

October 2024

**Volume 1: C-147 Registration for
Dayton Containments #1 and #2
Section 27, T 18S, R 26E, Eddy County NM**

Transmittal Letter

C-147 Form

Driving Directions

Design Drawings and Specifications

Design Construction Plan

Operations & Maintenance and Closure Plans



View north from southern edge of proposed Dayton Containments showing nature of landscape and vegetation.

**Prepared for:
Silverback Operating II, LLC
San Antonio, Texas**

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

**Cascade Services, LLC
4400 N Big Spring Street #114
Midland, TX 79705**

R. T. HICKS CONSULTANTS, LTD.

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

October 1, 2024

Mr. Mike Bratcher
NMOCD - District 2, Supervisor
811 S. First St.
Artesia, NM 88210
Via E-Mail

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

RE: Silverback Operating II, LLC, C-147 and Siting Criteria Demonstration for
Dayton Recycling Facility
In-Ground Containments 1 &2 and AST Containments 3&4

Dear Mr. Bratcher and Ms. Venegas:

On behalf of Silverback Operating II, LLC (Silverback), R.T. Hicks Consultants is pleased submit Volumes 1, 2 and 3 of the registration/permit for the above-referenced project. The in-ground containments are holding fresh water now but will accept produced water on or after August 25th. The ASTs will also accept produced water on or after August 25th. We apologize for the short notice of the AST submission and would appreciate your attention to this matter.

Please note that the siting criteria demonstration evaluates the recycling project area that includes the In-Ground, AST Containments and working area.

Hicks Consultants affirms that

- the location meets all siting criteria in the Rule and the location meets the specified setback criteria
- the Design/Construction Plan, Operation and Maintenance Plan and Closure Plan are consistent with the Rule.

Volume 1 of the registration package includes:

- Signed C-147
- Survey
- Final engineering plans and specifications for construction of the two in-ground containments
- Demonstrations of equivalency of the secondary liner system
- The Design/Construction Plan previously approved by OCD
- Operations & Maintenance Plan previously approved by OCD
- Closure Plan previously approved by OCD
- Provision of a Game Fence to comply with 19.15.34.13.D1.

Silverback will specify that the Avian Deterrent System include hazing calls for the Permian Basin of New Mexico.

October 1, 2024

Page 2

Volume 2 is the Siting Criteria Demonstration and Appendices

Volume 3 provides the following information for the AST

- Operation and Maintenance plan previously approved by OCD
- Closure Plan previously approved by OCD
- Design Construction Plan previously approved by OCD
- Variances previously approved by OCD

This submission for the in-ground containments is a registration, thus Silverback can employ these storage facilities for produced water after OCD receipt of this C-147. However, the AST portion of the submission requires review by OCD (permit). Thus, we greatly appreciate your timely review.

Silverback will transmit Volumes 1, 2 and 3 to OCD via the OCD.Online portal.

In compliance with 19.15.34.10 of the Rule, this transmission is copied to Silverback Operating, the majority owner of the surface. Silverback will transmit the C-147 to the minority owners of the surface shortly.

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: Silverback Operating

C-147

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

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

Form C-147
Revised April 3, 2017

Recycling Facility and/or Recycling Containment

Type of Facility: Recycling Facility Recycling Containment*

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

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

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

1.
Operator: Silverback Operating II, LLC (For multiple operators attach page with information) OGRID #: 330968
Address: 1001 West Wilshire Blvd, Suite 206, Oklahoma City, OK 73112
Facility or well name (include API# if associated with a well): Dayton Recycling Facility and Containments #1, #2, #3 and #4
OCD Permit Number: 2RF-208 (For new facilities the permit number will be assigned by the district office)
U/L or Qtr/Qtr G Section 27 Township 18S Range 26E County: Eddy
Surface Owner: Federal State Private Tribal Trust or Indian Allotment

2.
 Recycling Facility:
Location of recycling facility (if applicable): Latitude 32.71989 Longitude -104.36706 Approx NAD83
Proposed Use: Drilling* Completion* Production* Plugging*
**The re-use of produced water may NOT be used until fresh water zones are cased and cemented*
 Other, *requires permit for other uses. Describe use, process, testing, volume of produced water and ensure there will be no adverse impact on groundwater or surface water.*
 Fluid Storage
 Above ground tanks Recycling containment Activity permitted under 19.15.17 NMAC explain type _____
 Activity permitted under 19.15.36 NMAC explain type: _____ Other explain _____
 For multiple or additional recycling containments, attach design and location information of each containment
 Closure Report (required within 60 days of closure completion): Recycling Facility Closure Completion Date: _____

3.
 Recycling Containment: Dayton #1 &2, Dayton AST #3 & 4
 Annual Extension after initial 5 years (attach summary of monthly leak detection inspections for previous year)
Center of Recycling Containment (if applicable): Latitude 32.72118 Longitude -104.367001 Approx NAD83 For multiple or additional recycling containments, attach design and location information of each containment
 Lined Liner type: Thickness See Drawings LLDPE HDPE PVC Other _____
 String-Reinforced
Liner Seams: Welded Factory Other _____ Volume: See Drawings bbl Dimensions: L _____ x W _____ x D _____
 Recycling Containment Closure Completion Date: _____

4.

Bonding:

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

Bonding in accordance with 19.15.34.15(A)(1). Amount of bond \$ _____ (work on these facilities cannot commence until bonding amounts are approved)

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

5.

Fencing:

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

Alternate. Please specify __ Game Fence with option to install 4 strands barbed wire if required by District Office and AST Gates per variance _____

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 FIGURE 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. FIGURE 3	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA
- Written confirmation or verification from the municipality; written approval obtained from the municipality	
Within the area overlying a subsurface mine. FIGURE 4	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
- Written confirmation or verification or map from the NM EMNRD-Mining and Minerals Division	
Within an unstable area. FIGURE 5	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
- Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; topographic map	
Within a 100-year floodplain. FEMA map FIGURE 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). FIGURE 7	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
- Topographic map; visual inspection (certification) of the proposed site	
Within 1000 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
- Visual inspection (certification) of the proposed site; aerial photo; satellite image FIGURE 8	
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. FIGURES 1 AND 7	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
- NM Office of the State Engineer - iWATERS database search; visual inspection (certification) of the proposed site	
Within 500 feet of a wetland. FIGURE 9	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
- US Fish and Wildlife Wetland Identification map; topographic map; visual inspection (certification) of the proposed site	

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): Justin Carter Title: Regulatory Manager
 Signature: [Signature] Date: 10/11/24
 e-mail address: jcarter@novooq.com Telephone: 405.296.335

11. **OCD Representative Signature:** Victoria Venegas

Approval Date: 10/04/2024

Title: Environmental Specialist

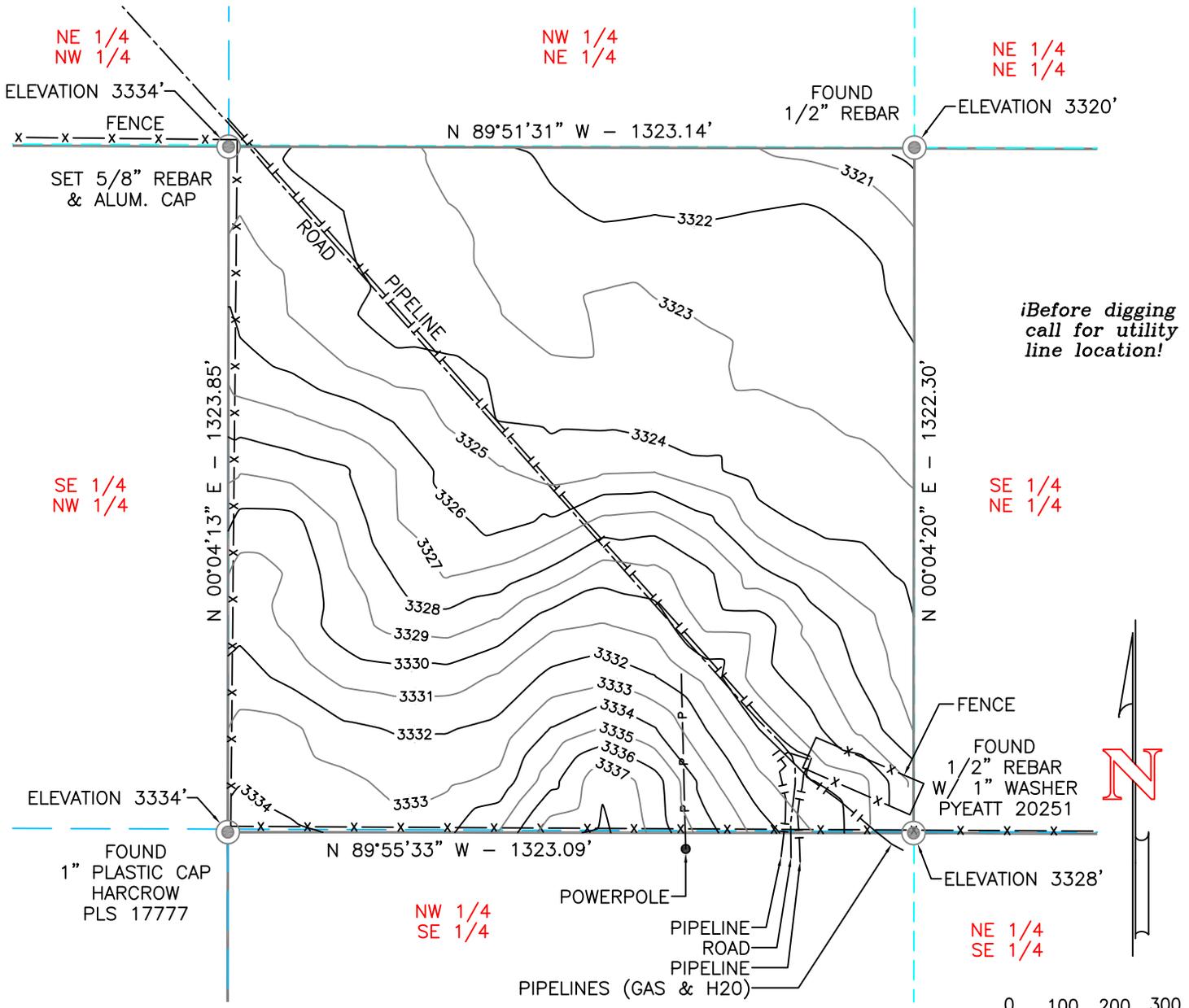
OCD Permit Number: 2RF-108

- OCD Conditions
- Additional OCD Conditions on Attachment

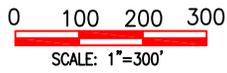
SURVEY FOR CONTAINMENT AND RECYCLING FACILITY

SILVERBACK OPERATING II, LLC

40 ACRE PARCEL
 SW 1/4 NE 1/4 OF SECTION 27, T-18-S, R-26-E, N.M.P.M.
 EDDY COUNTY, NEW MEXICO



Before digging call for utility line location!



- Notes:**
1. All Bearings and distances are based upon the New Mexico State Plane Coordinate System, East Zone, NAD 83, in U.S. survey feet.
 2. Contractor shall contact "One-Call" for location of any marked or unmarked buried pipelines or cables on pad and/or access road at least two (2) working days prior to construction.
 3. Unified Field Services Inc. is not liable for underground utilities or pipelines.
 4. Contour Intervals = 1ft.

I, MARSHALL W. LINDEEN, NEW MEXICO PROFESSIONAL SURVEYOR NO. 17078, DO HEREBY CERTIFY THAT THIS 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.

PRELIMINARY

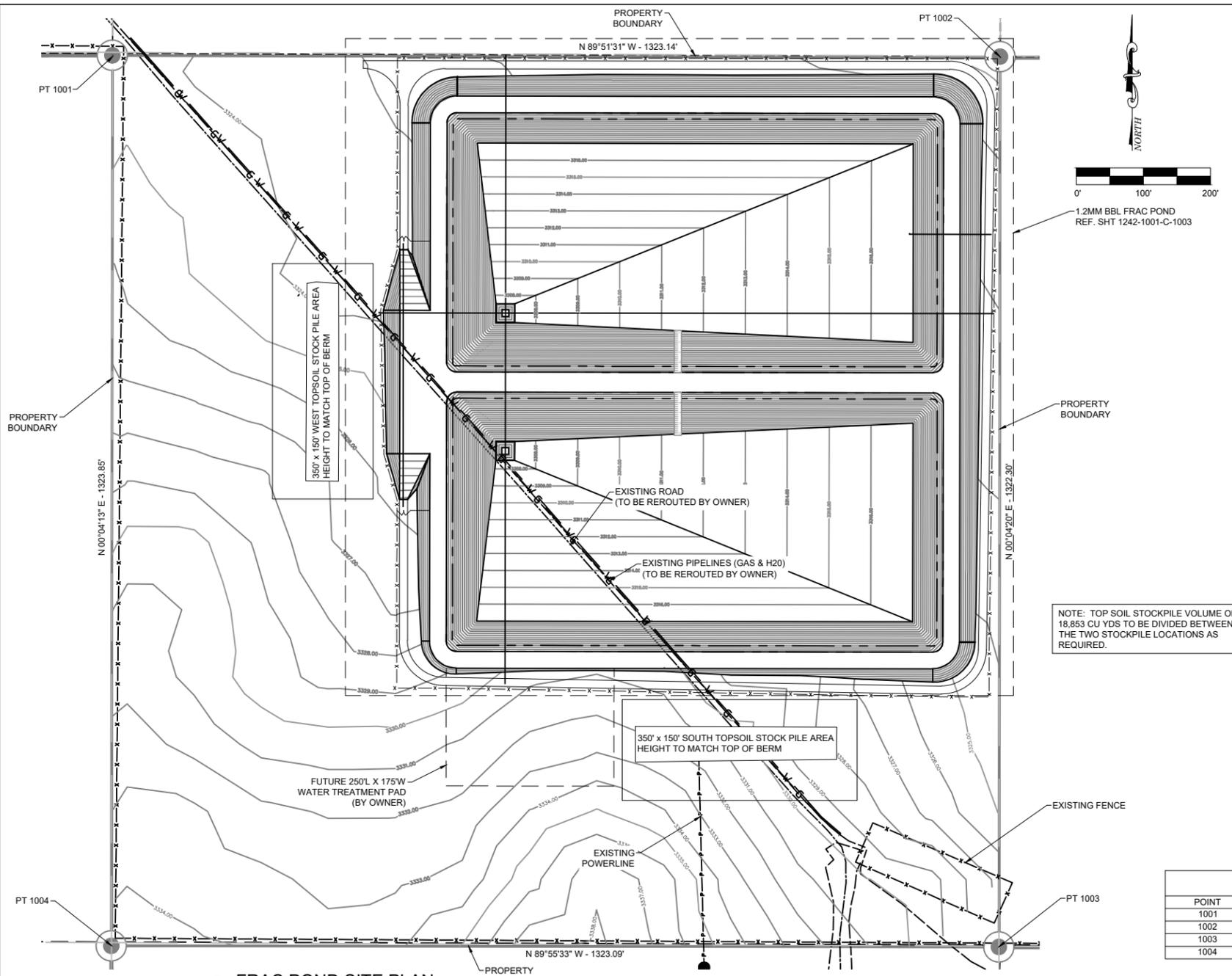
MARSHALL W. LINDEEN P.S. #17078 DATE

OWNER	SQ. FT.	ACRES
EOG RESOURCES INC	1,750,576	40.188

SILVERBACK OPERATING II, LLC	 UNITED FIELD SERVICES INC. P.O. BOX 3651 FARMINGTON, NM 87499 OFFICE: (505) 334-0408	
	SURVEYED: 1/17/22 & 2/08/22 DRAWN BY: K.S.	REV. DATE/BY: DATE DRAWN: 2/08/22

RECYCLING CONTAINMENT DESIGN DRAWINGS

AVIAN DETERRENT SYSTEM



01 FRAC POND SITE PLAN
SCALE: 1" = 200'

SITE PREPARATION NOTES:

1. GEOTECHNICAL REPORT PROVIDED BY TOLUNAY-WONG PROJECT NO. 22.61.006, REPORT NO. 1665, MARCH 29, 2022.
2. SITE PREPARATION FOR THE PROJECT SITE SHOULD INCLUDE STRIPPING ALL SURFACE VEGETATION, TOPSOIL, DELETERIOUS AND/OR WEAK SOILS, TO EXPOSE A COMPETENT SUBGRADE.
3. THE EXPOSED SOIL SUBGRADE SHOULD CONSIST OF COMPETENT, NATURAL STIFF CLAY AND BE PROOF-ROLLED WITH AT LEAST A 20-TON PNEUMATIC ROLLER. LOADED DUMP TRUCK OR EQUIVALENT TO DETECT WEAK AREAS UPON WHICH PROPER COMPACTION WOULD BE DIFFICULT TO OBTAIN ON THE BACKFILL MATERIALS. WEAK AREAS ARE GENERALLY DEFINED AS LOCATIONS THAT PUMP AND/OR RUT IN EXCESS OF ABOUT 2-INCHES OR AS DEEMED UNSATISFACTORY BASED ON OBSERVATIONS OF THE PROOF-ROLL PROCESS BY THE GEOTECHNICAL ENGINEER-OF-RECORD OR THEIR QUALIFIED REPRESENTATIVE. UPON IDENTIFICATION, WEAK AREAS SHOULD BE REMOVED DOWN TO COMPETENT MATERIAL AND REPLACED WITH PROPERLY COMPACTED STRUCTURAL CLAY FILL.
4. CONTAINMENT LEEVEE MATERIAL SHOULD BE GENERAL CLAY FILL OF MODERATE TO HIGH PLASTICITY AND LOW PERMEABILITY. CLAY SOILS WITH A LIQUID LIMIT (LL) RANGE OF 40 TO 60 AND A PLASTICITY INDEX (PI) RANGE OF 20 TO 40 SHOULD MEET LOW PERMEABILITY CRITERIA FOR A CONTAINMENT BERM. FOR RE-USE OF THE EXCAVATED SOILS FROM CONSTRUCTION OF THE POND, THE ONSITE MATERIALS SHOULD BE CHECKED FOR COMPLIANCE WITH THIS CRITERIA AND WITH THE APPROPRIATE REGULATORY GUIDELINES PRIOR TO USE.
5. CONTAINMENT LEEVEE MATERIAL SHOULD BE FREE OF ROOTS, DEBRIS, ORGANIC MATTER OR OTHER DELETERIOUS MATERIALS. THE CLAY BERM MATERIAL SHOULD BE PLACED IN THIN LIFTS, NOT EXCEEDING 8-IN LOOSE MEASURE, MOISTURE-CONDITIONED BETWEEN ±3% OF OPTIMUM MOISTURE CONTENT AND COMPACTED TO AT LEAST 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D698.
6. SANDS (SM, SC OR SP) OR SILTY CLAYS (CL-ML) SHOULD NOT BE USED FOR CONSTRUCTION OF CONTAINMENT LEEVES. THESE SOILS HAVE THE POTENTIAL TO TRAP WATER AND CREATE SEEPAGE PATHS.
7. THE AREA OF THE CONTAINMENT BERM FOOTPRINTS SHALL BE STRIPPED DOWN TO COMPETENT FOUNDATION SOILS. WE ANTICIPATE A DEPTH OF STRIPPING ON THE ORDER OF 4 TO 6 INCHES WILL BE NEEDED TO REMOVE VEGETATION AND DELETERIOUS MATERIAL. ONCE COMPETENT BEARING SOILS ARE REACHED AT THE DESIGN BASE ELEVATION, THE SUBGRADE SHOULD BE PROOF-ROLLED WITH AT LEAST A 20-TON PNEUMATIC ROLLER, LOADED DUMP TRUCK, OR EQUIVALENT, TO DETECT WEAK AREAS. IF WEAK AREAS ARE ENCOUNTERED, THEY SHOULD BE REMOVED AND REPLACED WITH PROPERLY-COMPACTED FILL SOILS AS INDICATED ABOVE.
8. SIDE SLOPES SHALL BE 1(V):3(H) FOR THE PROPOSED CONTAINMENT BERMS. SIDE SLOPES OF CLAY SOILS STEEPER THAN 1(V):3(H) COULD HAVE THE POTENTIAL FOR INSTABILITY AND SHALLOW SURFACE SLIDES. IF SIDE SLOPES STEEPER THAN 1(V):3(H) ARE PLANNED ONCE THE CONTAINMENT BERM SYSTEM ARRANGEMENT IS FINALIZED, TWE SHOULD BE ALLOWED TO REVIEW THE FINAL LEEVEE LAYOUT AND TYPICAL CROSS-SECTION AND PROVIDE COMMENTS. THE LEEVEE SIDE SLOPES SHOULD BE PROTECTED FROM EROSION DUE TO NORMAL SURFACE RUNOFF AND TEMPORARY INUNDATION BY VARYING WATER LEVELS WITHIN THE CONTAINMENT SYSTEMS.
9. STRUCTURAL CLAY FILL USED AS BACKFILL AND/OR FILL FOR THIS PROJECT SHOULD CONSIST OF A CLEAN SANDY LEAN CLAY (CL) OR LEAN CLAY WITH SAND (CL) MATERIAL WITH A LIQUID LIMIT (LL) OF 40 OR LESS AND A PLASTICITY INDEX (PI) FROM 10 TO 20. STRUCTURAL CLAY FILL SHOULD BE PLACED IN THIN LIFTS, MOISTURE CONDITIONED BETWEEN -1% AND +3% OF OPTIMUM MOISTURE CONTENT AND COMPACTED TO AT LEAST 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE STANDARD TEST METHOD FOR LABORATORY COMPACTION CHARACTERISTICS OF SOIL USING STANDARD EFFORTS (ASTM D 698).
10. WE ANTICIPATE THE ONSITE SOILS COULD BE CONSIDERED SUITABLE FOR REUSE AS STRUCTURAL CLAY FILL; HOWEVER, TESTING SHOULD BE PERFORMED TO ENSURE COMPLIANCE PRIOR TO PLACEMENT.
11. MAINTAINING THE SITE TO PREVENT PONDING AND/OR STANDING WATER DURING AND FOLLOWING CONSTRUCTION IS ESSENTIAL. PONDING OF SURFACE RUNOFF COULD CAUSE CONSTRUCTION DELAYS AND/OR INHIBIT SITE ACCESS. IF THE SUBGRADE MATERIALS BECOME WET AND SOFT, CONSIDERATION CAN BE GIVEN TO EITHER DRYING EFFORTS OR REMOVAL/REPLACEMENT OF THE WET MATERIAL WITH STRUCTURAL FILL. ALLOWING WATER TO POND ONSITE COULD RESULT IN SOIL SWELLING AND/OR SOFTENING THEREBY RESULTING IN HIGH MAINTENANCE COSTS AND POTENTIAL FAILURE. WE RECOMMEND POSITIVE DRAINAGE BE ESTABLISHED TO TRANSMIT WATER AWAY FROM THE SITE SO THAT PERCHED OR PONDED WATER DOES NOT COLLECT ADJACENT TO ANY NEW FOUNDATIONS.

BENCHMARKS				
POINT	NORTHING (FT)	EASTING (FT)	ELEVATION (FT)	DESCRIPTION
1001	626561.00	530106.00	3334.00	5/8" REBAR
1002	626558.71	531429.95	3320.00	1/2" REBAR
1003	625236.42	531428.28	3328.00	1/2" REBAR W/ 1" WASHER PYEATT 20251
1004	625238.13	530105.19	3334.00	1" PLASTIC CAP HARCROW PLS 17777

CONFIDENTIAL - RESTRICTED USE
THIS DOCUMENT AND THE IDEAS HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF THE ENGINEER & IS NOT TO BE USED IN WHOLE OR IN PART, WITHOUT THE AUTHORIZATION OF LJA ENERGY.

SITE NOTES:

1. ALL BEARINGS, DISTANCES AND COORDINATES ARE BASED UPON THE NEW MEXICO STATE PLANE COORDINATE SYSTEM, EAST ZONE, NAD 83, IN US SURVEY FEET
2. CONTRACTOR SHALL CONTACT "ONE-CALL" FOR LOCATION OF ANY MARKED OR UNMARKED BURIED PIPELINES OR CABLES ON PAD AND/OR ACCESS ROAD AT LEAST TWO (2) WORKING DAYS PRIOR TO CONSTRUCTION.
3. LJA ENERGY IS NOT RESPONSIBLE FOR UNDERGROUND UTILITIES OR PIPELINES.
4. CONTOUR INTERVALS = 1 FT

SWPPP NOTES:

1. THE CONTRACTOR SHALL DEVELOP AND IMPLEMENT A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) IN ACCORDANCE WITH THE CONSTRUCTION GENERAL PERMIT (CGP) OF THE EPA. THE STORM WATER POLLUTION PREVENTION PLAN SHALL INCLUDE DEVELOPING, PERMITTING, INSTALLING AND MAINTAINING SWPPP BMP'S AS WELL AS PERMANENT SEEDING WHEN THE PROJECT IS COMPLETED.
2. THE CONTRACTOR SHALL PREVENT SOILS FROM ERODING FROM THE SITE ONTO OTHER PROPERTY BY CONSTRUCTING TEMPORARY EROSION CONTROL BERMS OR INSTALLING SILT FENCES AT THE PROPERTY LINES AS INDICATED ON THE APPROVED SWPPP.
3. THE CONTRACTOR SHALL MITIGATE EROSION OF TEMPORARY OR PERMANENT DIRT SWALES BY INSTALLING CHECK DAMS IN THE SWALES PERPENDICULAR TO THE DIRECTION OF FLOW, AND AT INTERVALS SPECIFIED ON THE SWPPP.
4. THE CONTRACTOR SHALL PREPARE AND MAINTAIN A COPY OF THE SWPPP ON-SITE AT ALL TIMES, AND SHALL COMPLY WITH THE REQUIREMENTS INDICATED ON THAT PLAN. COST IS INCIDENTAL TO CONSTRUCTION.
5. BEST MANAGEMENT PRACTICES (BMP'S) SHALL BE UTILIZED TO CONTROL SEDIMENT SO THAT NO ADDITIONAL SEDIMENT RESULTING FROM CONSTRUCTION ACTIVITIES DISCHARGE TO WATERWAYS.
6. THE CONTRACTOR SHALL CONFORM TO ALL CITY, COUNTY, STATE AND FEDERAL DUST AND EROSION CONTROL REGULATIONS. THE CONTRACTOR SHALL PREPARE AND OBTAIN ANY NECESSARY DUST OR EROSION CONTROL PERMITS FROM REGULATORY AGENCIES.
7. THE CONTRACTOR SHALL PROMPTLY REMOVE ANY MATERIAL EXCAVATED WITHIN THE PUBLIC RIGHT-OF-WAY TO KEEP IT FROM WASHING OFF THE PROJECT SITE.

GENERAL NOTES:

- GENERAL NOTES**
1. NEW MEXICO ADMINISTRATIVE CODE TITLE 19, CHAPTER 15, PART 34. DESIGN CRITERIA FOR RECYCLING CONTAINMENTS SHALL APPLY TO THIS PROJECT.
 2. ALL BOUNDARY, TOPOGRAPHIC AND UTILITY INFORMATION SHOWN ARE BASED ON SURVEY INFORMATION FURNISHED BY UNITED FIELD SERVICES FILE NAME 11648-TOPO DATED: 02/08/22.
 3. THE CONTRACTOR SHALL IDENTIFY AND LOCATE UTILITY LINES, MONITORING WELLS, SURVEY MONUMENTS, AND OTHER NEARBY STRUCTURES PRIOR TO PERFORMING WORK.
 4. COORDINATE INFORMATION IS BASED ON STATE PLANE COORDINATES, NEW MEXICO EAST, NAD 83. THE CONTRACTOR SHALL IDENTIFY ANY DISCREPANCIES PRIOR TO PROCEEDING WITH CONSTRUCTION.
 5. THE OPERATOR WILL PLACE AN UPRIGHT SIGN NO LESS THAN 12 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
- LINER NOTES**
1. INSTALLER TO SIGN SUBGRADE ACCEPTANCE FORM (PROVIDED BY OWNER REPRESENTATIVE) DAILY PRIOR TO INSTALLATION.
 2. CONTRACTOR TO PROVIDE SUBMITTAL OF LINER PANEL LAYOUT.
 3. A 3" DIAMETER MINIMUM PIECE OF 40MIL LINER SHALL BE EXTRUDED WELDED WHERE THE PIE SHAPED CORNER SECTIONS MEET FOR SEAM REINFORCEMENT.
 4. 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.
 5. CONTRACTOR SHALL PLACE SANDBAGS ON LINER DURING INSTALLATION AS REQUIRED TO PREVENT WIND UPLIFT UNTIL POND IS FILLED TO A DEPTH OF 3 FEET.
 6. CONTRACTOR SHALL INSPECT GRADED SURFACE FOR DEBRIS, ROCKS OR OTHER MATERIAL THAT MAY DAMAGE THE LINER.
 7. CONTRACTOR SHALL ROLL SURFACE WITH A SMOOTH ROLLER TO ELIMINATE RUTS.
 8. CONTRACTOR SHALL USE BLACK 60 MIL HDPE SMOOTH GEOMEMBRANE AS THE PRIMARY LINER AND BLACK 40 MIL HDPE SMOOTH GEOMEMBRANE AS THE SECONDARY LINER.
 9. LINER TO BE INSTALLED PER MANUFACTURER'S RECOMMENDING PROCEDURES (PATRIOT ENVIRONMENTAL INSTALLATION QUALITY ASSURANCE MANUAL AND THE PATRIOT ENVIRONMENTAL DROP-IN SPECIFICATIONS FOR GEOMEMBRANES.)
 10. ALL SEAMS MUST BE WELDED WITH A 6" MINIMUM OVERLAP.
 11. 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 PER THE INSTALLATION QUALITY ASSURANCE MANUAL.

12. FOR AIR PRESSURE TESTING (ASTM 5820), THE FOLLOWING PROCEDURES ARE APPLICABLE TO THE SEAMS WELD WITH DOUBLE SEAM FUSION WELDER.
 - a. THE EQUIPMENT USED SHALL CONSIST OF AN AIR TANK OR PUMP CAPABLE OF PRODUCING A MINIMUM 35 PSI AND A SHARP NEEDLE WITH A PRESSURE GAUGE ATTACHED TO INSERT INTO THE AIR CHAMBER.
 - b. SEAL BOTH ENDS OF THE SEAM BY HEATING AND SQUEEZING THEM TOGETHER. INSERT THE NEEDLE WITH THE GAUGE INTO THE AIR CHANNEL. PRESSURIZE THE AIR CHANNEL TO A MINIMUM OF 35 PSI. NOTE TIME STARTS AND WAIT A MINIMUM OF 5 MINUTES TO CHECK. IF PRESSURE AFTER 5 MINUTES HAD DROPPED LESS THAN 2 PSI THE TEST IS SUCCESSFUL (THICKNESS OF MATERIAL MAY CAUSE VARIANCE).
 - c. CUT OPPOSITE SEAM END AND LISTEN FOR PRESSURE RELEASE TO VERIFY FULL SEAM HAS BEEN TESTED.
 - d. IF THE TEST FAILS, FOLLOW THESE PROCEDURES.
 - i. WHILE CHANNEL IS UNDER PRESSURE WALK THE LENGTH OF THE SEAM LISTENING FOR A LEAK.
 - ii. WHILE CHANNEL IS UNDER PRESSURE APPLY A SOAPY SOLUTION TO THE SEAM EDGE AND LOOK FOR BUBBLES FORMED BY AIR ESCAPING.
 - iii. RE-TEST THE SEAM IN SMALLER INCREMENTS UNTIL THE LEAK IS FOUND.
 - e. ONCE LEAK IS FOUND USING ONE OF THE PROCEDURES ABOVE, CUT OUT THE AREA AND RETEST THE PORTIONS OF THE PORTIONS OF THE SEAMS BETWEEN THE LEAK AREAS PER 6A AND 6B ABOVE. CONTINUE THIS PROCEDURE UNTIL ALL SECTIONS OF THE SEAM PASS THE PRESSURE TEST.
 - f. REPAIR THE LEAK WITH A PATCH AND VACUUM TEST.
13. ALL NON-DESTRUCTIVE TESTS WILL BE NOTED IN THE NON-DESTRUCTIVE LOGS.
14. LINER SHALL BE PROTECTED WITH A 10 OZ. NONWOVEN GEOTEXTILE IF ROCK OR OTHER ANGULAR MATERIALS WITH A DIMENSION GREATER THAN 3/4 INCH ARE PRESENT.
15. SUMPS SHALL BE BACKFILLED WITH NON-ANGULAR MAXIMUM 3/8 INCH SIZED PEA GRAVEL.
16. LINER GAS VENTS SHALL BE SPACED ALONG THE INSIDE SLOPE AT APPROXIMATELY 100 FEET ON CENTER OR MINIMUM 2 VENTS PER SIDE.
17. 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 SYSTEM.
18. LAY BOTH LINERS IN ANCHOR TRENCH. BACKFILL ANCHOR TRENCH IN 2 LIFTS AND COMPACT IN ACCORDANCE WITH SITE PREPARATION NOTES THIS SHEET.

EARTHWORK NOTES

1. FILL FOR LEEVES SHALL BE PLACED AND COMPACTED IN ACCORDANCE WITH THE SITE PREP NOTES ABOVE AND THE GEOTECHNICAL REPORT. CONSTRUCT EACH LAYER CONTINUOUSLY AND APPROXIMATELY HORIZONTAL FOR THE WIDTH AND LENGTH OF THE DIKE. FILL SHALL BE COMPACTED IN ACCORDANCE WITH THE SITE PREP NOTES ABOVE AND THE GEOTECHNICAL REPORT.
2. 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.
3. PERFORM ONE NUCLEAR DENSITY GAGE TEST PER 2500 CY OR AS DIRECTED BY ENGINEER.
4. 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.
5. ALL REPLACED TOP SOIL TO BE SMOOTH DRUM ROLLED UP TO FENCELINE.

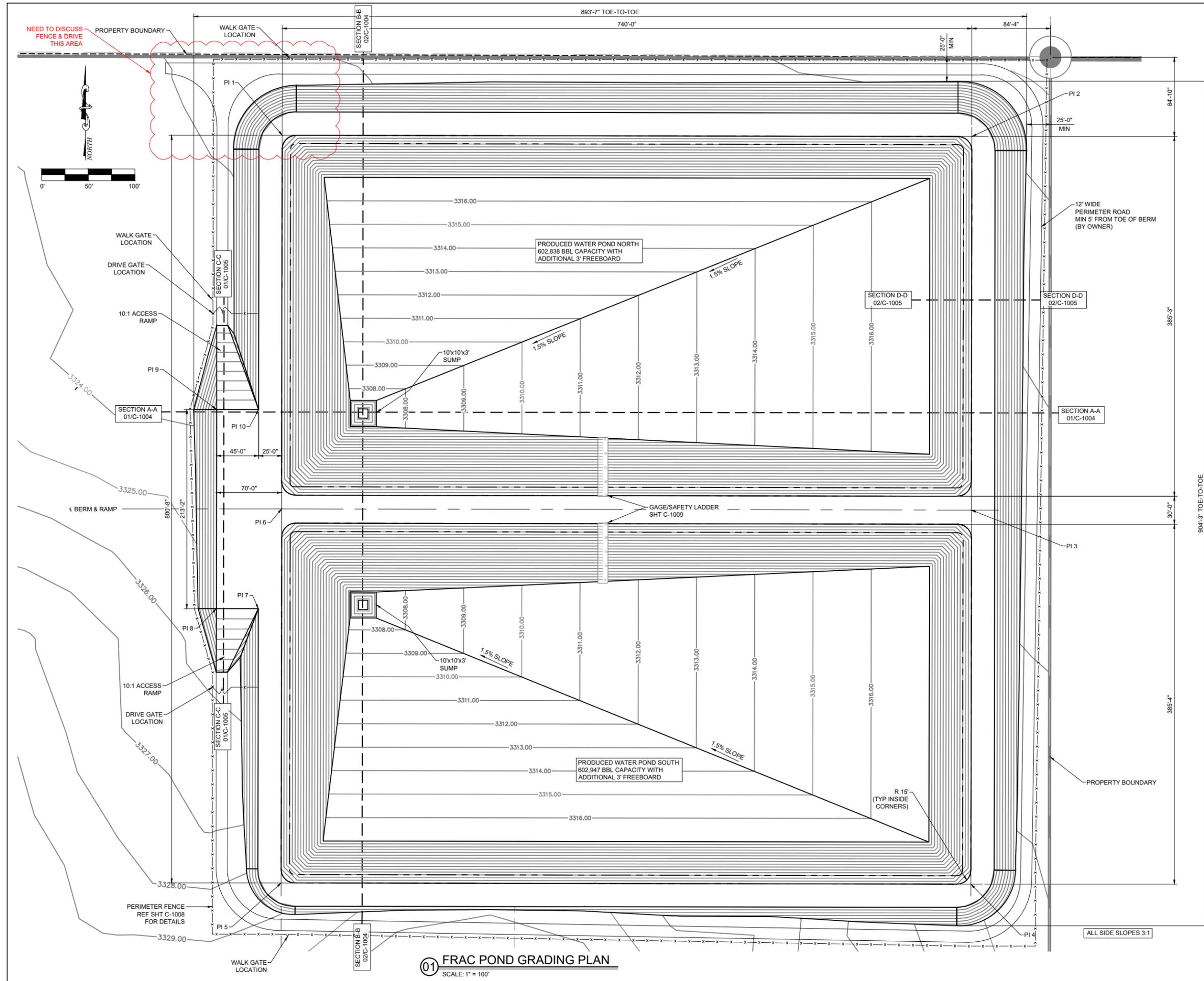
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ISSUE	DATE	BY	DESCRIPTION	CHKD	APPD
B	04/08/22	JLG	ISSUED FOR APPROVAL	HER	RCW
A	04/01/22	JLG	ISSUED FOR APPROVAL	HER	RCW



DRAWN BY: JLG				PROJ. MGR: HER	SCALE: 1" = 200'	PROJ. NO: B1242-1001
DRAWING NO: 1242-1001-C-1002				ISSUE NO: B		



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POND COORDINATES

PI	NORTHING	EASTING	ELEV
1	626476.70	530605.58	3332.0
2	626475.44	531345.58	3332.0
3	626075.34	531345.03	3332.0
4	625674.79	531344.49	3332.0
5	625676.06	530604.41	3332.0
6	626076.66	530604.94	3332.0
7	625969.76	530579.87	3332.0
8	625969.82	530534.87	3332.0
9	626183.02	530535.16	3332.0
10	626182.97	530580.16	3332.0

STAGE STORAGE

ELEVATION	N. POND (BBL)	S. POND (BBL)
3305	0.00	0.00
3306	46.13	46.14
3307	132.87	132.89
3308	396.68	396.72
3309	1356.82	1356.99
3310	3769.10	3769.65
3311	8288.96	8290.28
3312	15572.42	15575.05
3313	26275.64	26280.24
3314	41054.80	41062.16
3315	60566.08	60577.13
3316	85465.68	85481.51
3317	116409.82	116431.61
3318	151101.59	151130.07
3319	186815.17	186850.43
3320	223562.76	223604.91
3321	261356.60	261405.76
3322	300208.91	300265.17
3323	340131.90	340195.38
3324	381137.80	381208.62
3325	423238.84	423317.09
3326	466447.23	466533.03
3327	510775.20	510868.65
3328	556234.96	556336.19
3329	602838.75	602947.85
3330	650598.79	650715.87
3331	699527.29	699652.47
3332	749636.48	749769.86

FRAC POND CONTAINMENT

TOP OF BERM ELEVATION	3332.0 FT
HIGH WATER ELEVATION	3329.0 FT
BOTTOM OF POND ELEVATION (MAX)	3307.5 FT
BOTTOM OF POND ELEVATION (MIN)	3317.0 FT
SUMP ELEVATION	3304.5 FT
TOTAL CONTAINMENT VOLUME	1,499,406 BBL
NORTH POND CONTAINMENT VOLUME	749,636 BBL
SOUTH POND CONTAINMENT VOLUME	749,770 BBL
TOTAL FLUID VOLUME (3' BELOW FREEBOARD ELEVATION)	1,205,785 BBL
NORTH POND TOTAL FLUID VOLUME	602,838 BBL
SOUTH POND TOTAL FLUID VOLUME	602,947 BBL

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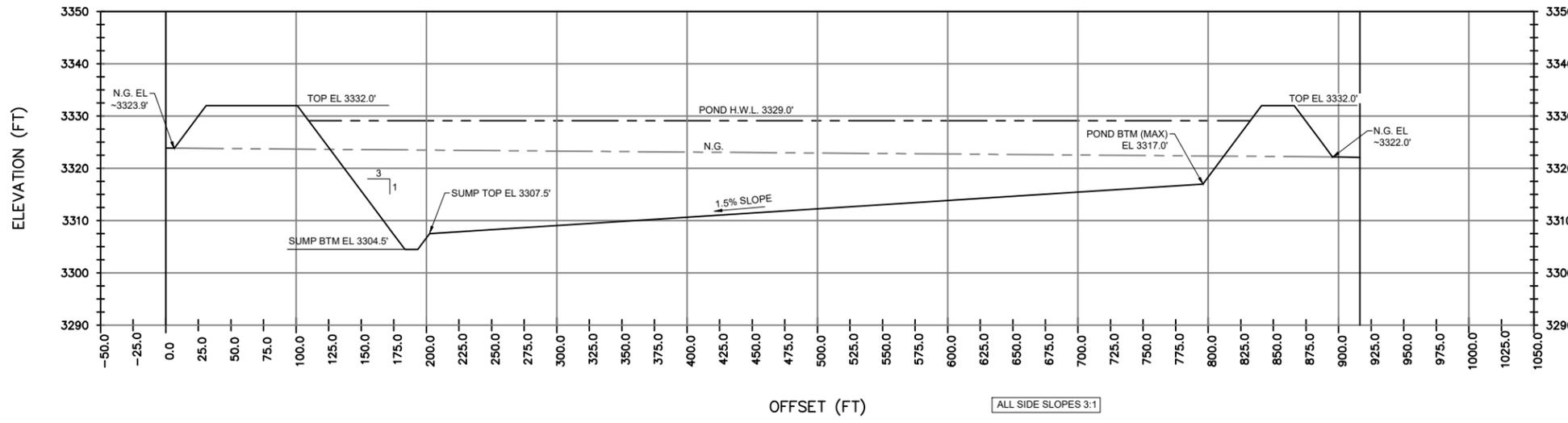


SILVERBACK EXPLORATION
 1.2MM BBL FRAC POND
 GRADING PLAN

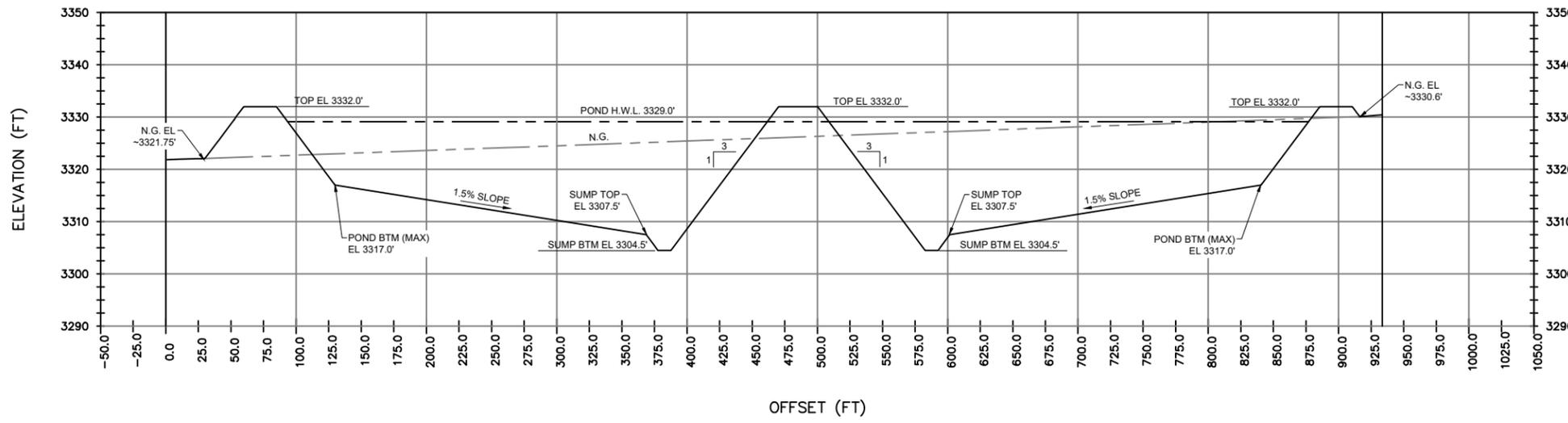
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JLG	HER	1" = 100'	B1242-1001

DRAWING NO. 1242-1001-C-1003
 ISSUE NO. B

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01 FRAC POND SECTION A-A
 SCALE: N.T.S. 1H:4V



02 FRAC POND SECTION B-B
 SCALE: N.T.S. 1H:4V

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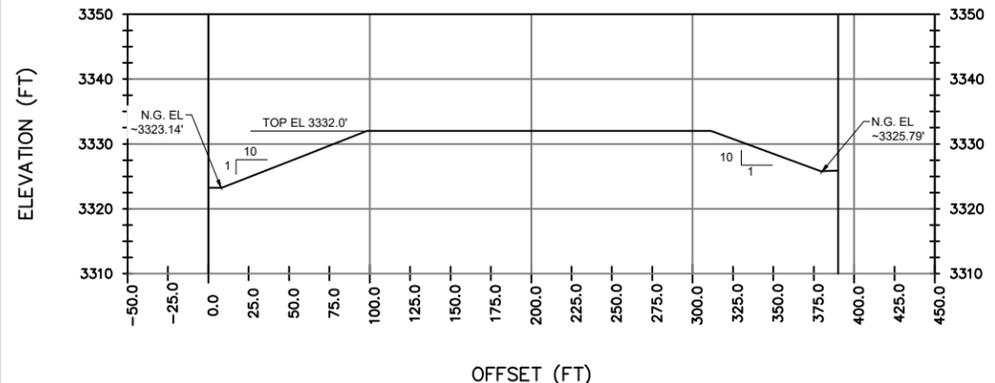
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A	04/01/22	JLG	ISSUED FOR APPROVAL	HER	RCW



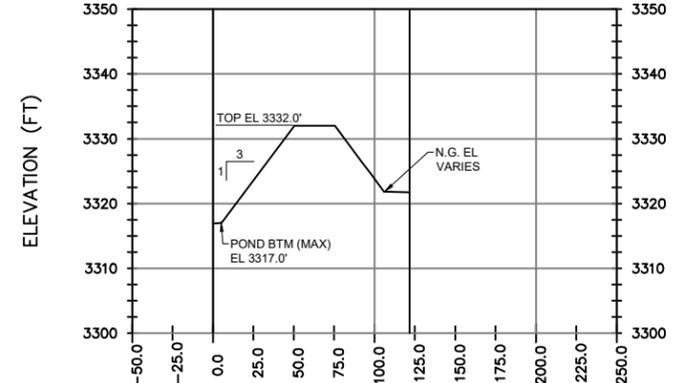
SILVERBACK EXPLORATION
 1.2MM BBL FRAC POND
 SECTIONS

DRAWN BY	PROJ. MGR.	SCALE	PROJ. NO.
JLG	HER	N.T.S.	B1242-1001
DRAWING NO.	ISSUE NO.		
1242-1001-C-1004	B		

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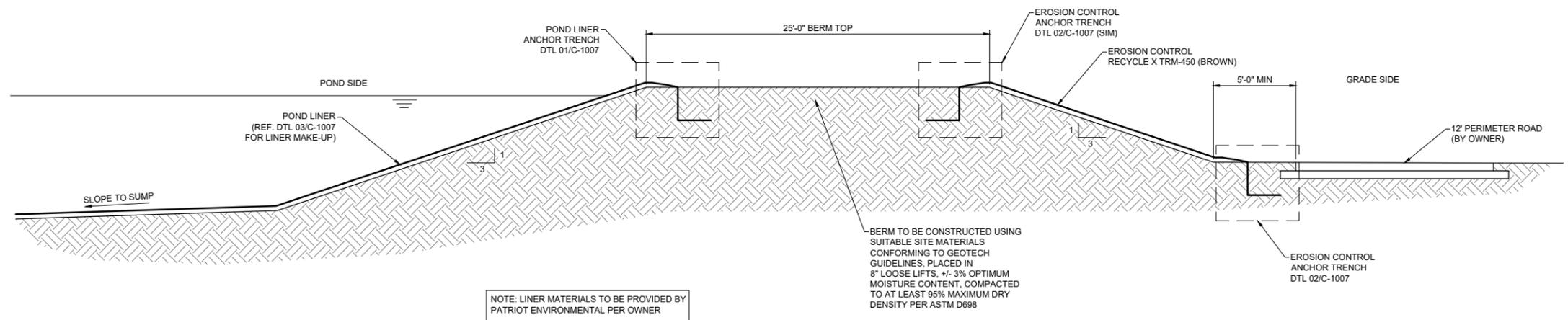
01 RAMP SECTION C-C
 SCALE: N.T.S. 1H:4V



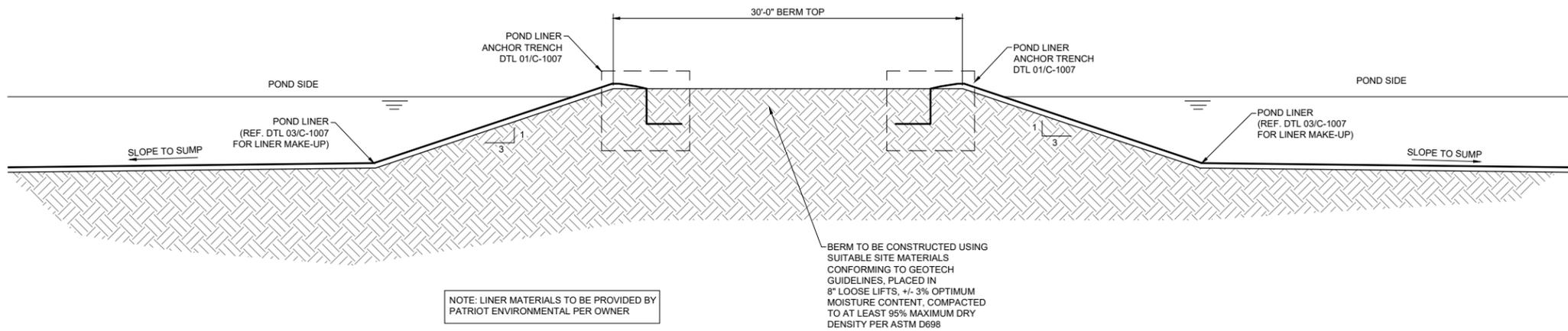
02 TYPICAL BERM SECTION D-D
 SCALE: N.T.S. 1H:4V

ALL SIDE SLOPES 3:1

REF DTL 03/THIS SHEET & 04/THIS SHEET FOR DETAILED BERM SECTIONS



03 DETAILED OUTER BERM SECTION
 SCALE: 1/8" = 1'-0"



04 DETAILED MIDDLE BERM SECTION
 SCALE: 1/8" = 1'-0"

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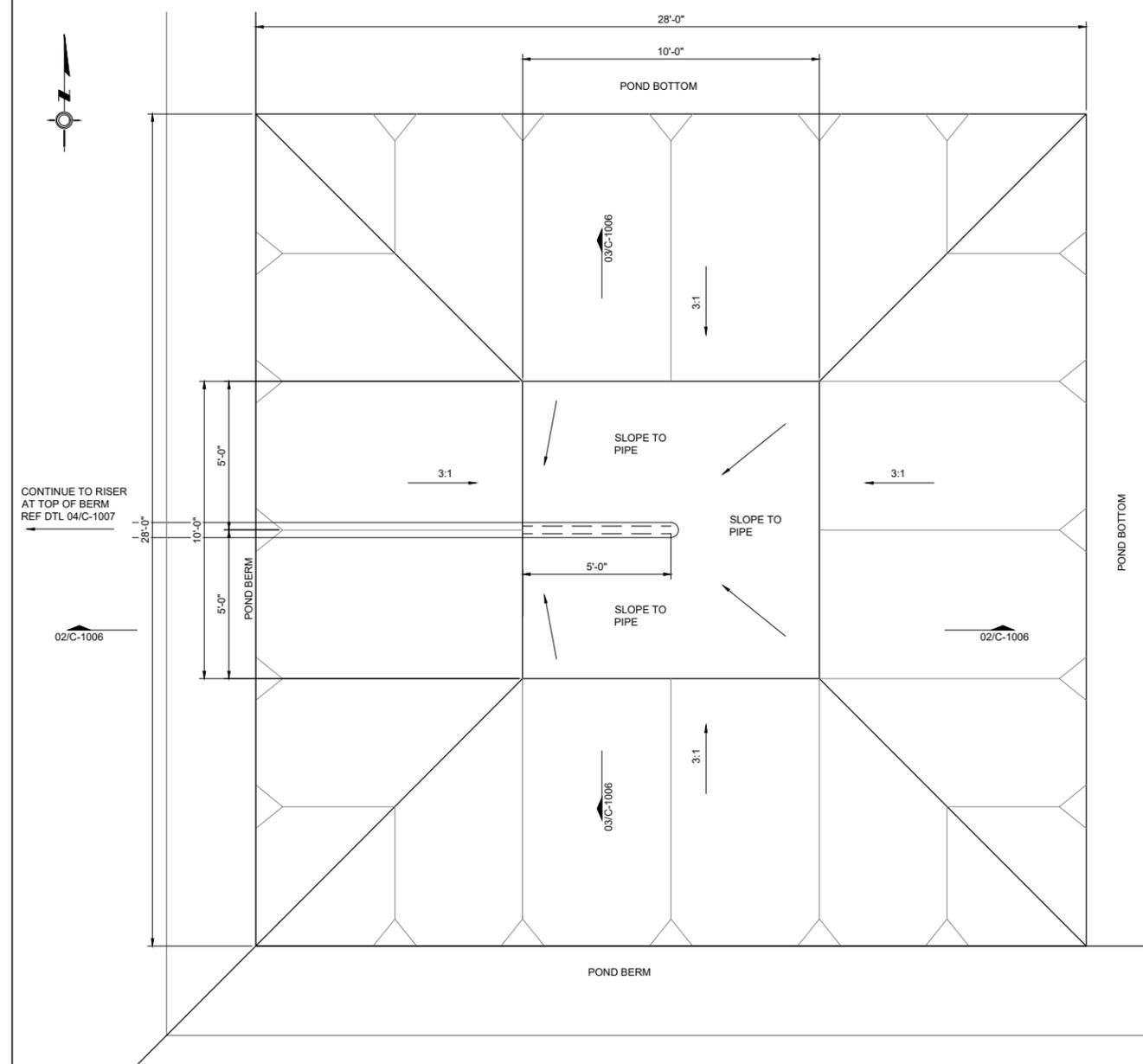
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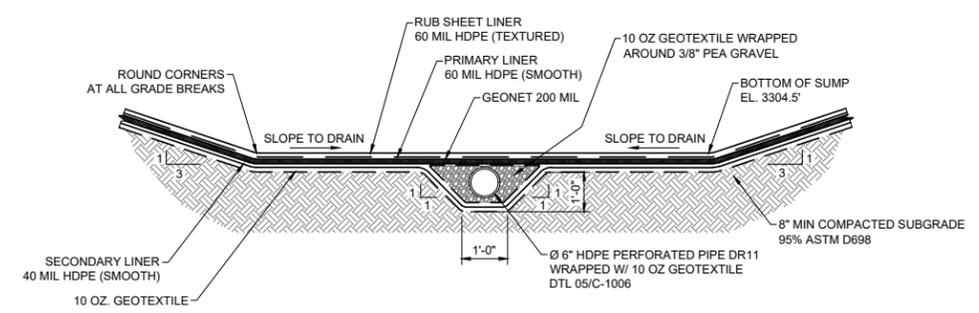


SILVERBACK EXPLORATION
 1.2MM BBL FRAC POND
 SECTIONS/DETAILS

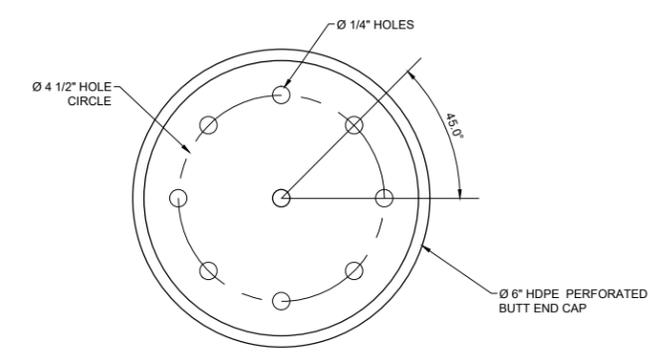
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JLG	HER	N.T.S.	B1242-1001
DRAWING NO.	ISSUE NO.		
1242-1001-C-1005	B		



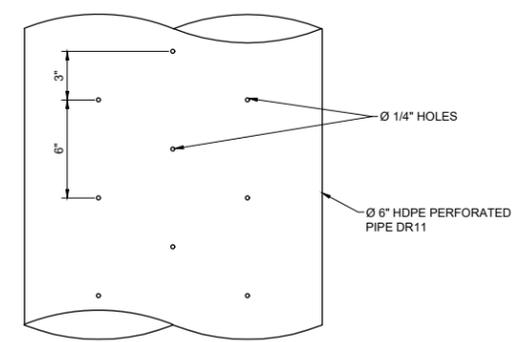
01 POND SUMP PLAN VIEW
 SCALE: 1/8" = 1'-0"



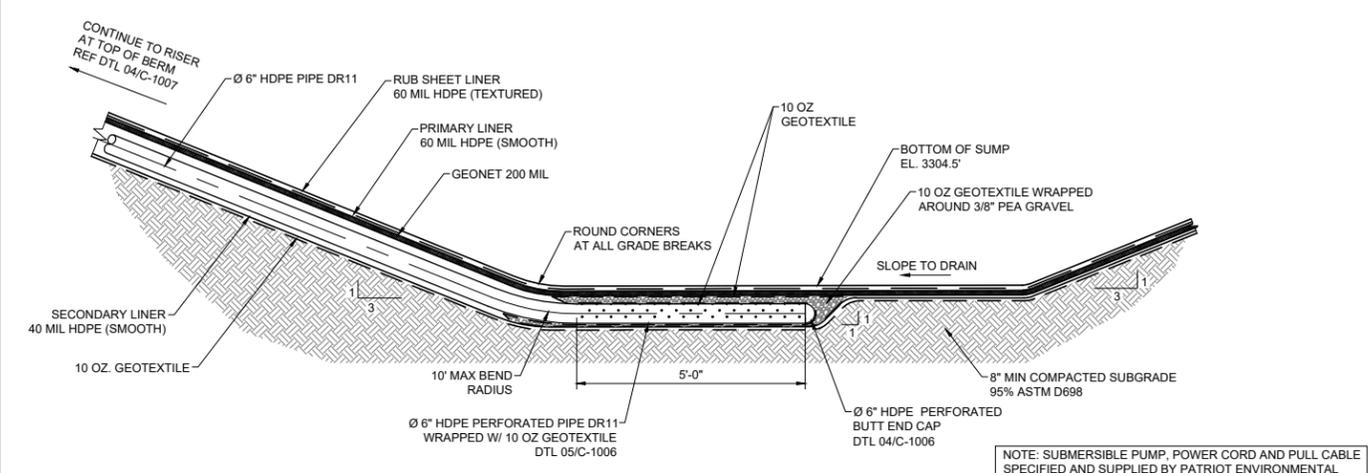
03 LEAK DETECTION SYSTEM
 SCALE: 1/4" = 1'-0"



04 PERFORATED END CAP DETAIL
 SCALE: 3" = 1'-0"



05 PIPE PERFORATION DETAIL
 SCALE: NTS



02 LEAK DETECTION SYSTEM
 SCALE: 1/4" = 1'-0"

NOTE: SUBMERSIBLE PUMP, POWER CORD AND PULL CABLE SPECIFIED AND SUPPLIED BY PATRIOT ENVIRONMENTAL

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A	04/01/22	JLG	ISSUED FOR APPROVAL	HER	RCW

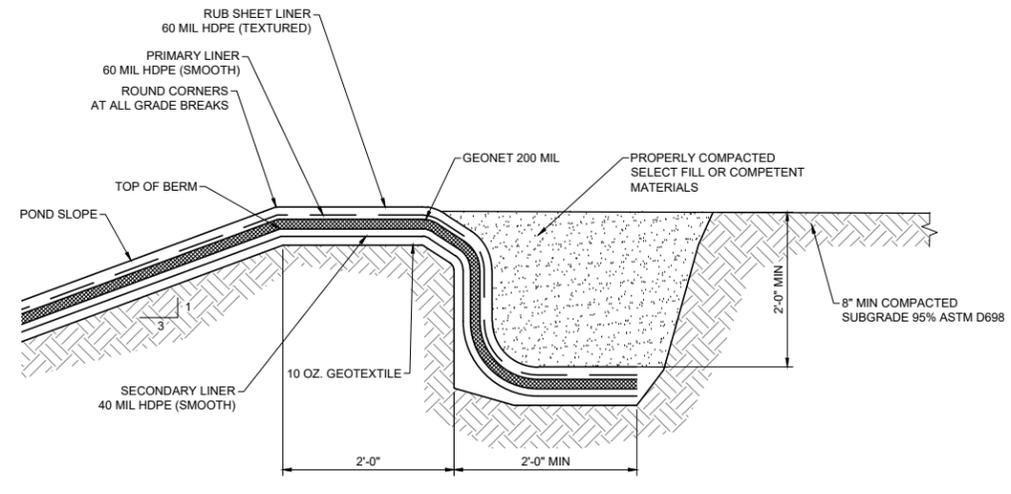


SILVERBACK EXPLORATION
 1.2MM BBL FRAC POND
 SUMP & LEAK DETECTION DETAILS

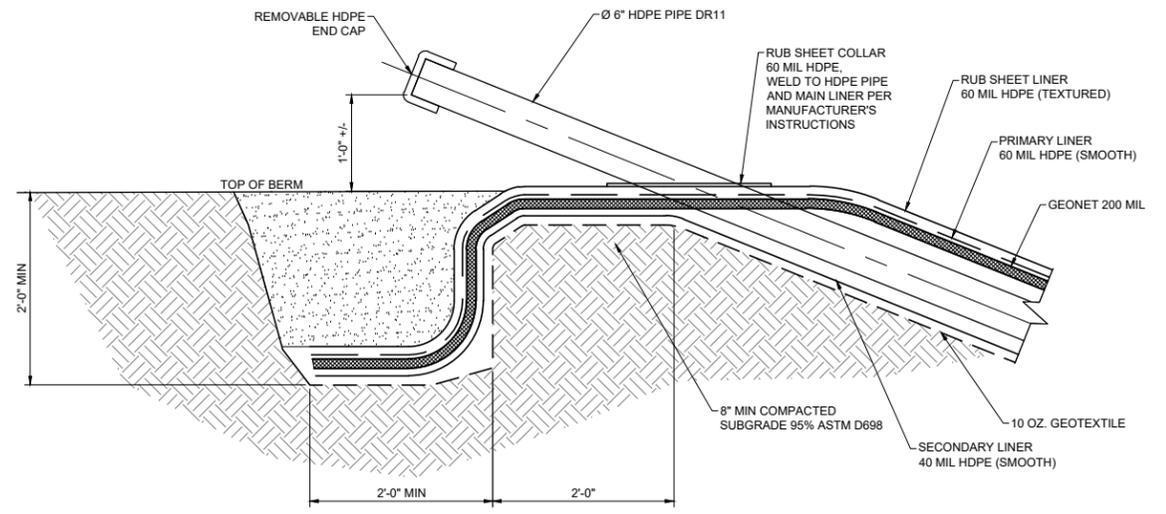
DRAWN BY	PROJ. MGR	SCALE	PROJ. NO.
JLG	HER	NOTED	B1242-1001

DRAWING NO.	ISSUE NO.
1242-1001-C-1006	B

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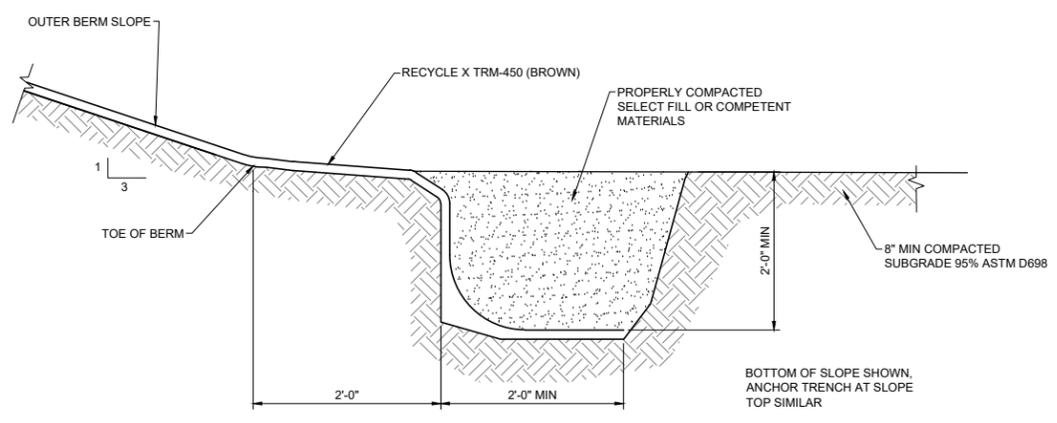


01 POND LINER ANCHOR TRENCH DETAIL
 SCALE: 1/2" = 1'-0"

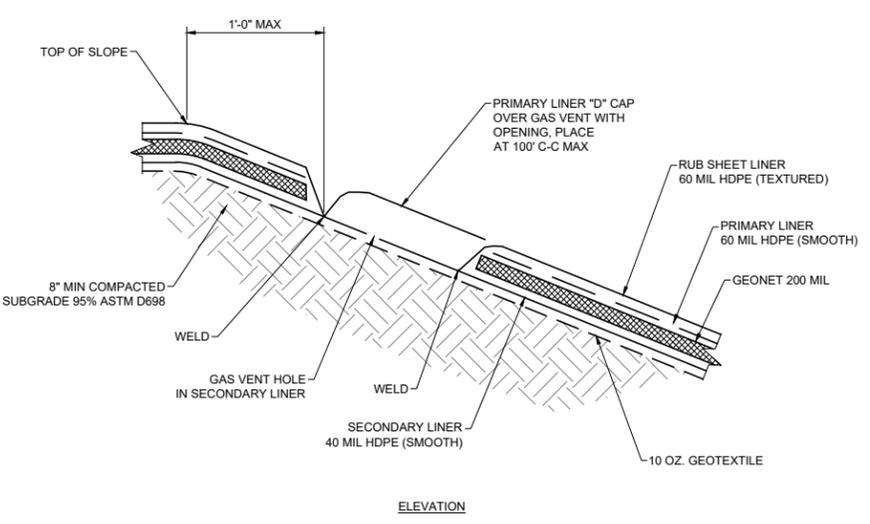
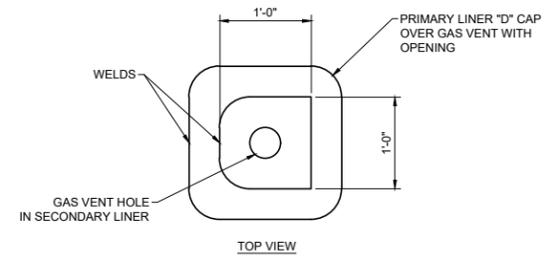


04 LEAK DETECTION PIPE RISER
 SCALE: 1/2" = 1'-0"

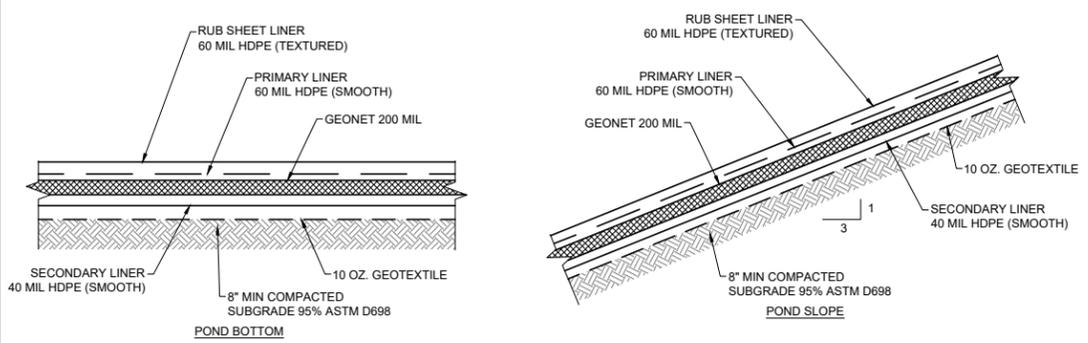
NOTE: SUBMERSIBLE PUMP, POWER CORD AND PULL CABLE SPECIFIED AND SUPPLIED BY PATRIOT ENVIRONMENTAL



02 EROSION CONTROL ANCHOR TRENCH DETAIL
 SCALE: 1/2" = 1'-0"



05 TYPICAL GAS VENT
 SCALE: 3/4" = 1'-0"



03 TYPICAL POND LINER DETAIL
 SCALE: 3/4" = 1'-0"

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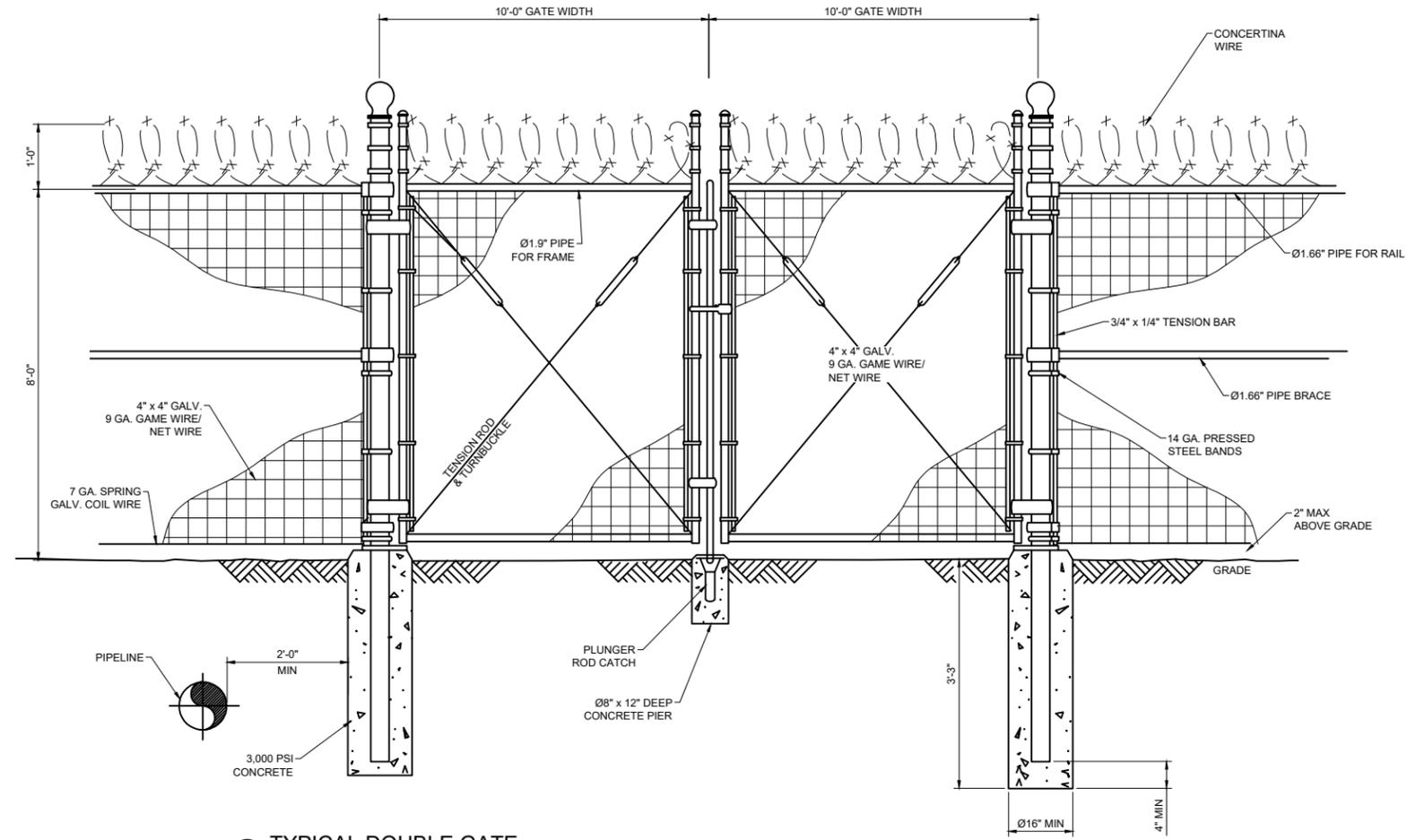
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A	04/01/22	JLG	ISSUED FOR APPROVAL	HER	RCW



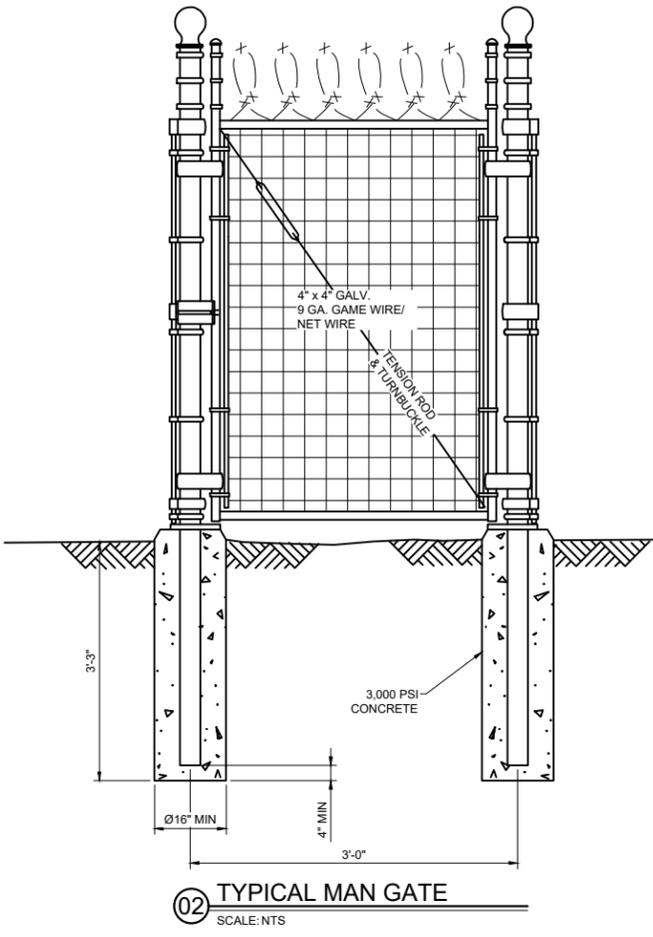
SILVERBACK EXPLORATION
 1.2MM BBL FRAC POND
 LINER & ANCHOR TRENCH DETAILS

DRAWN BY	PROJ. MGR.	SCALE	PROJ. NO.
JLG	HER	NOTED	B1242-1001
DRAWING NO.	ISSUE NO.		
1242-1001-C-1007	B		

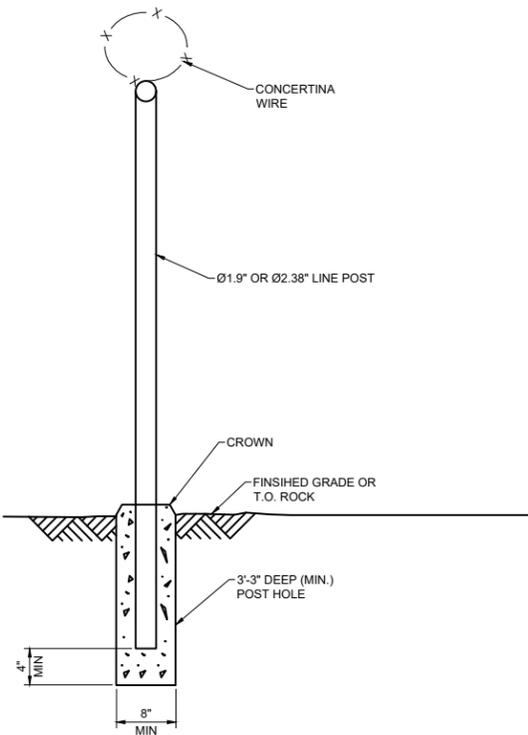
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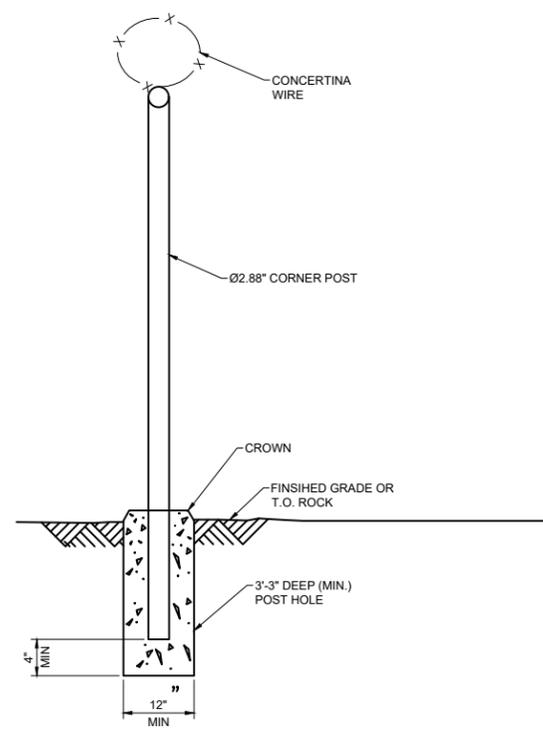
01 TYPICAL DOUBLE GATE
SCALE: NTS



02 TYPICAL MAN GATE
SCALE: NTS



03 TYPICAL 2" DIA LINE POST
SCALE: NTS



04 TYPICAL 3" DIA CORNER POST, END POST, & PULL POST
SCALE: NTS

- NOTES:
- GATES LOCATED AS SHOWN ON PLAN SHEET C-1003.
 - FENCE SHALL BE ELECTRICALLY GROUNDED IN ACCORDANCE WITH REGULATIONS AROUND SUBSTATIONS AND WHERE OVERHEAD POWER LINES CROSS FENCE LINES.
 - FENCE POSTS FOUNDATIONS TO BE A MINIMUM 2' FROM ALL PIPELINES.
 - LOCAL BUILDING CODES AND PERMITS PREVAIL.
 - ALL FENCE AND GATE MATERIAL TO BE HOT-DIP GALVANIZED.
 - END OF EMBEDDED POST TO BE 4" ABOVE BOTTOM OF CONCRETE.

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SILVERBACK EXPLORATION
 1.2MM BBL FRAC POND
 FENCE DETAILS

DRAWN BY	JLG	PROJ. MGR	HER	SCALE	NOTED	PROJ. NO.	B1242-1001
DRAWING NO.	1242-1001-C-1008	ISSUE NO.	A				

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.**

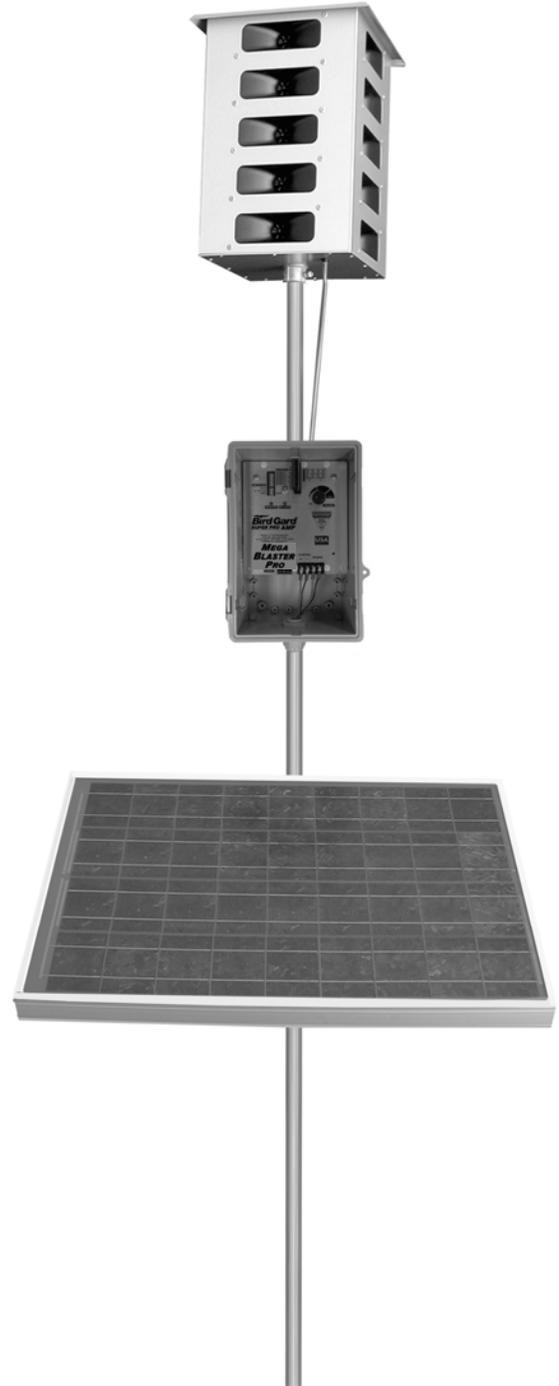


MEGA BLASTER PRO



User's Manual

Overview	2
Bird Control Management Guidelines	3
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Solar Panel	8
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Solar Panel Connections	9
Settings	10
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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:

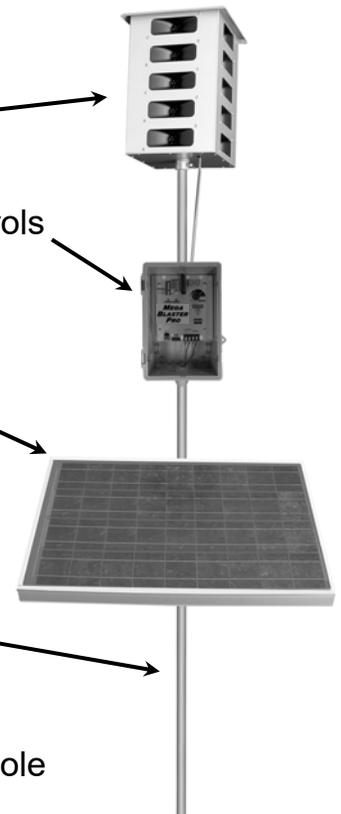
20-Speaker Tower broadcasts the bird sounds

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



Mustang Extreme

December 9, 2019

Attn: Mr. Steven Roeder
Re: 40 mil HDPE Geomembrane – Hydraulic Conductivity

Dear Mr. Roeder:

Hydraulic Conductivity of HDPE geomembranes can be indirectly obtained through ASTM E96 method (Designing with Geosynthetics, page 437, fifth edition – Robert Koerner).

Based on our test results and the method pointed out in the above reference, it can be concluded that Solmax HDPE geomembranes have a typical Hydraulic Conductivity no higher than 10^{-12} cm/s

Should you need further information, please do not hesitate to contact us.

Sincerely,

A handwritten signature in blue ink, appearing to read "Mauricio Ossa".

Mauricio Ossa
Senior Technical Manager
Houston- Texas

● T +1 800 435-2008



GSE ENVIRONMENTAL, LLC | A SOLMAX COMPANY
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SOLMAX.COM



Solmax Reflective HDPE Specification

HDPE 40 mils Smooth Geomembrane Properties

Tested Property	Test Description	Test Method	Unit	Test Value ⁽²⁾
Thickness	Min. Average	ASTM D5199	mils	40
	Min.	ASTM D5199	mils	36
Resin Density	-	ASTM D1505	g/cm ³	≥ 0.932
Sheet Density	-	ASTM D1505	g/cm ³	≥ 0.940
Carbon Black Content ⁽⁴⁾	-	ASTM D4218	%	2.0-3.0
Carbon Black Dispersion ⁽⁵⁾	-	ASTM D5596	Category	1 & 2
OIT – Standard	Average	ASTM D3895	min	100
Tensile Properties ⁽¹⁾	Min. Average	ASTM D-6693		
Strength at Yield			ppi	84
Elongation at Yield			%	13
Strength at Break			ppi	162
Elongation at Break			%	700
Tear Resistance	Min. Average	ASTM D1004	lbf	28
Puncture Resistance	Min. Average	ASTM D4833	lbf	80
Dimensional Stability	-	ASTM D1204	%	±2
Stress Crack Resistance	SP-NCTL	ASTM D5397	hours	500
Oven Aging ⁽⁶⁾	% retained after 90 days	ASTM D5721		
HP-OIT	Min. Average	ASTM D5885	%	80
UV Resistance ⁽⁷⁾	% retained after 1600 hours	ASTM D7238		
HP-OIT	Min. Average	ASTM D5885	%	50
Color	Topside	-	-	White

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 transmittal letter and design drawings, the operator will employ a chain-link or game fence rather than a four foot, four-strand wire fence. 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. 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-strand, 4-foot high barbed wire fence and deer will jump over. Thus, compliance with D.2 results in a violation of D.1. Compliance with D.1 is the critical component of the Rule and operators need not submit a variance request in order to follow Best Management Practices and comply with the Rule.

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.

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.

Closure Documentation

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

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

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.

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.

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.

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.

October 2024

**Volume 2: C-147 Siting Criteria
Demonstration for
Dayton Containments #1, #2, #3, #4
Section 27, T 18S, R 26E, Eddy County NM**



View north from southern edge of proposed Dayton Containments showing nature of landscape and vegetation.

**Prepared for:
Silverback Operating II, LLC
San Antonio, Texas**

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

**Cascade Services, LLC
4400 N Big Spring Street #114
Midland, TX 79705**

GENERAL SITING CRITERIA DEMONSTRATION AND SITE-SPECIFIC GROUNDWATER DATA

SITING CRITERIA (19.15.34.11 NMAC)
SILVERBACK OPERATING – DAYTON CONTAINMENTS

Distance to Groundwater

Figure 1, Figure 2, and the discussion below demonstrates that groundwater (fresh water as defined by NMOCD Rules) at the location is greater than 50 feet beneath the area of interest that will include the location of the recycling containments.

Figure 1a uses a recent air photo as a base map and shows:

1. The Dayton Recycling Project area identified by the blue stippled polygon. The in-ground containments are in the northern portion of the area, and a potential/future AST Containment is in the south/central portion of the recycling project area.
2. Water wells from the OSE database as a blue triangle inside colored circles that indicate well depth. OSE wells are often mislocated in the WATERS database as older wells are plotted in the center of the quarter, quarter, quarter, of the Section Township and Range. Additionally, the OSE database can include locations of proposed wells (i.e. permit applications). The permit data show “no date”. Figure 1a has screened the OSE data and eliminated permit information from Figure 1a.
3. Water wells from the USGS database as large triangles color-coded to the formation from which the well draws water. Note that two principal aquifers are present in this area: the shallow (Alluvial) aquifer and the artesian deep/limestone aquifer.
4. Water wells, which are not documented in the public databases but were identified by field inspection or other published reports as colored squares (Misc. well database).
5. The depth-to-water from the most recent available measurement for each well is provided adjacent to the well symbol.

Figure 1b is at the same scale as Figure 1a and

- uses the USGS topographic map as a base and
- plots only the wells listed in the OSE database.

The following wells plot within the 500-foot setback requirement of Rule 34:

- RA-11890 plots within the 500-foot setback on the south side of the Dayton Recycling Project. Google Earth images and our foot survey reveal no evidence of a well at this location. Examination of the permit for this well (see Appendix Well Logs) shows the location in the NE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ of Section 28, not Section 27 where plotted. Several wells plotted in Section 28 could be this well.
- RA-6423 is an expired permit and was never drilled, thus the “0 ft” depth of the well.
- RA-10490 plots at the same location as RA-6423 and is a shallow well according to the log and permit (see Appendix Well Logs). This well draws water from the water-table aquifer underlying the Dayton Recycling Project area. The well was drilled in 2004 and the permit indicates the well is in the SE $\frac{1}{4}$ of NE $\frac{1}{4}$ of Section 27, which is a 40 acre area. Our site investigation and evaluation of Google Earth historical air photographs demonstrates that this well is within the 40-acre block but lies about 30 feet west of the Section line, as shown within the yellow circle in the 2010 Google Earth image below. RA-10490 is more than 1000 feet east of the Dayton Recycling project area.

SITING CRITERIA (19.15.34.11 NMAC)
SILVERBACK OPERATING – DAYTON CONTAINMENTS

Figure 2 is an area topographic and geologic map that shows:

1. The Dayton Project area is identified by the blue stippled polygon with the surface elevation noted.
2. Water wells measured by the USGS, the year of the measurement and the calculated elevation of the groundwater surface.
3. Water wells measured by professionals and documented in published reports or by staff of Hicks Consultants (Misc.).
4. USGS wells with the aquifer code Alluvium only (shallow aquifer).
5. Contour lines showing the approximate groundwater elevation of the water-table aquifer.

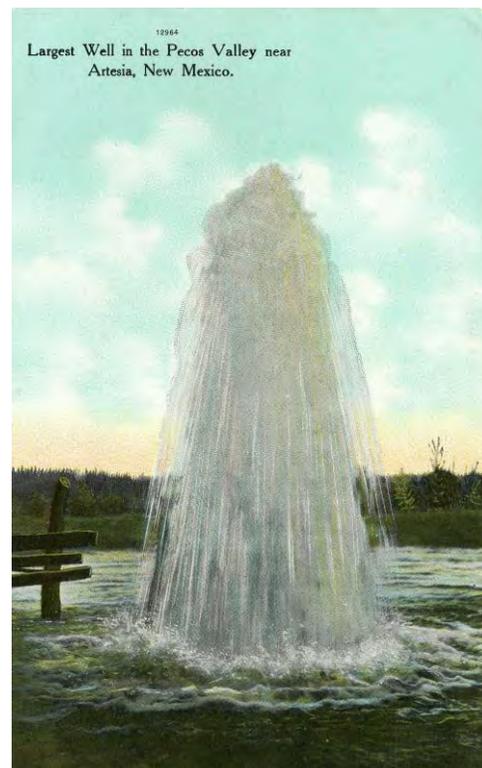
Hydrogeology

Two hydrogeologic units exist beneath the Dayton Recycling Facility area.

- The artesian aquifer is composed of Permian limestones of the Grayburg and San Andres Formations. The artesian aquifer is separated from the overlying alluvium by a confining layer of Permian marine shales and claystone.
- The alluvial aquifer that is composed of Quaternary age deposits from the Pecos River and alluvium derived from the uplands to the west and can exist under water-table conditions or as a confined aquifer.

SITING CRITERIA (19.15.34.11 NMAC)
SILVERBACK OPERATING – DAYTON CONTAINMENTS

Wells completed in the Permian artesian aquifer in 1903 gave Artesia its name. The vintage postcard to the right suggests that the name is quite apt. The artesian aquifer is the primary aquifer in the region.



The alluvial aquifer is the shallowest water and is the only aquifer that could be impacted by any releases from the recycling facility. However, as discussed below, a 70-foot boring at the site that was logged by geotechnical professionals demonstrate that groundwater does not exist between ground surface and a depth of 70 feet (see boring T1 in the geotechnical report of Appendix Well Logs). The company monitored the auger drilling for water during drilling and 24-hours after completion of the boring. An important element of the boring log is the presence of a “very stiff, gray FAT CLAY”. This layer is a good aquiclude and would cause a confined underlying groundwater zone.

Groundwater Data

We relied upon the most recent data measured by the USGS, published data, and measurements by Hicks Consultants to create Figure 2. Water level data from the OSE database rely upon observed water levels by drillers during the completion of the water well. The OSE dataset provides some useful data in certain areas but were not used to generate groundwater elevations for these Figures. Based upon our field survey and examination of Google Earth images, we are confident that the wells shown on Figure 2 are located within ¼ mile of the plotted point.

The closest water well to the Dayton facility (Misc. 440) is USGS-10303, about 0.7 miles to the southeast. The USGS data for this well is presented below. The text in italics is directly from the USGS database, as is the graph.

USGS 324249104213301 18S.26E.26.33334 AKA USGS-10303

*Eddy County, New Mexico
Hydrologic Unit Code 13060011
Latitude 32°42'49", Longitude 104°21'33" NAD27
Land-surface elevation 3,328 feet above NAVD88
This well is completed in the Roswell Basin aquifer system (S400RSWLBS) national aquifer.
This well is completed in the Alluvium, Bolson Deposits and Other Surface Deposits (110AVMB) local aquifer.*

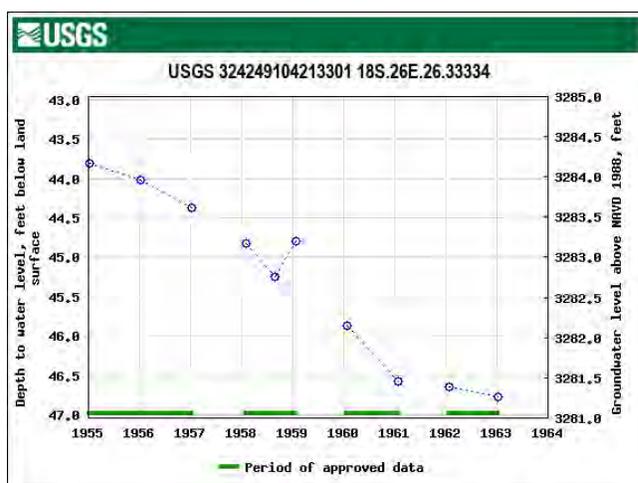


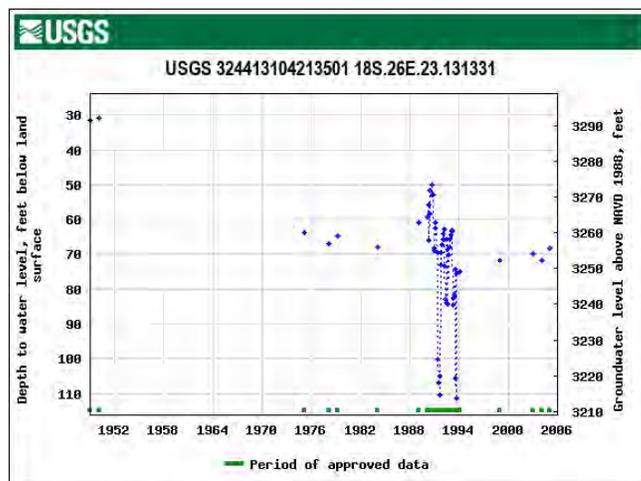
Figure 2 shows this well was static when measured in 1963. The OSE has documented the decline of the shallow elevation in the Roswell Basin and the approximate 4-foot decline over the 10-year period of record is not surprising.

SITING CRITERIA (19.15.34.11 NMAC)
SILVERBACK OPERATING – DAYTON CONTAINMENTS

USGS 324413104213501 18S.26E.23.131331 AKA USGS-9227

*Eddy County, New Mexico
Hydrologic Unit Code 13060011
Latitude 32°44'13", Longitude 104°21'35" NAD27
Land-surface elevation 3,324 feet above NAVD88
The depth of the well is 180 feet below land surface.
This well is completed in the Roswell Basin aquifer system (S400RSWLBS) national aquifer.
This well is completed in the Alluvium, Bolson Deposits and Other Surface Deposits (110AVMB) local aquifer*

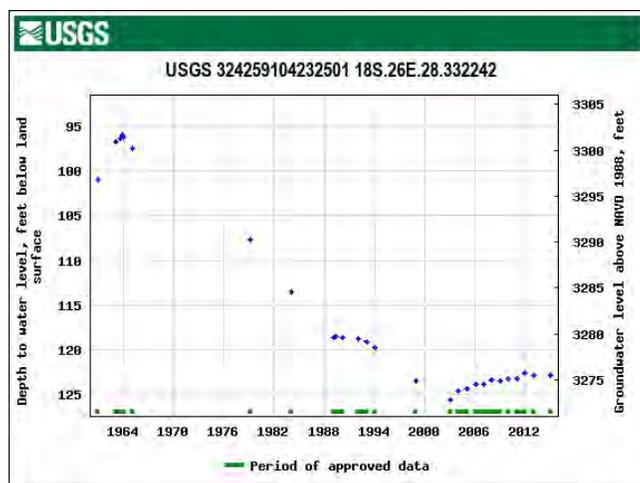
USGS-9227 is 1.2 miles northeast of the Dayton and provides data to 2005. While the data point in 1951 is like USGS-10303, static water levels from about 1975-2006 are relatively constant at a level about 40 below the 1951 measurement.



USGS 324259104232501 18S.26E.28.332242 AKA USGS-10285

*Eddy County, New Mexico
Hydrologic Unit Code 13060011
Latitude 32°42'59", Longitude 104°23'25" NAD27
Land-surface elevation 3,398 feet above NAVD88
The depth of the well is 170 feet below land surface.
This well is completed in the Roswell Basin aquifer system (S400RSWLBS) national aquifer.
This well is completed in the Alluvium, Bolson Deposits and Other Surface Deposits (110AVMB) local aquifer.*

USGS from well 10285 include static measurements as late as 2015. As the graph shows, since 1988, elevations vary by less than 10 feet, which we consider insignificant.



Measurements made by Hicks Consultants in 2016 compliment the USGS measurements and were used to estimate the static groundwater elevation presented in Figure 2. The interpretation of the current groundwater elevation emphasizes USGS data after 2005. Based upon our interpretation, we believe the elevation of groundwater beneath the Dayton Recycling Project area is about 3255 feet above sea level.

Our conclusions honor all data that we know are accurate to the best of our knowledge. We employed the most recent data, and we conclude:

- The elevation of the ground surface at the Dayton AST site is about 3325 feet ASL and the elevation of the sumps of Containments #1 and #2 are 3304.5 feet asl (see engineering design drawings, Cross Section A-A and B-B).
- The Alluvial (shallow) aquifer is the uppermost groundwater beneath the site.
- The approximate depth to groundwater beneath the Dayton Containments is about (3304 - 3255=) 49 feet.

SITING CRITERIA (19.15.34.11 NMAC)
SILVERBACK OPERATING – DAYTON CONTAINMENTS

- The 70-foot boring log (T1, described above) at the Dayton site was dry to total depth (see Appendix Well Logs). The data in the engineer’s log presents excellent lithologic and groundwater data that strongly suggests that the alluvial aquifer is confined and under pressure beneath the project area.
- The location of the Dayton Recycling Facility is fully compliant with the distance to groundwater mandate of Rule 34.

Distance to Municipal Boundaries and Fresh Water Fields

Figure 3 demonstrates that the Dayton facility 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 Atoka, NM approximately 3 miles north of the Dayton recycling area.
- The closest public well fields belong to the City of Artesia. These municipal supply wells are about 11 miles to the north-northwest.

Distance to Subsurface Mines

Figure 4 and our general reconnaissance of the Dayton recycling area demonstrate that the nearest mines are caliche/gravel pits. This location is not within an area overlying a subsurface mine.

- A surface quarry is about 1 mile southwest.
- There are no subsurface mines in the area shown in Figure 4.

Distance to High or Critical Karst Areas

Figure 5 shows the Dayton recycling project area is not within mapped zone of high or critical with respect to BLM Karst areas.

- The proposed containments are located within a “low” potential karst area.
- The nearest “high” or “critical” potential karst area is located approximately 3 miles east of the proposed recycling facility.
- We observed no evidence of solution voids or unstable ground near the site during the field inspection.

Distance to 100-Year Floodplain

Figure 6 demonstrates that the Dayton recycling project area 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 minimal risk for flooding.
- The nearest mapped flood hazard is about 1.5 miles east in the Pecos River floodplain.
- A flood hazard also exists in the Rio Peñasco drainage to the north and the Four Mile Draw drainage to the south.

SITING CRITERIA (19.15.34.11 NMAC)
SILVERBACK OPERATING – DAYTON CONTAINMENTS**Distance to Surface Water**

Figure 7 shows

- the closest intermittent stream mapped by the USGS is the Rio Peñasco about 1.5 miles north of the proposed Dayton Recycling area
- the Pecos River is about 2 miles east
- the closest surface water bodies are irrigation reservoirs, the closest of which is about ½ mile south.

The site visit and photographs demonstrate that the recycling project area is not within 300 feet of a continuously flowing watercourse or 200-feet of any other significant watercourse, lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark) or spring.

Distance to Permanent Residence or Structures

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

- The nearest structure is a service barn/warehouse about 1000 feet east of the southern boundary of the recycling area.
- No residences or other regulated structures are in the area.

Distance to Non-Public Water Supply

Figures 1 and 7 demonstrates that the Dayton Recycling project 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.

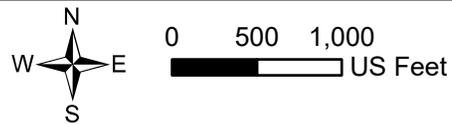
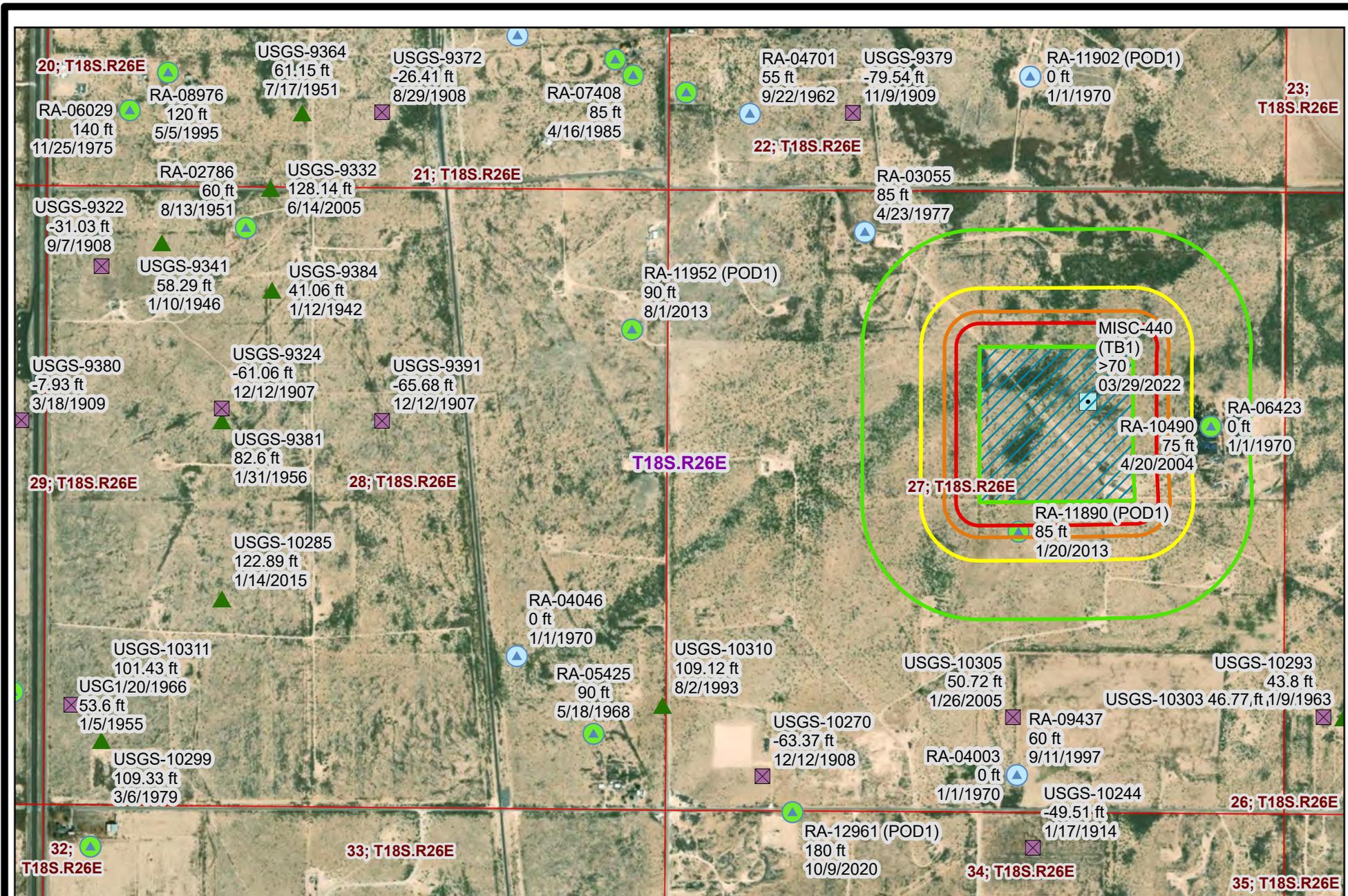
- Figure 1 shows the locations of all area water wells, active or plugged.
- As described earlier in this submission, RA-11890 plots about 300 feet south of recycling area according to the OSE database. Figure 1 uses the latitude and longitude values in the OSE database and these coordinates do not agree with the Section/Township/Range data on the drilling log (see Appendix Well Logs). The well permit indicates this well is in Section 28 to the west.
- Well RA-6423 is also mis-located as described earlier. The well is about 1250 feet east of the southern boundary of the Dayton Recycling Project area.
- 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 Figure 7)

Distance to Wetlands

Figure 9 demonstrates the Dayton location is not within 300 feet of mapped wetlands using the New Mexico database.

- The nearest designated wetland is about 1.3 miles north and appears to be a reservoir associated with a nearby farms.
- Natural wetlands (freshwater ponds) are not observed in the area.

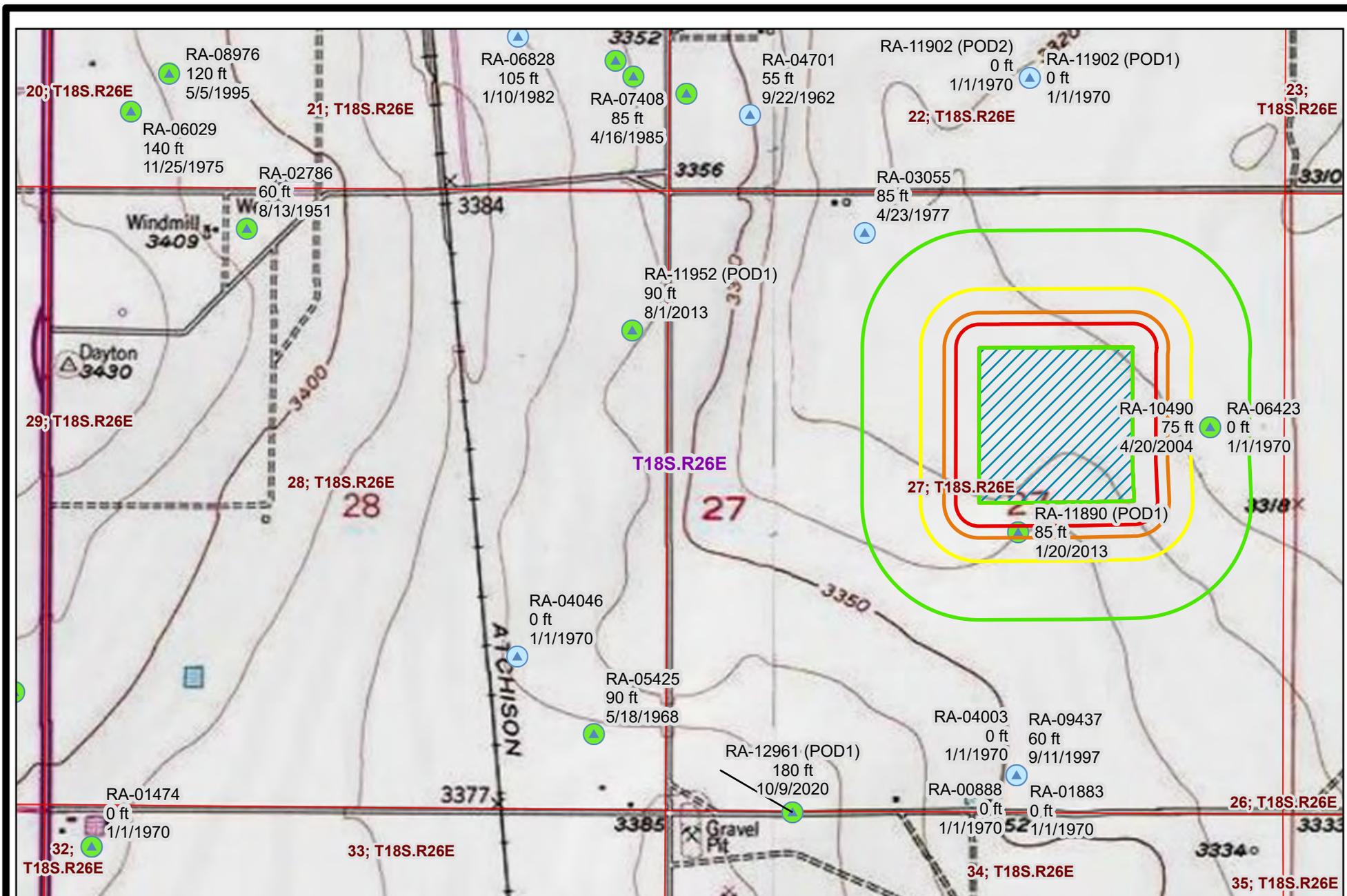
FIGURES



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Nearby Wells and Depth to Water
 Silverback Operating II, LLC - Dayton Containments

Figure 1a
 May 2022



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Shallow Water Wells in the OSE Database
 Silverback Operating II, LLC - Dayton Containments

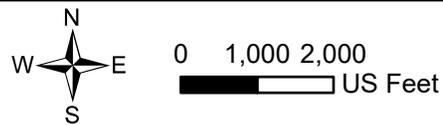
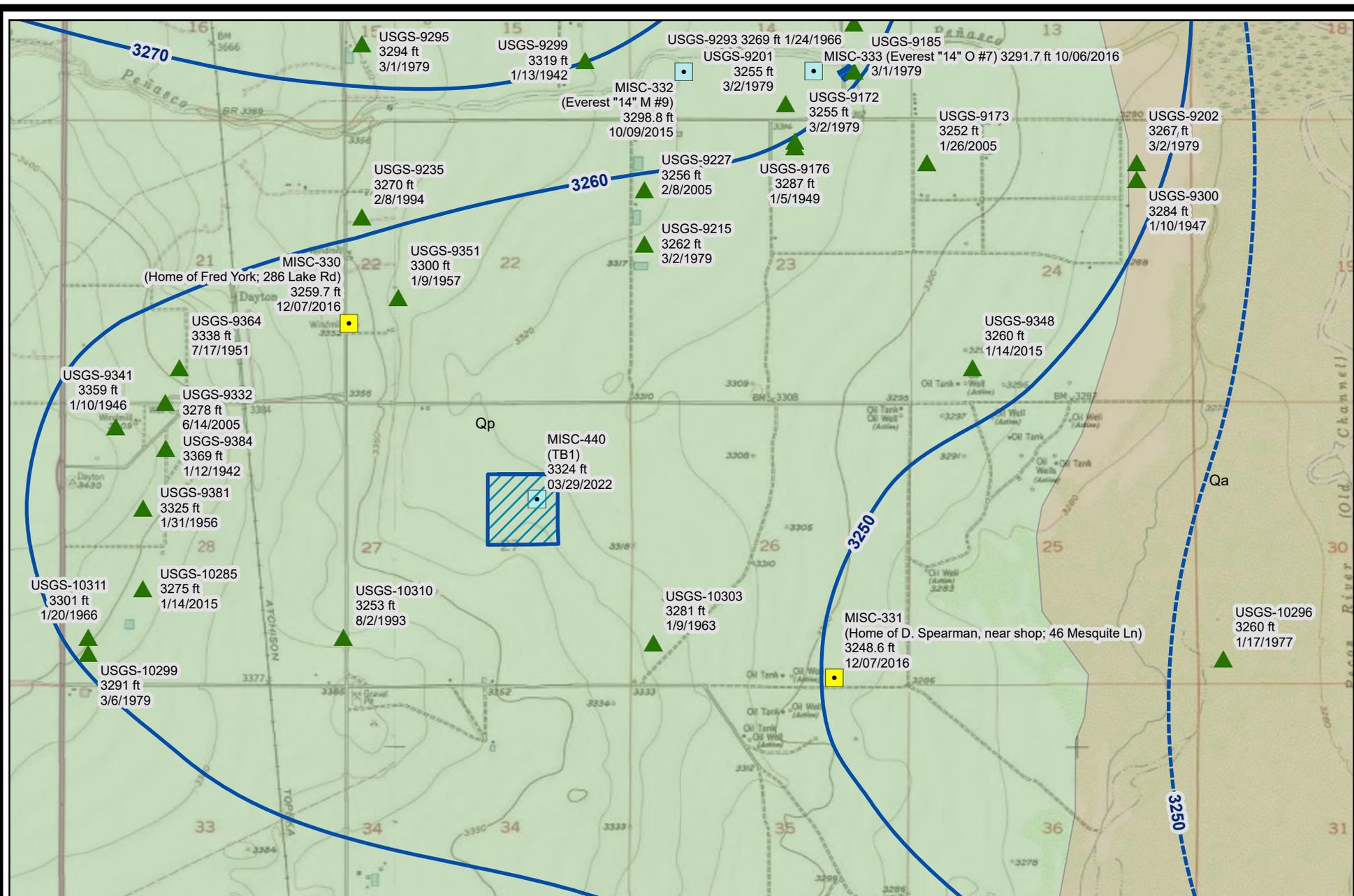
Figure 1b
 May 2022

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polygon_spe
 Recycling Containment Area
 USGS Gauging Station (GW Elev, Date)
 Aquifer Code, Well Status
 Alluvium/Bolsom
 Misc. Water Wells (GW Elev, Date)
 Well Depth (ft)
 No Data
 <= 150
 Potentiometric Surface (ft msl)
 Isocontours
 Isocontour
 NM Geology
 Map Unit,Description
 Qa, Quaternary Alluvium,Qa, Quaternary Alluvium
 Qp, Quaternary-Piedmont Alluvial Deposits,Qp, Quaternary-Piedmont Alluvial Deposits

<p> R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004 </p>	<p>Figures 1 and 2 Legend</p>	
	<p>Silverback Operating II, LLC - Dayton Containments</p>	<p>May2022</p>

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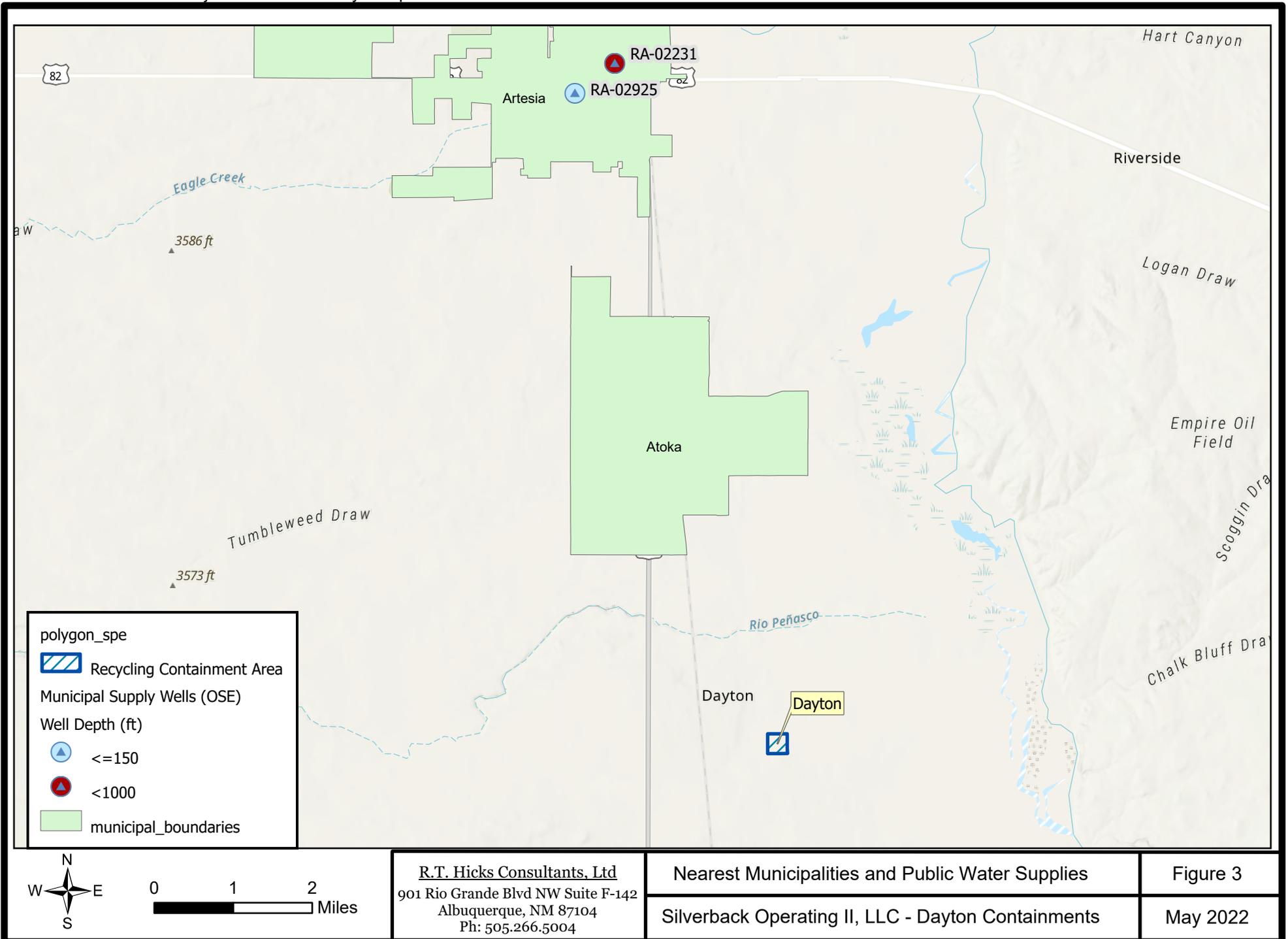


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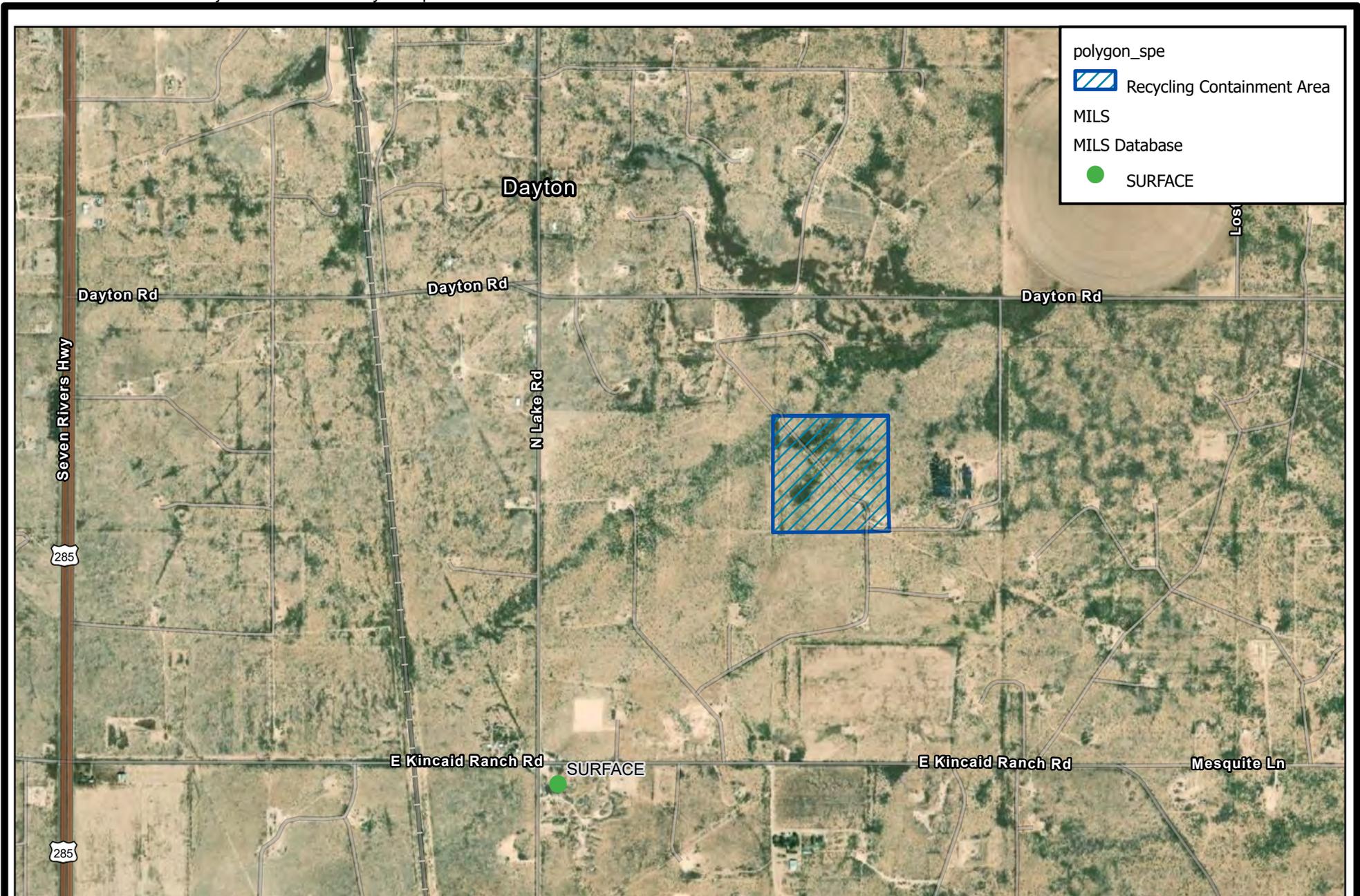
Geology and Water Table Elevation
 Silverback Operating II, LLC - Dayton Containments

Figure 2
 May2022

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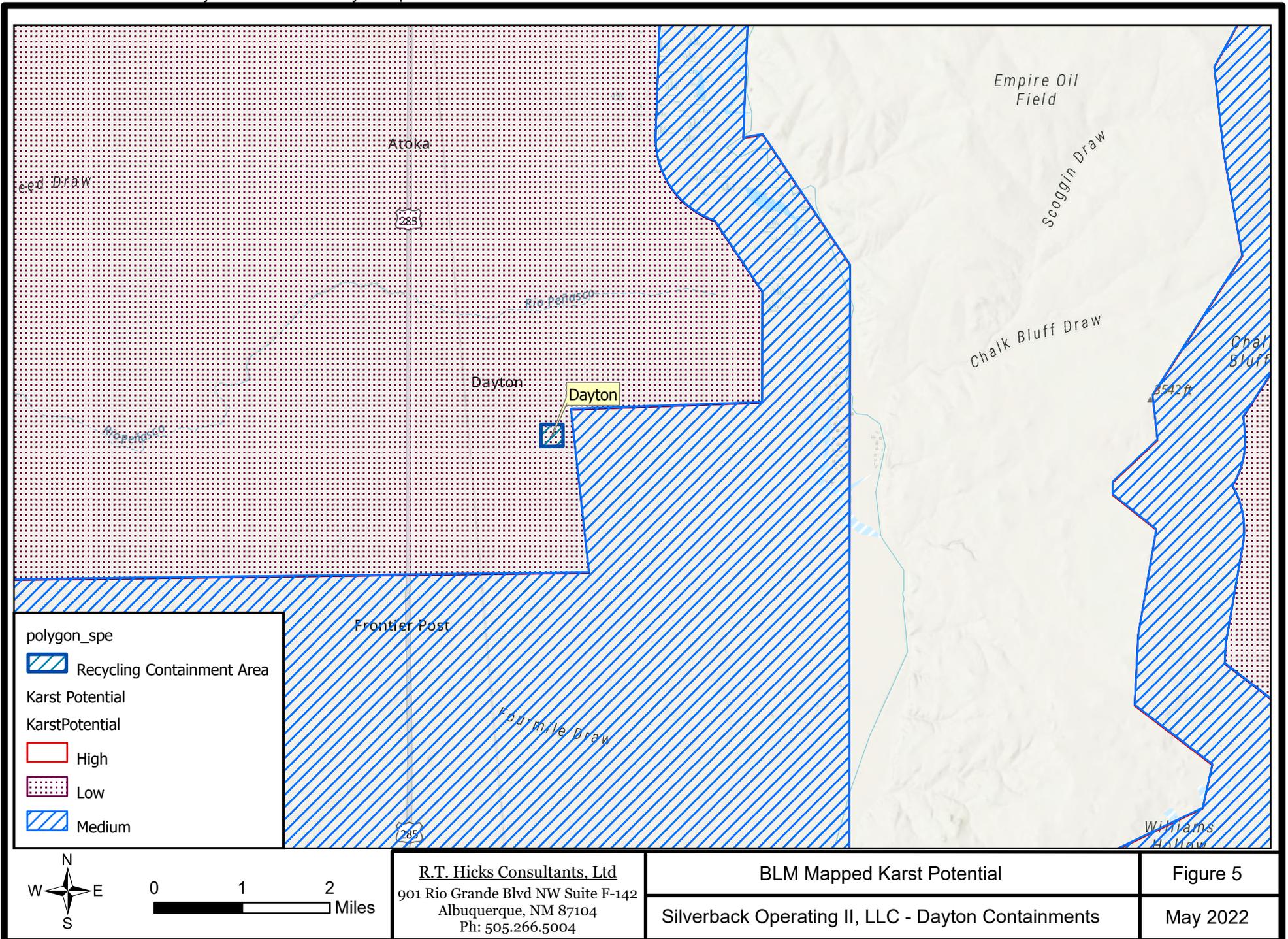
0 1,000 2,000
 Feet

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Nearest Mines
Silverback Operating II, LLC - Dayton Containments

Figure 4
May 2022

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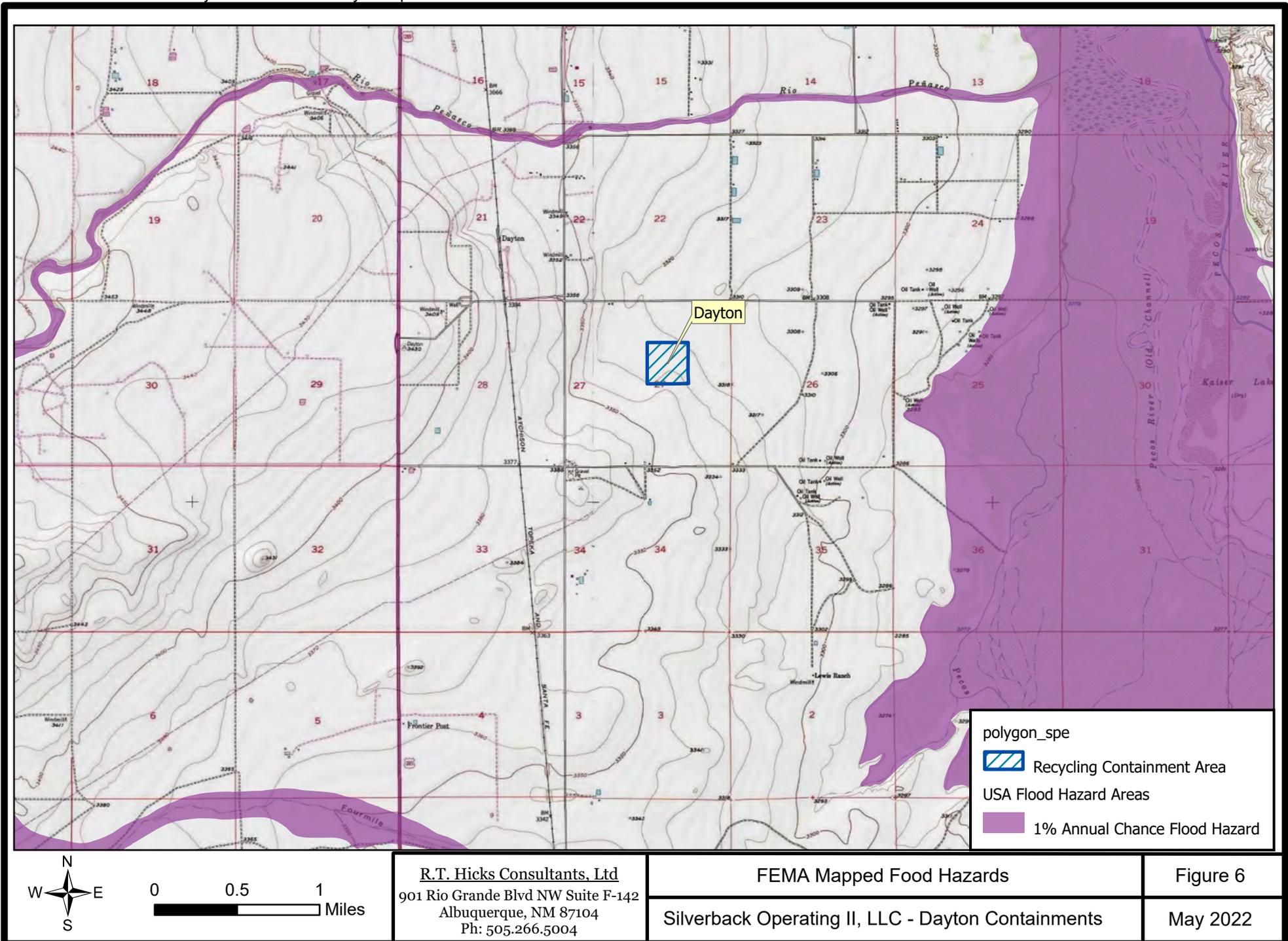


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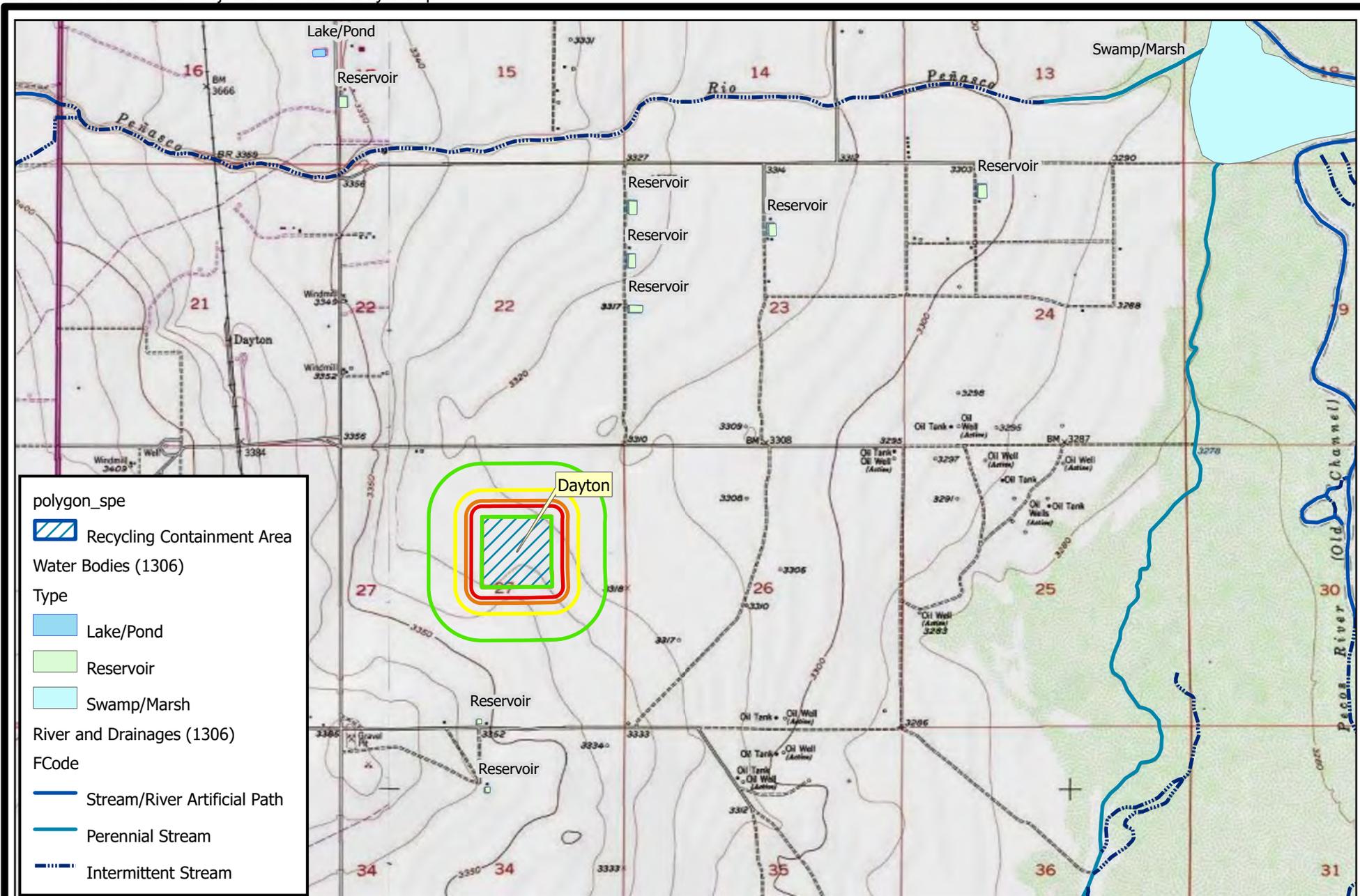
BLM Mapped Karst Potential
 Silverback Operating II, LLC - Dayton Containments

Figure 5
 May 2022

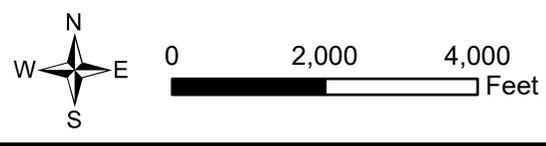
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polygon_spe
 Recycling Containment Area
 Water Bodies (1306)
 Type
 Lake/Pond
 Reservoir
 Swamp/Marsh
 River and Drainages (1306)
 FCode
 Stream/River Artificial Path
 Perennial Stream
 Intermittent Stream

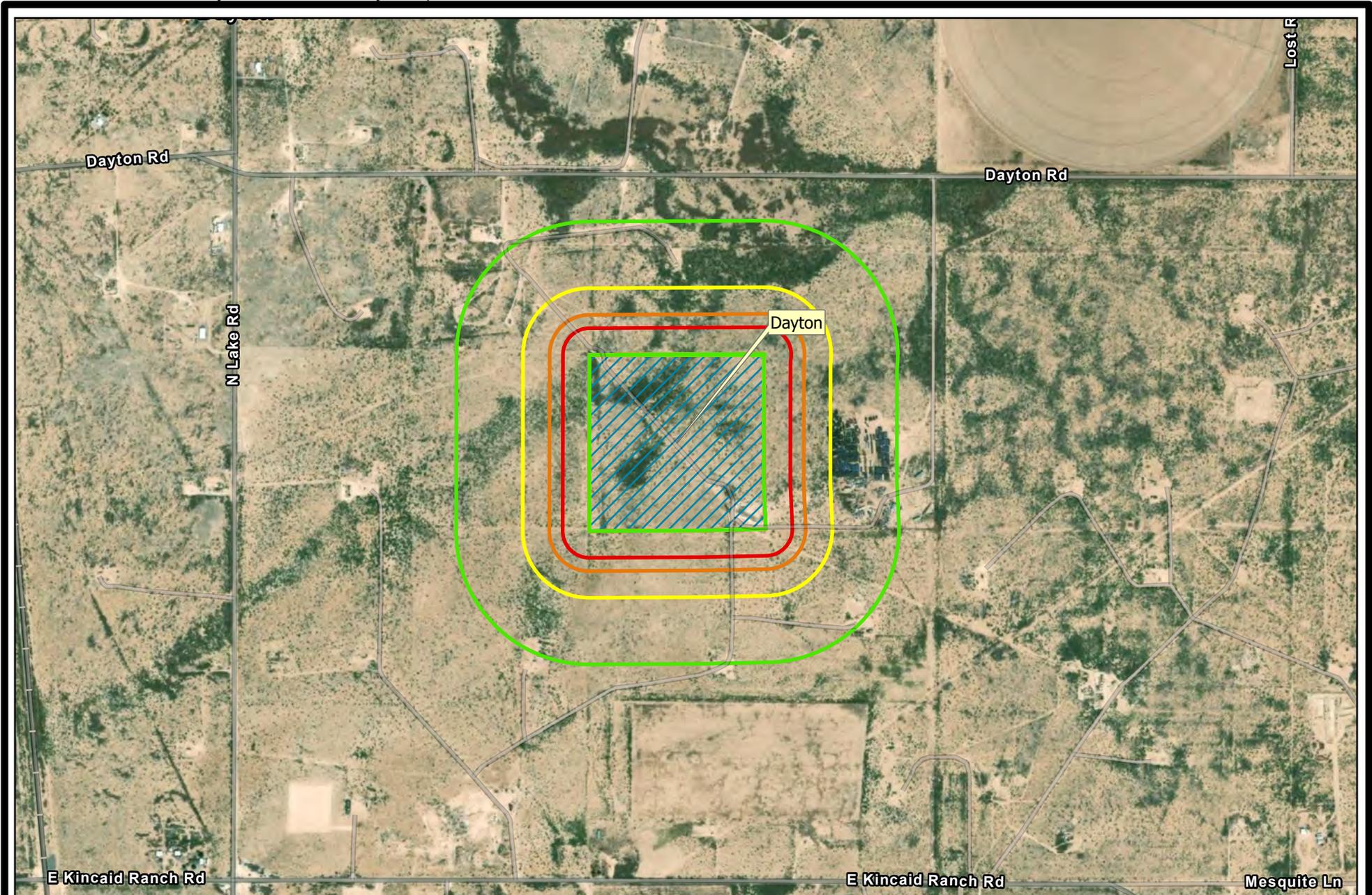


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Nearest Mapped Surface Waters
 Silverback Operating II, LLC - Dayton Containments

Figure 7
 May 2022

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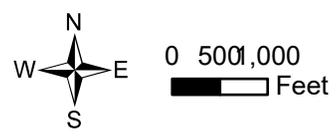
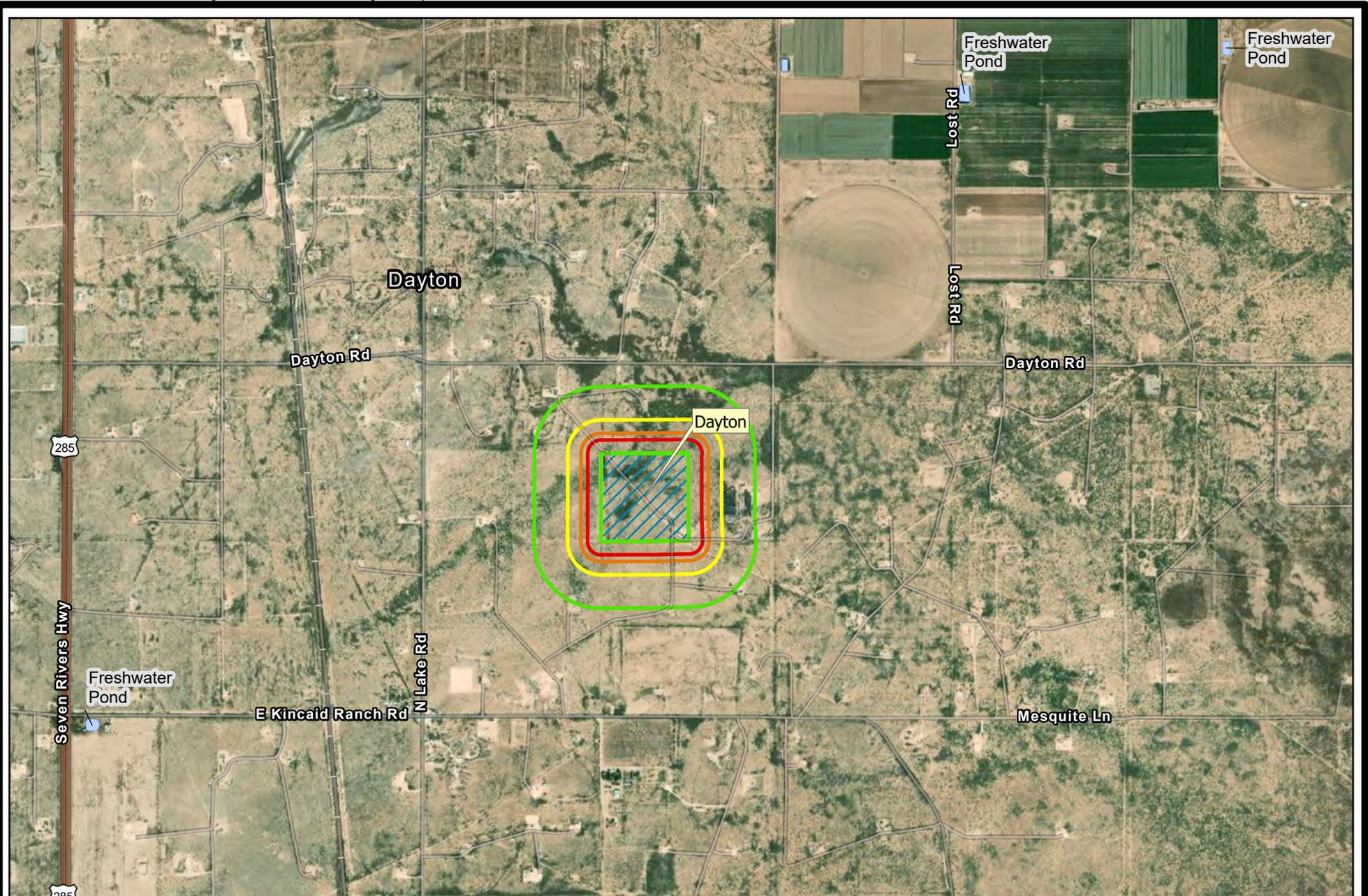


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Nearby Structures
Silverback Operating II, LLC - Dayton Containments

Figure 8
May 2022

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Nearby New Mexico Mapped Wetlands
Silverback Operating II, LLC - Dayton Containments

Figure 9
May 2022

SITE PHOTOGRAPHS

Site Photographs – Dayton Recycling Facility



Figure SP1 View east from southeastern corner of Dayton Recycling Area. Well RA-10490 is behind the building below red arrow. Location of view is 32.71947, -104.36556



SP2 – View north from eastern edge of recycling area showing nature of undisturbed vegetation and topography. 32.71986, -104.36582

APPENDIX WELL LOGS

File Number: _____

Sub Basin: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
APPLICATION FOR PERMIT TO USE UNDERGROUND WATERS
IN ACCORDANCE WITH SECTIONS 72-12-1.1, 72-12-1.2, or 72-12-1.3 NEW MEXICO STATUTES

1. APPLICANT

2-32314

Name: Guillermo Camacho Name: _____
Address: P.O. Box 1514 Address: _____
City: Artesia City: _____
State: N.M. Zip: 88211 State: _____ Zip: _____
Phone: 575-365-7894 Phone: _____
Contact: _____

2. LOCATION OF WELL (A or B required, C required, if applicable, D required)

A. NAD 83 (Select Appropriate Coordinate System and Zone) →

NOTE: State Plane units - feet, UTM units - meters

X = _____, Y = _____

State Plane	_____ NM West Zone
	_____ NM Central Zone
	_____ NM East Zone
UTM	_____ UTM Zone 13N
	_____ UTM Zone 12N

B. Latitude: 32 d 43 m 509 s
Longitude: 104 d 22 m 732 s
(Enter Lat/Long to at least 1/10th of a second)

Grant (If Applicable) _____

C. Subdivision _____ Recorded in County of _____
Lot No. _____, Block No. _____

D. On land owned by: Guillermo Camacho

E. Tract No. _____, Map No. _____ of the _____ Hydrographic Survey

F. Is this well within a municipality? _____ if yes, where? _____

G. Give State Engineer File Number if existing well: _____

H. NE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ Section 28 Township 18S Range 24E

I. Other _____

3. USE OF WATER (check use applied for)

- Domestic use for one household
- Livestock watering
- _____ Domestic well to accompany a house or other dwelling unit constructed for sale.
- _____ Domestic use to serve _____ households
- _____ Drinking and sanitary uses that are incidental to the operations of a governmental, commercial, or non-profit facility
- _____ Prospecting, mining or drilling operations to discover or develop natural resources
- _____ Construction of public works, highways and roads

STATE ENGINEER OFFICE
ROSENBERG
2017 DEC -11 A 11:30

Trn Desc: _____ File Number: RA-11990
Log Due Date: _____ Trn Number: 518081
Form: wr-01

File Number: _____

Sub Basin: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
APPLICATION FOR PERMIT TO USE UNDERGROUND WATERS
IN ACCORDANCE WITH SECTIONS 72-12-1.1, 72-12-1.2, or 72-12-1.3 NEW MEXICO STATUTES

4. WELL INFORMATION

Name of well driller and driller license number:
Delford Martin WD#: 1064

Approximate depth 150 feet; Outside diameter of casing 5 1/2 inches.

Replacement well

Repair or Deepen:

Clean out well to original depth

Deepen well from _____ to _____ feet

Other _____

Supplemental well

5. ADDITIONAL STATEMENTS OR EXPLANATIONS:

ACKNOWLEDGEMENT

x (I, We) Guillermo Camacho affirm that the
(Please Print)
foregoing statements are true to the best of (my, our) knowledge and belief.

Guillermo Camacho
Applicant Signature Applicant Signature

x _____

ACTION OF THE STATE ENGINEER

This application is approved subject to the attached general and specific conditions of approval.

Witness my hand and seal this 5th day of December, 2012.

Scott A. Verhines, P.[State Engineer

By: Rachel Garcia
Rachel Garcia

Trn Desc: _____ File Number: _____
Log Due Date: _____ Trn Number: _____
Form: wr-01

NEW MEXICO STATE ENGINEER OFFICE
APPLICATION FOR PERMIT TO USE UNDERGROUND WATERS
IN ACCORDANCE WITH SECTION 72-12-1 NEW MEXICO STATUTES

GENERAL CONDITIONS OF APPROVAL (A thru P)

- 06-A The maximum amount of water that may be appropriated under this permit is 3.000 acre-feet in any year.
- 06-B The well shall be drilled by a driller licensed in the State of New Mexico in accordance with Section 72-12-12 New Mexico Statutes Annotated. A licensed driller shall not be required for the construction of a driven well; provided that the casing shall not exceed two and three-eighths (2 3/8) inches outside diameter (Section 72-12-12).
- 06-C Driller's well record must be filed with the State Engineer within 20 days after the well is drilled or driven. Well record forms will be provided by the State Engineer upon request.
- 06-D The casing shall not exceed 7 inches outside diameter except under specific conditions in which reasons satisfactory to the State Engineer are shown.
- 06-E To request a change to the use of water authorized under this permit, the permittee shall file an application with the State Engineer.
- 06-F An application for a new 72-12-1.1 domestic well permit where the proposed point of diversion is to be located on the same legal lot of record as an operational 72-12-1.1 domestic well shall be treated as an application for a supplemental well.
- 06-G If artesian water is encountered, all rules and regulations pertaining to the drilling and casing of artesian wells shall be complied with.
- 06-H The drilling of the well and amount and uses of water permitted are subject to such limitations as may be imposed by a court or by lawful municipal or county ordinance which are more restrictive than the conditions of this permit and applicable State Engineer regulations.
- 06-I The permittee shall utilize the highest and best technology available to ensure conservation of water to the maximum extent practical.

Trn Desc: RA 11890
Log Due Date: 12/31/2013
Form: wr-01

File Number: RA 11890
Trn Number: 518081

NEW MEXICO STATE ENGINEER OFFICE
APPLICATION FOR PERMIT TO USE UNDERGROUND WATERS
IN ACCORDANCE WITH SECTION 72-12-1 NEW MEXICO STATUTES

GENERAL CONDITIONS OF APPROVAL (Continued)

- 06-J The well shall be set back a minimum of 50 ft. from an existing well of other ownership unless a variance has been granted by the State Engineer. The State Engineer may grant a variance for a replacement well or to allow for maximum spacing of the well from a source of groundwater contamination. The well shall be set back from potential sources of contamination in accordance with rules and regulations of the NM Environment Department.
- 06-K Pursuant to section 72-8-1 NMSA, the permittee shall allow the State Engineer and his representatives entry upon private property for the performance of their respective duties, including access to the well for meter reading and water level measurement.
- 06-L The permit is subject to cancellation for non-compliance with the conditions of approval or if otherwise not exercised in accordance with the terms of the permit.
- 06-M The right to divert water under this permit is subject to curtailment by priority administration as implemented by the State Engineer or a court.
- 06-N In the event of any change of ownership to this permit the new owner shall file a change of ownership form with the State Engineer in accordance with Section 72-1-2.1 NMSA.
- 06-O This well permit shall automatically expire unless the well is completed and the well record is filed with the State Engineer within one year of the date of issuance of the permit. It is the responsibility of the permit holder to ensure that the well record has been properly filed with the State Engineer.
- 06-P The well shall be constructed, maintained, and operated to prevent inter-aquifer exchange of water and to prevent loss of hydraulic head between geologic zones.

SPECIFIC CONDITIONS OF APPROVAL

- 06-18 Any diversion of water made in excess of the authorized maximum diversion amount shall be repaid with twice the amount of the over-diversion during the following calendar year. Repayment shall be made by either: (a) reducing the diversion from the well that is the source of the over-diversion; or (b) acquiring or leasing a valid, existing consumptive use water right in an amount equal to the repayment amount and submitting to the State Engineer

Trn Desc: RA 11890
Log Due Date: 12/31/2013
Form: wr-01

File Number: RA 11890
Trn Number: 518081

NEW MEXICO STATE ENGINEER OFFICE
APPLICATION FOR PERMIT TO USE UNDERGROUND WATERS
IN ACCORDANCE WITH SECTION 72-12-1 NEW MEXICO STATUTES

for his approval a plan for the proposed repayment.

06-19 This permit authorizes the diversion of water for domestic use to serve a single household and livestock. The maximum combined total diversion of water under this permit shall not exceed 3.000 acre-feet per year.

LOG This permit will automatically expire unless the well RA 11890 POD1 is completed and the well record filed on or before 12/31/2013.

ACTION OF STATE ENGINEER

This application is approved for the use indicated, subject to all general conditions and to specific conditions listed above.

Witness my hand and seal this 05 day of Dec A.D., 2012

Scott A. Verhines, P.E., State Engineer

By: Rh
Rachel Garcia

Trn Desc: RA 11890
Log Due Date: 12/31/2013
Form: wr-01

File Number: RA 11890
Trn Number: 518081



Eddy County, New Mexico
Address and Floodplain Pre-Determination Certificate

508 2

Sur

2-32314

Certificate No. 12-087

Date 09/10/12

Address / Pre-Determination requested by: Everado Morales

Property description: Track 8, Sec 28 T18S R26E 4-153-107-519-041

Address assigned: 313 N. Lake Rd

This property is is not located in a Special Flood Hazard area and will will not

require a Floodplain Use Permit. FIRM Panel Number 35015C0550D dated 6/4/2010

Request processed by: [Signature] CFM

STATE ENGINEER OFFICE
ROSWELL, NEW MEXICO
2012 DEC -11 A 11:31

CA

SHORT FORM WARRANTY DEED—New Mexico Statutory Form
Approved by State Comptroller as Standard Form, Oct. 6, 1947
Revised September, 1975

Printed and For Sale By Bryan Printers & Stationers, Inc.
Form 312

WARRANTY DEED

365-7891
2-32314

FERRARDO HOALES

_____ , for consideration paid, grant _____ to

Guillermo Camacho

P.O. Box 1514 Artesia NM 88210

whose address is _____

the following described real estate in Eddy county, New Mexico:

Tract 8. NE 1/4 of section 28. Township 18 south Range 26 East.
N.M.P.M. to the city of Artesia, Eddy county. New Mexico.
Being 1.5 acres

STATE ENGINEER OFFICE
ROSWELL
2012 DEC -11 A 11 30

subject to reservations, restrictions and easements of record

with warranty covenants.

WITNESS _____ hand _____ and seal _____ this 05 day of

September

2012

Ferrardo Hoales (Seal)

(Seal)

(Seal)

(Seal)

(Seal)

STATE OF NEW MEXICO,
County of Eddy } ss.

September 5th

The foregoing instrument was acknowledged before me this September day of 05

2012 by Ferrardo Hoales

My Commission expires 10/27 2015

Emma Acosta

Notary Public
OFFICIAL SEAL
Emma Acosta
NOTARY PUBLIC-STATE OF NEW MEXICO
10/27/15

My commission expires: _____

STATE OF NEW MEXICO,
County of _____ } ss.

RECEPTION NO: 1208838 STATE OF
NEW MEXICO, COUNTY OF EDDY
RECORDED 09/10/2012 9:13 AM
BOOK 0904 PAGE 0800 Guillermo
DARLENE ROSPRIM, COUNTY CLERK

I hereby certify that this instrument was filed for
record on the _____ day of

_____, A. D., 19 _____

at _____ o'clock _____ M., and duly recorded in

Book _____ Page _____ of _____

Return to Guillermo Camacho
P.O. Box 1514
Artesia, NM 88210



Locator Tool Report

General Information:

Application ID:30 Date: 12-05-2012 Time: 08:19:49

WR File Number: RA
Purpose: POINT OF DIVERSION

Applicant First Name: GUILLERMO
Applicant Last Name: CAMACHO

GW Basin: ROSWELL ARTESIAN
County: EDDY

Critical Management Area Name(s): NONE
Special Condition Area Name(s): NONE
Land Grant Name: NON GRANT

PLSS Description (New Mexico Principal Meridian):

SE 1/4 of NE 1/4 of NE 1/4 of NE 1/4 of Section 28, Township 18S, Range 26E.

Coordinate System Details:

Geographic Coordinates:

Latitude: 32 Degrees 43 Minutes 30.5 Seconds N
Longitude: 104 Degrees 22 Minutes 43.9 Seconds W

Universal Transverse Mercator Zone: 13N

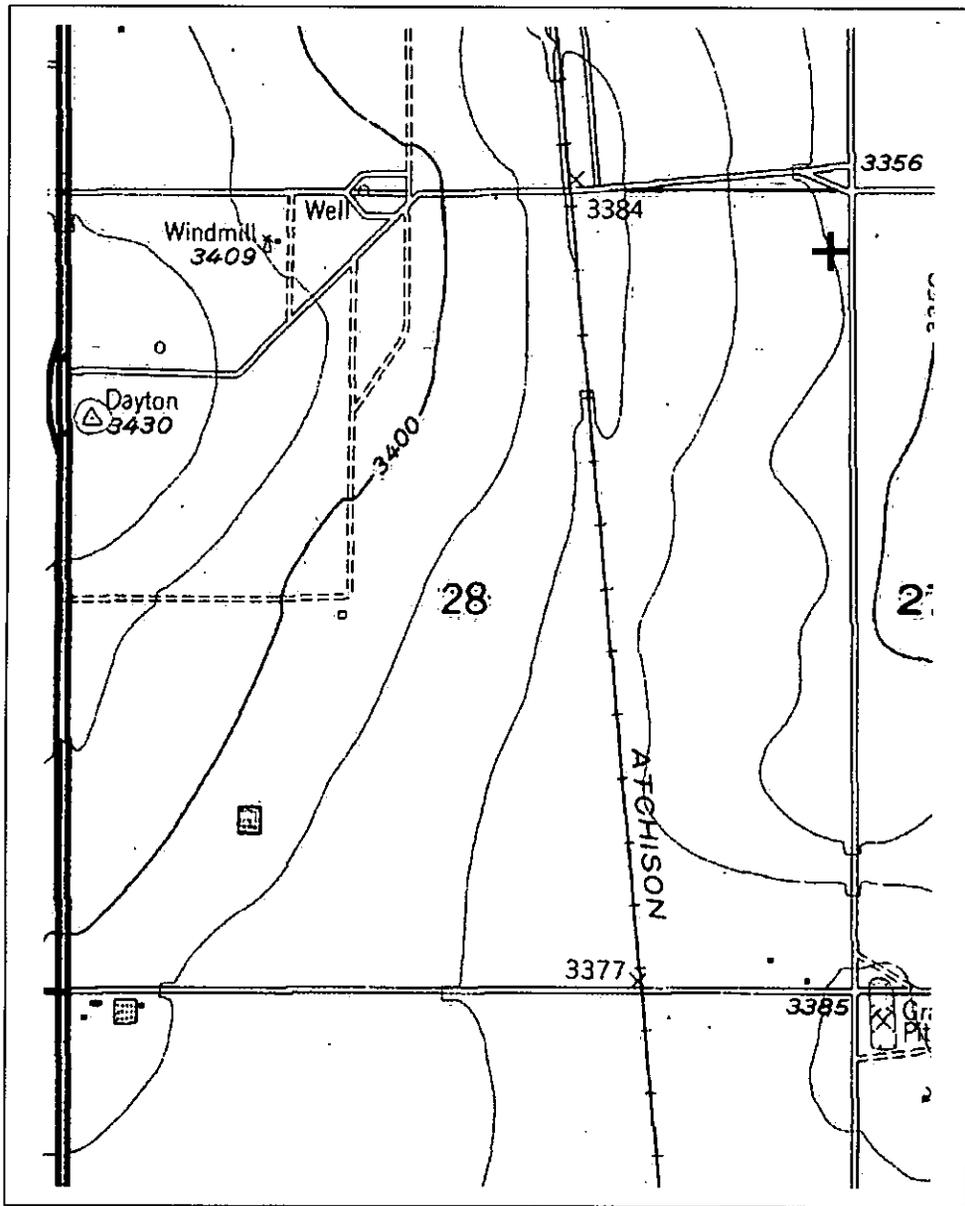
NAD 1983(92) (Meters)	N: 3,620,988	E: 558,203
NAD 1983(92) (Survey Feet)	N: 11,879,859	E: 1,831,372
NAD 1927 (Meters)	N: 3,620,786	E: 558,253
NAD 1927 (Survey Feet)	N: 11,879,195	E: 1,831,536

State Plane Coordinate System Zone: New Mexico East

NAD 1983(92) (Meters)	N: 191,276	E: 160,732
NAD 1983(92) (Survey Feet)	N: 627,544	E: 527,335
NAD 1927 (Meters)	N: 191,257	E: 148,181
NAD 1927 (Survey Feet)	N: 627,482	E: 486,156

NEW MEXICO OFFICE OF STATE ENGINEER

Locator Tool Report



WR File Number: RA

Scale: 1:15,370

Northing/Easting: UTM83(92) (Meter): N: 3,620,988

E: 558,203

Northing/Easting: SPCS83(92) (Feet): N: 627,544

E: 527,335

GW Basin: Roswell Artesian

Scott A. Verhines, P.E.
State Engineer



Roswell Office
1900 WEST SECOND STREET
ROSWELL, NM 88201

**STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER**

Trn Nbr: 518081
File Nbr: RA 11890

Dec. 05, 2012

GUILLERMO CAMACHO
P.O. BOX 1514
ARTESIA, NM 88211

Greetings:

Enclosed is your copy of the above numbered permit that has been approved in accordance with NM Statute Section 72-12-1 subject to the conditions set forth on the approval page.

Please review the conditions for any required submittals. If submittals are not made by the date(s) indicated in the conditions, your rights under this permit shall expire by the date indicated on your permit.

Appropriate forms can be downloaded from the OSE website www.ose.state.nm.us or will be mailed upon request.

Sincerely,

A handwritten signature in cursive script, appearing to read "R Garcia".

Rachel Garcia
(575) 622-6521

Enclosure

wr_01app



WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

STATE ENGINEER OFFICE
ROSWELL, NEW MEXICO

2013 JAN 30 A 12 13

I. GENERAL AND WELL LOCATION	OSE POD NUMBER (WELL NUMBER) RA-11890			OSE FILE NUMBER(S) RA-11890			
	WELL OWNER NAME(S) Guillermo Camacho			PHONE (OPTIONAL) 375 365-7894			
	WELL OWNER MAILING ADDRESS PO Box 1514			CITY STATE ZIP Artesia NM 88211			
	WELL LOCATION (FROM GPS)	DEGREES	MINUTES	SECONDS	* ACCURACY REQUIRED: ONE TENTH OF A SECOND		
	LATITUDE	32	43	509	* DATUM REQUIRED: WGS 84		
	LONGITUDE	104	22	732			
DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS - PLSS (SECTION, TOWNSHIP, RANGE) WHERE AVAILABLE							

2. DRILLING & CASING INFORMATION	LICENSE NUMBER 1064		NAME OF LICENSED DRILLER Delford Martin		NAME OF WELL DRILLING COMPANY Martin Waterwell Drllg			
	DRILLING STARTED 1-12-13	DRILLING ENDED 1-20-13	DEPTH OF COMPLETED WELL (FT) 175	BORE HOLE DEPTH (FT) 175	DEPTH WATER FIRST ENCOUNTERED (FT) 144			
	COMPLETED WELL IS: <input type="checkbox"/> ARTESIAN <input type="checkbox"/> DRY HOLE <input checked="" type="checkbox"/> SHALLOW (UNCONFINED)				STATIC WATER LEVEL IN COMPLETED WELL (FT) 85			
	DRILLING FLUID: <input checked="" type="checkbox"/> AIR <input type="checkbox"/> MUD <input type="checkbox"/> ADDITIVES - SPECIFY:							
	DRILLING METHOD: <input checked="" type="checkbox"/> ROTARY <input type="checkbox"/> HAMMER <input type="checkbox"/> CABLE TOOL <input type="checkbox"/> OTHER - SPECIFY:							
	DEPTH (feet bgl)		BORE HOLE DIAM (inches)	CASING MATERIAL AND/OR GRADE (include each casing string, and note sections of screen)	CASING CONNECTION TYPE	CASING INSIDE DIAM (inches)	CASING WALL THICKNESS (inches)	SLOT SIZE (inches)
	FROM	TO						
	0	95	7 7/8	5 1/2 PVC	Bell	5	1/4	1/8
95	175	7 7/8	5 1/2 PVC	Bell	5	1/4	1/8	

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				
	0	175	7 7/8	3/8 gravel	54	dropped

FOR OSE INTERNAL USE

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

FILE NUMBER RA-11890	POD NUMBER Dam	TRN NUMBER SI 8081
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Locator Tool Report

General Information:

Application ID:29 Date: 02-07-2013 Time: 09:35:04

WR File Number: RA
Purpose: POINT OF DIVERSION

Applicant First Name: GUILLERMO
Applicant Last Name: CAMACHO

GW Basin: ROSWELL ARTESIAN
County: EDDY

Critical Management Area Name(s): NONE
Special Condition Area Name(s): NONE
Land Grant Name: NON GRANT

PLSS Description (New Mexico Principal Meridian):

NE 1/4 of NW 1/4 of NW 1/4 of SE 1/4 of Section 27, Township 18S, Range 26E.

Coordinate System Details:

Geographic Coordinates:

Latitude: 32 Degrees 43 Minutes 5.1 Seconds N
Longitude: 104 Degrees 22 Minutes 7.3 Seconds W

Universal Transverse Mercator Zone: 13N

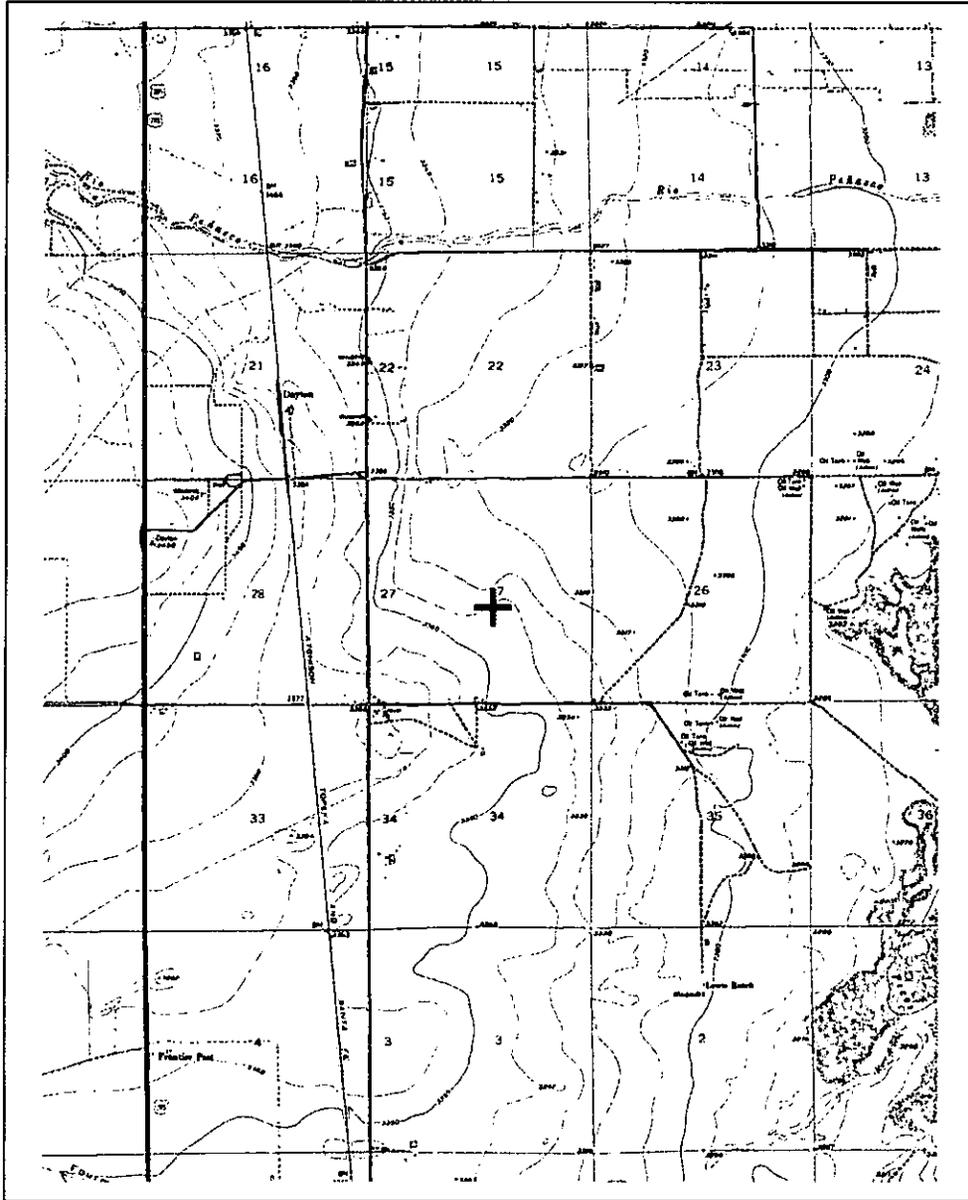
NAD 1983(92) (Meters)	N: 3,620,210	E: 559,161
NAD 1983(92) (Survey Feet)	N: 11,877,306	E: 1,834,513
NAD 1927 (Meters)	N: 3,620,008	E: 559,211
NAD 1927 (Survey Feet)	N: 11,876,642	E: 1,834,677

State Plane Coordinate System Zone: New Mexico East

NAD 1983(92) (Meters)	N: 190,492	E: 161,685
NAD 1983(92) (Survey Feet)	N: 624,971	E: 530,461
NAD 1927 (Meters)	N: 190,473	E: 149,133
NAD 1927 (Survey Feet)	N: 624,909	E: 489,282

NEW MEXICO OFFICE OF STATE ENGINEER

Locator Tool Report



WR File Number: RA

Scale: 1:54,512

Northing/Easting: UTM83(92) (Meter): N: 3,620,210

E: 559,161

Northing/Easting: SPCS83(92) (Feet): N: 624,971

E: 530,461

GW Basin: Roswell Artesian



WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

STATE ENGINEER OFFICE
ROSWELL, NEW MEXICO

1. GENERAL AND WELL LOCATION	OSB POD NUMBER (WELL NUMBER) RA-11890 Guillermo Camacho			OSB FILE NUMBER 32 A 12 18 RA-11890		
	WELL OWNER NAME(S) Guillermo Camacho			PHONE (OPTIONAL) 575 365-7894		
	WELL OWNER MAILING ADDRESS P.O. Box 1514			CITY STATE ZIP Artesia NM 88211		
	WELL LOCATION (FROM GPS)	DEGREES LATITUDE 32	MINUTES 43	SECONDS 509	* ACCURACY REQUIRED: ONE TENTH OF A SECOND	
		LONGITUDE 104	22	732	* DATUM REQUIRED: WGS 84	
DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS - PLSS (SECTION, TOWNSHIP, RANGE) WHERE AVAILABLE						

2. DRILLING & CASING INFORMATION	LICENSE NUMBER 1064		NAME OF LICENSED DRILLER Delford Martin			NAME OF WELL DRILLING COMPANY Martin Waterwell Drilling		
	DRILLING STARTED 1-12-13	DRILLING ENDED 1-20-13	DEPTH OF COMPLETED WELL (FT) 175	BORE HOLE DEPTH (FT) 175	DEPTH WATER FIRST ENCOUNTERED (FT) 144			
	COMPLETED WELL IS: <input type="checkbox"/> ARTESIAN <input type="checkbox"/> DRY HOLE <input checked="" type="checkbox"/> SHALLOW (UNCONFINED)					STATIC WATER LEVEL IN COMPLETED WELL (FT) 85		
	DRILLING FLUID: <input checked="" type="checkbox"/> AIR <input type="checkbox"/> MUD <input type="checkbox"/> ADDITIVES - SPECIFY:							
	DRILLING METHOD: <input checked="" type="checkbox"/> ROTARY <input type="checkbox"/> HAMMER <input type="checkbox"/> CABLE TOOL <input type="checkbox"/> OTHER - SPECIFY:							
	DEPTH (feet bgl)		BORE HOLE DIAM (inches)	CASING MATERIAL AND/OR GRADE (include each casing string, and note sections of screen)	CASING CONNECTION TYPE	CASING INSIDE DIAM. (inches)	CASING WALL THICKNESS (inches)	SLOT SIZE (inches)
	FROM	TO						
	0	95	7 7/8	5 1/2 PVC	Bell	5	1/4	1/8
	95	175	7 7/8	5 1/2 PVC	Bell	5	1/4	1/8

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				
	0	175	7 7/8	3/8 gravel	54	dropped

FOR OSE INTERNAL USE

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

FILE NUMBER RA-11890	POD NUMBER Dom	TRN NUMBER 518081
-----------------------------	-----------------------	--------------------------

Locator Tool Report

General Information:

Application ID:29 Date: 02-07-2013 Time: 09:35:04

WR File Number: RA
Purpose: POINT OF DIVERSION

Applicant First Name: GUILLERMO
Applicant Last Name: CAMACHO

GW Basin: ROSWELL ARTESIAN
County: EDDY

Critical Management Area Name(s): NONE
Special Condition Area Name(s): NONE
Land Grant Name: NON GRANT

PLSS Description (New Mexico Principal Meridian):

NE 1/4 of NW 1/4 of NW 1/4 of SE 1/4 of Section 27, Township 18S, Range 26E.

Coordinate System Details:

Geographic Coordinates:

Latitude: 32 Degrees 43 Minutes 5.1 Seconds N
Longitude: 104 Degrees 22 Minutes 7.3 Seconds W

Universal Transverse Mercator Zone: 13N

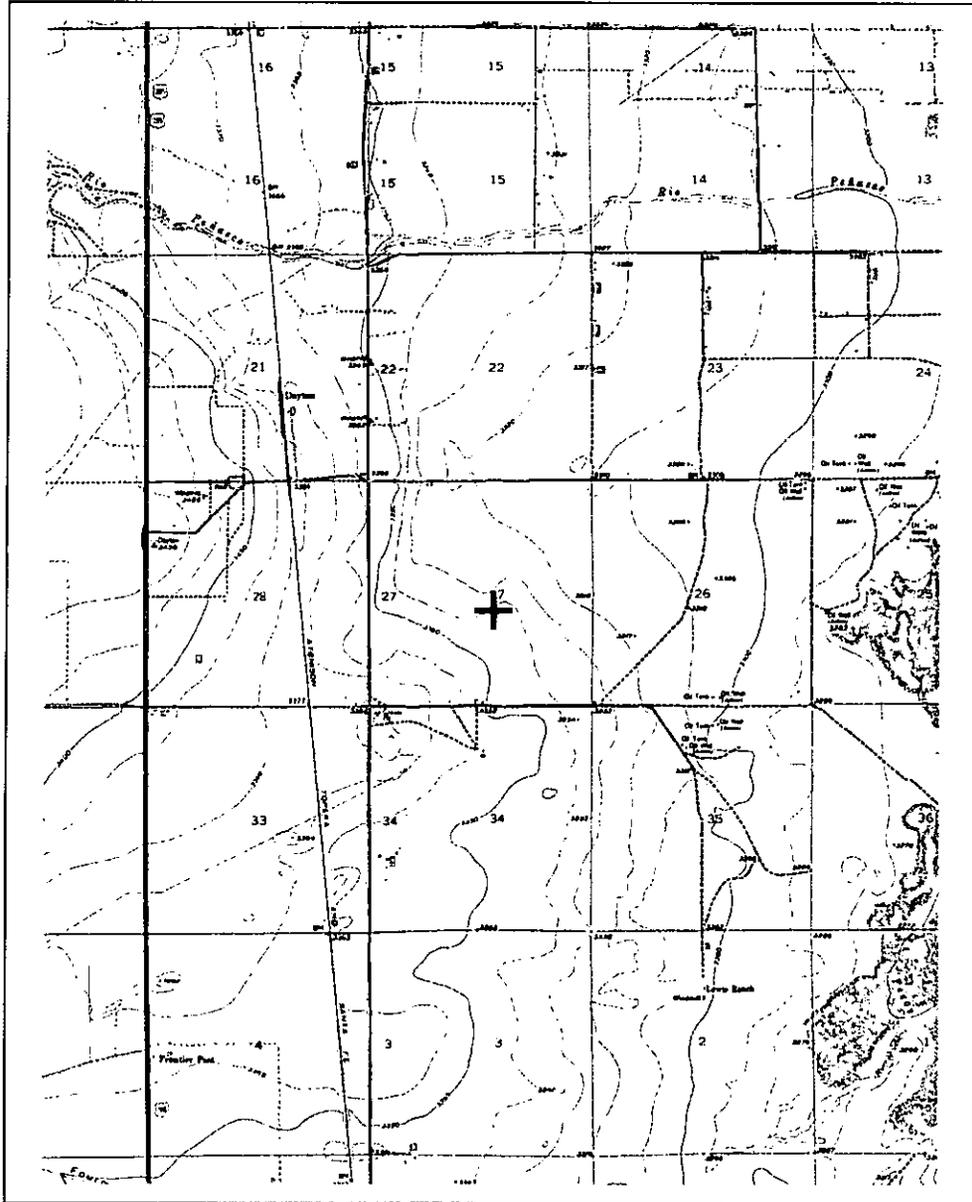
NAD 1983(92) (Meters)	N: 3,620,210	E: 559,161
NAD 1983(92) (Survey Feet)	N: 11,877,306	E: 1,834,513
NAD 1927 (Meters)	N: 3,620,008	E: 559,211
NAD 1927 (Survey Feet)	N: 11,876,642	E: 1,834,677

State Plane Coordinate System Zone: New Mexico East

NAD 1983(92) (Meters)	N: 190,492	E: 161,685
NAD 1983(92) (Survey Feet)	N: 624,971	E: 530,461
NAD 1927 (Meters)	N: 190,473	E: 149,133
NAD 1927 (Survey Feet)	N: 624,909	E: 489,282

NEW MEXICO OFFICE OF STATE ENGINEER

Locator Tool Report



WR File Number: RA

Scale: 1:54,512

Northing/Easting: UTM83(92) (Meter): N: 3,620,210

E: 559,161

Northing/Easting: SPCS83(92) (Feet): N: 624,971

E: 530,461

GW Basin: Roswell Artesian

File Number: _____

2-16918
500

NEW MEXICO OFFICE OF THE STATE ENGINEER
APPLICATION FOR PERMIT TO USE UNDERGROUND WATERS
IN ACCORDANCE WITH SECTION 72-12-1 NEW MEXICO STATUTES

1. APPLICANT

Name: Sarah Joiner / Eric Kilmer Work Phone: (505) 308-1300
Contact: _____ Home Phone: (505) 308-1300
Address: PO Box 1096 (mailing)
((physical: 201 E Dayton))
City: Artesia, NM State: NM Zip: 88211-1096

2. LOCATION OF WELL (A and/or B or G Required)

A. 1/4 SE 1/4 NE 1/4 Section: 27 Township: 18 Range: 26E N.M.P.M.
in Eddy County.

B. X = _____ feet, Y = _____ feet, N.M. Coordinate System
Zone in the _____ Grant.
U.S.G.S. Quad Map _____

C. Give State Engineer File Number if existing well: _____

D. On land owned by: Sarah Joiner / Eric Kilmer

E. Tract No. _____, Map No. _____ of the _____ Hydrographic Survey

F. Lot No. _____, Block No. _____ of Unit/Tract _____ of the
_____ Subdivision recorded in _____ County.

G. Latitude: _____ Longitude: _____

H. Other: _____

3. USE OF WATER (check use applied for)

One household, non-commercial trees, lawn and garden not to exceed a total of one acre.

Livestock watering.

Note: If any of the following items are marked, give the name and nature of business or use under item 5 of the additional statements or explanations section.

____ More than one household, non-commercial trees, lawns and gardens not to exceed a total of one acre.

____ Drinking and sanitary purposes and the irrigation of non-commercial trees, shrubs and lawns not to exceed one acre in conjunction with a commercial operation.

____ Prospecting, mining or drilling operations to discover or develop natural resources.

____ Construction of public works, highways and roads.

Trn Desc: _____

File Number: RA-10490

Log Due Date: _____

Trn Number: 291173

Form: wr-01

page 1 of 4

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
APPLICATION FOR PERMIT TO USE UNDERGROUND WATERS
IN ACCORDANCE WITH SECTION 72-12-1 NEW MEXICO STATUTES

4. WELL INFORMATION (Change, Repair, Drill, Test, Supplement)

Name of well driller and driller license number:

✓ Martin Water Well Drilling WD 1064

Approximate depth 200 feet; Outside diameter of casing 5 1/2 inches.

___ Change Location of existing well or replacement well

___ Repair or Deepen:

___ Clean out well to original depth

___ Deepen well from ___ to ___ feet

___ Other _____

___ Drill and test a well for _____ use.

___ Supplemental well

5. ADDITIONAL STATEMENTS OR EXPLANATIONS:

ACKNOWLEDGEMENT FOR NATURAL PERSONS

✓ I, Sarah Joiner affirm that the foregoing statements are true to
(Please Print)

the best of my knowledge and belief, By: _____

Sarah Joiner
Signature

Signature

Trn Desc: _____
Log Due Date: _____
Form: wr-01

File Number: _____
Trn Number: _____

NEW MEXICO STATE ENGINEER OFFICE
APPLICATION FOR PERMIT TO USE UNDERGROUND WATERS
IN ACCORDANCE WITH SECTION 72-12-1 NEW MEXICO STATUTES

GENERAL CONDITIONS OF APPROVAL (Continued)

I The permittee shall utilize the highest and best technology available to ensure conservation of water to the maximum extent practical.

SPECIFIC CONDITIONS OF APPROVAL

4 Use shall be limited to household, non-commercial trees, lawn and garden not to exceed one acre and/or stock use.

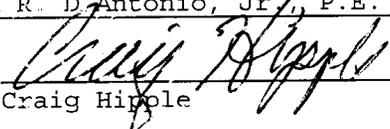
LOG This permit will automatically expire unless the well RA 10490 is completed and the well record filed on or before 12/31/2004.

ACTION OF STATE ENGINEER

This application is approved for the use indicated, subject to all general conditions and to specific conditions listed above.

Witness my hand and seal this 29 day of Dec A.D., 2003

John R. D. Antonio, Jr., P.E., State Engineer

By: 
Craig Hipple

The amount, uses and locations of domestic water wells permitted under 72-12-1 (NMSA) are subject to such limitations as may be imposed by the courts or by lawful municipal and county ordinances which are more restrictive than applicable State Engineer Regulations and the conditions of this permit.

Trn Desc: RA 10490
Log Due Date: 12/31/2004
Form: wr-01

File Number: RA 10490
Trn Number: 291173

**NEW MEXICO STATE ENGINEER OFFICE
APPLICATION FOR PERMIT TO USE UNDERGROUND WATERS
IN ACCORDANCE WITH SECTION 72-12-1 NEW MEXICO STATUTES**

GENERAL CONDITIONS OF APPROVAL (A thru I)

- A The maximum amount of water that may be appropriated under this permit is 3 acre-feet in any year.
- B The well shall be drilled by a driller licensed in the State of New Mexico in accordance with Section 72-12-12 New Mexico Statutes Annotated. A licensed driller shall not be required for the construction of a driven well; provided, that the casing shall not exceed two and three-eighths (2 3/8) inches outside diameter (Section 72-12-12).
- C Driller's well record must be filed with the State Engineer within 10 days after the well is drilled or driven. Well record forms will be provided by the State Engineer upon request.
- D The casing shall not exceed 7 inches outside diameter except under specific conditions in which reasons satisfactory to the State Engineer are shown.
- E If the well under this permit is used at any time to serve more than one household or livestock in a commercial feed lot operation, or for drinking and sanitation purposes in conjunction with a commercial operation, the permittee shall notify the State Engineer Office in writing.
- F In the event this well is combined with other wells permitted under Section 72-12-1 New Mexico Statutes Annotated, the total outdoor use shall not exceed the irrigation of one acre of non-commercial trees, lawn, and garden, or the equivalent outside consumptive use, and the total appropriation for household and outdoor use from the entire water distribution system shall not exceed 3 acre-feet in any year.
- G If artesian water is encountered, all rules and regulations pertaining to the drilling and casing of artesian wells shall be complied with.
- H The amount and uses of water permitted under this Application are subject to such limitations as may be imposed by the courts or by lawful municipal and county ordinances which are more restrictive than applicable State Engineer Regulations and the conditions of this permit.

Trn Desc: RA 10490
Log Due Date: 12/31/2004
Form: wr-01

File Number: RA 10490
Trn Number: 291173

page: 1

John R. D Antonio, Jr., P.E.
State Engineer



Roswell Office
1900 WEST SECOND STREET
ROSWELL, NM 88201

**STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER**

Trn Nbr: 291173
File Nbr: RA 10490

Dec. 29, 2003

SARAH JOINER
P.O. BOX 1096
ARTESIA, NM 88211

Greetings:

Enclosed is your copy of the 72-12-1 Permit which has been approved. Your attention is called to the Specific and the General Conditions of Approval of this permit.

In accordance with General Condition C, a well record shall be filed in this office within ten (10) days after completion of drilling. The well record is proof of completion of the well. IT IS YOUR RESPONSIBILITY TO ASSURE THAT THE WELL LOG BE FILED WITHIN 10 DAYS OF DRILLING THE WELL.

This permit will expire on or before 12/31/2004, unless the well has been drilled and the well log filed in this office.

Sincerely,

for M. Chavez
Craig Hipple
(505) 622-6467

Enclosure

cc: Santa Fe Office

wr_01app

Revised June 1972

STATE ENGINEER OFFICE
WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well SARAH JOINER / ERIC KILMER Owner's Well No. 1
 Street or Post Office Address 201 E DATON Rd.
 City and State ARTESIA N. MEX 88210

Well was drilled under Permit No. RA 10490 and is located in the:
 a. $\frac{1}{4}$ $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ of Section 27 Township 18S Range 26E N.M.P.B.
 b. Tract No. _____ of Map No. _____ of the _____
 c. Lot No. _____ of Block No. _____ of the _____
 Subdivision, recorded in Eddy County.
 d. X= _____ feet, Y= _____ feet, N.M. Coordinate System _____ Zone in
 the _____ Grant.

(B) Drilling Contractor _____ License No. 1229

Address _____
 Drilling Began 3/18/04 Completed 4/20/04 Type tools Mud Rotary Size of hole 8 3/4 in.
 Elevation of land surface or _____ at well is _____ ft. Total depth of well 200 ft.
 Completed well is shallow artesian. Depth to water upon completion of well 75' ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet		Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
From	To			
<u>100</u>	<u>110</u>	<u>10</u>	<u>Blue Shale</u>	<u>10</u>
<u>185</u>	<u>190</u>	<u>5</u>	<u>Blue SHALE</u>	<u>5</u>

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet		Length (feet)	Type of Shoe	Perforations	
			Top	Bottom			From	To
<u>4 1/2</u>	<u>Sch 40</u>	<u>PVC</u>	<u>3</u>	<u>200</u>	<u>197</u>	<u>—</u>	<u>100</u>	<u>200</u>

Section 4. RECORD OF MUDDING AND CEMENTING

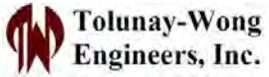
Depth in Feet		Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement
From	To				

Section 5. PLUGGING RECORD

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

No.	Depth in Feet		Cubic Feet of Cement
	Top	Bottom	
<u>1</u>			
<u>2</u>			
<u>3</u>			
<u>4</u>			

Date Received 6-1-04 FOR USE OF STATE ENGINEER ONLY 291173
 Quad _____ FWL _____ FSL _____
 File No. RA-10490 Use cem Location No. 18-26-27-24



APPENDIX A
BORING LOCATION PLAN



VICINITY MAP



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FIELD PROGRAM COORDINATES

LOCATION	DEPTH	LATITUDE	LONGITUDE
TB-1	70'	32° 43' 15.90" N	104° 22' 00.53" W
TB-2	15'	32° 43' 19.45" N	104° 22' 07.63" W
TB-3	15'	32° 43' 18.26" N	104° 22' 02.11" W
TB-4	15'	32° 43' 19.14" N	104° 21' 56.40" W
TB-5	15'	32° 43' 13.16" N	104° 21' 58.64" W
TB-6	15'	32° 43' 10.37" N	104° 21' 56.66" W
TB-7	15'	32° 43' 12.70" N	104° 22' 04.38" W

LEGEND

SYMBOL	DESCRIPTION
	BORING LOCATION
	CANCELLED BORING LOCATION

Tolunay-Wong Engineers, Inc.

BORING LOCATION PLAN
 SCHUDDE 27 FRAC POND
 SILVERBACK EXPLORATION
 LJA ENERGY
 EDDY COUNTY, NEW MEXICO

Drawn	T.T.	03-24-2022
Checked	T.G.H.	03-24-2022
Approved	P.R.	03-24-2022
Scale	N.T.S.	
TWE DRAWING NO.		22.61.006-1

LOG OF BORING TB-1

PROJECT: Schudde 27 Frac Pond
Eddy County, New Mexico

CLIENT: LJA Energy
Beaumont, Texas

ELEVATION (FT) ----- DEPTH (FT)	SAMPLE TYPE	SYMBOL	COORDINATES: 32° 43' 15.90" 104° 22' 00.53"	(F) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
			SURFACE ELEVATION: DRILLING METHOD: Dry Augered: 0' to 70' Wash Bored: to												
0	X	[Hatched]	Stiff, tan and brown SANDY LEAN CLAY (CL)		3/6"	4								70	
					4/6"										
					5/6"										
5	X	[Hatched]	Very stiff, tan LEAN CLAY with SAND (CL), with calcareous nodules		6/6"	6								75	
					9/6"										
					12/6"										
10	X	[Hatched]	Very stiff, tan SANDY LEAN CLAY (CL), with calcareous nodules -becomes hard at 13.5'		10/6"	6		25	9					63	
					12/6"										
					12/6"										
15	X	[Hatched]			14/6"										
					19/6"										
					22/6"										
20	X	[Hatched]			41/6"										
					50/6"										
					-										
25	X	[Hatched]	Hard, brown LEAN CLAY with SAND (CL), with calcareous nodules		17/6"	12		45	28					78	
					32/6"										
					36/6"										
30	X	[Hatched]			8/6"										
					18/6"										
					29/6"										
35	X	[Hatched]			13/6"										
					34/6"										
					40/6"										

COMPLETION DEPTH: 70 ft
 DATE BORING STARTED: 03/08/2022
 DATE BORING COMPLETED: 03/08/2022
 LOGGER: C.M.
 PROJECT NO.: 22.61.006

NOTES: Groundwater was not encountered during dry-auger drilling. Borehole was back filled with cement-grout.

LOG OF BORING TB-1

PROJECT: Schudde 27 Frac Pond
Eddy County, New Mexico

CLIENT: LJA Energy
Beaumont, Texas

ELEVATION (FT) DEPTH (FT)	SAMPLE TYPE	SYMBOL	COORDINATES: 32° 43' 15.90" 104° 22' 00.53" SURFACE ELEVATION: DRILLING METHOD: Dry Augered: 0' to 70' Wash Bored: to	(F) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
			MATERIAL DESCRIPTION												
35			Hard brown SANDY LEAN CLAY (CL), with calcareous nodules												
40	X	/	Hard brown SANDY FAT CLAY (CH) -becomes tan and and gray at 43.5' -with caliche from 43.5' to 45' -with calcareous nodules from 48.5' to 50'		10/6" 23/6" 30/6"	13		52	29					64	
45	X	/			13/6" 15/6" 19/6"										
50	X	/			13/6" 19/6" 25/6"										
55	X	/	Hard, tan LEAN CLAY with SAND (CL)		14/6" 13/6" 18/6"	16		41	23					78	
60	X	/			13/6" 20/6" 27/6"										
65	X	/			19/6" 21/6" 26/6"										
70	X	/	Very stiff, gray FAT CLAY (CH) Bottom @ 70'		9/6" 12/6" 16/6"	19		51	25					88	

COMPLETION DEPTH: 70 ft
 DATE BORING STARTED: 03/08/2022
 DATE BORING COMPLETED: 03/08/2022
 LOGGER: C.M.
 PROJECT NO.: 22.61.006

NOTES: Groundwater was not encountered during dry-auger drilling. Borehole was back filled with cement-grout.

LOG OF BORING TB-2

PROJECT: Schudde 27 Frac Pond
Eddy County, New Mexico

CLIENT: LJA Energy
Beaumont, Texas

ELEVATION (FT) ----- DEPTH (FT)	SAMPLE TYPE	SYMBOL	COORDINATES: 32° 43' 19.45" 104° 22' 07.63"	(F) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED	
			SURFACE ELEVATION: DRILLING METHOD: Dry Augered: 0' to 15' Wash Bored: to													
			MATERIAL DESCRIPTION													
0	X	[diagonal lines]	Firm, tan LEAN CLAY with SAND (CL)		3/6" 4/6" 4/6"											
			-becomes stiff at 2.5'		5/6" 6/6" 9/6"	7		27	12					84		
5	X	[diagonal lines]	Hard, tan LEAN CLAY (CL) -with calcareous nodules		12/6" 15/6" 23/6"											
					14/6" 17/6" 21/6"	8		41	24					90		
10	X	[diagonal lines]			14/6" 14/6" 19/6"											
15	X	[diagonal lines]	Hard, tan LEAN CLAY with SAND (CL) -with calcareous nodules		32/6" 50/4" -	10		41	25					85		
			Bottom @ 15'													
20																
25																
30																
35																

COMPLETION DEPTH: 15 ft
 DATE BORING STARTED: 03/09/2022
 DATE BORING COMPLETED: 03/09/2022
 LOGGER: C.M.
 PROJECT NO.: 22.61.006

NOTES: Groundwater was not encountered during dry-auger drilling. Borehole was back filled with cement-grout.

LOG OF BORING TB-3

PROJECT: Schudde 27 Frac Pond
Eddy County, New Mexico

CLIENT: LJA Energy
Beaumont, Texas

ELEVATION (FT) ----- DEPTH (FT)	SAMPLE TYPE	SYMBOL	COORDINATES: 32° 43' 18.26" 104° 22' 02.11"	(P) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED	
			SURFACE ELEVATION: DRILLING METHOD: Dry Augered: 0' to 15' Wash Bored: to													
			MATERIAL DESCRIPTION													
0	X	X	Stiff, tan LEAN CLAY with SAND (CL)		4/6 5/6 6/6											
5	X	X	-become very stiff at 4.5' -with calcareous nodules from 4.5' to 15'		5/6 6/6 7/6	8		27	12					84		
10	X	X	-becomes hard and brown at 6.5'		7/6 8/6 12/6											
15	X	X			7/6 14/6 25/6	11		39	21					85		
15			Bottom @ 15'		14/6 23/6 27/6											
20					38/6 50/4 -											
25																
30																
35																

COMPLETION DEPTH: 15 ft
 DATE BORING STARTED: 03/09/2022
 DATE BORING COMPLETED: 03/09/2022
 LOGGER: C.M.
 PROJECT NO.: 22.61.006

NOTES: Groundwater was not encountered during dry-auger drilling. Borehole was back filled with cement-grout.

LOG OF BORING TB-4

PROJECT: Schudde 27 Frac Pond
Eddy County, New Mexico

CLIENT: LJA Energy
Beaumont, Texas

ELEVATION (FT) ----- DEPTH (FT)	SAMPLE TYPE	SYMBOL	COORDINATES: 32° 43' 19.14" 104° 21' 56.40"	(F) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED
			SURFACE ELEVATION: DRILLING METHOD: Dry Augered: 0' to 15' Wash Bored: to												
0	X	/	Firm, tan LEAN CLAY (CL)		2/6" 3/6" 3/6"										
5			-becomes hard at 2.5'		9/6" 14/6" 19/6"	6	27	12						90	
10	X	.	Medium dense, reddish brown SILTY SAND (SM) with organics		8/6" 17/6" 19/6"										
15			-becomes very stiff at 6.5'		9/6" 12/6" 14/6"										
15	X	.	Medium dense, reddish brown SILTY SAND (SM) with organics		12/6" 14/6" 15/6"	2		0	0					25	
20			-becomes very dense at 13.5'		14/6" 50/2" -										
25			Bottom @ 15'												
30															
35															

COMPLETION DEPTH: 15 ft
DATE BORING STARTED: 03/09/2022
DATE BORING COMPLETED: 03/09/2022
LOGGER: C.M.
PROJECT NO.: 22.61.006

NOTES: Groundwater was not encountered during dry-auger drilling. Borehole was back filled with cement-grout.

LOG OF BORING TB-5

PROJECT: Schudde 27 Frac Pond
Eddy County, New Mexico

CLIENT: LJA Energy
Beaumont, Texas

ELEVATION (FT) ----- DEPTH (FT)	SAMPLE TYPE	SYMBOL	COORDINATES: 32° 43' 13.16" 104° 21' 58.64"	(F) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED			
			SURFACE ELEVATION: DRILLING METHOD: Dry Augered: 0' to 15' Wash Bored: to													MATERIAL DESCRIPTION		
0	X	[Hatched Box]	Firm, tan SANDY LEAN CLAY (CL) -becomes stiff at 2.5' -with calcareous nodules -becomes hard at 6.5'		3/6" 4/6" 4/6"	4									67			
5				4/6" 5/6" 7/6"	7	27	12											
10				4/6" 5/6" 6/6"	14	26	12									59		
15				14/6" 20/6" 14/6"														
15				14/6" 18/6" 31/6"														
20			Bottom @ 15'															
25																		
30																		
35																		

COMPLETION DEPTH: 15 ft
DATE BORING STARTED: 03/09/2022
DATE BORING COMPLETED: 03/09/2022
LOGGER: C.M.
PROJECT NO.: 22.61.006

NOTES: Groundwater was not encountered during dry-auger drilling. Borehole was back filled with cement-grout.

LOG OF BORING TB-7

PROJECT: Schudde 27 Frac Pond
Eddy County, New Mexico

CLIENT: LJA Energy
Beaumont, Texas

ELEVATION (FT) ----- DEPTH (FT)	SAMPLE TYPE	SYMBOL	COORDINATES: 32° 43' 12.70" 104° 22' 04.38"	(F) POCKET PEN (tsf) (T) TORVANE (tsf)	STD. PENETRATION TEST BLOWCOUNT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LAB MINI VANE SHEAR (tsf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	PASSING #200 SIEVE (%)	OTHER TESTS PERFORMED	
			SURFACE ELEVATION: DRILLING METHOD: Dry Augered: 0' to 15' Wash Bored: to													MATERIAL DESCRIPTION
0	X	[Hatched]	Firm, tan SANDY LEAN CLAY (CL)		3/6" 4/6" 4/6"											
5	X	[Hatched]	-becomes very stiff at 2.5' -becomes hard, tan and gray at 4.5'		6/6" 9/6" 9/6"	7		36	15					69		
10	X	[Hatched]	-becomes gray at 8.5'		7/6" 15/6" 30/6" 32/6" 50/4" -											
15	X	[Hatched]	Very hard, gray LEAN CLAY (CL)		23/6" 24/6" 25/6"	9		28	12					92		
			Bottom @ 15'													
20																
25																
30																
35																

COMPLETION DEPTH: 15 ft
DATE BORING STARTED: 03/09/2022
DATE BORING COMPLETED: 03/09/2022
LOGGER: C.M.
PROJECT NO.: 22.61.006

NOTES: Groundwater was not encountered during dry-auger drilling. Borehole was back filled with cement-grout.

KEY TO SYMBOLS AND TERMS USED ON BORING LOGS FOR SOIL

Most Common Unified Soil Classifications System Symbols

	Lean Clay (CL)		Well Graded Sand (SW)
	Lean Clay w/ Sand (CL)		Well Graded Sand w/ Gravel (SW-GM)
	Sandy Lean Clay (CL)		Poorly Graded Sand (SP)
	Fat Clay (CH)		Poorly Graded Sand w/ Silt (SP-SM)
	Fat Clay w/ Sand (CH)		Silt (ML)
	Sandy Fat Clay (CH)		Elastic Silt (MH)
	Silty Clay (CL-ML)		Elastic Silt w/ Sand (MH-SP)
	Sandy Silty Clay (CL-ML)		Silty Gravel (GM)
	Silty Clayey Sand (SC-SM)		Clayey Gravel (GC)
	Clayey Sand (SC)		Well Graded Gravel (GW)
	Sandy Silt (ML)		Well Graded Gravel w/ Sand (SP-GM)
	Silty Sand (SM)		Poorly Graded Gravel (GP)
	Silt w/ Sand (ML)		Peat

Miscellaneous Materials

	Fill		Concrete		Asphalt and/or Base
--	------	--	----------	--	---------------------

Sampler Symbols

Meaning

	Pavement core
	Thin-walled tube sample
	Standard Penetration Test (SPT)
	Auger sample
	Sampling attempt with no recovery
	TxDOT Cone Penetrometer Test

Field Test Data

2.50	Pocket penetrometer reading in tons per square foot
(T)1.13	Torvane Measurement in tons per square foot
8/6"	Blow count per 6 - in. interval of the Standard Penetration Test
	Observed free water during drilling
	Observed static water level

Laboratory Test Data

Wc (%)	Moisture content in percent
Dens. (pcf)	Dry unit weight in pounds per cubic foot
Qu (tsf)	Unconfined compressive strength in tons per square foot
UU (tsf)	Compressive strength under confining pressure in tons per square foot
Str. (%)	Strain at failure in percent
LL	Liquid Limit in percent
PI	Plasticity Index
#200 (%)	Percent passing the No. 200 mesh sieve
()	Confining pressure in pounds per square inch
*	Slickensided failure
**	Did not fail @ 15% strain

RELATIVE DENSITY OF COHESIONLESS & SEMI-COHESIONLESS SOILS

The following descriptive terms for relative density apply to cohesionless soils such as gravels, silty sands, and sands as well as semi-cohesive and semi-cohesionless soils such as sandy silts, and clayey sands.

Relative Density	Typical N ₆₀ Value Range*
Very Loose	0-4
Loose	5-10
Medium Dense	11-30
Dense	31-50
Very Dense	Over 50

* N₆₀ is the number of blows from a 140-lb weight having a free fall of 30-in. required to penetrate the final 12-in. of an 18-in. sample interval, corrected for field procedure to an average energy ratio of 60% (Terzaghi, Peck, and Mesri, 1996).

CONSISTENCY OF COHESIVE SOILS

The following descriptive terms for consistency apply to cohesive soils such as clays, sandy clays, and silty clays.

Typical Compressive Strength (tsf)	Consistency	Typical SPT "N ₆₀ " Value Range**
q _u < 0.25	Very soft	≤ 2
0.25 ≤ q _u < 0.50	Soft	3-4
0.50 ≤ q _u < 1.00	Firm	5-8
1.00 ≤ q _u < 2.00	Stiff	9-15
2.00 ≤ q _u < 4.00	Very Stiff	16-30
q _u ≥ 4.00	Hard	≥ 31

** An "N₆₀" value of 31 or greater corresponds to a hard consistency. The correlation of consistency with a typical SPT "N₆₀" value range is approximate.

October 2024

**Volume 3: C-147 Permit Information
for Dayton AST #3 and #4
Section 27, T 18S, R 26E, Eddy County NM**

**O&M Plan
Closure Plan
Design Drawings and Specifications
Design Construction Plan
Operations & Maintenance and Closure Plans
Design Construction Plan
Design Drawings, Set up and Maintenance Protocols
Previously Approved Variances**



View north from southern edge of proposed Dayton Containments showing nature of landscape and vegetation.

**Prepared for:
Silverback Operating II, LLC
San Antonio, Texas**

Prepared by:

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

OPERATIONS AND MAINTENANCE PLAN

CLOSURE PLAN

Operations and Maintenance Plan Above Ground Tank Containment (AST)

General Specifications

This plan provides additional protocols to cause the proposed recycling containments (AST Containments) to conform to NMOCD Rules.

The operator will maintain and operate the recycling containments and facility in accordance with the following plan to contain liquids and maintain the integrity of the liner to prevent contamination of fresh water and protect public health and the environment.

- The operator will use the treated produced water in the containments for drilling, completion (stimulation), producing or processing oil or gas or both. If other uses are planned, the operator will notify the OCD through the submission of a modified C-147.
- For all exploration and production operations that use produced water, the operator will conduct these activities in a manner consistent with hydrogen sulfide gas provisions in 19.15.11 NMAC or NORM provisions in 19.15.35 NMAC, as applicable.
- The operator will address all releases from the recycling and re-use of produced water in accordance with 19.15.29 NMAC.
- The operator will not discharge into or store any hazardous waste in the recycling containments, but they may hold fluids such as freshwater, brackish water, recycled and treated water, water generated by oil or gas processing facilities, or other waters that are gathered for well drilling or completion. The recycling facility will not be used for the disposal of produced water. The operator will maintain the containments free of miscellaneous solid waste or debris.
- The operator will verify that no oil is on the surface of the contained fluid. If oil is observed, the oil shall be removed using an absorbent boom or other device and properly disposed at an approved facility. An absorbent boom or other device will be maintained on site.
- The operator will install and use a header and diverter described in the design/construction plan in

19.15.34.10 B

Recycling containments may hold produced water for use in connection with drilling, completion, producing or processing oil or gas or both.

19.15.34.8 A

(5) All operations in which produced water is used shall be conducted in a manner consistent with hydrogen sulfide gas provisions in 19.15.11 NMAC or NORM provisions in 19.15.35 NMAC, as applicable.

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.

19.15.34.10 B

Recycling containments may hold produced water for use in connection with drilling, completion, producing or processing oil or gas or both. Such fluids may include fresh water, brackish water, recycled and treated water, fluids added to water to facilitate well drilling or completion, water produced with oil and gas, flowback from operations, water generated by an oil or gas processing facility or other waters that are gathered for well drilling or completion but may not include any hazardous waste.

19.15.34.9 G

Recycling facilities may not be used for the disposal of produced water.

19.15.34.13 B

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

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.

Operations and Maintenance Plan Above Ground Tank Containment (AST)

order to prevent damage to the liner by erosion, fluid jets or impact from installation and removal of hoses or pipes during injection or withdrawal of liquids.

- The operator will maintain at least 3-feet of freeboard in each AST containment.
- If the liner develops a leak or if any penetration of the liner occurs above the liquid's surface, then the operator will repair the damage or initiate replacement of the liner within 48 hours of discovery or will seek a variance from the division district office within this time period.
- If visible inspection suggests that the liner developed a leak or if any penetration of the liner occurs below the liquid's surface, then the operator will remove all liquid above the damage or leak line within 48 hours of discovery. The operator will also notify the district division office within this same 48 hours of the discovery and repair the damage or replace the liner.
- In the event of a leak due to a hole in the liner, the following steps will be followed:
 1. If the source of the fluid is uncertain, comparative field tests may need to be performed on both the water in the containment and that which may have been released (e.g. pH, conductance, and chloride).
 2. If the fluid is found to be coming from the containment, determine the location from which the leak is originating.
 3. Mark the point where the water is coming out of the tank.
 4. Locate the puncture or hole in the liner.
 5. Empty the containment to the point of damage in liner.
 6. Clean area of liner that needs to be repaired.

19.15.34.13 B

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

19.5.34.13 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.

Operations and Maintenance Plan Above Ground Tank Containment (AST)

7. Cut out piece of material (patch or tape) to overlay liner.
8. Either weld the patch to the injured area in the liner or apply tape over the rupture.
9. Make sure rupture is completely covered.
10. Monitor as needed.

The operator will inspect and remove, as necessary, surface water run-on accumulated in the secondary containment

Monitoring, Inspections, and Reporting

The containment will contain enough produced water to prevent any shifting of the liner. Operator shall inspect the recycling containment and associated leak detection system weekly while there is fluid in containment. Operator shall maintain a current log of such inspection and make the log available for review by the division upon request. Inspection may include: freeboard monitoring, leak detection, identifying potential hazards that may have developed, change in site conditions or if the contents of the containment change from the initial use.

An "Inspection Form" to be filled out during these routine inspections.

The "**AST Visual Inspection Checklist**" form to be filled out by the operator during periodic inspections. The form provides a list of observations that will enable early detection of uneven tank panel settlement, soil settlement, liner damage, insufficient liner slack, or leaks. The form is reproduced at the end of this section.

The form "**Tank Panel Visual Inspection Check Sheet**" will be used by the operator to inspect individual containment panels and connections titled.

Monitoring and Inspection Checklist (routine weekly or monthly inspections):

Operations and Maintenance Plan Above Ground Tank Containment (AST)

- Visually inspect the liner. If a liner's integrity is compromised, or if any penetration of the liner occurs below the water surface, then the operator will notify the appropriate Division district office within 48 hours (phone or email).
- Inspect the system for injection or withdrawal of liquids from the ASTs and document that the design prevents damage to the liner by erosion, fluid jets or impact from installation and removal of hoses or pipes is working appropriately.
- Inspect the water surface for visible oil.
- Measure the freeboard.
- Inspect the secondary containment berm around the ASTs to check for erosion and collection of surface water run-on.
- If H₂S is a documented potential issue with the containment, measure H₂S concentrations on the down-wind side of the facility when produced water is present.
- Inspect the secondary containment for evidence of damage and monitor for leakage.
- Inspect the netting for damage or failure. If netting is jeopardized, repair of the netting shall occur within 48 hours.
- At least monthly, inspect netting (may not be used if Mega Blaster Pro avian deterrent is used) for dead wildlife, including migratory birds. Operator shall report the discovery of a dead animal to the appropriate wildlife agency and to the district within 30 days of discovery. Further prevention measures may be required.
- If observed conditions indicate a potential tank failure is imminent, the vicinity will be immediately cleared and the AST will be drained.

Cessation of Operations

If less than 20% of the total fluid capacity is utilized every six months, beginning from the first withdraw, operation of the facility has ceased and the division district office will be notified. The division district may grant an extension not to exceed six months to determine the cessation of operations.

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.

19.15.34.13 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.

Operations and Maintenance Plan Above Ground Tank Containment (AST)

The operator will remove all fluids from the recycling facility within 60 days of cessation of operations. An extension, not to exceed 2 months, may be granted by the district division for the removal of fluids from the facility.

The breakdown of the containments follows the reverse order of the setup steps presented in the set-up manual

19.15.34.14 A

Once the operator has ceased operations, the operator shall remove all fluids within 60 days and close the containment within six months from the date the operator ceases operations from the containment for use. The division district office may grant an extension for the removal of all fluids not to exceed two months.

Inspection Form

Date: _____

Silverback Daytin AST Containment

Tank ID: _____

Weekly inspection/Fluid level must be maintained > 1 foot

Fluid Level: _____

Tank contents: _____

Inspection Task	Results		Remarks, Observations, and/or Remedial Actions
Visible Oil on Surface	<input type="checkbox"/> None Observed	<input type="checkbox"/> Yes, Describe Action	
<i>An absorbent boom or similar device is located on site to remove visible oil from surface.</i>			
At least 3 ft of freeboard	<input type="checkbox"/> Yes	<input type="checkbox"/> No, Measure Freeboard	
Evidence of surface water run-on	<input type="checkbox"/> None Observed	<input type="checkbox"/> Yes, Describe	
<i>Check for excessive erosion of perimeter berms.</i>			
Birds or wildlife in net or screen	<input type="checkbox"/> None Observed	<input type="checkbox"/> Yes, Describe	
<i>Within 30 days of discovery (immediately if federally protected species) report dead birds or wildlife to the appropriate agency (USFWS, NMDGF) and to NMOCD district division office.</i>			
Damage to netting or screen	<input type="checkbox"/> None Observed	<input type="checkbox"/> Yes, Describe	
Rupture of Liner	<input type="checkbox"/> None Observed	<input type="checkbox"/> Yes, Describe	
<i>If rupture is above fluid level, repair within 48 hours. If below fluid level, remove fluid above within 48 hours, notify NMOCD district division office, and repair. Immediately notify BLM of any leak</i>			
Clips or clamps properly securing liner	<input type="checkbox"/> Yes	<input type="checkbox"/> No, Describe	
If low level, enough liner slack on panel wall	<input type="checkbox"/> Yes	<input type="checkbox"/> No, Describe	
Uneven gaps between panels	<input type="checkbox"/> None Observed	<input type="checkbox"/> Yes, Describe	
Signs of tank settlement	<input type="checkbox"/> None Observed	<input type="checkbox"/> Yes, Describe	

Dayton AST Containment

Erosion of soil surrounding tank (10 ft radius)	<input type="checkbox"/> None Observed	<input type="checkbox"/> Yes, Describe	
Running water on the ground	<input type="checkbox"/> None Observed	<input type="checkbox"/> Yes, Describe	
Unusual ponding of fluid inside berm	<input type="checkbox"/> None Observed	<input type="checkbox"/> Yes, Describe	
<i>Field test (pH, Cl-, conductance, etc.) ponded fluid and compare to fluid in tank. If tank is determined as the source, locate and repair rupture within 48 hours. Notify NMOCD district division office and repair. Immediately notify BLM.</i>			
Rust or corrosion on panels, stairs, or hardware	<input type="checkbox"/> None Observed	<input type="checkbox"/> Yes, Describe	
Damage to any hardware	<input type="checkbox"/> None Observed	<input type="checkbox"/> Yes, Describe	

Additional Observations or Actions:

Inspected by: _____

Closure Plan Above Ground Tank Containment (AST)

Closure Plan

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

The operator will notify the division district (phone or email) before initiating closure of the containments and/or facility.

Excavation and Removal Closure Plan – Protocols and Procedures

1. Residual fluids in the containments will be sent to disposal at a division-approved facility.
2. The operator will remove all solid contents and transfer those materials to the following division-approved facility:
 Disposal Facility Name: R360
 Permit Number NM 01-0006
3. If possible, geomembrane textiles and liners that exhibit good integrity may be recycled for use as an under liner of tank batteries or other use as approved by OCD.
4. Disassemble the recycling containment infrastructure according to manufacturer's recommendations
5. After the disassemble of the containments and removal of the contents and liners, soils beneath the tanks will be tested as follows
 - a. Collect a five-point (minimum) composite from beneath the liner to include any obviously stained or wet soils, or any other evidence of impact from the containments for laboratory analyses for the constituents listed in Table I of 19.15.34.14 NMAC.
 - b. If any concentration is higher than the parameters listed in Table I, additional delineation may be required, and closure activities will not proceed without Division approval.
 - c. If all constituents' concentrations are less than or equal to the parameters listed in Table I, then the operator will backfill the facility as necessary using non-waste containing, uncontaminated, earthen material and proceed to reclaim the surface to pre-existing conditions.

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.

(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.

(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.

Closure Plan Above Ground Tank Containment (AST)

Closure Documentation

Within 60 days of closure completion, the operator will submit a closure report (Form C-147) to the District Division, with necessary attachments to document all closure activities are complete, including sampling results and details regarding backfilling and capping as necessary.

In the closure report, the operator will 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 the closure plan.

Reclamation and Revegetation

The operator will reclaim the surface to safe and stable pre-existing conditions that blends with the surrounding undisturbed area. "Pre-existing conditions" may include a caliche well pad that existed prior to the construction of the recycling containment and that supports active oil and gas operations.

Areas not reclaimed as described herein due to their use in production or drilling operations will be stabilized and maintained to minimize dust and erosion.

For all areas disturbed by the closure process that will not be used for production operations or future drilling, the operator will

1. Replace topsoils and subsoils to their original relative positions
2. Grade so as to achieve erosion control, long-term stability and preservation of surface water flow patterns
3. Reseed in the first favorable growing season following closure

Federal, state trust land, or tribal lands may impose alternate reclamation and revegetation obligations that provide equal or better protection of fresh water, human health, and the environment. Revegetation and reclamation plans imposed by the surface owner will be outlined in communications with the OCD.

The operator will notify the division when the site meets the surface owner's requirements or exhibits a uniform vegetative cover 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. The operator will notify the Division when reclamation and re-vegetation is complete.

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.

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. 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 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.

Box 9

DESIGN AND CONSTRUCTION PLAN

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)

Design and Construction Plan Above Ground Tank (AST) Containments

General

Examination of the engineering drawings and the SOP for set-up (Appendix Engineering Drawings, Liner Specifications, Set Up) plus the history of solid performance of these AST Containments demonstrates that the AST Containment is designed and will be assembled to ensure the confinement of produced water, to prevent releases and to prevent overtopping due to wave action or rainfall. As the AST Containments are generally less than 190 feet in diameter, wave action is not a meaningful consideration.

These AST Containments are constructed of 12-foot high steel panels and are netted or employ the Mega Blaster Pro avian deterrent system to prevent ingress of migratory birds. AST Containments will be enclosed by a 4-strand barbed wire fence. Thus, complies with the Rule to 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 post an upright sign no less than 12 inches by 24 inches with lettering not less than two inches in height in conspicuous places 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.

Site Preparation

Foundation for AST Containment

Preparation of the soils on site is required to form a dependable base for the AST Containment in accordance with the SOP. If the location of the AST Containment is on an existing pad, the operator has stripped and stockpiled the topsoil for use as the final cover or fill at the time of closure. If the pad is new construction, the operator will strip and stockpile the soil for reclamation upon cessation of site activities.

19.15.34.12 A

(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.

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.

19.15.34.12 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 B

Stockpiling of topsoil. 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.

Design and Construction Plan Above Ground Tank (AST) Containments

The foundation soils must be roller compacted smooth and free of loose aggregate over ½ inch. Compaction characteristics must meet or exceed 95% of Standard Proctor Density in accordance with ASTM D 698.

Examination of the SOP shows that the AST Containment contractor will conform to the following mandates of the Rule:

- the AST Containment will have a properly constructed compacted earth foundation and interior slopes (vertical steel) 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 will be placed under the liner where needed to reduce localized stress-strain or protuberances that otherwise may compromise the liner's integrity.
- If the AST Containment is within a levee, the inside grade is no steeper than two horizontal feet to one vertical foot (2H: 1V) and the outside grade no steeper than three horizontal feet to one vertical foot (3H: 1V). The vertical steel walls of the AST Containment are the *subject of a requested variance*.

The Operator will ensure that at a point of discharge into or suction from the recycling containment, the liner is protected from excessive hydrostatic force or mechanical damage and external discharge or suction lines shall not penetrate the liner.

Liner and Leak Detection Materials

The liner and geotextile specifications show that 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 *an equivalent liner [to that stated in Rule 34] approved by OCD pursuant to a variance*. The liner system is presented in an earlier section of this submission.

All secondary liners shall be *an equivalent liner [to that stated in Rule 34] or approved by OCD pursuant to a*

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. 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

(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.

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 1×10^{-9} cm/sec. Liner compatibility shall meet or exceed the EPA SW-846 method 9090A or subsequent relevant publications.

Design and Construction Plan Above Ground Tank (AST) Containments

variance. The liner system is presented in an earlier section of this submission.

Liner compatibility shall meet or exceed the EPA SW-846 method 9090A or subsequent relevant publications.

The AST Containment will have a leak detection system between the upper and lower geomembrane liners that shall consist of 200-mil geonet to facilitate drainage.

Install Secondary Liner, Leak Detection System and Secondary Containment

All AST containments holding produced water will have a primary (upper) liner and a secondary (lower) liner with a leak detection system appropriate to the site's conditions. The rule states that the edges of all secondary liners shall be anchored in the bottom of a compacted earth-filled trench. The anchor trench shall be at least 18 inches deep. *The lack of an anchor trench with an AST Containment is also the subject of requested variance.*

The AST Containment Contractor will cause the recycling containment will have a leak detection system between the upper and lower geomembrane liners that shall consist of 200-mil geonet 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 (see attached design sketch).

The presence of the secondary containment levee or pre-fabricated secondary containment meets the OCD Rule mandate that 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.

AST Containment Setup

As with the secondary liner, AST Containment contractor will minimize liner seams and orient them up and down, as much as possible, not across, a slope. Factory welded seams shall be used where possible. AST Containment contractor will employ field seams in

19.15.34.12 A

(3) Each recycling containment shall incorporate, at a minimum, a primary (upper) liner and a secondary (lower) liner with a leak detection system appropriate to the site's conditions. The 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

(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 1×10^{-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

(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 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

Design and Construction Plan Above Ground Tank (AST) Containments

geosynthetic material that are thermally seamed. Prior to field seaming, AST Containment contractor shall overlap liners four to six inches and minimize the number of field seams and corners and irregularly shaped areas. There shall be no horizontal seams within five feet of the AST Containment bottom. Qualified personnel shall perform field welding and testing.

Fluid Injection/Withdrawal Flow Diverter

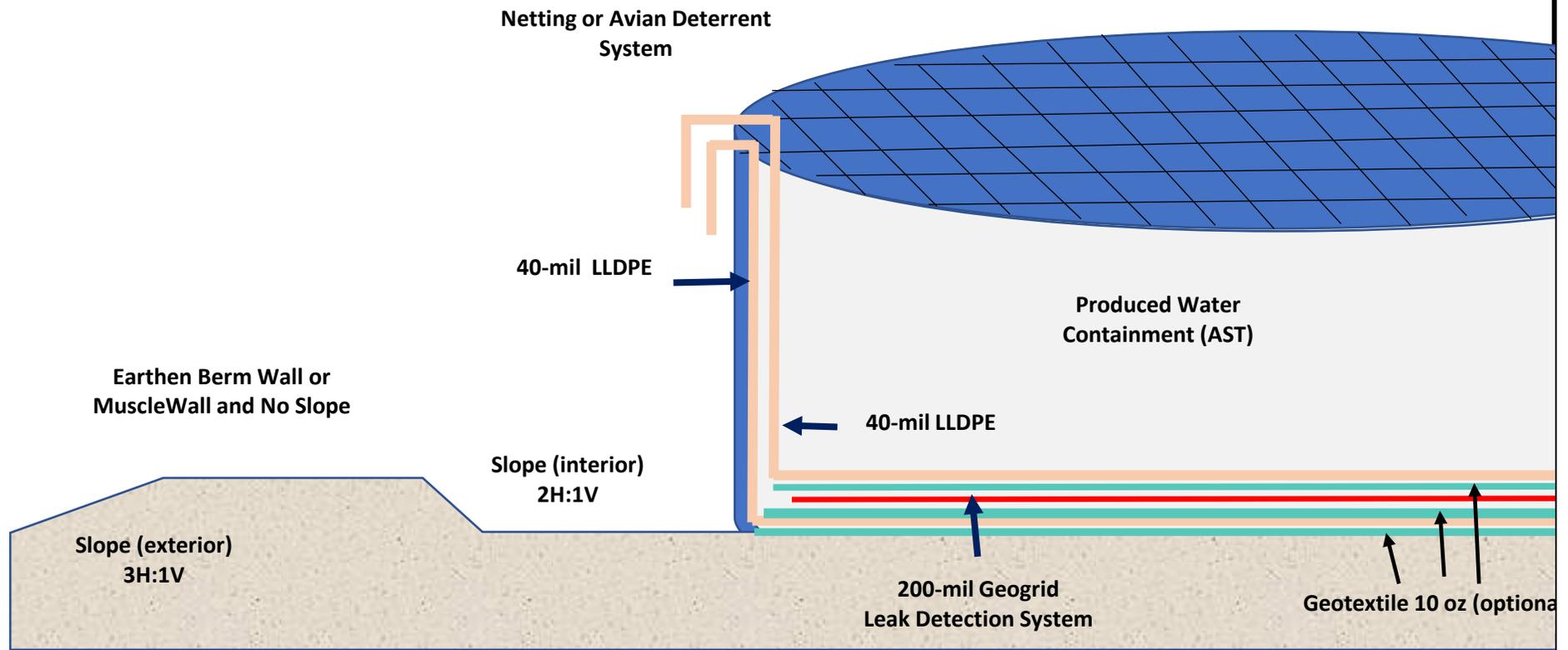
The injection or withdrawal of fluids from the containment shall be accomplished through a header, diverter or other hardware that prevents damage to the liner by erosion, fluid jets or impact from installation and removal of hoses or pipes.

operator shall ensure field seams in geosynthetic material are thermally seamed. Prior to field seaming, the operator shall overlap liners four to six inches. 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.

19.15.34.13 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.

C 147 – BOX 3
RECYCLING CONTAINMENT DESIGN DRAWINGS
Maintenance
LINER SPECIFICATIONS



Description of Leak Detection System

- 200-mil geogrid drainage layer lies between the primary and secondary liner
- Geotextile between the geogrid and the liners
- 2- to 3-inch deep sump excavated within the compacted caliche pad as a collection point for any seepage
- A 3/4-inch aqua braid line runs from the collection sump between the liners and beneath the geogrid drainage system to the outside of the AST
- The leak detection pipe is fastened to the exterior of the AST and terminates at ground level.
- Every week, a portable self-priming peristaltic pump connects to the leak detection system.
- The self-priming pump discharges into a 3/4" aqua braid line, through a turbine meter, and back into the AST, on top of the primary liner
- If fluid is detected, it is tested for conductance to determine the origin of the water (e.e. produced water or condensation)

R.T. Hicks Consultants Albuquerque, NM	Design Sketch	Plate 1
	Rugged Tanks/Palm Engineering	Aug-22

Use laser level to determine slope of pad and low point of AST

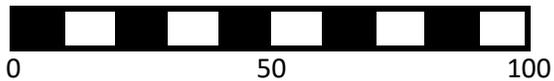
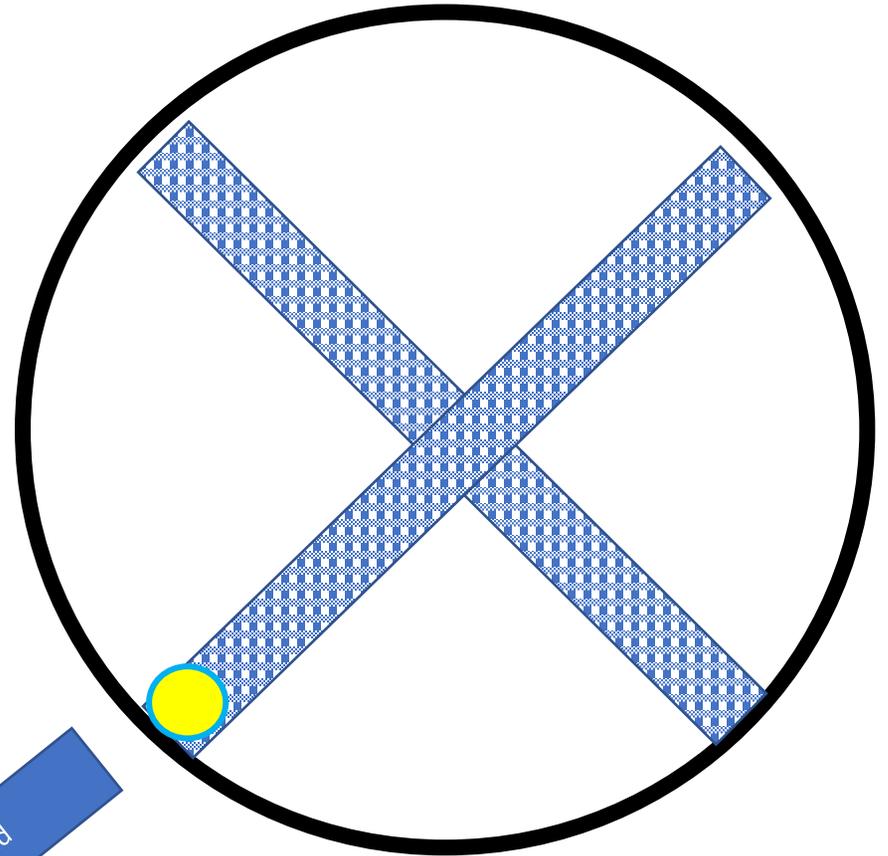
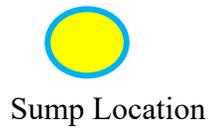
200 mil geogrid placed

above 8-oz geotextile and 40-mil secondary liner inside of AST after set up, before install of primary liner below 40-mil primary liner

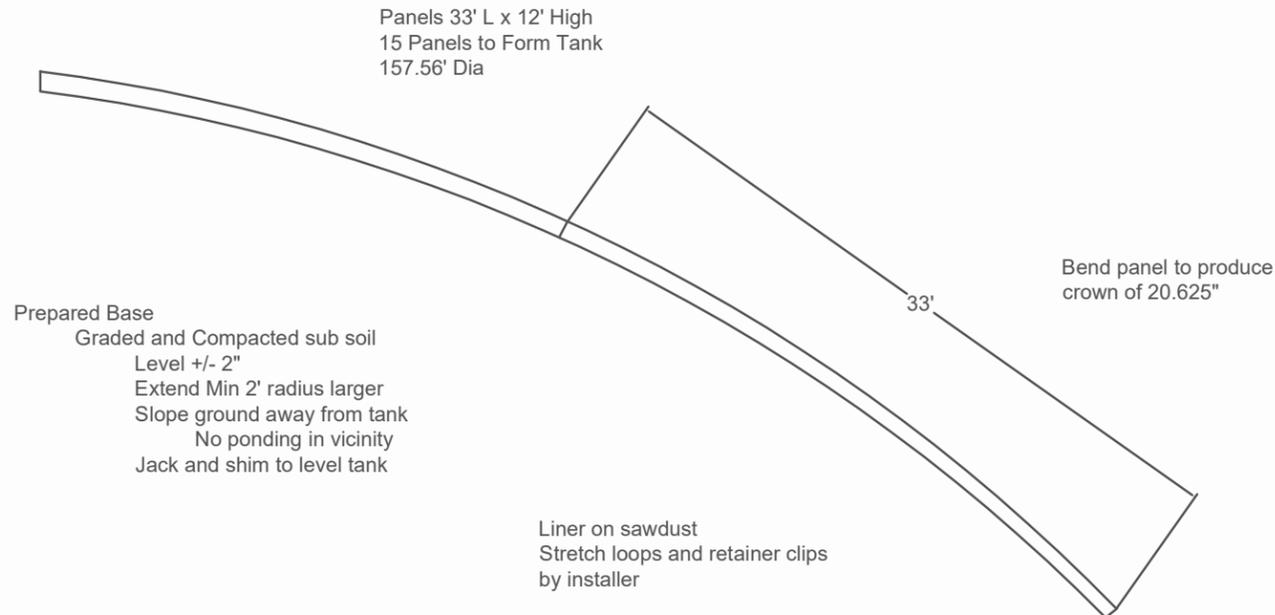
8-oz geotextile is placed

over the 40-mil LLDPE liner inside the steel AST ring under the 40-mil primary liner inside the AST

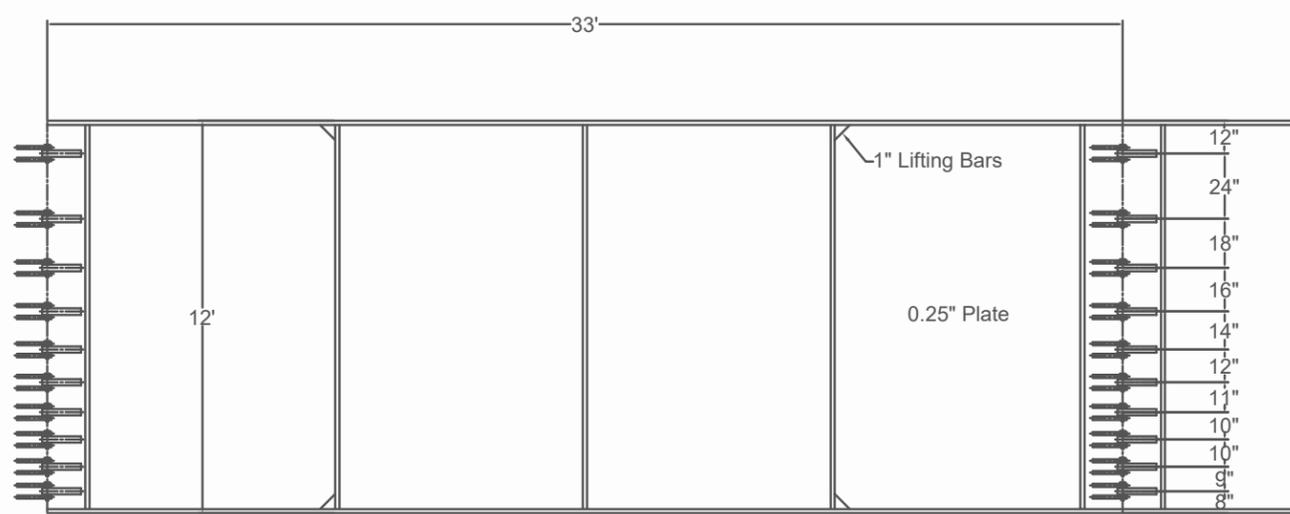
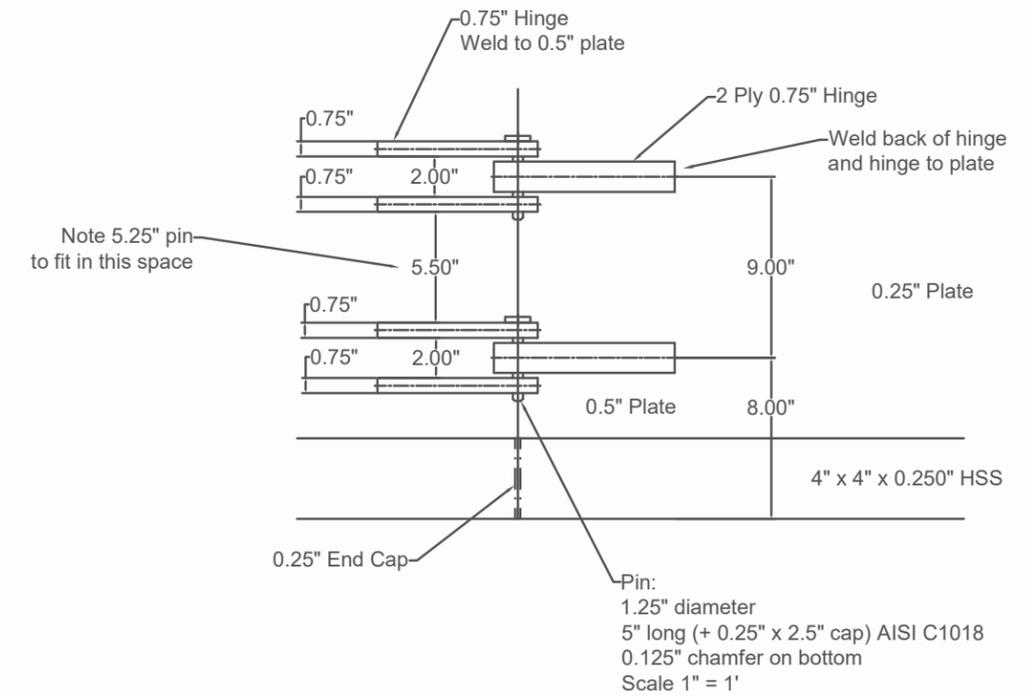
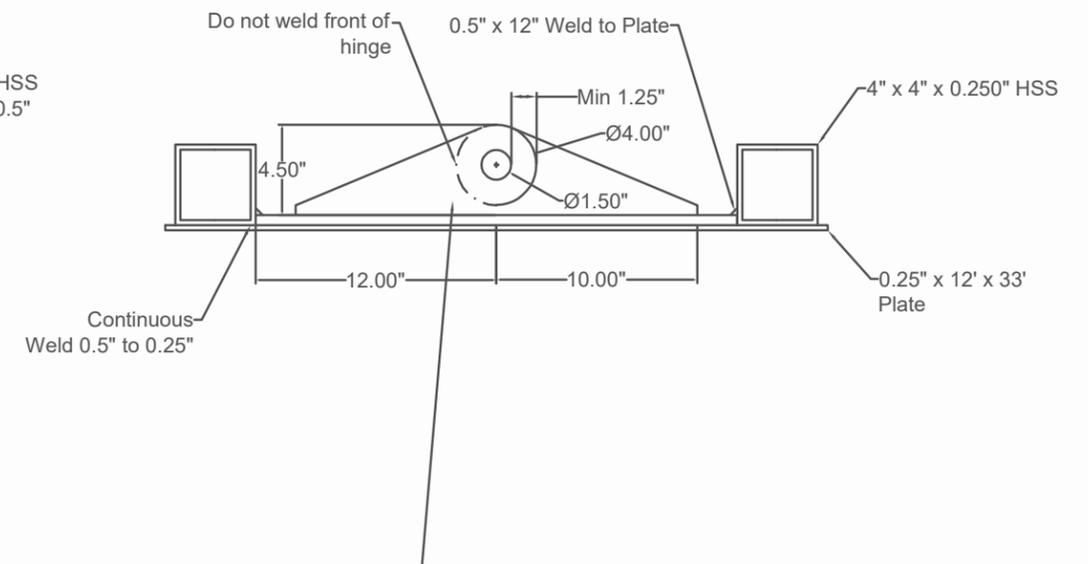
Sump at lowest point of the AST set up



R.T. Hicks Consultants Albuquerque, NM	Layout of Geogrid Drainage Mat	Plate 1
	Rugged Tanks/Palm Engineering	August 2022



Weld 4" x 4" HSS to 0.25" and 0.5"



PALM ENGINEERING LTD
170 CENTER STREET DRUMHELLER ALBERTA T0J0Y0 PH 823-7044

PERMIT TO PRACTICE
PALM ENGINEERING LTD.
Signature *[Signature]*
Date Sept 10 2013
PERMIT NUMBER: P 4420
The Association of Professional Engineers,
Geologists and Geophysicists of Alberta



SCALE: *As shown*
DATE: SEPT 10 13
DRAWN BY: *EP*
DWG. No. 1 OF 1

Rugged Tanks and Fabricating
Box 4444 Taber AB.
lrbergen@tecus.net 382-9150
25 Panel 157.6 ft dia Water Tank



PALM ENGINEERING LTD

**BOX 1209 170 CENTER STREET, DRUMHELLER, ALBERTA T0J 0Y0
PH. / FAX. 403-823-7044**

October 1, 2014

TO:

PURCHASERS OF TANKS SUPPLIED BY RUGGED TANKS & FABRICATING

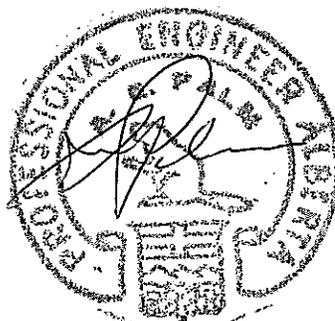
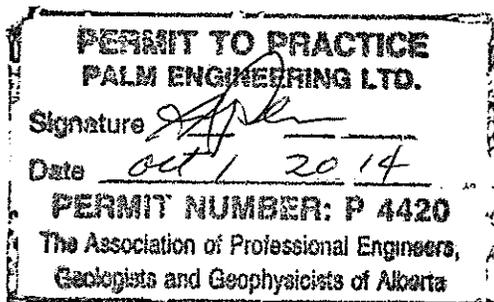
Palm Engineering Ltd. has supplied engineered structural designs for the following tanks:

1. 10 panel 105.0 foot diameter 12' high
2. 15 panel 157.6 foot diameter 12' high
3. 18 panel 189.1 foot diameter 12' high

The tanks are designed to contain liquids having a density not exceeding that of water (62.43 pounds per cubic foot) to a full containment level.

Tanks are to be placed on a level graded compacted subsoil pad extending 2' in radius larger than the tank radius, with the ground sloping away from the tank in all directions on the exterior. No ponding is permitted on the ground within 20' of the tank.

The tank interior is to have a bed of sawdust a minimum of 2" deep wrapping up the interior side to a depth of 6". A liner is to be installed with an expansion fold and the top securely fastened to each panel in accordance with the liner manufacturer's recommendations.



MAINTENANCE SCHEDULE

FOR TANKS SUPPLIED BY RUGGED TANKS & FABRICATING

October 1, 2014

1. TANK FIRST PUT INTO SERVICE

Perform a visual inspection when the tank is first filled

- Look for weld faults not earlier detected
- Look for separation of seams
- Look for base failure
- Check that walls remain vertical

2. TANK IN EXTENDED TIME SERVICE

- Check that moisture is not trapped against tank walls
- Keep tank elements dry
- Check for creep of joints indicating that a failure is underway
- Check vertical level of walls

If stretching is detected – reduce the height of liquid contained immediately

Tanks are designed for a liquid weight equivalent to water, or for fluids of lighter density.

Tanks are not designed for heavier than water density fluids (such as drilling mud).

Check for distortion.

If the structural pad undergoes a deformation, such as due to thawing of frozen ground, distortion could result in a tank going out of level, or if a depression develops it could cause a warp to panels.

Welds need not be x rayed.

Stretching will occur before failure and load adjustment will occur before total rupture. If a failure is detected remove the contents immediately before the liner gives way.



**MAINTENANCE SCHEDULE
FOR TANKS SUPPLIED BY RUGGED TANKS & FABRICATING**

October 1, 2014

Page 2

3. On dismantling a tank perform a visual inspection of connectors and structural members. Look for:
 - Corrosion of welds and steel plate (blistering, pitting, or rust)
 - Stretching of tear drop clamps
 - Pull on weld to plate
 - Elongation of holes
 - Shearing of pins – shows up if pin has an offset shape
 - Distortion, or warpage of panels

4. STORAGE OF PANELS
 - Storage racks must be used to maintain the correct curvature
 - Do not store panels stacked on their ends without intermediate support

Remove from service any panels showing faults. Do not attempt to repair.
Determine the cause of failure.
Order new panels from Rugged Tanks & Fabricating.





4172 North Frontage Rd E Moses Lake, WA 98837
 (800) 346-7744 (509) 766-7024 Fax (509) 766-0414
www.inlandtarp.com

TECHNICAL DATA SHEET

Geomembrane 40mil LLDPE

Property	Test Method	Frequency (A)	Unit Metric	Solmax 140-7000
Thickness (Nominal +/- 10%) (E)	ASTM D 5199	Every roll	mm	1.00
Resin Density	ASTM D 1505	1/Batch	g/cc	<0.926
Melt Index-190/2.16(max)	ASTM D 1238	1/Batch	g/10min	1.0
Sheet Density (C)	ASTM D 1505	Every 2 rolls	g/cc	<0.939
Carbon Black Content (D)	ASTM D 4218	Every 2 rolls	%	2.0 - 3.0
Carbon Black Dispersion	ASTM D 5596	Every 6 rolls	Category	Cat. 1 / Cat. 2
Oxidative Induction Time (min. avg)	ASTM D3895	1/Batch	min	100
Tensile Properties (min. avg)(B)	ASTM D 6693	Every 2 rolls		
Strength as Break			kN/m	23
Elongation at Break			%	800
2% Modulus (max.)	ASTM D 5323	PerFormulation	kN/m	420
Tear Resistance (min. avg.)	ASTM D 1004	Every 6 rolls	N	85
Puncture Resistance (min. avg.)	ASTM D 4833	Every 6 rolls	N	215
Dimensional Stability	ASTM D 1204	Every 6 rolls	%	+/- 2
Multi-Axial Tensile (min.)	ASTM D 5617	PerFormulation	%	90
Oven Aging-% retained after 90 days	ASTM D 5721	PerFormulation		
STD OIT (min. avg.)	ASTM D 3895		%	35
HP OIT (min. avg.)	ASTM D 5885		%	60
UV Resistance-% retained after 1600 hr	GRI-GM-11	PerFormulation		
HP-OIT (min. avg.)	ASTM D 5885		%	35

Note;

- (A) Testing frequency based on standard roll dimensions and one batch is approximately 180,000 lbs (or one railcar).
 (B) Machine Direction (MD) and Cross Machine Direction (XMD or TD) average values should be on the basis of 5 specimens each direction.
 (C) Correlation table is available for ASTM D792 vs. ASTM D1505. Both methods give the same results.
 (D) Correlation table is available for ASTM D1603 vs. ASTM D4218. Both methods give the same results.
 (E) The minimum average thickness is +/- 10% of the nominal value.

*All values are nominal test results, except when specified as minimum of maximum.

* The information contained herein is provided for reference purposes only and is not intended as warranty of guarantee. Final determination of suitability for use contemplated is the sole responsibility of the user. Solmax along with Inland Tarp & Liner assumes no liability in connection with the use of this information.

Manufacture & Distribution of Hay Tarps, Truck Tarps, Industrial Liners, Building & Athletic Field Covers.
1-800-346-7744

March 2020

**Variations and/or Equivalency Demonstrations for
Above Ground Steel Tank Modular Recycling
Storage Containments (AST) Primary and
Secondary Liners**

***40-mil Non-reinforced LLDPE Liner as Alternate Primary
and 40-mil Non-reinforced LLDPE as Secondary Liner for
Above Ground Steel Tank Modular Recycling Storage
Containments***

STATEMENT EXPLAINING WHY THE APPLICANT SEEKS A VARIANCE FOR 40 MIL NON-REINFORCED LLDPE GEOMEMBRANE AS AN ALTERNATIVE PRIMARY AND 40 MIL NON-REINFORCED AS ALTERNATIVE SECONDARY LINER FOR MODULAR STEEL AST CONTAINMENT

The prescriptive mandates of the Rule that are the subject of this variance request are the following subsections of 19.15.34.12

NMAC 19.15.34.12 A DESIGN AND CONSTRUCTION SPECIFICATIONS FOR A RECYCLING CONTAINMENT

(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 1×10^{-9} cm/sec. Liner compatibility shall meet or exceed the EPA SW-846 method 9090A or subsequent relevant publications.*

The applicant proposes one layer of 40-mil LLDPE non-reinforced as a primary liner and a secondary liner comprised of one layer of 40-mil LLDPE non-reinforced material

Rule 34 did not consider Above Ground Steel Storage Tanks that employ liners as a primary and secondary containment method.

This material is more readily available than the prescribed liners in the Rule and provides superior flexibility and conformity characteristics. Due to the vertical steel walls, 60-mil HDPE, 45 or 30-mil LLDPE string reinforced liners and 30-mil PCV liners are not sufficiently flexible for use in these modular containments.

All liners will have a hydraulic conductivity no greater than 1×10^{-9} cm/sec and meet or exceed EPA SW-846 method 9090A.

Demonstration That the Variance Will Provide Equal or Better Protection of Fresh Water, Public Health and the Environment

The following technical documents provide supportive data to demonstrate that this liner system (*with integrated leak detection system*) provides equal or better protection of fresh water, public health and the environment by providing the requisite containment and protection. Attached is a technical comparison of the proposed material is compared to what is advised through Rule 34. A second memorandum provides clarification that the engineering requirements for site preparation, which ensures functionality of the liner system, is crosscutting to varied locations/sites within the Permian Basin. Liner specifications are also included in submission.

R.K. FROBEL & ASSOCIATES
Consulting Engineers

**Technical Memorandum: 40-mil LLDPE as Alternative Primary with
40-mil LLDPE as Alternative Secondary Liner System for Modular Steel
AST Recycling Containment**
NMAC 19.15.34.12 A (4)

In consideration of the liner application for modular AST impoundments, size and depth of the AST, design details for modular tanks as well as estimated length of at least five years of service time, it is my professional opinion that a 40 mil LLDPE (non-reinforced) and a 40 mil LLDPE (non-reinforced) geomembrane system will provide the requisite barrier against produced water loss as an alternative primary and secondary liner system. *The two proposed liners, 40 mil LLDPE as Primary liner and 40 mil LLDPE Secondary liner, will function equal to or better than 45 mil String Reinforced LLDPE, 30 mil PVC, or 60 mil HDPE liners as a primary liner and 40 mil LLDPE string reinforced as a secondary liner system. Additionally, this two-layer system with integrated leak detection system, will provide requisite protection for the environment that is equal to or better than the above primary and secondary liner systems referenced in OCD rule 34.* The following are discussion points that will exhibit the attributes of a 40 mil/40 mil LLDPE lining system:

The nature and formulation of LLDPE resin is very similar to HDPE. The major difference is that LLDPE is lower density, lower crystallinity (more flexible and less chemical resistant). However, LLDPE will resist aging and degradation and remain intact for many years in exposed conditions. The LLDPE resin is virtually the same for non-reinforced 40 or 40 mil LLDPE and string reinforced 40 or 45 mil LLDPE geomembranes and both will provide requisite containment and be equally protective for this application, enduring UV and chemical degradation in the produced water environment.

Flexibility Requirements. Non-reinforced LLDPE geomembranes are less stiff and far more flexible than string reinforced geomembranes as well as 60 mil HDPE and in this regard are preferred for installations in vertical wall tanks such as this proposed installation. LLDPE provides a very flexible sheet that enables it to be fabricated into large panels, folded for shipping and installed on vertical walls transitioned to flat bottom. Non-reinforced LLDPE sheet will conform better than a string reinforced LLDPE to the tank dimensions under hydrostatic loading and will exhibit less wrinkling and creasing during and after installation.

Thermal Fusion Seaming Requirements. Thermal seaming and QC seam test requirements for geomembranes are product specific and usually prescribed by the sheet manufacturer. Both dual wedge and single wedge thermal fusion welding is commonly used on LLDPE and QC testing by air channel (ASTM D 5820) or High Pressure Air Lance (ASTM D 4437) is fully acceptable and recognized as industry standards. In this regard, either non-reinforced LLDPE or string-reinforced LLDPE will be acceptable as far as QC and thermal fusion seaming methods are concerned.

R.K. FROBEL & ASSOCIATES
Consulting Engineers

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 between the primary and secondary LLDPE geomembranes at the base of the AST in this application provides immediate drainage to a low point or outside the Modular AST Impoundment and thus no hydrostatic head or driving gradient is available to push leakage water through a hole in the Secondary LLDPE liner .

Leakage through any Primary geomembrane is driven by size of hole and depth and will be detected by the increase of water in the drainage system and the volume being pumped out of the secondary containment. In this regard and for this variance, the Primary consists of 40 mil LLDPE geomembrane which will perform equal to or better than a single layer of string reinforced LLDPE for potential leakage. Thus, if a leak occurs through the top layer, it will be effectively contained by the second layer of 30 mil LLDPE geomembrane. If required, location of holes in the Primary can be found by Electrical Leak Location Survey (ELLS) using a towed electrode (ASTM D 7007). Holes found can then be repaired and thus water seepage into the leakage collection and drainage system will be kept to a minimum. Dependent on OCR requirements for Action Leakage Rate (ALR), the leakage volumes may only be monitored. For example, a typical ALR is < 20 gpad whereas a rapid and large leak (RLL) may be > 100 gpad. Most states specify maximum ALR values for waste and process water impoundments usually in the range of 100 to 500 gpad. However, New Mexico does not specify an ALR for waste or process water impoundments (GRI Paper No. 15).

LLDPE (and string reinforced LLDPE) can be prefabricated into large panels and thus both types offer the following for Containment:

- Prefabrication in factory-controlled conditions into very large panels (up to 30,000 sf) results in ease of installation, less thermal fusion field seams and less on site QC and CQA. (It should be noted that HDPE cannot be prefabricated into panels and requires considerably more on-site welding and QC).
- Large prefabricated panels will provide better control of thermal fusion welding in a factory environment that will improve the liner system integrity for the long term. Ease of installation of large prefabricated custom size panels results in a greater reduction of installation time and associated installation and QC costs
- The Non-reinforced LLDPE geomembrane provides superior lay flat characteristics and conformability which allows for more intimate contact with the underlying soil, geonet, or geotextile and tank walls as well as overlying materials thus providing better flow characteristics for drainage of water. String reinforced LLDPE exhibits more wrinkling and when overlaid or in contact with a geonet drain, wrinkles tend to form pockets and dams affecting drainage of any leakage water to the exterior of the Modular AST Impoundment.

R.K. FROBEL & ASSOCIATES
Consulting Engineers

- Both types of LLDPE geomembrane are easily repaired using the same thermal fusion bonding method without the need for special surface grading preparation for extrusion welding as is typically used in repair of HDPE geomembranes. However, string reinforced LLDPE requires that all cut edges with exposed scrim must be encapsulated with extrusion bead. No encapsulation is required on non-reinforced LLDPE.

In summary, it is my professional opinion that the liner system of 40 mil non-reinforced LLDPE geomembrane as Primary liner and 30 mil non reinforced LLDPE Secondary liner, with integrated leak detection system, will provide protection that is equal to or better than 45 mil string reinforced LLDPE, 30 mil PVC, 60 mil HDPE (primary liner) and 35 mil LLDPEr (secondary liner) and meets requirements as defined by the rule as an alternative liner system (resistance to UV and chemical exposure and required hydraulic conductivity). Additionally, this liner system will provide a superior installation in the AST environment and function better than liners referenced in the OCD rule and will provide the requisite protection of fresh water, public health and the environment for at least 5 years in the produced water recycling environment.

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 DESIGN AND CONSTRUCTION SPECIFICATIONS FOR A RECYCLING CONTAINMENT

Geosynthetic Research Institute (GRI) Published Standards and Papers 2018

ASTM Standards 2018

Attachments:

R. K. Frobel C.V.

STATEMENT EXPLAINING WHY THE APPLICANT SEEKS A VARIANCE FOR 40 MIL NON-REINFORCED LLDPE GEOMEMBRANE AS AN ALTERNATIVE PRIMARY AND SECONDARY LINER FOR MODULAR STEEL AST CONTAINMENT

The prescriptive mandates of the Rule that are the subject of this variance request are the following subsections of 19.15.34.12

NMAC 19.15.34.12 A DESIGN AND CONSTRUCTION SPECIFICATIONS FOR A RECYCLING CONTAINMENT

(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 1×10^{-9} cm/sec.* Liner compatibility shall meet or exceed the EPA SW-846 method 9090A or subsequent relevant publications.

The applicant proposes one layer of 40-mil LLDPE as a primary liner and a secondary liner comprised of one layer of 40-mil LLDPE material.

Rule 34 did not consider Above Ground Steel Storage Tanks that employ liners as a primary and secondary containment method.

This material is more readily available than the prescribed liners in the Rule and provides superior flexibility and conformity characteristics. Due to the vertical steel walls, 60-mil HDPE, 45 or 30-mil LLDPE string reinforced liners and 30-mil PCV liners are not sufficiently flexible for use in these modular containments.

Demonstration That the Variance Will Provide Equal or Better Protection of Fresh Water, Public Health and the Environment

The following technical documents provide supportive data to demonstrate equal or better protection of fresh water, public health and the environment by providing the requisite containment and protection. Technical comparison of the proposed material is compared to what is advised through Rule 34 is discussed. A second memorandum provides clarification that the engineering requirements for site preparation, which ensures functionality of the liner system, is crosscutting to varied locations within the Permian Basin. Stamped plans from design engineer confirm applicability of this liner system to this specific site.

R.K. FROBEL & ASSOCIATES
Consulting Engineers

**Technical Memorandum: 40-mil LLDPE as Alternative
Primary/Secondary Liner System for Modular Steel AST Recycling
Containment**

NMAC 19.15.34.12 A (4)

In consideration of the Primary lining application (modular AST impoundment), size of the AST and depth, design details for modular tanks as well as estimated length of up to five years of service time, it is my professional opinion that a 40 mil LLDPE geomembrane will provide the requisite barrier against processed water loss. It should be noted that the 40 mil LLDPE exceeds the OCD mandate for a Secondary lining system. *The two proposed 40 mil LLDPE liners will function equal to or better than 45 mil String Reinforced LLDPE, 30 mil PVC, or 60 mil HDPE liners as a primary liner and 30 mil LLDPE string reinforced as a secondary liner system. Additionally, the 40 mil LLDPE in a two-layer system will provide requisite protection for the environment that is equal to or better than the above primary and secondary liner systems referenced in OCD rule 34.* The following are discussion points that will exhibit the attributes of a 40 mil LLDPE lining system:

The nature and formulation of LLDPE resin is very similar to HDPE. The major difference is that LLDPE is lower density, lower crystallinity (more flexible and less chemical resistant). However, LLDPE will resist aging and degradation and remain intact for many years in exposed conditions. The LLDPE resin is virtually the same for non-reinforced 40 mil LLDPE and string reinforced 45 mil LLDPE geomembranes and both will provide requisite containment and be equally protective for this application.

Flexibility Requirements. Non-reinforced LLDPE geomembranes are less stiff and far more flexible than string reinforced geomembranes as well as 60 mil HDPE and in this regard are preferred for installations in vertical wall tanks such as this proposed installation. LLDPE provides a very flexible sheet that enables it to be fabricated into large panels, folded for shipping and installed on vertical walls transitioned to flat bottom. Non-reinforced LLDPE sheet will conform better than a string reinforced LLDPE to the tank dimensions under hydrostatic loading and will exhibit less wrinkling and creasing during and after installation.

Thermal Fusion Seaming Requirements. Thermal seaming and QC seam test requirements for geomembranes are product specific and usually prescribed by the sheet manufacturer. Both dual wedge and single wedge thermal fusion welding is commonly used on LLDPE and QC testing by air channel (ASTM D 5820) or High Pressure Air Lance (ASTM D 4437) is fully acceptable and recognized as industry standards. In this regard, either non-reinforced LLDPE or string-reinforced LLDPE will be acceptable as far as QC and thermal fusion seaming methods are concerned.

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 between the primary and secondary LLDPE

R.K. FROBEL & ASSOCIATES
Consulting Engineers

geomembranes at the base of the AST in this application provides immediate drainage to a low point or outside the Modular AST Impoundment and thus no hydrostatic head or driving gradient is available to push leakage water through a hole in the Secondary LLDPE liner .

Leakage through any Primary geomembrane is driven by size of hole and depth and will be detected by the increase of water in the drainage system and the volume being pumped out of the secondary containment. In this regard and for this variance, the Primary consists of 40 mil LLDPE geomembrane which will perform equal to or better than a single layer of string reinforced LLDPE for potential leakage. Thus, if a leak occurs through the top layer, it will be effectively contained by the second layer of 40 mil LLDPE geomembrane. If required, location of holes in the Primary can be found by Electrical Leak Location Survey (ELLS) using a towed electrode (ASTM D 7007). Holes found can then be repaired and thus water seepage into the leakage collection and drainage system will be kept to a minimum. Dependent on OCR requirements for Action Leakage Rate (ALR), the leakage volumes may only be monitored. For example, a typical ALR is < 20 gpad whereas a rapid and large leak (RLL) may be > 100 gpad. Most states specify maximum ALR values for waste and process water impoundments usually in the range of 100 to 500 gpad. However, New Mexico does not specify an ALR for waste or process water impoundments (GRI Paper No. 15).

Both non-reinforced LLDPE and string reinforced LLDPE can be prefabricated into large panels and thus both types offer the following for Containment:

- Prefabrication in factory-controlled conditions into very large panels (up to 30,000 sf) results in ease of installation, less thermal fusion field seams and less on site QC and CQA. (It should be noted that HDPE cannot be prefabricated into panels and requires considerably more on-site welding and QC).
- Large prefabricated panels will provide better control of thermal fusion welding in a factory environment that will improve the liner system integrity for the long term. Ease of installation of large prefabricated custom size panels results in a greater reduction of installation time and associated installation and QC costs
- The Non-reinforced LLDPE geomembrane provides superior lay flat characteristics and conformability which allows for more intimate contact with the underlying soil, geonet, or geotextile and tank walls as well as overlying materials thus providing better flow characteristics for drainage of water. String reinforced LLDPE exhibits more wrinkling and when overlaid or in contact with a geonet drain, wrinkles tend to form pockets and dams affecting drainage of any leakage water to the exterior of the Modular AST Impoundment.
- Both types of LLDPE geomembrane are easily repaired using the same thermal fusion bonding method without the need for special surface grinding/preparation for extrusion welding as is typically used in repair of HDPE geomembranes.

R.K. FROBEL & ASSOCIATES
Consulting Engineers

However, string reinforced LLDPE requires that all cut edges with exposed scrim must be encapsulated with extrusion bead. No encapsulation is required on non-reinforced LLDPE.

In summary, it is my professional opinion that the two layers of 40 mil non-reinforced LLDPE geomembranes will provide a Primary/Secondary liner system that is equal to or better than 45 mil string reinforced LLDPE, 30 mil PVC, 60 mil HDPE (primary liner) and 35 mil LLDPEr (secondary liner). Additionally, the two layers of 40 mil LLDPE will provide a superior installation and function better than liners referenced in the OCD rife. The two layers of 40 mil non-reinforced LLDPE will provide the requisite protection of fresh water, public health and the environment for at least 5 years in the frack water environment.

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

Sincerely Yours,

R K Frobel

Ronald K. Frobel, MSCE, PE



References:

NMAC 19.15.34.12 DESIGN AND CONSTRUCTION SPECIFICATIONS FOR A RECYCLING CONTAINMENT

Geosynthetic Research Institute (GRI) Published Standards and Papers 2018

ASTM Standards 2018

Attachments:

R. K. Frobel CV

***Slope and Anchor Variance Request for Above Ground
Steel Tank Modular Recycling Storage Containments***

STATEMENT EXPLAINING WHY THE APPLICANT SEEKS A VARIANCE FOR SLOPE AND ANCHOR FOR MODULAR STEEL AST CONTAINMENT

Statement Explaining Why the Applicant Seeks a Variance

The prescriptive mandates of the Rule that are the subject of this variance request are the following subsections of NMAC 19.15.34.12.

NMAC 19.15.34.12 DESIGN AND CONSTRUCTION SPECIFICATIONS FOR A RECYCLING CONTAINMENT:

A. An operator shall design and construct a recycling containment in accordance with the following specifications.

(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. *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.

(3) Each recycling containment shall incorporate, at a minimum, a primary (upper) liner and a secondary (lower) liner with a leak detection system appropriate to the site's conditions. *The edges of all liners shall be anchored in the bottom of a compacted earth-filled trench. The anchor trench shall be at least 18 inches deep.*

The applicant requests a variance to prescribed slope and anchor in the setting of above ground modular steel containments.

With respect to storage of produced water for use in lieu of fresh water, Rule 34 is written for earthen, lined pits, not free-standing modular impoundments that employ liners as their primary fluid containment system. A modular impoundment consists of a professionally designed steel tank ring with vertical walls. There is no slope to consider as the segmental steel sections are set vertical.

There is no anchor trench as envisioned by the Rule, liners are anchored to the top of the steel walls with clips, no anchor trench is required.

Demonstration That the Variance Will Provide Equal or Better Protection of Fresh Water, Public Health and the Environment

The following technical memorandum provides supportive data to demonstrate equal or better protection of fresh water, public health and the environment by providing the requisite containment and protection.

R.K. FROBEL & ASSOCIATES
Consulting Engineers

Technical Memorandum: Slope and Anchor Trench Variance for Above Ground Steel Modular Containments

NMAC 19.15.34.12 A (2), (3)

Side Slope

The design of soil side slope (inclination) is a geotechnical engineering design consideration. Liquid impoundments such as fresh water or process water containments are usually built within an excavation or with raised earthen embankments. For a liquid impoundment with an exposed liner system, the slope soils and construction dictate slope inclination and very detailed slope stability analysis may be required to determine if slope failure within the embankment will occur once loaded with impounded water. Slope failure may also occur during construction or when the impoundment is empty. A maximum slope is usually specified and is dependent on soil type and cohesive strength, saturated or unsaturated conditions, etc. Detailed analysis for slope stability can be found in "Designing with Geosynthetics" by R.M Koerner as well as many geotechnical books.

A modular impoundment, on the other hand, consists of a professionally designed steel tank ring with vertical walls. *There is no slope to consider as the segmental steel sections are set vertical.* Design of steel tanks, in regard to hydrostatic loading, wind loading, seismic loads, etc. are thoroughly referenced with detailed procedures in the design code - American Petroleum Institute (API) 650-98 "Welded Steel Tanks for Oil Storage". *There are no requirements for maximum slope inclination other than perhaps 90 degrees or vertical wall.*

Anchor Trench

All earthen impoundments with a geomembrane lining system require some form of top of slope anchor, the most common of which is an excavated and backfilled anchor trench usually set back at least 3 ft from the top of slope. Again, there are detailed procedures for anchor trench design in "Designing with Geosynthetics" by R.M Koerner.

A Modular Impoundment requires mechanical anchoring of the geomembrane at the top of the vertical steel wall using standard liner clips that prevent the geomembrane or geomembrane layers from slipping down the side wall. These are detailed in the Tank Installation Manual. *There are no requirements for an "anchor trench" as this is not an in-ground impoundment.*

In summary, based on the design and specifications of a modular steel impoundment, there is no requirement for a maximum interior slope angle of 2H:1V due to the fact that this impoundment is a steel tank with vertical walls. Additionally, there is no requirement for an anchor trench as the geomembrane is attached to the top of the Modular Impoundment vertical walls with large steel clips. This provides the requisite protection of fresh water, public health and the environment for many years.

R.K. FROBEL & ASSOCIATES
Consulting Engineers

If you have any questions on the above technical memorandum or require further information, give me a call at 303-679-0285 or email geosynthetics@msn.com

Sincerely Yours,

RK Frobel

Ronald K. Frobel, MSCE, PE



References:

NMAC 19 15.34.12 DESIGN AND CONSTRUCTION SPECIFICATIONS FOR A RECYCLING CONTAINMENT

American Petroleum Institute (API) 650-98 "Welded Steel Tanks for Oil Storage"

Koerner, R.M., 2005 "Designing With Geosynthetics" Prentice Hall Publishers

Attachments:

R. K. Frobel C.V.

January 2020

***Applicability of Variances for Modular AST Containments
in the Permian Basin of New Mexico***

R.K. FROBEL & ASSOCIATES
Consulting Engineers

Technical Memorandum: Applicability of Variances for Modular AST Containments in the Permian Basin of New Mexico
NMAC 19.15.34.12 A (2)

I have reviewed the most recent historical variances for AST Containments in the document titled “Variances for C-147 Registration Packages Permian Basin of New Mexico” (January 2020) and examined the applicable design drawings and permits for the following modular AST containments located in the Permian Basin of New Mexico.

- C-147 Registration Package for Myox Above Ground Storage Tank Section 32, T25S, R28E, Eddy County (January 20, 2020)
- C-147 Registration Package for Fez Recycling Containment and Recycling Facility Area (100+ acres) Section 8, T25-S, R35-E, Lea County, Volume 2 – Above-Ground Storage Tank Containments
- Hackberry 16 Recycling Containments and Recycling Facility Section 16, T19S, R31E, Eddy County

Locations of the modular containments range from west of the Pecos River to slightly west of Jal, NM. All locations exhibit different surface and subsurface geology, different topography and are of various sizes and volumes. *However, in regard to structural integrity of the base soils that support the AST and in particular the geomembrane containment system, the specification requirements are the same.* The foundation soils must be roller compacted smooth and free of loose aggregate over ½ inch. Compaction characteristics must meet or exceed 95% of Standard Proctor Density in accordance with ASTM D 698. This specification requirement is specific and causes the general or earthworks contractor to meet this standard regardless of the site- specific geology or topography. Provided that the design drawings and associated specifications call out the minimum requirements for subsoils compaction (i.e., 95% Standard Proctor Density – ASTM D 698), the design engineer or owners representative will carry out soils testing on the foundation materials to provide certainty to the AST containment owner that the earthworks contractor has met these obligations.

Thus, provided that the contractor meets the minimum specified requirements for foundation soils preparation and density, the location, geology or depth to groundwater will make no difference in regard to geomembrane liner equivalency as demonstrated by the AST variances presented in this volume and are considered valid for meeting NMOCD Rule 34 requirements for all locations within the Permian Basin of New Mexico.

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

R.K. FROBEL & ASSOCIATES
Consulting Engineers

Sincerely Yours,

R.K. Frobel

Ronald K. Frobel, MSCE, PE

References:

NMAC 19.15.34.12 DESIGN AND CONSTRUCTION SPECIFICATIONS FOR A
RECYCLING CONTAINMENT

ASTM Standards 2019



RONALD K. FROBEL, MSCE, P.E.

**CIVIL ENGINEERING
GEOSYNTHETICS
EXPERT WITNESS
FORENSICS**

FIRM: R. K. FROBEL & ASSOCIATES
Consulting Civil / Geosynthetics Engineers

TITLE: Principal and Owner

PROFESSIONAL

AFFILIATIONS: American Society for Testing and Materials (ASTM) -
Founding member of Committee D 35 on Geosynthetics
Chairman ASTM D35 Subcommittee on Geomembranes 1985-2000
ASTM Award of Merit Recipient/ASTM Fellow - 1992
ASTM D18 Soil and Rock - Special Service Award - 2000
Transportation Research Board (TRB) of The National Academies
Appointed Member A2K07 Geosynthetics 2000 - 2003
National Society of Professional Engineers (NSPE) - Member
American Society of Civil Engineers (ASCE) - Member
Colorado Section - ASCE - Member
International Society of Soil Mechanics and Foundation Engineers
(ISSMFE) - Member
International Geosynthetics Society (IGS) - Member
North American Geosynthetics Society (NAGS) - Member
International Standards Organization (ISO) - Member TC 221
Team Leader - USA Delegation Geosynthetics 1985 - 2001
European Committee for Standardization (CEN) - USA Observer
EPA Advisory Committee on Geosynthetics (Past Member)
Association of State Dam Safety Officials (ASDSO) – Member
U. S. Committee on Irrigation and Drainage (USCID) - Member
Technical Advisory Committee - Geosynthetics Magazine
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BACKGROUND: University of Arizona: M.S. - Civil Engineering - 1975
University of Arizona: B. S. - Civil Engineering – 1969
Wentworth Institute of Technology: A.S. Architecture – 1966

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**PROFESSIONAL
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R. K. Frobel & Associates - Consulting Engineers
Evergreen, Colorado, Principal and Owner, 1988 - Present

Chemie Linz AG and Polyfelt Ges.m.b.H., Linz, Austria
U. S. Technical Manager Geosynthetics, 1985 - 1988

U.S. Bureau of Reclamation, Engineering and Research Center
Denver, Colorado, Technical Specialist in Construction
Materials Research and Application, 1978 - 1985

Water Resources Research Center (WRRC), University of Arizona
Tucson, AZ, Associate Research Engineer, 1975 - 1978

Engineering Experiment Station, University of Arizona
Tucson, AZ, Research Assistant, 1974 - 1975

United States Navy, Commissioned Naval Officer, 1970 - 1973

**REPRESENTATIVE
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R.K. Frobel & Associates: Civil engineering firm specializing in the fields of geotechnical, geo-environmental and geosynthetics. Expertise is provided to full service civil/geotechnical engineering firms, federal agencies, municipalities or owners on a direct contract, joint venture or sub-consultant basis. Responsibilities are primarily devoted to specialized technical assistance in design and application for foreign and domestic projects such as the following:

Forensics investigations into geotechnical and geosynthetics failures; providing expert report and testimony on failure analysis; providing design and peer review on landfill lining and cover system design, mine waste reclamation, water treatment facilities, hydro-technical canal, dam, reservoir and mining projects, floating reservoir covers; oil and gas waste containment; design of manufacturers technical literature and manuals; development and presentation of technical seminars; new product development and testing; MQA/CQA program design and implementation.

Polyfelt Ges.m.b.H., Linz, Austria and Denver Colorado: As U.S. technical manager, primary responsibilities included technical development for the Polyfelt line of geosynthetics for the U.S. civil engineering market as well as worldwide applications.

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Page 3

U.S. Bureau of Reclamation, Denver, Colorado: As technical specialist, responsibilities included directing laboratory research, design and development investigations into geosynthetics and construction materials for use on large western water projects such as dams, canals, power plants and other civil structures. Included were material research, selection and testing, specification writing, large scale pilot test programs, MQA/CQA program design and supervision of site installations. Prime author or contributor to several USBR technical publications incorporating geosynthetics.

University of Arizona, Tucson, Arizona: As research engineer at the Water Resources Research Center, responsibilities included research, design and development of engineering materials and methods for use in construction of major water projects including potable water reservoirs, canals and distribution systems. Prime author or contributor to several WRRC technical publications.

Northeast Utilities, Hartford, Connecticut: As field engineer for construction at Northeast Utilities, responsibilities included liason for many construction projects including additions to power plants, construction of substations, erection of fuel oil pipelines and fuel oil storage tanks. Responsibilities also included detailed review, inspection and reporting on numerous construction projects.

U.S. Navy: Commissioned Naval Officer – Nuclear Program

PUBLICATIONS: Over 85 published articles, papers and books.

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Additional VARIANCE FOR RECYCLING STORAGE CONTAINMENTS (Inground and AST)

- **Alternative Testing Methods and AST Fencing**

Request for OCD Approval of Alternative Test Methods to Analyze Concentrations of TPH and Chloride

The prescriptive mandates of the Rule that are the subject of this request are the following subsections of NMAC 19.15.17.13 [emphasis added], 19.15.34.14 and 19.15.29. 12 D

19.15.17.13 CLOSURE AND SITE RECLAMATION REQUIREMENTS:

D.(5) The operator shall collect, at a minimum, a five point composite of the contents of the temporary pit or drying pad/tank associated with a closed-loop system to demonstrate that, after the waste is solidified or stabilized with soil or other non-waste material at a ratio of no more than 3:1 soil or other non-waste material to waste, the concentration of any contaminant in the stabilized waste is not higher than the parameters listed in Table II of 19.15.17.13 NMAC.

The referenced Table II, which is reproduced in part below, notes the Method with asterisk signifying: “*Or other test methods approved by the division”.

Table II Closure Criteria for Burial Trenches and Waste Left in Place in Temporary Pits			
Depth below bottom of pit to groundwater less than 10,000 mg/l TDS	Constituent	Method*	Limit**
25-50 feet	Chloride	EPA Method 300.0	20,000 mg/kg
	TPH	EPA SW-846 Method 418.1	100 mg/kg

19.15.34.14 CLOSURE AND SITE RECLAMATION REQUIREMENTS FOR RECYCLING CONTAINMENTS:

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.

(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.

The referenced Table I, which is reproduced in part below, notes the Method with asterisk signifying: “*Or other test methods approved by the division”.

Table I Closure Criteria for Recycling Containments			
Depth below bottom of containment to groundwater less than 10,000 mg/l TDS	Constituent	Method*	Limit**
51 feet - 100 feet	Chloride	EPA 300.0	10,000 mg/kg
	TPH (GRO+DRO+MRO)	EPA SW-846 Method 8015M	2,500 mg/kg

After sampling solids of more than 50 drilling pits in the Permian Basin, we have observed and reported to OCD on numerous occasions significant problems with non-petroleum drilling additives (e.g. starch) interfering with the laboratory method 418.1. It is not surprising that in many instances we found no correlation between the laboratory results using 418.1 and the results using Method 8015.

We request approval of Method 8015 (GRO + DRO + MRO) for Method 418.1.

19.15.29.12 D. CLOSURE REQUIREMENTS. The responsible party must take the following action for any major or minor release containing liquids.

(1) The responsible party must test the remediated areas for contamination with representative five-point composite samples from the walls and base, and individual grab samples from any wet or discolored areas. The samples must be analyzed for the constituents listed in Table I of 19.15.29.12 NMAC or constituents from other applicable remediation standards.

The referenced Table I, is reproduced in part below.

Table I Closure Criteria for Soils Impacted by a Release			
Minimum depth below any point within the horizontal boundary of the release to ground water less than 10,000 mg/l TDS	Constituent	Method*	Limit**
≤ 50 feet	Chloride***	EPA 300.0 or SM4500 Cl B	600 mg/kg
	TPH (GRO+DRO+MRO)	EPA SW-846 Method 8015M	100 mg/kg
	BTEX	EPA SW-846 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8260B	10 mg/kg

We request approval of EPA 300.0 or SM4500 for the analysis of chloride.

Demonstration that OCD Approval Will Provide Equal or Better Protection of Fresh Water, Public Health and the Environment

The purpose of TPH analyses in the Pit Rule is to measure total petroleum hydrocarbons not all non-polar compounds, such as starch or cellulose that can interfere with Method 418.1. While Method 418.1 may provide some useful data for transportation of crude oil or condensate spills to disposal, the addition of non-polar organic materials in drilling fluids, especially for horizontal wells, renders Method 418.1 highly problematic to determine compliance with the Rule. Using Method 8015 for TPH (GRO+DRO+MRO) provides a better measurement of what we believe the Commission intended operators to measure.

In hearings before the Oil Conservation Commission technical arguments were presented regarding the use of SM4500 in lieu of EPA 300.00 for chloride analysis for Rule 29. The Division and the Commission agreed that these two methods provide equal or better protection of fresh water, public health and the environment.

Statement Explaining Why the Applicant Seeks a Variance

The prescriptive mandates of the Rule that are the subject of this variance request are presented below with **emphasis added**:

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.

E. Netting. The operator shall ensure that **a recycling containment is screened, netted or otherwise protective of wildlife, including migratory birds**. The operator shall on a monthly basis inspect for and, within 30 days of discovery, report the discovery of dead migratory birds or other wildlife to the appropriate wildlife agency and to the division district office in order to facilitate assessment and implementation of measures to prevent incidents from reoccurring.

The subject AST employs netting or sonic bird hazing (Mega Bird X with bird calls specific to the Permian Basin). These methods effectively protect avian species such as waterfowl and bats. OCD and BLM have approved both methods per Rule 34 and by BLM Rules respectively.

The steel structure of the AST is 11-feet high, which obviously encloses the containment “in a manner that deters...[terrestrial] wildlife.” Thus, the steel structure meets the mandate of the Rule for enclosure. Thus, netting and the steel structure meet the mandate of Rule 34 for deterring/protecting avian and terrestrial wildlife.

Because AST Containments have a steel stairway between ground surface and the open top, the operator proposes the following deterrent to unauthorized human access:

1. Install gate (e.g. <https://www.saferack.com/product/industrial-safety-gates/safety-swing-gates/>) or chain across the stairway
2. Place an appropriate sign on the gate or chain to help deter unauthorized human access to the open top of the containment
3. Provide for a mechanism to lock the gate when responsible personnel are not onsite.

Demonstration That the Variance Will Provide Equal or Better Protection of Fresh Water, Public Health and the Environment

We believe the proposed protocol provides equal protection of Public Health as a 4-strand barbed wire fence.

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

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

CONDITIONS

Action 388971

CONDITIONS

Operator: Silverback Operating II, LLC 1001 W. Wilshire Blvd Oklahoma City, OK 73112	OGRID: 330968
	Action Number: 388971
	Action Type: [C-147] Water Recycle Long (C-147L)

CONDITIONS

Created By	Condition	Condition Date
vvenegas	• 2RF-208 - DAYTON RECYCLING FACILITY AND CONTAINMENTS #1, #2, [fVV2427449353] permit expires on 08/08/2027. If [330968] Silverback Operating II, LLC wishes to extend operations past five years, an annual extension request must be submitted using on form C-147 Long through OCD Permitting by 07/08/2027. • [330968] Silverback Operating II, LLC shall construct, operate, maintain, close, and reclaim 2RF-208 - DAYTON RECYCLING FACILITY AND CONTAINMENTS #1, #2, [fVV2427449353] in compliance with NMAC 19.15.34 NMAC. • [330968] Silverback Operating II, LLC shall comply with 19.15.29 NMAC Releases in the event of any release of produced water or other oil field waste at 2RF-208 - DAYTON RECYCLING FACILITY AND CONTAINMENTS #1, #2, [fVV2427449353].	10/9/2024