

August 2024

Rule 34 Registration Mad Cow & Containments Section 12, T24S, R30E, Eddy County

Volume 1 In-Ground Containment

- *Transmittal Letter & Closure Cost Estimate*
- *Siting Criteria Demonstration with Plates & Appendices*



View northeast of caliche pit on horizon that will be re-purposed as the Mad Cow produced water containments. Poker Tank, an area mapped as a surface water body and wetland is in the foreground.

Prepared for:
Vaughan Operating, LLC
Carlsbad, NM

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

R. T. HICKS CONSULTANTS, LTD.

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

August 20, 2024

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, Mad Cow Recycling Facility and Containments
In-ground Containment Registration Section 12, T24S, R30E, Eddy County

Dear Ms. Barr and Ms. Venegas:

On behalf Vaughan Operating, LLC, R.T. Hicks Consultants prepared a C-147 *registration* for the above-referenced project. Vaughan anticipates that construction will commence within 2-3 weeks. Produced water will flow into the containments soon thereafter – the end of September 2024.

Volume 1 of the package contains:

- this letter
- closure cost estimates for in-ground containments
- siting criteria demonstration for containments

Volume 2 includes:

- C-147 Form to register the in-ground containment,
- Stamped Design Drawings,
- Recently Approved Plans for Design/Construction, O&M, Closure.

This containment is close to but out side of the mandated setback distance from a wetland. The setback distance is noted on the design drawings (e.g., CG-100). Plate 8 is less precise than the design drawings but shows the same relationship – the anchor trench of the containments is more than 500 feet from the boundary of the wetland. Because the wetland is defined by the normal high water mark of Poker Tank, this mapped surface water body is also outside of the 300-foot setback requirement of Rule 34.

This submission refers to the following elements that some OCD reviewers have considered variances for in-ground containments:

1. OCD has previously approved an equivalency demonstration written by experts for 40-mil HDPE secondary liner. 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

August 2024

Page 2

- “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 will transmit the registration package to OCD via the OCD.Online portal. In compliance with 19.15.34.10 of the Rule, Hicks Consultants provided this package to the surface owner (Mr. McCutcheon). 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: Mr. Steve McCutcheon, Vaughan Operating, LLC
Cascade Services, LLC

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MAD COW IN-GROUND CONTAINMENTS

Financial Assurance Cost Estimate

Attached is the cost estimate for reclamation of the Mad Cow recycling in-ground containments.

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 (\$3,075.00). Total closure costs associated with the sampling and reporting 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 **\$671,644.04**

RT Hicks Consultants

Preparation of sampling results and closure report 7500.00

Total for all Closure Activities **\$679,144.04**

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

Cascade Services, LLC

www.cascadeservicesllc.com



Estimate

| | | | |
|----------------------------|----------------------------|-----------------|------------|
| ADDRESS | SHIP TO | ESTIMATE | 1702 |
| Steven and Lisa McCutcheon | Steven and Lisa McCutcheon | DATE | 08/21/2024 |
| | | EXPIRATION DATE | 09/20/2024 |

| | |
|-----------------------|------------------------------|
| CUSTOMER PROJECT NAME | PROJECT LOCATION COORDINATES |
| Mad Cow Closure | 32.22773°, -103.83248° |

| DATE | DESCRIPTION | QTY | RATE | AMOUNT | |
|------|-----------------|--|-----------|------------|------------|
| | Service (Other) | Remove and dispose of all four layers out all four pits | 2,245,712 | 0.17 | 381,771.04 |
| | Construction | This is pricing a package to reclaim the four pond cells Mobilize equipment to site. Existing Ponds estimated dimensions (1) 874'x265' top (1) 610'x254' top (1)216'x220' top (1)288'x168' top Average 18' deep 3:1 slopes 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 | 242,153.00 | 242,153.00 |
| | Construction | 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 | 2,587.00 | 2,587.00 |
| | Construction | Environmental Soil testing Before earthwork can begin the soil | 1 | 4,050.00 | 4,050.00 |

Questions? Email AR@cascadeservicesllc.com

must be tested for contamination in case of liner leakage. Cost include trip, labor, materials, and laboratory testing of 27 tests.

| | | | | |
|--------------|--|---|-----------|-----------|
| Construction | Broadcast seeding of pond area Seed will be a native mix for Eddy County NM Includes purchase of seed mix and placement | 1 | 4,500.00 | 4,500.00 |
| Fence | Fence removal and disposal Fence estimated at 4,575 ft per pond This includes removal of all posts, braces, wire, fabric, gates, and hardware. | 1 | 36,583.00 | 36,583.00 |

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

SUBTOTAL 671,644.04

TAX 0.00

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

TOTAL **\$671,644.04**

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

Questions? Email AR@Cascadeservicesllc.com

Accepted By

Accepted Date

SITING CRITERIA DEMONSTRATION

TEXT AND FIGURES

PLATES

SITING CRITERIA (19.15.34.11 NMAC)
VAUGHAN OPERATING – MAD COW CONTAINMENTS

Distance to Groundwater

Plate 1, Plates 2a & 2b, 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 Mad Cow Containments lies within the blue striped rectangle with a yellow label.
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.

Appendix-Well Logs & USGS Data has OSE drillers' logs of three wells/borings shown on Plate 1:

- C-4646 about 1 ½ miles north of the site
- C-4575 about 1 ¼ mile southwest and
- C-4499 about 2 miles southeast

The OSE database does not have records of water supply wells at Twin Wells Ranch, which is about 1 ¼ mile southeast of the Mad Cow Containments.

The most salient well log is BH-5 from the geotechnical boring program. This well is near the center of the proposed containment, the existing caliche quarry, and is a dry hole to 80 feet.

Plate 2a is a topographic map that shows:

- A. The Mad Cow Containments area is identified by the blue striped rectangle with a yellow label with the surface elevation of 3540.
- 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-#).

Plate 2a shows MISC-164 and USGS-8924 near Poker Tank. They are the same well. Our examination of these data permit a conclusions:

1. The location of the USGS and Misc well is adjacent to Poker Tank as depicted by MISC-164
2. The groundwater elevation in the USGS database is correct because the surface elevation in the USGS database agrees with our site observations. The MISC well uses an incorrect surface elevation to calculate groundwater elevation.
3. This well is no longer visible at the surface, based on our foot inspections. It was abandoned many years ago.

SITING CRITERIA (19.15.34.11 NMAC)
VAUGHAN OPERATING – MAD COW CONTAINMENTS

Plate 2b is a geologic and topographic map showing:

- Surface geology of the area surrounding the site
- Groundwater elevations of nearby wells in the USGS and MISC databases

Hydrogeology

A veneer of eolian and pediment deposits (Qe/Qp and Qp) cover all bedrock in the area shown by Plate 2b. The driller's logs and USGS data (in appendix) provides the following information regarding near surface geology and groundwater zones.

- BH #5 indicates red clay that is erosional Chinle surface exists between 5-18 feet below grade. Between 18 feet and 80 feet (TD), the described lithology is like Chinle (red beds). While moist sand and clay are described, the boring is dry.
- C-4499 provides a lithologic description of Piedmont deposits to a depth of 110 feet. The sand and caliche described in this dry boring are distinct from the description provided by the same drilling contractor as BH #5.
- C-4575 is also logged by Atkins Engineering and is like C-4499. It describes 105 feet of dry sand that resembles Piedmont deposits.
- C-4646 is a reasonable driller's log that is typical of Piedmont deposits to 15-20 feet that are underlain by Chinle red beds to the depth of 110 feet. This is a dry boring.

The USGS database presents the following data from wells nearby the proposed Mad Cow containment

- ✓ USGS 8924, the well at Poker Lake, draws water from the Rustler Formation, which is probably at a depth of 400-500 feet.
- ✓ USGS-8899 is at or near the Twin Wells Ranch and draws water from saturated alluvium overlying the Chinle red beds. This well lies within a closed depression.
- ✓ USGS-8847 draws water from the Rustler formation at a depth between 400-600 feet.
- ✓ USGS-9126 also draws water from the Rustler Formation at a depth of about 400-550 feet
- ✓ USGS-8820 draws water from the Pecos River Basin Alluvial Aquifer and/or the Rustler Formation. Publications and maps show the PRBA Aquifer in this area and this water table aquifer is hydraulically connected to bedrock aquifers, such as the Rustler.

From these data we conclude:

1. Closed depressions, such as the area mapped around the Twin Wells Ranch headquarters, can exhibit adequate groundwater perched on the underlying red beds of the Chinle.
2. Poker Tank does not exhibit shallow, alluvial groundwater at depth.
3. The Rustler Formation is the uppermost groundwater zone around the Mad Cow containment.

Groundwater Data

While the data from nearby wells allow a professional hydrogeologist to present data and conclusions to demonstrate that depth to groundwater at this location exceeds 100 feet, BH-5 provides excellent on-site data. This boring is dry to 80 feet and the data is consistent with information from the wells shown on Plates 1 and 2. We conclude with certainty that:

SITING CRITERIA (19.15.34.11 NMAC)
VAUGHAN OPERATING – MAD COW CONTAINMENTS

- The distance between the lowermost liner of the proposed containment and groundwater is greater than 50 feet.

Distance to Municipal Boundaries and Fresh Water Fields

Plate 3 demonstrates that the Mad Cow Containment 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 Malaga, NM approximately 13 miles west of the Mad Cow Containment.
- The closest public wells are associated with the Malaga public water system that employs supply wells near Loving.

Distance to Subsurface Mines

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

- Vaughan Operating will re-purpose the existing caliche pit that is the site of the Mad Cow containment.
- Exclusive of the Mad Cow containment location, the closest caliche pits are more than 1 mile southeast
- There are no subsurface mines in the area shown in Plate 4.

Distance to High or Critical Karst Areas

Plate 5 shows the Mad Cow site is not within a mapped zone of high or critical with respect to BLM Karst areas.

- The proposed containment is located within a “low” potential karst area.
- The nearest “high” or “critical” potential karst area is located approximately 4.5 miles northwest of the proposed containment.
- We observed no evidence of solution voids or unstable ground near the site during the field inspection.

Distance to 100-Year Floodplain

Plates 6a and 6b demonstrate that the Mad Cow Containment is within Zone D as designated by the Federal Emergency Management Agency with respect to the Flood Insurance Rate 100-Year Floodplain.

- FEMA describes the location as an area with possible but undetermined flood hazards. No flood hazard analysis has been conducted.
- Our field inspection and examination of the topography permits a conclusion that the location is not within any floodplain and has low risk for flooding.
- Flood water cannot exceed the 3520-foot elevation as drainage to the west causes Poker Lake to overflow. Plate 6b shows that the FEMA mapped floodplain is slightly offset from the 3520 contour line.
- The 3520-foot contour line that represents nearest mapped flood hazard is slightly more than 200 feet from the containment.

SITING CRITERIA (19.15.34.11 NMAC)
VAUGHAN OPERATING – MAD COW CONTAINMENTS**Distance to Surface Water**

Plates 7a and 7b show that the containment is not within 300 feet of a surface water body or a significant watercourse.

- Plate 7a depicts two mapped watercourses: 2000 feet due west and 2000 feet northeast. Our site visit documented that there are no next order tributaries to these mapped features that lie within the 300 foot setback distance.
- Plate 7b is a larger scale map of the area around Poker Tank and the Mad Cow containment. The mapped surface water body of Poker Tank lies below the 3520-foot contour line.

The geomorphology of the area, the oilfield infrastructure installed after mapping of the water body, and Google Earth images from 1996-2024 do not support the mapping of a water body of this size in 2024. Appendix Site Photographs show the nature of a north trending swale and an east trending swale from Poker Tank. Plates 8 and 9 and Figure 1 present the highest water level observed in Google Earth images (2005), which corresponds to the mapping of a wetland. The E&P infrastructure, shown on Plate 8 and Figure 2 will divert all stormwater that originally flowed through the northern swale into Poker Tank. Stormwater originating east of the Mad Cow containment site will most likely flow south to Poker Lake, as illustrated in Figure 3.

Vaughan Operating will cause the anchor trench of the Mad Cow containment to remain “200 feet of any other significant watercourse or lakebed, sinkhole or playa lake (measured from the ordinary high-water mark)”. While Poker Tank is human-caused and not a playa lake, the normal high water mark is shown in Plates 7a, 7b and 8. The high water mark is 500 feet from the anchor trench of the containment.

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 lease roads a and several working pads immediately to the north and east.
- No residences or other structures are in the area.

Distance to Non-Public Water Supply

Plates 1 and 7 demonstrates that the Mad Cow Containment site is 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 area water wells, active or plugged.
- There are no domestic water wells located within 1,000 feet of the area of interest.
- No springs were identified within the mapping area (see Plate 8)

SITING CRITERIA (19.15.34.11 NMAC)
VAUGHAN OPERATING – MAD COW CONTAINMENTS

Distance to Wetlands

Plate 9 demonstrates the Mad Cow location will not be within 500 feet of any mapped wetlands identified in the New Mexico database.

- The nearest designated wetland coincides with the 2005 high water mark of Poker Tank

During our site walk, Hicks Consultants placed stakes at the high water mark of Poker Tank, which is the boundary created by the difference in vegetation from scrub land to grass (see Appendix Site Photographs). As indicated on Plates 8 and 9, the wetland is close to the 500-foot setback distance.

Vaughan will survey the distance from the anchor trench to the scrub/grass vegetation boundary to document that the containment is more than 500 feet from the nearest mapped wetland.



Figure 1 – Google Earth image dated 6/30/2005 showing the maximum water level observed in Poker Tank. The northern swale extension of Poker Tank shown in Appendix Site Photos captured a relatively large drainage area at this time. Low areas in this image are defined by darker vegetation, thus we contend that the area shown in blue likely drained into Poker Tank.



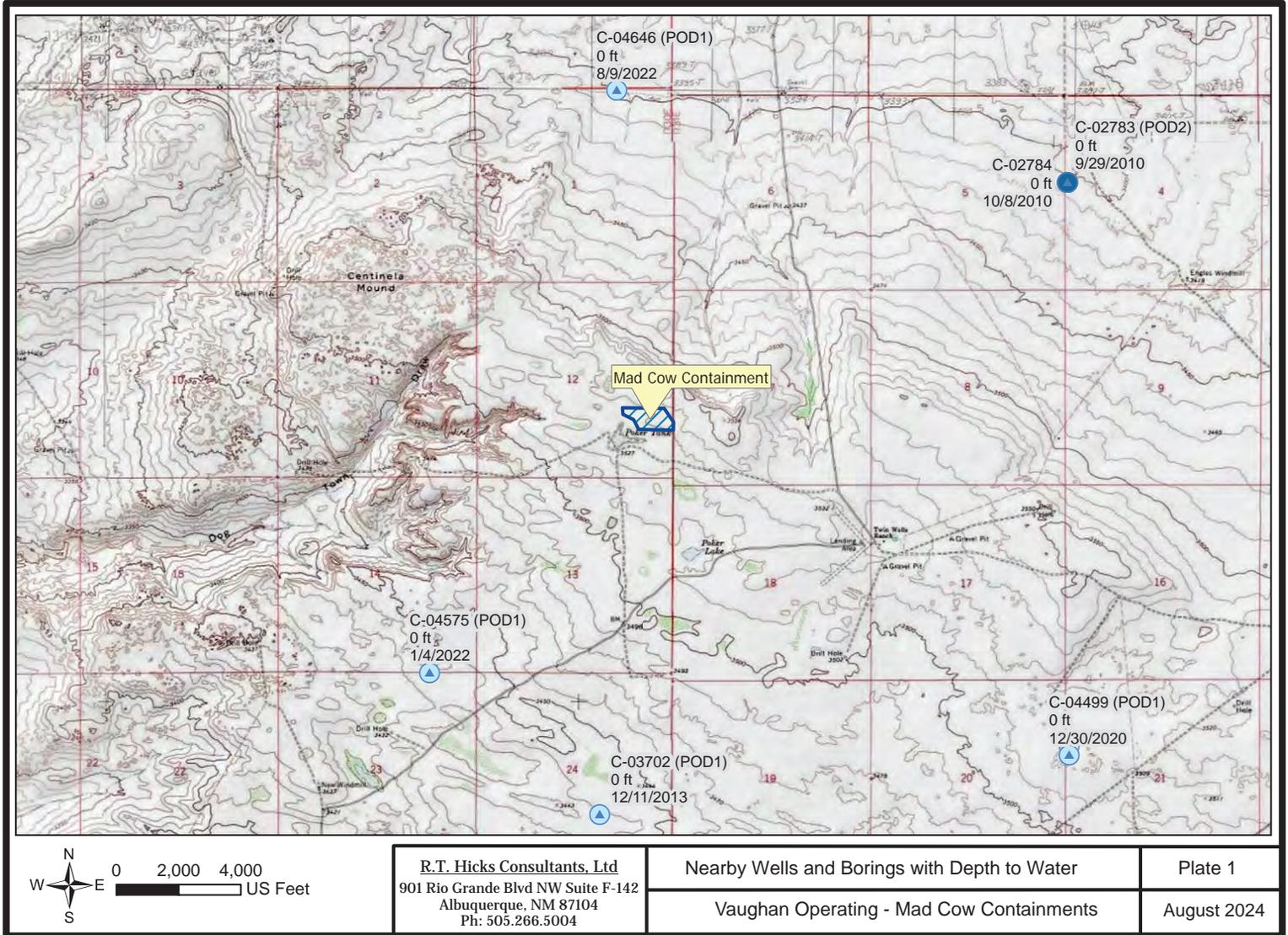
Figure 2- This Google Earth image from 12/31/2024 shows that most of the drainage area of the northern swale into Poker Tank shown in Figure 1 is captured by the caliche quarry. Close examination of this image shows evidence that surface water flow from the area east of the proposed containment, lease roads and the E&P pad flows south to Poker Lake (see Plate 9 and Figure 3) rather than into the east-west swale and into Poker Tank.

Figure 3 – Probable stormwater flow path east of Mad Cow containment. Infrastructure installed after 2017 diverts stormwater from potentially flowing into Poker Tank to Poker Lake. This is a reasonable conclusion, but without the benefit of a field walk through.

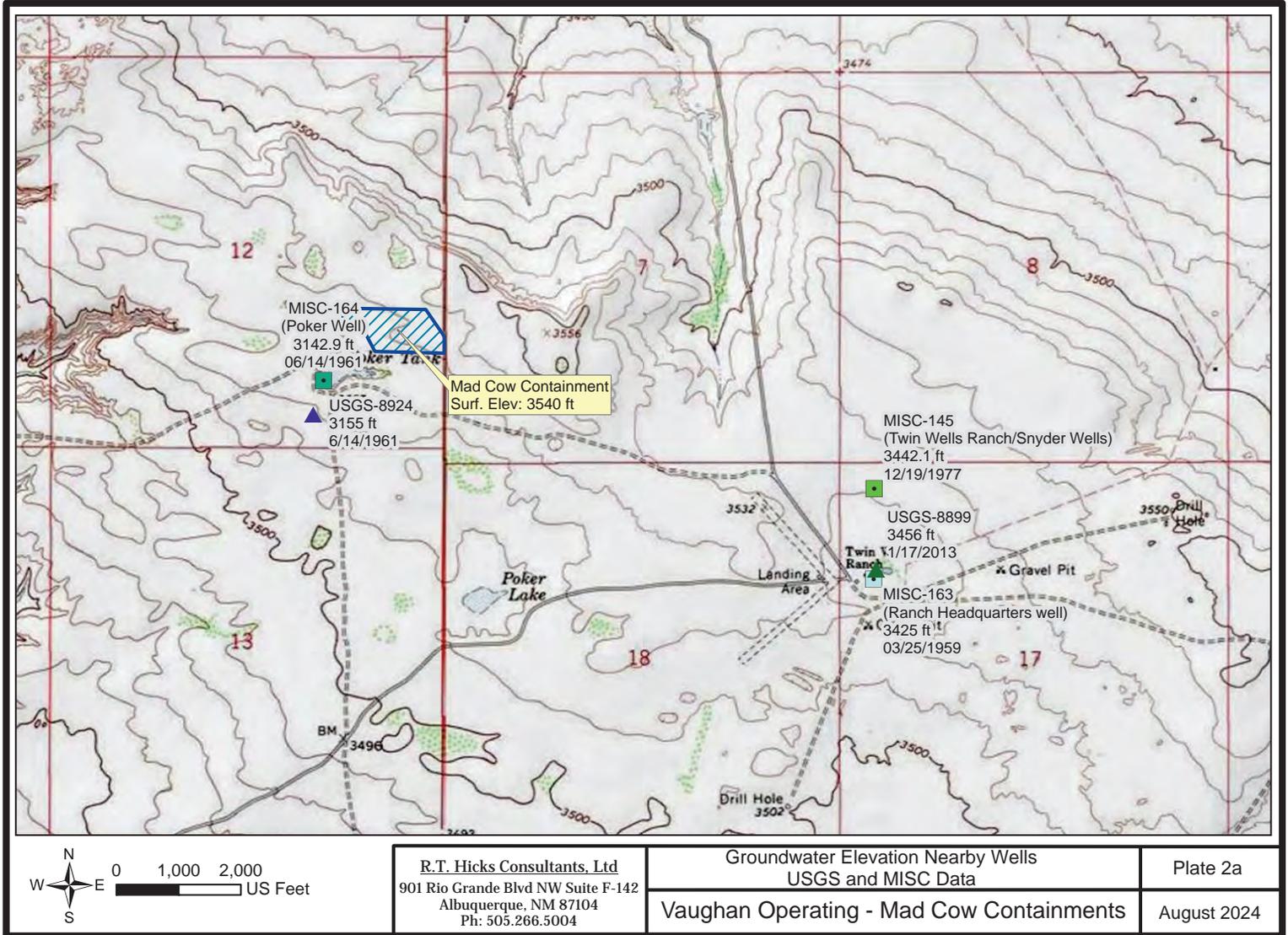


PLATES

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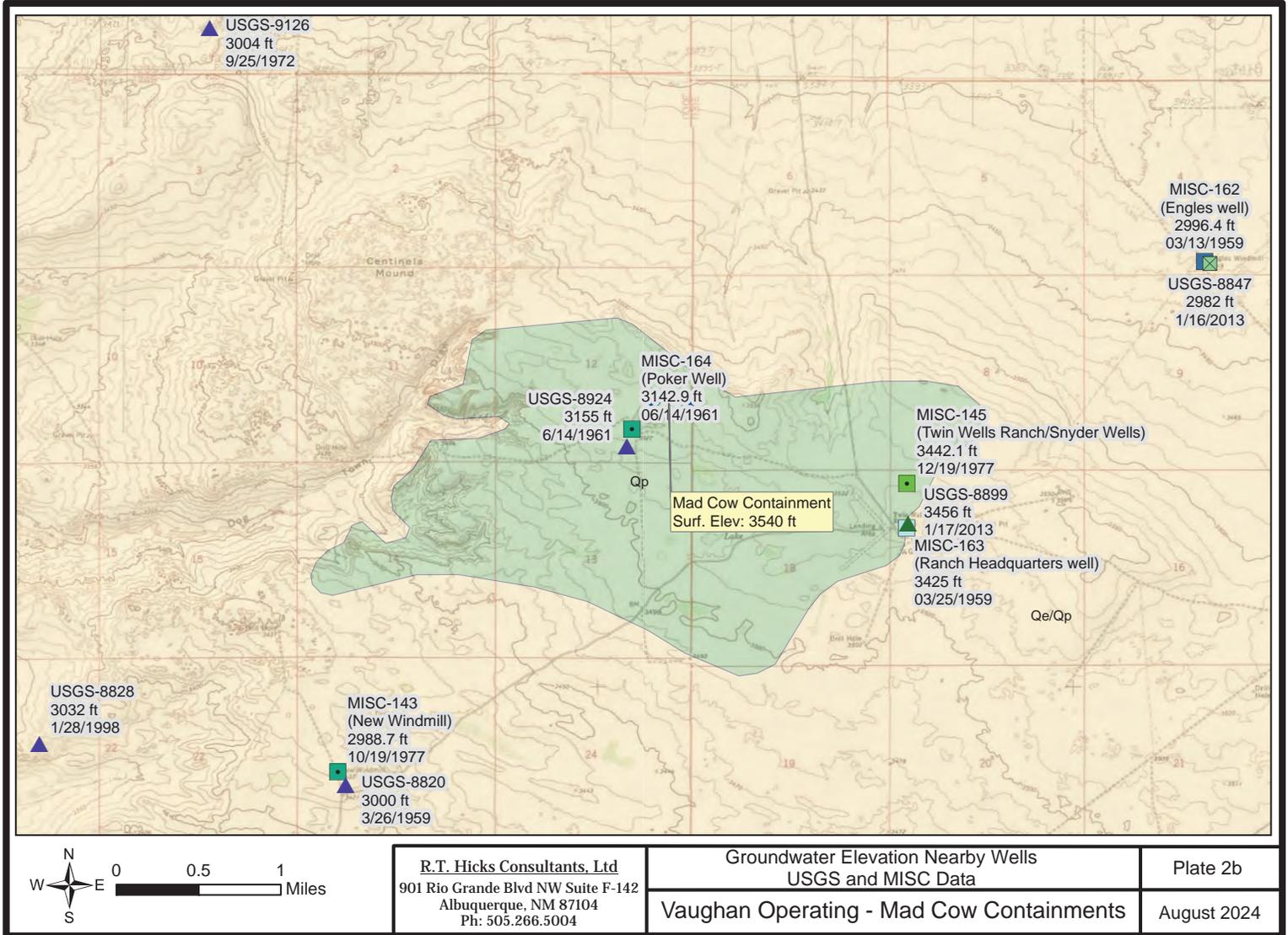


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| | |
|---|---|
| USGS Gauging Station (GW Elev, Date) | |
| Aquifer Code, Well Status | |
|  | Alluvium/Bolsom |
|  | Rustler |
|  | Rustler, Site was being pumped. |
| OSE Water Wells (DTW/Date) | |
| Well Depth (ft) | |
|  | 351-500 |
|  | 501-1000 |
| Misc. Water Wells (GW Elev, Date) | |
| Well Depth (ft) | |
|  | <= 150 |
|  | 151 - 350 |
|  | 351 - 500 |
|  | > 500 |
| NM_Geology | |
| Map Unit,Description | |
|  | Qe/Qp, Quaternary-Eolian Piedmont Deposits |
|  | Qp, Quaternary-Piedmont Alluvial Deposits,Qp, Quaternary-Piedmont Alluvial Deposits |

| | | |
|--|--|-------------|
| R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004 | Legend Plates 1 & 2 | |
| | Vaughan Operating - Mad Cow Containments | August 2024 |

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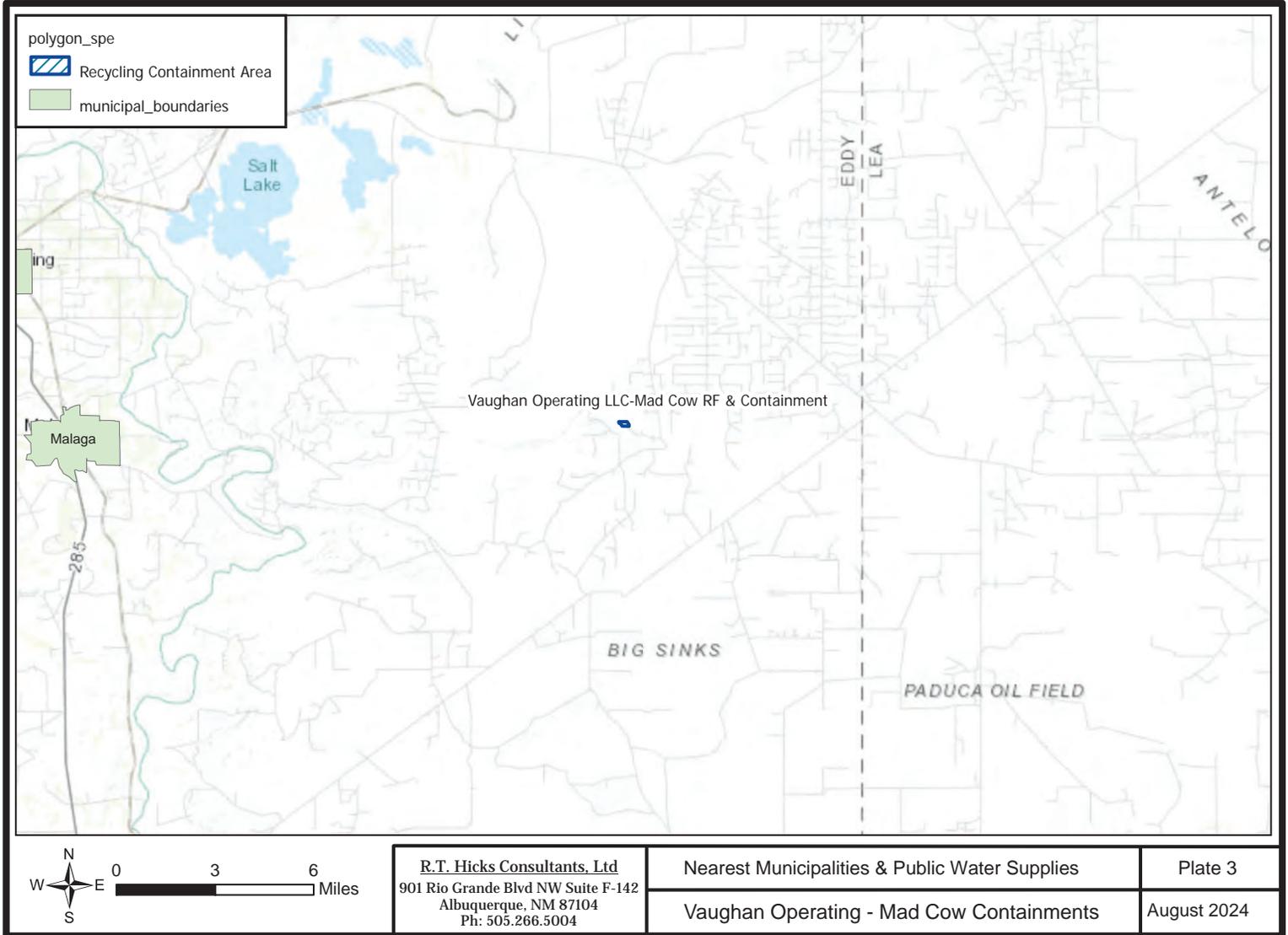


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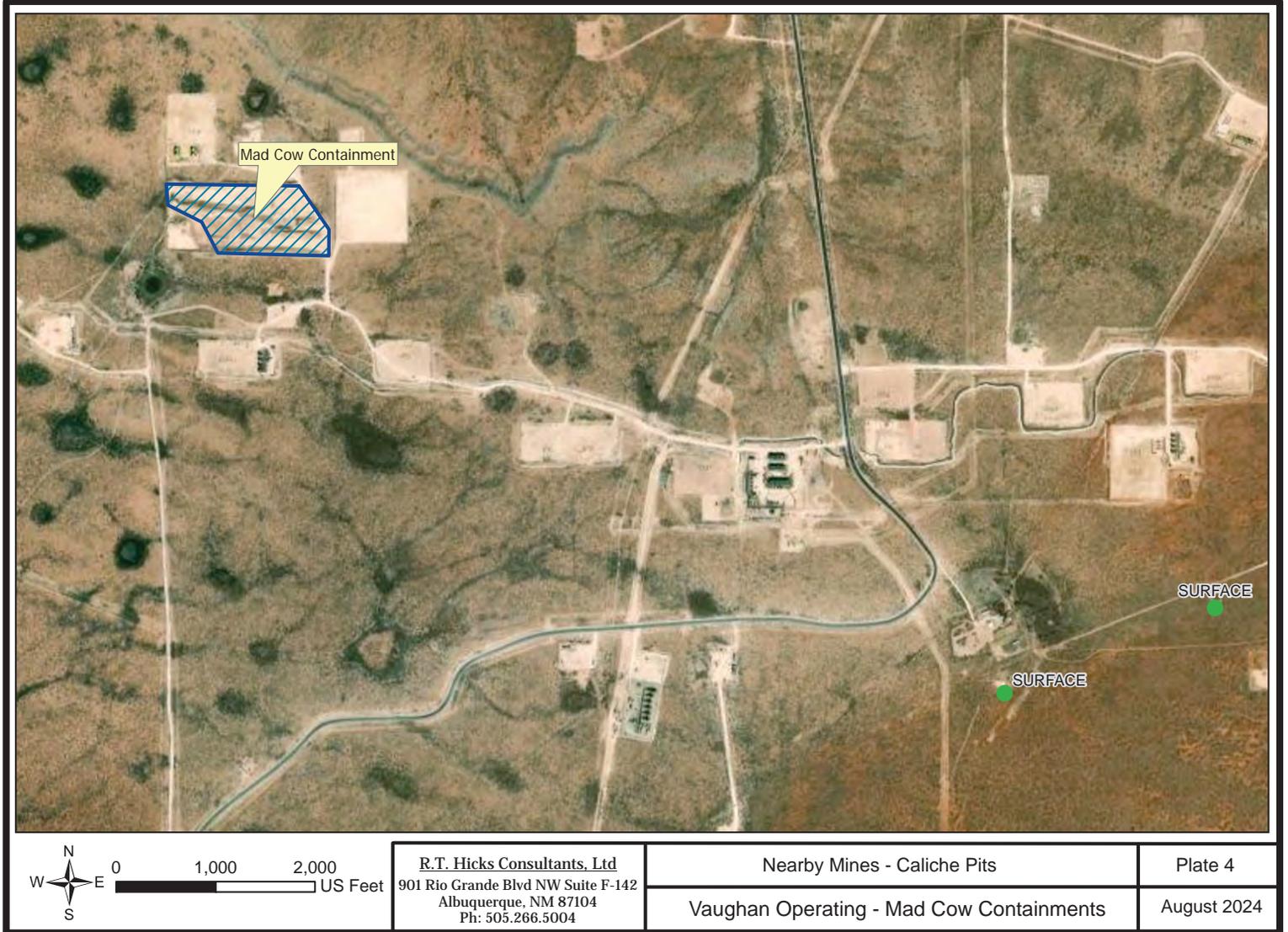
Groundwater Elevation Nearby Wells
 USGS and MISC Data
 Vaughan Operating - Mad Cow Containments

Plate 2b
 August 2024

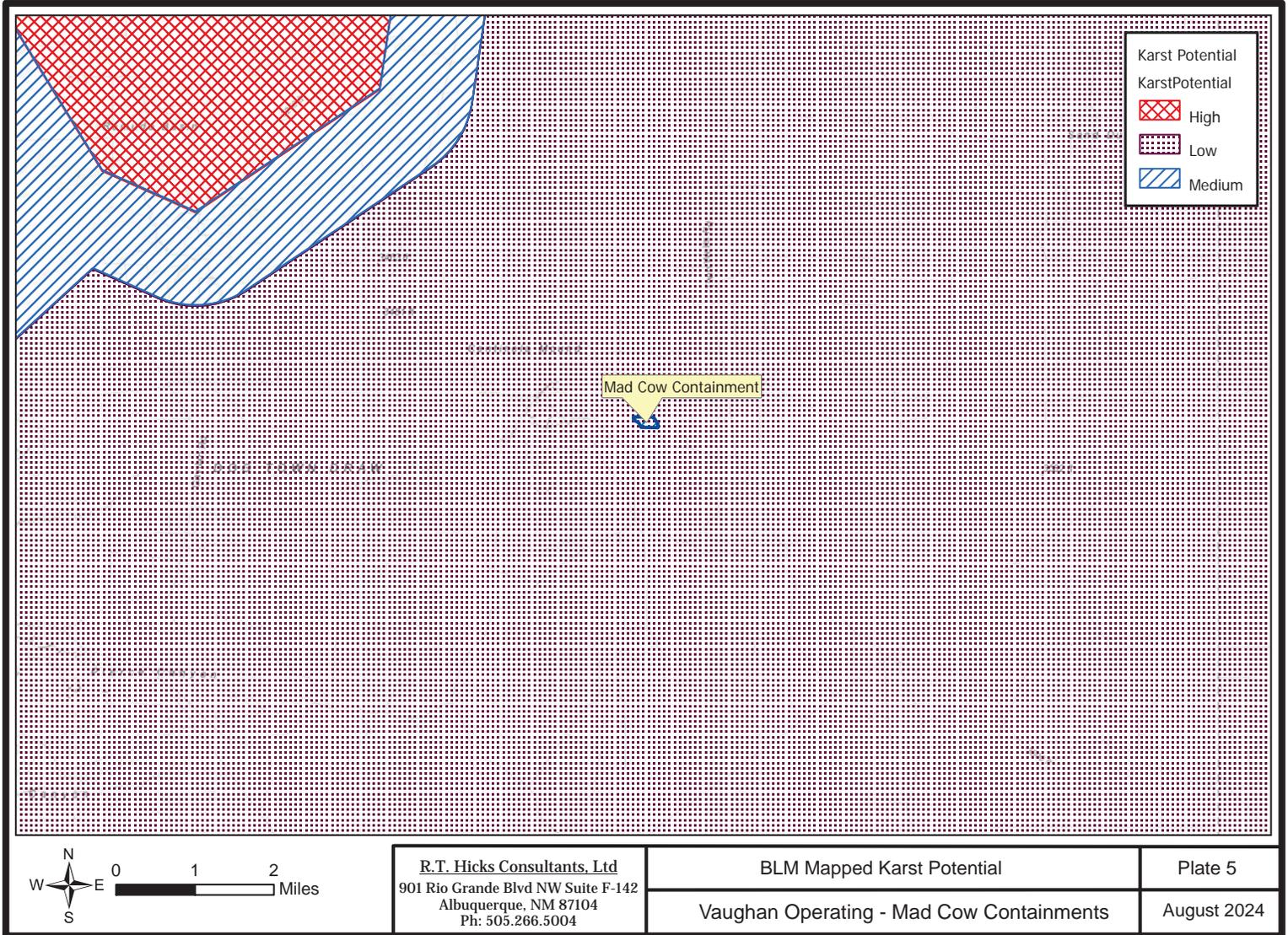
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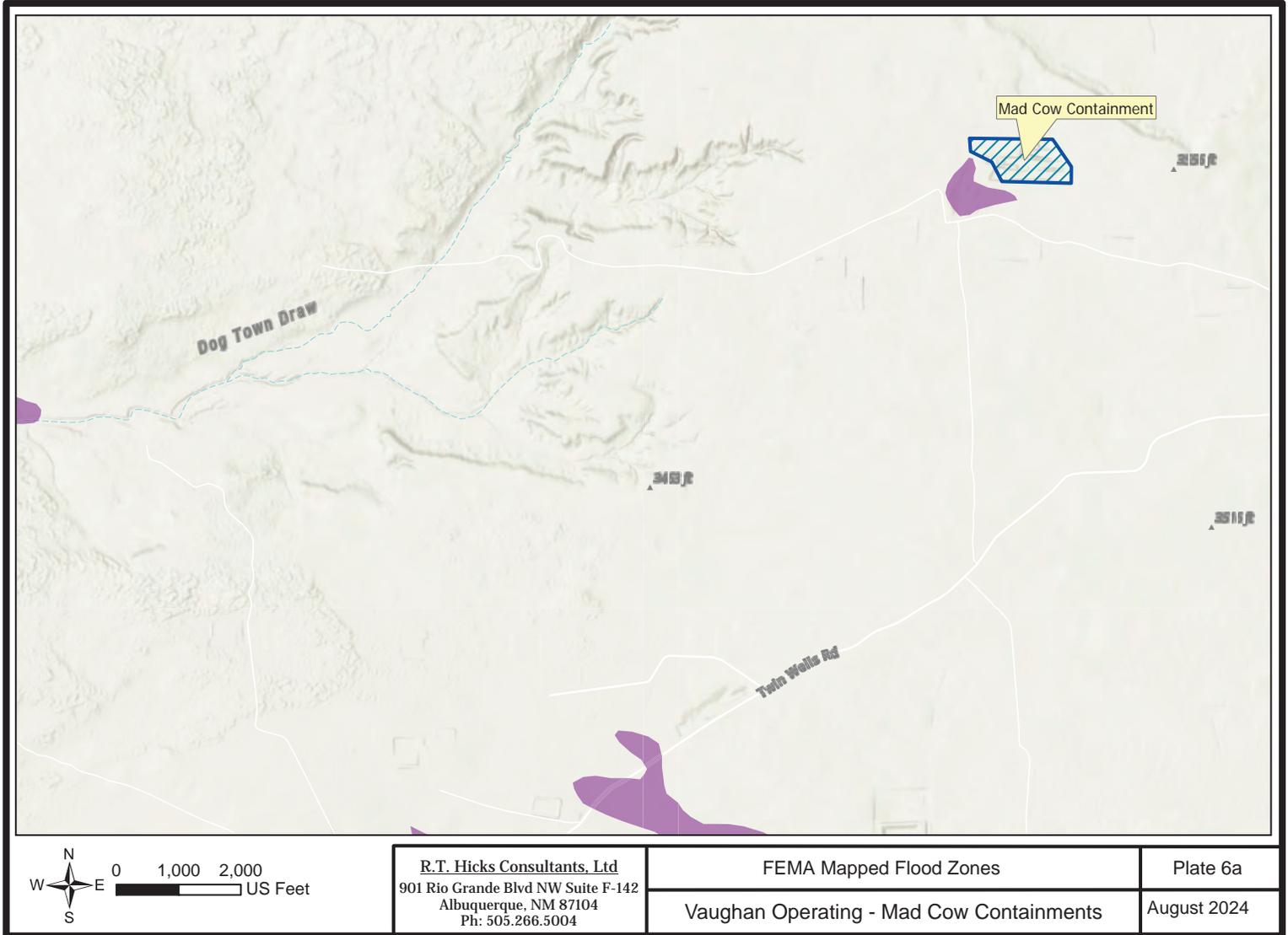
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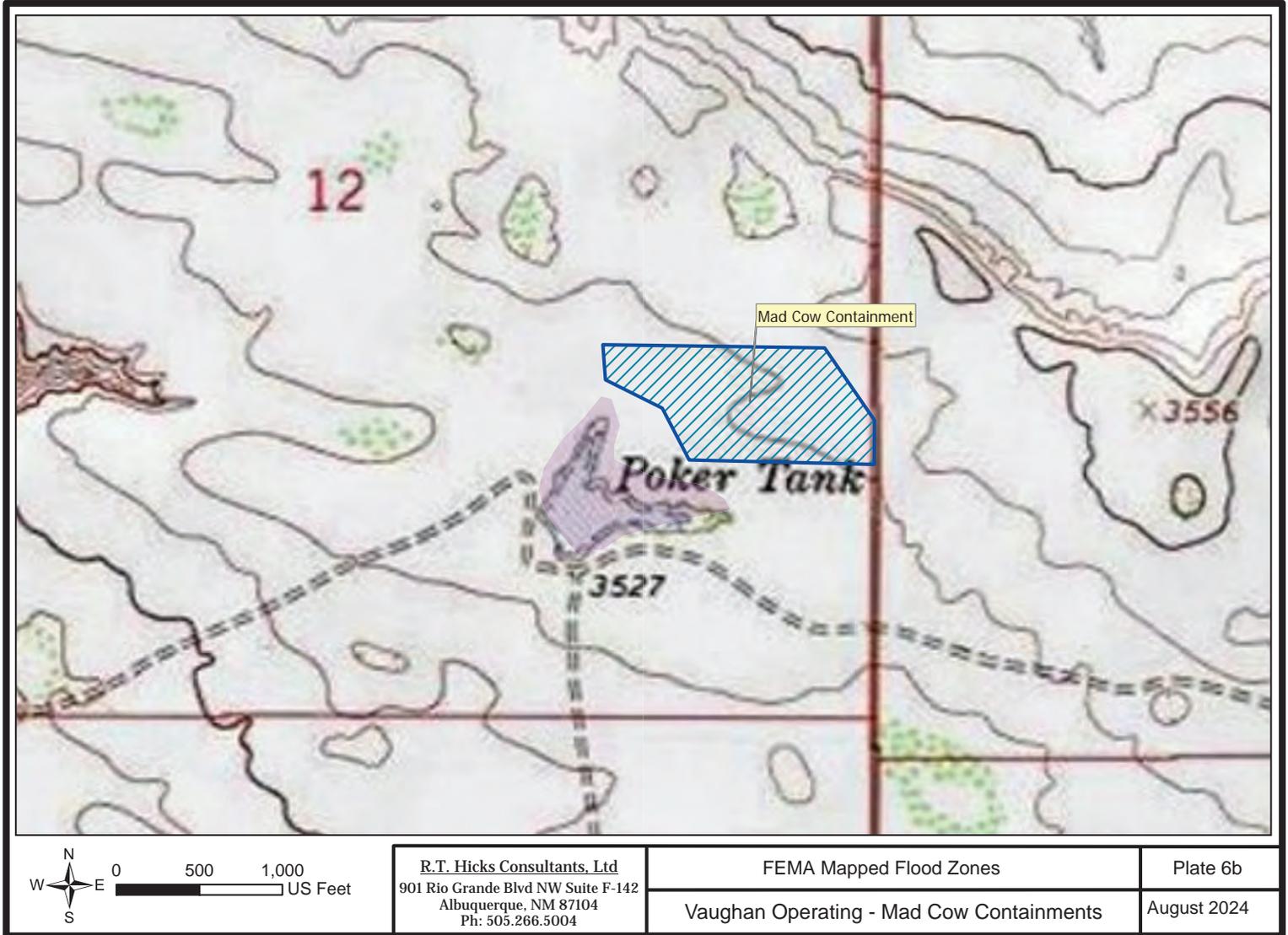


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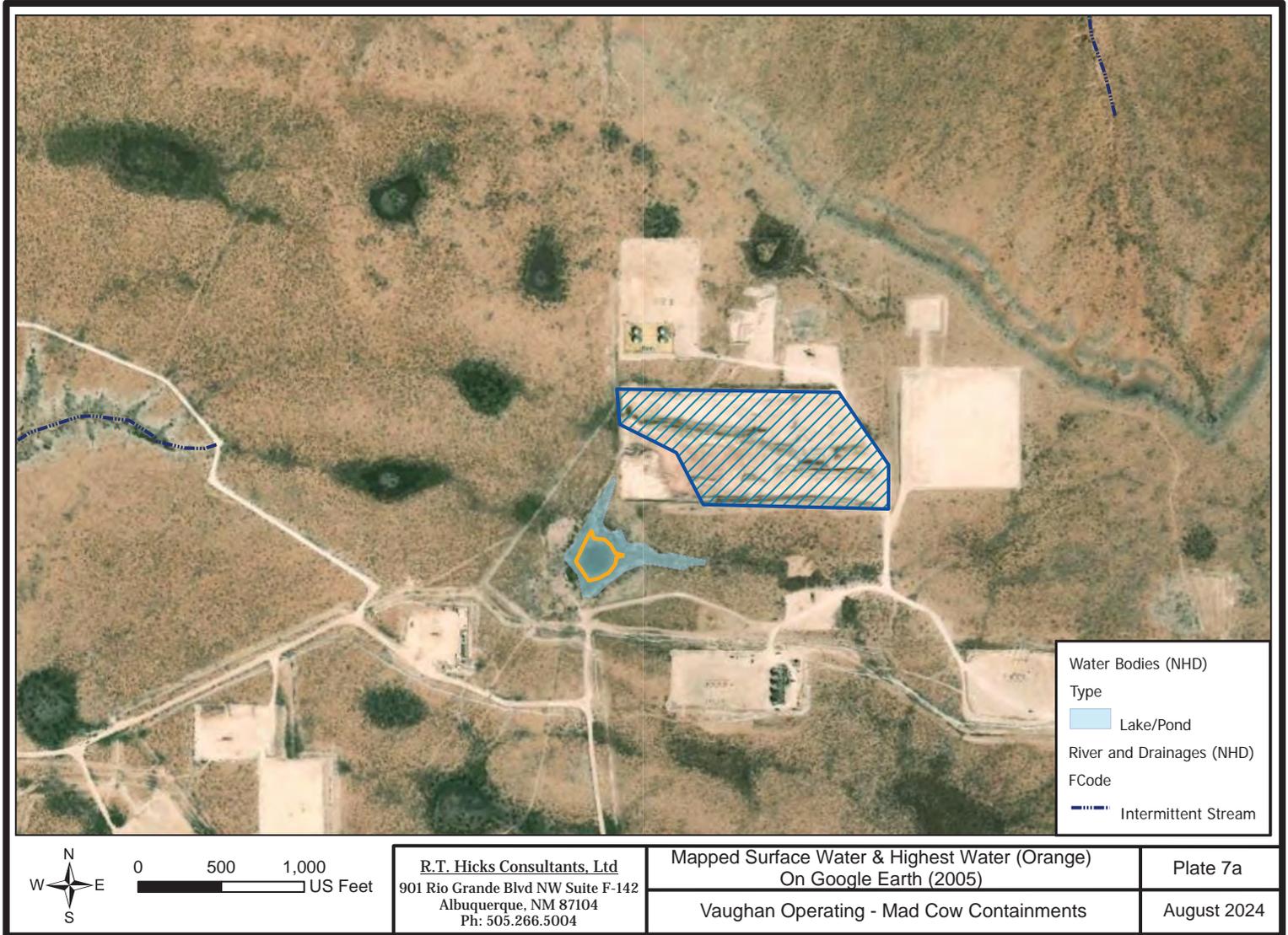
FEMA Mapped Flood Zones
Vaughan Operating - Mad Cow Containments

Plate 6a
August 2024

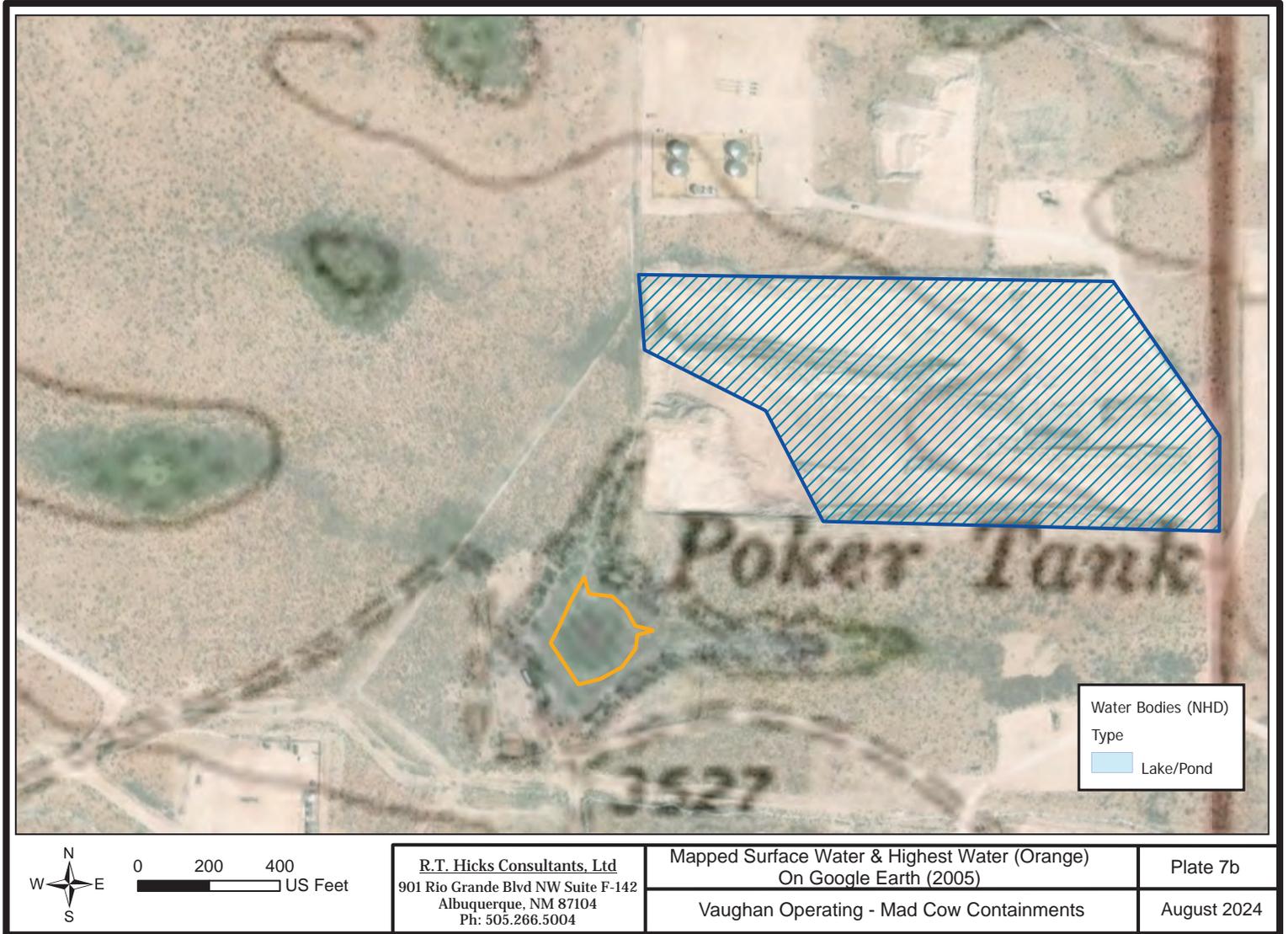
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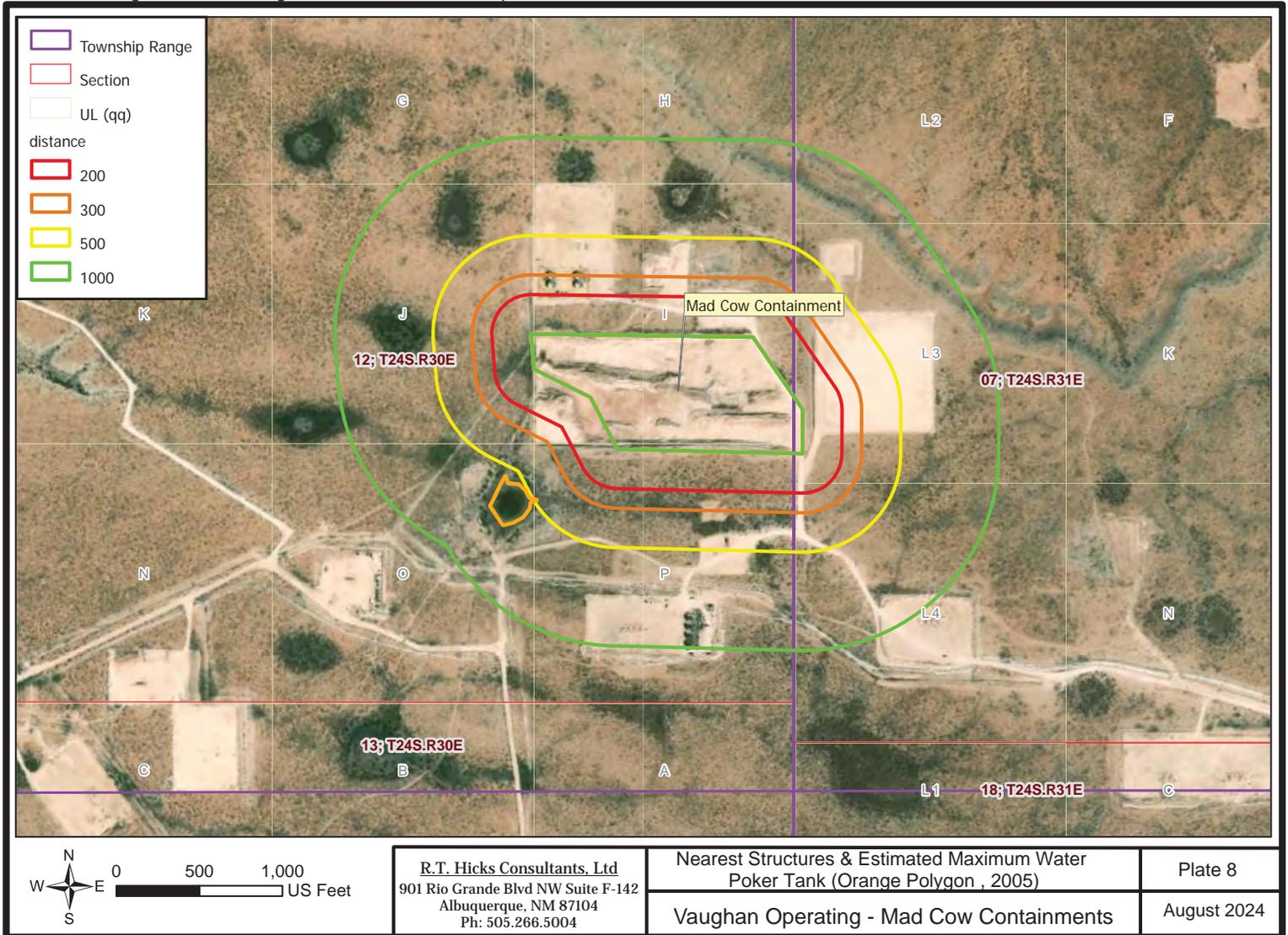
Mapped Surface Water & Highest Water (Orange)
On Google Earth (2005)

Plate 7b

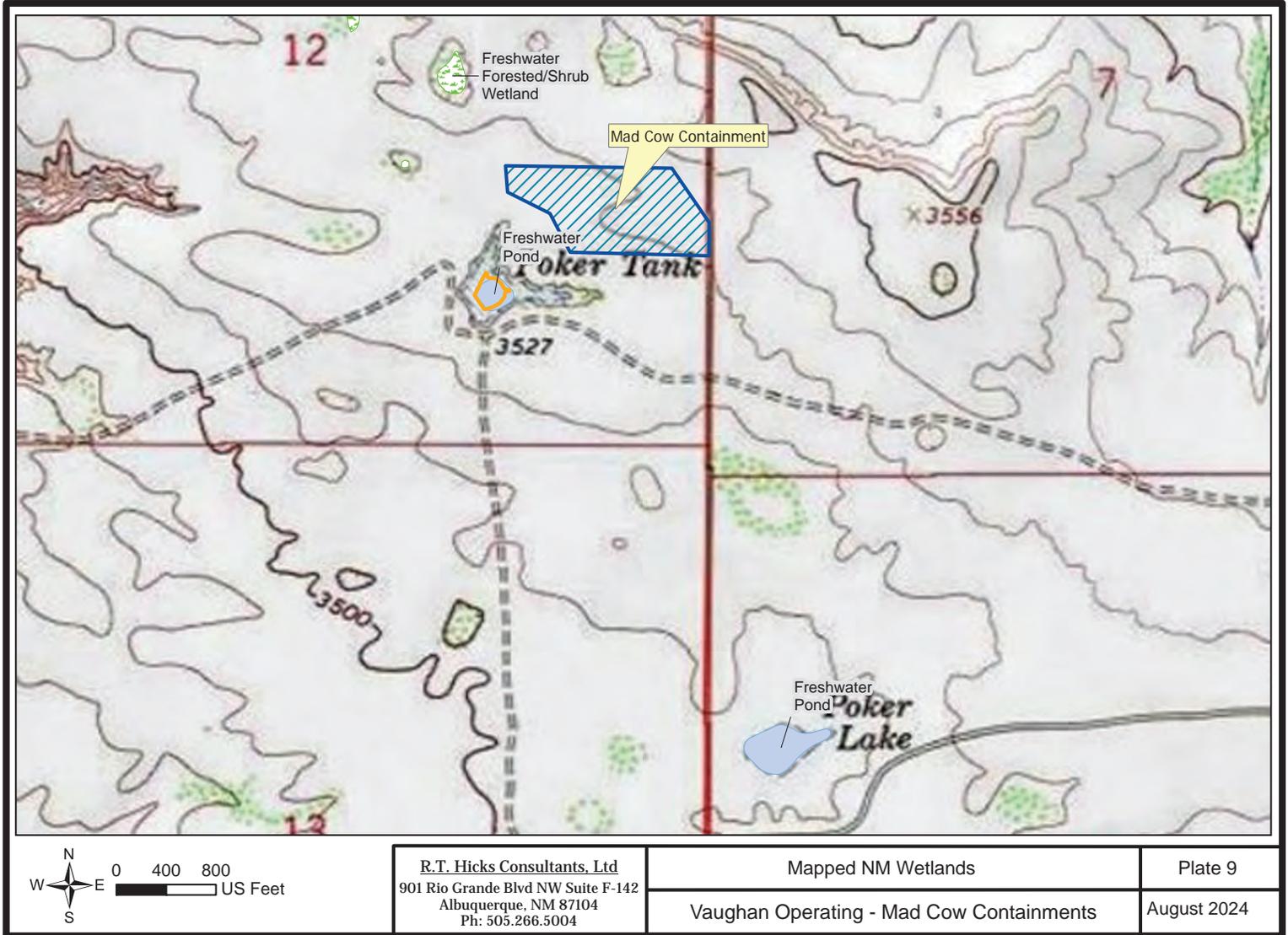
Vaughan Operating - Mad Cow Containments

August 2024

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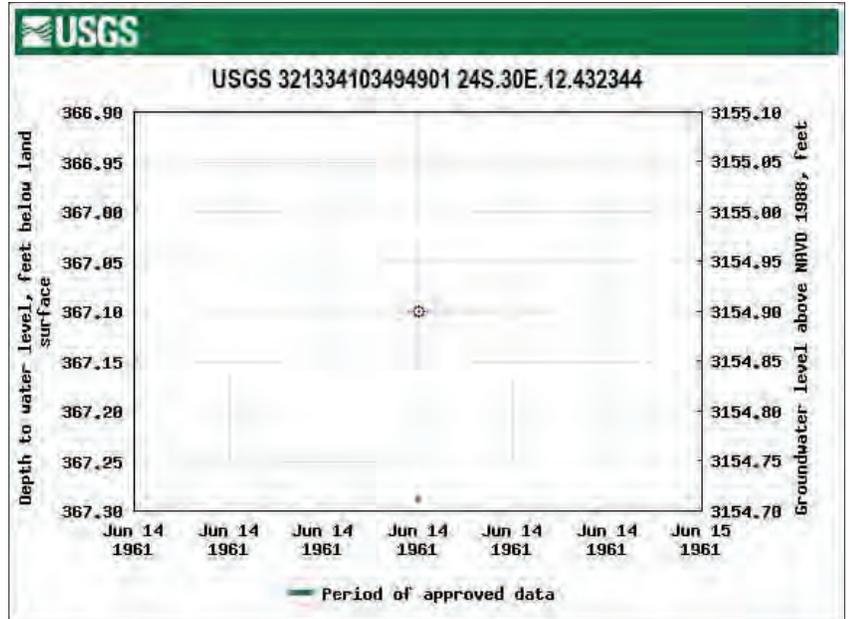
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WELL LOGS AND USGS DATA

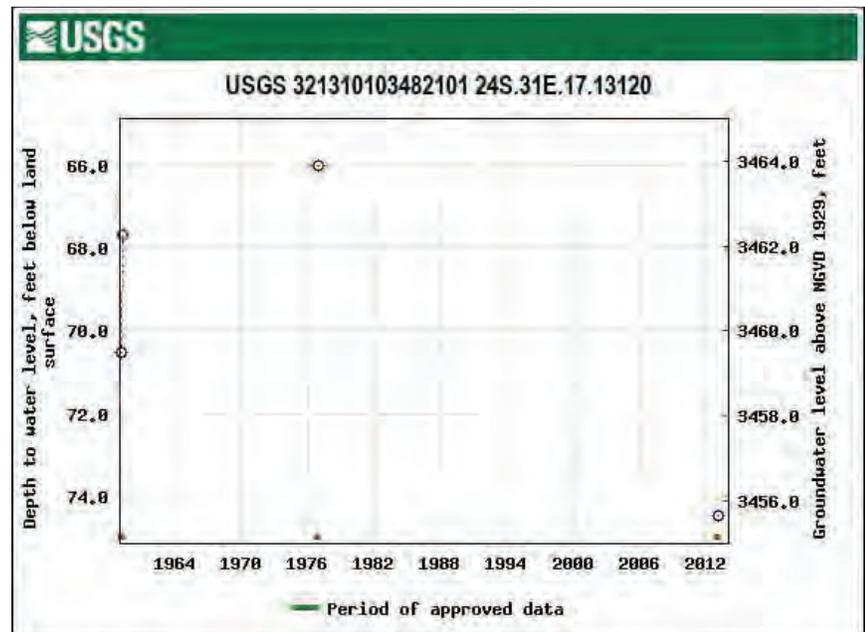
USGS 321334103494901 24S.30E.12.432344 AKA USGS-8924

Eddy County, New Mexico
 Hydrologic Unit Code 13060011
 Latitude 32°13'34",
 Longitude 103°49'49" NAD27
 Land-surface elevation 3,522 feet above NAVD88
 The depth of the well is 500 feet below land surface.
 This well is completed in the Other aquifers (N9999OTHER) national aquifer.
 This well is completed in the Rustler Formation (312RSLR) local aquifer



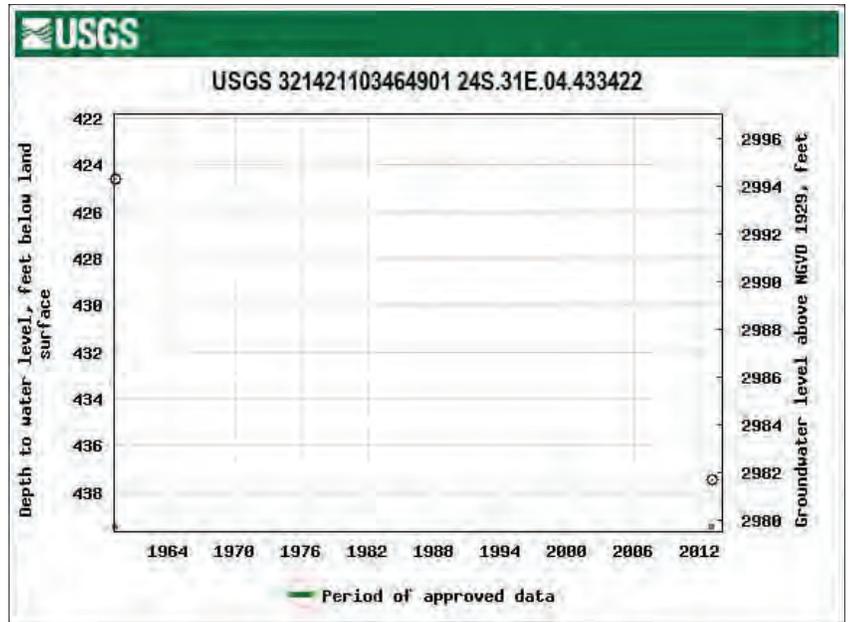
USGS 321310103482101 24S.31E.17.13120 AKA USGS-8899

Eddy County, New Mexico
 Hydrologic Unit Code 13060011
 Latitude 32°13'14.1",
 Longitude 103°48'23.4" NAD83
 Land-surface elevation 3,530.00 feet above NGVD29
 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.



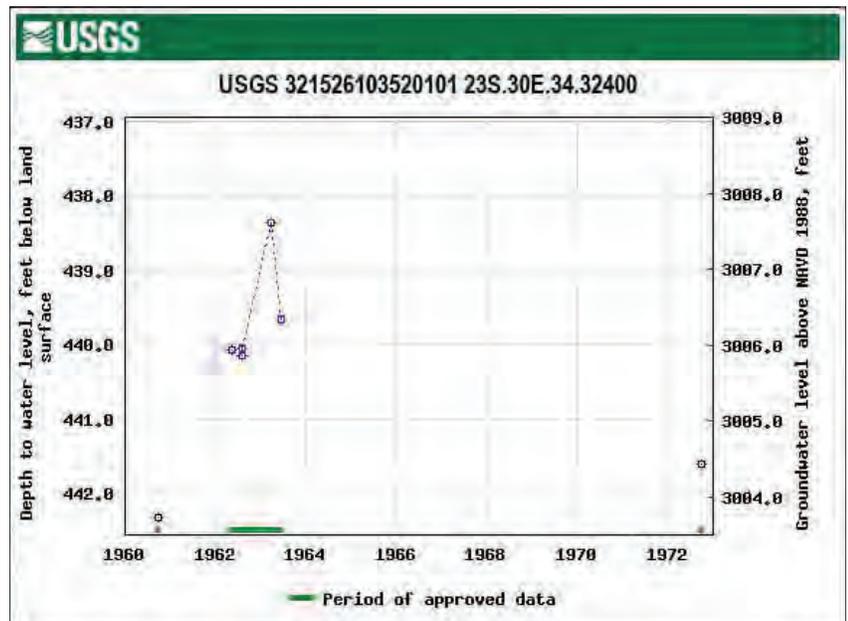
USGS 321421103464901 24S.31E.04.433422 AKA USGS-8847

Eddy County, New Mexico
 Hydrologic Unit Code 13060011
 Latitude 32°14'23.7",
 Longitude 103°46'47.8" NAD83
 Land-surface elevation 3,419.00 feet above NGVD29
 The depth of the well is 627 feet below land surface.
 This well is completed in the Other aquifers (N9999OTHER) national aquifer.
 This well is completed in the Rustler Formation (312RSLR) local aquifer.



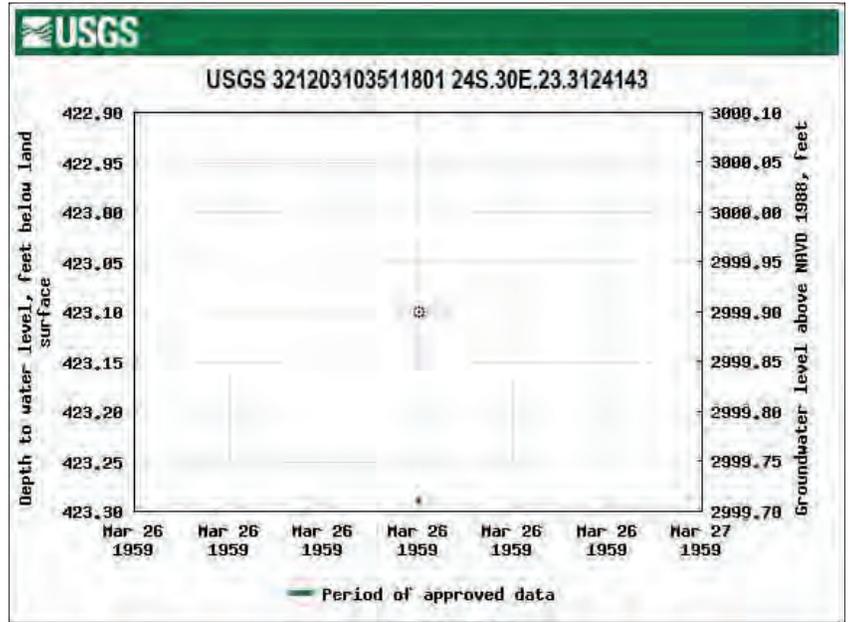
USGS 321526103520101 23S.30E.34.32400 AKA- USGS-9126

Eddy County, New Mexico
 Hydrologic Unit Code 13060011
 Latitude 32°15'26",
 Longitude 103°52'01" NAD27
 Land-surface elevation 3,446 feet above NAVD88
 The depth of the well is 567 feet below land surface.
 This well is completed in the Other aquifers (N9999OTHER) national aquifer.
 This well is completed in the Rustler Formation (312RSLR) local aquifer.



USGS 321203103511801 24S.30E.23.3124143 AKA USGS-8820

Eddy County, New Mexico
Hydrologic Unit Code 13060011
Latitude 32°12'03",
Longitude 103°51'18" NAD27
Land-surface elevation 3,423 feet
above NAVD88
The depth of the well is 474 feet
below land surface.
This well is completed in the Pecos
River Basin alluvial aquifer
(N100PCSRVR) national aquifer.
This well is completed in the Rustler
Formation (312RSLR) local aquifer.



TOPOGRAPHIC SURVEY of MAD COW IMPOUNDMENT

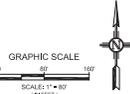


7821 N WOOD DR.
Hobbs, NM 88242-6032
SquareRootServices.net
505.233.2347

TYPE OF SURVEY:
TOPOGRAPHIC SURVEY
OF
MAD COW IMPOUNDMENT
FOR
ANDERSON BROTHERS CONSTRUCTION

PROJECT NUMBER:
23156

PROJECT SURVEYOR:
Jeremy Baker, P.S.
DRAFTER:
Stephan Sady



LEGEND

- CONTROL POINT AS NOTED
- EDGE OF ROAD
- CONCRETE
- MAJOR CONTOUR (5 FT)
- - - MINOR CONTOUR (1 FT)

REVISIONS

| NO. | DATE | DESCRIPTION |
|-----|------|-------------|
| | | |
| | | |
| | | |
| | | |
| | | |

Control Point Data

| NO. | Easting | Northing | Elevation | CHUCK | PLC |
|-----|-----------|-----------|-----------|-------|-----|
| 100 | 442129.77 | 438337.59 | 5539.10 | 100 | 100 |
| 101 | 442130.11 | 437156.09 | 5532.10 | 101 | 101 |
| 102 | 442129.24 | 438324.76 | 5537.38 | 102 | 102 |
| 103 | 442129.20 | 437152.00 | 5532.11 | 103 | 103 |
| 104 | 442128.75 | 437151.20 | 5534.74 | 104 | 104 |
| 105 | 442128.66 | 438111.87 | 5533.60 | 105 | 105 |
| 106 | 442128.21 | 438112.25 | 5536.49 | 106 | 106 |
| 107 | 442132.47 | 437114.76 | 5531.15 | 107 | 107 |
| 108 | 442129.24 | 437156.09 | 5532.10 | 108 | 108 |
| 109 | 442132.73 | 437137.36 | 5532.11 | 109 | 109 |
| 110 | 442133.84 | 437144.80 | 5532.14 | 110 | 110 |
| 111 | 442128.22 | 437155.21 | 5531.17 | 111 | 111 |
| 112 | 442128.21 | 437155.21 | 5531.17 | 112 | 112 |
| 113 | 442131.12 | 437128.76 | 5532.10 | 113 | 113 |
| 114 | 442131.12 | 437128.76 | 5532.10 | 114 | 114 |
| 115 | 442128.21 | 437155.21 | 5531.17 | 115 | 115 |
| 116 | 442128.21 | 437155.21 | 5531.17 | 116 | 116 |
| 117 | 442128.21 | 437155.21 | 5531.17 | 117 | 117 |
| 118 | 442128.21 | 437155.21 | 5531.17 | 118 | 118 |
| 119 | 442128.21 | 437155.21 | 5531.17 | 119 | 119 |
| 120 | 442128.21 | 437155.21 | 5531.17 | 120 | 120 |

TOPOGRAPHIC NOTE

THE TOPOGRAPHY SHOWN HEREIN IS A COMBINATION OF UAV DATA AND CONVENTIONAL SURVEY DATA. THE UAV DATA WAS GENERATED USING INDUSTRY STANDARD QUALITY CHECKS AND IS WITHIN THE PRECISION RECORDED GROUND SAMPLING STRIKE (GSD) STANDARD OF BELOW 2.0 CM (0.78 IN) PLUS FT. THE ABSOLUTE ACCURACY LEVEL IN STANDARD UAV DATA IS EQUAL TO 1 X GSD PLUS FT + 0.04 FT. UAV DATA WAS USED FOR MEASUREMENTS ON NATURAL GROUND AND SUPPLEMENTAL FEATURES.

SURVEYOR NOTE

THIS IS NOT A BOUNDARY SURVEY OR A RIGHT-OF-WAY SURVEY. APPARENT PROPERTY CORNERS, RIGHT-OF-WAY LINES, OR PROPERTY LINES AS SHOWN ARE DERIVED FROM RECORD SURVEY PLATS, RIGHT-OF-WAY MAPS, OR DEEDS REFERENCED HEREON AND ARE NOT GUARANTEED OR TO BE RELIED ON FOR THE ESTABLISHMENT OF PROPERTY LINES.

BASIS OF BEARING

BEARINGS SHOWN HEREON ARE FROM GPS/INS OBSERVATIONS AND CORRECTED TO THE NEW MEXICO STATE PLUMB COORDINATE SYSTEM "NEW MEXICO EAST ZONE" NORTH AMERICAN DATUM OF 1983. THE NORTH CAN BE OBTAINED BY APPLYING A CORRECTION ANGLE OF 80°24'42" AT ALL DISTANCES SHOWN HEREON AND TO GROUND AND WERE OBTAINED BY APPLYING A CORRECTION TO GROUND SCALE FACTOR OF 1.000277874 AT THE PREVIOUSLY NOTED POINT LOCATED AT N 44°21'06.8" S 89°54'20.8" W. THE VERTICAL DATUM IS BASED ON GEOID AND IT PROVIDES ORTHOMETRIC HEIGHTS CORRECTED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD83).

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

Jeremy Baker
Jeremy Baker / N.M.P.S. 25773
Date: 11/30/2023



SHEET: 3 of 10
SU-100

C:\Users\jba\OneDrive\Documents\Projects\23156 Anderson Brothers Construction Mad Cow Impoundment\Survey\DWG\SU-100.dwg 11/30/2023 10:40 AM



BORING LOG

| | |
|-----------------------|--|
| Project: | Mad Cow Impoundment |
| Project Location: | 556 Twin Wells Road, Eddy County, New Mexico |
| Project Number: | 23156 |
| Drill Date(s): | 9/13 - 9/19/2023 |
| Drilling Contractor: | Atkins |
| Boring Locations: | See Boring Plan |
| Depth of Borehole(s): | 80 Feet |

Log of Boring - BH #5 / Elevation 3507.74'

| DEPTH (FEET) | Soils Classification | Lithologic Symbol | Materials Description | 3/4" | #4 | #10 | #40 | #200 | Moisture Content % | Liquid Limit | Plastic Limit | Plasticity Index |
|--------------|----------------------|-------------------|--------------------------|------|-----|-----|-----|------|--------------------|--------------|---------------|------------------|
| 0 | GM | | Dry Tan Sand w/ Caliche | 92 | 78 | 73 | 64 | 15.7 | 2.9% | SNP | SNP | SNP |
| 5 | CL | | Red Clay w/ Hard Caliche | 92 | 55 | 49 | 44 | 33.1 | 4.2% | 29 | 17 | 12 |
| 10 | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | |
| 20 | SM | | Moist Red Sand | 100 | 94 | 90 | 84 | 16.9 | 5.8% | SNP | SNP | SNP |
| 25 | | | | | | | | | | | | |
| 30 | GW | | Clean Dry Tan Sand | 100 | 100 | 97 | 65 | 5 | 1.2% | SNP | SNP | SNP |
| 35 | | | | | | | | | | | | |

February 8, 2024

Square Root Services, LLC

Page | 15

| | | | | | | | | | | | | |
|----|----|--------------------------|-----|----|----|----|------|------|-----|-----|-----|--|
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 40 | SM | Moist Red Sand | 100 | 94 | 90 | 84 | 16.9 | 5.8% | SNP | SNP | SNP | |
| | | | | | | | | | | | | |
| 45 | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 55 | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | CL | Red Clay w/ Hard Caliche | 92 | 55 | 49 | 44 | 33.1 | 4.2% | 29 | 17 | 12 | |
| 65 | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 70 | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 75 | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 80 | | | | | | | | | | | | |



WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

| | | | | | | | | |
|--|---|------------------------------|---|--|--|--|--------------------------------|--------------------|
| 1. GENERAL AND WELL LOCATION | OSE POD NO. (WELL NO.) POD1 (MW-1) | | WELL TAG ID NO. n/a | | OSE FILE NO(S). C-4499 | | | |
| | WELL OWNER NAME(S) XTO Energy (Kyle Littrell) | | | | PHONE (OPTIONAL) | | | |
| | WELL OWNER MAILING ADDRESS 6401 Holiday Hill Dr. | | | | CITY Midland | STATE TX | ZIP 79707 | |
| | WELL LOCATION (FROM GPS) | LATITUDE | DEGREES 32° | MINUTES 12' | SECONDS 15.89" N | * ACCURACY REQUIRED: ONE TENTH OF A SECOND * DATUM REQUIRED: WGS 84 | | |
| | | LONGITUDE | -103° | 47' | 36.29" W | | | |
| DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS - PLSS (SECTION, TOWNSHIP, RANGE) WHERE AVAILABLE SE NE Sec. 20 T24S R31E | | | | | | | | |
| 2. DRILLING & CASING INFORMATION | LICENSE NO. 1249 | | NAME OF LICENSED DRILLER Jackie D. Atkins | | | NAME OF WELL DRILLING COMPANY Atkins Engineering Associates, Inc. | | |
| | DRILLING STARTED 12/30/2020 | DRILLING ENDED 12/30/2020 | DEPTH OF COMPLETED WELL (FT) temporary well material | BORE HOLE DEPTH (FT) 110 | DEPTH WATER FIRST ENCOUNTERED (FT) n/a | | | |
| | COMPLETED WELL IS: <input type="checkbox"/> ARTESIAN <input checked="" type="checkbox"/> DRY HOLE <input type="checkbox"/> SHALLOW (UNCONFINED) | | | | STATIC WATER LEVEL IN COMPLETED WELL (FT) n/a | | | |
| | DRILLING FLUID: <input checked="" type="checkbox"/> AIR <input type="checkbox"/> MUD | | ADDITIVES - SPECIFY: | | | | | |
| | DRILLING METHOD: <input type="checkbox"/> ROTARY <input type="checkbox"/> HAMMER <input type="checkbox"/> CABLE TOOL <input checked="" type="checkbox"/> OTHER - SPECIFY: | | Hollow Stem Auger | | | | | |
| | DEPTH (feet bgl) | | 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) |
| | FROM | TO | | | | | | |
| | 0 | 110 | ±8.5 | Boring- HSA | -- | -- | -- | -- |
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| 3. ANNULAR MATERIAL | DEPTH (feet bgl) | | BORE HOLE DIAM. (inches) | LIST ANNULAR SEAL MATERIAL AND GRAVEL PACK SIZE-RANGE BY INTERVAL | AMOUNT (cubic feet) | METHOD OF PLACEMENT | | |
| | FROM | TO | | | | | | |
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|----------------------|----------------|--|-----------------|---------|-------------|
| FOR OSE INTERNAL USE | | WR-20 WELL RECORD & LOG (Version 06/30/17) | | | |
| FILE NO. | C-4499 | POD NO. | 1 | TRN NO. | 182532 |
| LOCATION | 24S.31E.20.243 | | WELL TAG ID NO. | --- | PAGE 1 OF 2 |

DSE DJT JAN 27 2021 PM3:34



WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

OSE DTJ JAN 24 2022 PM 3:00

| | | | | | | | | | |
|--|---|-----------|--|--|---|--|--|---|--------------------|
| 1. GENERAL AND WELL LOCATION | OSE POD NO. (WELL NO.) POD1 (BH-01) | | WELL TAG ID NO. n/a | | OSE FILE NO(S). C-4575 | | | | |
| | WELL OWNER NAME(S) XTO Energy (Kyle Littrell) | | | | PHONE (OPTIONAL) | | | | |
| | WELL OWNER MAILING ADDRESS 6401 Holiday Hill Dr. | | | | CITY Midland | STATE TX | ZIP 79707 | | |
| | WELL LOCATION (FROM GPS) | LATITUDE | DEGREES 32 | MINUTES 12 | SECONDS 38.03 | N | | | |
| | | LONGITUDE | 103 | 50 | 58.70 | 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 NW NE Sec. 23 T24S R30E, NMPM | | | | | | | | | |
| 2. DRILLING & CASING INFORMATION | LICENSE NO. 1249 | | NAME OF LICENSED DRILLER Jackie D. Atkins | | | NAME OF WELL DRILLING COMPANY Atkins Engineering Associates, Inc. | | | |
| | DRILLING STARTED 1-4-2022 | | DRILLING ENDED 1-4-2022 | | DEPTH OF COMPLETED WELL (FT) temporary well material | | BORE HOLE DEPTH (FT) 105 | DEPTH WATER FIRST ENCOUNTERED (FT) n/a | |
| | COMPLETED WELL IS: <input type="checkbox"/> ARTESIAN <input checked="" type="checkbox"/> DRY HOLE <input type="checkbox"/> SHALLOW (UNCONFINED) | | | | | | STATIC WATER LEVEL IN COMPLETED WELL (FT) n/a | | |
| | DRILLING FLUID: <input type="checkbox"/> AIR <input type="checkbox"/> MUD ADDITIVES - SPECIFY: | | | | | | | | |
| | DRILLING METHOD: <input type="checkbox"/> ROTARY <input type="checkbox"/> HAMMER <input type="checkbox"/> CABLE TOOL <input checked="" type="checkbox"/> OTHER - SPECIFY: Hollow Stem Auger | | | | | | | | |
| | DEPTH (feet bgl) | | 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) |
| | FROM | TO | | | | | | | |
| | 0 | 105 | ±8.5 | Boring- HSA | | -- | -- | -- | -- |
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| 3. ANNULAR MATERIAL | DEPTH (feet bgl) | | BORE HOLE DIAM. (inches) | LIST ANNULAR SEAL MATERIAL AND GRAVEL PACK SIZE-RANGE BY INTERVAL | | AMOUNT (cubic feet) | METHOD OF PLACEMENT | | |
| | FROM | TO | | | | | | | |
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|----------------------|--------|------------|-----------------|--|-------------|--|--|
| FOR OSE INTERNAL USE | | | | WR-20 WELL RECORD & LOG (Version 06/30/17) | | | |
| FILE NO. | C-4575 | POD NO. | 1 | TRN NO. | 709414 | | |
| LOCATION | 2-1-1 | 245-30E-23 | WELL TAG ID NO. | — | PAGE 1 OF 2 | | |

MON

SITE PHOTOGRAHS



Google Earth image showing locations of photographs.



View from southwest edge of Poker Tank to the northeast. The caliche quarry is on the horizon to the right of the production pad with tanks. The nature of the vegetation is scrub in the foreground, the lower edge of which defines the boundary of water commonly held by Poker Tank. Grass surrounds the center of Poker Tank where forbs dominate the vegetation, as shown in the next image. 32 13 39.35, -103 49 50.51



The center of Poer Tan is dominated by forbs rather than grass. While we are not habitat or plant taxonomy experts, the nature of the soil and vegetation does not appear typical of wetlands.

32 13 40.88, -103 49 49.76



View north from near the scrub grass boundary of Poer Tan. This shallow swale lies within the northern extension of the lake mapped as Poer Tan. The mapped surface water body in Plate 7b is defined by the 3520 elevation contour. Google Earth indicates that the elevation at the location of this image is 3518 feet.

32 13 42.26, -103 49 49.32



View from northwest corner of proposed containment showing caliche spoils that define the western edge of the caliche quarry that will become the containment. The north-south buried pipeline is west of the fence and the swale west of the pipeline that drains into Poer Tan is defined by denser vegetation. 32 13 49.36, -103 49 47.87 .



View east of east-west swale that lies south of the proposed containment. The Google Earth elevation of the location of this image is 3514, suggesting that the mapped la e extends 6-feet higher than ground level of this image. 32 13 40.88, -103 49 48.14



A portion of the quarry that will be re-purposed as a Rule 34 containment is shown in this image.
32 13 43.85, -103 49 41.52

August 2024

Rule 34 Registration Mad Cow & Containments Section 12, T24S, R30E, Eddy County

Volume 2 In-Ground Containment

- *C-147 Form*
- *Stamped Design Drawings, Avian Hazing System & Liner Equivalency Demonstration*
- *Recently Approved Plans for Design/Construction, O&M, Closure*



View northeast of caliche pit on horizon that will be re-purposed as the Mad Cow produced water containments. Poker Tank, an area mapped as a surface water body and wetland is in the foreground.

Prepared for:
Vaughan Operating, LLC
Carlsbad, NM

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

C-147

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/

Recycling Facility and/or Recycling Containment

Type of Facility: [X] Recycling Facility [X] Recycling Containment*
Type of action: [] Permit [X] 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: VAUGHN 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): MAD COW RECYCLING FACILITY AND CONTAINMENTS
OCD Permit Number: 2RF-207 (For new facilities the permit number will be assigned by the district office)
U/L or Qtr/Qtr I Section 12 Township 24S Range 30E County: EDDY
Surface Owner: [] Federal [] State [X] Private [] Tribal Trust or Indian Allotment

2. [X] Recycling Facility:
Location of recycling facility (if applicable): Latitude 32.229535 Longitude -103.827800 NAD83
Proposed Use: [X] Drilling* [X] Completion* [X] Production* [X] Plugging *
*The re-use of produced water may NOT be used until fresh water zones are cased and cemented
[] Other, requires permit for other uses. Describe use, process, testing, volume of produced water and ensure there will be no adverse impact on groundwater or surface water.
[X] Fluid Storage
[] Above ground tanks [X] Recycling containment [X] Activity permitted under 19.15.17 NMAC explain type
[] Activity permitted under 19.15.36 NMAC explain type: [] Other explain
[] For multiple or additional recycling containments, attach design and location information of each containment
[] Closure Report (required within 60 days of closure completion): [] Recycling Facility Closure Completion Date:

3. [X] Recycling Containment:
[] Annual Extension after initial 5 years (attach summary of monthly leak detection inspections for previous year)
Center of Recycling Containment (if applicable): Latitude 32.229535 Longitude -103.827800 NAD83
[] For multiple or additional recycling containments, attach design and location information of each containment
[X] Lined [] Liner type: Thickness 60&40 mil [] LLDPE [X] HDPE [] PVC [] Other 60 primary, 40 secondary, see Engineer drawings
[] String-Reinforced
Liner Seams: [X] Welded [] Factory [] Other 671094 bbl See Attached Engineer Drawing 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 \$ see attached estimate (work on these facilities cannot commence until bonding amounts are approved)

Attach closure cost estimate and documentation on how the closure cost was calculated. (See transmittal letter.)

5.

Fencing:

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

Alternate. Please specify Fixed knot woven wire, 8-foot height.

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

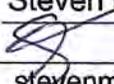
Instructions: The applicant must provide attachments that demonstrate compliance for each siting criteria below as part of the application. Potential examples of the siting attachment source material are provided below under each criteria.

| 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 Plates 1- 2 | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> 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 Plate 3 | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA |
| Within the area overlying a subsurface mine. - Written confirmation or verification or map from the NM EMNRD-Mining and Minerals Division Plate 4 | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Within an unstable area. - Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; topographic map Plate 5 | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Within a 100-year floodplain. FEMA map Plt 6 | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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 Plate 7 | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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 Plate 8 | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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 Plt 1 and 7 | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Within 500 feet of a wetland. Plate 9 - US Fish and Wildlife Wetland Identification map; topographic map; visual inspection (certification) of the proposed site | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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 Partner
 Signature:  Date: 8/21/2024
 e-mail address: stevenm@mhatllc.com Telephone: 575 689-8620

11.
OCD Representative Signature: Victoria Venegas **Approval Date:** 09/25/2024
Title: Environmental Specialist **OCD Permit Number:** 2RF-207

- OCD Conditions
- Additional OCD Conditions on Attachment

RECYCLING CONTAINMENT DESIGN DRAWINGS

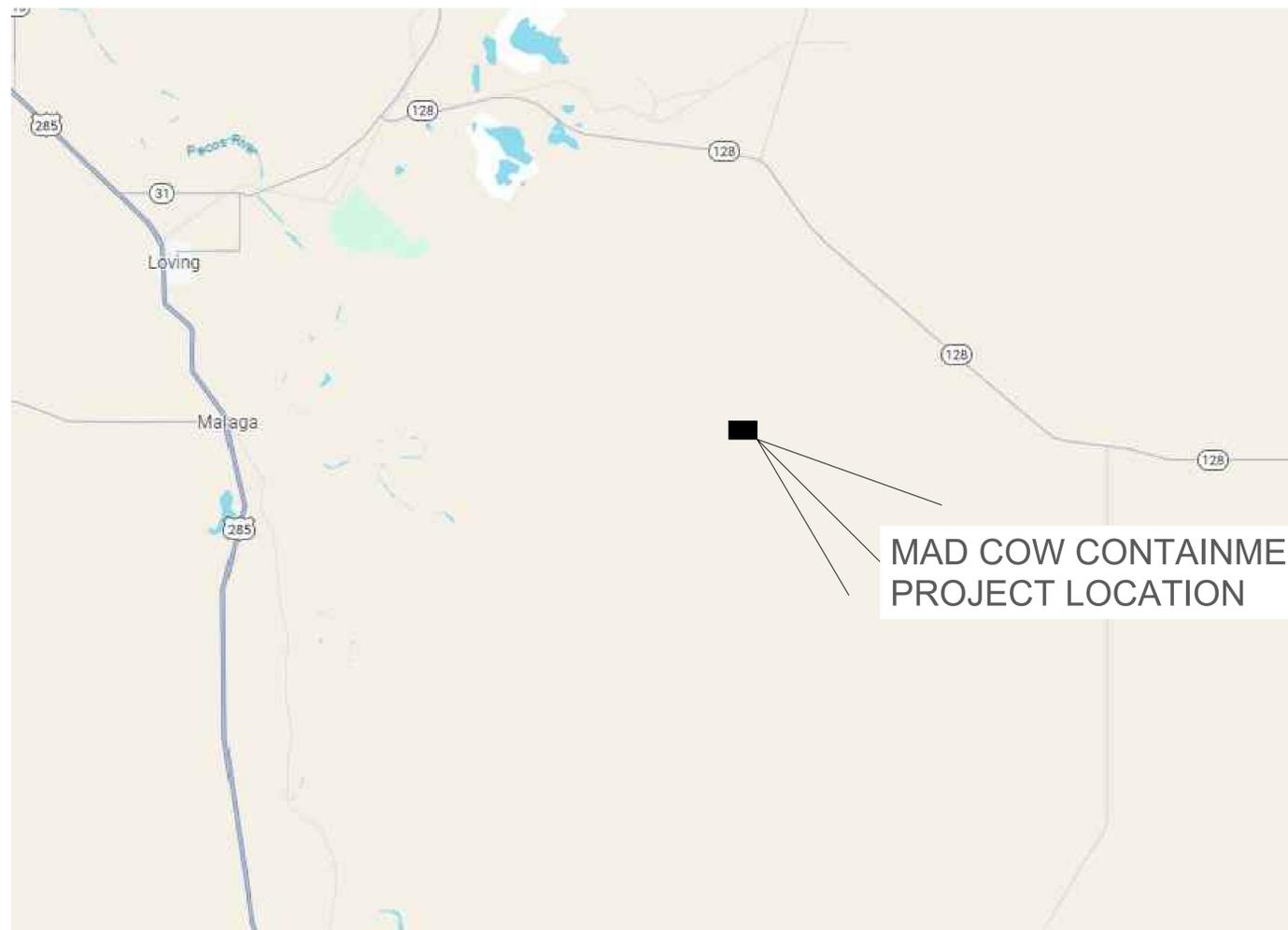
AVIAN DETERRENT SYSTEM



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

MAD COW CONTAINMENT

SECTION 12, TOWNSHIP 24 SOUTH, RANGE 30 EAST, NEW MEXICO PRINCIPAL MERIDIAN
EDDY, COUNTY
32.22773°, -103.83248°



MAD COW CONTAINMENT
PROJECT LOCATION

INDEX OF SHEETS

| SHEET | SHEET NAME | DESCRIPTION |
|-------|------------|---|
| 1 | C-100 | COVER |
| 2 | C-101 | LOCATION MAP |
| 3 | C-102 | GENERAL NOTES |
| 4 | SU-100 | TOPOGRAPHIC SURVEY |
| 5 | CG-100 | SITE PLAN |
| 6 | CG-101 | NW- CONTAINMENT WEST-EAST ONLY PLAN AND PROFILE |
| 7 | CG-102 | NW- CONTAINMENT AT SUMP PLAN AND PROFILE |
| 8 | CG-103 | SO- CONTAINMENT WEST-EAST PLAN AND PROFILE |
| 9 | CG-104 | SO- CONTAINMENT NORTH-SOUTH PLAN AND PROFILE |
| 10 | CG-105 | NE-CONTAINMENT PLAN AND PROFILE |
| 11 | CG-106 | SE-CONTAINMENT PLAN AND PROFILE |
| 12 | CD-100 | SUMP DETAILS |
| 13 | CD-101 | LINER DETAILS |
| 14 | CD-102 | FENCE DETAILS |



GENERAL NOTES

- NEW MEXICO ADMINISTRATIVE CODE TITLE 19, CHAPTER 15, PART 34, DESIGN CRITERIA FOR RECYCLING CONTAINMENTS SHALL APPLY TO THIS PROJECT.
- ALL BOUNDARY, TOPOGRAPHIC AND UTILITY INFORMATION SHOWN ARE BASED ON SURVEY INFORMATION FURNISHED BY TOPOGRAPHIC.
- THE CONTRACTOR SHALL IDENTIFY AND LOCATE UTILITY LINES, MONITORING WELLS, SURVEY MONUMENTS, AND OTHER NEARBY STRUCTURES PRIOR TO PERFORMING WORK.
- COORDINATE INFORMATION IS BASED ON STATE PLANE COORDINATES, NEW MEXICO EAST, NAD 83.
- THE CONTRACTOR SHALL IDENTIFY ANY DISCREPANCIES PRIOR TO PROCEEDING WITH CONSTRUCTION AND CONTACT THE ENGINEER IN WRITING.
- 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

- 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.
- 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 COMPACTION EFFORT AS LONG AS THE MATERIALS ENCOUNTERED REMAINS CONSISTENT. IF ONSITE SOILS ENCOUNTERED CHANGE, THE CONTRACTOR SHALL DEVELOP A NEW COMPACTION PATTERN.
- 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.
- 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.
- PERFORM ONE NUCLEAR DENSITY GAGE TEST PER 2500 CY MINIMUM OR AS DIRECTED BY THE ENGINEER.
- 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.
- EARTHWORK CONTRACTOR SHALL ROLL SURFACE WITH A SMOOTH ROLLER TO ELIMINATE RUTS.

LINER NOTES

- 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.
- LINER CONTRACTOR TO PROVIDE SUBMITTAL OF LINER PANEL LAYOUT.
- LINER CONTRACTOR TO SIGN SUBGRADE ACCEPTANCE FORM (PROVIDED BY OWNER REPRESENTATIVE) DAILY PRIOR TO INSTALLATION.
- LINER TO BE INSTALLED PER GRI SPECIFICATIONS, GUIDES AND PRACTICES.
- CONTRACTOR SHALL PLACE SANDBAGS ON LINER DURING INSTALLATION AS REQUIRED TO PREVENT WIND UPLIFT UNTIL POND IS FILLED TO A DEPTH OF 3 FEET.
- CONTRACTOR SHALL USE BLACK 60 MIL HDPE SMOOTH GEOMEMBRANE AS THE PRIMARY LINER AND BLACK 40 MIL HDPE SMOOTH GEOMEMBRANE AS THE SECONDARY LINER.
- A 3' DIAMETER MINIMUM PIECE OF 40MIL LINER SHALL BE EXTRUDED WELDED WHERE THE PIE SHAPED CORNER SECTIONS MEET FOR SEAM REINFORCEMENT.
- 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.
- 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.
- SUMPS SHALL BE BACKFILLED WITH NON-ANGULAR MAXIMUM 3/8 INCH SIZED PEA GRAVEL.
- ALL SEAMS MUST BE WELDED WITH A 6" MINIMUM OVERLAP.
- 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.
- FOR AIR PRESSURE TESTING (ASTM 5820), THE FOLLOWING PROCEDURES ARE APPLICABLE TO THE SEAMS WELD WITH DOUBLE SEAM FUSION WELDER.
 - 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.
 - 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).
 - CUT OPPOSITE SEAM END AND LISTEN FOR PRESSURE RELEASE TO VERIFY FULL SEAM HAS BEEN TESTED.
 - IF THE TEST FAILS, FOLLOW THESE PROCEDURES.
 - WHILE CHANNEL IS UNDER PRESSURE WALK THE LENGTH OF THE SEAM LISTENING FOR A LEAK.
 - WHILE CHANNEL IS UNDER PRESSURE APPLY A SOAPY SOLUTION TO THE SEAM EDGE AND LOOK FOR BUBBLES FORMED BY AIR ESCAPING.
 - RE-TEST THE SEAM IN SMALLER INCREMENTS UNTIL THE LEAK IS FOUND.
 - 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.
 - REPAIR THE LEAK WITH A PATCH AND VACUUM TEST.
- ALL NON-DESTRUCTIVE TESTS WILL BE NOTED IN THE NON-DESTRUCTIVE LOGS.
- LINER GAS VENTS SHALL BE SPACED ALONG THE INSIDE SLOPE AT APPROXIMATELY 100 FEET ON CENTER OR MINIMUM 2 VENTS PER SIDE.
- 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.
- LAY BOTH LINERS IN ANCHOR TRENCH. BACKFILL ANCHOR TRENCH IN 2 LIFTS AND COMPACT.

SUGGESTED CONSTRUCTION SEQUENCE

- CLEAR EXISTING VEGETATION.
- STRIP AND STOCKPILE TOPSOIL AT THE LOCATION DESIGNATED ON THESE PLANS.
- PERFORM EARTHWORK OPERATIONS:
 - CONSTRUCT STORMWATER DIVERSION CHANNEL.
 - PERFORM RIPPING/EXCAVATING OPERATIONS.
 - REPLACE EXCAVATED MATERIAL IN COMPACTED LAYERS ON THE LEVEE/PAD IN ACCORDANCE WITH THE DETAILS AND SPECIFICATIONS.
 - FINISH SLOPES USING A SMOOTH ROLLER.
 - DIG ANCHOR TRENCH.
- INSTALL NEW GAME FENCE AND GATES.
- INSTALL GEOMEMBRANES:
 - INSTALL GEOTEXTILE AS NEEDED, SECONDARY LINER, GEONET, LEAK DETECTION SYSTEM AND PRIMARY LINER.
 - INSTALL RUB SHEETS AND WATER LEVEL GAGE/LADDER.
 - BACKFILL AND COMPACT ANCHOR TRENCH.



Engineering | Surveying
Materials Testing

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

ENGINEERING SHEET:

GENERAL NOTES

OF
PROJECT NAME:

**MAD COW
CONTAINMENT**

FOR
CLIENT:
LON LON RANCH

PROJECT NUMBER:

23156

PROJECT ENGINEER:

Jeremy Baker, PE

DRAWN BY:

MG

REVISIONS

| No. | DATE | DESCRIPTION |
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SHEET:
3 of 14

C - 102

TOPOGRAPHIC SURVEY of MAD COW CONTAINMENT

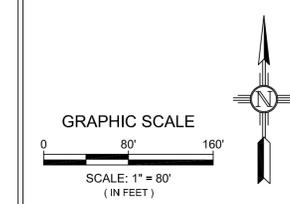


7921 N World Dr.
Hobbs, NM 88242-9032
Squarerootservices.net
575-231-7347

TYPE OF SURVEY:
TOPOGRAPHIC SURVEY
OF
PROJECT NAME:
MAD COW CONTAINMENT
FOR
CLIENT:
ANDERSON BROTHERS CONSTRUCTION

PROJECT NUMBER:
23156

PROJECT SURVEYOR:
Jeremy Baker, PS
DRAWN BY:
Brayden Sealy

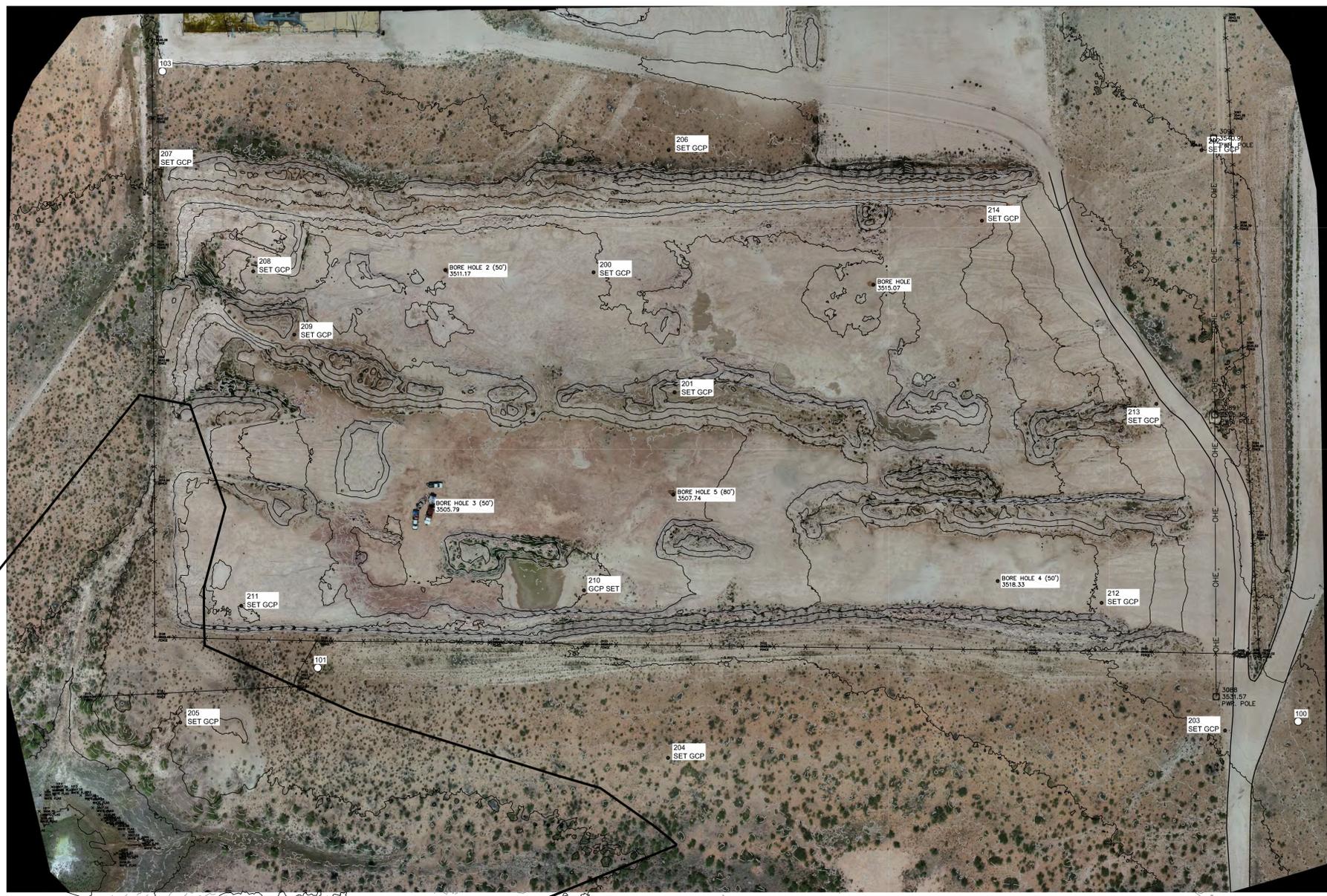


LEGEND

- CONTROL POINT AS NOTED
- EDGE OF ROAD
- CONCRETE
- MAJOR CONTOUR (5FT)
- - - MINOR CONTOUR (1FT)

REVISIONS

| No. | DATE | DESCRIPTION |
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Control Point Table

| Point Number | Point Northing | Point Easting | Elevation | Point Description |
|--------------|----------------|---------------|-----------|--------------------------------|
| 100 | 447197.57 | 698437.03 | 3533.31 | PSSET 5/8" RBR W/ YC MARKED CI |
| 101 | 447265.52 | 697191.83 | 3522.44 | PSSET 5/8" RBR W/ YC MARKED CI |
| 103 | 448019.54 | 696994.76 | 3527.88 | PSSET 5/8" RBR W/ YC MARKED CI |
| 200 | 447765.49 | 697542.20 | 3514.27 | SET GCP |
| 201 | 447613.75 | 697645.01 | 3525.72 | SET GCP |
| 202 | 447919.86 | 698314.37 | 3539.80 | SET GCP |
| 203 | 447186.34 | 698344.24 | 3530.49 | SET GCP |
| 204 | 447151.67 | 697636.76 | 3521.36 | SET GCP |
| 205 | 447196.41 | 697017.40 | 3520.18 | SET GCP |
| 206 | 447920.03 | 697637.59 | 3532.32 | SET GCP |
| 207 | 447905.84 | 696983.80 | 3525.18 | SET GCP |
| 208 | 447766.81 | 697110.01 | 3508.12 | SET GCP |
| 209 | 447686.82 | 697162.14 | 3522.24 | SET GCP |
| 210 | 447363.52 | 697529.98 | 3504.81 | SET GCP |
| 211 | 447343.92 | 697094.76 | 3510.02 | SET GCP |
| 212 | 447347.63 | 698187.38 | 3520.22 | SET GCP |
| 213 | 447599.13 | 698257.07 | 3532.53 | SET GCP |
| 214 | 447830.83 | 698035.37 | 3518.64 | SET GCP |

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°24'24.8" AT 100. DISTANCES SHOWN HEREON ARE IN GROUND AND WERE OBTAINED BY APPLYING A COMBINED GRID TO GROUND SCALE FACTOR OF 1.0002278136 AT THE PREVIOUSLY NOTED POINT LOCATED AT N 447197.566, E 698437.029. THE VERTICAL DATUM IS BASED ON GEOID18 AND IT PROVIDES ORTHOMETRIC HEIGHTS CONSISTENT WITH THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

SURVEYOR NOTE

THIS IS NOT A BOUNDARY SURVEY OR A RIGHT-OF-WAY SURVEY. APPARENT PROPERTY CORNERS, RIGHT-OF-WAY LINES, OR PROPERTY LINES AS SHOWN ARE DERIVED FROM RECORD SURVEY PLATS, RIGHT-OF-WAY MAPS, OR DEEDS REFERENCED HEREON AND ARE NOT GUARANTEED OR TO BE RELIED ON FOR THE ESTABLISHMENT OF PROPERTY LINES.

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
Date: 08/21/2024



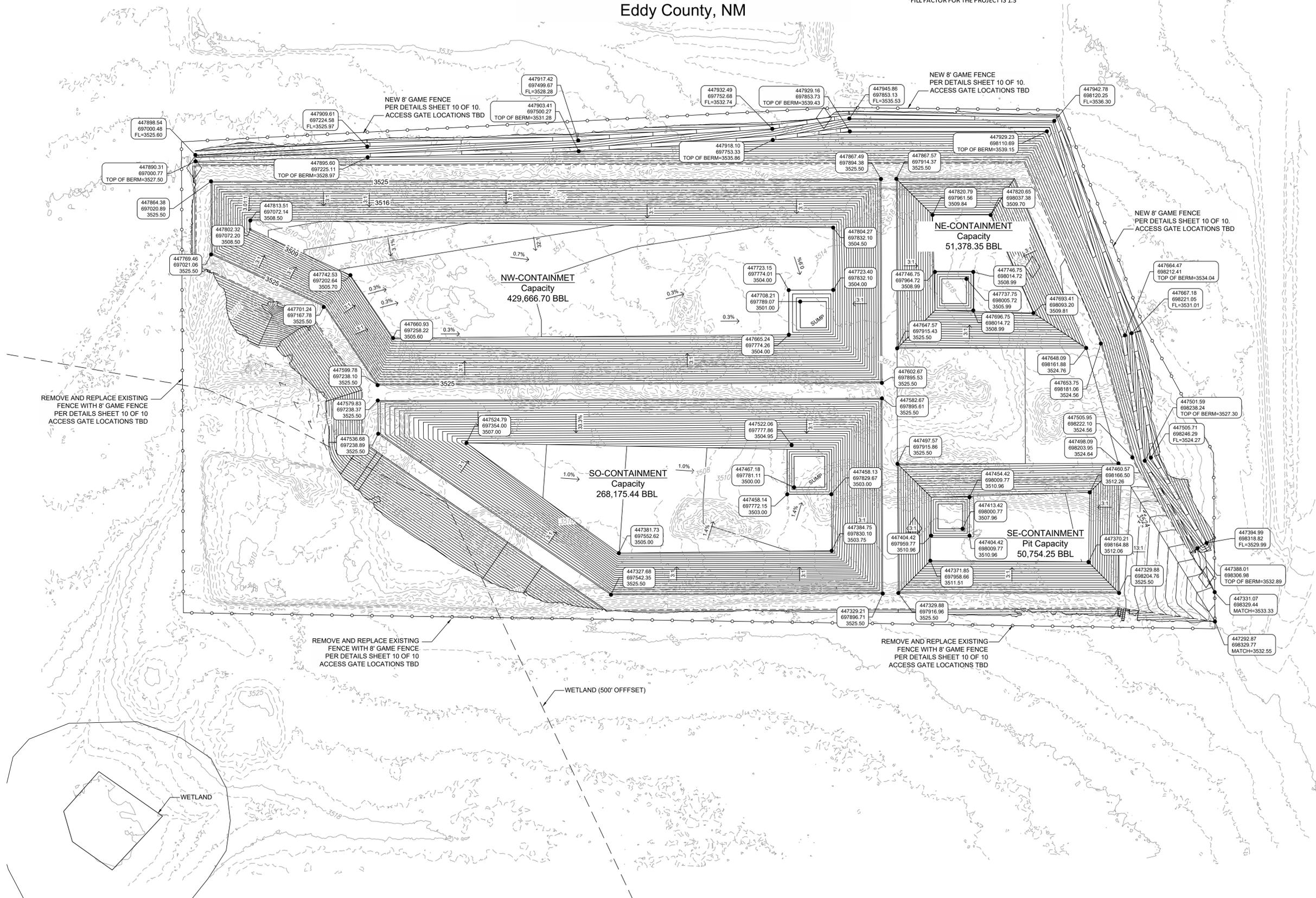
SHEET:
1 of 1
SU - 100

MAD COW CONTAINMENT

SEC. 12, T24S, R30E, NMPM
Eddy County, NM

| DIRTWORK QUANTITIES (CU. YD.) | |
|-------------------------------|----------------|
| CUT | 92,752.14 |
| FILL* | 84,693.97 |
| NET | 8,058.17 (CUT) |

*FILL FACTOR FOR THE PROJECT IS 1.3



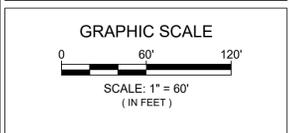
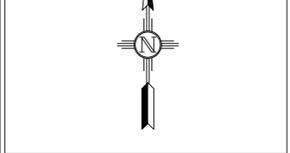
7921 N World Dr.
Hobbs, NM 88242-9032
Squarerootservices.net
575-231-7347

TYPE OF SURVEY:
SITE PLAN
OF
PROJECT NAME:
MAD COW CONTAINMENT
FOR
CLIENT:
LON LON RANCH LLC

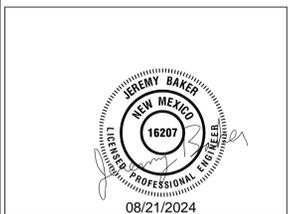
PROJECT NUMBER:
23156

PROJECT ENGINEER:
JEREMY BAKER, PE

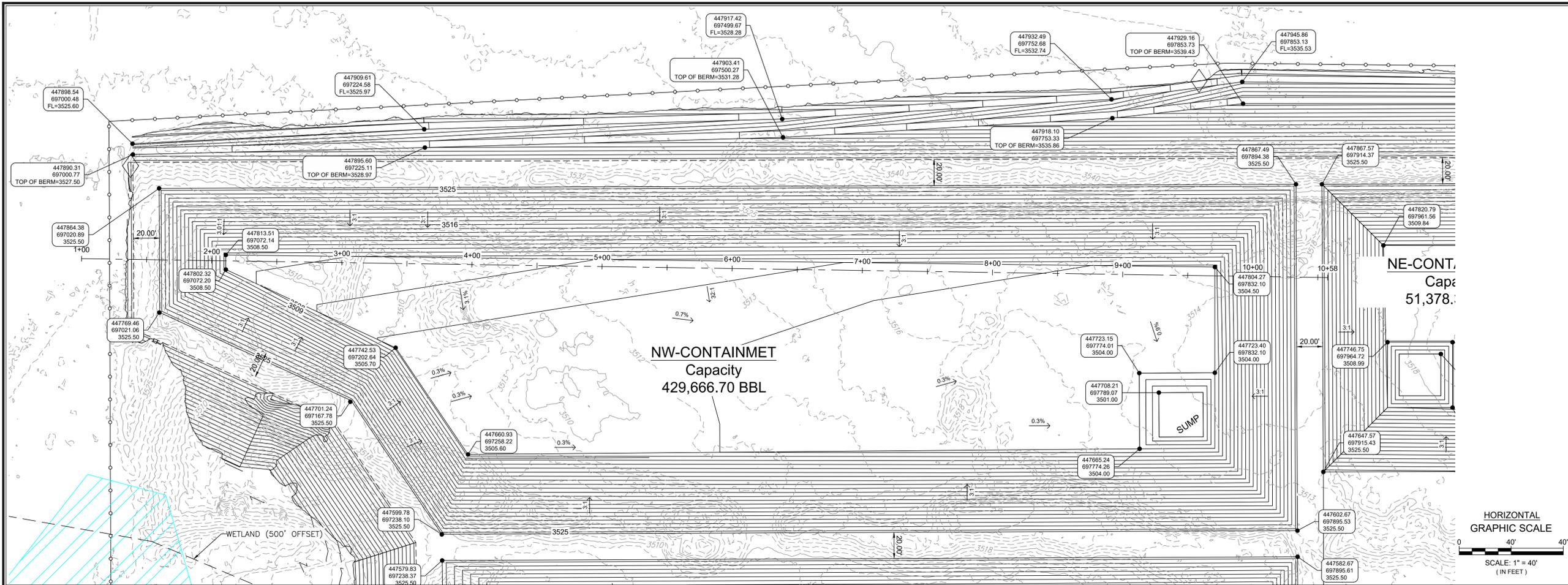
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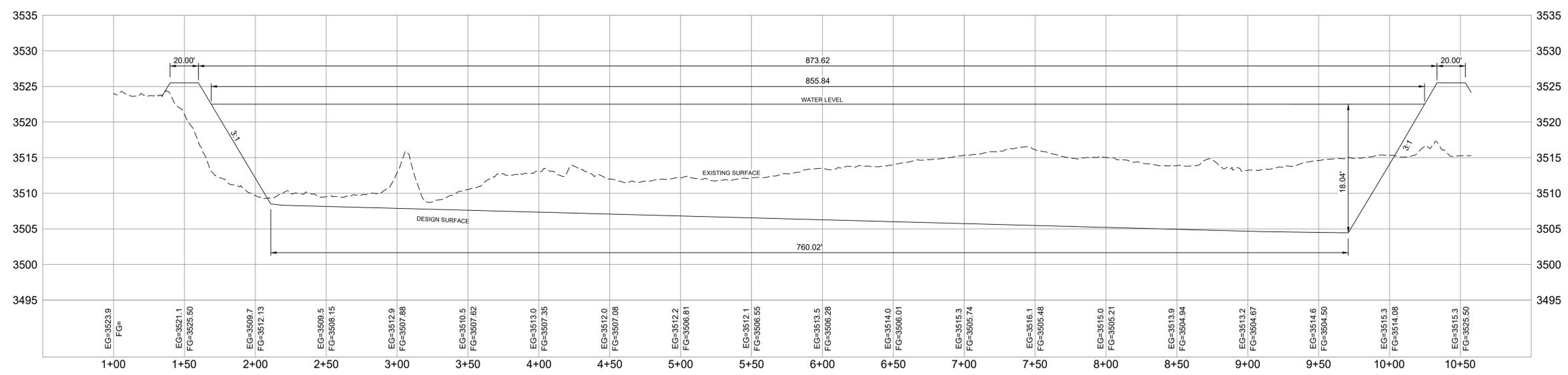
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| No. | DATE | DESCRIPTION |
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SHEET:
5 of 14
CG-100



WEST - EAST PROFILE



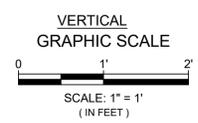
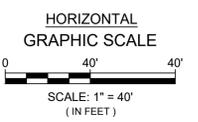
7921 N World Dr.
Hobbs, NM 88242-9032
Squarerootservices.net
575-231-7347

TYPE OF SURVEY:
**NW-CONTAINMENT
WEST - EAST ONLY
PLAN AND PROFILE**
OF

PROJECT NAME:
**MAD COW
CONTAINMENT**
FOR
CLIENT:
LON LON RANCH LLC

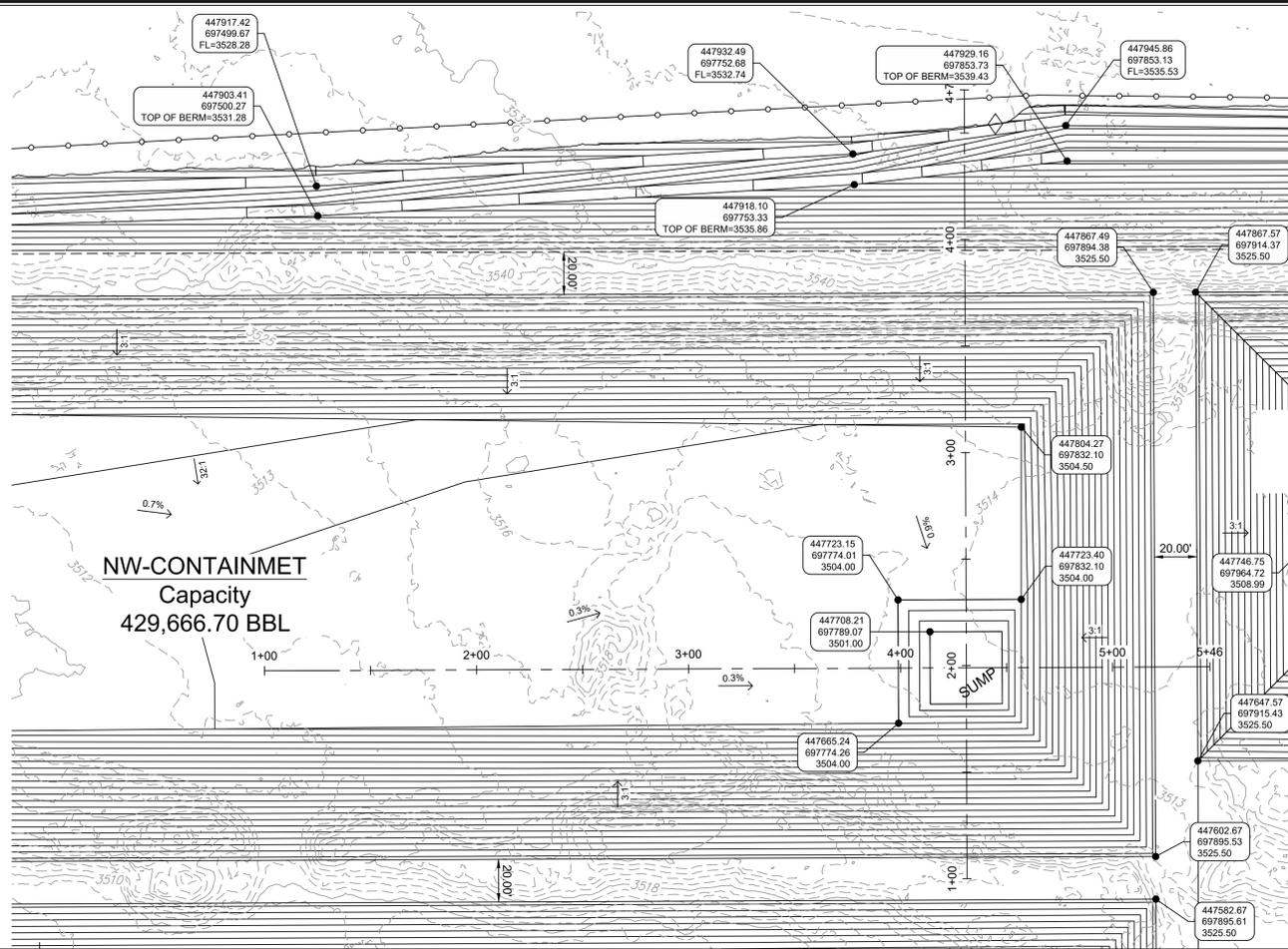
PROJECT NUMBER:
23156

PROJECT ENGINEER:
JEREMY BAKER, PE
DRAWN BY:
LPS



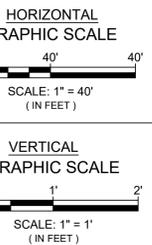
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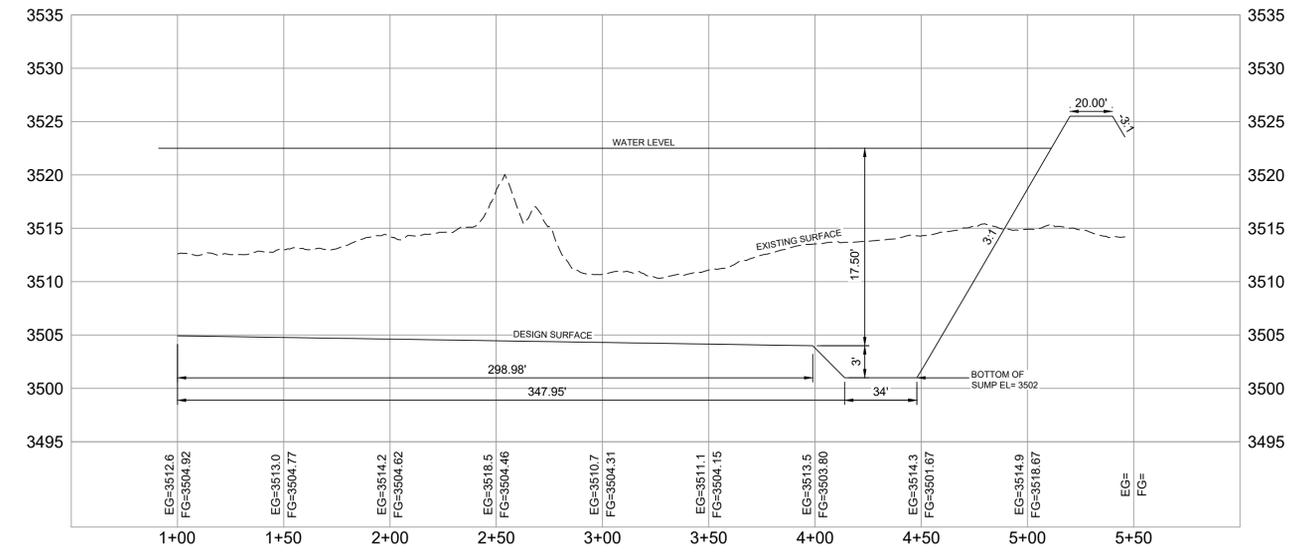


NE-TOTAL-STORAGE
Project: MAD COW IMPOUNDMENT
Basin Description: NE-POND

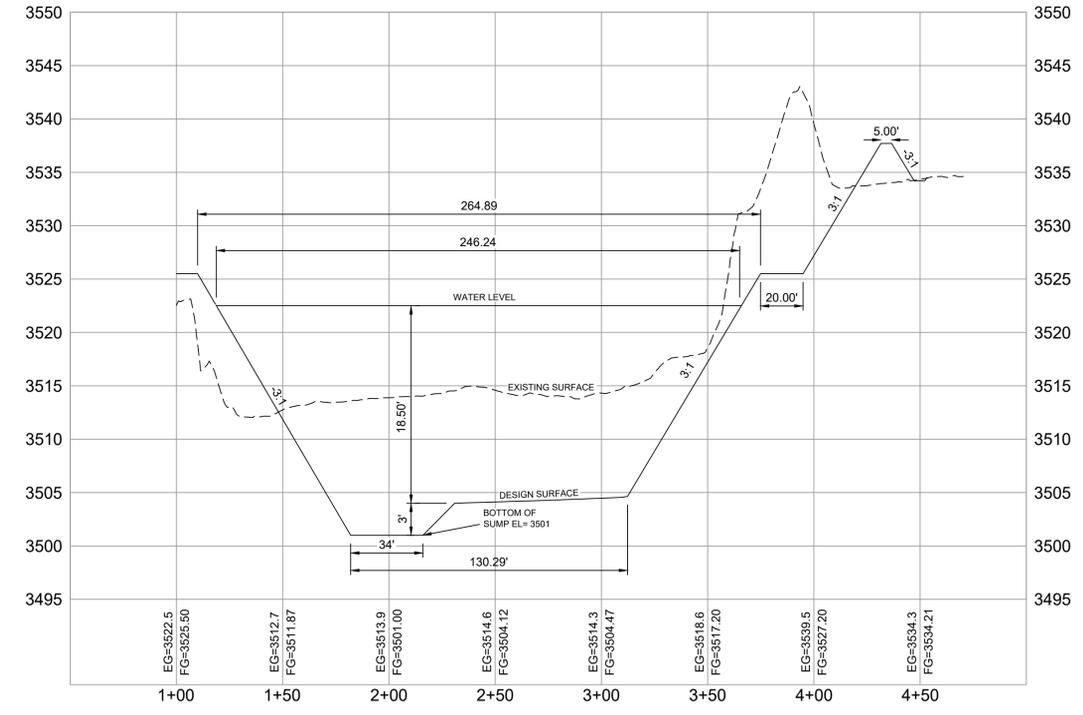
| Contour Elevation | Contour Area (sq. ft) | Surface Area (ac) | Depth (ft) | Incremental Volume Avg. End (cu. ft) | Cumulative Volume Avg. End (cu. ft) | Gallons Storage (gal) | BBLs Storage (bbls) |
|-------------------|-----------------------|-------------------|------------|--------------------------------------|-------------------------------------|-----------------------|---------------------|
| 3,525.50 | 208,158.53 | 4.78 | 0.5 | | | | |
| 3,525.00 | 204,794.02 | 4.70 | 1 | 103238.14 | 3005198.79 | 22,478,886.95 | 535,246.94 |
| 3,524.00 | 198,448.05 | 4.56 | 1 | 201621.04 | 2901960.65 | 21,706,665.66 | 516,859.51 |
| 3,523.00 | 192,170.21 | 4.41 | 0.5 | 195309.13 | 2700339.62 | 20,198,540.36 | 480,949.39 |
| 3,522.50 | 189,042.38 | 4.34 | 0.5 | 95303.15 | 2505030.49 | 18,737,628.07 | 446,163.47 |
| 3,522.00 | 185,960.47 | 4.27 | 1 | 240972.34 | 2409727.34 | 18,024,760.50 | 429,189.31 |
| 3,521.00 | 179,818.85 | 4.13 | 1 | 182889.66 | 231976.63 | 17,323,505.19 | 412,491.65 |
| 3,520.00 | 173,745.35 | 3.99 | 1 | 176782.1 | 2133086.96 | 15,955,490.46 | 379,917.72 |
| 3,519.00 | 167,739.96 | 3.85 | 1 | 170742.65 | 1956304.86 | 14,633,160.35 | 348,431.59 |
| 3,518.00 | 161,802.68 | 3.71 | 1 | 164771.32 | 1785562.21 | 13,356,005.33 | 318,021.13 |
| 3,517.00 | 155,933.52 | 3.58 | 1 | 158868.1 | 1620790.88 | 12,123,515.78 | 288,674.20 |
| 3,516.00 | 150,132.48 | 3.45 | 1 | 153033 | 1461922.78 | 10,935,182.39 | 260,378.68 |
| 3,515.00 | 144,399.55 | 3.31 | 1 | 147266.01 | 1308889.78 | 9,790,495.55 | 233,122.43 |
| 3,514.00 | 138,734.73 | 3.18 | 1 | 141567.14 | 1161623.76 | 8,688,945.72 | 206,893.32 |
| 3,513.00 | 133,138.03 | 3.06 | 1 | 135936.38 | 1020056.63 | 7,630,023.59 | 181,679.23 |
| 3,512.00 | 127,609.44 | 2.93 | 1 | 130373.74 | 884120.25 | 6,613,219.47 | 157,468.01 |
| 3,511.00 | 122,148.97 | 2.80 | 1 | 124879.2 | 753746.51 | 5,638,023.89 | 134,247.53 |
| 3,510.00 | 116,756.61 | 2.68 | 1 | 119452.79 | 628867.31 | 4,703,927.48 | 112,005.67 |
| 3,509.00 | 111,432.37 | 2.56 | 1 | 114094.49 | 509414.52 | 3,810,420.61 | 90,730.29 |
| 3,508.00 | 105,451.46 | 2.42 | 1 | 108441.91 | 395320.03 | 2,956,993.82 | 70,409.26 |
| 3,507.00 | 99,924.87 | 2.20 | 1 | 100688.17 | 286878.11 | 2,145,848.26 | 51,095.00 |
| 3,506.00 | 82,614.36 | 1.90 | 1 | 89269.62 | 186189.95 | 1,392,700.83 | 33,161.73 |
| 3,505.00 | 47,425.75 | 1.09 | 1 | 65020.06 | 96920.33 | 724,964.07 | 17,262.19 |
| 3,504.00 | 3,353.18 | 0.08 | 1 | 25389.47 | 31900.27 | 238,614.02 | 5,681.66 |
| 3,503.00 | 2,494.94 | 0.06 | 1 | 2924.06 | 6510.81 | 48,700.86 | 1,159.62 |
| 3,502.00 | 1,762.04 | 0.04 | 1 | 2128.49 | 3586.75 | 26,828.89 | 638.83 |
| 3,501.00 | 1,154.48 | 0.03 | N/A | N/A | 0.00 | 0.00 | 0 |



WEST - EAST PROFILE



SOUTH - NORTH PROFILE



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

TYPE OF SURVEY:
**NW-CONTAINMENT
AT SUMP
PLAN AND PROFILE**
OF
PROJECT NAME:
**MAD COW
CONTAINMENT**
FOR
CLIENT:
LON LON RANCH LLC

PROJECT NUMBER:
23156

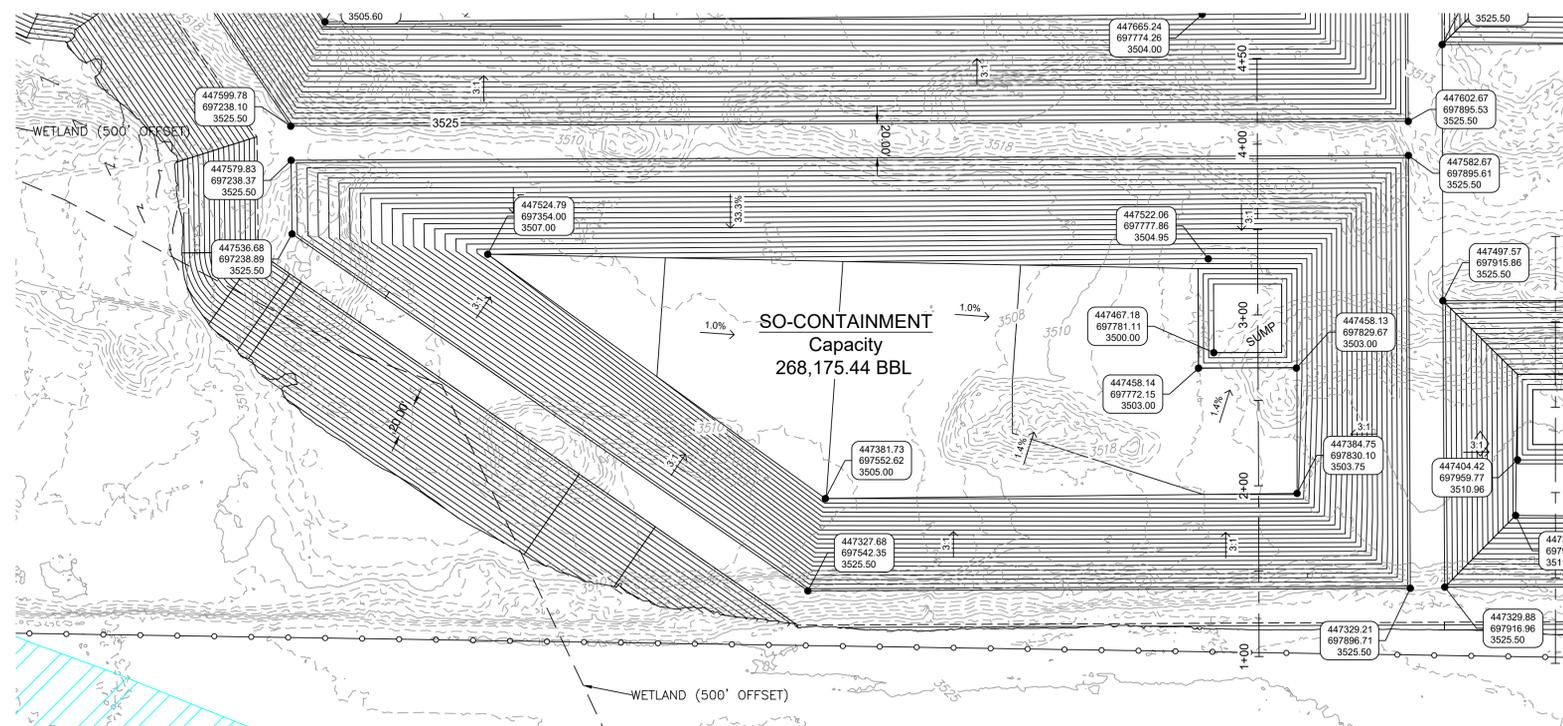
PROJECT ENGINEER:
JEREMY BAKER, PE
DRAWN BY:
LPS



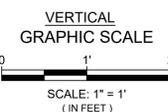
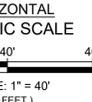
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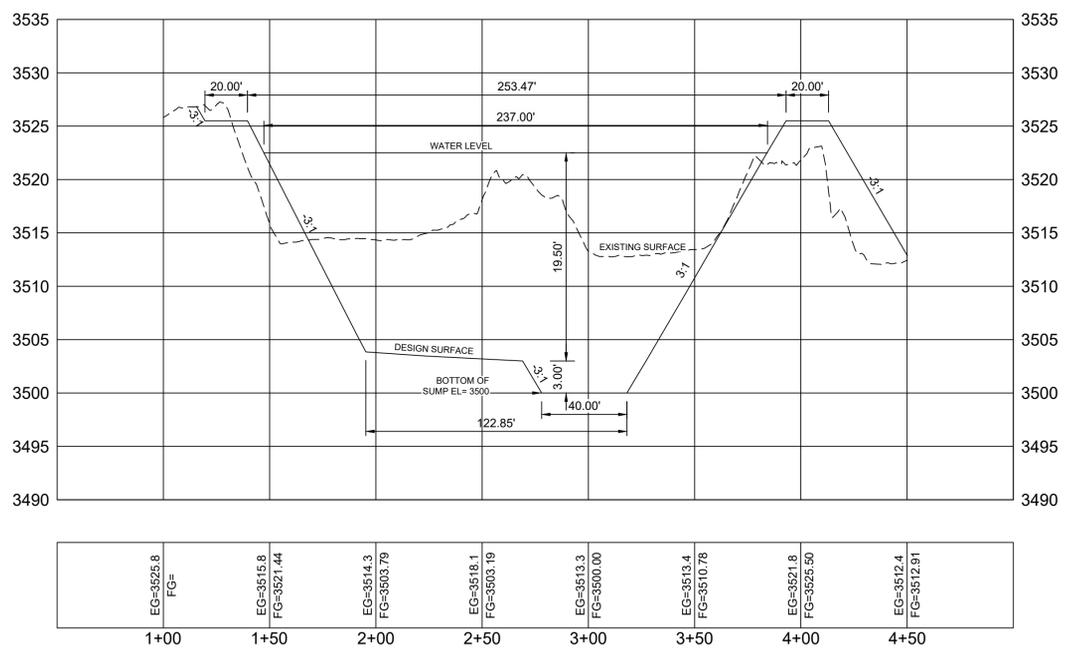




| Contour Elevation | Contour Area (sq. ft) | Surface Area (ac) | Depth (ft) | Incremental Volume (cu. ft) | Cumulative Volume (cu. ft) | Gallons Storage | BBLs Storage |
|-------------------|-----------------------|-------------------|------------|-----------------------------|----------------------------|-----------------|--------------|
| 3,525.50 | 134,585.31 | 3.09 | 0.50 | | | | |
| 3,525.00 | 132,209.98 | 3.04 | 1.00 | 66,698.82 | 1,887,064.32 | 14,115,241.11 | 336,099.36 |
| 3,524.00 | 127,304.39 | 2.92 | 1.00 | 129,757.18 | 1,820,365.50 | 13,616,333.94 | 324,219.84 |
| 3,523.00 | 122,494.65 | 2.81 | 0.50 | 124,899.52 | 1,690,608.31 | 12,645,750.16 | 301,109.17 |
| 3,522.50 | 119,883.48 | 2.75 | 0.50 | 60,594.53 | 1,565,708.79 | 11,711,501.75 | 278,863.70 |
| 3,522.00 | 117,780.77 | 2.70 | 1.00 | 59,416.06 | 1,505,114.26 | 11,258,254.66 | 268,071.39 |
| 3,521.00 | 113,162.75 | 2.60 | 1.00 | 115,471.76 | 1,445,698.19 | 10,813,822.46 | 257,488.97 |
| 3,520.00 | 108,640.58 | 2.49 | 1.00 | 110,901.67 | 1,330,226.43 | 9,950,093.70 | 236,922.64 |
| 3,519.00 | 104,214.27 | 2.39 | 1.00 | 106,427.43 | 1,219,324.77 | 9,120,549.28 | 217,170.28 |
| 3,518.00 | 99,883.81 | 2.29 | 1.00 | 102,049.04 | 1,112,897.34 | 8,324,472.10 | 198,214.81 |
| 3,517.00 | 95,649.21 | 2.20 | 1.00 | 97,766.51 | 1,010,848.30 | 7,561,145.28 | 180,039.16 |
| 3,516.00 | 91,510.46 | 2.10 | 1.00 | 93,579.83 | 913,081.79 | 6,829,851.79 | 162,626.26 |
| 3,515.00 | 87,467.57 | 2.01 | 1.00 | 89,489.01 | 819,501.96 | 6,129,874.66 | 145,959.04 |
| 3,514.00 | 83,520.53 | 1.92 | 1.00 | 85,494.05 | 730,012.95 | 5,460,496.87 | 130,020.42 |
| 3,513.00 | 79,669.35 | 1.83 | 1.00 | 81,594.94 | 644,518.90 | 4,821,001.37 | 114,793.33 |
| 3,512.00 | 75,914.02 | 1.74 | 1.00 | 77,791.68 | 562,923.96 | 4,210,671.22 | 100,260.70 |
| 3,511.00 | 72,254.55 | 1.66 | 1.00 | 74,084.28 | 485,132.28 | 3,628,789.45 | 86,405.45 |
| 3,510.00 | 68,690.93 | 1.58 | 1.00 | 70,472.74 | 411,048.00 | 3,074,639.04 | 73,210.53 |
| 3,509.00 | 65,223.17 | 1.50 | 1.00 | 66,957.05 | 340,575.26 | 2,547,502.94 | 60,658.84 |
| 3,508.00 | 61,851.26 | 1.42 | 1.00 | 63,537.22 | 273,618.21 | 2,046,664.21 | 48,733.32 |
| 3,507.00 | 58,575.21 | 1.34 | 1.00 | 60,213.24 | 210,081.00 | 1,571,405.88 | 37,416.90 |
| 3,506.00 | 52,023.45 | 1.19 | 1.00 | 55,299.33 | 149,867.76 | 1,121,010.84 | 26,692.50 |
| 3,505.00 | 38,824.47 | 0.89 | 1.00 | 45,423.96 | 94,568.43 | 707,371.86 | 16,843.30 |
| 3,504.00 | 20,727.15 | 0.48 | 1.00 | 29,775.81 | 49,144.47 | 367,600.64 | 8,752.97 |
| 3,503.00 | 3,370.95 | 0.08 | 1.00 | 12,049.05 | 19,368.66 | 144,877.58 | 3,449.69 |
| 3,502.00 | 2,710.23 | 0.06 | 1.00 | 3,040.59 | 7,319.61 | 54,750.68 | 1,303.67 |
| 3,501.00 | 2,121.51 | 0.05 | 1.00 | 2,415.87 | 4,279.02 | 32,007.07 | 762.12 |
| 3,500.00 | 1,604.79 | 0.04 | N/A | N/A | 0.00 | 0.00 | 0.00 |



NORTH - SOUTH PROFILE



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

TYPE OF SURVEY:
**SO-CONTAINMENT
NORTH - SOUTH
PLAN AND PROFILE**
OF

PROJECT NAME:
**MAD COW
CONTAINMENT**
FOR
LON LON RANCH LLC

PROJECT NUMBER:
23156

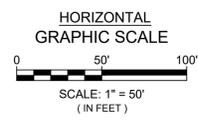
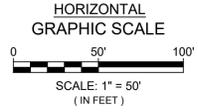
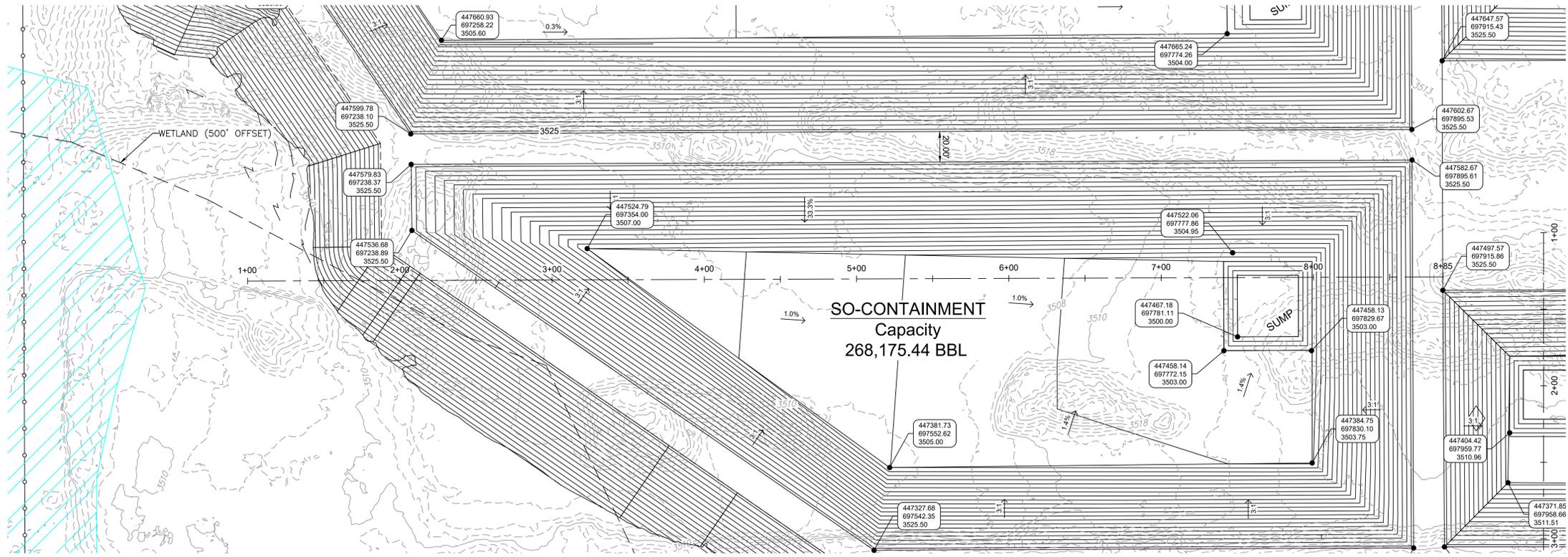
PROJECT ENGINEER:
JEREMY BAKER, PE
DRAWN BY:
LPS



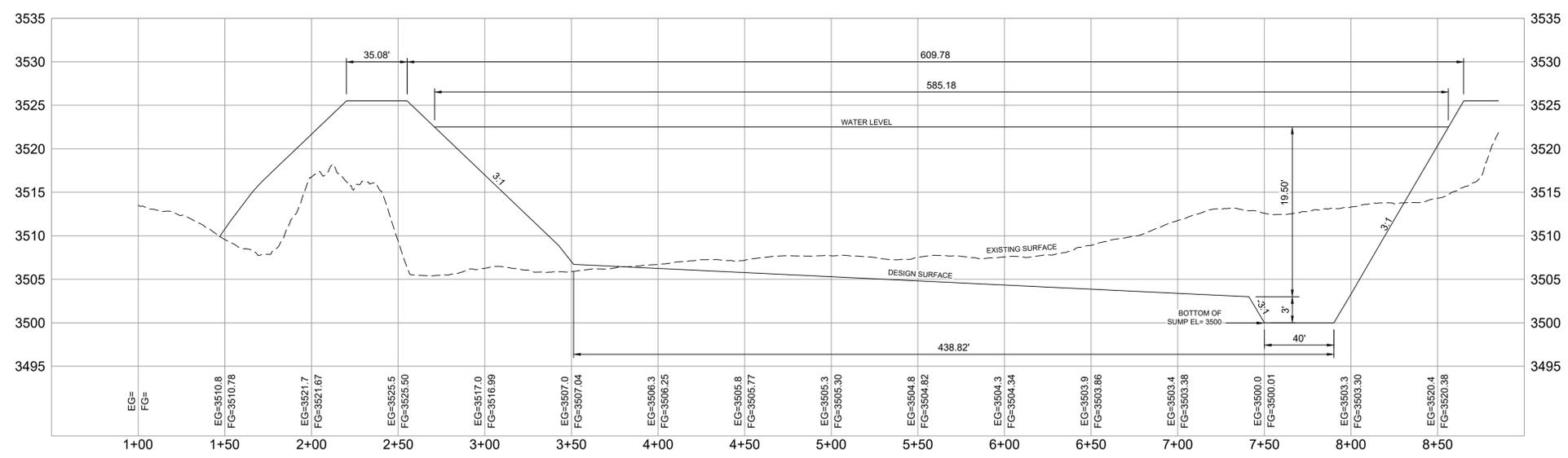
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SHEET:
8 of 14
CG- 103



WEST - EAST PROFILE



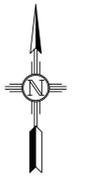
7921 N World Dr.
Hobbs, NM 88242-9032
Squarerootservices.net
575-231-7347

TYPE OF SURVEY:
**SO-CONTAINMENT
WEST - EAST
PLAN AND PROFILE**
OF

PROJECT NAME:
**MAD COW
CONTAINMENT**
FOR
CLIENT:
LON LON RANCH LLC

PROJECT NUMBER:
23156

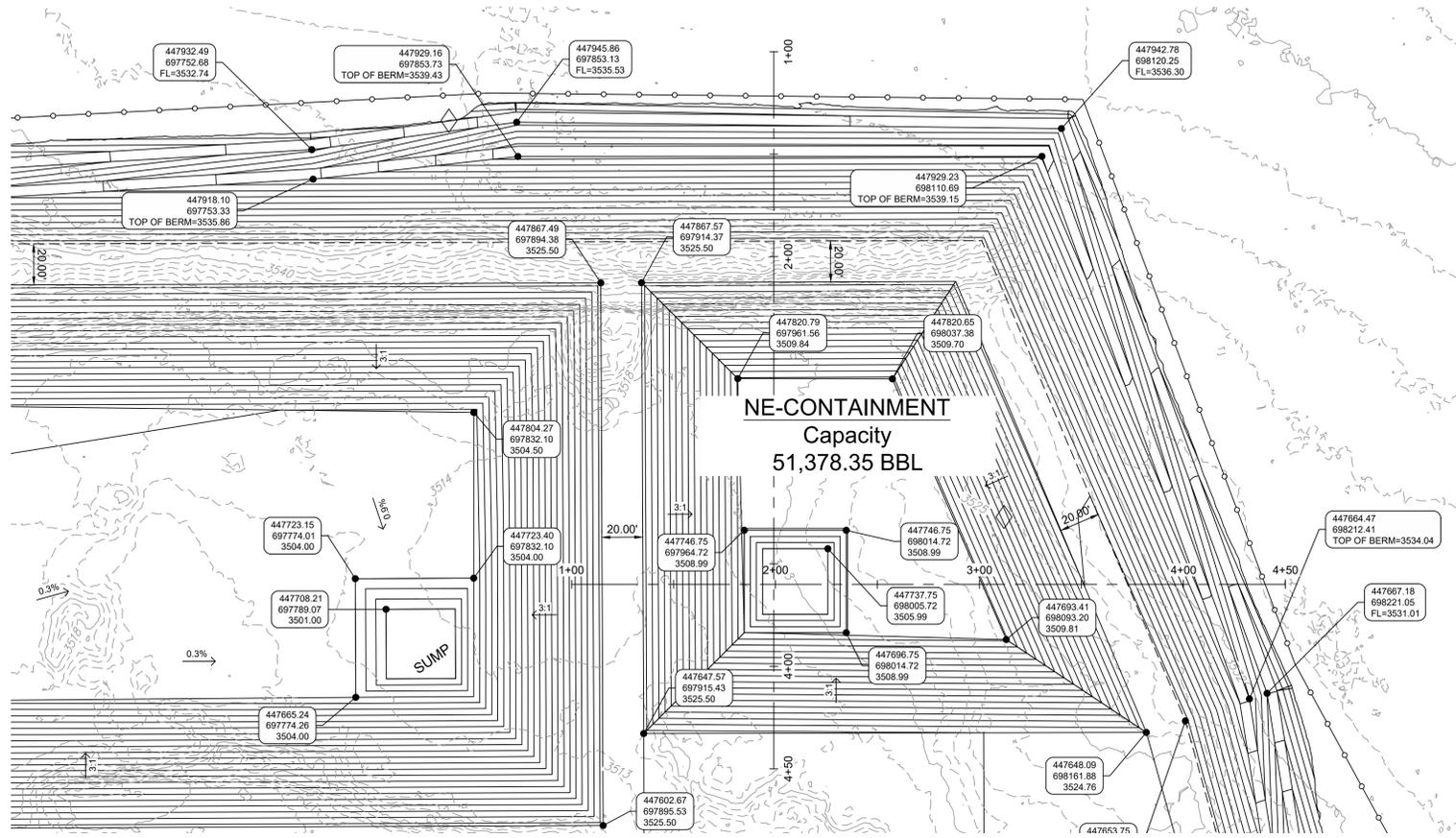
PROJECT ENGINEER:
JEREMY BAKER, PE
DRAWN BY:
LPS



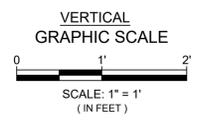
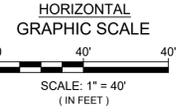
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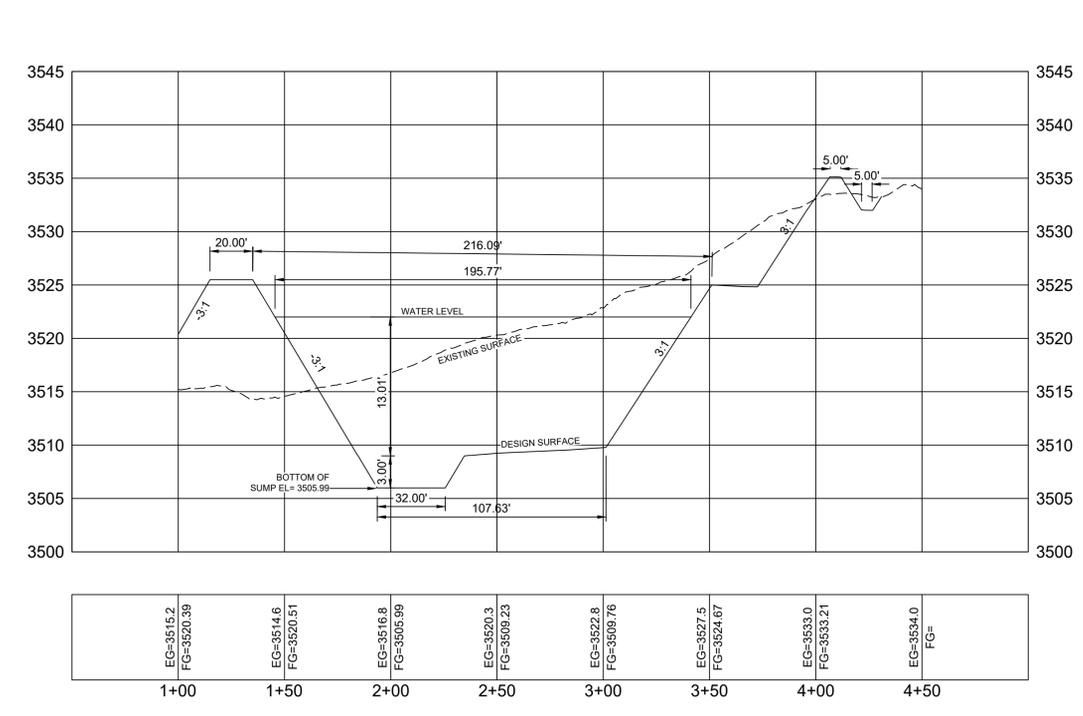
SHEET:
9 of 14
CG- 104



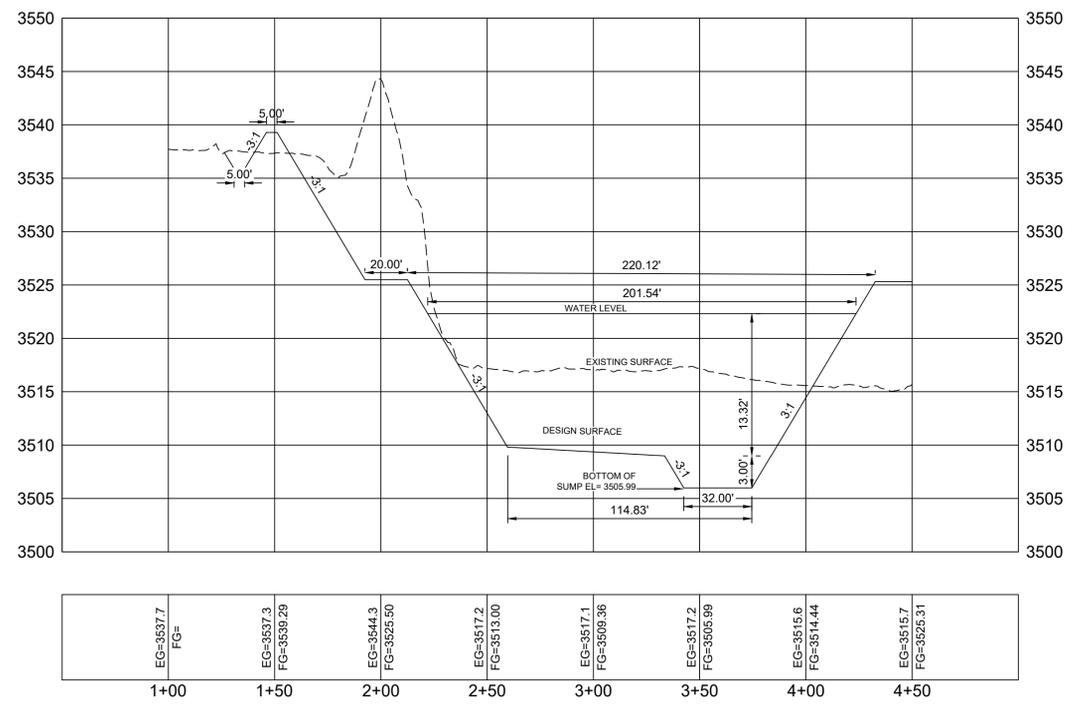
| Contour Elevation | Contour Area (sq. ft) | Surface Area (ac) | Depth (ft) | Incremental Volume (cu. ft) | Cumulative Volume (cu. ft) | Gallons Storage (gal) | BBLs Storage (bbls) |
|-------------------|-----------------------|-------------------|------------|-----------------------------|----------------------------|-----------------------|---------------------|
| 3,524.76 | 42,875.69 | 0.98 | 0.76 | | | | |
| 3,524.00 | 40,815.42 | 0.94 | 1 | 31802.62 | 407198.73 | 3,045,846.50 | 72,524.94 |
| 3,523.00 | 38,367.04 | 0.88 | 1 | 39591.23 | 375396.11 | 2,807,962.90 | 66,860.67 |
| 3,522.00 | 35,993.99 | 0.83 | 0.24 | 37180.51 | 335804.88 | 2,511,820.50 | 59,809.20 |
| 3,521.76 | 35,219.78 | 0.81 | 0.76 | 8545.65 | 298624.37 | 2,233,710.29 | 53,187.09 |
| 3,521.00 | 33,696.28 | 0.77 | 1 | 26188.1 | 290078.71 | 2,169,788.75 | 51,665.05 |
| 3,520.00 | 31,473.91 | 0.72 | 1 | 32585.1 | 263890.61 | 1,973,901.76 | 47,000.76 |
| 3,519.00 | 29,326.88 | 0.67 | 1 | 30400.39 | 231305.51 | 1,730,165.21 | 41,197.13 |
| 3,518.00 | 27,255.18 | 0.63 | 1 | 28291.03 | 200905.12 | 1,502,770.30 | 35,782.61 |
| 3,517.00 | 25,258.81 | 0.58 | 1 | 26256.99 | 172614.09 | 1,291,153.39 | 30,743.78 |
| 3,516.00 | 23,337.78 | 0.54 | 1 | 24298.3 | 146357.1 | 1,094,751.11 | 26,067.22 |
| 3,515.00 | 21,492.09 | 0.49 | 1 | 22414.94 | 122058.8 | 912,999.82 | 21,739.53 |
| 3,514.00 | 19,721.73 | 0.45 | 1 | 20606.91 | 99643.86 | 745,336.07 | 17,747.27 |
| 3,513.00 | 18,026.71 | 0.41 | 1 | 18874.22 | 79036.95 | 591,196.39 | 14,077.03 |
| 3,512.00 | 16,407.03 | 0.38 | 1 | 17216.87 | 60162.73 | 450,017.22 | 10,715.40 |
| 3,511.00 | 14,862.68 | 0.34 | 1 | 15634.86 | 42945.85 | 321,234.96 | 7,648.96 |
| 3,510.00 | 13,393.67 | 0.31 | 1 | 14128.17 | 27311 | 204,286.28 | 4,864.28 |
| 3,509.00 | 2,582.22 | 0.06 | 1 | 7987.95 | 13182.83 | 98,607.57 | 2,347.95 |
| 3,508.00 | 1,941.28 | 0.04 | 1 | 2261.75 | 5194.88 | 38,857.70 | 925.24 |
| 3,507.00 | 1,448.56 | 0.03 | 1 | 1694.92 | 2933.13 | 21,939.81 | 522.41 |
| 3,506.00 | 1,027.84 | N/A | N/A | | 0 | 0.00 | 0.00 |



WEST - EAST PROFILE



NORTH - SOUTH PROFILE



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

TYPE OF SURVEY:
**NE-CONTAINMENT
PLAN AND PROFILE**

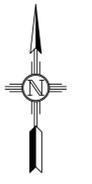
OF
**MAD COW
CONTAINMENT**

FOR
LON LON RANCH LLC

PROJECT NUMBER:
23156

PROJECT ENGINEER:
JEREMY BAKER, PE

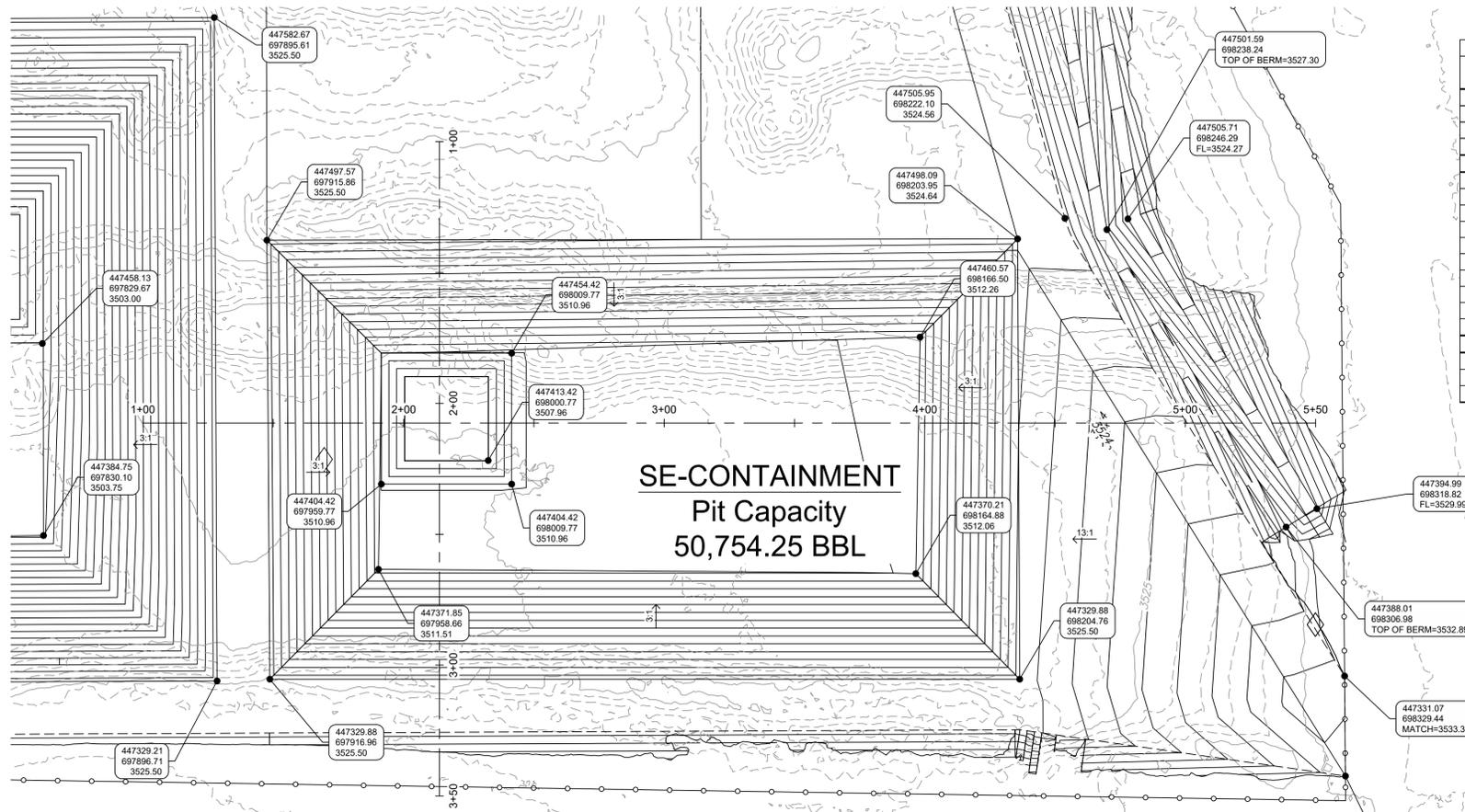
DRAWN BY:
LPS



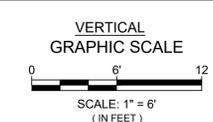
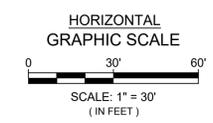
| REVISIONS | | |
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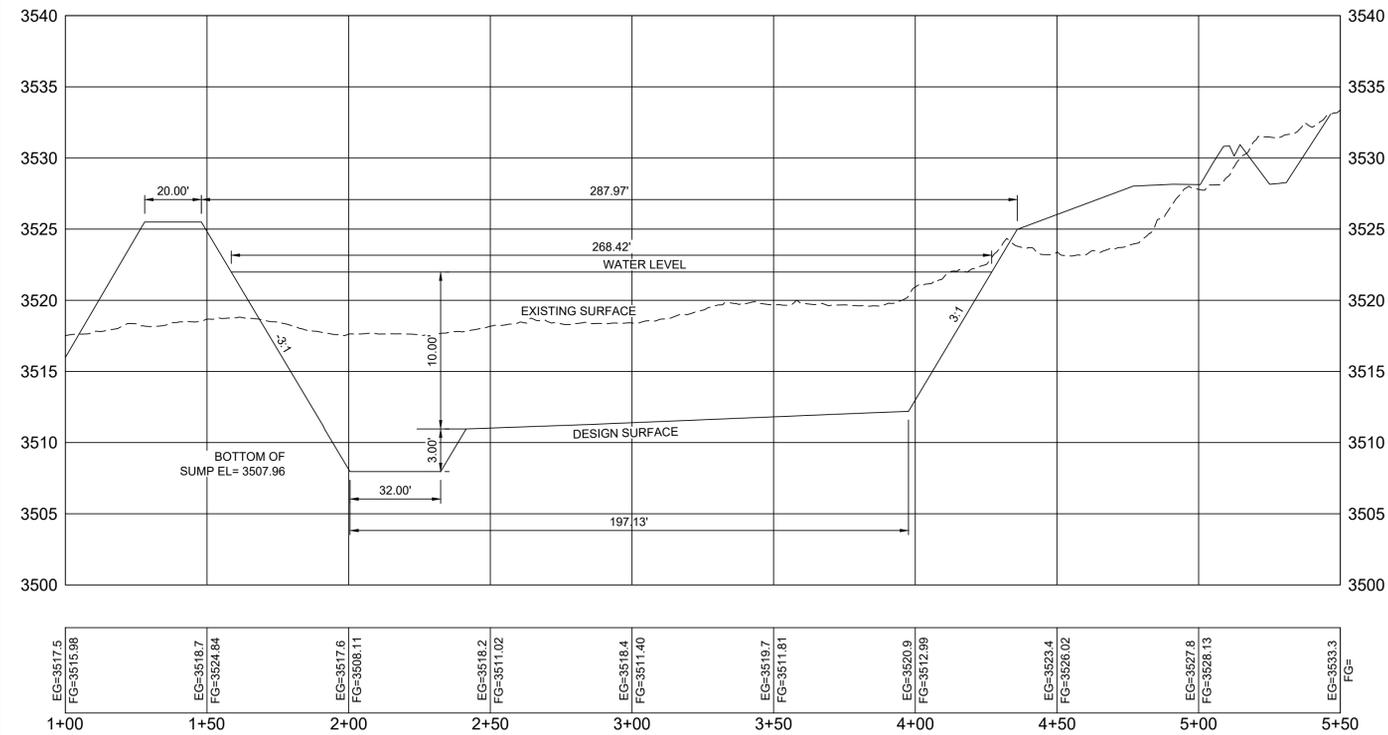
SHEET:
10 of 14
CG- 105



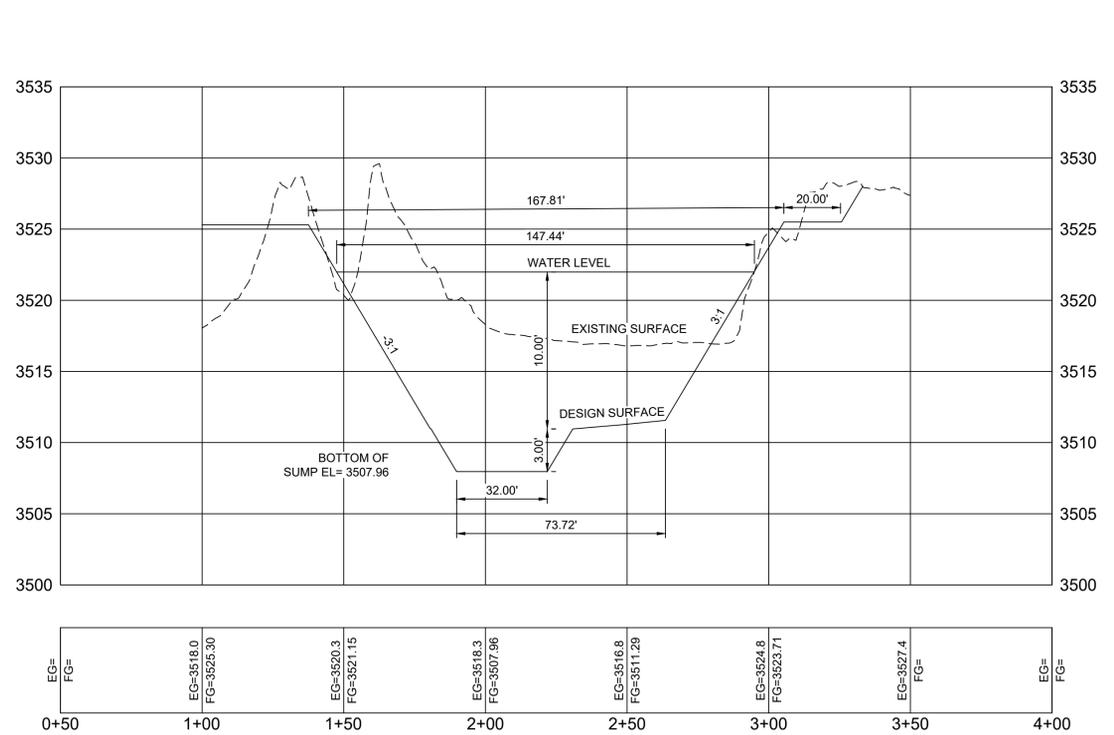
| Contour | Contour Area | Surface Area | Depth | Incremental Volume | Cumulative Volume | Gallons Storage | BBLs Storage | |
|-----------|--------------|--------------|-------|--------------------|-------------------|-----------------|--------------|----------------|
| Elevation | (sq. ft) | (ac) | (ft) | Avg. End (cu. ft) | Avg. End (cu. ft) | (gal) | (bbls) | |
| 3,524.64 | 46,728.81 | 1.07 | 0.64 | | | | | Freeboard |
| 3,524.00 | 44,918.62 | 1.03 | 1.00 | 29,327.18 | 413,056.78 | 3,089,664.71 | 73,568.30 | |
| 3,523.00 | 42,311.35 | 0.97 | 1.00 | 43,614.99 | 383,729.60 | 2,870,297.41 | 68,344.93 | |
| 3,522.00 | 39,776.09 | 0.91 | 0.36 | 41,043.72 | 340,114.61 | 2,544,057.28 | 60,576.79 | |
| 3,521.64 | 38,880.96 | 0.89 | 0.64 | 14,158.27 | 299,070.90 | 2,237,050.33 | 53,266.62 | Max Volume |
| 3,521.00 | 37,312.81 | 0.86 | 1.00 | 24,382.01 | 284,912.63 | 2,131,146.47 | 50,744.93 | |
| 3,520.00 | 34,921.54 | 0.80 | 1.00 | 36,117.18 | 260,530.62 | 1,948,769.04 | 46,402.33 | |
| 3,519.00 | 32,602.27 | 0.75 | 1.00 | 33,761.90 | 224,413.44 | 1,678,612.53 | 39,969.60 | |
| 3,518.00 | 30,354.99 | 0.70 | 1.00 | 31,478.63 | 190,651.54 | 1,426,073.52 | 33,956.37 | |
| 3,517.00 | 28,179.71 | 0.65 | 1.00 | 29,267.35 | 159,172.91 | 1,190,613.37 | 28,349.81 | |
| 3,516.00 | 26,076.43 | 0.60 | 1.00 | 27,128.07 | 129,905.56 | 971,693.59 | 23,137.09 | |
| 3,515.00 | 24,045.15 | 0.55 | 1.00 | 25,060.79 | 102,777.49 | 768,775.63 | 18,305.39 | Storage Volume |
| 3,514.00 | 22,085.86 | 0.51 | 1.00 | 23,065.51 | 77,716.70 | 581,320.92 | 13,841.89 | |
| 3,513.00 | 20,198.58 | 0.46 | 1.00 | 21,142.22 | 54,651.20 | 408,790.98 | 9,733.76 | |
| 3,512.00 | 16,545.50 | 0.38 | 1.00 | 18,372.04 | 33,508.98 | 250,647.17 | 5,968.18 | |
| 3,511.00 | 2,924.65 | 0.07 | 1.00 | 9,735.08 | 15,136.94 | 113,224.31 | 2,695.99 | Floor Volume |
| 3,510.00 | 1,957.42 | 0.04 | 1.00 | 2,441.04 | 5,401.86 | 40,405.91 | 962.11 | |
| 3,509.00 | 1,462.40 | 0.03 | 1.00 | 1,709.91 | 2,960.82 | 22,146.93 | 527.34 | Sump Volume |
| 3,508.00 | 1,039.42 | 0.02 | N/A | N/A | 0.00 | 0.00 | 0.00 | |



WEST - EAST PROFILE



NORTH - SOUTH PROFILE



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

TYPE OF SURVEY:
SE-CONTAINMENT
PLAN AND PROFILE

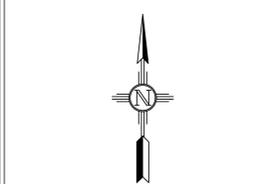
PROJECT NAME:
MAD COW
CONTAINMENT

CLIENT:
LON LON RANCH LLC

PROJECT NUMBER:
23156

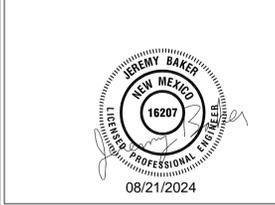
PROJECT ENGINEER:
JEREMY BAKER, PE

DRAWN BY:
LPS



REVISIONS

| No. | DATE | DESCRIPTION |
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Engineering | Surveying
Materials Testing

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

ENGINEERING SHEET:

FENCE DETAILS

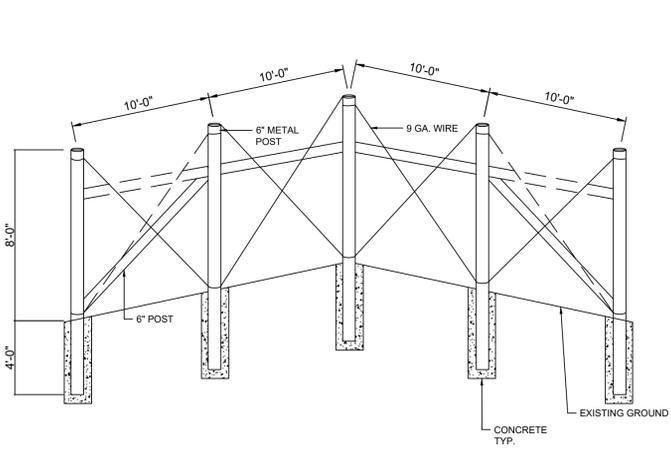
OF
PROJECT NAME:

MAD COW
CONTAINMENT

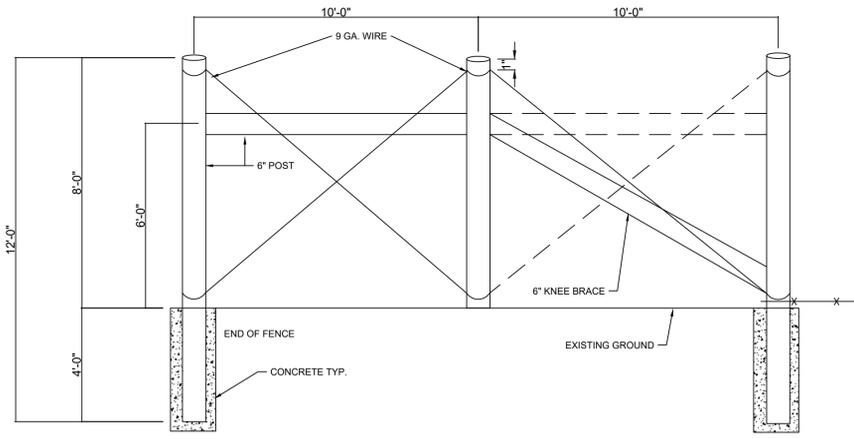
FOR
CLIENT: LON LON RANCH

PROJECT NUMBER:
23156

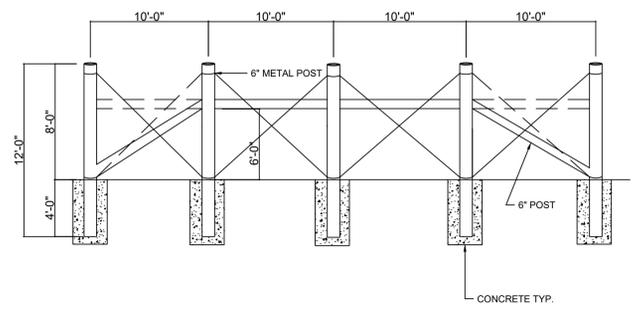
PROJECT ENGINEER:
Jeremy Baker, PE
DRAWN BY: MG



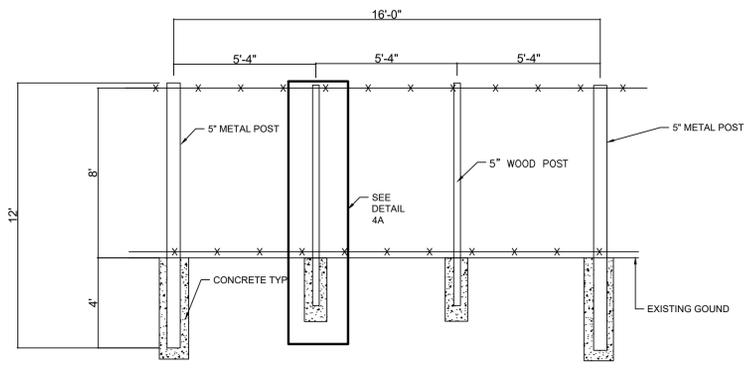
1 CORNER POST



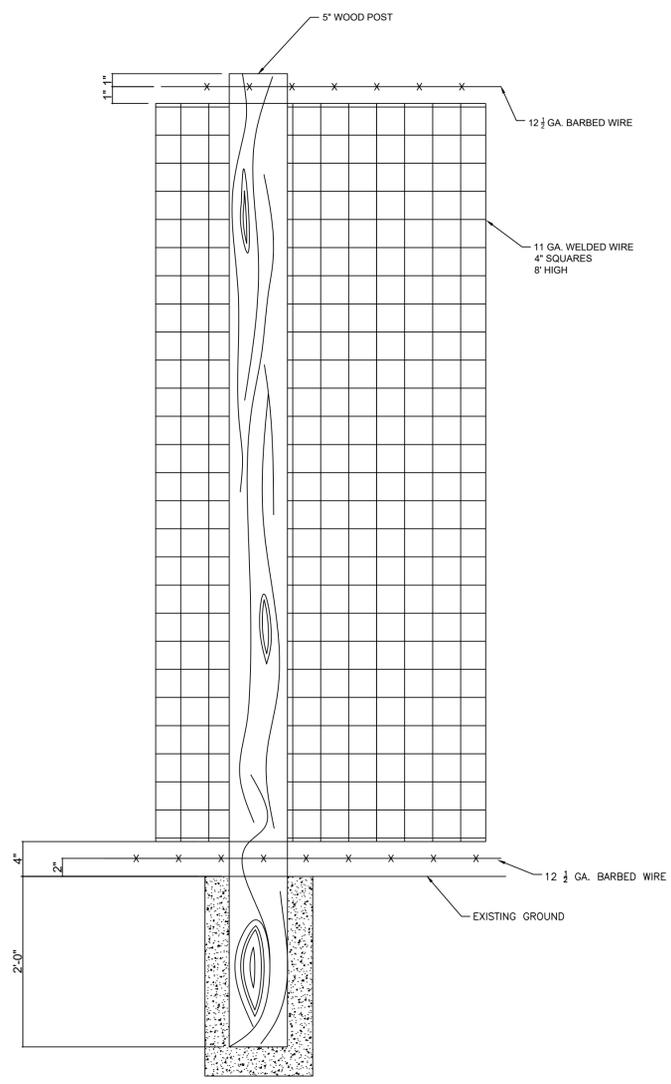
2 END POST



3 LINE BRACE POST



4 LINE POST



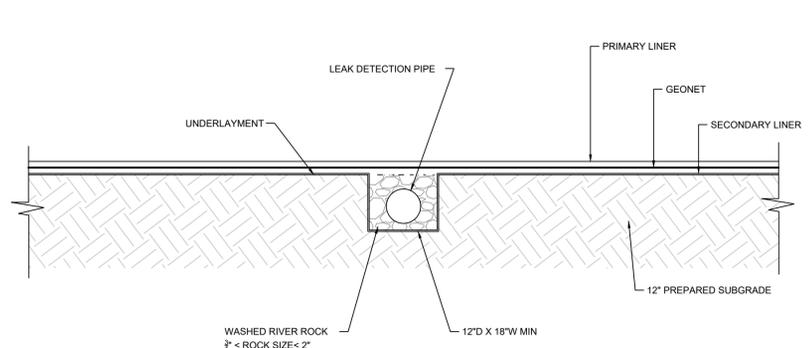
4A WOOD POST

REVISIONS

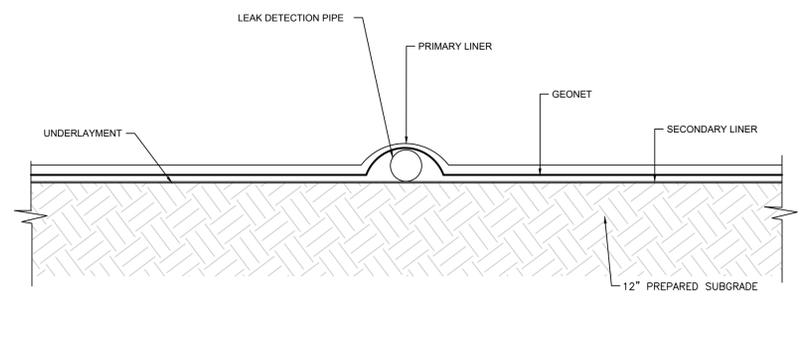
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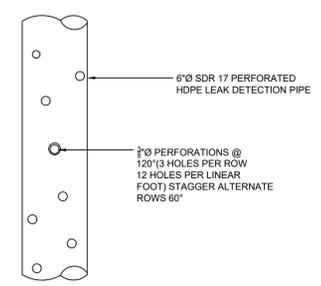
SHEET:
14 of 14
CD- 102



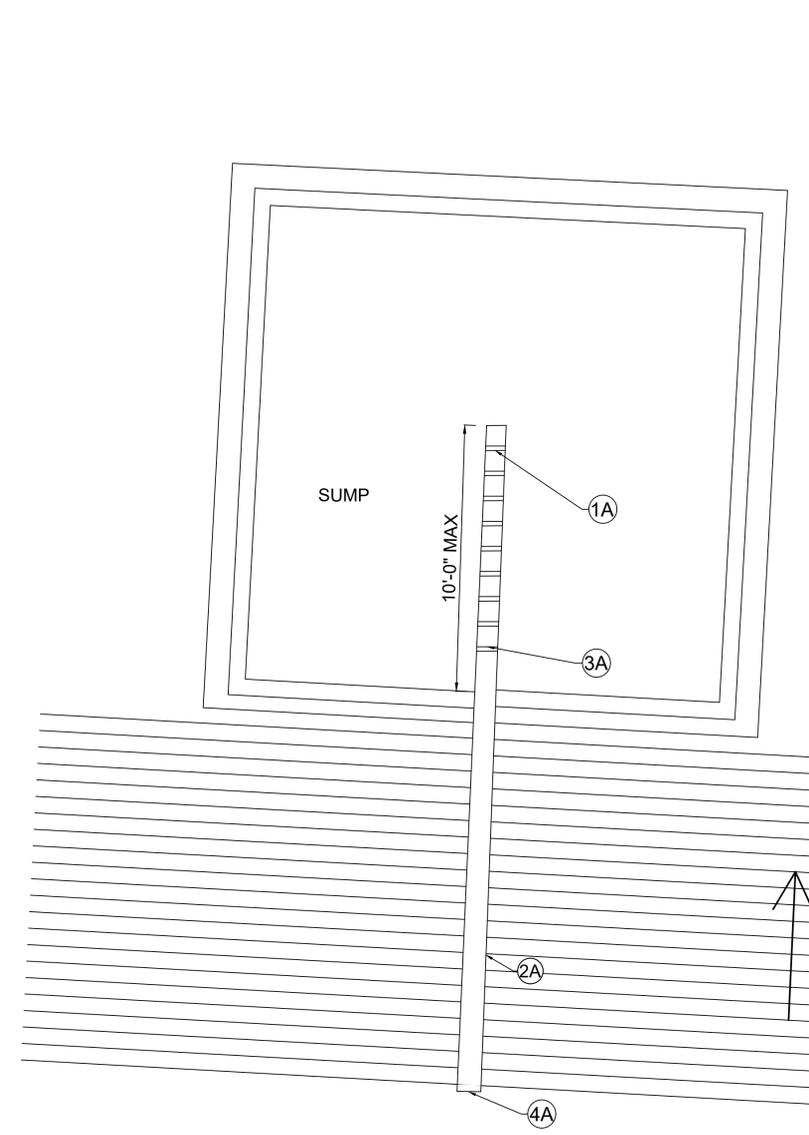
1A SUMP DETECTION CROSS SECTION



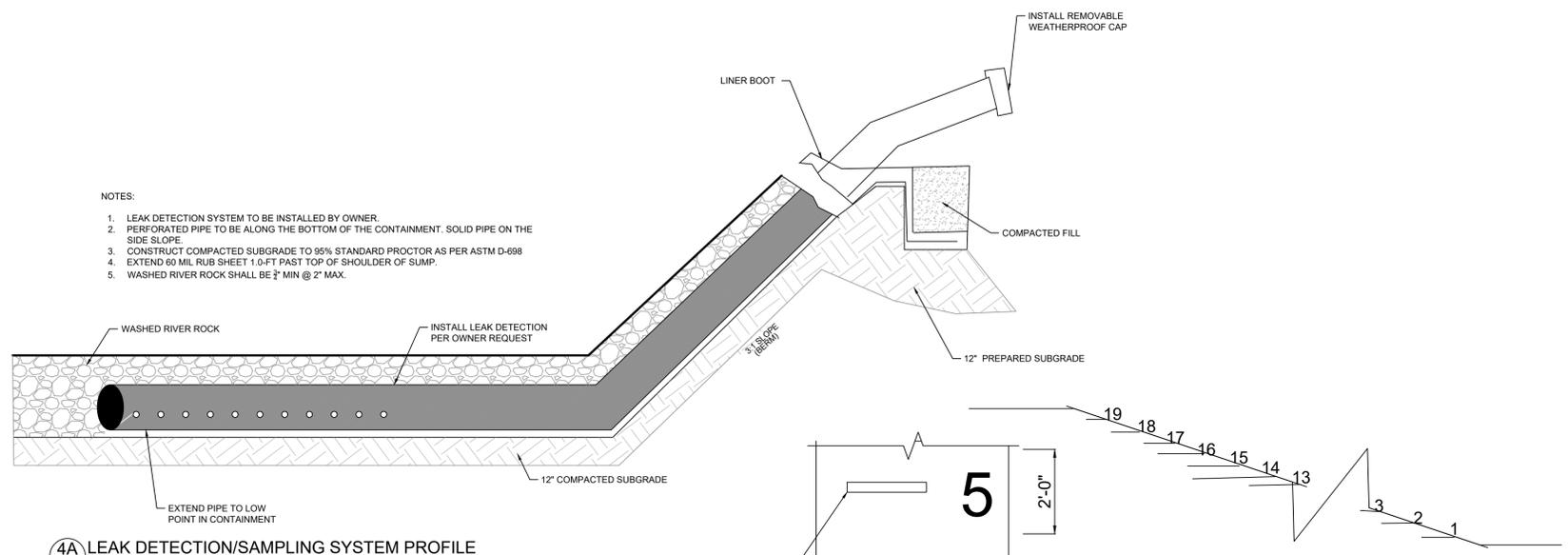
2A SIDE SLOPE LEAK DETECTION PIPE DETAIL



3A PERFORATED PIPE DETAIL

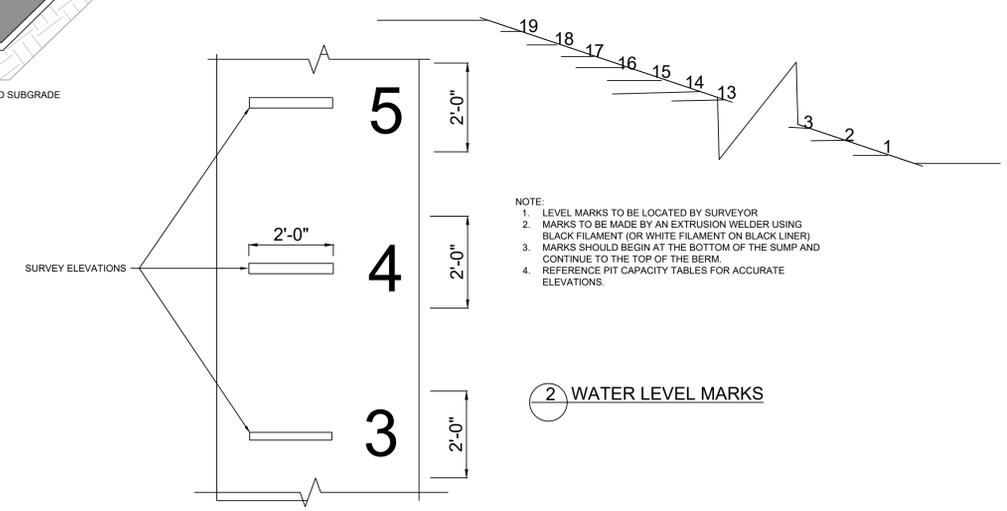


1 CONTAINMENT SUMP PLAN DETAIL



4A LEAK DETECTION/SAMPLING SYSTEM PROFILE

- 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\"/>



- NOTE:
1. LEVEL MARKS TO BE LOCATED BY SURVEYOR
 2. MARKS TO BE MADE BY AN EXTRUSION WELDER USING BLACK FILAMENT (OR WHITE FILAMENT ON BLACK LINER)
 3. MARKS SHOULD BEGIN AT THE BOTTOM OF THE SUMP 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 |
| SUMP ELEVATION | 3502.00 |
| BERM (ROAD CREST) ELEVATION | 3525.50 |
| LEAK DETECTION PIPING | 6-IN DR11 X PERFORATED HDPE PIPE LEAK DETECTION PIPE |



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

ENGINEERING SHEET:

SUMP DETAILS
OF
PROJECT NAME:
MAD COW CONTAINMENT
FOR
CLIENT:
LON LON RANCH

PROJECT NUMBER:
23156

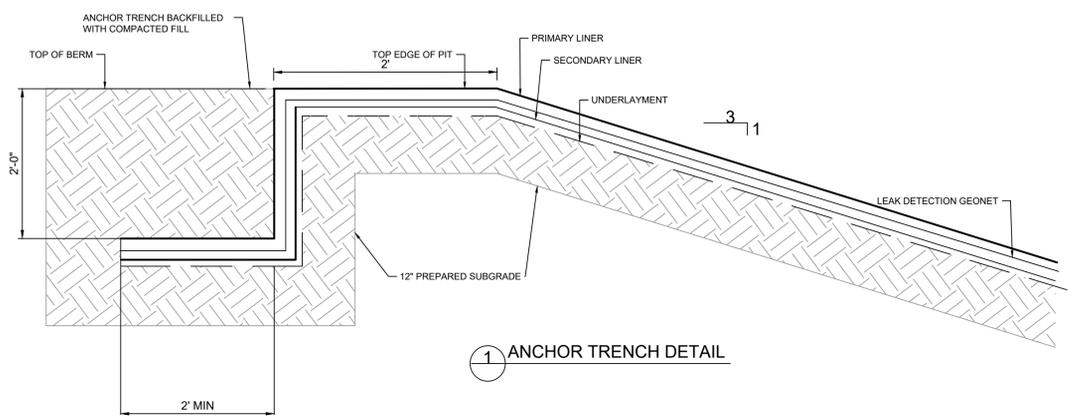
PROJECT ENGINEER:
Jeremy Baker, PE
DRAWN BY:
MG

REVISIONS

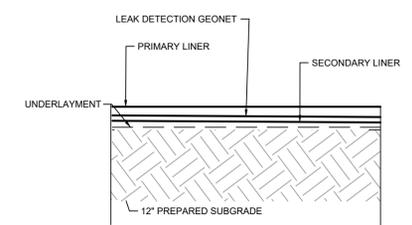
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SHEET:
12 of 14
CD- 100

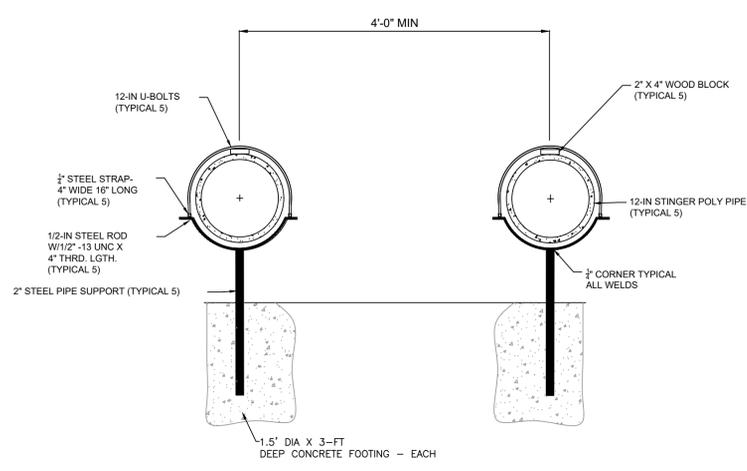


1 ANCHOR TRENCH DETAIL

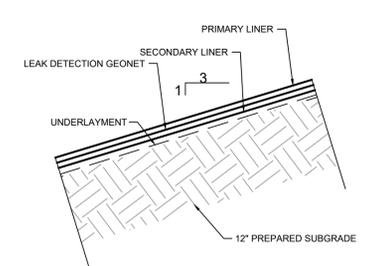


4 LINER SYSTEM FLOOR DETAIL

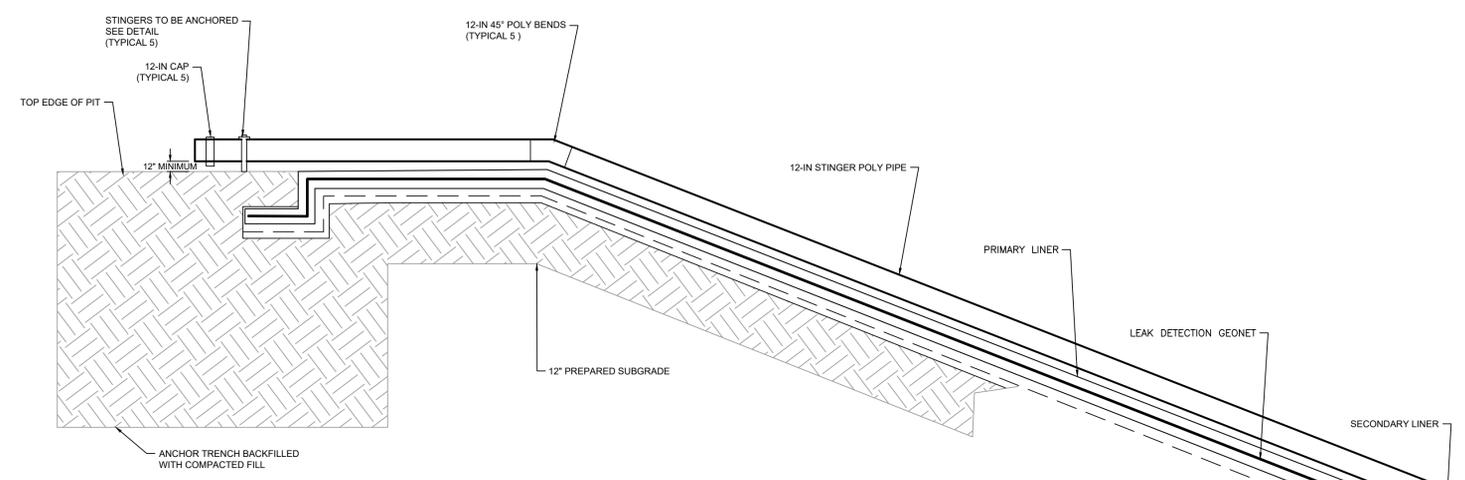
- GENERAL NOTES:
1. PREPARED SUBGRADE MEANS COMPACTED SMOOTH SUBGRADE FREE OF ROCK, ROOTS, WOOD DEBRIS, CONCRETE RUBBLE AND ANY SHARP OBJECTS THAT MAY PUNCTURE THE HDPE LINER, A MINIMUM COMPACTED DEPTH OF 12".
 2. ALL INTERIOR SLOPES AND TOP OF BERMS TO BE SMOOTH DRUM ROLLED
 3. ALL EMBANKMENT SLOPES 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 CD - 100



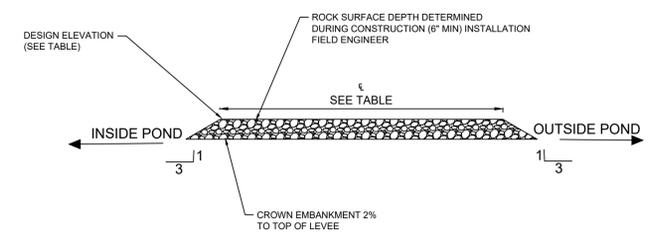
3 STINGER SYSTEM ANCHOR DETAIL



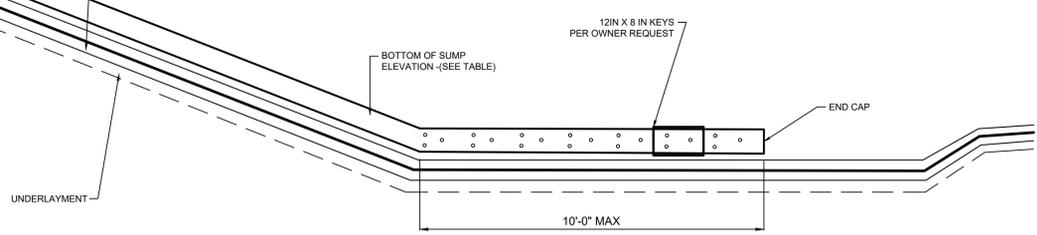
5 LINER SYSTEM SIDE SLOPE



2 STINGER SECTION DETAIL



6 TYPICAL CREST DETAIL



Engineering | Surveying
Materials Testing

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

ENGINEERING SHEET:

LINER DETAILS
OF

PROJECT NAME:

**MAD COW
CONTAINMENT**

FOR

CLIENT:
LON LON RANCH

PROJECT NUMBER:
23156

PROJECT ENGINEER:
Jeremy Baker, PE

DRAWN BY:
MG

| REVISIONS | | |
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| No. | DATE | DESCRIPTION |
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SHEET:
13 of 14
CD- 101

EFFECTIVE WIDE-AREA BIRD CONTROL!

Mega Blaster PRO sonic bird repeller covers 30 acres!



Mega Blaster PRO uses intermittent distress calls to create a "danger zone" that frightens infesting birds away for good. PREDATOR cries help scare all the birds.



- NEMA Rated Case
- Crystal-Clear Digital Sounds
- Laughing Gull
- Ring-Billed Gull
- Herring Gull
- California Gull
- Black-Headed Gull
- Glaucous-Winged Gull
- Double Crested Cormorant
- Marsh Hawk

Perfect for Landfills, Airfields, Fish Farms, Farm Fields or any multi-acre facility.

Our most powerful system features two high-output amplifiers that drive our specially-designed 20 speaker tower. The intense sound output covers up to 30 acres (12 hectares).

It features solid-state electronics mounted inside a NEMA-type control box, suitable for most any application.

The generating unit mounts easily to a post or pole using the included hardware. The unit comes pre-recorded in four different configurations for the most common bird infestations.

Choose any or all of the 8 sounds, including predators to give the birds even more of a sense of danger. Customize by choosing volume and silent time between sounds.

Mega Blaster PRO

Complete system includes the generating unit with two built-in high-output amplifiers, 20-speaker tower with audio cables, 40 watt solar panel, battery clips and all mounting hardware.

- CONFIGURATIONS AVAILABLE:**
- Agricultural # MEGA-AG
 - Crow / Raven # MEGA-CROW
 - Woodpecker # MEGA-WP
 - Marine / Gull # MEGA-MAR



The Bird Control 'X'-Perts

NOTE: This unit is capable of sound output up to 125 decibels. **HEARING PROTECTION IS RECOMMENDED.**

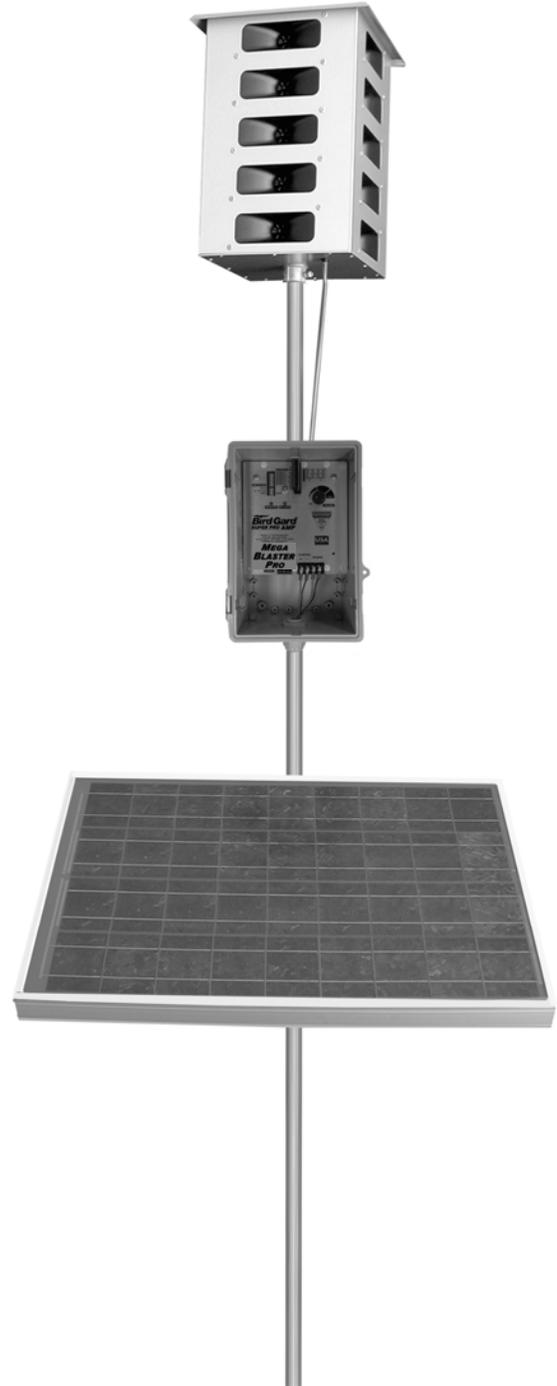


MEGA BLASTER PRO



User's Manual

| | |
|------------------------------------|----|
| Overview | 2 |
| Bird Control Management Guidelines | 3 |
| Materials List | 4 |
| Assembly | 5 |
| Control Unit | 5 |
| Solar Panel | 5 |
| Placement | 6 |
| Building a Mounting Pole or Mast | 7 |
| Installation | 8 |
| 20-Speaker Tower | 8 |
| Solar Panel | 8 |
| Control Box | 9 |
| Solar Panel Connections | 9 |
| Settings | 10 |
| Recordings | 10 |
| Mode Settings | 10 |
| Warranty | 12 |



Overview

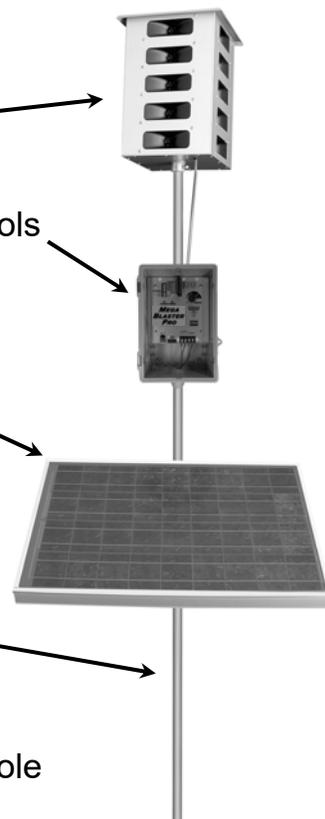
The Bird-X Mega Blaster Pro utilizes the innate power of the natural survival instincts of birds to effectively repel them. Digital recordings of distressed and alarmed birds, along with the sounds made by their natural predators are broadcast through high fidelity weather-resistant speakers over the 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

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/grispeccs) 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

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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*

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- (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,

RK 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

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.

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.

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

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 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

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

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

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.

Design and Construction Plan In Ground Containments

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).

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 Pro¹ 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.

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).

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.

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...

Design and Construction Plan In Ground Containments

- 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).

Liner and Drainage Geotextile Installation

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

The primary (upper) liner is a geomembrane liner composed of an impervious, synthetic material that is resistant to ultraviolet light, petroleum hydrocarbons, salts and acidic and alkaline solutions. It is 60-mil HDPE. The secondary liner is 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.

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.

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

(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.

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.

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.

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.

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...

Design and Construction Plan In Ground Containments

- 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

At points of discharge into the lined earthen containment the pipe configuration effectively protects the liner from excessive hydrostatic force or mechanical damage during filling.

The design shows that at any point of discharge into or suction from the recycling containment, the liner is protected from excessive hydrostatic force or mechanical damage. External discharge or suction lines do not penetrate the liner.

Pumping from the containment to hydraulic fracturing operations is the responsibility of stimulation contractors. Typically, 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).

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.

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.

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.

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.

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.

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

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.

Operation and Maintenance Plan In Ground Containments

- 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.

Operation and Maintenance Plan In Ground Containments

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.

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.

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.

Operation and Maintenance Plan In Ground Containments

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.

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.

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.

Operation and Maintenance Plan In Ground Containments

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.

Operation and Maintenance Plan In Ground Containments

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.

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,

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 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.

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.

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.

Closure Plan In Ground Containments

- 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: Thursday, September 26, 2024 2:09 PM
To: Bobbi Settle; 'BobbiJo Crain'
Subject: 2RF-207 - MAD COW RECYCLING FACILITY AND CONTAINMENTS FACILITY [fVV2426951124]
Attachments: C-147 2RF-207 - MAD COW RECYCLING FACILITY AND CONTAINMENTS FACILITY [fVV2426951124] 09.26.2024.pdf

2RF-207 - MAD COW RECYCLING FACILITY AND CONTAINMENTS FACILITY [fVV2426951124]

Good afternoon Ms. Settle,
 NMOCD has reviewed the recycling containment permit application and related documents, submitted by [330307] Vaughan Operating LLC on September 04, 2024, Application ID: 38071, for 2RF-207 - MAD COW RECYCLING FACILITY AND CONTAINMENTS FACILITY [fVV2426951124] in I-12-24S-30E, Eddy County, New Mexico. The form C-147 and related documents for 2RF-207 - MAD COW RECYCLING FACILITY AND CONTAINMENTS FACILITY [fVV2426951124] is approved with the following conditions of approval:

- [330307] Vaughan Operating LLC shall construct, operate, maintain, close, and reclaim 2RF-207 - MAD COW RECYCLING FACILITY AND CONTAINMENTS FACILITY [fVV2426951124] in compliance with 19.15.34 NMAC.
- 2RF-207 - MAD COW RECYCLING FACILITY AND CONTAINMENTS FACILITY [fVV2426951124] is approved for five years of operation from the date of permit application. 2RF-207 - MAD COW RECYCLING FACILITY AND CONTAINMENTS FACILITY [fVV2426951124] permit expires on September 04, 2029. If [330307] Vaughan Operating LLC, wishes to extend operations past five years, an annual permit extension request must be submitted using an NMOCD form C-147 through OCD Online by August 04, 2029.
- 2RF-207 - MAD COW RECYCLING FACILITY AND CONTAINMENTS FACILITY [fVV2426951124] consists of four (4) earthen containment with a total capacity of approximately 780,000.00 bbl.
- Per Rule 19.15.34.15.A.(1) operators without existing financial assurance pursuant to 19.15.8 NMAC shall furnish financial assurance acceptable to the division in the amount of the recycling containment’s estimated closure cost. The total closure cost estimate provided in the application in the amount of \$ 679,144.04 for 2RF-207 - MAD COW RECYCLING FACILITY AND CONTAINMENTS FACILITY [fVV2426951124] meets the requirements of NMAC 19.15.34.15.A.(1).
- [330307] Vaughan Operating LLC cannot receive produced water in 2RF-207 - MAD COW RECYCLING FACILITY AND CONTAINMENTS FACILITY [fVV2426951124] until after the original copy of the financial assurance has been accepted by NMOCD. The financial assurance bond should be mailed

EMNRD - Oil Conservation Division
Administration and Compliance Bureau
1220 S. St. Francis Drive
Santa Fe, NM 87505

- [330307] Vaughan Operating LLC shall notify OCD when construction of 2RF-207 - MAD COW RECYCLING FACILITY AND CONTAINMENTS FACILITY [fVV2426951124] commences.
- [330307] Vaughan Operating LLC shall notify OCD when recycling operations commence and cease at 2RF-207 - MAD COW RECYCLING FACILITY AND CONTAINMENTS FACILITY [fVV2426951124].
- A minimum of 3-feet freeboard must be maintained at 2RF-207 - MAD COW RECYCLING FACILITY AND CONTAINMENTS FACILITY [fVV2426951124], at all times during operations.

- If less than 20% of the total fluid capacity is utilized every six months, beginning from the first withdrawal, operation of the facility is considered ceased and notification of cessation of operations should be sent electronically to OCD Online. An extension to extend the cessation of operation, not to exceed six months, may be submitted using a C-147 form through OCD Online.
- [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 Online 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-207 - MAD COW RECYCLING FACILITY AND CONTAINMENTS FACILITY [fVV2426951124].

Please reference number 2RF-207 - MAD COW RECYCLING FACILITY AND CONTAINMENTS FACILITY [fVV2426951124] in all future communications.

Regards,

Victoria Venegas • Environmental Specialist

Environmental Bureau

EMNRD - Oil Conservation Division

506 W. Texas Ave. Artesia, NM 88210

(575) 909-0269 | Victoria.Venegas@emnrd.nm.gov

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District IV
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 Phone:(505) 476-3470 Fax:(505) 476-3462

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

CONDITIONS
 Action 380711

CONDITIONS

| | |
|---|---|
| Operator: Vaughan Operating LLC 3021 Hepler Rd. Carlsbad, NM 88220 | OGRID: 330307 |
| | Action Number: 380711 |
| | Action Type: [C-147] Water Recycle Long (C-147L) |

CONDITIONS

| Created By | Condition | Condition Date |
|------------|--|----------------|
| vvenegas | NMOCD has reviewed and approved the recycling containment permit application and related documents, submitted by [330307] Vaughan Operating LLC on September 04, 2024, Application ID: 38071, for 2RF-207 - MAD COW RECYCLING FACILITY AND CONTAINMENTS FACILITY [fVV2426951124] in I-12-24S-30E, Eddy County, New Mexico. • [330307] Vaughan Operating LLC shall construct, operate, maintain, close, and reclaim 2RF-207 - MAD COW RECYCLING FACILITY AND CONTAINMENTS FACILITY [fVV2426951124] in compliance with 19.15.34 NMAC. • [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-207 - MAD COW RECYCLING FACILITY AND CONTAINMENTS FACILITY [fVV2426951124]. | 9/26/2024 |