AVIAN DETERRENT SYSTEM

MEGA BLASTER PRO

BIRD-X

User's Manual



Overview

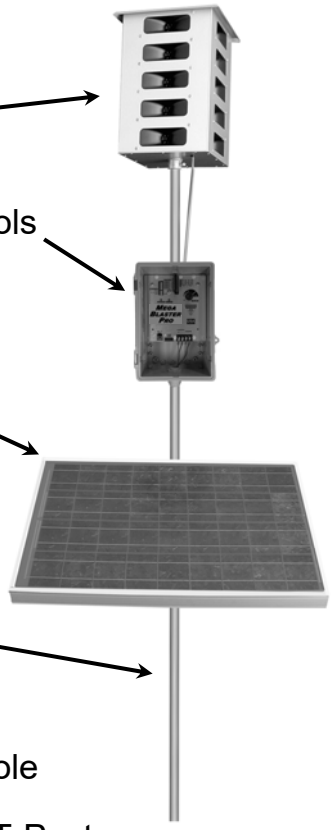
The Bird-X Mega Blaster Pro utilizes the innate power of the natural survival instincts of birds to effectively repel them. Digital recordings of distressed and alarmed birds, along with the sounds made by their natural predators are broadcast through high fidelity weather-resistant speakers over the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

Your Bird-X Mega Blaster Pro system consists of:

20-Speaker Tower broadcasts the bird sounds

Control Unit produces the bird sounds and contains all operational controls

Solar Panel recharges the 12-volt deep cycle battery



Items needed but not included:

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

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

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

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

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

Bird Control Management Guidelines

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

For best results:

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

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

DESIGN/CONSTRUCTION PLAN

Design and Construction Plan In Ground Containments

This plan addresses construction of the earthen containments.

Magrym Engineers is providing the design of the containment and their plans are presented in this submission.

Dike Protection and Structural Integrity

The design and operation provide for the confinement of produced water, prevention of releases and prevention of 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 (a berm) and/or diversion ditch (between the levee and the soil stockpile) to prevent run-on of surface water.

19.15.34.12 A Design and Construction Specifications
(1). The operator shall design and construct a recycling containment to ensure the confinement of produced water, to prevent releases and to prevent overtopping due to wave action or rainfall.
(8). The operator of a recycling containment shall design the containment to prevent run-on of surface water. The containment shall be surrounded by a berm, ditch or other diversion 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.

19.15.34.12 B. Prior to constructing containment, the operator shall strip and stockpile the topsoil for use as the final cover or fill at the time of closure

Signage

The operator will place an upright sign no less than 12 inches by 24 inches 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:

- the operator's name,
- the location of the site by quarter-quarter or unit letter, section, township and range, and
- emergency telephone numbers

19.15.34.12 C. Signs.
The operator shall post an upright sign no less than 12 inches by 24 inches with lettering not less than two inches in height in a conspicuous place on the fence surrounding the containment. The operator shall post the sign in a manner and location such that a person can easily read the legend. The sign shall provide the following information: the operator's name, the location of the site by quarter-quarter or unit letter, section, township and range, and emergency telephone numbers

Fencing

The operator will provide for a fence to enclose the recycling containment in a manner that deters unauthorized wildlife and human access. As specified in the design drawings, the operator will employ a chain-link or game fence. If required by the District Office, the operator will add four-strands of barbed wire to comply with the text of the Rule. Because feral pigs, javelina and deer are present in the area, a chain link or game fence is required in order to comply with Section 19.15.34.12 D.1 of the Rule because pigs will move beneath the lower strand of a 4-strand, 4-foot high barbed wire fence and deer will jump over. However, 19.15.34.12 D.2 requires "a four-foot fence that has at least four strands of barbed wire evenly spaced in the interval between one foot and four feet above ground level". Therefore, a barbed wire specification will be added to the game fence to avoid a variance if required by the OCD District Office.

19.15.34.12 D. Fencing
(1) The operator shall fence or enclose a recycling containment in a manner that deters unauthorized wildlife and human access and shall maintain the fences in good repair. The operator shall ensure that all gates associated with the fence are closed and locked when responsible personnel are not onsite.
(2) Recycling containments shall be fenced with a four-foot fence that has at least four strands of barbed wire evenly spaced in the interval between one foot and four feet above ground level.

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 perimeter game/chain-link fence will be effective in excluding stock and most terrestrial wildlife. If requested by the surface owner, the game fence can include a fine mesh from the base to 1 foot above the ground to exclude the small reptiles (e.g. dune sagebrush lizard).

19.15.34.12 E Netting.
The operator shall ensure that a recycling containment is screened, netted or otherwise protective of wildlife, including migratory birds. The operator shall on a monthly basis inspect for and, 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.

The recycling containment will be protective of wildlife, including migratory birds through the implementation of an Avian Protection Plan, routine inspections and the perimeter fence.

The avian protection plan includes the use of a Bird-X Mega Blaster Pro[1] as a primary hazing program for avian species. The device will be equipped with sounds suitable for the Permian Basin environment. In addition to this sonic device, staff will routinely inspect the containment for the presence of avian species and, if detected, will use a blank cartridge or shell in a handgun, starter pistol or shotgun as additional hazing. Decoys of birds of prey may be placed on the game fence and other roosts around the open water to provide additional hazing.

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

Earthwork

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 is required under the liner when needed to reduce localized stress-strain or protuberances that otherwise may compromise the liner's integrity.

19.15.34.12 A
(2) A recycling containment shall 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 is required under the liner when needed to reduce localized stress-strain or protuberances that otherwise may compromise the liner's integrity…

This volume provides the stamped drawings for the containment with the following design/construction specifications:

a) levee has inside grade no steeper than two horizontal feet to one vertical foot (2H: 1V).

b) levee outside grade is no steeper than three horizontal feet to one vertical foot (3H: 1V)
c) top of the levee is wide enough to install an anchor trench and provide adequate room for inspection and maintenance.
d) The containment floor design calls for a slope toward the sump in the corner(s).

19.15.34.12 A
(2) …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). The levee shall have an outside grade no steeper than three horizontal feet to one vertical foot (3H:1V). The top of the levee shall be wide enough to install an anchor trench and provide adequate room for inspection and maintenance.

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.

19.15.34.12 A
(3) Each recycling containment shall incorporate, at a minimum, 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 specified in the design drawings and is 40-mil HDPE or thicker and is equivalent to 30-mil LLDPEr (in accordance with a previously approved variance) Liner compatibility meets or exceeds a subsequent relevant publication to EPA SW-846 method 9090A.

19.15.34.12 A
(4) All primary (upper) liners in a recycling containment shall be geomembrane liners composed of an impervious, synthetic material that is resistant to ultraviolet light, petroleum hydrocarbons, salts and acidic and alkaline solutions. All primary liners shall be 30-mil flexible PVC, 45-mil LLDPE string reinforced or 60-mil HDPE liners. Secondary liners shall be 30-mil LLDPE string reinforced or equivalent with a hydraulic conductivity no greater than 1 x 10-9 cm/sec. Liner compatibility shall meet or exceed the EPA SW-846 method 9090A or subsequent relevant publications.

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 in the corner(s) of the containment, as shown in the design drawings. This slope combined with the highly transmissive geonet drainage layer provide for rapid leak detection.

19.15.34.12 A
(7) The operator of a recycling containment shall place a leak detection system between the upper and lower geomembrane liners that shall consist of 200-mil geonet or two feet of compacted soil with a saturated hydraulic conductivity of 1 x 10-5 cm/sec or greater to facilitate drainage. The leak detection system shall consist 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 liners and drainage material will be installed consistent with the Manufacturer's specifications. In addition to any specifications of the Manufacturer, protocols for liner installation include measures to:

i. minimizing liner seams and orient them up and down, not across, a slope of the levee.
ii. use factory-welded seams where possible.
iii. use field seams in geosynthetic material that are thermally seamed and prior to field seaming, overlap liners four to six inches.
iv. minimize the number of field seams and comers and irregularly shaped areas.
v. provide for no horizontal seams within five feet of the

19.15.34.12 A
(5) The operator of a recycling containment shall minimize liner seams and orient them up and down, not across, a slope of the levee. Factory welded seams shall be used where possible. The operator shall ensure field seams in geosynthetic material are thermally seamed. Prior to field seaming, the operator shall overlap liners four to six inches…

slope's toe.

vi. use qualified personnel to perform field welding and testing.

vii. avoid excessive stress-strain on the liner

viii. The edges of all liners are anchored in the bottom of a compacted earth-filled trench that is at least 18 inches deep

19.15.34.12 A
(5) …The operator shall minimize the number of field seams and corners and irregularly shaped areas. There shall be no horizontal seams within five feet of the slope's toe. Qualified personnel shall perform field welding and testing.

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.

19.15.34.12 A
(3) The edges of all liners shall be anchored in the bottom of a compacted earth-filled trench. The anchor trench shall be at least 18 inches deep.

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.

19.15.34.12 A
(6) At a point of discharge into or suction from the recycling containment, the operator shall insure that the liner is protected from excessive hydrostatic force or mechanical damage. External discharge or suction lines shall not penetrate the liner.

Pumping from the containment to hydraulic fracturing operations is the responsibility of stimulation contractors. Typically, 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 if the owner deems necessary during operations.

Leak Detection and Fluid Removal System Installation

The leak detection system, contains the following design elements

a. The 200-mil HyperNet Geonet drainage material between the primary and secondary liner that is sufficiently permeable to allow the transport of fluids to the observation ports (Appendix A).
b. The containment floor is sloped towards the monitoring riser pipe to facilitate the earliest possible leak detection of the containment bottom. A pump may be placed in the observation port to provide for fluid removal.
c. Piping will withstand chemical attack from any seepage, structural loading from stresses and disturbances from overlying water, cover materials, equipment operation or expansion or contraction (see Appendix A).

OPERATIONS AND MAINTENANCE PLAN

CLOSURE PLAN

Operation and Maintenance Plan
In Ground Containments

Overview

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

19.15.34.10 D
Recycling containments may not be used for the disposal of produced water or other oilfield wastes.

The operation of the containment is summarized below.

A. Produced water generated from nearby oil and gas wells is delivered to a treatment system located as indicated in the C-147.
B. Unless specified in the transmittal letter, after treatment, the produced water discharges into the containment.
C. When required, produced water is removed from the containment for E&P operations. At this time, produced water will be used for drilling beneath the freshwater zones (beneath surface casing), for well stimulation (e.g. hydraulic fracturing) and other E&P uses as approved by OCD.
D. Whenever the maximum fluid capacity of the containment is reached, treatment and discharge to the containment ceases (see Freeboard and Overtopping Plan, below).
E. 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 (see attached example).
F. 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.

19.15.34.9 E
The operator of a recycling facility shall 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.

19.15.34.9 F
The operator of a recycling facility shall 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.

G. 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.

19.15.34.13 C
A recycling 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 must 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 discovery, 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 Monitoring, Inspection, and Reporting Plan; below), 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 on site, 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.

19.15.34.13 B
(4) If the containment's primary liner is compromised above the fluid's surface, the operator shall 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.
(5) If the primary liner is compromised below the fluid's surface, the operator shall remove all fluid above the damage or leak within 48 hours of discovery, notify the division district office and repair the damage or replace the primary liner.

19.15.34.13 B
(7) The operator shall install, or maintain on site, an oil absorbent boom or other device to contain an unanticipated release.
(1) The operator shall remove any visible layer of oil from the surface of the recycling containment.
19.15.34.8 A

(6) All releases from the recycling and re-use of produced water shall be handled in accordance with 19.15.29 NMAC.

8. The operator will maintain the containment free of miscellaneous solid waste or debris.
9. The operator will maintain at least three feet of freeboard for the containment and will use a free-standing staff gauge to allow easy determination of the required 3-foot 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.

19.15.34.13
(6) The containment shall be operated to prevent the collection of surface water run-on.

19.15.34.13 B
(2) The operator shall maintain at least three feet of freeboard at each containment.

19.15.34.13 B
(3) The injection or withdrawal of fluids from the containment shall be accomplished through a header, diverter or other hardware that prevents damage to the liner by erosion, fluid jets or impact from installation and removal of hoses or pipes.

19.15.34.12 D
(1) The operator shall fence or enclose a recycling containment in a manner that deters unauthorized wildlife and human access and shall maintain the fences in good repair. The operator shall ensure that all gates associated with the fence are closed and locked when responsible personnel are not onsite.

19.15.34.13 A
The operator shall 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.

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:

- reading and recording the fluid height of staff gauges,
- recording any evidence that the pond surface shows visible oil,
- visually inspecting the containment's exposed liners
- checking the leak detection system for any evidence of a loss of integrity of the primary liner.
- inspect diversion ditches and berms around the containment to check for erosion and collection of surface water run-on.
- inspect the leak detection system for evidence of damage or malfunction and monitor for leakage.

As stated above, if a liner's integrity is compromised, or if any penetration of the liner occurs, then the operator will take appropriate action within 48 hours, based on if above or below water surface, as noted above.

Monthly, the operator will:

A. Inspect the containment for dead 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.
B. 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.
C. Record sources and disposition of all recycled water.

19.15.34.12 E
The operator shall on a monthly basis inspect for and, 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.

19.15.34.9 E
The operator of a recycling facility shall 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.

19.15.34.9 F
The operator of a recycling facility shall 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.

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

Freeboard and Overtopping Prevention Plan

The method of operation of the containment allows for maintaining freeboard with very few potential problems. When the capacity of the containment is reached (3-feet of freeboard), the discharge of produced water ceases and the produced water generated by nearby oil and gas wells is managed by an injection well(s).

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

I. Cease discharging produced water to the containment.

II.Accelerate re-use of the produced water for purposes approved by the Division.

III. Transfer produced water from the containment to injection wells.

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 A, 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-inch 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 produced water from the containment via electrical 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.

Closure Plan
In Ground Containments

Overview

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.

19.15.34.14 A
Once the operator has ceased operations, the operator shall 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

a. the condition that existed prior to the construction of the recycling containment or
b. 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,

19.15.34.14 E
The operator shall substantially restore the impacted surface area to the condition that existed prior to the construction of the recycling containment.

19.15.34.14 G
The re-vegetation and reclamation obligations imposed by federal, state trust land or tribal agencies on lands managed by those agencies shall supersede these provisions and govern the obligations of any operator subject to those provisions, provided that the other requirements provide equal or better protection of fresh water, human health and the environment.

The surface owner will impose a closure design that conforms to their needs for the site. The operator understands that a variance will be submitted to OCD to allow for any alternative closure protocol.

Excavation and Removal Closure Plan – Protocols and Procedures

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

1. The operator will remove all liquids from the containment 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.
2. 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.
3. After the removal of the containment contents and liners, soils beneath the containment will be tested by collection of a five-point (minimum) composite sample which includes stained or wet soils, if any, and that sample shall be analyzed for the constituents listed in Table I of 19.15.34.14.
4. After review of the laboratory results:
    a. If any contaminant concentration is higher than the parameters listed in Table I, additional delineation may be required, and the operator must receive approval before proceeding with closure.

19.15.34.14 B
The operator shall close a recycling containment by first removing all fluids, contents and synthetic liners and transferring these materials to a division approved facility.

19.15.34.14 C
The operator shall test the soils beneath the containment for contamination with a five-point composite sample which includes stained or wet soils, if any, and that sample shall be analyzed for the constituents listed in Table I below.

19.15.34.14 C
(1) If any contaminant concentration is higher than the parameters listed in Table I, the division may require additional delineation upon review of the results 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 I, 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.

19.15.34.14 C
(2) If all contaminant concentrations are less than or equal to the parameters listed in Table I, then the operator can proceed to backfill with non-waste containing, uncontaminated, earthen material.

Reclamation and Re-vegetation

a. The operator will reclaim the containment's location to a safe and stable condition that blends with the surrounding undisturbed area.
b. 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.
c. The disturbed area shall then be reseeded in the first favorable growing season following closure of a recycling containment.

19.15.34.14 E
Once the operator has closed the recycling containment, the operator shall 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.

19.15.34.14 D
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.

19.15.34.14 H
The operator shall notify the division when reclamation and re-vegetation are complete.

19.15.34.14 F
Reclamation of all disturbed areas no longer in use shall be considered complete when 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.

April 2024

Rule 34 Registration
TSW RF and Containments Modification
2RF-212
Section 34, T21S, R27E, Eddy County

Volume 3 Sam Houston In-Ground Containment

- ***C-147 Form & Liner Equivalency Demonstration***
- ***Closure Cost Estimate for East In-Ground Containments***
- ***Stamped Design Drawings and Avian Deterrence***
- ***Recently Approved Plans for Design/Construction, O&M, and Closure***

View south southeast to the Nolan Ryan containment area from northeast corner of adjacent production pad. A small swale in fore ground (with tire tracks) separates the production pad from the Nolan Ryan Containments location..

Prepared for:
Vaughan Operating, LLC
Carlsbad, New Mexico

Prepared by:

R.T. Hicks Consultants Ltd.
Albuquerque, New Mexico

Cascade Services LLC
Midland, Texas

C-147

LINER EQUIVALENCY DEMONSTRATION

State of New Mexico
Energy Minerals and Natural Resources
Department Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505
https://www.emnrd.nm.gov/ocd/ocd-e-permitting/

Form C-147
Revised October 11, 2022

Recycling Facility and/or Recycling Containment

Type of Facility: ☑ Recycling Facility ☑ Recycling Containment*

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

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

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

1.
Operator: Vaughan Operating, LLC (For multiple operators attach page with information) OGRID #: 330307
Address: 1409 Verdel Ave, Carlsbad, NM 88220
Facility or well name (include API# if associated with a well): Sam Houston Containment
OCD Permit Number: 2RF-212 (For new facilities the permit number will be assigned by the district office)
U/L or Qtr/Qtr J Section 35 Township 21S Range 27E County: Eddy
Surface Owner: ☐ Federal ☐ State ☑ Private ☐ Tribal Trust or Indian Allotment

2.
☑ **Recycling Facility:** Tall Texan
Location of recycling facility (if applicable): Latitude 32.433586 Longitude -104.170048 NAD83
Proposed Use: ☑ Drilling* ☑ Completion* ☑ Production* ☑ Plugging *
The re-use of produced water may NOT be used until fresh water zones are cased and cemented
☐ Other, ***requires permit for other uses. Describe use, process, testing, volume of produced water and ensure there will be no adverse impact on groundwater or surface water.***
☑ Fluid Storage
☑ Above ground tanks ☐ Recycling containment ☐ Activity permitted under 19.15.17 NMAC explain type_____
☐ Activity permitted under 19.15.36 NMAC explain type:_____ ☐ Other explain _____
☐ For multiple or additional recycling containments, attach design and location information of each containment
☐ **Closure Report (required within 60 days of closure completion):** ☐ Recycling Facility Closure Completion Date:_____

3.
☑ **Recycling Containment:** East Containment
☐ Annual Extension after initial 5 years (attach summary of monthly leak detection inspections for previous year)
Center of Recycling Containment (if applicable): Latitude 32.434503 Longitude -104.159178 NAD83
☑ For multiple or additional recycling containments, attach design and location information of each containment
☑ Lined ☐ Liner type: Thickness _____mil ☐ LLDPE ☑ HDPE ☐ PVC ☐ Other _____
☐ String-Reinforced
Liner Seams: ☑ Welded ☐ Factory ☐ Other _____ Volume: 790 K bbl Dimensions: L_____ x W_____ x D_____ See design drawings
☐ 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 $_____ **(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 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.

- ☒ Design Plan - based upon the appropriate requirements.
- ☒ Operating and Maintenance Plan - based upon the appropriate requirements.
- ☒ Closure Plan - based upon the appropriate requirements.
- ☒ Site Specific Groundwater Data -
- ☒ Siting Criteria Compliance Demonstrations –
- ☒ **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): Steven McCutcheon Title: Managing Partne r

Signature: Date: 04/28/25

e-mail address: stevenm@mhatllc.com Telephone: 575 689-8620

11.
OCD Representative Signature: Victoria Venegas **Approval Date:** 05/13/2025

Title: Environmental Specialist **OCD Permit Number:** 2RF-212

☒ OCD Conditions

☒ Additional OCD Conditions on Attachment

R.K. FROBEL & ASSOCIATES
Consulting Engineers

Technical Memorandum: 40-mil HDPE as Alternative Secondary Liner System for In Ground Recycling Containment Facilities

NMAC 19.15.34.12 A

I have investigated the suitability of application for 40 mil HDPE geomembrane as an equivalent secondary liner to 30 mil scrim reinforced LLDPE (LLDPEr) in the application for In Ground Recycling Containment facilities. *In summary, it is my professional opinion that the specified 40 mil HDPE geomembrane will provide a secondary liner system that is equal to or better than 30 mil scrim reinforced LLDPEr and will provide the requisite protection of fresh water, public health and the environment for many years when engineering design provides requisite site/soil/slope preparation and when used in concert with requisite primary liners and drainage layers.*

It is understood that the lining system under discussion is composed of a 60 mil HDPE Primary liner, geonet drainage layer and a 40 mil HDPE Secondary liner. *In consideration of the secondary lining system application, size of impoundment and depth, design details as well as the chemical nature of typical processed water, it is my professional opinion that the 40 mil HDPE geomembrane will provide the requisite barrier against processed water loss and will function effectively as a secondary liner.*

The following are discussion points that hopefully will exhibit the equivalency of a 40 mil HDPE secondary liner to that of a 30 mil LLDPEr.

The nature and formulation of the 40 mil HDPE resin is the same as the Primary 60 mil HDPE. The major difference is that the 40 mil HDPE is lower in thickness (more flexible and less puncture resistant). However, in covered conditions, HDPE will resist aging and degradation and remain intact for many decades. In fact, a secondary liner of 40 mil HDPE will outlast an exposed 60 mil HDPE liner. According to the Geosynthetic Research Institute (GRI) study on lifetime prediction (GRI Paper No. 6), the half life of HDPE (GRI GM 13) exposed is > 36 years and the half-life of HDPE covered or buried is greater than 100 years. It is understood that in order to ensure compliance of materials, the primary 60 mil HDPE to be used must meet or exceed GRI GM 13 Standards. Likewise, the secondary liner that is not exposed to the same environmental and chemical conditions must meet or exceed GRI GM 13 for non-reinforced HDPE. Adhering to the minimum requirements of the GRI Specifications, 40 mil HDPE when used as a secondary liner will be equally as protective as the primary 60 mil HDPE liner (reference: www.geosynthetic-institute.org/grispecs) and equally as protective as a 30 mil scrim reinforced LLDPEr liner.

Durability of Geomembranes is directly affected by exposure conditions. Buried or covered geomembranes are not affected by the same degradation mechanisms (UV, Ozone, Chemical, Stress, Temperature, etc) as are fully exposed geomembranes. In this regard, the secondary liner material and thickness can be much less robust than the fully exposed primary liner which in this case is 60 mil HDPE. This is also the case for

landfill lining systems where the secondary geomembrane in a bottom landfill cell may be 40 mil HDPE.

Thermal Fusion Seaming Requirements. Thermal seaming and QC seam test requirements for geomembranes are product specific and usually prescribed by the sheet manufacturer. Dual wedge thermal fusion welding is commonly used on HDPE and QC testing by air channel (ASTM D 5820) is fully acceptable and recognized as an industry standard. In this regard, there should be no exception requirement for seaming and QC testing as both the Primary and Secondary geomembranes are HDPE. This is fully covered in comprehensive specifications for both the Primary and Secondary geomembranes (Reference: www.ASTM.org/Standards).

Potential for Leakage through the Primary and Secondary Liners. Leakage through geomembrane liners is directly a function of the height of liquid head above any hole or imperfection. The geonet drainage media provides immediate drainage to a low point or sump and thus no hydrostatic head or driving gradient is available to push leakage water through a hole in the secondary liner. In this regard, secondary geomembrane materials can be (and usually are) much less in thickness and also polymer type. Hydraulic Conductivity through the 40 mil HDPE liner material is extremely low due to the polymer type, structure and crystallinity and exceeds requirements of EPA SW-846 Method 9090A.

Chemical Attack. Chemical attack to polymeric geomembranes is directly a function of type of chemical, temperature and exposure time. Again, the HDPE Primary provides the chemically resistant liner and is QC tested to reduce potential defects or holes. If there is a small hole, the geonet drain takes any leakage water immediately to the sump for extraction. Thus, exposure time is very limited on a secondary liner in addition to low temperature, little volume and virtually no head pressure. In this regard, a chemically resistant geomembrane material such as 40 mil HDPE can be specified for the secondary and is a fully acceptable alternate to 30 mil scrim reinforced LLDPEr.

Mechanical Properties Characteristics. Geomembranes of different polymer and/or structure (i.e., reinforced vs non-reinforced) cannot be readily compared using such characteristics as tensile stress/strain, tear, puncture and polymer requirements. For a 40 mil HDPE liner material to function as a Secondary liner it should meet or exceed the manufacturers minimum requirements for Density, Tensile Properties, Tear, Puncture as well as other properties such as UV resistance. The sheet material must also meet or exceed GRI GM 13 minimum requirements. *In this regard, a 40 mil HDPE will be equivalent to a 30 mil LLDPEr as a secondary liner for the conditions listed below:*

- *The subgrade or compacted earth foundation will be smooth, free of debris or loose rocks, dry, unyielding and will support the lining system.*
- *The side slopes for the containment shall be equal to or less than 3H:1V.*
- *The physical properties and condition of the subgrade or liner foundation*

(i.e., density, slope, moisture) will be inspected and certified by a Professional Engineer that it meets or exceeds specification requirements.

- *Immediately prior to installation, the installation contractor shall inspect and sign off on the subgrade conditions that they meet or exceed the HDPE manufacturer and installers requirements.*
- *A protective geotextile will be placed on the finished and accepted subgrade between subgrade and the 40 mil HDPE Secondary liner.*
- *A 200 mil geonet will be placed over the 40 mil HDPE Secondary Liner.*
- *A 60 mil HDPE Primary liner will be placed over the 200 mil geonet drainage layer.*

If you have any questions on the above technical memorandum or require further information, give me a call at 720-289-0300 or email geosynthetics@msn.com

Sincerely Yours,

R K Frobel

Ronald K. Frobel, MSCE, PE

References:

NMAC 19.15.34.12 A DESIGN AND CONSTRUCTION SPECIFICATIONS FOR A RECYCLING CONTAINMENT

Geosynthetic Research Institute (GRI) Published Standards and Papers 2017
www.geosynthetic-institute.org

ASTM Geosynthetics Standards 2017
www.ASTM.org/Standards

CLOSURE COST ESTIMATE

R. T. HICKS CONSULTANTS, LTD.
901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Since 1996

TWS MODIFICATION EAST IN-GROUND CONTAINMENTS

Financial Assurance Cost Estimate

Attached is the cost estimate for reclamation of the TWS East recycling in-ground containment.

The cost of closure sampling and analysis is estimated at $1725 (sampling) plus $2,700 (laboratory cost) to “test the soils beneath the containment for contamination with a five-point composite sample which includes stained or wet soils, if any, and that sample shall be analyzed for the constituents listed in Table I” of Rule 34.

RT Hicks Consultants will assist with the sampling as necessary and prepare the Closure Report for the site. Total closure costs associated with the sampling are estimated at $7500. The cost estimates from Cascade Services (attached) and from RT Hicks Consultants are presented below.

Cascade Services	
All work elements required by Rule 34	$630,105.00
RT Hicks Consultants	
Preparation of sampling results and closure report	7500.00
Total for all Closure Activities	$637,605.00

The reclamation must meet terms set forth in the surface lease agreement with the landowner, who received a copy of the registration.

Please contact Randall Hicks if you have any questions concerning this closure cost estimate.

Cascade Services, LLC
3403B E County Road 44
Midland, TX 79705
www.cascadeservicesllc.com

Estimate

ADDRESS	SHIP TO		
Steven McCutcheon Vaughn Operating, LLC 3021 Hepler Rd Carlsbad, NM 88220	Steven McCutcheon Vaughn Operating, LLC 3021 Hepler Rd Carlsbad, NM 88220	ESTIMATE DATE EXPIRATION DATE	1814 11/21/2024 12/21/2024

CUSTOMER PROJECT NAME	PROJECT LOCATION COORDINATES
TWS Closure	32.4338144861, -104.159455045

DESCRIPTION	QTY	UNIT	RATE	AMOUNT
This is pricing a package to reclaim the single 1mm bbl pond cell Mobilize equipment to site. Dirt reclaim of pond consist of- Bury all material (Caliche, Gypsum, Sand, ect.) below ground level, backfill pond area with uncontaminated soil from pond walls. Pond area will be reclaimed to natural elevations and water flow patterns. All stockpiled strippings will be put down last to ensure ground has been completely returned to native design.	1		352,000.00	352,000.00
Environmental soil sampling This will include digging 6 sample locations for each containment. One composite sample from 0-4 feet below surface and one discrete sample from each location at 4.25 feet Cost include trip, labor, materials, and laboratory testing	1		1,725.00	1,725.00
Environmental Soil testing Before earthwork can begin the soil must be tested for contamination in case of liner leakage. Cost include trip, labor, materials, and laboratory testing of 18 tests.	1		2,700.00	2,700.00
Broadcast seeding of pond area Seed will be a native mix for Eddy County NM Includes purchase of seed mix and placement	1		3,000.00	3,000.00

Fence removal and disposal Fence estimated at 3020 ft This includes removal of all posts, braces, wire, fabric, gates, and hardware.	3,020	4.00	12,080.00
Remove and dispose of all four layers. Textile, 40 mil, net, and 60 mil	1,724,000	0.15	258,600.00

Preferred payment method: ACH/Wire
Email AR@cascadeservicesllc.com for ACH/Wire details.

Remit Checks To:
Cascade Services LLC
PO Box 200954
Dallas, TX 75320-0954
**THIS ESTIMATE IS SUBJECT TO THE TERMS & CONDITIONS ATTACHED.

**If pumping is needed due to weather conditions, a $350 daily fee will be charged on final invoice.

**Materials will be invoiced upon receipt of customer purchase order or job approval.

**This estimate may not include tax and may be added on invoice unless customer provides a valid tax exemption document.

Questions? Email AR@Cascadeservicesllc.com

SUBTOTAL	630,105.00
TAX	0.00
TOTAL	**$630,105.00**

Accepted By

Accepted Date

RECYCLING CONTAINMENT DESIGN DRAWINGS

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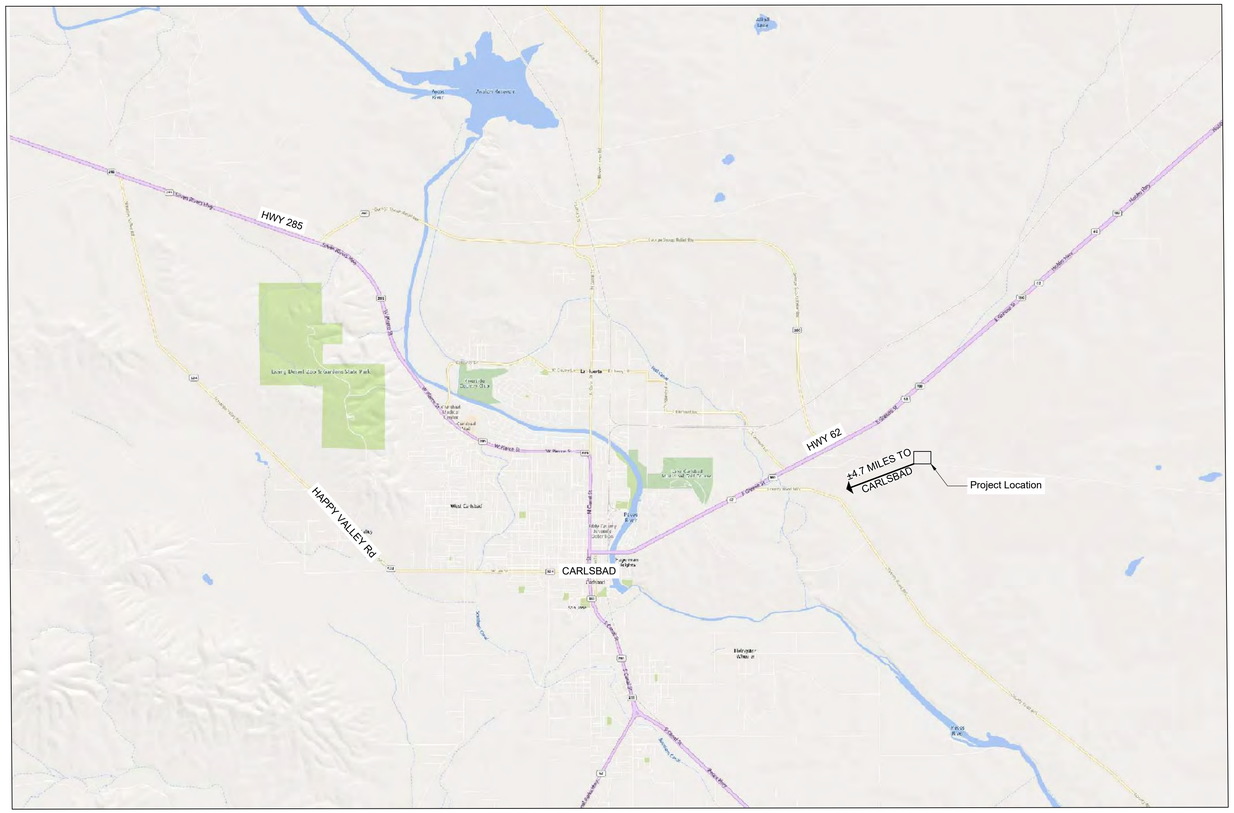
Hobbs, NM 88242
Squarerootservices.net
575-231-7347

CIVIL PLANS

VAUGHN OPERATING

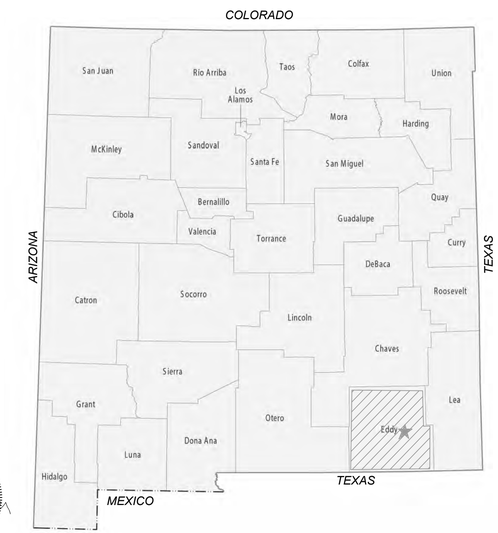
TWS . Now Sam Houston

CITY OF CARLSBAD
N.M.P.M., EDDY COUNTY, NEW MEXICO



INDEX OF SHEETS		
SHEET	NAME	DESCRIPTION
1	C-100	COVER SHEET
2	C-101	PROJECT LOCATION
3	C-102	GENERAL NOTES
4	CS-101	SITE PLAN
5	CS-102	PROFILES
6	CS-501	LEAK DETECTION DETAILS
7	CS-502	LINER DETAILS
8	CS-503	FENCE DETAILS

EDDY COUNTY
NEW MEXICO



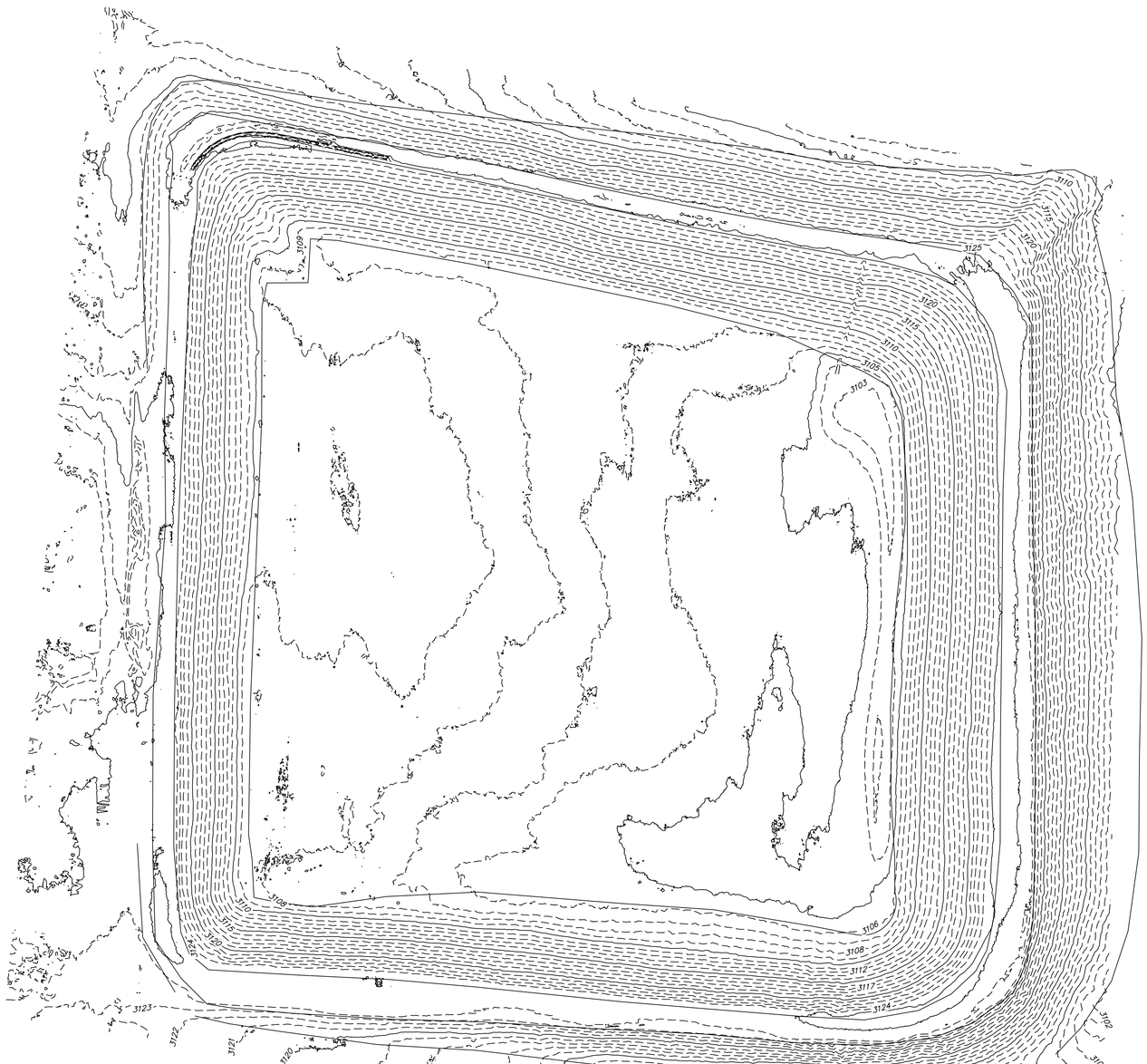
nm811 Know what's below. Call before you dig.

(505)-254-7310

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

JEREMY BAKER NEW MEXICO 16207 LICENSED PROFESSIONAL ENGINEER
11/26/2024

TOPOGRAPHIC SURVEY



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Hobbs, NM 88242-9032
Squarerootservices.net
575-231-7347

TYPE OF SURVEY:

TOPOGRAPHIC SURVEY

OF

PROJECT NAME:

TWS

FOR

CLIENT:

VAUGHN OPERATING

PROJECT NUMBER:

24189

PROJECT SURVEYOR:

Jeremy Baker, PS

DRAWN BY:

V. Munoz

GRAPHIC SCALE

0 50' 100'

SCALE: 1" = 50'
(IN FEET)

LEGEND

MAJOR CONTOUR LINE 5FT INTERVAL

MINOR CONTOUR LINE 1FT INTERVAL

TOPOGRAPHIC NOTE

THE TOPOGRAPHY SHOWN HEREIN IS A COMBINATION OF UAV DATA AND CONVENTIONAL/GPS DATA. THE UAV DATA WAS GENERATED USING INDUSTRY STANDARD QUALITY CHECKS AND IS **WITHIN** THE INDUSTRY RECOGNIZED GROUND SAMPLING DISTANCE (GSD) STANDARD OF BELOW 2.5 CM (1 IN / 0.08 FT). THE ABSOLUTE ACCURACY LEVEL IN STANDARD UAV DATA IS EQUAL TO 3 X GSD (3 X 0.08 FT = 0.24 FT). UAV DATA WAS USED FOR MEASUREMENTS ON NATURAL GROUND AND SUPPLEMENTAL FEATURES.

BASIS OF BEARING

BEARINGS SHOWN HEREON ARE FROM GPS/GNSS OBSERVATIONS AND CONFORM TO THE NEW MEXICO STATE PLANE COORDINATE SYSTEM "NEW MEXICO EAST ZONE" NORTH AMERICAN DATUM OF 1983. TRUE NORTH CAN BE OBTAINED BY APPLYING A CONVERGENCE ANGLE OF 00°05'39.90" AT A CITY OF HOBBS CONTROL POINT #100 LOCATED AT N 521,404.17, E 595,654.39. DISTANCES SHOWN HEREON ARE IN GROUND AND WERE OBTAINED BY APPLYING A COMBINED GRID TO GROUND SCALE FACTOR OF 1.00023221143907 AT N 0.00, E 0.00. THE VERTICAL DATUM IS BASED ON GEOID18 (CONUS) AND IT PROVIDES ORTHOMETRIC HEIGHTS CONSISTENT WITH THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

JEREMY E. BAKER
NEW MEXICO
25773
PROFESSIONAL SURVEYOR

I, JEREMY BAKER, NEW MEXICO PROFESSIONAL SURVEYOR NO. 25773, DO HEREBY CERTIFY THAT THIS TOPOGRAPHIC SURVEY PLAT AND THE ACTUAL SURVEY ON THE GROUND UPON WHICH IT IS BASED WERE PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION; THAT I AM RESPONSIBLE FOR THIS SURVEY; THAT THIS SURVEY MEETS THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO; AND THAT IT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. I FURTHER CERTIFY THAT THIS SURVEY IS NOT A LAND DIVISION OR SUBDIVISION AS DEFINED IN THE NEW MEXICO SUBDIVISION ACT AND THAT THIS INSTRUMENT IS A BOUNDARY SURVEY PLAT OF AN EXISTING TRACT OR TRACTS.

Jeremy Baker
Jeremy Baker, N.M. P.S 25773

11/26/2024
Date

SHEET: 2 of 8

SU - 101

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GENERAL NOTES

1. NEW MEXICO ADMINISTRATIVE CODE TITLE 19, CHAPTER 15, PART 34, DESIGN CRITERIA FOR RECYCLING CONTAINMENTS SHALL APPLY TO THIS PROJECT.
2. ALL BOUNDARY, TOPOGRAPHIC AND UTILITY INFORMATION SHOWN ARE BASED ON SURVEY INFORMATION FURNISHED BY TOPOGRAPHIC.
3. THE CONTRACTOR SHALL IDENTIFY AND LOCATE UTILITY LINES, MONITORING WELLS, SURVEY MONUMENTS, AND OTHER NEARBY STRUCTURES PRIOR TO PERFORMING WORK.
4. COORDINATE INFORMATION IS BASED ON STATE PLANE COORDINATES, NEW MEXICO EAST, NAD 83.
5. THE CONTRACTOR SHALL IDENTIFY ANY DISCREPANCIES PRIOR TO PROCEEDING WITH CONSTRUCTION AND CONTACT THE ENGINEER IN WRITING.
6. THE CONTRACTOR SHALL IMPLEMENT AND MAINTAIN BEST MANAGEMENT PRACTICES (BMPS) TO MINIMIZE EROSION AND CONTROL SEDIMENT TO PROTECT SURFACE WATER QUALITY DURING STORM EVENTS.

EARTHWORK NOTES

1. THE CONTRACTOR SHALL USE WATER FOR COMPACTION AT ALL TIMES. THE CONTRACTOR SHALL ENSURE THEIR BID INCLUDES CONSTRUCTION WATER. NO EARTHWORK OPERATIONS SHALL TAKE PLACE IF CONSTRUCTION WATER IS NOT AVAILABLE ONSITE.
2. THE CONTRACTOR SHALL BUILD THE LEVEES USING COMPACTED LAYERS. UNCONTROLLED AND INCONSISTENT PUSHING AND PILING OF MATERIAL FOR LEVEE CONSTRUCTION IS NOT ACCEPTABLE. THE CONTRACTOR SHALL DEVELOP A SUCCESSFUL COMPACTION PATTERN EARLY IN THE PROCESS, VERIFIED THROUGH NUCLEAR DENSITY OR SAND CONE TESTING, AND SHALL MAINTAIN CONSISTENCY IN THE COMPACTIVE EFFORT AS LONG AS THE MATERIALS ENCOUNTERED REMAINS CONSISTENT. IF ONSITE SOILS ENCOUNTERED CHANGE, THE CONTRACTOR SHALL DEVELOP A NEW COMPACTION PATTERN.
3. FILL FOR LEVEES SHALL BE PLACED AND COMPACTED IN HORIZONTAL LIFTS WITH MAXIMUM LOOSE LIFT THICKNESS OF 10 INCHES, OR AS DIRECTED BY ENGINEER. CONSTRUCT EACH LAYER CONTINUOUSLY AND APPROXIMATELY HORIZONTAL FOR THE WIDTH AND LENGTH OF THE LEVEE. FILL SHALL BE COMPACTED TO AT LEAST 95 PERCENT OF MAXIMUM DRY DENSITY DETERMINED BY THE ASTM D698 AND AT MOISTURE CONTENT WITHIN +2% TO -2% OF OPTIMUM MOISTURE CONTENT AS DETERMINED BY A STANDARD PROCTOR SOILS TEST ON SAMPLES FROM THE SOURCE AREA.
4. FILL SHALL NOT BE PLACED AND COMPACTED WHEN THE MATERIALS ARE TOO WET TO PROPERLY COMPACT. MATERIAL WHICH IS TOO WET SHALL BE SPREAD ON THE FILL AREA AND PERMITTED TO DRY, ASSISTED BY HARROWING IF NECESSARY, UNTIL THE MOISTURE CONTENT IS REDUCED TO ALLOWABLE LIMITS. IF THE ENGINEER DETERMINED THAT ADDED MOISTURE IS REQUIRED, WATER SHALL BE APPLIED UNIFORMLY OVER THE AREA TO BE TREATED, AND GIVE COMPLETE AND ACCURATE CONTROL OF THE AMOUNT OF WATER TO BE USED. IF TOO MUCH WATER IS ADDED, THAT AREA SHALL BE PERMITTED TO DRY BEFORE COMPACTION IS CONTINUED.
5. PERFORM ONE NUCLEAR DENSITY GAGE TEST PER 2500 CY MINIMUM OR AS DIRECTED BY THE ENGINEER.
6. EARTHWORK CONTRACTOR SHALL PERFORM A VISUAL INSPECTION OF THE FINISHED COMPACTED POND BOTTOM AND SIDE SLOPES BEFORE HDPE LINER INSTALLATION, REMOVING ALL DEBRIS, SHARP OBJECTS AND GRAVEL LARGER THAN 3/4 INCH.
7. EARTHWORK CONTRACTOR SHALL ROLL SURFACE WITH A SMOOTH ROLLER TO ELIMINATE RUTS.

LINER NOTES

1. LINER CONTRACTOR SHALL INSPECT GRADED SURFACE FOR DEBRIS, ROCKS OR OTHER MATERIAL THAT MAY DAMAGE THE LINER AND COORDINATE WITH OWNER IF ADDITIONAL SUBGRADE RESURFACING IS NEEDED PRIOR TO PERFORMING WORK.
2. LINER CONTRACTOR TO PROVIDE SUBMITTAL OF LINER PANEL LAYOUT.
3. LINER CONTRACTOR TO SIGN SUBGRADE ACCEPTANCE FORM (PROVIDED BY OWNER REPRESENTATIVE) DAILY PRIOR TO INSTALLATION.
4. LINER TO BE INSTALLED PER GRI SPECIFICATIONS, GUIDES AND PRACTICES.
5. CONTRACTOR SHALL PLACE SANDBAGS ON LINER DURING INSTALLATION AS REQUIRED TO PREVENT WIND UPLIFT UNTIL POND IS FILLED TO A DEPTH OF 3 FEET.
6. CONTRACTOR SHALL USE BLACK 60 MIL HDPE SMOOTH GEOMEMBRANE AS THE PRIMARY LINER AND BLACK 40 MIL HDPE SMOOTH GEOMEMBRANE AS THE SECONDARY LINER.
7. A 3' DIAMETER MINIMUM PIECE OF 40MIL LINER SHALL BE EXTRUDED WELDED WHERE THE PIE SHAPED CORNER SECTIONS MEET FOR SEAM REINFORCEMENT.
8. INSTALL A FULL DOUBLE WIDTH SECTION OF BLACK OR WHITE 60 MIL TEXTURED HDPE GEOMEMBRANE RUB SHEET. EXTRUDE WELD TO LINER. WELDS SHALL BE 2" LONG AND SPACED EVERY 12" ALONG BOTH SIDES OF THE SHEET. DO NOT WELD END EDGES. SECTION SHALL EXTEND FROM SUMP AND INSTALLED INTO LINER ANCHOR TRENCH AS SHOWN.
9. LINER SHALL BE PROTECTED WITH A 8 OZ. NONWOVEN GEOTEXTILE IF ROCK OR OTHER ANGULAR MATERIALS WITH A DIMENSION GREATER THAN 3/4 INCH ARE PRESENT.
10. SUMPS SHALL BE BACKFILLED WITH NON-ANGULAR MAXIMUM 3/8 INCH SIZED PEA GRAVEL.
11. ALL SEAMS MUST BE WELDED WITH A 6" MINIMUM OVERLAP.
12. CONTRACTOR SHALL NON-DESTRUCTIVELY TEST ALL SEAMS THEIR FULL LENGTH USING AN AIR PRESSURE OR VACUUM TEST, THE PURPOSE OF THIS TEST IS TO CHECK THE CONTINUITY OF THE SEAM.
13. FOR AIR PRESSURE TESTING (ASTM 5820), THE FOLLOWING PROCEDURES ARE APPLICABLE TO THE SEAMS WELD WITH DOUBLE SEAM FUSION WELDER.
    a. THE EQUIPMENT USED SHALL CONSIST OF AN AIR TANK OR PUMP CAPABLE OF PRODUCING A MINIMUM 35 PSI AND A SHARP NEEDLE WITH A PRESSURE GAUGE ATTACHED TO INSERT INTO THE AIR CHAMBER.
    b. SEAL BOTH ENDS OF THE SEAM BY HEATING AND SQUEEZING THEM TOGETHER. INSERT THE NEEDLE WITH THE GAUGE INTO THE AIR CHANNEL. PRESSURIZE THE AIR CHANNEL TO A MINIMUM OF 35 PSI. NOTE TIME STARTS AND WAIT A MINIMUM OF 5 MINUTES TO CHECK. IF PRESSURE AFTER 5 MINUTES HAD DROPPED LESS THAN 2 PSI THE TEST IS SUCCESSFUL (THICKNESS OF MATERIAL MAY CAUSE VARIANCE).
    c. CUT OPPOSITE SEAM END AND LISTEN FOR PRESSURE RELEASE TO VERIFY FULL SEAM HAS BEEN TESTED.
    d. IF THE TEST FAILS, FOLLOW THESE PROCEDURES.
        I. WHILE CHANNEL IS UNDER PRESSURE WALK THE LENGTH OF THE SEAM LISTENING FOR A LEAK.
        II. WHILE CHANNEL IS UNDER PRESSURE APPLY A SOAPY SOLUTION TO THE SEAM EDGE AND LOOK FOR BUBBLES FORMED BY AIR ESCAPING.
        III. RE-TEST THE SEAM IN SMALLER INCREMENTS UNTIL THE LEAK IS FOUND.
    e. ONCE LEAK IS FOUND USING ONE OF THE PROCEDURES ABOVE, CUT OUT THE AREA AND RETEST THE PORTIONS OF THE PORTIONS OF THE SEAMS BETWEEN THE LEAK AREAS PER 6A AND 6B ABOVE. CONTINUE THIS PROCEDURE UNTIL ALL SECTIONS OF THE SEAM PASS THE PRESSURE TEST.
    f. REPAIR THE LEAK WITH A PATCH AND VACUUM TEST.
14. ALL NON-DESTRUCTIVE TESTS WILL BE NOTED IN THE NON-DESTRUCTIVE LOGS.
15. LINER GAS VENTS SHALL BE SPACED ALONG THE INSIDE SLOPE AT APPROXIMATELY 100 FEET ON CENTER OR MINIMUM 2 VENTS PER SIDE.
16. WHEN ANY PIPING EQUIPMENT, INLET, OR OUTLET IS IN DIRECT CONTACT WITH THE LINER, AN APRON CONSISTING OF 60 MIL HDPE MATERIAL SHALL BE INSTALLED BENEATH THE EQUIPMENT OR STRUCTURE TO PROTECT THE PRIMARY LINER.
17. LAY BOTH LINERS IN ANCHOR TRENCH. BACKFILL ANCHOR TRENCH IN 2 LIFTS AND COMPACT.

SUGGESTED CONSTRUCTION SEQUENCE

1. CLEAR EXISTING VEGETATION.

2. STRIP AND STOCKPILE TOPSOIL AT THE LOCATION DESIGNATED ON THESE PLANS.

3. PERFORM EARTHWORK OPERATIONS:
   3.1. CONSTRUCT STORMWATER DIVERSION CHANNEL.
   3.2. PERFORM RIPPING/EXCAVATING OPERATIONS.
   3.3. REPLACE EXCAVATED MATERIAL IN COMPACTED LAYERS ON THE LEVEE/PAD IN ACCORDANCE WITH THE DETAILS AND SPECIFICATIONS.
   3.4. FINISH SLOPES USING A SMOOTH ROLLER.
   3.5. DIG ANCHOR TRENCH.

4. INSTALL NEW GAME FENCE AND GATES.

5. INSTALL GEOMEMBRANES:
   5.1. INSTALL GEOTEXTILE AS NEEDED, SECONDARY LINER, GEONET, LEAK DETECTION SYSTEM AND PRIMARY LINER.
   5.2. INSTALL RUB SHEETS AND WATER LEVEL GAGE/LADDER.
   5.3. BACKFILL AND COMPACT ANCHOR TRENCH.

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ENGINEERING SHEET:
GENERAL NOTES
OF
PROJECT NAME:
TWS
FOR
CLIENT:
VAUGHN OPERATING

PROJECT NUMBER:
24189

PROJECT ENGINEER:
JEREMY BAKER, PE
DRAWN BY:
XAVIER CLARK

REVISIONS

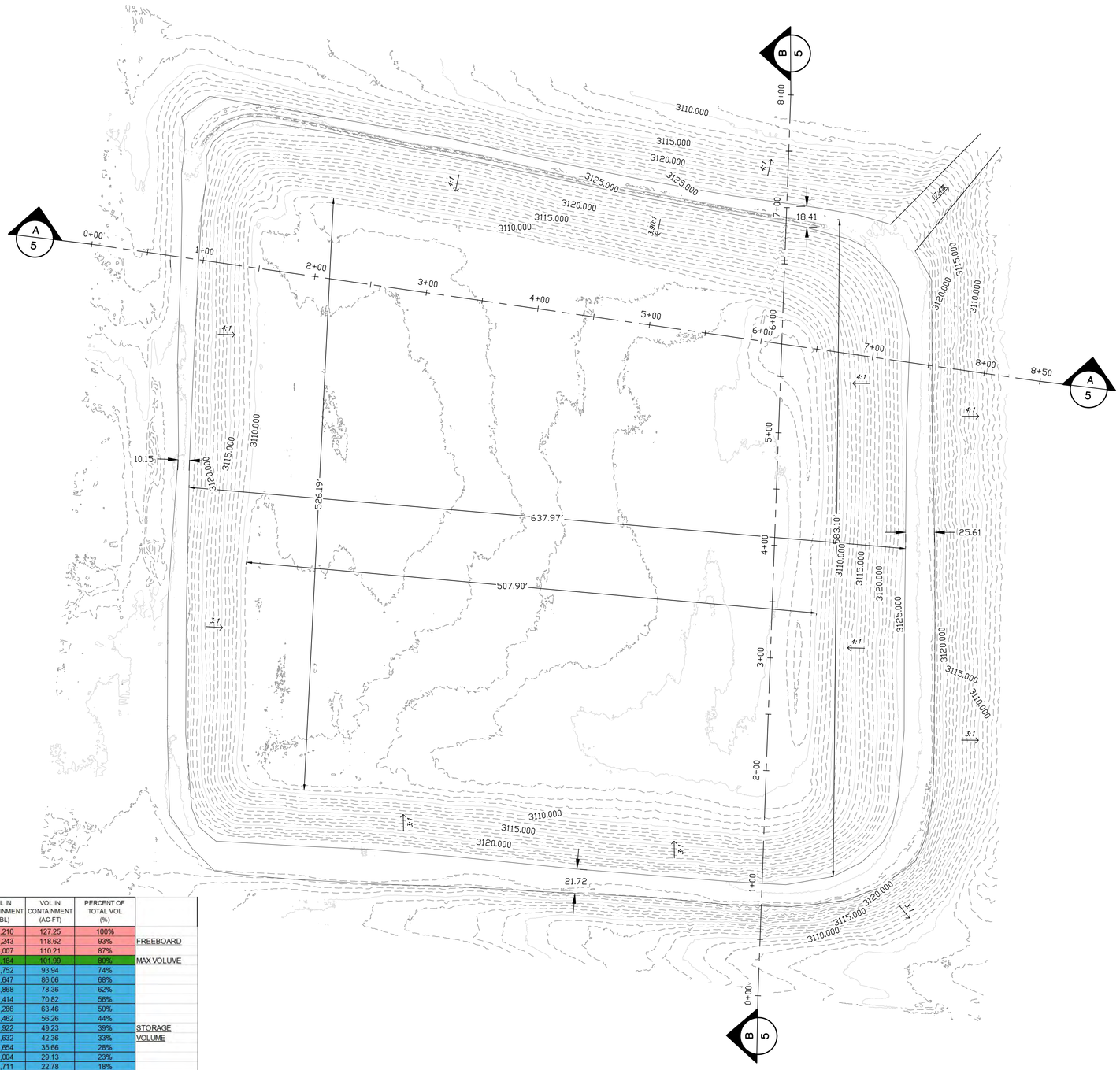
No.	DATE	DESCRIPTION

JEREMY BAKER NEW MEXICO 16207 LICENSED PROFESSIONAL ENGINEER

11/26/2024

SHEET: 3 of 8

C-102



ELEVATION (FT)	CONTAINMENT DEPTH (FT)	REMAINING STORAGE (FT)	REMAINING STORAGE VOL (FT3)	REMAINING STORAGE VOL (GAL)	REMAINING STORAGE VOL (BBL)	PERCENT OF TOTAL VOL (%)	VOL IN CONTAINMENT (FT3)	VOL IN CONTAINMENT (GAL)	VOL IN CONTAINMENT (BBL)	VOL IN CONTAINMENT (AC-FT)	PERCENT OF TOTAL VOL (%)	
3,124.80	0	22	0	-	-	0%	5,543,185	41,468,565	987,210	127.25	100%	
3,123.80	1	21	376,023	2,813,024	66,968	7%	5,167,162	38,655,541	920,243	118.62	93%	FREEBOARD
3,122.80	2	20	742,321	5,553,303	132,203	13%	4,800,864	35,915,262	855,007	110.21	87%	
3,121.80	3	19	1,100,884	8,234,218	196,026	20%	4,442,501	33,234,347	791,164	101.99	80%	MAX VOLUME
3,120.80	4	18	1,451,240	10,856,729	258,458	26%	4,091,945	30,611,837	728,752	93.94	74%	
3,119.80	5	17	1,794,348	13,423,519	319,563	32%	3,748,837	28,045,047	667,647	86.06	68%	
3,118.80	6	16	2,130,006	15,934,575	379,342	38%	3,413,179	25,533,991	607,868	78.36	62%	
3,117.80	7	15	2,458,224	18,389,973	437,796	44%	3,084,961	23,078,592	549,414	70.82	56%	
3,116.80	8	14	2,779,000	20,789,700	494,924	50%	2,764,185	20,678,866	492,286	63.46	50%	
3,115.80	9	13	3,092,450	23,134,619	550,748	56%	2,450,735	18,333,946	436,462	56.26	44%	
3,114.80	10	12	3,398,691	25,425,608	605,288	61%	2,144,494	16,042,957	381,922	49.23	39%	STORAGE
3,113.80	11	11	3,697,918	27,664,123	658,578	67%	1,845,267	13,804,442	328,632	42.36	33%	VOLUME
3,112.80	12	10	3,989,772	29,847,484	710,556	72%	1,553,413	11,621,082	276,654	35.66	28%	
3,111.80	13	9	4,274,173	31,975,085	761,206	77%	1,269,012	9,493,480	226,004	29.13	23%	
3,110.80	14	8	4,550,954	34,045,691	810,499	82%	992,230	7,422,875	176,711	22.78	18%	
3,109.80	15	7	4,819,792	36,056,861	858,378	87%	723,393	5,411,704	128,832	16.61	13%	
3,108.80	16	6	5,059,244	37,848,203	901,023	91%	483,941	3,620,362	86,187	11.11	9%	
3,107.80	17	5	5,243,618	39,227,509	933,859	95%	299,566	2,241,056	53,351	6.88	5%	
3,106.80	18	4	5,380,068	40,248,285	958,160	97%	163,117	1,220,280	29,050	3.74	3%	
3,105.80	19	3	5,475,981	40,965,068	975,224	99%	67,303	503,497	11,986	1.55	1%	
3,104.80	20	2	5,526,976	41,347,304	984,323	100%	16,209	121,261	2,887	0.37	0%	SUMP VOLUME
3,103.80	21	1	5,538,775	41,435,579	986,425	100%	4,409	32,986	785	0.10	0%	
3,102.80	22	0	5,543,185	41,468,565	987,210	100%	0	0	0	0.00	0%	

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ENGINEERING SHEET:

SITE PLAN

OF

PROJECT NAME:

TWS

FOR

CLIENT:

VAUGHN OPERATING

PROJECT NUMBER:

24189

PROJECT ENGINEER:
JEREMY BAKER, PE

DRAWN BY:
VM

GRAPHIC SCALE

0 50' 100'

SCALE: 1" = 50'
(IN FEET)

REVISIONS

No.	DATE	DESCRIPTION

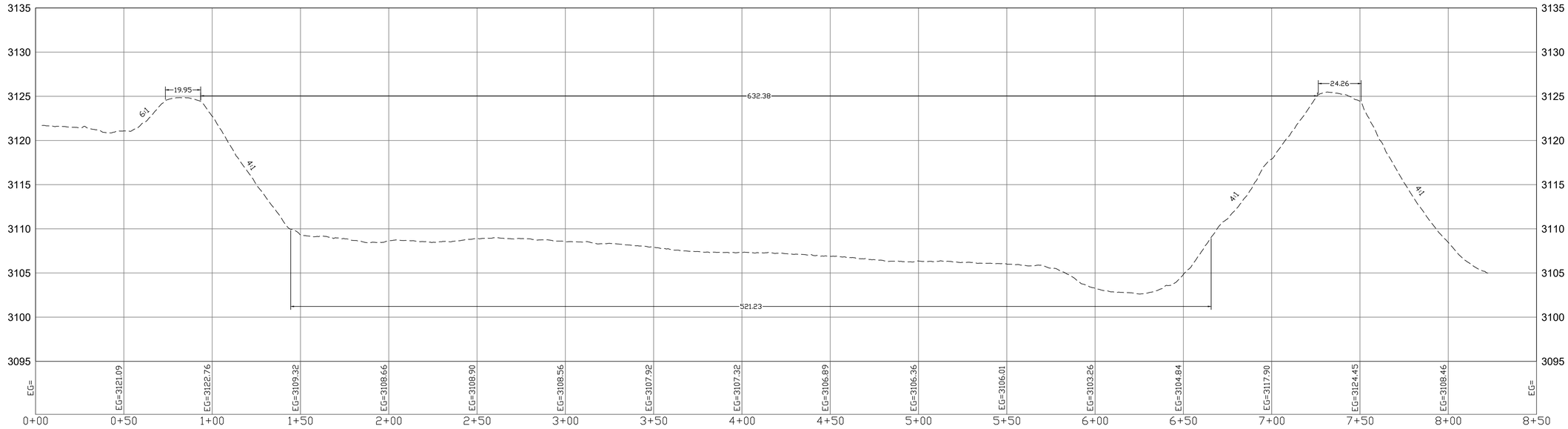
JEREMY BAKER
NEW MEXICO
16207
LICENSED PROFESSIONAL ENGINEER

11/26/2024

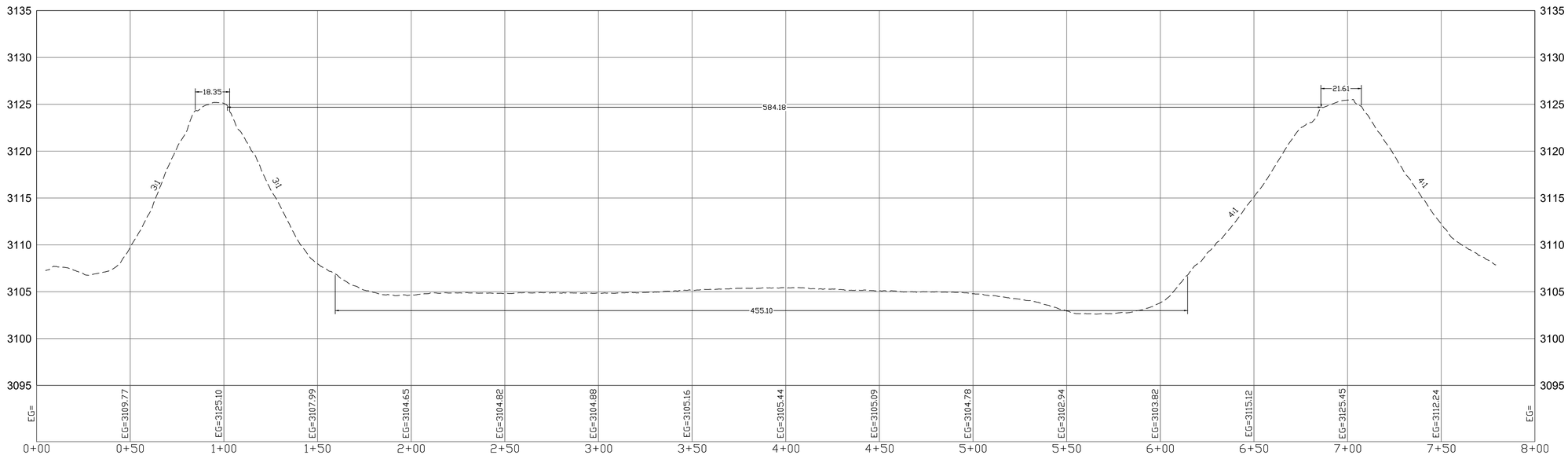
SHEET: 4 of 8

CS-101

A EAST–WEST PROFILE (A)



B SOUTH–NORTH PROFILE (B)



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ENGINEERING SHEET:
NORTH-SOUTH &
EAST-WEST
CONTAINMENT PROFILES
OF

PROJECT NAME:

TWS

FOR

CLIENT:

VAUGHN OPERATING

PROJECT NUMBER:
24189

PROJECT ENGINEER:
JEREMY BAKER, PE

DRAWN BY:
VM

GRAPHIC SCALE
VERTICAL
0 6' 12'
SCALE: 1" = 6'
(IN FEET)

GRAPHIC SCALE
HORIZONTAL
0 30' 60'
SCALE: 1" = 30'
(IN FEET)

REVISIONS

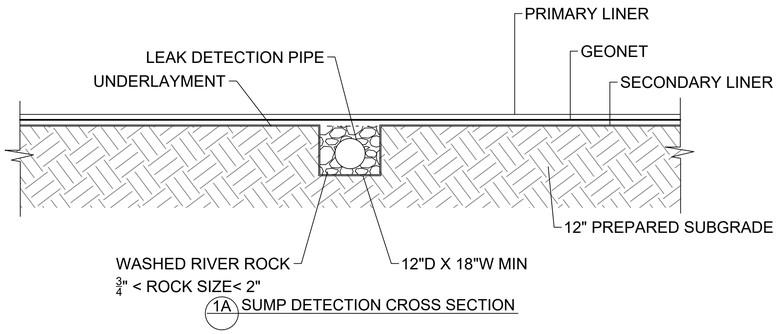
No.	DATE	DESCRIPTION

JEREMY BAKER
NEW MEXICO
16207
LICENSED PROFESSIONAL ENGINEER

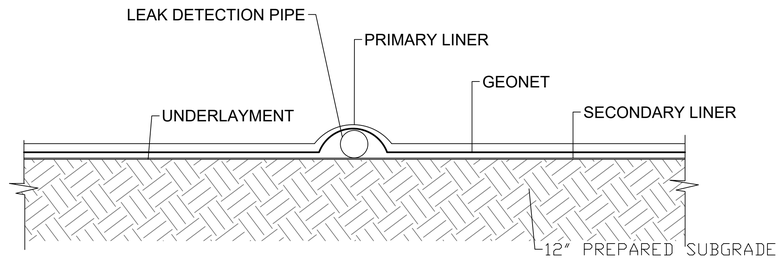
11/26/2024

SHEET: 5 of 8

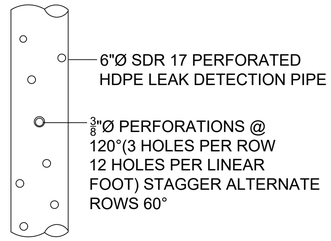
CS-102



1A SUMP DETECTION CROSS SECTION



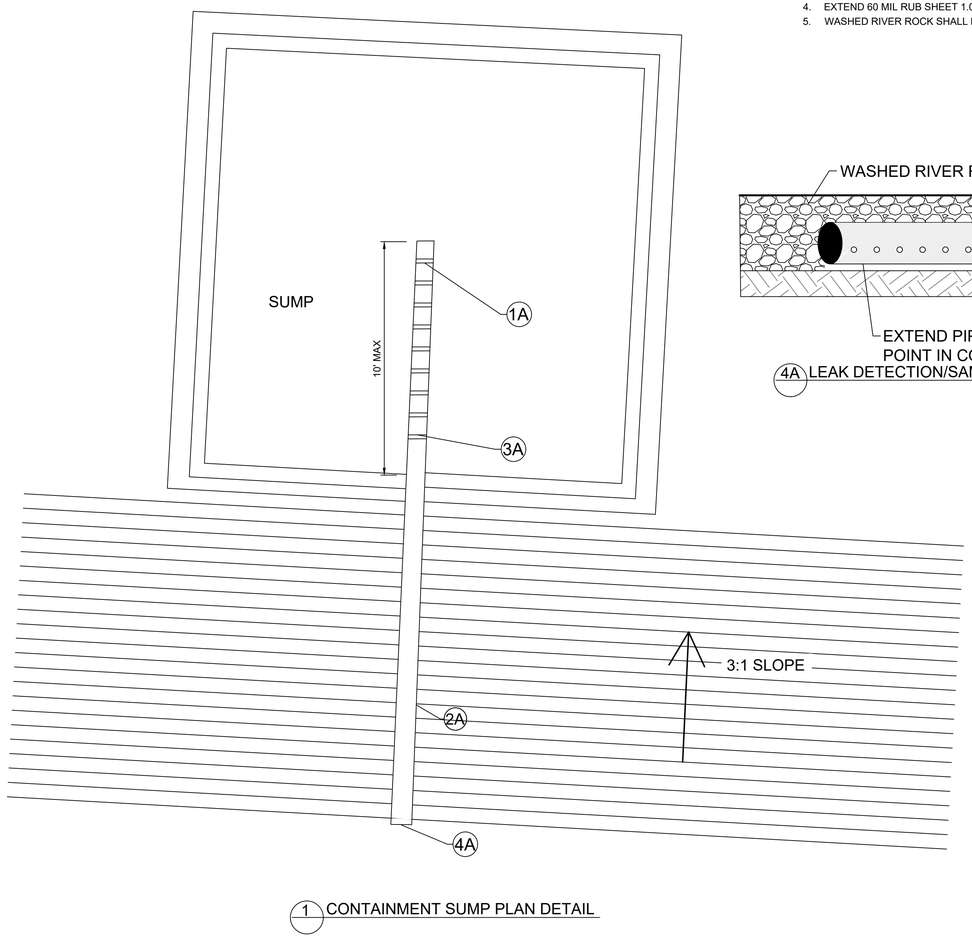
2A SIDE SLOPE LEAK DETECTION PIPE DETAIL



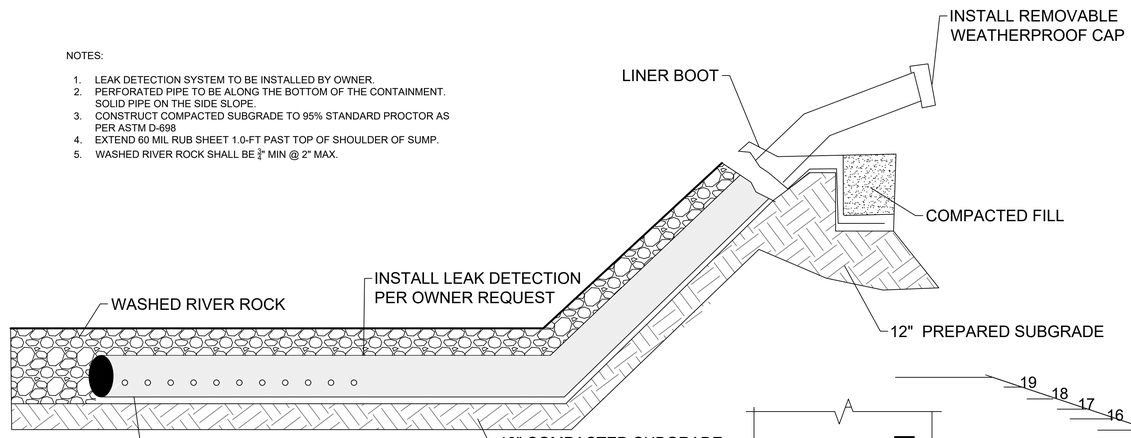
3A PERFORATED PIPE DETAIL

NOTES:

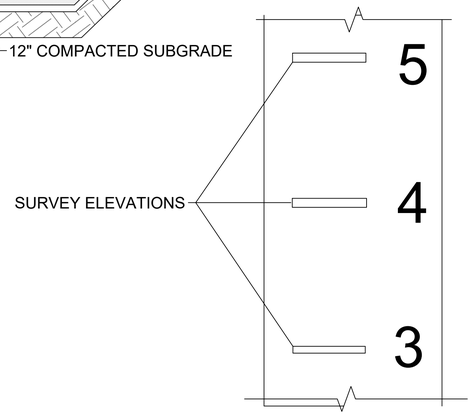
1. LEAK DETECTION SYSTEM TO BE INSTALLED BY OWNER.
2. PERFORATED PIPE TO BE ALONG THE BOTTOM OF THE CONTAINMENT. SOLID PIPE ON THE SIDE SLOPE.
3. CONSTRUCT COMPACTED SUBGRADE TO 95% STANDARD PROCTOR AS PER ASTM D-698
4. EXTEND 60 MIL RUB SHEET 1.0-FT PAST TOP OF SHOULDER OF SUMP.
5. WASHED RIVER ROCK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

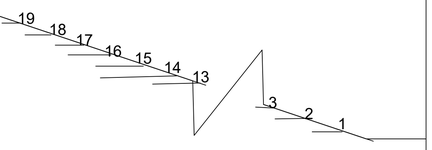


1 CONTAINMENT SUMP PLAN DETAIL



4A LEAK DETECTION/SAMPLING SYSTEM PROFILE





NOTE:

1. LEVEL MARKS TO BE LOCATED BY SURVEYOR
2. MARKS TO BE MADE BY AN EXTRUSION WELDER USING BLACK FILAMENT (OR WHITE FILAMENT ON BLACK LINER)
3. MARKS WILL BE DETERMINE ON THE FIELD BY THE OWNER AND CONTINUE TO THE TOP OF THE BERM.
4. REFERENCE PIT CAPACITY TABLES FOR ACCURATE ELEVATIONS.

2 WATER LEVEL MARKS

PROPOSED PIT REFERENCE TABLE

DETAIL	DESCRIPTION
PRIMARY LINER	60 MIL HDPE LINER
LEAK DETECTION	200 MIL GEONET
SECONDARY LINER	40 MIL HDPE LINER
UNDERLAYMENT	COMPACTED SUBGRADE/10 OZ GEOTEXTILE
BOTTOM OF POND	3102.80
BERM (ROAD CREST)	3124.80'
LEAK DETECTION PIPING	8-IN DR11 X PERFORATED HEPE PIPE LEAK DETECTION PIPE

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ENGINEERING SHEET:
LEAK DETECTION DETAILS
OF
PROJECT NAME:
TWS
FOR
CLIENT:
VAUGHN OPERATING

PROJECT NUMBER: 24189

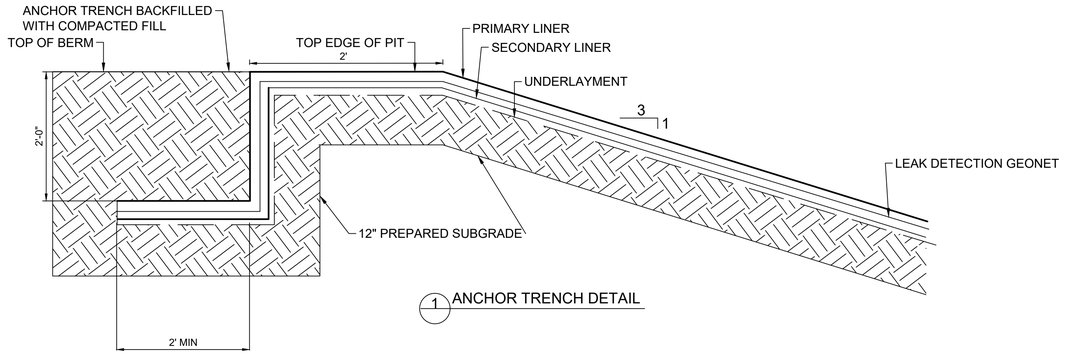
PROJECT ENGINEER: JEREMY BAKER, PE
DRAWN BY: XAVIER CLARK

REVISIONS

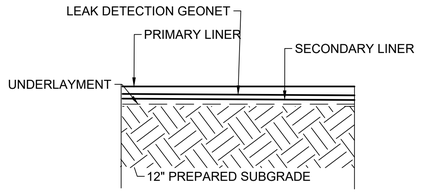
No.	DATE	DESCRIPTION

JEREMY BAKER NEW MEXICO 16207 LICENSED PROFESSIONAL ENGINEER
11/26/2024

SHEET: 6 of 8
CS-501



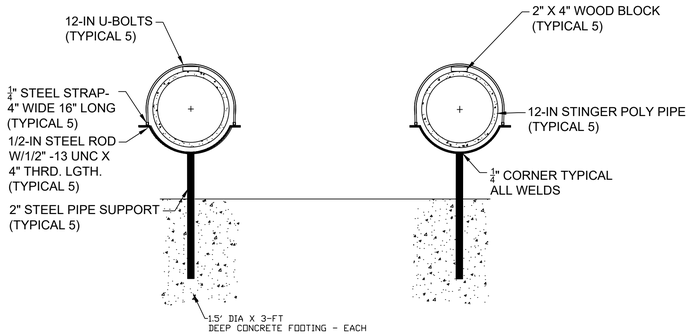
1 ANCHOR TRENCH DETAIL



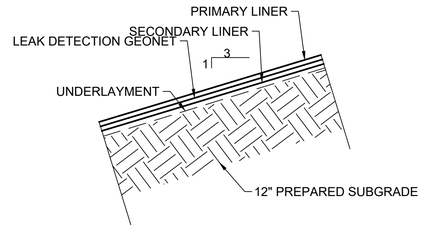
4 LINER SYSTEM FLOOR DETAIL

GENERAL NOTES:

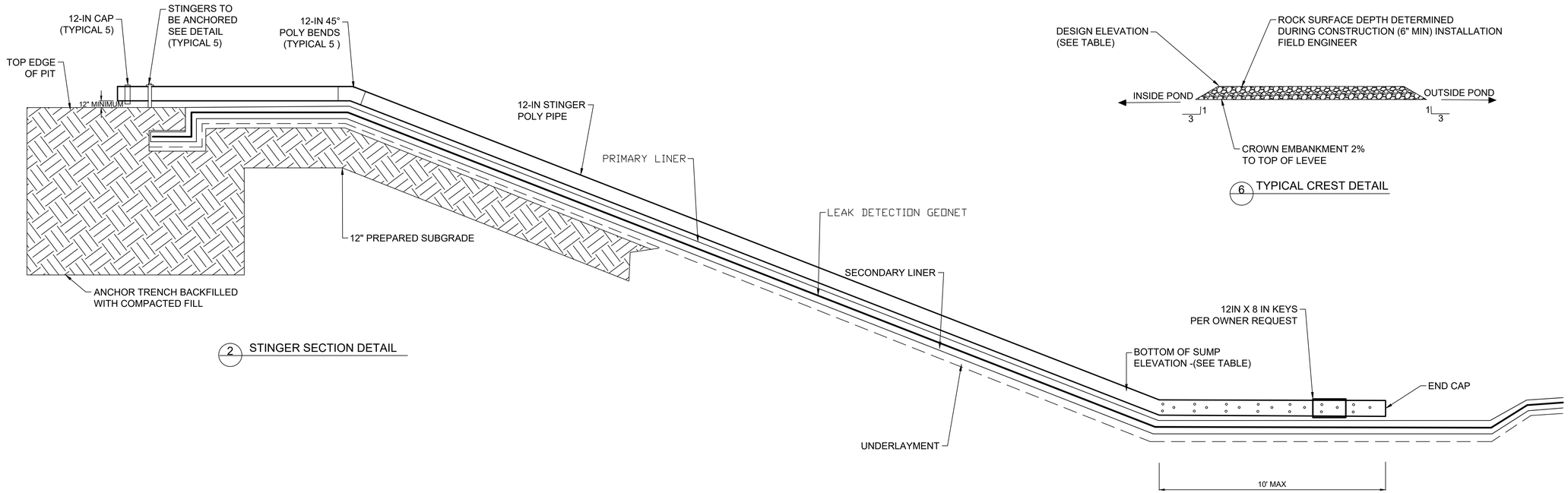
1. PREPARED SUBGRADE MEANS COMPACTED SMOOTH SUBGRADE FREE OF ROCK, ROOTS, WOOD DEBRIS, CONCRETE RUBBLE AND ANY SHARP OBJECTS THAT MAY PUNCTURE THE HDPE LINER, A MINIMUM COMPACTED DEPTH OF 12".
2. ALL INTERIOR SLOPES AND TOP OF BERMS TO BE SMOOTH DRUM ROLLED
3. ALL EMBANKMENT SLOPES SHALL HAVE A SLOPE (H:V RATIO) OF 3:1.
4. COMPACTED EARTH EMBANKMENTS TO BE CONSTRUCTED WITH 12 INCH (MAXIMUM LOOSE LIFTS, COMPACTED TO 95% STANDARD PROCTOR DENSITY)
5. PERFORM GEOTECHNICAL ANALYSIS ON EXISTING SOIL TO CONFIRM SOIL IS SUITABLE FOR USE IN THE LEVEE.
6. LINER SPECIFICATIONS PROVIDED ON SHEET CS - 501



3 STINGER SYSTEM ANCHOR DETAIL



5 LINER SYSTEM SIDE SLOPE



2 STINGER SECTION DETAIL

6 TYPICAL CREST DETAIL

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ENGINEERING SHEET:

LINER DETAILS

OF

PROJECT NAME:

TWS

FOR

CLIENT:

VAUGHN OPERATING

PROJECT NUMBER:

24189

PROJECT ENGINEER: JEREMY BAKER, PE

DRAWN BY: XAVIER CLARK

REVISIONS

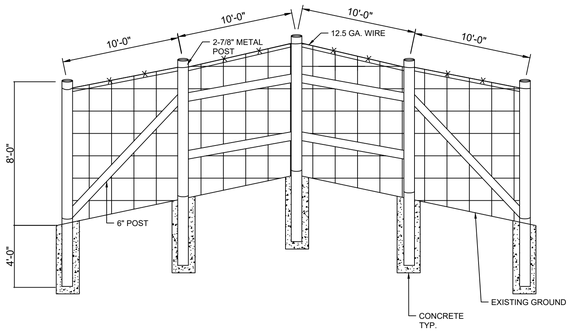
No.	DATE	DESCRIPTION

JEREMY BAKER NEW MEXICO 16207 LICENSED PROFESSIONAL ENGINEER

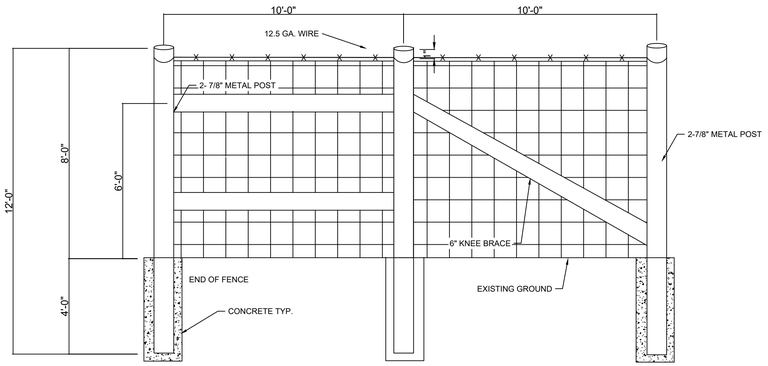
11/26/2024

SHEET: 7 of 8

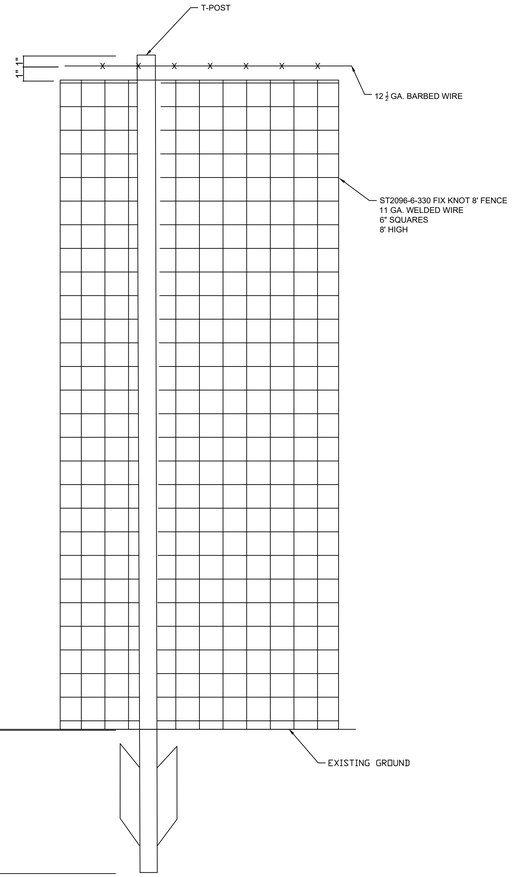
CS-502



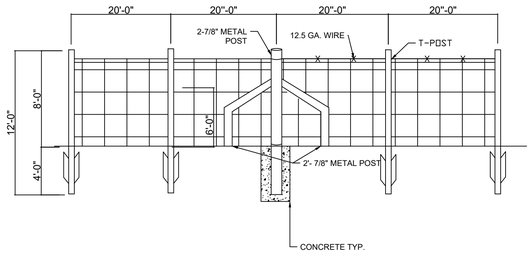
1 CORNER POST



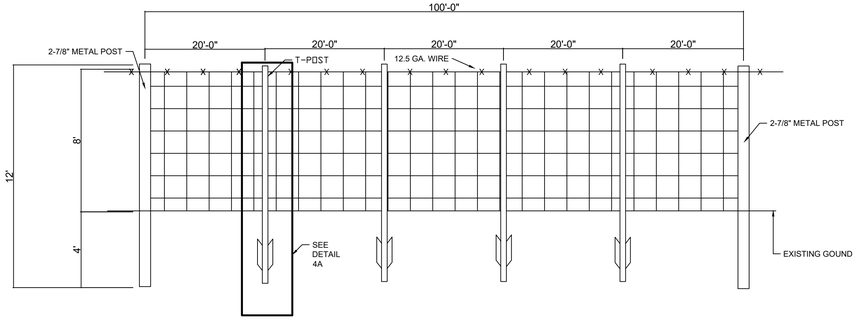
2 END POST



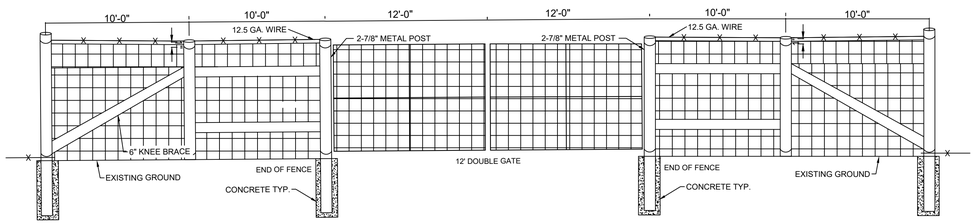
4A METAL POST



3 LINE BRACE POST



4 LINE POST



5 GATE POSTS

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ENGINEERING SHEET:

FENCE DETAILS

OF

PROJECT NAME:

TWS

FOR

CLIENT:

VAUGHN OPERATING

PROJECT NUMBER:
24189

PROJECT ENGINEER:
JEREMY BAKER, PE

DRAWN BY:
XAVIER CLARK

REVISIONS

No.	DATE	DESCRIPTION

JEREMY BAKER NEW MEXICO 16207 LICENSED PROFESSIONAL ENGINEER

11/26/2024

SHEET: 8 of 8

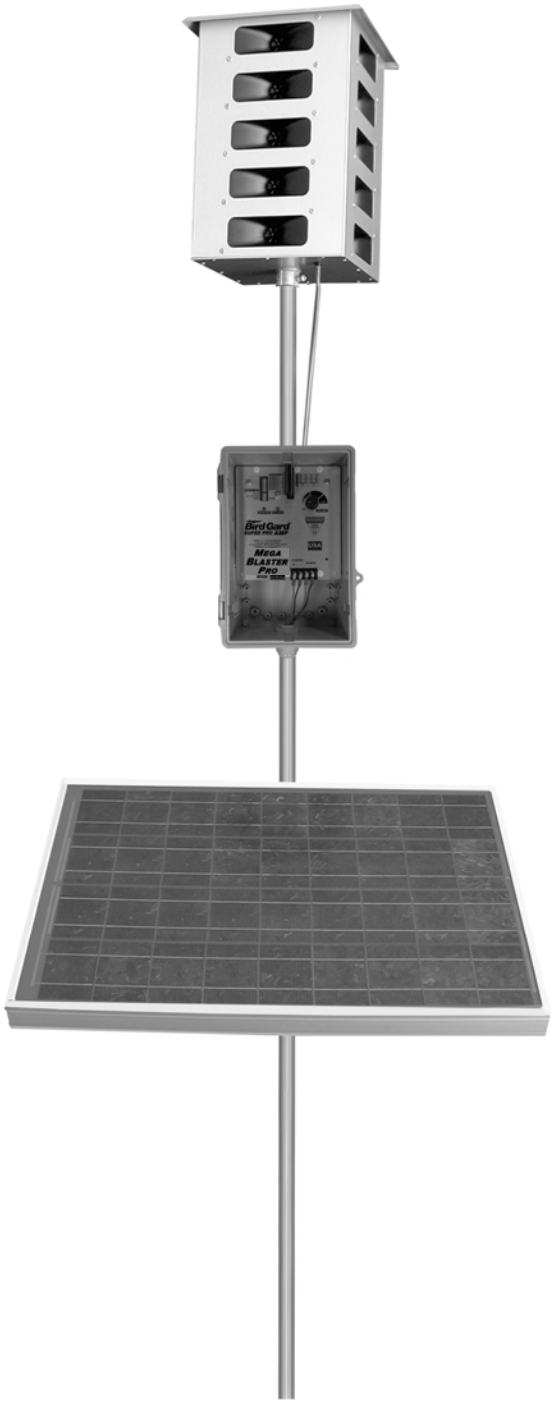
CS-503

AVIAN DETERRENT SYSTEM

MEGA BLASTER PRO

BIRD-X

User's Manual



Overview

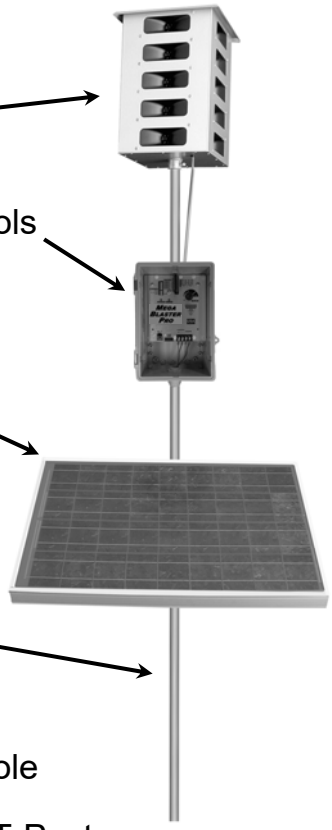
The Bird-X Mega Blaster Pro utilizes the innate power of the natural survival instincts of birds to effectively repel them. Digital recordings of distressed and alarmed birds, along with the sounds made by their natural predators are broadcast through high fidelity weather-resistant speakers over the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

Your Bird-X Mega Blaster Pro system consists of:

20-Speaker Tower broadcasts the bird sounds

Control Unit produces the bird sounds and contains all operational controls

Solar Panel recharges the 12-volt deep cycle battery



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

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

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

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

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

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

Bird Control Management Guidelines

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

For best results:

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

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

DESIGN/CONSTRUCTION PLAN

Design and Construction Plan In Ground Containments

This plan addresses construction of the earthen containments.

Magrym Engineers is providing the design of the containment and their plans are presented in this submission.

Dike Protection and Structural Integrity

The design and operation provide for the confinement of produced water, prevention of releases and prevention of 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 (a berm) and/or diversion ditch (between the levee and the soil stockpile) to prevent run-on of surface water.

19.15.34.12 A Design and Construction Specifications
(1). The operator shall design and construct a recycling containment to ensure the confinement of produced water, to prevent releases and to prevent overtopping due to wave action or rainfall.
(8). The operator of a recycling containment shall design the containment to prevent run-on of surface water. The containment shall be surrounded by a berm, ditch or other diversion 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.

19.15.34.12 B. Prior to constructing containment, the operator shall strip and stockpile the topsoil for use as the final cover or fill at the time of closure

Signage

The operator will place an upright sign no less than 12 inches by 24 inches 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:

- the operator's name,
- the location of the site by quarter-quarter or unit letter, section, township and range, and
- emergency telephone numbers

19.15.34.12 C. Signs.
The operator shall post an upright sign no less than 12 inches by 24 inches with lettering not less than two inches in height in a conspicuous place on the fence surrounding the containment. The operator shall post the sign in a manner and location such that a person can easily read the legend. The sign shall provide the following information: the operator's name, the location of the site by quarter-quarter or unit letter, section, township and range, and emergency telephone numbers

Fencing

The operator will provide for a fence to enclose the recycling containment in a manner that deters unauthorized wildlife and human access. As specified in the design drawings, the operator will employ a chain-link or game fence. If required by the District Office, the operator will add four-strands of barbed wire to comply with the text of the Rule. Because feral pigs, javelina and deer are present in the area, a chain link or game fence is required in order to comply with Section 19.15.34.12 D.1 of the Rule because pigs will move beneath the lower strand of a 4-strand, 4-foot high barbed wire fence and deer will jump over. However, 19.15.34.12 D.2 requires "a four-foot fence that has at least four strands of barbed wire evenly spaced in the interval between one foot and four feet above ground level". Therefore, a barbed wire specification will be added to the game fence to avoid a variance if required by the OCD District Office.

19.15.34.12 D. Fencing
(1) The operator shall fence or enclose a recycling containment in a manner that deters unauthorized wildlife and human access and shall maintain the fences in good repair. The operator shall ensure that all gates associated with the fence are closed and locked when responsible personnel are not onsite.
(2) Recycling containments shall be fenced with a four-foot fence that has at least four strands of barbed wire evenly spaced in the interval between one foot and four feet above ground level.

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 perimeter game/chain-link fence will be effective in excluding stock and most terrestrial wildlife. If requested by the surface owner, the game fence can include a fine mesh from the base to 1 foot above the ground to exclude the small reptiles (e.g. dune sagebrush lizard).

19.15.34.12 E Netting.
The operator shall ensure that a recycling containment is screened, netted or otherwise protective of wildlife, including migratory birds. The operator shall on a monthly basis inspect for and, 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.

The recycling containment will be protective of wildlife, including migratory birds through the implementation of an Avian Protection Plan, routine inspections and the perimeter fence.

The avian protection plan includes the use of a Bird-X Mega Blaster Pro[1] as a primary hazing program for avian species. The device will be equipped with sounds suitable for the Permian Basin environment. In addition to this sonic device, staff will routinely inspect the containment for the presence of avian species and, if detected, will use a blank cartridge or shell in a handgun, starter pistol or shotgun as additional hazing. Decoys of birds of prey may be placed on the game fence and other roosts around the open water to provide additional hazing.

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

Earthwork

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 is required under the liner when needed to reduce localized stress-strain or protuberances that otherwise may compromise the liner's integrity.

19.15.34.12 A
(2) A recycling containment shall 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 is required under the liner when needed to reduce localized stress-strain or protuberances that otherwise may compromise the liner's integrity…

This volume provides the stamped drawings for the containment with the following design/construction specifications:

a) levee has inside grade no steeper than two horizontal feet to one vertical foot (2H: 1V).

b) levee outside grade is no steeper than three horizontal feet to one vertical foot (3H: 1V)
c) top of the levee is wide enough to install an anchor trench and provide adequate room for inspection and maintenance.
d) The containment floor design calls for a slope toward the sump in the corner(s).

19.15.34.12 A
(2) …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). The levee shall have an outside grade no steeper than three horizontal feet to one vertical foot (3H:1V). The top of the levee shall be wide enough to install an anchor trench and provide adequate room for inspection and maintenance.

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.

19.15.34.12 A
(3) Each recycling containment shall incorporate, at a minimum, 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 specified in the design drawings and is 40-mil HDPE or thicker and is equivalent to 30-mil LLDPEr (in accordance with a previously approved variance) Liner compatibility meets or exceeds a subsequent relevant publication to EPA SW-846 method 9090A.

19.15.34.12 A
(4) All primary (upper) liners in a recycling containment shall be geomembrane liners composed of an impervious, synthetic material that is resistant to ultraviolet light, petroleum hydrocarbons, salts and acidic and alkaline solutions. All primary liners shall be 30-mil flexible PVC, 45-mil LLDPE string reinforced or 60-mil HDPE liners. Secondary liners shall be 30-mil LLDPE string reinforced or equivalent with a hydraulic conductivity no greater than 1 x 10-9 cm/sec. Liner compatibility shall meet or exceed the EPA SW-846 method 9090A or subsequent relevant publications.

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 in the corner(s) of the containment, as shown in the design drawings. This slope combined with the highly transmissive geonet drainage layer provide for rapid leak detection.

19.15.34.12 A
(7) The operator of a recycling containment shall place a leak detection system between the upper and lower geomembrane liners that shall consist of 200-mil geonet or two feet of compacted soil with a saturated hydraulic conductivity of 1 x 10-5 cm/sec or greater to facilitate drainage. The leak detection system shall consist 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 liners and drainage material will be installed consistent with the Manufacturer's specifications. In addition to any specifications of the Manufacturer, protocols for liner installation include measures to:

i. minimizing liner seams and orient them up and down, not across, a slope of the levee.
ii. use factory-welded seams where possible.
iii. use field seams in geosynthetic material that are thermally seamed and prior to field seaming, overlap liners four to six inches.
iv. minimize the number of field seams and comers and irregularly shaped areas.
v. provide for no horizontal seams within five feet of the

19.15.34.12 A
(5) The operator of a recycling containment shall minimize liner seams and orient them up and down, not across, a slope of the levee. Factory welded seams shall be used where possible. The operator shall ensure field seams in geosynthetic material are thermally seamed. Prior to field seaming, the operator shall overlap liners four to six inches…

slope's toe.

vi. use qualified personnel to perform field welding and testing.

vii. avoid excessive stress-strain on the liner

viii. The edges of all liners are anchored in the bottom of a compacted earth-filled trench that is at least 18 inches deep

19.15.34.12 A
(5) …The operator shall minimize the number of field seams and corners and irregularly shaped areas. There shall be no horizontal seams within five feet of the slope's toe. Qualified personnel shall perform field welding and testing.

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.

19.15.34.12 A
(3) The edges of all liners shall be anchored in the bottom of a compacted earth-filled trench. The anchor trench shall be at least 18 inches deep.

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.

19.15.34.12 A
(6) At a point of discharge into or suction from the recycling containment, the operator shall insure that the liner is protected from excessive hydrostatic force or mechanical damage. External discharge or suction lines shall not penetrate the liner.

Pumping from the containment to hydraulic fracturing operations is the responsibility of stimulation contractors. Typically, 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 if the owner deems necessary during operations.

Leak Detection and Fluid Removal System Installation

The leak detection system, contains the following design elements

a. The 200-mil HyperNet Geonet drainage material between the primary and secondary liner that is sufficiently permeable to allow the transport of fluids to the observation ports (Appendix A).
b. The containment floor is sloped towards the monitoring riser pipe to facilitate the earliest possible leak detection of the containment bottom. A pump may be placed in the observation port to provide for fluid removal.
c. Piping will withstand chemical attack from any seepage, structural loading from stresses and disturbances from overlying water, cover materials, equipment operation or expansion or contraction (see Appendix A).

OPERATIONS AND MAINTENANCE PLAN

CLOSURE PLAN

Operation and Maintenance Plan
In Ground Containments

Overview

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

19.15.34.10 D
Recycling containments may not be used for the disposal of produced water or other oilfield wastes.

The operation of the containment is summarized below.

A. Produced water generated from nearby oil and gas wells is delivered to a treatment system located as indicated in the C-147.
B. Unless specified in the transmittal letter, after treatment, the produced water discharges into the containment.
C. When required, produced water is removed from the containment for E&P operations. At this time, produced water will be used for drilling beneath the freshwater zones (beneath surface casing), for well stimulation (e.g. hydraulic fracturing) and other E&P uses as approved by OCD.
D. Whenever the maximum fluid capacity of the containment is reached, treatment and discharge to the containment ceases (see Freeboard and Overtopping Plan, below).
E. 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 (see attached example).
F. 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.

19.15.34.9 E
The operator of a recycling facility shall 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.

19.15.34.9 F
The operator of a recycling facility shall 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.

G. 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.

19.15.34.13 C
A recycling 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 must 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 discovery, 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 Monitoring, Inspection, and Reporting Plan; below), 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 on site, 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.

19.15.34.13 B
(4) If the containment's primary liner is compromised above the fluid's surface, the operator shall 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.
(5) If the primary liner is compromised below the fluid's surface, the operator shall remove all fluid above the damage or leak within 48 hours of discovery, notify the division district office and repair the damage or replace the primary liner.

19.15.34.13 B
(7) The operator shall install, or maintain on site, an oil absorbent boom or other device to contain an unanticipated release.
(1) The operator shall remove any visible layer of oil from the surface of the recycling containment.
19.15.34.8 A

(6) All releases from the recycling and re-use of produced water shall be handled in accordance with 19.15.29 NMAC.

8. The operator will maintain the containment free of miscellaneous solid waste or debris.
9. The operator will maintain at least three feet of freeboard for the containment and will use a free-standing staff gauge to allow easy determination of the required 3-foot 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.

19.15.34.13
(6) The containment shall be operated to prevent the collection of surface water run-on.

19.15.34.13 B
(2) The operator shall maintain at least three feet of freeboard at each containment.

19.15.34.13 B
(3) The injection or withdrawal of fluids from the containment shall be accomplished through a header, diverter or other hardware that prevents damage to the liner by erosion, fluid jets or impact from installation and removal of hoses or pipes.

19.15.34.12 D
(1) The operator shall fence or enclose a recycling containment in a manner that deters unauthorized wildlife and human access and shall maintain the fences in good repair. The operator shall ensure that all gates associated with the fence are closed and locked when responsible personnel are not onsite.

19.15.34.13 A
The operator shall 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.

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:

- reading and recording the fluid height of staff gauges,
- recording any evidence that the pond surface shows visible oil,
- visually inspecting the containment's exposed liners
- checking the leak detection system for any evidence of a loss of integrity of the primary liner.
- inspect diversion ditches and berms around the containment to check for erosion and collection of surface water run-on.
- inspect the leak detection system for evidence of damage or malfunction and monitor for leakage.

As stated above, if a liner's integrity is compromised, or if any penetration of the liner occurs, then the operator will take appropriate action within 48 hours, based on if above or below water surface, as noted above.

Monthly, the operator will:

A. Inspect the containment for dead 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.
B. 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.
C. Record sources and disposition of all recycled water.

19.15.34.12 E
The operator shall on a monthly basis inspect for and, 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.

19.15.34.9 E
The operator of a recycling facility shall 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.

19.15.34.9 F
The operator of a recycling facility shall 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.

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

Freeboard and Overtopping Prevention Plan

The method of operation of the containment allows for maintaining freeboard with very few potential problems. When the capacity of the containment is reached (3-feet of freeboard), the discharge of produced water ceases and the produced water generated by nearby oil and gas wells is managed by an injection well(s).

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

I. Cease discharging produced water to the containment.

II.Accelerate re-use of the produced water for purposes approved by the Division.

III. Transfer produced water from the containment to injection wells.

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 A, 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-inch 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 produced water from the containment via electrical 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.

Closure Plan
In Ground Containments

Overview

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.

19.15.34.14 A
Once the operator has ceased operations, the operator shall 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

a. the condition that existed prior to the construction of the recycling containment or
b. 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,

19.15.34.14 E
The operator shall substantially restore the impacted surface area to the condition that existed prior to the construction of the recycling containment.

19.15.34.14 G
The re-vegetation and reclamation obligations imposed by federal, state trust land or tribal agencies on lands managed by those agencies shall supersede these provisions and govern the obligations of any operator subject to those provisions, provided that the other requirements provide equal or better protection of fresh water, human health and the environment.

The surface owner will impose a closure design that conforms to their needs for the site. The operator understands that a variance will be submitted to OCD to allow for any alternative closure protocol.

Excavation and Removal Closure Plan – Protocols and Procedures

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

1. The operator will remove all liquids from the containment 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.
2. 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.
3. After the removal of the containment contents and liners, soils beneath the containment will be tested by collection of a five-point (minimum) composite sample which includes stained or wet soils, if any, and that sample shall be analyzed for the constituents listed in Table I of 19.15.34.14.
4. After review of the laboratory results:
    a. If any contaminant concentration is higher than the parameters listed in Table I, additional delineation may be required, and the operator must receive approval before proceeding with closure.

19.15.34.14 B
The operator shall close a recycling containment by first removing all fluids, contents and synthetic liners and transferring these materials to a division approved facility.

19.15.34.14 C
The operator shall test the soils beneath the containment for contamination with a five-point composite sample which includes stained or wet soils, if any, and that sample shall be analyzed for the constituents listed in Table I below.

19.15.34.14 C
(1) If any contaminant concentration is higher than the parameters listed in Table I, the division may require additional delineation upon review of the results 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 I, 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.

19.15.34.14 C
(2) If all contaminant concentrations are less than or equal to the parameters listed in Table I, then the operator can proceed to backfill with non-waste containing, uncontaminated, earthen material.

Reclamation and Re-vegetation

a. The operator will reclaim the containment's location to a safe and stable condition that blends with the surrounding undisturbed area.
b. 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.
c. The disturbed area shall then be reseeded in the first favorable growing season following closure of a recycling containment.

19.15.34.14 E
Once the operator has closed the recycling containment, the operator shall 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.

19.15.34.14 D
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.

19.15.34.14 H
The operator shall notify the division when reclamation and re-vegetation are complete.

19.15.34.14 F
Reclamation of all disturbed areas no longer in use shall be considered complete when 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.

April 2024

Rule 34 Registration
2RF-212 (Sam Houston) Modification
Section 34, T21S, R27E, Eddy County

Volume 4 Tall Texan In-Ground Containments

- ***C-147 Form & Liner Equivalency Demonstration***
- ***Closure Cost Estimate for In-Ground Containments***
- ***Stamped Design Drawings and Avian Deterrence***
- ***Recently Approved Plans for Design/Construction, O&M, and Closure***

View south southeast to the Nolan Ryan containment area from northeast corner of adjacent production pad. A small swale in fore ground (with tire tracks) separates the production pad from the Nolan Ryan Containments location..

Prepared for:
Vaughan Operating, LLC
Carlsbad, New Mexico

Prepared by:

R.T. Hicks Consultants Ltd.
Albuquerque, New Mexico

Cascade Services LLC
Midland, Texas

C-147

LINER EQUIVALENCY DEMONSTRATION

State of New Mexico
Energy Minerals and Natural Resources
Department Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505
https://www.emnrd.nm.gov/ocd/ocd-e-permitting/

Form C-147
Revised October 11, 2022

Recycling Facility and/or Recycling Containment

Type of Facility: ☑ Recycling Facility ☑ Recycling Containment*

Type of action: ☐ Permit ☑ Registration
☑ Modification ☐ Extension
☐ Closure ☑ Other (explain) Change name from TWS to TSW (Sam Houston)

*** 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: Vaughan Operating, LLC (For multiple operators attach page with information) OGRID #: 330307
Address: 1409 Verdel Ave, Carlsbad, NM 88220
Facility or well name (include API# if associated with a well): TSW Tall Texan Containments
OCD Permit Number: 2RF-212 (TSW Sam Houston) (For new facilities the permit number will be assigned by the district office)
U/L or Qtr/Qtr I Section 34 Township 21S Range 27E County: Eddy
Surface Owner: ☐ Federal ☐ State ☑ Private ☐ Tribal Trust or Indian Allotment

2.
☑ **Recycling Facility:** Tall Texan
Location of recycling facility (if applicable): Latitude 32.433586 Longitude -104.170048 NAD83
Proposed Use: ☑ Drilling* ☑ Completion* ☑ Production* ☑ Plugging *
The re-use of produced water may NOT be used until fresh water zones are cased and cemented
☐ Other, ***requires permit for other uses. Describe use, process, testing, volume of produced water and ensure there will be no adverse impact on groundwater or surface water.***
☑ Fluid Storage
☑ Above ground tanks ☐ Recycling containment ☐ Activity permitted under 19.15.17 NMAC explain type_____
☐ Activity permitted under 19.15.36 NMAC explain type:_____ ☐ Other explain _____
☐ For multiple or additional recycling containments, attach design and location information of each containment
☐ **Closure Report (required within 60 days of closure completion):** ☐ Recycling Facility Closure Completion Date:_____

3.
☑ **Recycling Containment:** Tall Texan North and South Containments
☐ Annual Extension after initial 5 years (attach summary of monthly leak detection inspections for previous year)
Center of Recycling Containment (if applicable): Latitude 32.433656 Longitude -104.170097 NAD83
☑ For multiple or additional recycling containments, attach design and location information of each containment
☑ Lined ☐ Liner type: Thickness _____mil ☐ LLDPE ☑ HDPE ☐ PVC ☐ Other _____
☐ String-Reinforced N = 51533 S =5 1541 Total = 106074 See design drawings
Liner Seams: ☑ Welded ☐ Factory ☐ Other _____ Volume: _____bbl Dimensions: L_____ x W_____ x D_____
☐ 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 $_____ **(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 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.

- ☒ Design Plan - based upon the appropriate requirements.
- ☒ Operating and Maintenance Plan - based upon the appropriate requirements.
- ☒ Closure Plan - based upon the appropriate requirements.
- ☒ Site Specific Groundwater Data -
- ☒ Siting Criteria Compliance Demonstrations –
- ☒ **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): Steven McCutcheon Title: Managing Partne r
Signature: Date: 04/28/25
e-mail address: stevenm@mhatllc.com Telephone: 575 689-8620

11.
OCD Representative Signature: Victoria Venegas **Approval Date:** 05/13/2025
Title: Environmental Specialist **OCD Permit Number:** 2RF-212

- ☒ OCD Conditions
- ☒ Additional OCD Conditions on Attachment

R.K. FROBEL & ASSOCIATES
Consulting Engineers

Technical Memorandum: 40-mil HDPE as Alternative Secondary Liner System for In Ground Recycling Containment Facilities

NMAC 19.15.34.12 A

I have investigated the suitability of application for 40 mil HDPE geomembrane as an equivalent secondary liner to 30 mil scrim reinforced LLDPE (LLDPEr) in the application for In Ground Recycling Containment facilities. *In summary, it is my professional opinion that the specified 40 mil HDPE geomembrane will provide a secondary liner system that is equal to or better than 30 mil scrim reinforced LLDPEr and will provide the requisite protection of fresh water, public health and the environment for many years when engineering design provides requisite site/soil/slope preparation and when used in concert with requisite primary liners and drainage layers.*

It is understood that the lining system under discussion is composed of a 60 mil HDPE Primary liner, geonet drainage layer and a 40 mil HDPE Secondary liner. *In consideration of the secondary lining system application, size of impoundment and depth, design details as well as the chemical nature of typical processed water, it is my professional opinion that the 40 mil HDPE geomembrane will provide the requisite barrier against processed water loss and will function effectively as a secondary liner.*

The following are discussion points that hopefully will exhibit the equivalency of a 40 mil HDPE secondary liner to that of a 30 mil LLDPEr.

The nature and formulation of the 40 mil HDPE resin is the same as the Primary 60 mil HDPE. The major difference is that the 40 mil HDPE is lower in thickness (more flexible and less puncture resistant). However, in covered conditions, HDPE will resist aging and degradation and remain intact for many decades. In fact, a secondary liner of 40 mil HDPE will outlast an exposed 60 mil HDPE liner. According to the Geosynthetic Research Institute (GRI) study on lifetime prediction (GRI Paper No. 6), the half life of HDPE (GRI GM 13) exposed is > 36 years and the half-life of HDPE covered or buried is greater than 100 years. It is understood that in order to ensure compliance of materials, the primary 60 mil HDPE to be used must meet or exceed GRI GM 13 Standards. Likewise, the secondary liner that is not exposed to the same environmental and chemical conditions must meet or exceed GRI GM 13 for non-reinforced HDPE. Adhering to the minimum requirements of the GRI Specifications, 40 mil HDPE when used as a secondary liner will be equally as protective as the primary 60 mil HDPE liner (reference: www.geosynthetic-institute.org/grispecs) and equally as protective as a 30 mil scrim reinforced LLDPEr liner.

Durability of Geomembranes is directly affected by exposure conditions. Buried or covered geomembranes are not affected by the same degradation mechanisms (UV, Ozone, Chemical, Stress, Temperature, etc) as are fully exposed geomembranes. In this regard, the secondary liner material and thickness can be much less robust than the fully exposed primary liner which in this case is 60 mil HDPE. This is also the case for

landfill lining systems where the secondary geomembrane in a bottom landfill cell may be 40 mil HDPE.

Thermal Fusion Seaming Requirements. Thermal seaming and QC seam test requirements for geomembranes are product specific and usually prescribed by the sheet manufacturer. Dual wedge thermal fusion welding is commonly used on HDPE and QC testing by air channel (ASTM D 5820) is fully acceptable and recognized as an industry standard. In this regard, there should be no exception requirement for seaming and QC testing as both the Primary and Secondary geomembranes are HDPE. This is fully covered in comprehensive specifications for both the Primary and Secondary geomembranes (Reference: www.ASTM.org/Standards).

Potential for Leakage through the Primary and Secondary Liners. Leakage through geomembrane liners is directly a function of the height of liquid head above any hole or imperfection. The geonet drainage media provides immediate drainage to a low point or sump and thus no hydrostatic head or driving gradient is available to push leakage water through a hole in the secondary liner. In this regard, secondary geomembrane materials can be (and usually are) much less in thickness and also polymer type. Hydraulic Conductivity through the 40 mil HDPE liner material is extremely low due to the polymer type, structure and crystallinity and exceeds requirements of EPA SW-846 Method 9090A.

Chemical Attack. Chemical attack to polymeric geomembranes is directly a function of type of chemical, temperature and exposure time. Again, the HDPE Primary provides the chemically resistant liner and is QC tested to reduce potential defects or holes. If there is a small hole, the geonet drain takes any leakage water immediately to the sump for extraction. Thus, exposure time is very limited on a secondary liner in addition to low temperature, little volume and virtually no head pressure. In this regard, a chemically resistant geomembrane material such as 40 mil HDPE can be specified for the secondary and is a fully acceptable alternate to 30 mil scrim reinforced LLDPEr.

Mechanical Properties Characteristics. Geomembranes of different polymer and/or structure (i.e., reinforced vs non-reinforced) cannot be readily compared using such characteristics as tensile stress/strain, tear, puncture and polymer requirements. For a 40 mil HDPE liner material to function as a Secondary liner it should meet or exceed the manufacturers minimum requirements for Density, Tensile Properties, Tear, Puncture as well as other properties such as UV resistance. The sheet material must also meet or exceed GRI GM 13 minimum requirements. *In this regard, a 40 mil HDPE will be equivalent to a 30 mil LLDPEr as a secondary liner for the conditions listed below:*

- *The subgrade or compacted earth foundation will be smooth, free of debris or loose rocks, dry, unyielding and will support the lining system.*
- *The side slopes for the containment shall be equal to or less than 3H:1V.*
- *The physical properties and condition of the subgrade or liner foundation*

(i.e., density, slope, moisture) will be inspected and certified by a Professional Engineer that it meets or exceeds specification requirements.

- *Immediately prior to installation, the installation contractor shall inspect and sign off on the subgrade conditions that they meet or exceed the HDPE manufacturer and installers requirements.*
- *A protective geotextile will be placed on the finished and accepted subgrade between subgrade and the 40 mil HDPE Secondary liner.*
- *A 200 mil geonet will be placed over the 40 mil HDPE Secondary Liner.*
- *A 60 mil HDPE Primary liner will be placed over the 200 mil geonet drainage layer.*

If you have any questions on the above technical memorandum or require further information, give me a call at 720-289-0300 or email geosynthetics@msn.com

Sincerely Yours,

R K Frobel

Ronald K. Frobel, MSCE, PE

References:

NMAC 19.15.34.12 A DESIGN AND CONSTRUCTION SPECIFICATIONS FOR A RECYCLING CONTAINMENT

Geosynthetic Research Institute (GRI) Published Standards and Papers 2017
www.geosynthetic-institute.org

ASTM Geosynthetics Standards 2017
www.ASTM.org/Standards

CLOSURE COST ESTIMATE

R. T. HICKS CONSULTANTS, LTD.
901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Since 1996

TALL TEXAN IN-GROUND CONTAINMENTS

Financial Assurance Cost Estimate

Attached is the cost estimate for reclamation of the Tall Texan recycling in-ground containments.

The cost of closure sampling and analysis is estimated at $1725 (sampling) plus $2,700 (laboratory cost) to "test the soils beneath the containment for contamination with a five-point composite sample which includes stained or wet soils, if any, and that sample shall be analyzed for the constituents listed in Table I" of Rule 34.

RT Hicks Consultants will assist with the sampling as necessary and prepare the Closure Report for the site. Total closure costs associated with the sampling are estimated at $7500. The cost estimates from Cascade Services (attached) and from RT Hicks Consultants are presented below.

Cascade Services	
All work elements required by Rule 34	$108,293.20
RT Hicks Consultants	
Preparation of sampling results and closure report	7500.00
Total for all Closure Activities	$115,793.20

The reclamation must meet terms set forth in the surface lease agreement with the landowner, who received a copy of the registration.

Please contact Randall Hicks if you have any questions concerning this closure cost estimate.

Cascade Services, LLC
952 Echo Ln
Ste 375
Houston, TX 77024-2814
www.cascadeservicesllc.com

Estimate

ADDRESS
Steven McCutcheon
Vaughn Operating, LLC
3021 Hepler Rd
Carlsbad, NM 88220

SHIP TO
Steven McCutcheon
Vaughn Operating, LLC
3021 Hepler Rd
Carlsbad, NM 88220

ESTIMATE 2041
DATE 04/29/2025

CUSTOMER PROJECT NAME
TSW Tall Texan Closure

PROJECT LOCATION COORDINATES
32.4338144861, -104.159455045

DESCRIPTION	QTY	UNIT	RATE	AMOUNT
This is pricing a package to reclaim the 51,537 BBL & 45,657 BBL recycle water ponds Mobilize equipment to site. Dirt reclaim of pond consist of- Bury all material (Caliche, Gypsum, Sand, ect.) below ground level, backfill pond area with uncontaminated soil from pond walls. Pond area will be reclaimed to natural elevations and water flow patterns. All stockpiled strippings will be put down last to ensure ground has been completely returned to native design.	17,201		2.00	34,402.00
Environmental soil sampling This will include digging 6 sample locations for each containment. One composite sample from 0-4 feet below surface and one discrete sample from each location at 4.25 feet Cost include trip, labor, materials, and laboratory testing	1		1,725.00	1,725.00
Environmental Soil testing Before earthwork can begin the soil must be tested for contamination in case of liner leakage. Cost include trip, labor, materials, and laboratory testing of 18 tests.	1		2,700.00	2,700.00
Broadcast seeding of pond area Seed will be a native mix for Eddy County NM Includes purchase of seed mix and placement	1		3,000.00	3,000.00

Fence removal and disposal Fence estimated at 2,400 ft This includes removal of all posts, braces, wire, fabric, gates, and hardware.	2,400	4.00	9,600.00
Remove and dispose of all four layers. Textile, 40 mil, net, and 60 mil	379,108	0.15	56,866.20

Preferred payment method: ACH/Wire
Email AR@cascadeservicesllc.com for ACH/Wire details.

Remit Checks To:
Cascade Services LLC
PO Box 200954
Dallas, TX 75320-0954
**THIS ESTIMATE IS SUBJECT TO THE TERMS & CONDITIONS ATTACHED.

**If pumping is needed due to weather conditions, a $350 daily fee will be charged on final invoice.

**Materials will be invoiced upon receipt of customer purchase order or job approval.

**This estimate may not include tax and may be added on invoice unless customer provides a valid tax exemption document.

Questions? Email AR@Cascadeservicesllc.com

SUBTOTAL	108,293.20
TAX	0.00
TOTAL	**$108,293.20**

Accepted By

Accepted Date

RECYCLING CONTAINMENT DESIGN DRAWINGS

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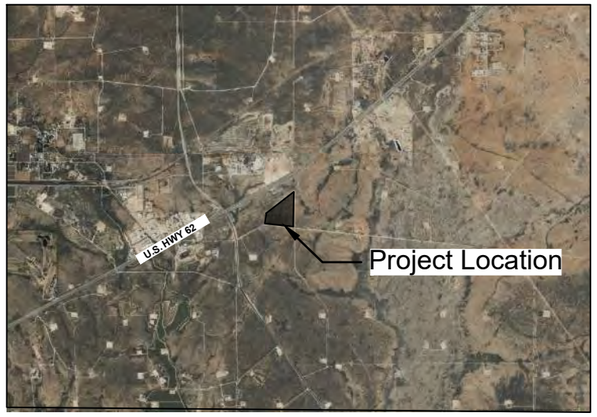
Hobbs, NM 88242
Squarerootservices.net
575-231-7347

CIVIL PLANS

VAUGHN OPERATING

TSW TALL TEXAN RECYCLE FACILITY

CITY OF CARLSBAD
SECTION 34, TOWNSHIP 21 SOUTH, RANGE 27 EAST
N.M.P.M., EDDY COUNTY, NEW MEXICO
N032° 26' 01.16" W104° 10' 12.35"



VICINITY MAP
N.T.S.

INDEX OF SHEETS		
SHEET	NAME	DESCRIPTION
1	C-100	COVER SHEET
2	SU-101	TOPOGRAPHIC SURVEY
3	C-101	GENERAL NOTES
4	CS-101	CIVIL SITE PLAN
5	CS-102	MASTER LAYOUT
6	CS-103	FENCE LAYOUT
7	CS-104	NORTH CONTAINMENT WEST TO EAST PLAN & PROFILE
8	CS-105	NORTH CONTAINMENT NORTH TO SOUTH PLAN & PROFILE
9	CS-106	SOUTH CONTAINMENT WEST TO EAST PLAN & PROFILE
10	CS-107	SOUTH CONTAINMENT NORTH TO SOUTH PLAN & PROFILE
11	CS-108	VOLUME QUANITITES
12	CS-501	LEAK DETECTION DETAILS
13	CS-502	LINER DETAILS
14	CS-503	FENCE DETAILS

nm811 Know what's below. Call before you dig.

(505)-254-7310

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

JEREMY BAKER
NEW MEXICO
16207
LICENSED PROFESSIONAL ENGINEER

04/29/2025

TOPOGRAPHIC SURVEY

of GREEN STREET SUBDIVISION TRACT 33

UTILITY NOTE

UTILITIES DEPICTED WERE OBTAINED THROUGH EVIDENCE: FROM FIELD OBSERVATIONS, PLANS AND/OR REPORTS PROVIDED BY THE CLIENT, AND MARKINGS COORDINATED BY THE NEW MEXICO 811. HOWEVER, LACKING EXCAVATION, THE EXACT LOCATION OF UNDERGROUND FEATURE CANNOT BE ACCURATELY, COMPLETELY, AND RELIABLY DEPICTED. WHERE ADDITIONAL OR MORE DETAILED INFORMATION IS REQUIRED, THE CLIENT IS ADVISED THAT EXCAVATION MAY BE NECESSARY.

TOPOGRAPHIC NOTE

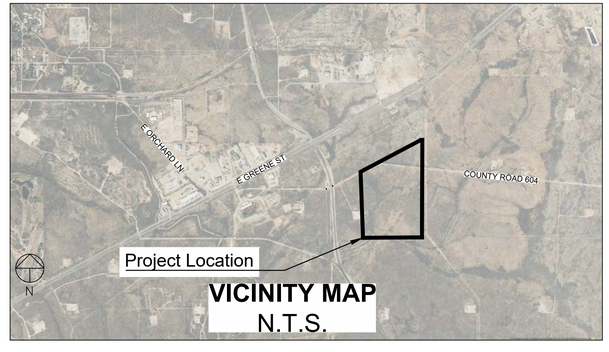
THE TOPOGRAPHY SHOWN HEREIN IS A COMBINATION OF UAV DATA AND CONVENTIONAL/GPS DATA. THE UAV DATA WAS GENERATED USING INDUSTRY STANDARD QUALITY CHECKS AND IS **WITHIN** THE INDUSTRY RECOGNIZED GROUND SAMPLING DISTANCE (GSD) STANDARD OF BELOW 2.5 CM (1 IN / 0.08 FT). THE ABSOLUTE ACCURACY LEVEL IN STANDARD UAV DATA IS EQUAL TO 3 X GSD (3 X 0.08 FT = 0.24 FT). UAV DATA WAS USED FOR MEASUREMENTS ON NATURAL GROUND AND SUPPLEMENTAL FEATURES.

BASIS OF BEARING

BEARINGS SHOWN HEREON ARE FROM GPS/GNSS OBSERVATIONS AND CONFORM TO THE NEW MEXICO STATE PLANE COORDINATE SYSTEM "***NEW MEXICO EAST ZONE***" NORTH AMERICAN DATUM OF 1983. TRUE NORTH CAN BE OBTAINED BY APPLYING A CONVERGENCE ANGLE OF ***00°05'17.3"*** AT ***CONTROL POINT #100***. DISTANCES SHOWN HEREON ARE IN GROUND AND WERE OBTAINED BY APPLYING A COMBINED GRID TO GROUND SCALE FACTOR OF ***1.0002346725*** AT THE PREVIOUSLY NOTED POINT LOCATED AT N ***521716.805, E 592042.636***. THE VERTICAL DATUM IS BASED ON GEOID18 AND IT PROVIDES ORTHOMETRIC HEIGHTS CONSISTENT WITH THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

I, JEREMY BAKER, NEW MEXICO PROFESSIONAL SURVEYOR NO. 25773, DO HEREBY CERTIFY THAT THIS TOPOGRAPHIC SURVEY PLAT AND THE ACTUAL SURVEY ON THE GROUND UPON WHICH IT IS BASED WERE PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION; THAT I AM RESPONSIBLE FOR THIS SURVEY; THAT THIS SURVEY MEETS THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO; AND THAT IT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. I FURTHER CERTIFY THAT THIS SURVEY IS NOT A LAND DIVISION OR SUBDIVISION AS DEFINED IN THE NEW MEXICO SUBDIVISION ACT AND THAT THIS INSTRUMENT IS A TOPOGRAPHIC SURVEY PLAT OF AN EXISTING TRACT OR TRACTS.

Jeremy Baker, N.M. P.S 25773 — 04/29/2025 Date



VICINITY MAP
N.T.S.

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Hobbs, NM 88242-9032
Squarerootservices.net
575-231-7347

TYPE OF SURVEY:
TOPOGRAPHIC SURVEY
OF
PROJECT NAME:
GREEN STREET SUBDIVISION
FOR
CLIENT:
TSW PROPERTIES

PROJECT NUMBER: 25048

PROJECT SURVEYOR: Jeremy Baker, PS
DRAWN BY: B. SEALY

GRAPHIC SCALE
0 150' 300'
SCALE: 1" = 150'
(IN FEET)

LEGEND

- CONTROL POINT AS NOTED
- FOUND MONUMENT AS NOTED
- PARCEL BOUNDARY
- EASEMENT BOUNDARY
- SECTION BOUNDARY
- FENCE
- EDGE OF ROAD
- PROPOSED ROAD
- UNDERGROUND WATER
- UNDERGROUND PETROLEUM
- UNKNOWN ABOVE GROUND LINE
- TOP OF BANK
- TOP OF EDGE
- CONTOUR LABEL WITH ELEVATION AS NOTED
- MAJOR CONTOUR (5FT)
- MINOR CONTOUR (1FT)

JEREMY E. BAKER NEW MEXICO 25773 PROFESSIONAL SURVEYOR

SHEET: 2 of 14
SU - 101

C:\Users\Xavier.Clark\OneDrive - squarerootservices.net\Project Folder\25048 TSW Properties Green Street Subdivision\Survey\DWG\GREEN_STREET_TRACT-33_TOPO.dwg 4/29/2025 6:20 PM

GENERAL NOTES

1. NEW MEXICO ADMINISTRATIVE CODE TITLE 19, CHAPTER 15, PART 34, DESIGN CRITERIA FOR RECYCLING CONTAINMENTS SHALL APPLY TO THIS PROJECT.
2. ALL BOUNDARY, TOPOGRAPHIC AND UTILITY INFORMATION SHOWN ARE BASED ON SURVEY INFORMATION FURNISHED BY TOPOGRAPHIC.
3. THE CONTRACTOR SHALL IDENTIFY AND LOCATE UTILITY LINES, MONITORING WELLS, SURVEY MONUMENTS, AND OTHER NEARBY STRUCTURES PRIOR TO PERFORMING WORK.
4. COORDINATE INFORMATION IS BASED ON STATE PLANE COORDINATES, NEW MEXICO EAST, NAD 83.
5. THE CONTRACTOR SHALL IDENTIFY ANY DISCREPANCIES PRIOR TO PROCEEDING WITH CONSTRUCTION AND CONTACT THE ENGINEER IN WRITING.
6. THE CONTRACTOR SHALL IMPLEMENT AND MAINTAIN BEST MANAGEMENT PRACTICES (BMPS) TO MINIMIZE EROSION AND CONTROL SEDIMENT TO PROTECT SURFACE WATER QUALITY DURING STORM EVENTS.

EARTHWORK NOTES

1. THE CONTRACTOR SHALL USE WATER FOR COMPACTION AT ALL TIMES. THE CONTRACTOR SHALL ENSURE THEIR BID INCLUDES CONSTRUCTION WATER. NO EARTHWORK OPERATIONS SHALL TAKE PLACE IF CONSTRUCTION WATER IS NOT AVAILABLE ONSITE.
2. THE CONTRACTOR SHALL BUILD THE LEVEES USING COMPACTED LAYERS. UNCONTROLLED AND INCONSISTENT PUSHING AND PILING OF MATERIAL FOR LEVEE CONSTRUCTION IS NOT ACCEPTABLE. THE CONTRACTOR SHALL DEVELOP A SUCCESSFUL COMPACTION PATTERN EARLY IN THE PROCESS, VERIFIED THROUGH NUCLEAR DENSITY OR SAND CONE TESTING, AND SHALL MAINTAIN CONSISTENCY IN THE COMPACTIVE EFFORT AS LONG AS THE MATERIALS ENCOUNTERED REMAINS CONSISTENT. IF ONSITE SOILS ENCOUNTERED CHANGE, THE CONTRACTOR SHALL DEVELOP A NEW COMPACTION PATTERN.
3. FILL FOR LEVEES SHALL BE PLACED AND COMPACTED IN HORIZONTAL LIFTS WITH MAXIMUM LOOSE LIFT THICKNESS OF 10 INCHES, OR AS DIRECTED BY ENGINEER. CONSTRUCT EACH LAYER CONTINUOUSLY AND APPROXIMATELY HORIZONTAL FOR THE WIDTH AND LENGTH OF THE LEVEE. FILL SHALL BE COMPACTED TO AT LEAST 95 PERCENT OF MAXIMUM DRY DENSITY DETERMINED BY THE ASTM D698 AND AT MOISTURE CONTENT WITHIN +2% TO -2% OF OPTIMUM MOISTURE CONTENT AS DETERMINED BY A STANDARD PROCTOR SOILS TEST ON SAMPLES FROM THE SOURCE AREA.
4. FILL SHALL NOT BE PLACED AND COMPACTED WHEN THE MATERIALS ARE TOO WET TO PROPERLY COMPACT. MATERIAL WHICH IS TOO WET SHALL BE SPREAD ON THE FILL AREA AND PERMITTED TO DRY, ASSISTED BY HARROWING IF NECESSARY, UNTIL THE MOISTURE CONTENT IS REDUCED TO ALLOWABLE LIMITS. IF THE ENGINEER DETERMINED THAT ADDED MOISTURE IS REQUIRED, WATER SHALL BE APPLIED UNIFORMLY OVER THE AREA TO BE TREATED, AND GIVE COMPLETE AND ACCURATE CONTROL OF THE AMOUNT OF WATER TO BE USED. IF TOO MUCH WATER IS ADDED, THAT AREA SHALL BE PERMITTED TO DRY BEFORE COMPACTION IS CONTINUED.
5. PERFORM ONE NUCLEAR DENSITY GAGE TEST PER 2500 CY MINIMUM OR AS DIRECTED BY THE ENGINEER.
6. EARTHWORK CONTRACTOR SHALL PERFORM A VISUAL INSPECTION OF THE FINISHED COMPACTED POND BOTTOM AND SIDE SLOPES BEFORE HDPE LINER INSTALLATION, REMOVING ALL DEBRIS, SHARP OBJECTS AND GRAVEL LARGER THAN 3/4 INCH.
7. EARTHWORK CONTRACTOR SHALL ROLL SURFACE WITH A SMOOTH ROLLER TO ELIMINATE RUTS.

LINER NOTES

1. LINER CONTRACTOR SHALL INSPECT GRADED SURFACE FOR DEBRIS, ROCKS OR OTHER MATERIAL THAT MAY DAMAGE THE LINER AND COORDINATE WITH OWNER IF ADDITIONAL SUBGRADE RESURFACING IS NEEDED PRIOR TO PERFORMING WORK.
2. LINER CONTRACTOR TO PROVIDE SUBMITTAL OF LINER PANEL LAYOUT.
3. LINER CONTRACTOR TO SIGN SUBGRADE ACCEPTANCE FORM (PROVIDED BY OWNER REPRESENTATIVE) DAILY PRIOR TO INSTALLATION.
4. LINER TO BE INSTALLED PER GRI SPECIFICATIONS, GUIDES AND PRACTICES.
5. CONTRACTOR SHALL PLACE SANDBAGS ON LINER DURING INSTALLATION AS REQUIRED TO PREVENT WIND UPLIFT UNTIL POND IS FILLED TO A DEPTH OF 3 FEET.
6. CONTRACTOR SHALL USE BLACK 60 MIL HDPE SMOOTH GEOMEMBRANE AS THE PRIMARY LINER AND BLACK 40 MIL HDPE SMOOTH GEOMEMBRANE AS THE SECONDARY LINER.
7. A 3' DIAMETER MINIMUM PIECE OF 40MIL LINER SHALL BE EXTRUDED WELDED WHERE THE PIE SHAPED CORNER SECTIONS MEET FOR SEAM REINFORCEMENT.
8. INSTALL A FULL DOUBLE WIDTH SECTION OF BLACK OR WHITE 60 MIL TEXTURED HDPE GEOMEMBRANE RUB SHEET. EXTRUDE WELD TO LINER. WELDS SHALL BE 2" LONG AND SPACED EVERY 12" ALONG BOTH SIDES OF THE SHEET. DO NOT WELD END EDGES. SECTION SHALL EXTEND FROM SUMP AND INSTALLED INTO LINER ANCHOR TRENCH AS SHOWN.
9. LINER SHALL BE PROTECTED WITH A 8 OZ. NONWOVEN GEOTEXTILE IF ROCK OR OTHER ANGULAR MATERIALS WITH A DIMENSION GREATER THAN 3/4 INCH ARE PRESENT.
10. SUMPS SHALL BE BACKFILLED WITH NON-ANGULAR MAXIMUM 3/8 INCH SIZED PEA GRAVEL.
11. ALL SEAMS MUST BE WELDED WITH A 6" MINIMUM OVERLAP.
12. CONTRACTOR SHALL NON-DESTRUCTIVELY TEST ALL SEAMS THEIR FULL LENGTH USING AN AIR PRESSURE OR VACUUM TEST, THE PURPOSE OF THIS TEST IS TO CHECK THE CONTINUITY OF THE SEAM.
13. FOR AIR PRESSURE TESTING (ASTM 5820), THE FOLLOWING PROCEDURES ARE APPLICABLE TO THE SEAMS WELD WITH DOUBLE SEAM FUSION WELDER.
    a. THE EQUIPMENT USED SHALL CONSIST OF AN AIR TANK OR PUMP CAPABLE OF PRODUCING A MINIMUM 35 PSI AND A SHARP NEEDLE WITH A PRESSURE GAUGE ATTACHED TO INSERT INTO THE AIR CHAMBER.
    b. SEAL BOTH ENDS OF THE SEAM BY HEATING AND SQUEEZING THEM TOGETHER. INSERT THE NEEDLE WITH THE GAUGE INTO THE AIR CHANNEL. PRESSURIZE THE AIR CHANNEL TO A MINIMUM OF 35 PSI. NOTE TIME STARTS AND WAIT A MINIMUM OF 5 MINUTES TO CHECK. IF PRESSURE AFTER 5 MINUTES HAD DROPPED LESS THAN 2 PSI THE TEST IS SUCCESSFUL (THICKNESS OF MATERIAL MAY CAUSE VARIANCE).
    c. CUT OPPOSITE SEAM END AND LISTEN FOR PRESSURE RELEASE TO VERIFY FULL SEAM HAS BEEN TESTED.
    d. IF THE TEST FAILS, FOLLOW THESE PROCEDURES.
        I. WHILE CHANNEL IS UNDER PRESSURE WALK THE LENGTH OF THE SEAM LISTENING FOR A LEAK.
        II. WHILE CHANNEL IS UNDER PRESSURE APPLY A SOAPY SOLUTION TO THE SEAM EDGE AND LOOK FOR BUBBLES FORMED BY AIR ESCAPING.
        III. RE-TEST THE SEAM IN SMALLER INCREMENTS UNTIL THE LEAK IS FOUND.
    e. ONCE LEAK IS FOUND USING ONE OF THE PROCEDURES ABOVE, CUT OUT THE AREA AND RETEST THE PORTIONS OF THE PORTIONS OF THE SEAMS BETWEEN THE LEAK AREAS PER 6A AND 6B ABOVE. CONTINUE THIS PROCEDURE UNTIL ALL SECTIONS OF THE SEAM PASS THE PRESSURE TEST.
    f. REPAIR THE LEAK WITH A PATCH AND VACUUM TEST.
14. ALL NON-DESTRUCTIVE TESTS WILL BE NOTED IN THE NON-DESTRUCTIVE LOGS.
15. LINER GAS VENTS SHALL BE SPACED ALONG THE INSIDE SLOPE AT APPROXIMATELY 100 FEET ON CENTER OR MINIMUM 2 VENTS PER SIDE.
16. WHEN ANY PIPING EQUIPMENT, INLET, OR OUTLET IS IN DIRECT CONTACT WITH THE LINER, AN APRON CONSISTING OF 60 MIL HDPE MATERIAL SHALL BE INSTALLED BENEATH THE EQUIPMENT OR STRUCTURE TO PROTECT THE PRIMARY LINER.
17. LAY BOTH LINERS IN ANCHOR TRENCH. BACKFILL ANCHOR TRENCH IN 2 LIFTS AND COMPACT.

SUGGESTED CONSTRUCTION SEQUENCE

1. CLEAR EXISTING VEGETATION.

2. STRIP AND STOCKPILE TOPSOIL AT THE LOCATION DESIGNATED ON THESE PLANS.

3. PERFORM EARTHWORK OPERATIONS:
   3.1. CONSTRUCT STORMWATER DIVERSION CHANNEL.
   3.2. PERFORM RIPPING/EXCAVATING OPERATIONS.
   3.3. REPLACE EXCAVATED MATERIAL IN COMPACTED LAYERS ON THE LEVEE/PAD IN ACCORDANCE WITH THE DETAILS AND SPECIFICATIONS.
   3.4. FINISH SLOPES USING A SMOOTH ROLLER.
   3.5. DIG ANCHOR TRENCH.

4. INSTALL NEW GAME FENCE AND GATES.

5. INSTALL GEOMEMBRANES:
   5.1. INSTALL GEOTEXTILE AS NEEDED, SECONDARY LINER, GEONET, LEAK DETECTION SYSTEM AND PRIMARY LINER.
   5.2. INSTALL RUB SHEETS AND WATER LEVEL GAGE/LADDER.
   5.3. BACKFILL AND COMPACT ANCHOR TRENCH.

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ENGINEERING SHEET:
GENERAL NOTES
OF
PROJECT NAME:
TSW TALL TEXAN RECYCLE FACILITY
FOR
CLIENT:
VAUGHN OPERATING

PROJECT NUMBER:
25084

PROJECT ENGINEER:
JEREMY BAKER, PE
DRAWN BY:
X.CLARK

REVISIONS

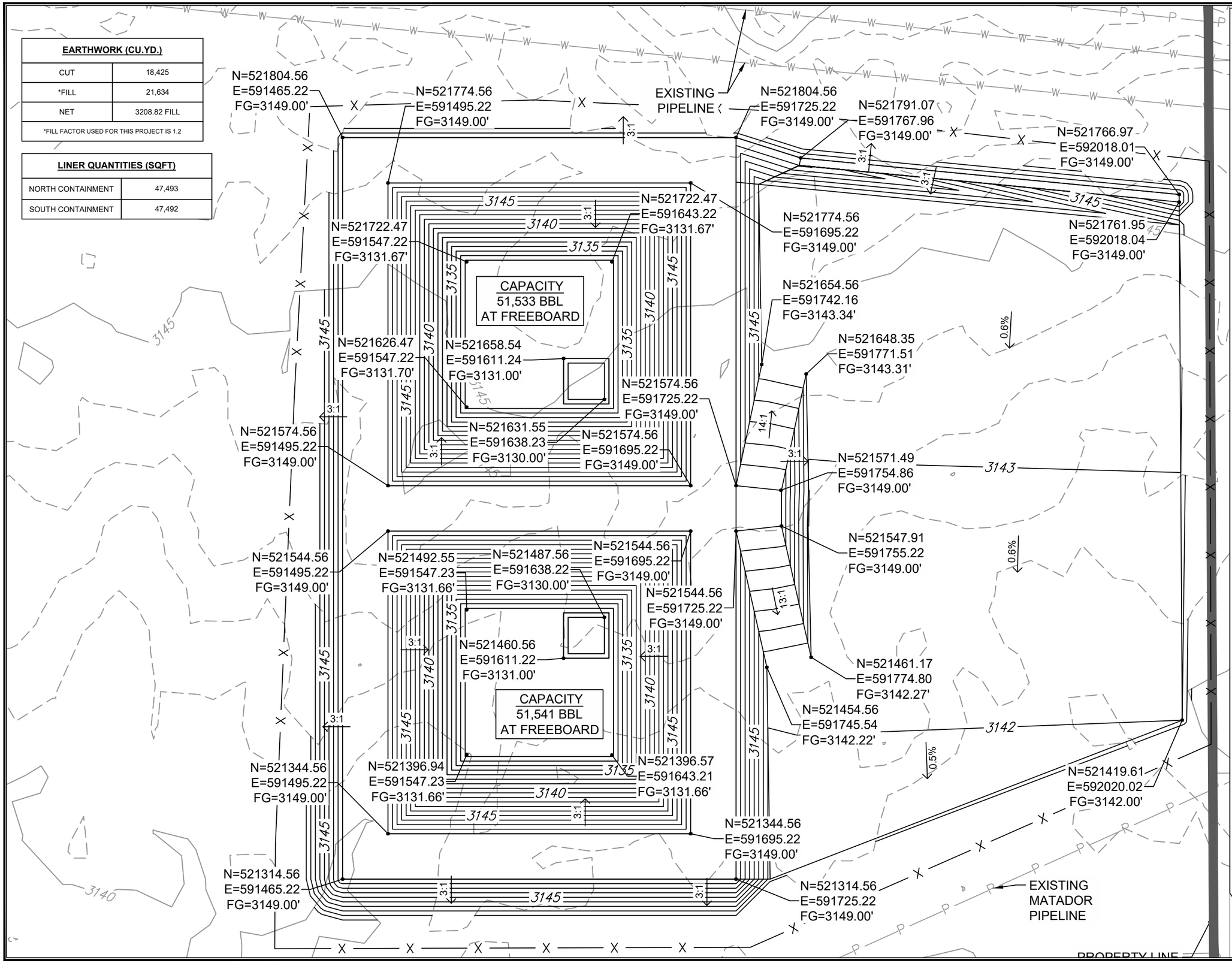
No.	DATE	DESCRIPTION

JEREMY BAKER
NEW MEXICO
16207
LICENSED PROFESSIONAL ENGINEER
04/29/2025

SHEET:
3 of 14
C-101

EARTHWORK (CU.YD.)	
CUT	18,425
*FILL	21,634
NET	3208.82 FILL
*FILL FACTOR USED FOR THIS PROJECT IS 1.2	

LINER QUANTITIES (SQFT)	
NORTH CONTAINMENT	47,493
SOUTH CONTAINMENT	47,492



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ENGINEERING SHEET:
CIVIL SITE PLAN
OF
PROJECT NAME:
TSW TALL TEXAN RECYCLE FACILITY
FOR
CLIENT:
VAUGHN OPERATING

PROJECT NUMBER:
25084

PROJECT ENGINEER:
JEREMY BAKER, PE

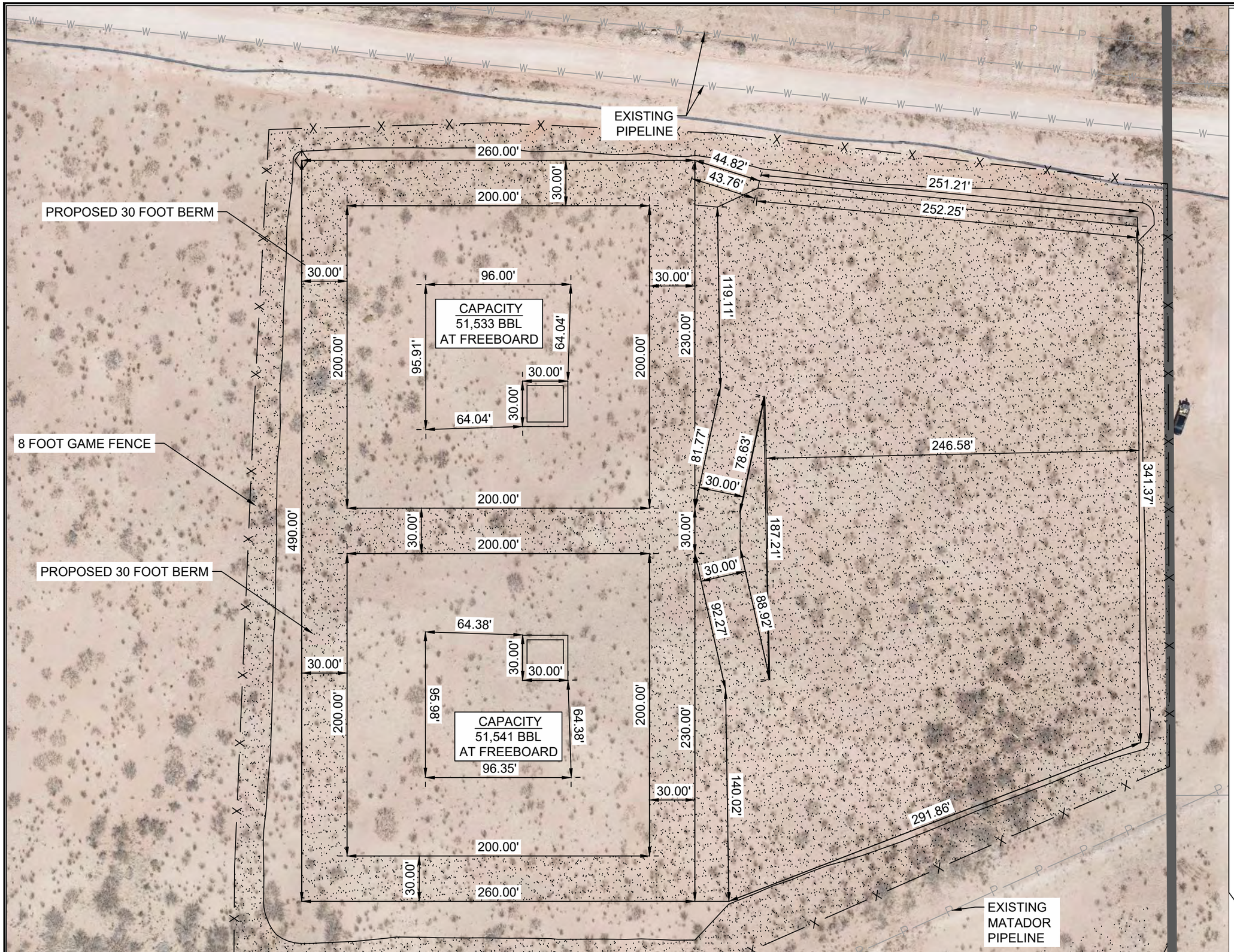
DRAWN BY:
X.CLARK

GRAPHIC SCALE
0 30' 60'
SCALE: 1" = 60'
(IN FEET)

REVISIONS		
No.	DATE	DESCRIPTION

JEREMY BAKER
NEW MEXICO
16207
LICENSED PROFESSIONAL ENGINEER
04/29/2025

SHEET:
4 of 14
CS-101



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ENGINEERING SHEET:
MASTER LAYOUT

OF

PROJECT NAME:
TSW TALL TEXAN RECYCLE FACILITY
FOR
CLIENT:
VAUGHN OPERATING

PROJECT NUMBER:
25084

PROJECT ENGINEER:
JEREMY BAKER, PE
DRAWN BY:
X.CLARK

GRAPHIC SCALE
0 30' 60'
SCALE: 1" = 60'
(IN FEET)

REVISIONS

No.	DATE	DESCRIPTION

JEREMY BAKER
NEW MEXICO
16207
LICENSED PROFESSIONAL ENGINEER
04/29/2025

SHEET:
5 of 14
CS-102

FENCE QUANTITIES	
FENCE LENGTH (LIN. FT)	2,185
AREA WITHIN FENCE (AC)	7.2
GATES	2

FENCE CORNER
N 521,824.97
E 591,443.55

FENCE CORNER
N 521,829.39
E 591,591.90

EXISTING
PIPELINE

FENCE CORNER
N 521,822.40
E 591,744.44

FENCE CORNER
N 521,789.00
E 592,037.88

FENCE CORNER
N 521,635.53
E 591,433.39

FENCE CORNER
N 521,337.52
E 591,420.80

FENCE CORNER
N 521,268.62
E 591,420.34

FENCE CORNER
N 521,269.55
E 591,734.57

FENCE CORNER
N 521,403.68
E 592,039.14

CAPACITY
51,533 BBL
AT FREEBOARD

CAPACITY
51,541 BBL
AT FREEBOARD

17.12' 15.81' 20.47' 16.12' 17.67' 17.00' 15.39' 19.74'
15.62' 15.89' 17.70' 17.69' 19.26' 20.46' 18.77' 37.05' 18.82' 22.07' 21.55' 20.91' 20.02' 21.58' 32.00' 23.86'

EXISTING
MATADOR
PIPELINE

PROPERTY LINE

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ENGINEERING
SHEET:
FENCE LAYOUT
OF
PROJECT NAME:
TSW TALL TEXAN RECYCLE FACILITY
FOR
CLIENT:
VAUGHN OPERATING

PROJECT NUMBER:
25084

PROJECT ENGINEER:
JEREMY BAKER, PE
DRAWN BY:
X.CLARK

GRAPHIC SCALE
0 30' 60'
SCALE: 1" = 60'
(IN FEET)

REVISIONS

No.	DATE	DESCRIPTION

JEREMY BAKER
NEW MEXICO
16207
LICENSED PROFESSIONAL ENGINEER
04/29/2025

SHEET:
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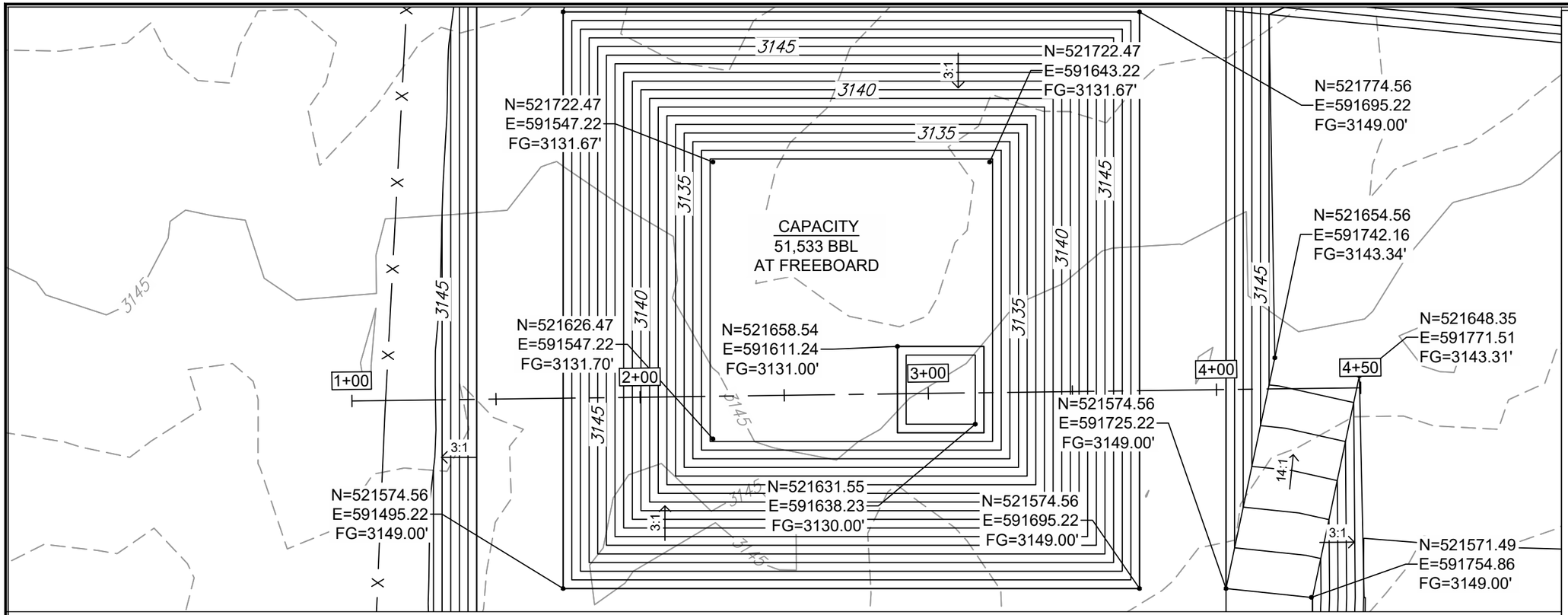
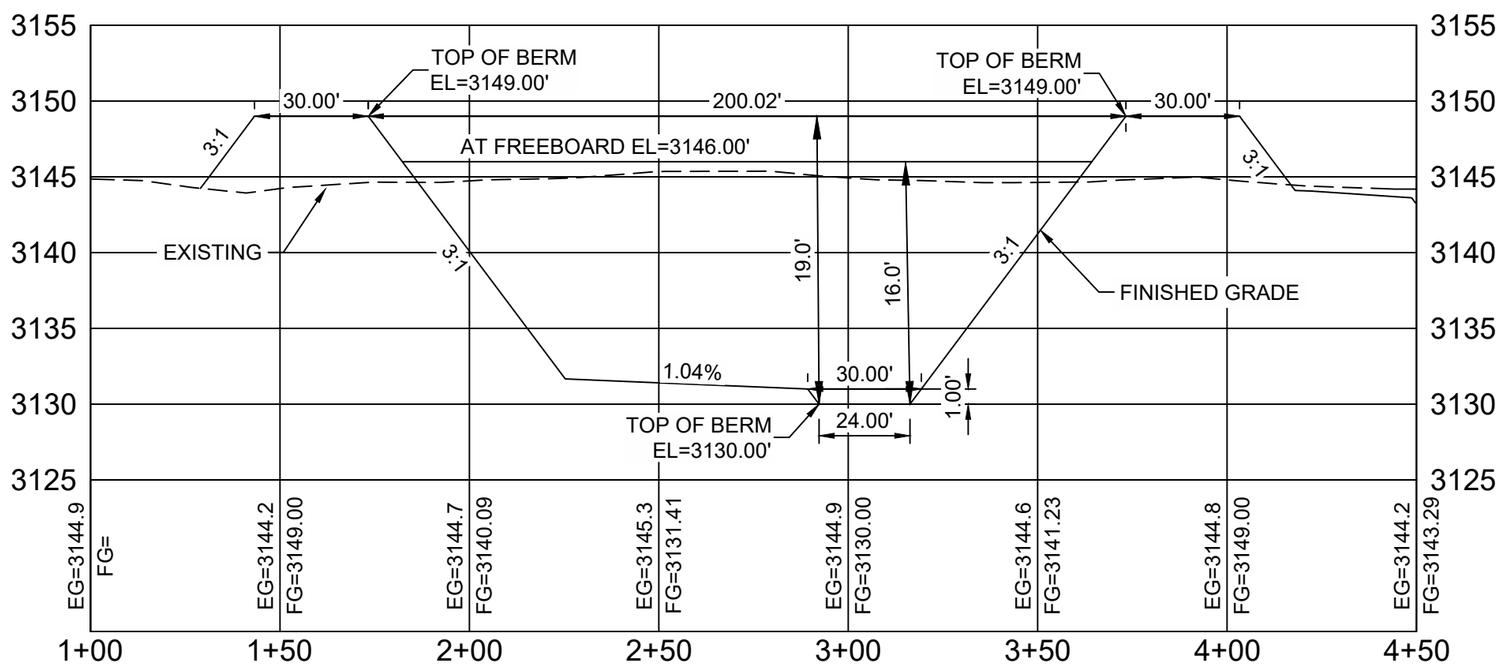
CS-103





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ENGINEERING SHEET:
NORTH CONTAINMENT WEST TO EAST PLAN & PROFILE

OF

PROJECT NAME:
TSW TALL TEXAN RECYCLE FACILITY
FOR

CLIENT:
VAUGHN OPERATING

PROJECT NUMBER:
25084

PROJECT ENGINEER:
JEREMY BAKER, PE

DRAWN BY:
X.CLARK

GRAPHIC SCALE
HORIZONTAL
0 20' 40'
SCALE: 1" = 40'
(IN FEET)

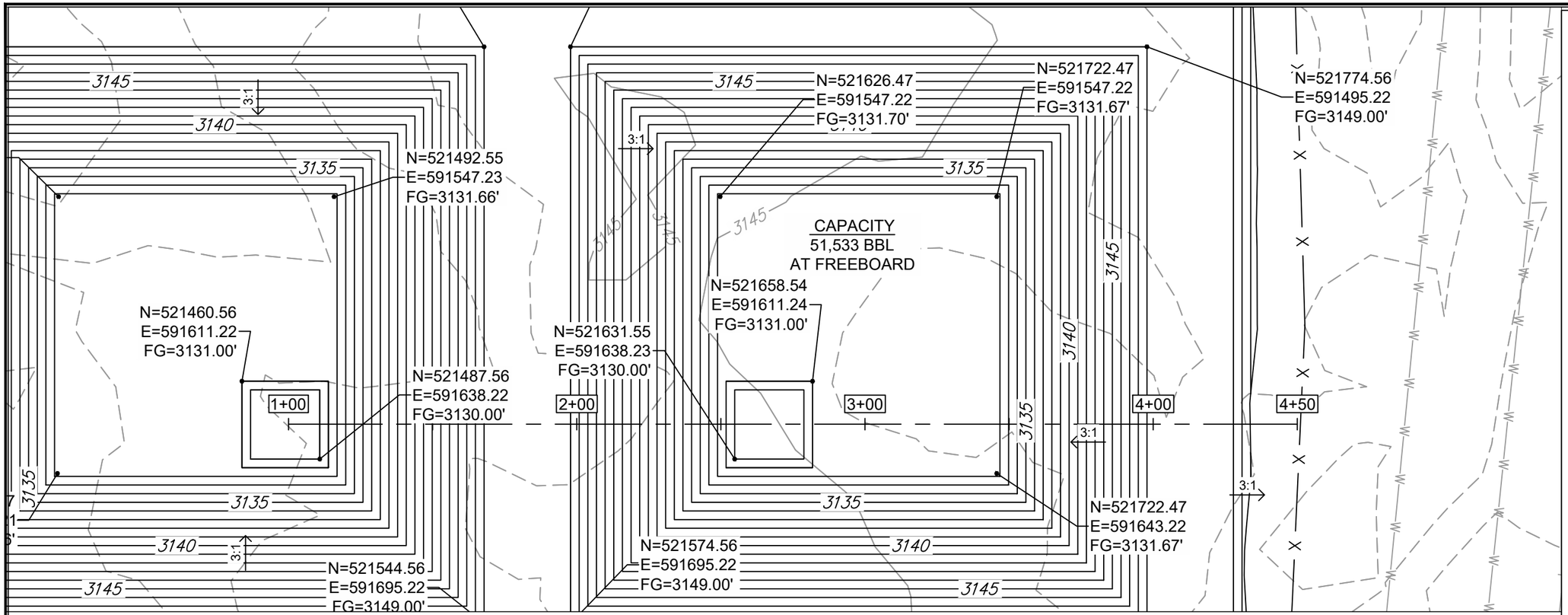
GRAPHIC SCALE
VERTICAL
0 5 10'
SCALE: 1" = 10'
(IN FEET)

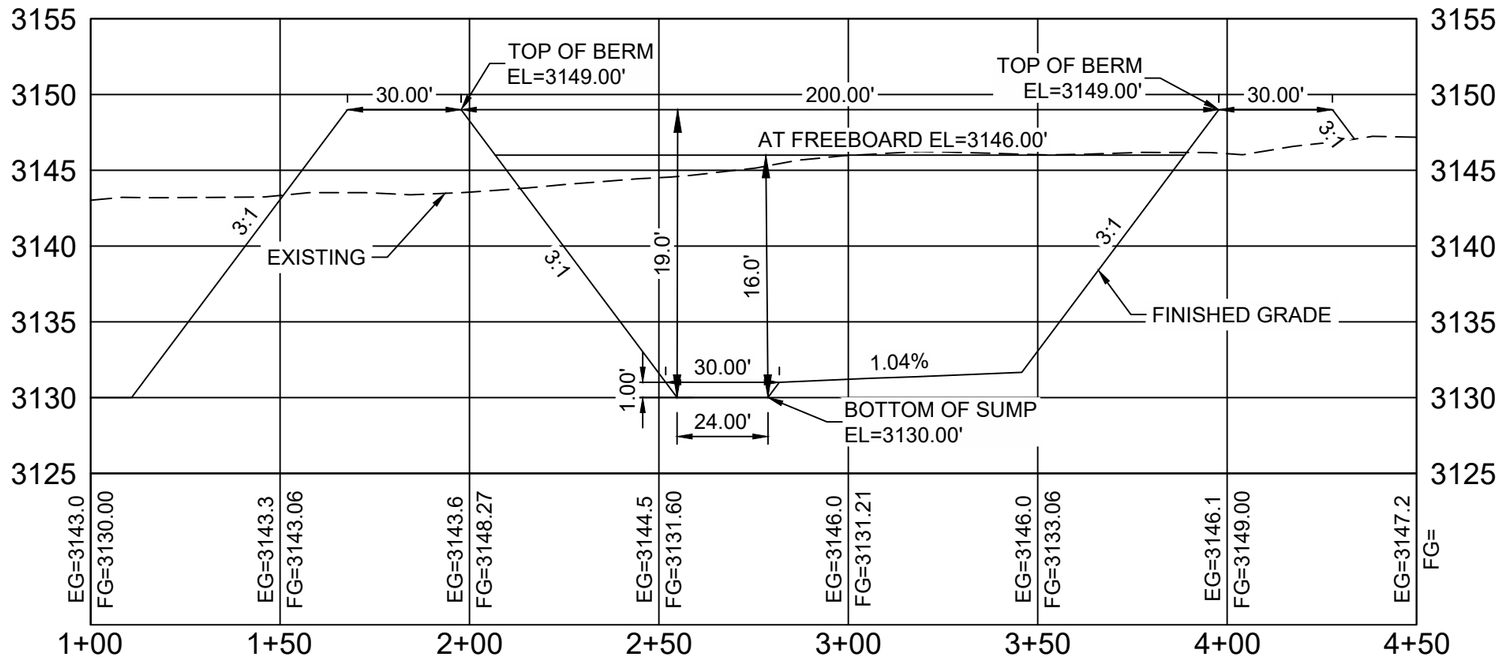
REVISIONS

No.	DATE	DESCRIPTION

JEREMY BAKER
NEW MEXICO
16207
LICENSED PROFESSIONAL ENGINEER
04/29/2025

SHEET:
7 of 14
CS-104





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ENGINEERING
SHEET: NORTH CONTAINMENT NORTH TO SOUTH PLAN & PROFILE OF
PROJECT NAME: TSW TALL TEXAN RECYCLE FACILITY FOR
CLIENT: VAUGHN OPERATING

PROJECT NUMBER: 25084
PROJECT ENGINEER: JEREMY BAKER, PE
DRAWN BY: X.CLARK

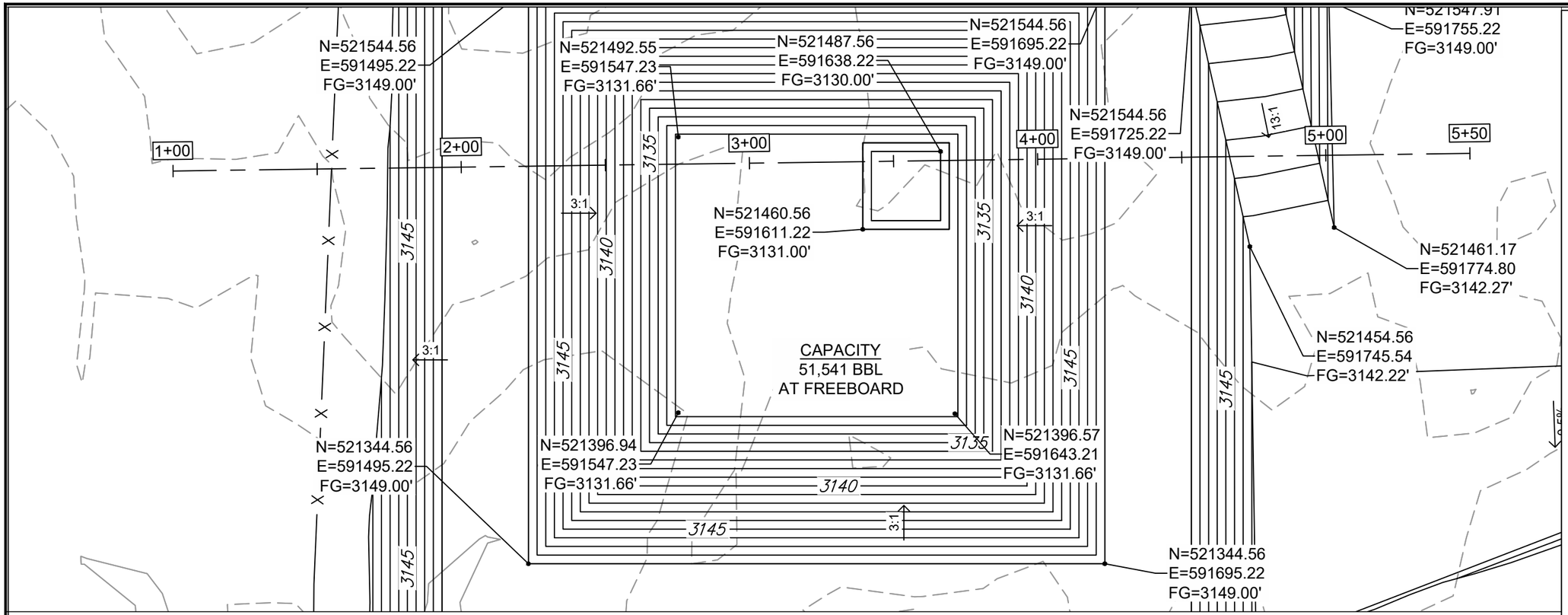
GRAPHIC SCALE HORIZONTAL
0 20' 40'
SCALE: 1" = 40' (IN FEET)
GRAPHIC SCALE VERTICAL
0 5' 10'
SCALE: 1" = 10' (IN FEET)

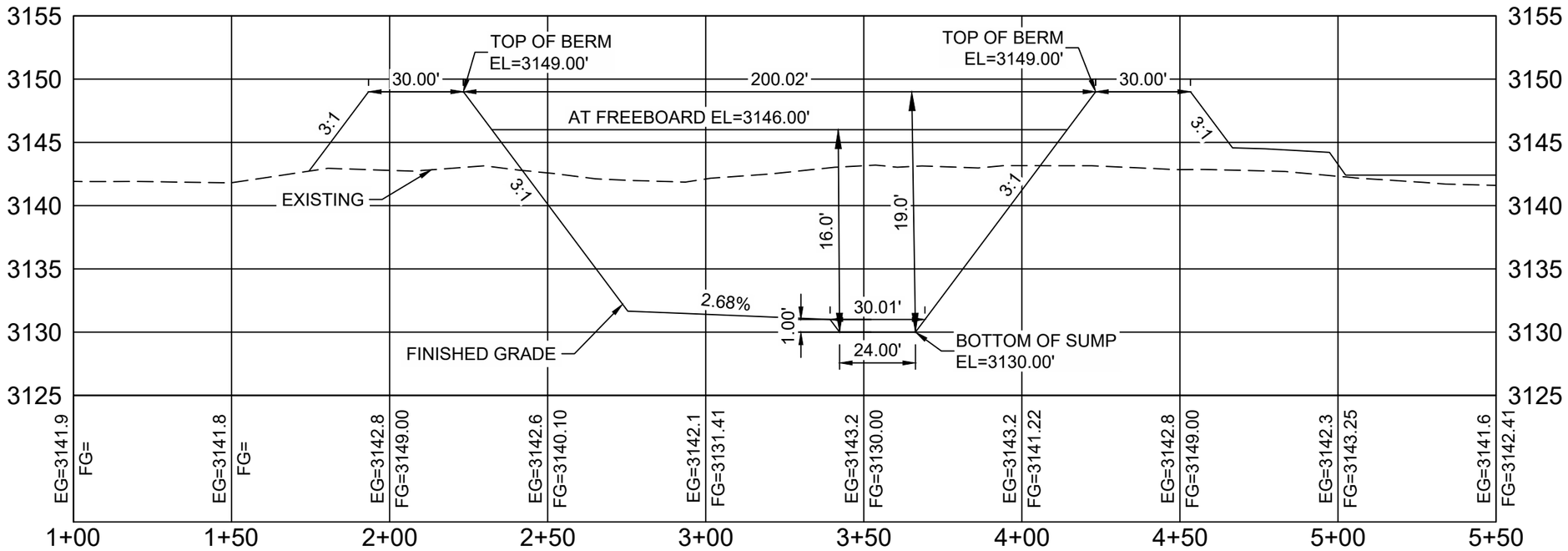
REVISIONS

No.	DATE	DESCRIPTION

JEREMY BAKER NEW MEXICO 16207 LICENSED PROFESSIONAL ENGINEER
04/29/2025

SHEET: 8 of 14
CS-105





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ENGINEERING
SHEET:
SOUTH CONTAINMENT WEST TO EAST PLAN & PROFILE
OF
PROJECT NAME:
TSW TALL TEXAN RECYCLE FACILITY
FOR
CLIENT:
VAUGHN OPERATING

PROJECT NUMBER:
25084

PROJECT ENGINEER:
JEREMY BAKER, PE
DRAWN BY:
X.CLARK

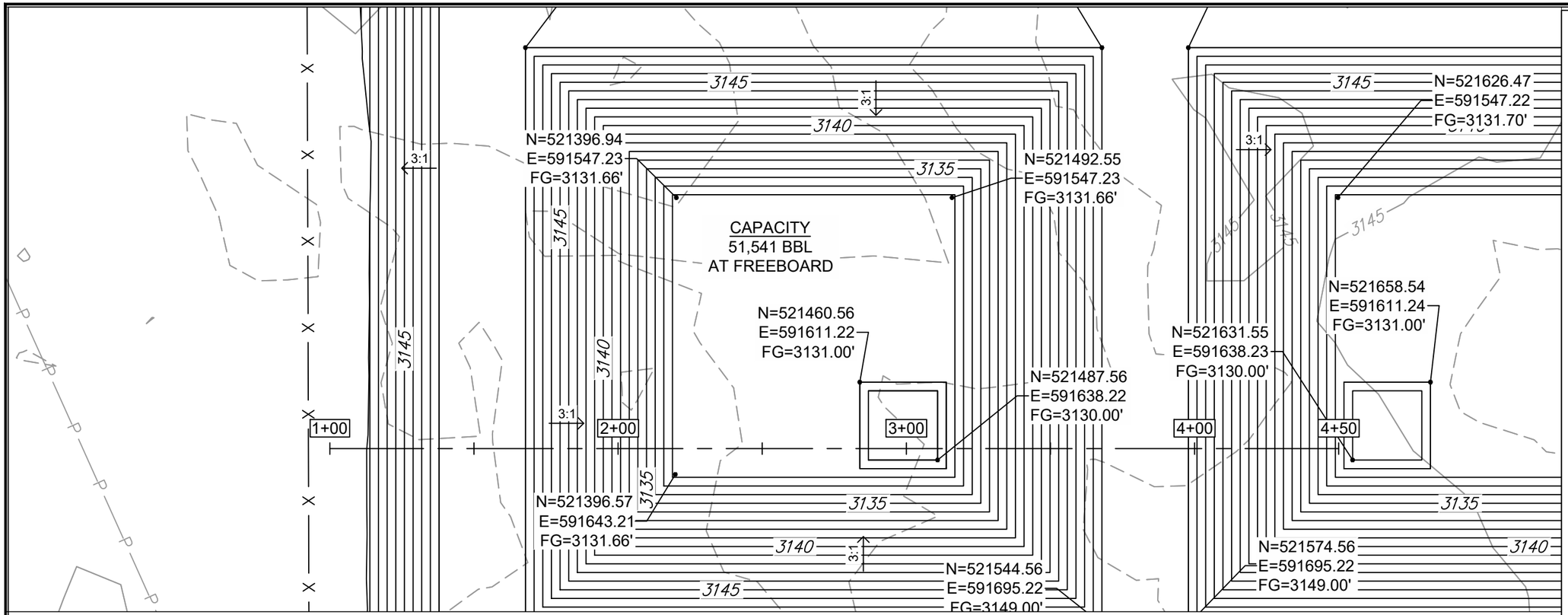
GRAPHIC SCALE
HORIZONTAL
0 20' 40'
SCALE: 1" = 40'
(IN FEET)
GRAPHIC SCALE
VERTICAL
0 5' 10'
SCALE: 1" = 10'
(IN FEET)

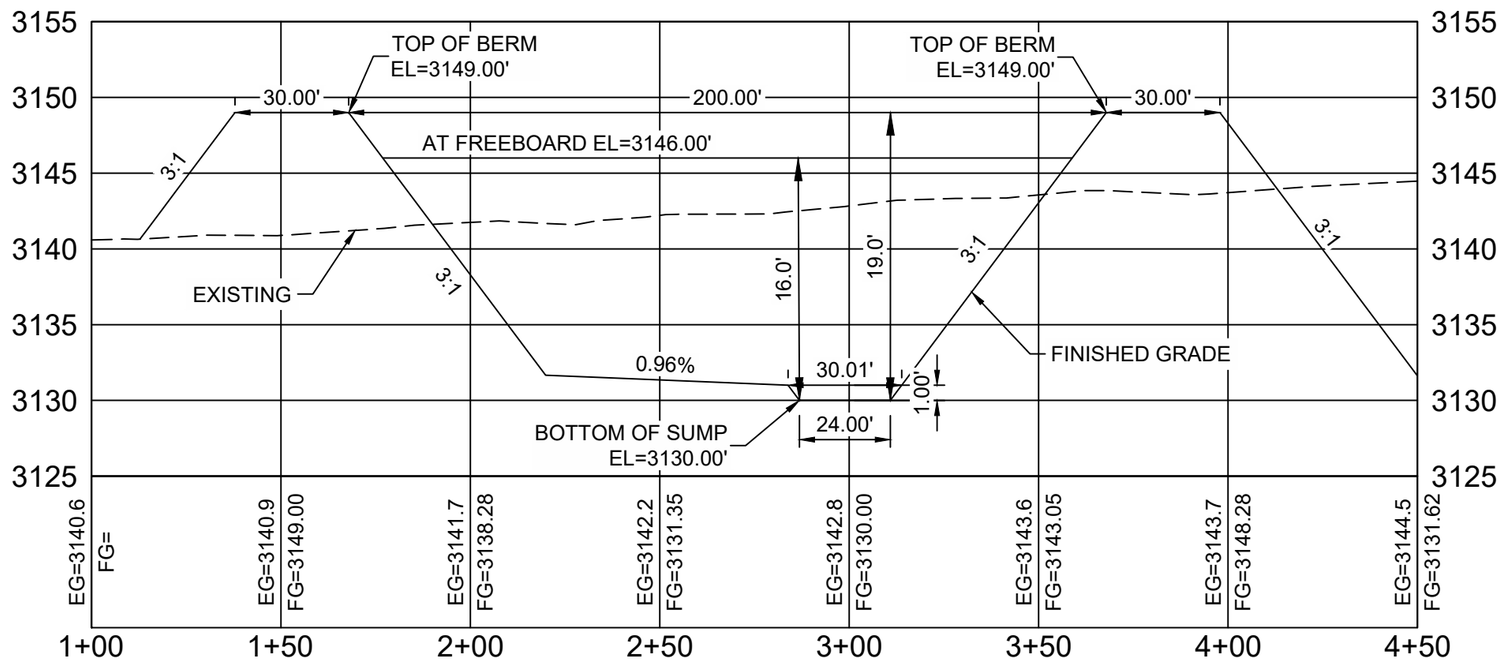
REVISIONS

No.	DATE	DESCRIPTION

JEREMY BAKER
NEW MEXICO
16207
LICENSED PROFESSIONAL ENGINEER
04/29/2025

SHEET:
9 of 14
CS-106





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ENGINEERING
SHEET: SOUTH CONTAINMENT NORTH TO SOUTH PLAN & PROFILE OF
PROJECT NAME: TSW TALL TEXAN RECYCLE FACILITY FOR
CLIENT: VAUGHN OPERATING

PROJECT NUMBER: 25084

PROJECT ENGINEER: JEREMY BAKER, PE
DRAWN BY: X.CLARK

GRAPHIC SCALE HORIZONTAL
0 20' 40'
SCALE: 1" = 40' (IN FEET)
GRAPHIC SCALE VERTICAL
0 5' 10'
SCALE: 1" = 10' (IN FEET)

REVISIONS

No.	DATE	DESCRIPTION

JEREMY BAKER
NEW MEXICO
16207
LICENSED PROFESSIONAL ENGINEER
04/29/2025

SHEET: 10 of 14
CS-107

NORTH CONTAINMENT

ELEVATION (FT)	CONTAINMENT DEPTH (FT)	REMAINING STORAGE (FT)	REMAINING STORAGE VOL (FT3)	REMAINING STORAGE VOL (GAL)	REMAINING STORAGE VOL (BBL)	PERCENT OF TOTAL VOL (%)	VOL IN CONTAINMENT (FT3)	VOL IN CONTAINMENT (GAL)	VOL IN CONTAINMENT (BBL)	VOL IN CONTAINMENT (AC-FT)	PERCENT OF TOTAL VOL (%)	
3,149.00	0	19	0	-	-	0%	398,883	2,984,043	71,039	9.16	100%	
3,148.00	1	18	38,812	290,352	6,912	10%	360,071	2,693,691	64,127	8.27	90%	FREEBOARD
3,147.00	2	17	75,296	563,289	13,410	19%	323,587	2,420,754	57,629	7.43	81%	
3,146.00	3	16	109,524	819,348	19,506	27%	289,359	2,164,695	51,533	6.64	73%	MAX VOLUME
3,145.00	4	15	141,568	1,059,070	25,212	35%	257,315	1,924,972	45,826	5.91	65%	
3,144.00	5	14	171,500	1,282,991	30,543	43%	227,383	1,701,052	40,496	5.22	57%	
3,143.00	6	13	199,392	1,491,652	35,511	50%	199,491	1,492,391	35,528	4.58	50%	
3,142.00	7	12	225,316	1,685,590	40,128	56%	173,567	1,298,453	30,911	3.98	44%	
3,141.00	8	11	249,344	1,865,342	44,407	63%	149,539	1,118,701	26,632	3.43	37%	
3,140.00	9	10	271,548	2,031,450	48,361	68%	127,335	952,593	22,678	2.92	32%	STORAGE
3,139.00	10	9	292,000	2,184,451	52,004	73%	106,883	799,592	19,035	2.45	27%	VOLUME
3,138.00	11	8	310,772	2,324,885	55,347	78%	88,111	659,158	15,692	2.02	22%	
3,137.00	12	7	327,936	2,453,290	58,404	82%	70,947	530,753	12,635	1.63	18%	
3,136.00	13	6	343,564	2,570,202	61,187	86%	55,319	413,841	9,852	1.27	14%	
3,135.00	14	5	357,728	2,676,162	63,709	90%	41,155	307,881	7,329	0.94	10%	
3,134.00	15	4	370,500	2,771,710	65,984	93%	28,383	212,333	5,055	0.65	7%	
3,133.00	16	3	381,952	2,857,383	68,024	96%	16,931	126,660	3,015	0.39	4%	FLOOR
3,132.00	17	2	392,156	2,933,720	69,841	98%	6,727	50,323	1,198	0.15	2%	VOLUME
3,131.00	18	1	398,153	2,978,585	70,909	100%	730	5,458	130	0.02	0%	
3,130.00	19	0	398,883	2,984,043	71,039	100%	0	0	0	0.00	0%	SUMP

SOUTH CONTAINMENT

ELEVATION (FT)	CONTAINMENT DEPTH (FT)	REMAINING STORAGE (FT)	REMAINING STORAGE VOL (FT3)	REMAINING STORAGE VOL (GAL)	REMAINING STORAGE VOL (BBL)	PERCENT OF TOTAL VOL (%)	VOL IN CONTAINMENT (FT3)	VOL IN CONTAINMENT (GAL)	VOL IN CONTAINMENT (BBL)	VOL IN CONTAINMENT (AC-FT)	PERCENT OF TOTAL VOL (%)	
3,149.00	0	19	0	-	-	0%	398,928	2,984,380	71,047	9.16	100%	
3,148.00	1	18	38,812	290,352	6,912	10%	360,116	2,694,028	64,135	8.27	90%	FREEBOARD
3,147.00	2	17	75,296	563,289	13,410	19%	323,632	2,421,091	57,637	7.43	81%	
3,146.00	3	16	109,524	819,350	19,506	27%	289,404	2,165,030	51,541	6.64	73%	MAX VOLUME
3,145.00	4	15	141,568	1,059,070	25,212	35%	257,360	1,925,310	45,834	5.91	65%	
3,144.00	5	14	171,500	1,282,991	30,543	43%	227,428	1,701,389	40,504	5.22	57%	
3,143.00	6	13	199,392	1,491,652	35,511	50%	199,536	1,492,728	35,536	4.58	50%	
3,142.00	7	12	225,316	1,685,590	40,128	56%	173,612	1,298,791	30,919	3.99	44%	
3,141.00	8	11	249,344	1,865,342	44,407	63%	149,584	1,119,038	26,640	3.43	37%	
3,140.00	9	10	271,548	2,031,452	48,361	68%	127,380	952,928	22,686	2.92	32%	STORAGE
3,139.00	10	9	292,000	2,184,453	52,004	73%	106,928	799,927	19,043	2.45	27%	VOLUME
3,138.00	11	8	310,772	2,324,887	55,347	78%	88,156	659,494	15,700	2.02	22%	
3,137.00	12	7	327,936	2,453,290	58,404	82%	70,992	531,090	12,643	1.63	18%	
3,136.00	13	6	343,564	2,570,202	61,187	86%	55,364	414,178	9,860	1.27	14%	
3,135.00	14	5	357,728	2,676,164	63,709	90%	41,200	308,216	7,337	0.95	10%	
3,134.00	15	4	370,500	2,771,710	65,984	93%	28,428	212,670	5,063	0.65	7%	
3,133.00	16	3	381,952	2,857,383	68,024	96%	16,976	126,997	3,023	0.39	4%	FLOOR
3,132.00	17	2	392,156	2,933,720	69,841	98%	6,772	50,660	1,206	0.16	2%	VOLUME
3,131.00	18	1	398,196	2,978,904	70,916	100%	732	5,476	130	0.02	0%	
3,130.00	19	0	398,928	2,984,380	71,047	100%	0	0	0	0.00	0%	SUMP

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ENGINEERING SHEET:
VOLUME QUANITITES
OF
PROJECT NAME:
TSW TALL TEXAN RECYCLE FACILITY
FOR
CLIENT:
VAUGHN OPERATING

PROJECT NUMBER:
25084

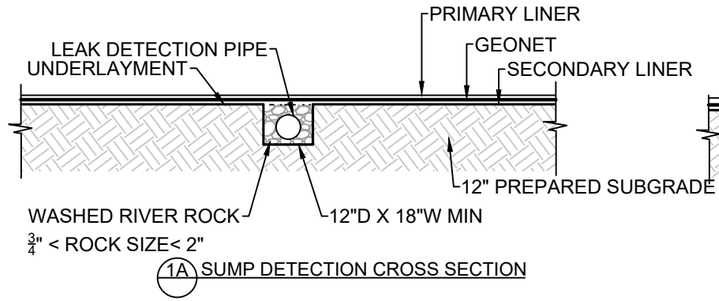
PROJECT ENGINEER:
JEREMY BAKER, PE
DRAWN BY:
X.CLARK

REVISIONS

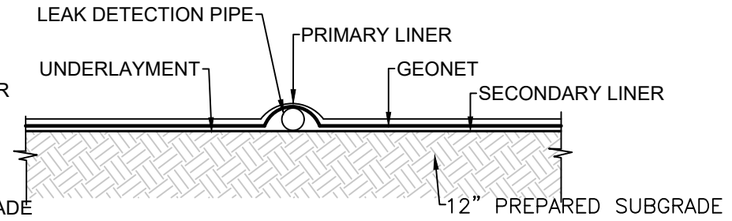
No.	DATE	DESCRIPTION

JEREMY BAKER
NEW MEXICO
16207
LICENSED PROFESSIONAL ENGINEER
04/29/2025

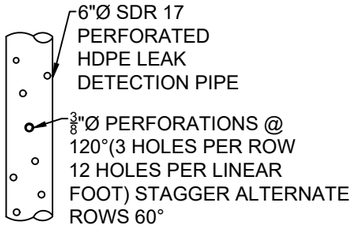
SHEET:
11 of 14
CS-108



1A SUMP DETECTION CROSS SECTION



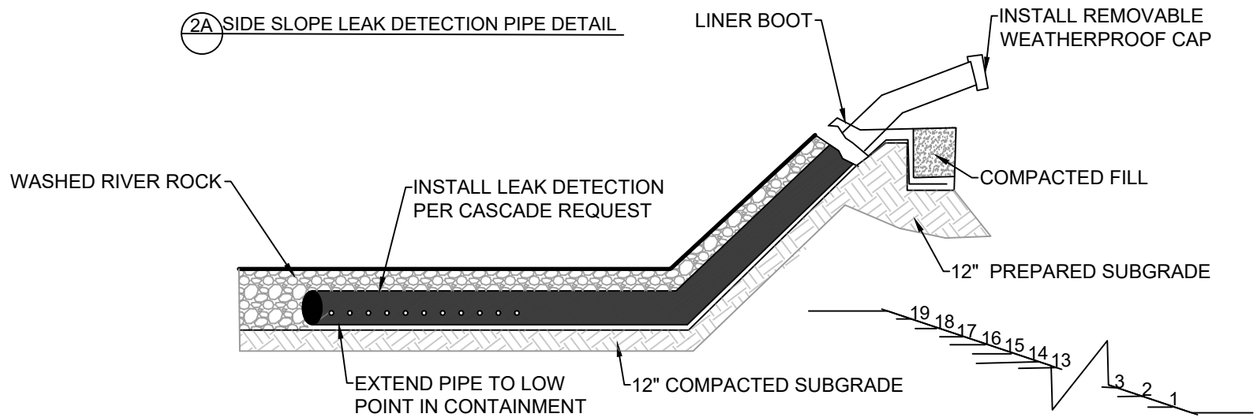
2A SIDE SLOPE LEAK DETECTION PIPE DETAIL



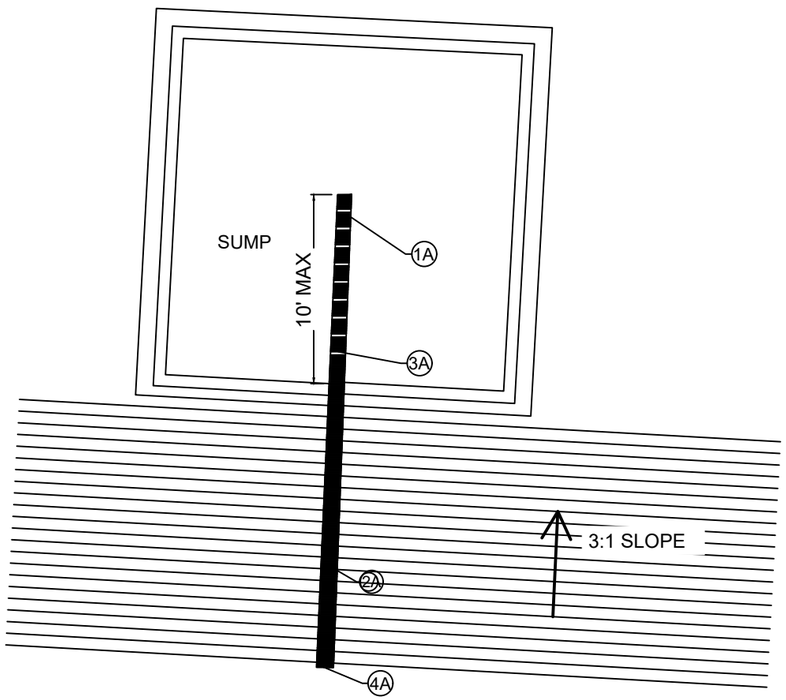
3A PERFORATED PIPE DETAIL

NOTES:

1. LEAK DETECTION SYSTEM TO BE INSTALLED BY OWNER.
2. PERFORATED PIPE TO BE ALONG THE BOTTOM OF THE CONTAINMENT. 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. WASHED RIVER ROCK SHALL BE ¾" MIN @ 2" MAX.



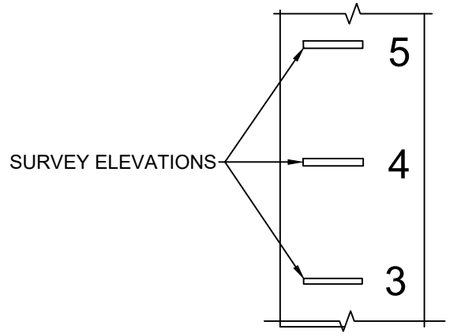
4A LEAK DETECTION/SAMPLING SYSTEM PROFILE



1 CONTAINMENT SUMP PLAN DETAIL

NOTE:

1. LEVEL MARKS TO BE LOCATED BY SURVEYOR
2. MARKS TO BE MADE BY AN EXTRUSION WELDER USING BLACK FILAMENT (OR WHITE FILAMENT ON BLACK LINER)
3. MARKS WILL BE DETERMINE ON THE FIELD BY THE OWNER AND CONTINUE TO THE TOP OF THE BERM.
4. REFERENCE PIT CAPACITY TABLES FOR ACCURATE ELEVATIONS.



2 WATER LEVEL MARKS

PROPOSED PIT REFERENCE TABLE	
DETAIL	DESCRIPTION
PRIMARY LINER	60 MIL HDPE LINER
LEAK DETECTION	200 MIL GEONET
SECONDARY LINER	40 MIL HDPE LINER
UNDERLAYMENT	COMPACTED SUBGRADE/10 OZ GEOTEXTILE
NORTH CONTAINMENT	
BOTTOM OF POND	3130.00
BERM (ROAD CREST)	3149.00
SOUTH CONTAINMENT	
BOTTOM OF POND	3130.00
BERM (ROAD CREST)	3149.00
LEAK DETECTION PIPING	6-IN DR11 X PERFORATED HEPE PIPE LEAK DETECTION PIPE

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ENGINEERING SHEET:
LEAK DETECTION DETAILS

OF
PROJECT NAME:
TSW TALL TEXAN RECYCLE FACILITY
FOR
CLIENT:
VAUGHN OPERATING

PROJECT NUMBER:
25084

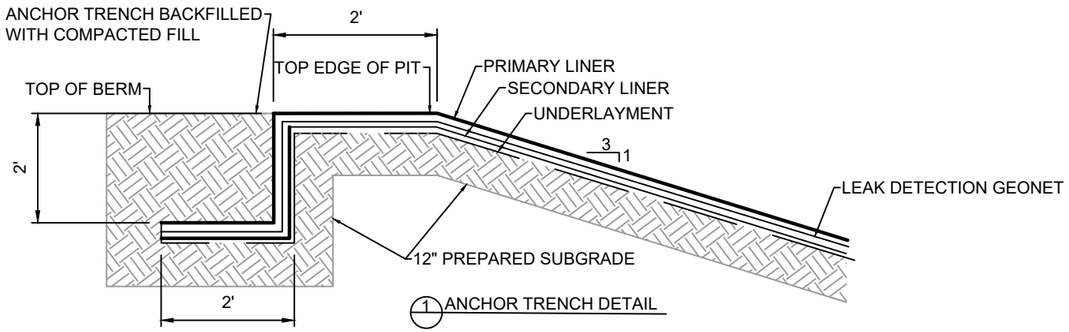
PROJECT ENGINEER:
JEREMY BAKER, PE
DRAWN BY:
X.CLARK

REVISIONS

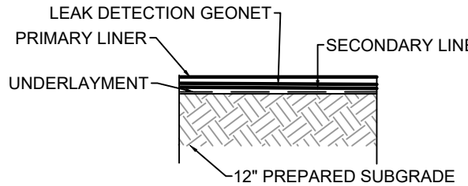
No.	DATE	DESCRIPTION

JEREMY BAKER NEW MEXICO 16207 LICENSED PROFESSIONAL ENGINEER
04/29/2025

SHEET:
12 of 14
CS-501



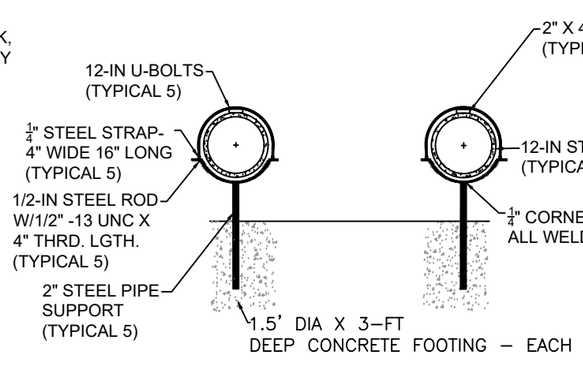
1 ANCHOR TRENCH DETAIL



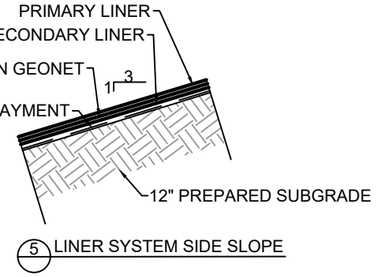
4 LINER SYSTEM FLOOR DETAIL

GENERAL NOTES:

1. PREPARED SUBGRADE MEANS COMPACTED SMOOTH SUBGRADE FREE OF ROCK, ROOTS, WOOD DEBRIS, CONCRETE RUBBLE AND ANY SHARP OBJECTS THAT MAY PUNCTURE THE HDPE LINER, A MINIMUM COMPACTED DEPTH OF 12".
2. ALL INTERIOR SLOPES AND TOP OF BERMS TO BE SMOOTH DRUM ROLLED
3. ALL EMBANKMENT SLOPES SHALL HAVE A SLOPE (H:V RATIO) OF 3:1.
4. COMPACTED EARTH EMBANKMENTS TO BE CONSTRUCTED WITH 12 INCH (MAXIMUM LOOSE LIFTS, COMPACTED TO 95% STANDARD PROCTOR DENSITY)
5. PERFORM GEOTECHNICAL ANALYSIS ON EXISTING SOIL TO CONFIRM SOIL IS SUITABLE FOR USE IN THE LEVEE.
6. LINER SPECIFICATIONS PROVIDED ON SHEET CS - 501



3 STINGER SYSTEM ANCHOR DETAIL



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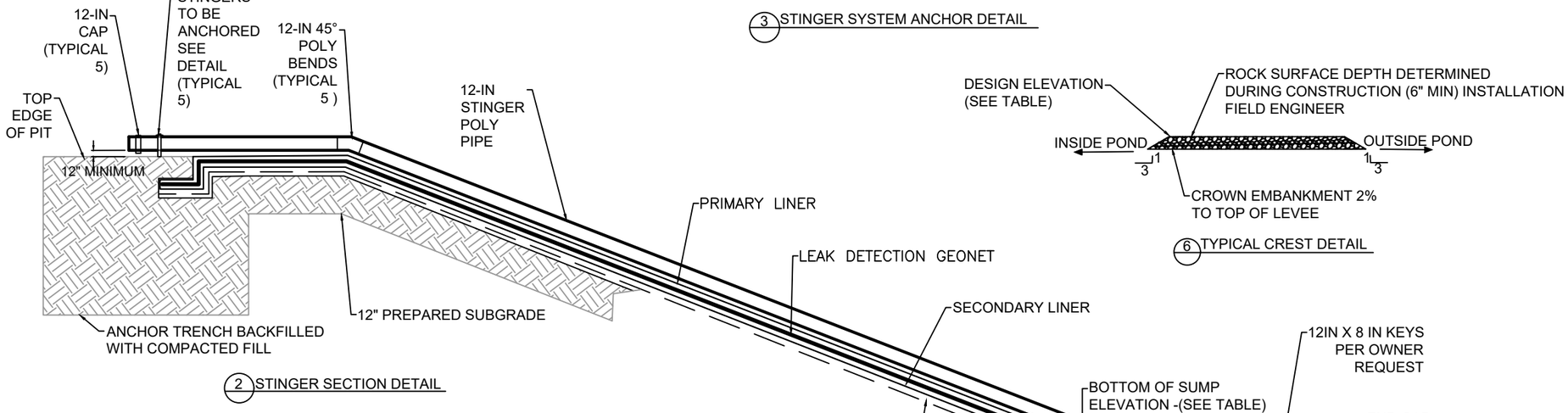


2 STINGER SECTION DETAIL

6 TYPICAL CREST DETAIL

SquareRoot services
Engineering | Surveying
Materials Testing
7921 N. World Dr.
Hobbs, NM 88242
Squarerootservices.net
575-231-7347

ENGINEERING SHEET:
LINER DETAILS

OF
PROJECT NAME:
TSW TALL TEXAN RECYCLE FACILITY
FOR
CLIENT:
VAUGHN OPERATING

PROJECT NUMBER:
25084

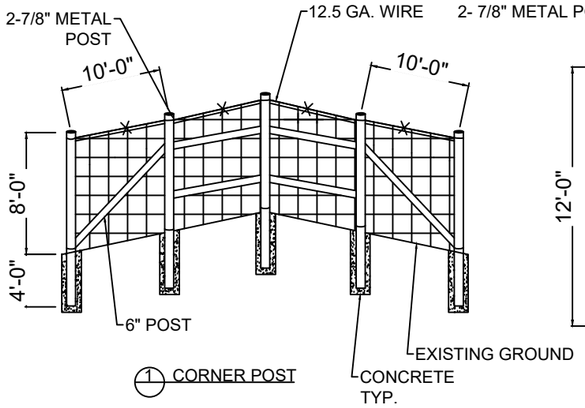
PROJECT ENGINEER:
JEREMY BAKER, PE
DRAWN BY:
X.CLARK

REVISIONS

No.	DATE	DESCRIPTION

JEREMY BAKER NEW MEXICO 16207 LICENSED PROFESSIONAL ENGINEER
04/29/2025

SHEET:
13 of 14
CS-502



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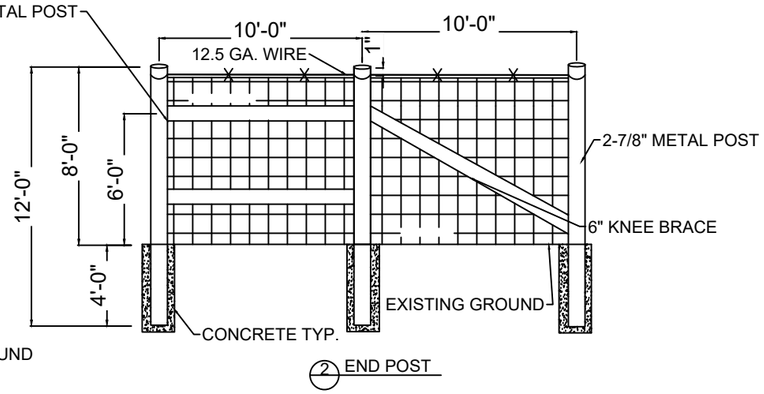

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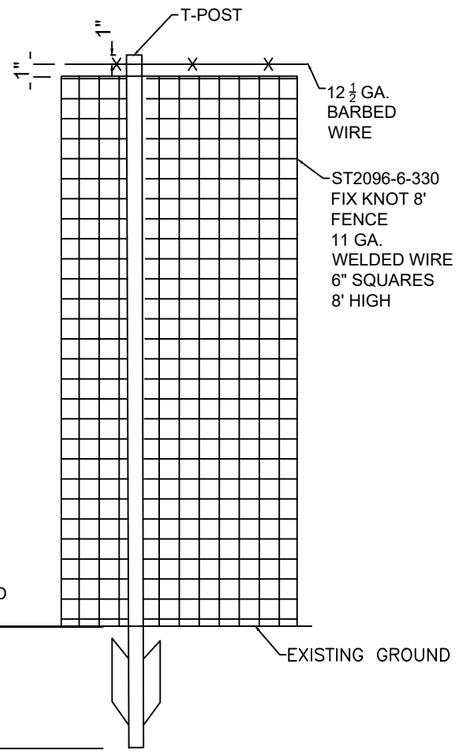

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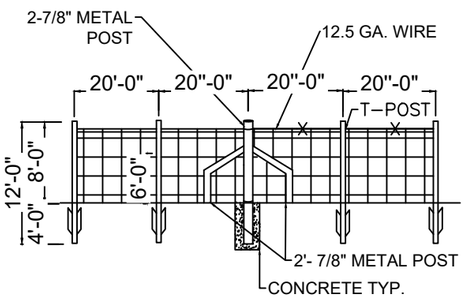

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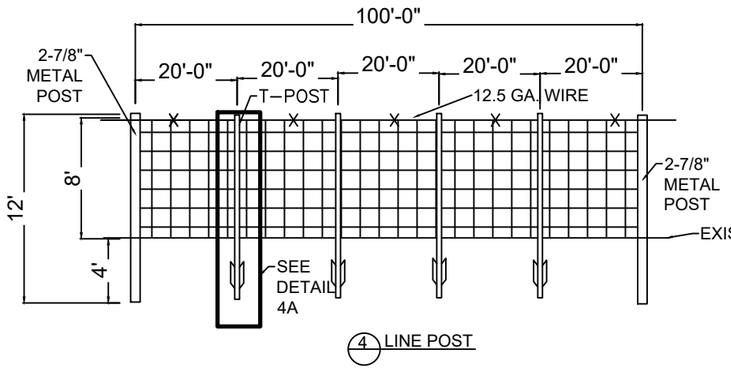

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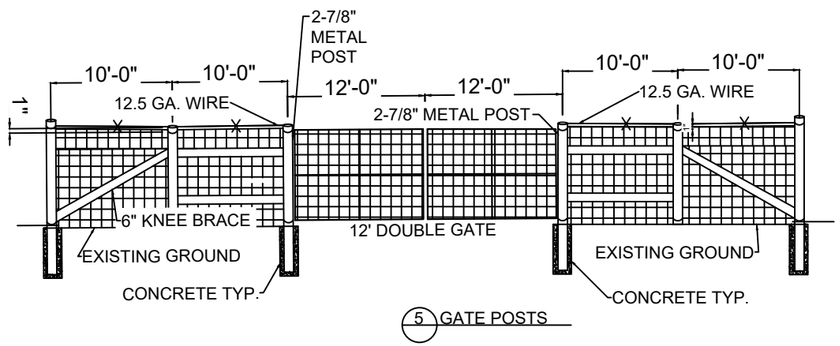

5 GATE POSTS

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Materials Testing

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Hobbs, NM 88242
Squarerootservices.net
575-231-7347

ENGINEERING SHEET:
FENCE DETAILS

OF

PROJECT NAME:
TSW TALL TEXAN RECYCLE FACILITY
FOR
CLIENT:
VAUGHN OPERATING

PROJECT NUMBER:
25084

PROJECT ENGINEER:
JEREMY BAKER, PE

DRAWN BY:
X.CLARK

REVISIONS

No.	DATE	DESCRIPTION

JEREMY BAKER
NEW MEXICO
16207
LICENSED PROFESSIONAL ENGINEER
04/29/2025

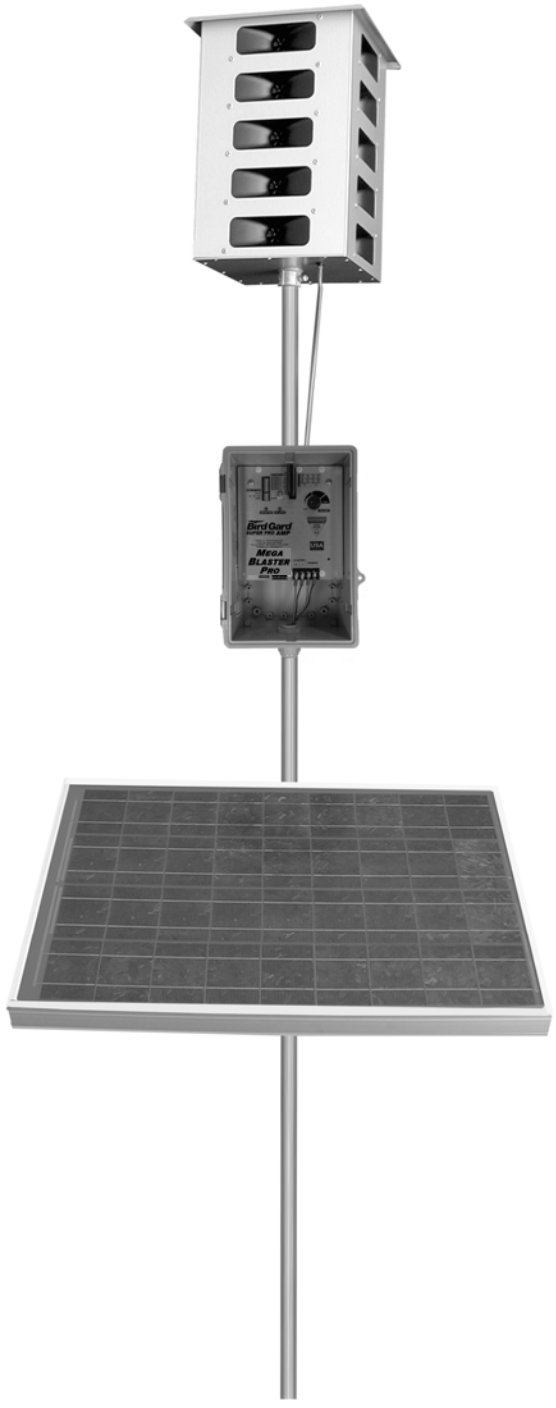
SHEET:
14 of 14
CS-503

AVIAN DETERRENT SYSTEM

MEGA BLASTER PRO

BIRD-X

User's Manual



Overview

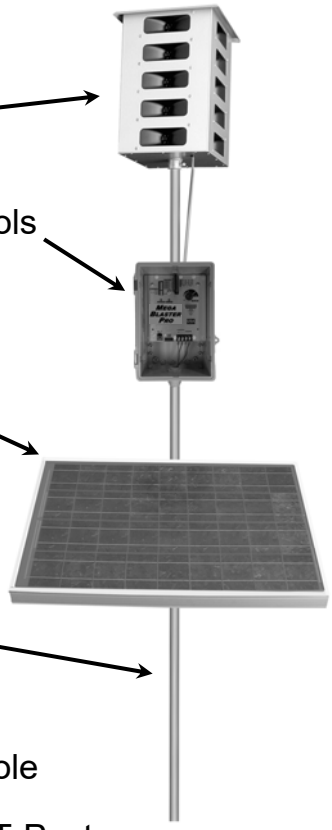
The Bird-X Mega Blaster Pro utilizes the innate power of the natural survival instincts of birds to effectively repel them. Digital recordings of distressed and alarmed birds, along with the sounds made by their natural predators are broadcast through high fidelity weather-resistant speakers over the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

Your Bird-X Mega Blaster Pro system consists of:

20-Speaker Tower broadcasts the bird sounds

Control Unit produces the bird sounds and contains all operational controls

Solar Panel recharges the 12-volt deep cycle battery



Items needed but not included:

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

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

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

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

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

Bird Control Management Guidelines

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

For best results:

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

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

DESIGN/CONSTRUCTION PLAN

Design and Construction Plan In Ground Containments

This plan addresses construction of the earthen containments.

Magrym Engineers is providing the design of the containment and their plans are presented in this submission.

Dike Protection and Structural Integrity

The design and operation provide for the confinement of produced water, prevention of releases and prevention of 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 (a berm) and/or diversion ditch (between the levee and the soil stockpile) to prevent run-on of surface water.

19.15.34.12 A Design and Construction Specifications
(1). The operator shall design and construct a recycling containment to ensure the confinement of produced water, to prevent releases and to prevent overtopping due to wave action or rainfall.
(8). The operator of a recycling containment shall design the containment to prevent run-on of surface water. The containment shall be surrounded by a berm, ditch or other diversion 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.

19.15.34.12 B. Prior to constructing containment, the operator shall strip and stockpile the topsoil for use as the final cover or fill at the time of closure

Signage

The operator will place an upright sign no less than 12 inches by 24 inches 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:

- the operator's name,
- the location of the site by quarter-quarter or unit letter, section, township and range, and
- emergency telephone numbers

19.15.34.12 C. Signs.
The operator shall post an upright sign no less than 12 inches by 24 inches with lettering not less than two inches in height in a conspicuous place on the fence surrounding the containment. The operator shall post the sign in a manner and location such that a person can easily read the legend. The sign shall provide the following information: the operator's name, the location of the site by quarter-quarter or unit letter, section, township and range, and emergency telephone numbers

Fencing

The operator will provide for a fence to enclose the recycling containment in a manner that deters unauthorized wildlife and human access. As specified in the design drawings, the operator will employ a chain-link or game fence. If required by the District Office, the operator will add four-strands of barbed wire to comply with the text of the Rule. Because feral pigs, javelina and deer are present in the area, a chain link or game fence is required in order to comply with Section 19.15.34.12 D.1 of the Rule because pigs will move beneath the lower strand of a 4-strand, 4-foot high barbed wire fence and deer will jump over. However, 19.15.34.12 D.2 requires "a four-foot fence that has at least four strands of barbed wire evenly spaced in the interval between one foot and four feet above ground level". Therefore, a barbed wire specification will be added to the game fence to avoid a variance if required by the OCD District Office.

19.15.34.12 D. Fencing
(1) The operator shall fence or enclose a recycling containment in a manner that deters unauthorized wildlife and human access and shall maintain the fences in good repair. The operator shall ensure that all gates associated with the fence are closed and locked when responsible personnel are not onsite.
(2) Recycling containments shall be fenced with a four-foot fence that has at least four strands of barbed wire evenly spaced in the interval between one foot and four feet above ground level.

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 perimeter game/chain-link fence will be effective in excluding stock and most terrestrial wildlife. If requested by the surface owner, the game fence can include a fine mesh from the base to 1 foot above the ground to exclude the small reptiles (e.g. dune sagebrush lizard).

19.15.34.12 E Netting.
The operator shall ensure that a recycling containment is screened, netted or otherwise protective of wildlife, including migratory birds. The operator shall on a monthly basis inspect for and, 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.

The recycling containment will be protective of wildlife, including migratory birds through the implementation of an Avian Protection Plan, routine inspections and the perimeter fence.

The avian protection plan includes the use of a Bird-X Mega Blaster Pro[1] as a primary hazing program for avian species. The device will be equipped with sounds suitable for the Permian Basin environment. In addition to this sonic device, staff will routinely inspect the containment for the presence of avian species and, if detected, will use a blank cartridge or shell in a handgun, starter pistol or shotgun as additional hazing. Decoys of birds of prey may be placed on the game fence and other roosts around the open water to provide additional hazing.

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

Earthwork

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 is required under the liner when needed to reduce localized stress-strain or protuberances that otherwise may compromise the liner's integrity.

19.15.34.12 A
(2) A recycling containment shall 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 is required under the liner when needed to reduce localized stress-strain or protuberances that otherwise may compromise the liner's integrity…

This volume provides the stamped drawings for the containment with the following design/construction specifications:

a) levee has inside grade no steeper than two horizontal feet to one vertical foot (2H: 1V).

b) levee outside grade is no steeper than three horizontal feet to one vertical foot (3H: 1V)
c) top of the levee is wide enough to install an anchor trench and provide adequate room for inspection and maintenance.
d) The containment floor design calls for a slope toward the sump in the corner(s).

19.15.34.12 A
(2) …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). The levee shall have an outside grade no steeper than three horizontal feet to one vertical foot (3H:1V). The top of the levee shall be wide enough to install an anchor trench and provide adequate room for inspection and maintenance.

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.

19.15.34.12 A
(3) Each recycling containment shall incorporate, at a minimum, 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 specified in the design drawings and is 40-mil HDPE or thicker and is equivalent to 30-mil LLDPEr (in accordance with a previously approved variance) Liner compatibility meets or exceeds a subsequent relevant publication to EPA SW-846 method 9090A.

19.15.34.12 A
(4) All primary (upper) liners in a recycling containment shall be geomembrane liners composed of an impervious, synthetic material that is resistant to ultraviolet light, petroleum hydrocarbons, salts and acidic and alkaline solutions. All primary liners shall be 30-mil flexible PVC, 45-mil LLDPE string reinforced or 60-mil HDPE liners. Secondary liners shall be 30-mil LLDPE string reinforced or equivalent with a hydraulic conductivity no greater than 1 x 10-9 cm/sec. Liner compatibility shall meet or exceed the EPA SW-846 method 9090A or subsequent relevant publications.

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 in the corner(s) of the containment, as shown in the design drawings. This slope combined with the highly transmissive geonet drainage layer provide for rapid leak detection.

19.15.34.12 A
(7) The operator of a recycling containment shall place a leak detection system between the upper and lower geomembrane liners that shall consist of 200-mil geonet or two feet of compacted soil with a saturated hydraulic conductivity of 1 x 10-5 cm/sec or greater to facilitate drainage. The leak detection system shall consist 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 liners and drainage material will be installed consistent with the Manufacturer's specifications. In addition to any specifications of the Manufacturer, protocols for liner installation include measures to:

i. minimizing liner seams and orient them up and down, not across, a slope of the levee.
ii. use factory-welded seams where possible.
iii. use field seams in geosynthetic material that are thermally seamed and prior to field seaming, overlap liners four to six inches.
iv. minimize the number of field seams and comers and irregularly shaped areas.
v. provide for no horizontal seams within five feet of the

19.15.34.12 A
(5) The operator of a recycling containment shall minimize liner seams and orient them up and down, not across, a slope of the levee. Factory welded seams shall be used where possible. The operator shall ensure field seams in geosynthetic material are thermally seamed. Prior to field seaming, the operator shall overlap liners four to six inches…

slope's toe.

vi. use qualified personnel to perform field welding and testing.

vii. avoid excessive stress-strain on the liner

viii. The edges of all liners are anchored in the bottom of a compacted earth-filled trench that is at least 18 inches deep

19.15.34.12 A
(5) …The operator shall minimize the number of field seams and corners and irregularly shaped areas. There shall be no horizontal seams within five feet of the slope's toe. Qualified personnel shall perform field welding and testing.

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.

19.15.34.12 A
(3) The edges of all liners shall be anchored in the bottom of a compacted earth-filled trench. The anchor trench shall be at least 18 inches deep.

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.

19.15.34.12 A
(6) At a point of discharge into or suction from the recycling containment, the operator shall insure that the liner is protected from excessive hydrostatic force or mechanical damage. External discharge or suction lines shall not penetrate the liner.

Pumping from the containment to hydraulic fracturing operations is the responsibility of stimulation contractors. Typically, 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 if the owner deems necessary during operations.

Leak Detection and Fluid Removal System Installation

The leak detection system, contains the following design elements

a. The 200-mil HyperNet Geonet drainage material between the primary and secondary liner that is sufficiently permeable to allow the transport of fluids to the observation ports (Appendix A).
b. The containment floor is sloped towards the monitoring riser pipe to facilitate the earliest possible leak detection of the containment bottom. A pump may be placed in the observation port to provide for fluid removal.
c. Piping will withstand chemical attack from any seepage, structural loading from stresses and disturbances from overlying water, cover materials, equipment operation or expansion or contraction (see Appendix A).

OPERATIONS AND MAINTENANCE PLAN

CLOSURE PLAN

Operation and Maintenance Plan
In Ground Containments

Overview

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

19.15.34.10 D
Recycling containments may not be used for the disposal of produced water or other oilfield wastes.

The operation of the containment is summarized below.

A. Produced water generated from nearby oil and gas wells is delivered to a treatment system located as indicated in the C-147.
B. Unless specified in the transmittal letter, after treatment, the produced water discharges into the containment.
C. When required, produced water is removed from the containment for E&P operations. At this time, produced water will be used for drilling beneath the freshwater zones (beneath surface casing), for well stimulation (e.g. hydraulic fracturing) and other E&P uses as approved by OCD.
D. Whenever the maximum fluid capacity of the containment is reached, treatment and discharge to the containment ceases (see Freeboard and Overtopping Plan, below).
E. 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 (see attached example).
F. 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.

19.15.34.9 E
The operator of a recycling facility shall 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.

19.15.34.9 F
The operator of a recycling facility shall 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.

G. 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.

19.15.34.13 C
A recycling 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 must 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 discovery, 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 Monitoring, Inspection, and Reporting Plan; below), 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 on site, 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.

19.15.34.13 B
(4) If the containment's primary liner is compromised above the fluid's surface, the operator shall 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.
(5) If the primary liner is compromised below the fluid's surface, the operator shall remove all fluid above the damage or leak within 48 hours of discovery, notify the division district office and repair the damage or replace the primary liner.

19.15.34.13 B
(7) The operator shall install, or maintain on site, an oil absorbent boom or other device to contain an unanticipated release.
(1) The operator shall remove any visible layer of oil from the surface of the recycling containment.
19.15.34.8 A

(6) All releases from the recycling and re-use of produced water shall be handled in accordance with 19.15.29 NMAC.

8. The operator will maintain the containment free of miscellaneous solid waste or debris.
9. The operator will maintain at least three feet of freeboard for the containment and will use a free-standing staff gauge to allow easy determination of the required 3-foot 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.

19.15.34.13
(6) The containment shall be operated to prevent the collection of surface water run-on.

19.15.34.13 B
(2) The operator shall maintain at least three feet of freeboard at each containment.

19.15.34.13 B
(3) The injection or withdrawal of fluids from the containment shall be accomplished through a header, diverter or other hardware that prevents damage to the liner by erosion, fluid jets or impact from installation and removal of hoses or pipes.

19.15.34.12 D
(1) The operator shall fence or enclose a recycling containment in a manner that deters unauthorized wildlife and human access and shall maintain the fences in good repair. The operator shall ensure that all gates associated with the fence are closed and locked when responsible personnel are not onsite.

19.15.34.13 A
The operator shall 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.

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:

- reading and recording the fluid height of staff gauges,
- recording any evidence that the pond surface shows visible oil,
- visually inspecting the containment's exposed liners
- checking the leak detection system for any evidence of a loss of integrity of the primary liner.
- inspect diversion ditches and berms around the containment to check for erosion and collection of surface water run-on.
- inspect the leak detection system for evidence of damage or malfunction and monitor for leakage.

As stated above, if a liner's integrity is compromised, or if any penetration of the liner occurs, then the operator will take appropriate action within 48 hours, based on if above or below water surface, as noted above.

Monthly, the operator will:

A. Inspect the containment for dead 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.
B. 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.
C. Record sources and disposition of all recycled water.

19.15.34.12 E
The operator shall on a monthly basis inspect for and, 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.

19.15.34.9 E
The operator of a recycling facility shall 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.

19.15.34.9 F
The operator of a recycling facility shall 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.

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

Freeboard and Overtopping Prevention Plan

The method of operation of the containment allows for maintaining freeboard with very few potential problems. When the capacity of the containment is reached (3-feet of freeboard), the discharge of produced water ceases and the produced water generated by nearby oil and gas wells is managed by an injection well(s).

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

I. Cease discharging produced water to the containment.
II.Accelerate re-use of the produced water for purposes approved by the Division.

III. Transfer produced water from the containment to injection wells.

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 A, 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-inch 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 produced water from the containment via electrical 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.

Closure Plan
In Ground Containments

Overview

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.

19.15.34.14 A
Once the operator has ceased operations, the operator shall 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

a. the condition that existed prior to the construction of the recycling containment or
b. 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,

19.15.34.14 E
The operator shall substantially restore the impacted surface area to the condition that existed prior to the construction of the recycling containment.

19.15.34.14 G
The re-vegetation and reclamation obligations imposed by federal, state trust land or tribal agencies on lands managed by those agencies shall supersede these provisions and govern the obligations of any operator subject to those provisions, provided that the other requirements provide equal or better protection of fresh water, human health and the environment.

The surface owner will impose a closure design that conforms to their needs for the site. The operator understands that a variance will be submitted to OCD to allow for any alternative closure protocol.

Excavation and Removal Closure Plan – Protocols and Procedures

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

1. The operator will remove all liquids from the containment 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.
2. 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.
3. After the removal of the containment contents and liners, soils beneath the containment will be tested by collection of a five-point (minimum) composite sample which includes stained or wet soils, if any, and that sample shall be analyzed for the constituents listed in Table I of 19.15.34.14.
4. After review of the laboratory results:
    a. If any contaminant concentration is higher than the parameters listed in Table I, additional delineation may be required, and the operator must receive approval before proceeding with closure.

19.15.34.14 B
The operator shall close a recycling containment by first removing all fluids, contents and synthetic liners and transferring these materials to a division approved facility.

19.15.34.14 C
The operator shall test the soils beneath the containment for contamination with a five-point composite sample which includes stained or wet soils, if any, and that sample shall be analyzed for the constituents listed in Table I below.

19.15.34.14 C
(1) If any contaminant concentration is higher than the parameters listed in Table I, the division may require additional delineation upon review of the results 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 I, 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.

19.15.34.14 C
(2) If all contaminant concentrations are less than or equal to the parameters listed in Table I, then the operator can proceed to backfill with non-waste containing, uncontaminated, earthen material.

Reclamation and Re-vegetation

a. The operator will reclaim the containment's location to a safe and stable condition that blends with the surrounding undisturbed area.
b. 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.
c. The disturbed area shall then be reseeded in the first favorable growing season following closure of a recycling containment.

19.15.34.14 E
Once the operator has closed the recycling containment, the operator shall 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.

19.15.34.14 D
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.

19.15.34.14 H
The operator shall notify the division when reclamation and re-vegetation are complete.

19.15.34.14 F
Reclamation of all disturbed areas no longer in use shall be considered complete when 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.

Venegas, Victoria, EMNRD

From: Venegas, Victoria, EMNRD
Sent: Wednesday, May 14, 2025 9:34 AM
To: bobbi.worden@mhatllc.com; Bobbi Jo Crain
Subject: 2RF-212 - TSW SAM HOUSTON RF & CONTAINMENTS [fVV2434052813]. Modification.
Attachments: C-147 2RF-212 - TSW SAM HOUSTON RF & CONTAINMENTS [fVV2434052813].pdf

2RF-212 - TSW SAM HOUSTON RF & CONTAINMENTS [fVV2434052813].

Good morning Ms. Settle.
NMOCD has reviewed the recycling containment permit modification and related documents, submitted by [330307] Vaughan Operating LLC on 04/30/2025, Application ID 457363, for 2RF-212 - TWS RECYCLING FACILITY & CONTAINMENTS [fVV2434052813] in K-35-21S-27E, Eddy County, New Mexico. [330307] Vaughan Operating LLC requested permit modifications to permit 2RF-212 - TWS RECYCLING FACILITY & CONTAINMENTS [fVV2434052813]. The following modifications have been approved:

- All documents submitted by [330307] Vaughan Operating LLC on 11/27/2024, Application ID 407083 contained a typographical error: TWS should have read TSW. The name of the permit 2RF-212 is TSW SAM HOUSTON RF & CONTAINMENTS [fVV2434052813]. Additionally, the November 2024 submission (TWS RF-212 Application ID 407083) contained an error relating to the location of this containment. The corrected C-147 has been approved.
- The addition to two (2) inground containments named Tall Texan RF is approved. The Tall Texan RF consists of the North Containment with a capacity at freeboard of 51,533 BBL and South Containment with a capacity at freeboard 51,541 BBL.
- The addition to two (2) inground containments named TSW MOD W Nolan Ryan East and West Containments is approved. The East Containment has a capacity of 1,157,895 BBL at freeboard and the West Containment has a capacity of 819,663 BBL at freeboard.

The requested permit modification is approved with the following conditions of approval:

- [330307] Vaughan Operating LLC will operate 2RF-212 - TSW SAM HOUSTON RF & CONTAINMENTS [fVV2434052813] as originally permitted.
- [330307] Vaughan Operating LLC will comply with all conditions previously approved for the 2RF-212 - TSW SAM HOUSTON RF & CONTAINMENTS [fVV2434052813] permit.
- No changes to the operations procedures, maintenance, monitoring procedures, or closure procedures will be made aside from the requested modification.
- The 2RF-212 - TSW SAM HOUSTON RF & CONTAINMENTS [fVV2434052813] consists of five (5) inground containments of approximately 2.8 million barrels.
- The closure cost estimated of 2RF-212 - TSW SAM HOUSTON RF & CONTAINMENTS [fVV2434052813] is as follows:
  TSW MOD W (Nolan Ryan East and West Containments) $972,113.60
  TSW MOD E (Sam Houston Containment) $637,605.00
  Tall Texan RF (Recycling Facility North & South Containments) $115,793.20.
- The total bonding for the 2RF-212 - TSW SAM HOUSTON RF & CONTAINMENTS [fVV2434052813] provided in the modification request in the amount of $1,725,511.80 meets the requirements of NMAC 19.15.34.14 CLOSURE AND SITE RECLAMATION REQUIREMENTS FOR RECYCLING CONTAINMENTS.
- The financial assurance should be mailed to: **EMNRD - Oil Conservation Division, Administration & Compliance Bureau. Attn: Bond Administrator. 1220 S. St. Francis Drive | Santa Fe, NM 87505.**

- The 2RF-212 - TSW SAM HOUSTON RF & CONTAINMENTS [fVV2434052813] permit expires on 11/27/2029. If [330307] Vaughan Operating LLC wishes to extend operations past five years, an annual permit extension request must be submitted using form C-147 through OCD Permitting by 10/27/2029.
- [330307] Vaughan Operating LLC shall construct, operate, maintain, close, and reclaim 2RF-212 - TSW SAM HOUSTON RF & CONTAINMENTS [fVV2434052813] in compliance with 19.15.34 NMAC.
- [330307] Vaughan Operating LLC shall submit monthly reports of recycling and reuse of produced water drilling fluids, and liquid oil field waste on OCD form C-148 through OCD Permitting even if there is zero activity.
- [330307] Vaughan Operating 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-212 - TSW SAM HOUSTON RF & CONTAINMENTS [fVV2434052813].

Please let me know if you have any additional questions.
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

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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: Vaughan Operating LLC 3021 Hepler Rd. Carlsbad, NM 88220	OGRID: 330307
	Action Number: 457363
	Action Type: [C-147] Water Recycle Long (C-147L)

CONDITIONS

Created By	Condition	Condition Date
vvenegas	The modification request is approved. Conditions of approval by email.	5/14/2025