1RF – 454

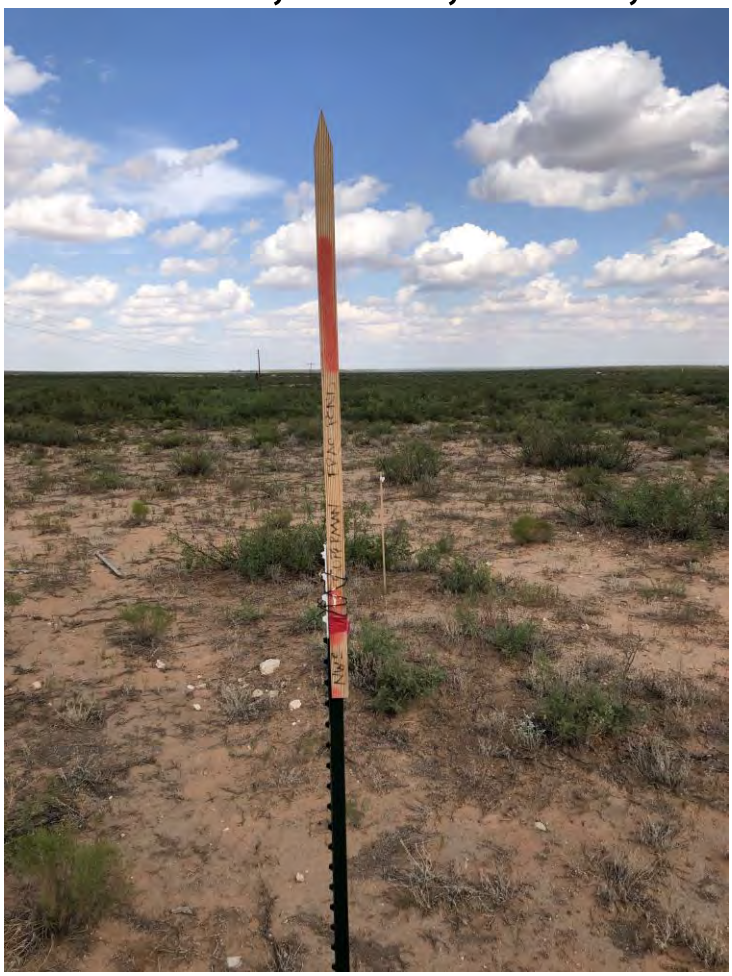
Zia Hills (Superman) Recycling Facility and Containment

Application
Volume 1

Conoco Phillips
May 28, 2020

March 2020

C-147 Registration Package for Zia Hills Containments and Recycling Facility Section 30, T26-S, R32-E, Lea County



View to north from near the northwest corner of the proposed containment showing the nature of the area.

Prepared for:
ConocoPhillips

15 N London Rd
Loving, Texas 88256

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

R. T. HICKS CONSULTANTS, LTD.

901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Fax: 505.266-0745
Artesia ▲ Carlsbad ▲ Durango ▲ Midland

March 26, 2020

Ms. Susan Lucas Kamat
NMOCD
1220 South St. Francis Drive
Santa Fe, New Mexico 87505
Via E-Mail Susan.LucasKamat@state.nm.us from Jeremy Lee, ConocoPhillips

RE: ConocoPhillips Company Zia Hills Containments and Recycling Facility
Section 30, T26-S, R32-E, Lea County

Dear Ms. Kamat Lucas:

On behalf of ConocoPhillips Company, Hicks Consultants submits the attached permit application for two in-ground containments (also known as Superman Pond) and three AST containments. The package follows the order of Form 147 to allow for an easier review. Construction will begin soon.

The following elements of the submission are germane to your review:

Volume 1 contains

a. Engineering drawings of the in-ground containments stamped by a NM Registered Engineer.
b. The stamped drawings indicate that the design engineer affirms the design elements of the in-ground containment, some of which NMOCD considers variances from the Rule (e.g. 60-mil HDPE secondary liner – specifically required by BLM for this project), are appropriate for this location.
c. Design, operational and closure plans for the in-ground containments.
d. Site specific information that demonstrates compliance with siting criteria for the location. This section of the submission includes a clear demonstration that unstable ground does not exist in this area and the high Karst Potential mapped by BLM.
e. Water well logs from the OSE database and data from nearby oil wells are included as appendices as is a site geotechnical report.
f. Photographs of the site and environs are included in this submission to aid in the review.

Volume 2 is to follow, pending confirmation of AST contractor, and will contain

a. Engineering drawings of the Above Ground Containment stamped by a NM Registered Engineer.
b. The stamped drawings (or letter) indicate that the design engineer affirms the design elements of the Above Ground Containment, which are variances from the Rule (alternate primary and secondary liner, slope and anchor, freeboard), are appropriate for this location.
c. Design, operational and closure plans for the AST containments.

Volume 3 presents

a. Variances applicable to the Zia Hills in-ground and AST containments with Technical Memorandums supporting engineering variances. Confirmation of liners for AST will be confirmed when design plan obtained.

b. Stamped letters from Ron Frobel PE discussing the applicability of engineering variances to a wide variety of site conditions for In-ground and AST Containments; CV included.
c. A variance request to allow for more than 48 hours during active hydraulic stimulation if the primary liner is compromised below the fluid's surface.
d. A variance to delay closure of the containments due to lack of use of water for E&P operations during 2020-21 market conditions.

Attached to this transmittal letter is an evaluation of the mapped "high karst potential" to cause adverse ground stability issues that might impact the integrity of the proposed containments. Dr. Lewis Land, a BLM-approved "karst contractor" conducted an evaluation as required by BLM.

In addition to the statement of the design engineer referenced above, I have personally evaluated the applicability of the all other variances to the text of Rule 34 listed below. In my opinion, the design elements listed below, all of which have been previously approved by OCD, are applicable to the location of the Zia Hills facility and all containments in the Permian Basin of New Mexico:

- Sonic hazing for avian protection with species calls that are specific to the Permian Basin
- Chain link or "game fence" as an alternative to the specified 4-foot barbed wire fence
- Alternative to an anchor trench for Above Ground Tank Containments
- Alternative to levee slope requirements for Above Ground Tank Containments

Alternative primary and secondary liners for AST Containments are discussed and evaluated in the letters stamped by Mr. Frobel, whose CV is attached to Volume 3. I have interviewed numerous AST Containment contractors, and all have testified to the field performance of the alternative liner systems described in this submission. The written evaluation by Mr. Frobel, the testimony of AST Containment contractors and the lack of any reported failures of AST Containment systems in New Mexico is sufficient rationale to support an opinion that the alternative liner system proposed for the Zia Hills AST Containment is appropriate for the site.

In compliance with 19.15.34.10 of the Rule, Mr. Lee transmitted this submission to the Bureau of Land Management who is the surface owner of the surface upon which the containments will be constructed.

If you have any questions or concerns regarding this registration or the attached C-147, please contact me. Contact person for Conoco Phillips is Jeremy Lee, as noted on the C 147. As always, we appreciate your work ethic and attention to detail.

Sincerely,
R.T. Hicks Consultants

Randall T. Hicks PG
Principal

Copy: ConocoPhillips Company
Bureau of Land Management, Carlsbad

CONOCOPHILLIPS SUPERMAN CONTAINMENT AND RECYCLING FACILITY
KARST GEOHAZARD ASSESSMENT

Lewis Land, Ph.D.
Zia Geoscience Consulting
Carlsbad, NM
575-932-9912
Lewisland78@gmail.com

I have been subcontracted by R. T. Hicks Consultants, Ltd. to conduct an assessment of the potential for karst geohazards at the proposed ConocoPhillips Superman produced water recycling center in the southwest corner of Lea County, NM. To that end I have conducted a review of the relevant literature and made a site visit on 10/5/2019.

According to state geologic maps, the surface geology at the proposed recycling facility consists of older alluvial and piedmont deposits and wind-blown sand, of late Pleistocene and Holocene age. The alluvial material is the shallowest source of potable water in southwestern Lea County. These sediments are underlain by fine-grained sandstones of the Triassic Dockum Group, which crops out ~five miles northeast of the site. The Triassic Santa Rosa sandstone underlies the Dockum Group, and is in turn underlain by upper Permian strata of the Dewey Lake, Rustler, Salado and Castile Formations (Figure 1).

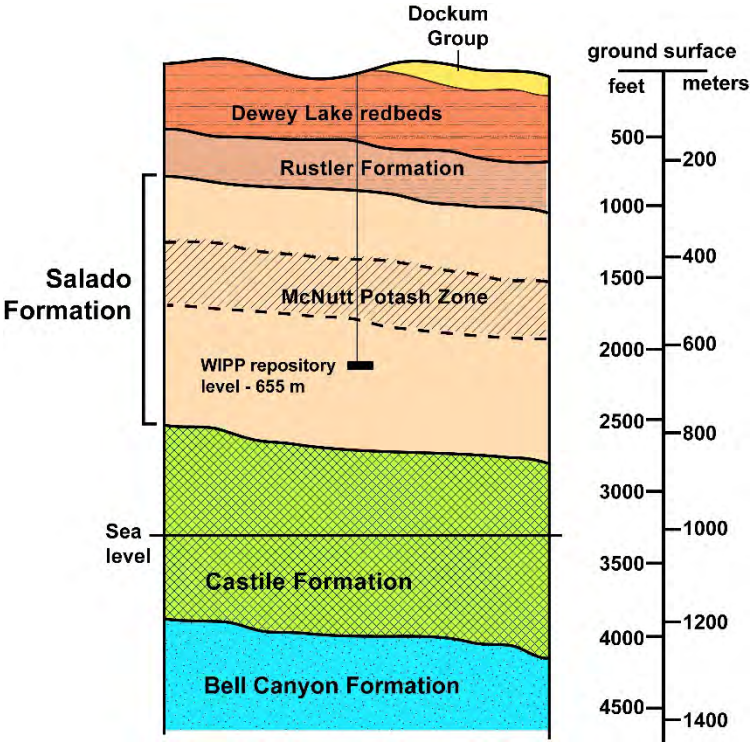


Figure 1: Upper Permian stratigraphy in the vicinity of the Waste Isolation Pilot Plant (WIPP) in east-central Eddy Co., NM, ~30 miles northwest of the study area. The WIPP site is updip from the proposed recycling facility, so the formations of interest are closer to the surface.

The topography of the area is subdued, defined by gentle swales and shallow arroyos. Topographically high areas are capped by thick layers of calcrete, or caliche,

which is the only lithified material in the study area (Figure 2). A pattern of linear depressions defined by vegetation occurs ~3000 feet south of the proposed facility, extending in a WNW-ESE direction. We observed a number of pock marks, or small holes, in the soil in these depressions (Figure 3). These pock marks are not solution features, but are probably collapse features associated with repeated wetting and desiccation of poorly drained soil.

Figure 2: Calcrete caprock ~six feet thick overlying poorly indurated alluvial material near proposed Superman recycling facility.

Figure 3: Small soil pit in linear depression south of proposed Superman recycling facility.

The proposed containment center is located in an area defined by BLM maps as having a high potential for karst hazards. The shallowest rock formation in this area that contains soluble rock is the Rustler Formation, which consists of alternating layers of mudstone, fine sandstone, dolomite and gypsum. The Rustler Formation is exposed at the surface farther to the west along the highway 285 corridor south of Loving, NM. Sinkholes formed in gypsum beds of the Rustler Formation are abundant

in that area and create a significant transportation geohazard (Land et al., 2018).

As the Hicks report observes, well records indicate that the top of the Rustler Formation is ~1000 feet below ground level in the vicinity of the proposed recycling facility. The stratigraphy in this part of New Mexico has been studied for decades and is well understood (e.g., Adams, 1944; Lucas, 1994; Land et al., 2006 plus dozens of other citations), and I can state with confidence that there are no soluble rocks between the land surface and the top of the Rustler Formation that would lead to subsidence or collapse. Given an overburden thickness in excess of 1000 feet, it is my opinion that the risk of sinkhole formation, subsidence or collapse at the proposed Superman recycling center is very small.

References

Adams JE. 1944, Upper Permian Ochoan Series of Delaware Basin, West Texas and southeastern New Mexico. AAPG Bulletin 28, p. 1596-1625.

Land L, Lueth V, Raatz B, Boston P, Love D (eds.). 2006. Caves and Karst of Southeastern New Mexico: New Mexico Geological Society, Guidebook 57, 344 p.

Land L, Cikoski CK, Veni G. 2018. Sinkholes as transportation and infrastructure geohazards in mixed evaporite-siliciclastic bedrock, southeastern New Mexico. In: Sasowsky ID, Byle MJ, Land L, editors. Proceedings of the Fifteenth Multidisciplinary Conference on Sinkholes and the Engineering and Environmental Impact of Karst, Shepherdstown, WV. National Cave and Karst Research Institute Symposium 7. Carlsbad (NM): National Cave and Karst Research Institute. p. 367-377.

Lucas SG, Anderson OJ. 1994. Ochoan (Late Permian) stratigraphy and chronology, southeastern New Mexico and West Texas. New Mexico Bureau of Mines and Mineral Resources Bulletin 15, p. 29-36.

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: : ConocoPhillips Company OGRID #: 217817

Address: PO Box 2197 Houston TX 77252

Facility or well name (include API# if associated with a well): Zia HIlls Recycling Facility and Containment

OCD Permit Number: _____(For new facilities the permit number will be assigned by the district office)

U/L or Qtr/Qtr _____ Section 30 Township 26S Range 32E County: Lea

Surface Owner: ☒ Federal ☐ State ☐ Private ☐ Tribal Trust or Indian Allotment

2.

☒ **Recycling Facility:**

Location of (if applicable): Latitude 32.014527° Longitude -103.714621 NAD83 (Approximate)

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:** VOLUME 1 FOR IN-GROUND CONTAINMENTS; VOLUME 2 FOR AST CONTAINMENTS

☐ Annual Extension after initial 5 years (attach summary of monthly leak detection inspections for previous year)

Center of Recycling **Two In Ground Containments** *(adjacent):* (if applicable) Latitude 32.014614° Longitude -103.717637 ;

AST containments*:* Latitude 32.015321 Longitude -103.714592 NAD83 (Approximate)

☒ For multiple or additional recycling containments, attach design and location information of each containment: SEE DESIGN DRAWINGS

☒ Lined ☐ Liner type: Thickness **In Ground x2**: Primary 60- Mil HDPE; Secondary 60-Mil HDPE ☐ LLDPE ☒ HDPE ☐ PVC ☐ Other

AST: Primary ; Secondary liner . SEE DESIGN DRAWINGS ☐ String-Reinforced

Liner Seams: ☒ Welded ☐ Factory ☐ Other _ Volume: SEE DESIGN DRAWINGS bbl Dimensions: (Inside dimensions) SEE DESIGN DRAWINGS AST final design drawings pending

☐ Recycling Containment Closure Completion Date: May 2020

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 6 foot Chain link with 3 strand barbed wire

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. See Volume 3

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 FIGURES 1-2	☐ Yes ☒ No ☐ NA
Within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended. - Written confirmation or verification from the municipality; written approval obtained from the municipality FIGURE 3	☐ Yes ☒ No ☐ NA
Within the area overlying a subsurface mine. - Written confirmation or verification or map from the NM EMNRD-Mining and Minerals Division FIGURE 4	☐ Yes ☒ No
Within an unstable area. - Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; topographic map FIGURES 5a-e	☐ Yes ☒ No
Within a 100-year floodplain. FEMA map FIGURE 6	☐ Yes ☒ No
Within 300 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse, or lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark). - Topographic map; visual inspection (certification) of the proposed site FIGURE 7	☐ Yes ☒ No
Within 1000 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. - Visual inspection (certification) of the proposed site; aerial photo; satellite image FIGURE 8	☐ Yes ☒ No
Within 500 horizontal feet of a spring or a fresh water well used for domestic or stock watering purposes, in existence at the time of initial application. FIGURES 1 and 7 - NM Office of the State Engineer - iWATERS database search; visual inspection (certification) of the proposed site	☐ Yes ☒ No
Within 500 feet of a wetland. FIGURE 9 - US Fish and Wildlife Wetland Identification map; topographic map; visual inspection (certification) of the proposed site	☐ Yes ☒ No

9.

Recycling Facility and/or Containment Checklist:

Instructions: Each of the following items must be attached to the application. Indicate, by a check mark in the box, that the documents are attached.

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

10.

Operator Application Certification:

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

Name (Print): Jeremy Lee Title: Regulatory Coordinator

Signature: Jeremy Lee Date: 3/30/20

e-mail address: Jeremy.L.Lee@conocophillips.com Telephone: 832.486.2510

11.

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

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

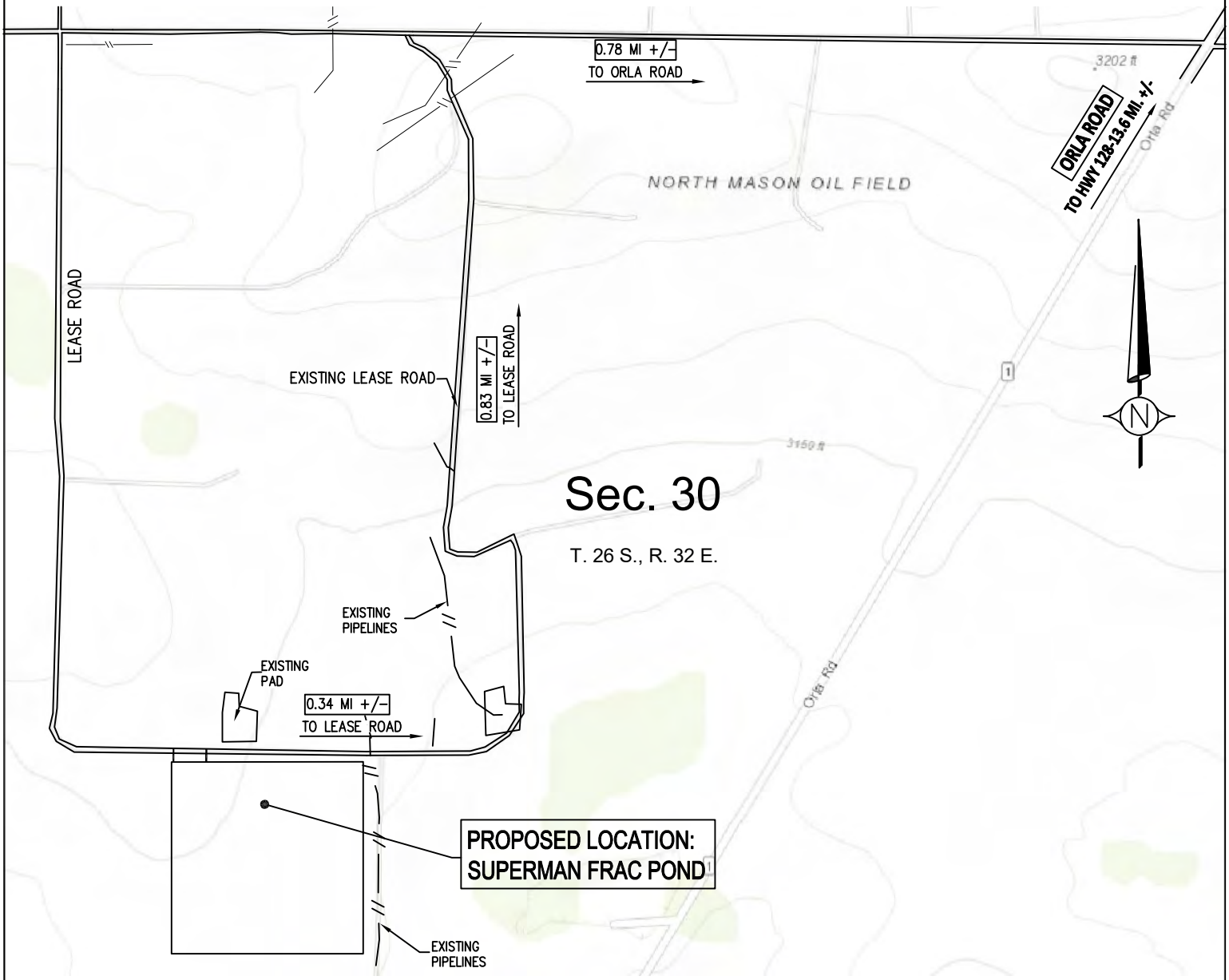
☐ OCD Conditions _____

☐ Additional OCD Conditions on Attachment

Survey For Containment and Recycling Facility

"Superman" = Zia Hills

SEC. 30, T. 26 S., R. 32 E.
LEA COUNTY, NEW MEXICO



NOTE:
1. PARCEL DATA SHOWN HAS BEEN OBTAINED FROM VARIOUS SOURCES AND SHOULD BE USED FOR MAPPING, GRAPHIC AND PLANNING PURPOSES ONLY. NO WARRANTY IS MADE FOR ACCURACY OF THE PARCEL DATA.

0' 800' 1600'

LEGEND

EXISTING PIPELINE
PROPOSED ROAD
FENCE

REV.	DATE	BY	DESCRIPTION	CHK.

PROJECT:2019.004–Superman Frac Pond Expansion

DRAWN BY: LM	DATE: 4/23/19	SUPERMAN FRAC POND EXPANSION ACCESS ROAD MAP
FIELD CREW: AV	DATE: 2/25/19	
SCALE: NTS	PAGE: 1	

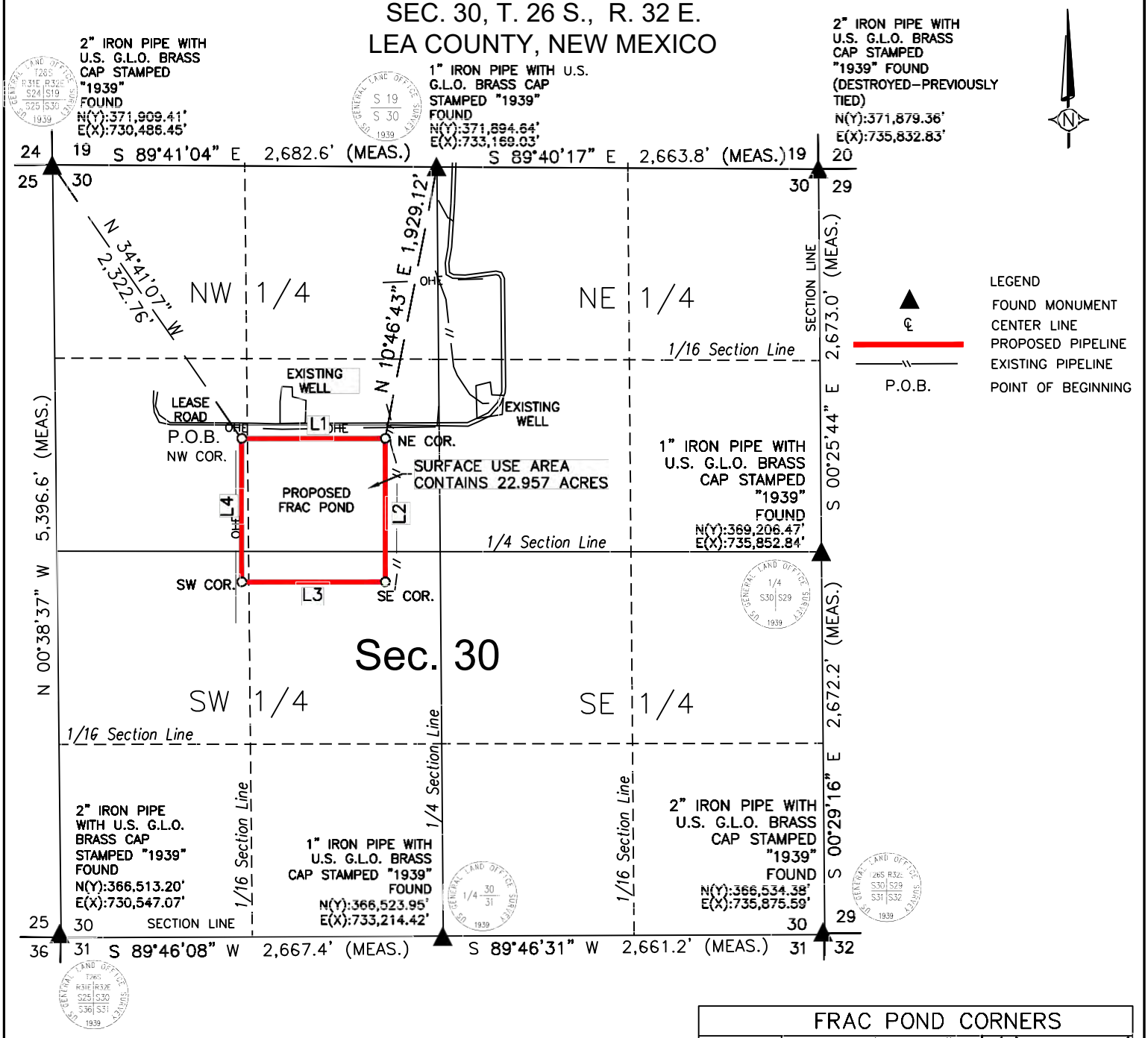
ConocoPhillips Company

PREPARED BY:
ROCKIN' CT SURVEYING
500 West Kilpatrick
Cleburne, TX 76033
817.565-6681

SUPERMAN FRAC POND EXPANSION
SEC. 30, T. 26 S., R. 32 E.
LEA COUNTY, NEW MEXICO

ACCESS ROAD MAP | **TOPO B**

SEC. 30, T. 26 S., R. 32 E.
LEA COUNTY, NEW MEXICO



FRAC POND CORNERS		
NW COR.	LAT: 32°00'56.5910"	N(Y): 369,999.43'
	LON: -103°43'07.6375"	E(X): 731,808.26'
NE COR.	LAT: 32°00'56.5359"	N(Y): 369,999.55'
	LON: -103°42'56.0228"	E(X): 732,808.26'
SE COR.	LAT: 32°00'46.6401"	N(Y): 368,999.56'
	LON: -103°42'56.0877"	E(X): 732,808.39'
SW COR.	LAT: 32°00'46.6952"	N(Y): 368,999.43'
	LON: -103°43'07.7021"	E(X): 731,808.39'

LINE TABLE		
LINE	BEARING	DIST.
L1	N 89°59'34" E	1,000'
L2	S 00°00'26" E	1,000'
L3	S 89°59'34" W	1,000'
L4	N 00°00'26" W	1,000'

0 1000 2000

NOTES:
1. SEE SURFACE USE DESCRIPTION NEXT SHEET.
2. COORDINATES, BEARINGS, DISTANCES, LATITUDES AND LONGITUDES ARE REFERENCED TO NAD83(2011) NEW MEXICO STATE PLANE COORDINATES, EAST ZONE 3001.

REV.	DATE	BY	DESCRIPTION	CHK.

PROJECT: 2019.004-Superman Frac Pond Expansion
DRAWN BY: CR | DATE: 2/19/19
FIELD CREW: AV | DATE: 2/18/19
SCALE: 1"=1,000' | PAGE: 1 OF 2
SUPERMAN FRAC POND EXPANSION FRAC POND

ConocoPhillips Company

PREPARED BY:
ROCKIN' CT SURVEYING
500 West Kilpatrick
Cleburne, TX 76033
817.565-6681

SUPERMAN FRAC POND EXPANSION
SEC. 30, T. 26 S., R. 32 E.
LEA COUNTY, NEW MEXICO

SURFACE USE AREA

SURFACE USE AREA DESCRIPTION

A PARCEL OF LAND FOR A SURFACE USE AREA CONTAINING 22.957 ACRES WITHIN THE NORTHWEST QUARTER AND THE SOUTHWEST QUARTER OF SECTION 30, TOWNSHIP 26 SOUTH, RANGE 32 EAST, N.M.P.M., LEA COUNTY, STATE OF NEW MEXICO.

SAID PROPOSED SURFACE USE AREA BEING MORE PARTICULARLY DESCRIBED WITH REFERENCE TO THE NAD83(2011) NEW MEXICO STATE PLANE COORDINATE SYSTEM, EAST ZONE (3001) AS FOLLOWS:

THE POINT OF BEGINNING ("P.O.B.") BEING THE NORTHWEST CORNER OF THE SURFACE USE AREA IN SEC. 30, T. 26 S., R. 32 E., N.M.P.M., LEA COUNTY, NEW MEXICO, HAVING COORDINATES OF N(Y):369,999.43', E(X):731,808.26', FROM WHICH P.O.B. THE FOLLOWING MONUMENT IS LOCATED:

- A 2-INCH IRON PIPE WITH U.S. G.L.O. BRASS CAP STAMPED "1939" FOUND FOR THE NORTHWEST CORNER OF SECTION 30 AND HAVING COORDINATES OF N(Y):371,909.41', E(X):730,486.45', BEARS NORTH 34°41'07" WEST, 2,322.76 FEET;

THENCE, NORTH 89°59'34" EAST, 1,000 FEET TO A POINT FOR THE NORTHEAST CORNER OF THIS DESCRIPTION AND HAVING COORDINATES OF N(Y):369,999.55', E(X):732,808.26';

THENCE, SOUTH 00°00'26" EAST, 1,000 FEET TO A POINT FOR THE SOUTHEAST CORNER OF THIS DESCRIPTION AND HAVING COORDINATES OF N(Y):368,999.56', E(X):732,808.39';

THENCE, SOUTH 89°59'34" WEST, 1,000 FEET TO A POINT FOR THE SOUTHWEST CORNER OF THIS DESCRIPTION AND HAVING COORDINATES OF N(Y):368,999.43', E(X):731,808.39';

THENCE, NORTH 00°00'26" WEST, 1,000 FEET TO THE POINT OF BEGINNING, CONTAINING 22.957 ACRES (1,000,000 SQ. FT) MORE OR LESS.

POINT OF BEGINNING BEARS SOUTH 34°41'07" EAST, 2,322.76' FEET FROM THE NORTHWEST CORNER OF SEC. 30, T. 26 S., R. 32 E., N.M.P.M., LEA COUNTY, NEW MEXICO.

CERTIFICATE

I, CHRISTIAN A. CLAUSEN, NEW MEXICO PROFESSIONAL SURVEYOR NO. 16467, DO HEREBY CERTIFY THAT THIS EASEMENT 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.

7-18-2019

CHRISTIAN A. CLAUSEN
NEW MEXICO PROFESSIONAL LAND SURVEYOR #16467

DATE

CHRISTIAN A CLAUSEN
NEW MEXICO
16467
LICENSED PROFESSIONAL SURVEYOR

NOTES:
1. SEE PLAT PREVIOUS SHEET.

2. COORDINATES, BEARINGS AND DISTANCES ARE REFERENCED TO NAD83(2011) NEW MEXICO STATE PLANE COORDINATES, EAST ZONE 3001.

REV.	DATE	BY	DESCRIPTION	CHK.

PROJECT:2019.004–Superman Frac Pond Expansion

DRAWN BY: CR	DATE: 2/19/19	SUPERMAN FRAC POND EXPANSION FRAC POND
FIELD CREW: AV	DATE: 2/18/19	
SCALE: 1"=1,000'	PAGE: 2 OF 2	

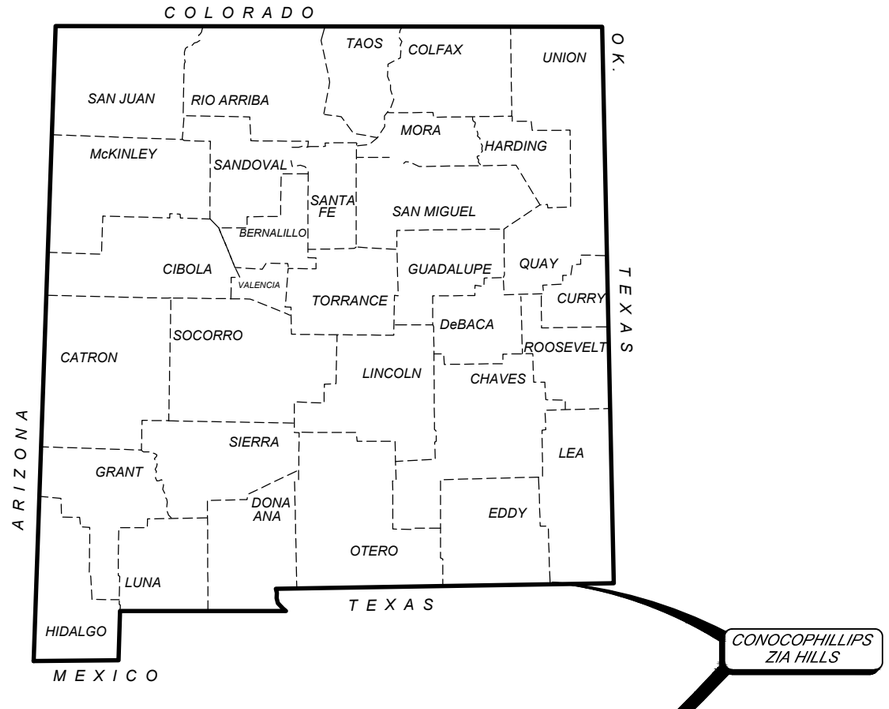
ConocoPhillips Company

PREPARED BY:
ROCKIN' CT SURVEYING
500 West Kilpatrick
Cleburne, TX 76033
817.565-6681

SUPERMAN FRAC POND EXPANSION
SEC. 30, T. 26 S., R. 32 E.
LEA COUNTY, NEW MEXICO

SURFACE USE AREA

RECYCLING CONTAINMENT DESIGN DRAWINGS
and
Avian Species Hazing Equipment



CONOCOPHILLIPS

ZIA HILLS WATER TREATMENT AND REUSE FACILITY
S30, T26S, R32E
LEA COUNTY, NM

CLAUDIUS SANCHEZ CZYZEWSKA
NEW MEXICO
22897
PROFESSIONAL ENGINEER
02/24/2020

GENERAL NOTES

1. *ALL BOUNDARY, TOPOGRAPHIC AND UTILITY INFORMATION SHOWN ARE BASED ON SURVEY INFORMATION FURNISHED BY CONOCOPHILLIPS.*
2. *THE CONTRACTOR SHALL IDENTIFY AND LOCATE UTILITY LINES, MONITORING WELLS, SURVEY MONUMENTS, AND OTHER NEARBY STRUCTURES PRIOR TO PERFORMING WORK.*
3. *COORDINATE INFORMATION IS BASED ON STATE PLANE COORDINATES, NEW MEXICO EAST, NAD 83. THE CONTRACTOR SHALL IDENTIFY ANY DISCREPANCIES PRIOR TO PROCEEDING WITH CONSTRUCTION.*
4. *ALL GEOMEMBRANES SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.*

INDEX OF SHEETS

MAGRYM
Magrym Consulting, Inc.
110 W. Louisiana Ave. Ste 314
Midland, TX 79701
(432) 999-2737
www.magrym.com
TBPE F-19848

R-X	DESCRIPTION	DATE	BY
	REVISIONS (OR CHANGE NOTICES)		

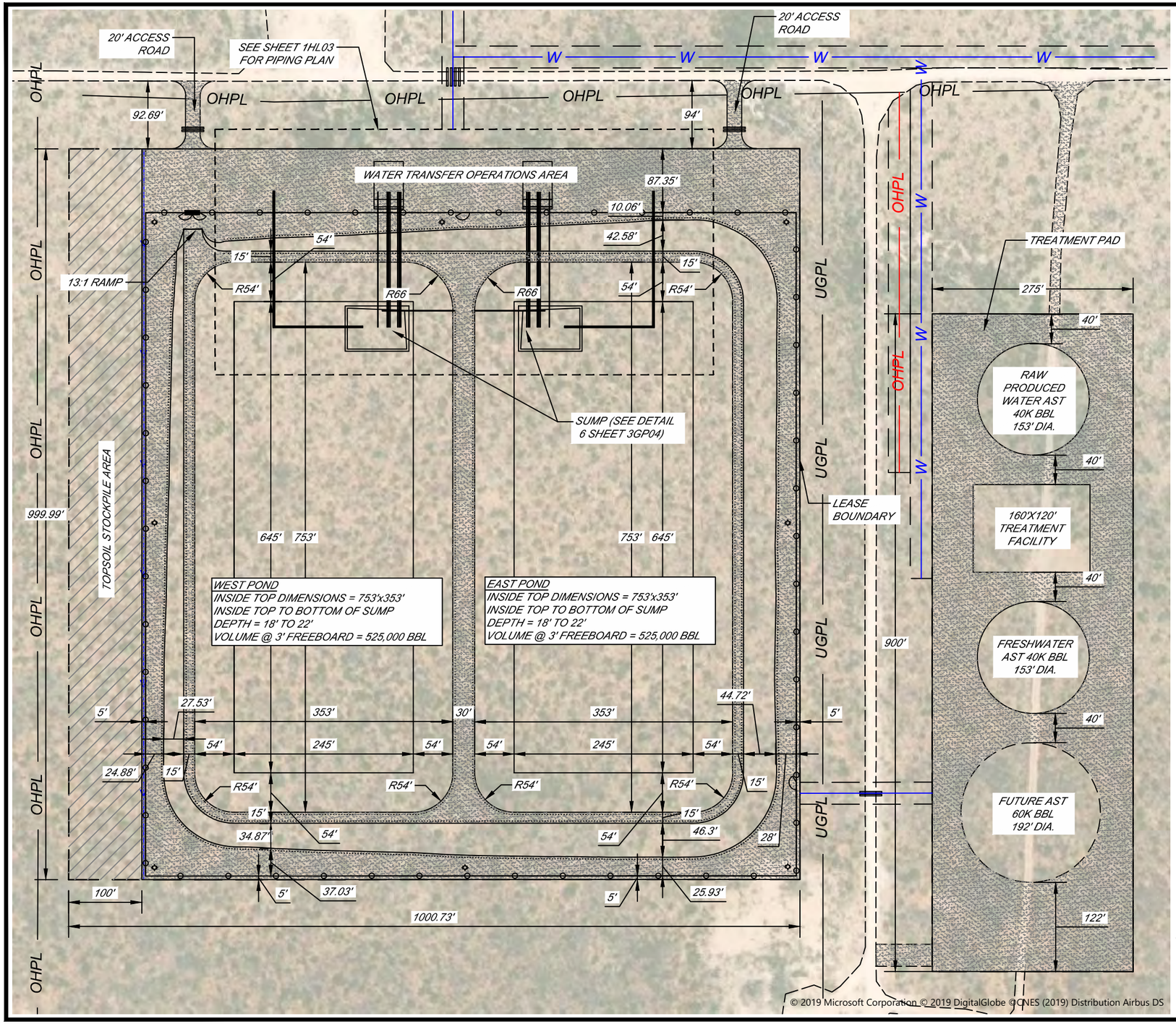
ConocoPhillips
15 W London Rd
PO Box 57
Loving, NM 88256
www.conocophillips.com

ZIA HILLS WATER TREATMENT AND REUSE FACILITY
S30, T26S, R32E
LEA COUNTY, NM
CONOCOPHILLIPS

COVER SHEET

HORIZONTAL SCALE: NTS	VERTICAL SCALE: NTS
PRINT DATE: 12/12/2019	DESIGNED BY: RW
PROJECT NO. 19-141	CHECKED BY: CSC/EMH
SUBSET: COVER	SHEET: 1COVER

Drawing File: Z:\Shared\Documents\Projects\19-141 Conoco Superman Pit\04_CIVIL\CADD\Design\Drawings\19-141 Cover.dwg



SUMMARY OF QUANTITIES

ITEM	UNIT	QTY
CLEARING AND GRUBBING	ACRE	20
ESTIMATED TOPSOIL (6" AVERAGE)	CUBIC YARD	17,000
ESTIMATED CUT (INCLUDING TOPSOIL)	CUBIC YARD	118,460
ESTIMATED FILL (ABOVE EXISTING GRADE)	CUBIC YARD	92,604
6' CHAINLINK FENCE W 3 STRAND BARBED WIRE (INC. GUILLOTINE GATES AND PIPE PENETRATION SECTIONS)	LINEAR FEET	3,632
20' DOUBLE GATE	EACH	1
3' WALK GATE	EACH	2
60 MIL RUB SHEET (INC 2X GAGE AND LADDER)	SQUARE FEET	30,402
30 MIL EROSION BLANKET	SQUARE FEET	125,609
60 MIL HDPE GEOMEMBRANE (TEXTURED)	SQUARE FEET	557,106
60 MIL HDPE GEOMEMBRANE (SMOOTH)	SQUARE FEET	557,106
200 MIL GEONET	SQUARE FEET	557,106
10 OZ. GEOTEXTILE	SQUARE FEET	557,106
PEA GRAVEL FOR LEAK DETECTION SYSTEM	CUBIC YARD	2
4" HDPE DR11 PIPE FOR LOAD LINES (INC. FITTINGS AND PIPE SUPPORTS)	LINEAR FEET	1,500
6" HDPE DR11 PIPE FOR LEAK DETEC (INC. PERFORATED SECTION AND END CAP)	LINEAR FEET	220
8" HDPE DR11 PIPE FOR DISCHARGE (INC. FITTINGS AND PIPE SUPPORTS,CAMLOCK)	LINEAR FEET	380
10" HDPE DR11 PIPE FOR SUCTION (INC. CONC BARREL AND T FITTINGS, PIPE SUPPORTS, REDUCERS AND CAMLOCK)	LINEAR FEET	2,300
24" CMP CULVERT 2-2/3" X 1/2" CORRUGATIONS 14 GAGE. 1 FT MIN. COVER	LINEAR FEET	240
18" CMP CULVERT 2-2/3" X 1/2" CORRUGATIONS 14 GAGE. 1 FT MIN. COVER	LINEAR FEET	50
24" CMP END SECTION	EACH	16
18" CMP END SECTION	EACH	4
STRUCTURAL CONCRETE W COMPRESSIVE STRENGTH 3000 PSI @ 28 DAYS (INC. REBAR AND WATERSTOPS)	CUBIC YARD	200
BASE COURSE TYPE 2	CUBIC YARD	120
2" BALL VALVE AND 2" X 10" TAPPING SADDLE	EACH	12
10" GATE VALVE	EACH	12
8" GATE VALVE	EACH	2
4" GATE VALVE	EACH	4
STRAINER BASKET	EACH	12
20' X 6' PIPE CATTLE GUARD	EACH	1

LEGEND

- 6' CHAINLINK FENCE
- EXISTING OVERHEAD POWERLINE — OHPL
- EXISTING PIPELINE — UGPL
- PROPOSED OVERHEAD POWERLINE — OHPL
- PROPOSED WATERLINE — W
- FLOW DIRECTION
- EASEMENT/LEASE BOUNDARY
- EDGE OF ROAD
- DRIVING SURFACE
- ANCHOR TRENCH

N

SCALE 1"=150'

0 75' 150' 300'

CLAUDIUS SANCHEZ CZYZEWSKA NEW MEXICO 22897 PROFESSIONAL ENGINEER

02/24/2020

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	REVISIONS (OR CHANGE NOTICES)		

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LEA COUNTY, NM
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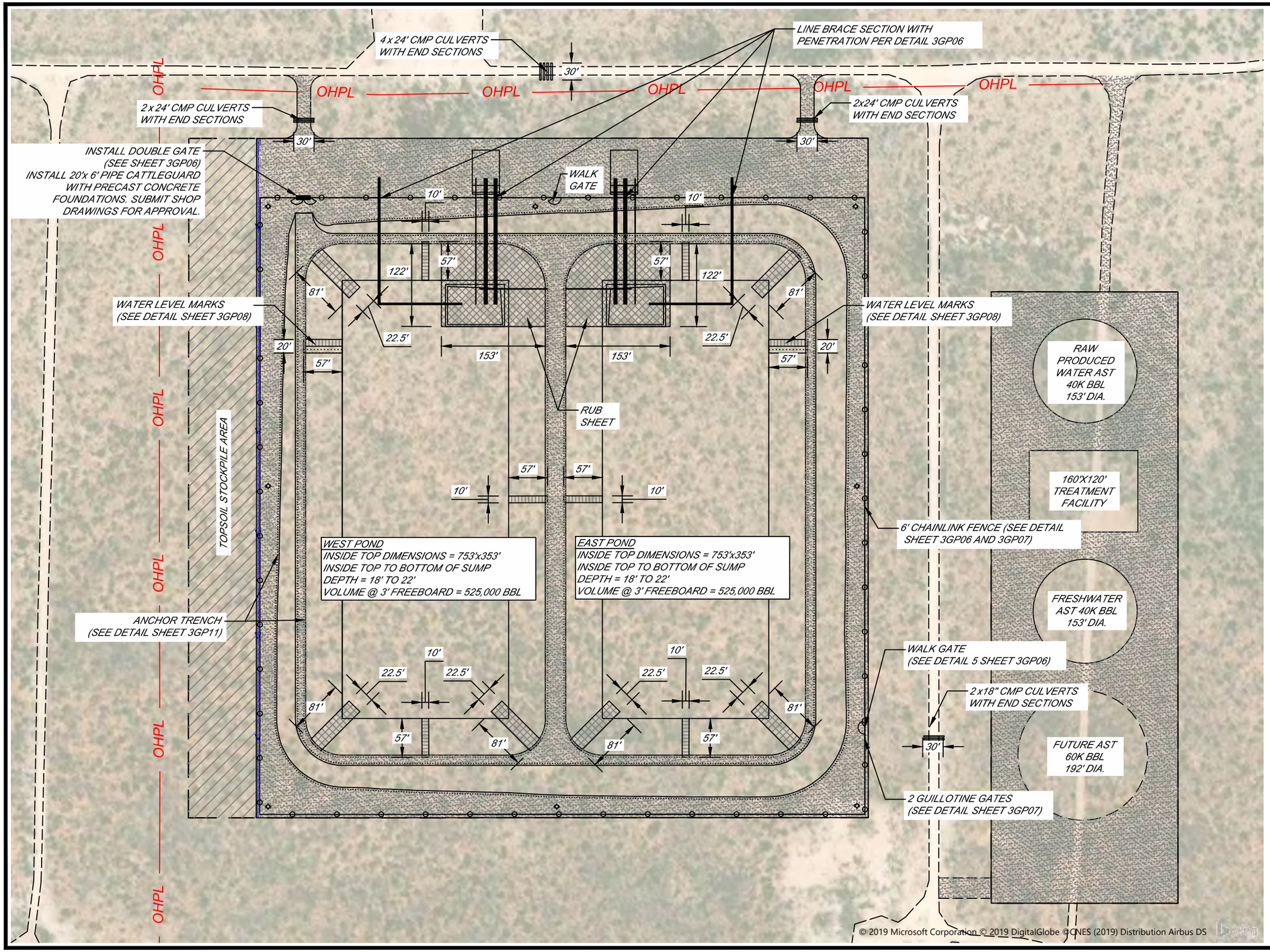
EXHIBIT 1

HORIZONTAL SCALE: 1"=150'	VERTICAL SCALE: NTS
PRINT DATE: 2/24/2020	DESIGNED BY: RW
PROJECT NO. 19-141	CHECKED BY: CSC/EMH
SUBSET: HORIZONTAL LAYOUT	SHEET: 1HL01

Drawing File: Z:\Shared\Documents\Projects\19-141 Conoco Superman Pit\04_CIVIL\CADD\Design\Drawings\19-141 1HLNN.dwg



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LEGEND

- 6' CHAINLINK FENCE
- OVERHEAD POWERLINE — OHPL
- DRAINAGE DIRECTION
- LEASE BOUNDARY
- EDGE OF ROAD
- ANCHOR TRENCH
- DRIVING SURFACE
- RUB SHEET
- ESCAPE LADDER PER DETAIL 3GP08
- LIGHT POLE (BY OTHERS)

N

SCALE 1"=150'

0 75' 150' 300'

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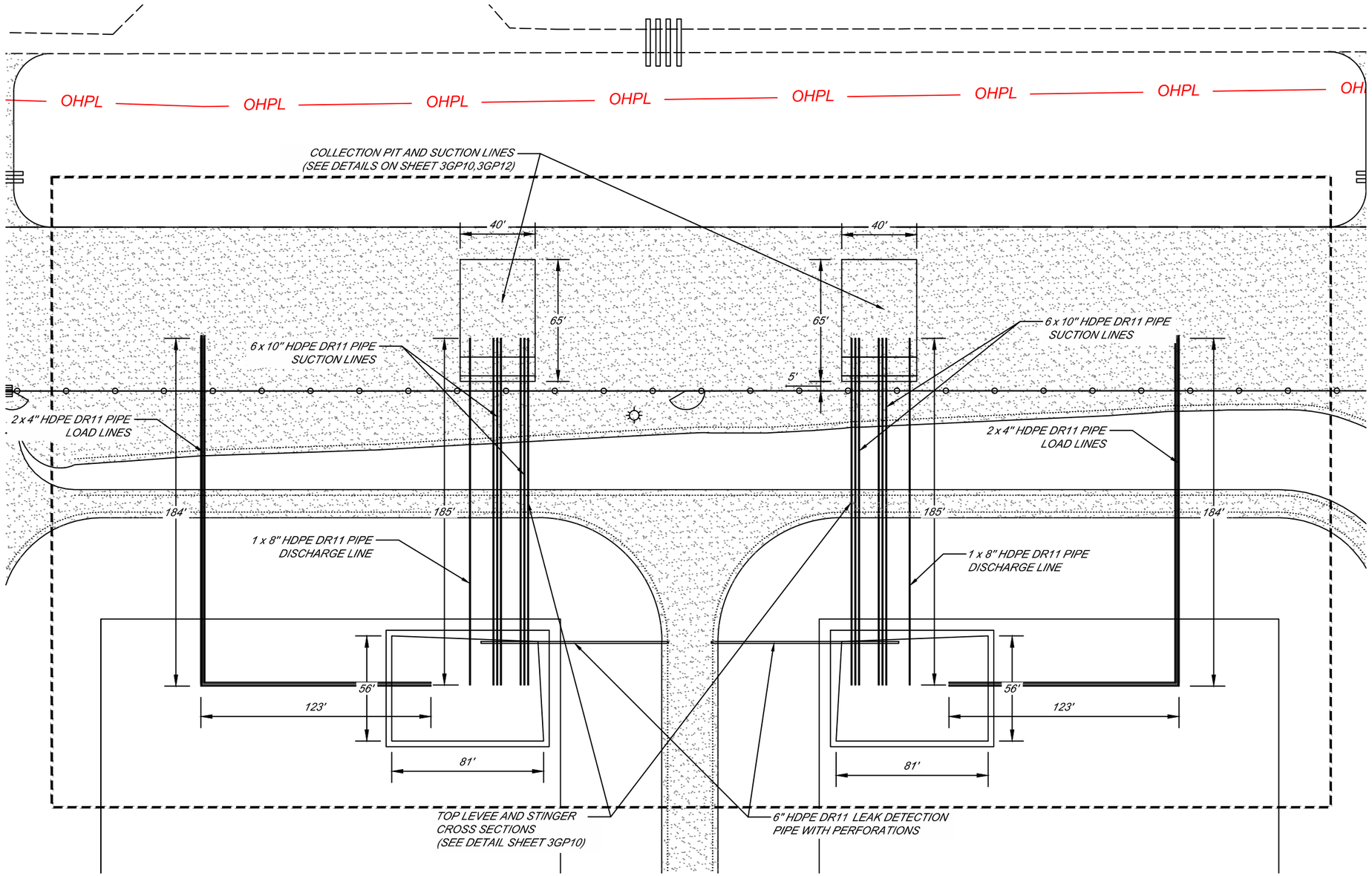
LINER AND FENCE PLAN

HORIZONTAL SCALE: 1"=150'	VERTICAL SCALE: NTS
PRINT DATE: 12/12/2019	DESIGNED BY: RW
PROJECT NO. 19-141	CHECKED BY: CSC/EMH
SUBSET: HORIZONTAL LAYOUT	SHEET: 1HL01

Drawing File: Z:\Shared\Documents\Projects\19-141 Conoco Superman Pit\04_CIVIL\CADD\Design\Drawings\19-141 1HLNN.dwg



LEGEND

- EXISTING GRADE CONTOURS
- FINISHED GRADE CONTOURS
- 6' CHAINLINK FENCE
- OVERHEAD POWERLINE — OHPL
- DRIVING SURFACE
- LIGHTPOLE (APORIXAMATION LOCATION BY OTHERS)

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N

SCALE 1"=60'

0 30' 60' 120'

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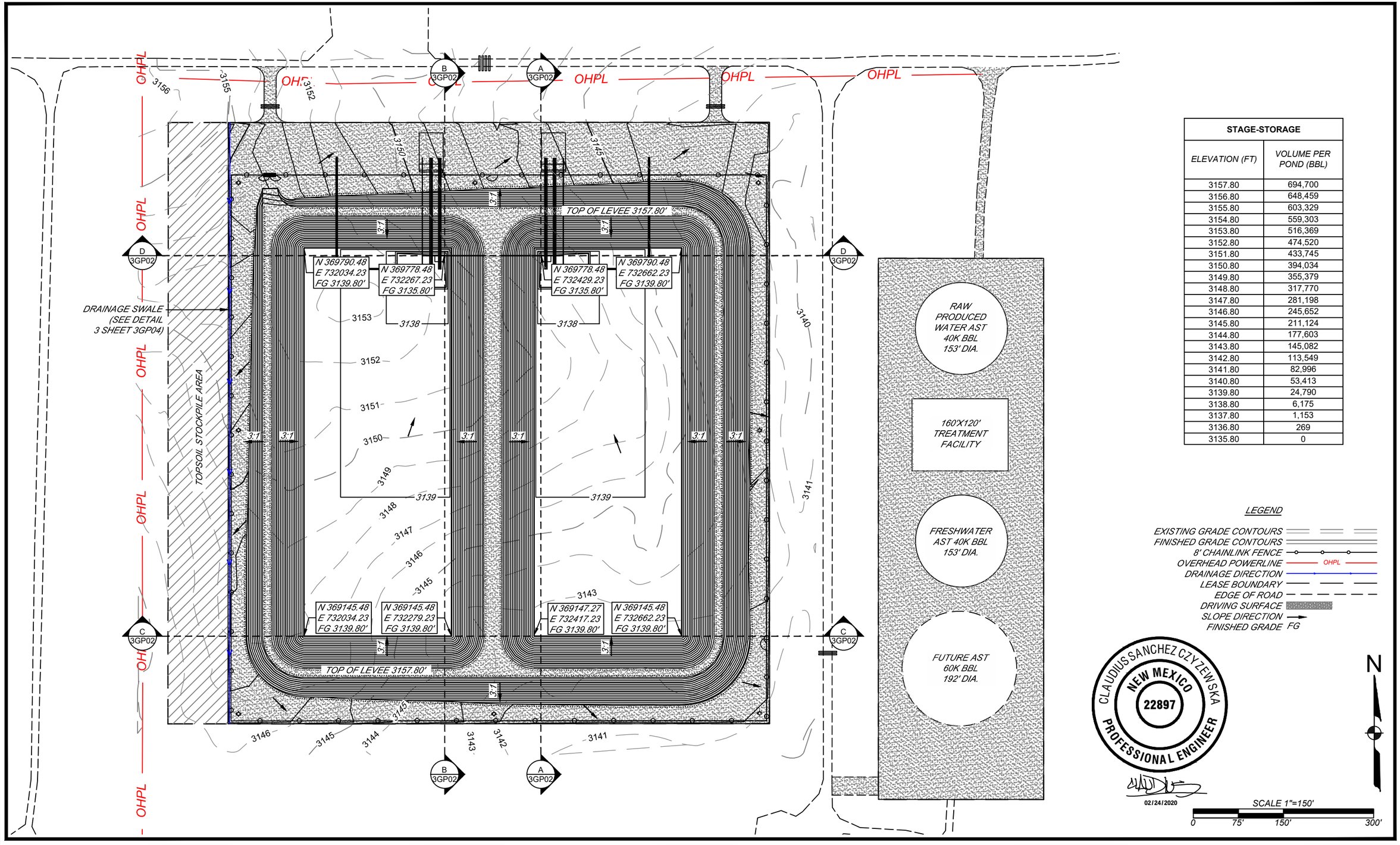
PIPING PLAN

HORIZONTAL SCALE: 1"=150'	VERTICAL SCALE: NTS
PRINT DATE: 12/12/2019	DESIGNED BY: RW
PROJECT NO. 19-141	CHECKED BY: CSC/EMH
SUBSET: HORIZONTAL LAYOUT	SHEET: 1HL03

Drawing File: Z:\Shared\Documents\Projects\19-141 Conoco Superman Pit\04_CIVIL\CADD\Design\Drawings\19-141 1HLNN.dwg



STAGE-STORAGE	
ELEVATION (FT)	*VOLUME PER POND (BBL)*
3157.80	694,700
3156.80	648,459
3155.80	603,329
3154.80	559,303
3153.80	516,369
3152.80	474,520
3151.80	433,745
3150.80	394,034
3149.80	355,379
3148.80	317,770
3147.80	281,198
3146.80	245,652
3145.80	211,124
3144.80	177,603
3143.80	145,082
3142.80	113,549
3141.80	82,996
3140.80	53,413
3139.80	24,790
3138.80	6,175
3137.80	1,153
3136.80	269
3135.80	0

LEGEND

- *EXISTING GRADE CONTOURS*
- *FINISHED GRADE CONTOURS*
- *8' CHAINLINK FENCE*
- *OVERHEAD POWERLINE* — OHPL
- *DRAINAGE DIRECTION*
- *LEASE BOUNDARY*
- *EDGE OF ROAD*
- *DRIVING SURFACE*
- *SLOPE DIRECTION*
- *FINISHED GRADE* FG

CLAUDIUS SANCHEZ CZYZEWSKA
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PROFESSIONAL ENGINEER

02/24/2020

N

SCALE 1"=150'

0 75' 150' 300'

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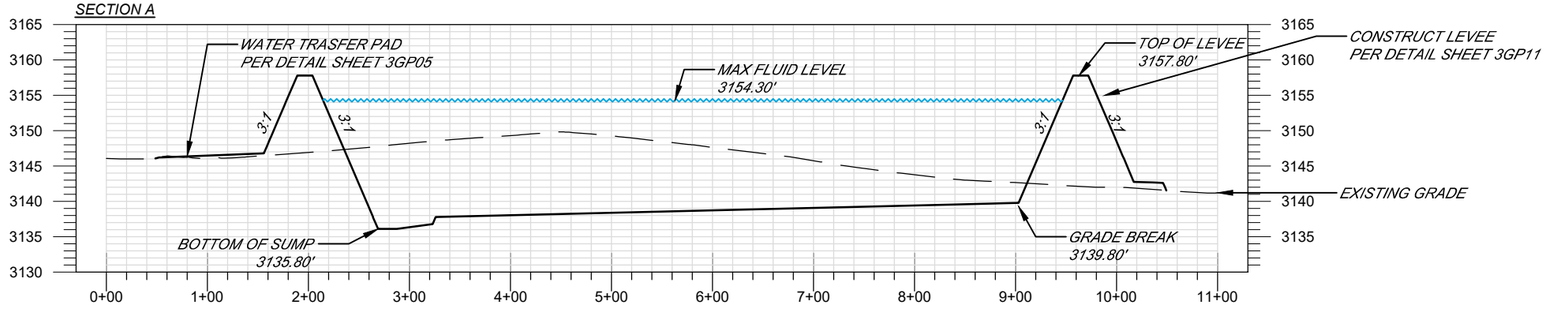
GRADING PLAN

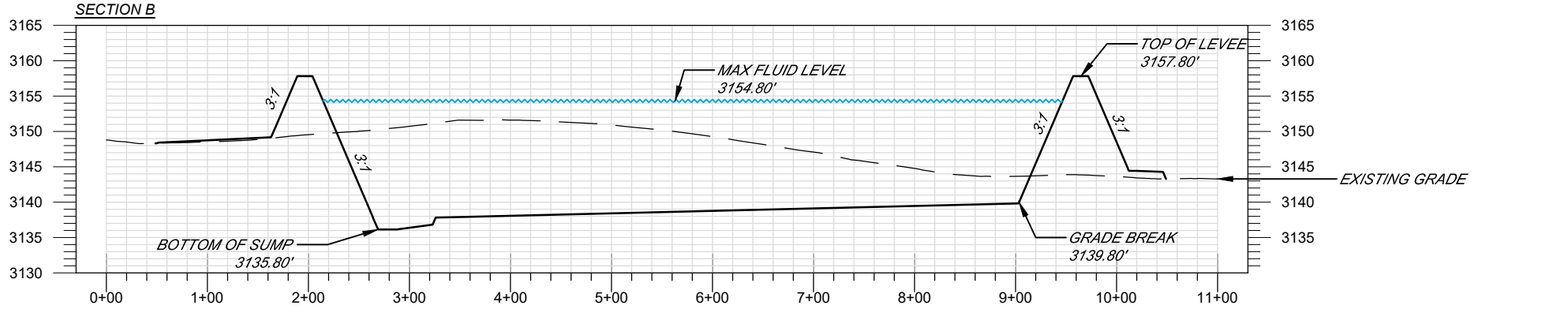
HORIZONTAL SCALE: 1"=150'	VERTICAL SCALE: NTS
PRINT DATE: 12/12/2019	DESIGNED BY: RW
PROJECT NO. 19-141	CHECKED BY: CSC/EMH
SUBSET: GRADING PLAN	SHEET: 3GP01

Drawing File: Z:\Shared\Documents\Projects\19-141 Conoco Superman Pit\04_CIVIL\CADD\Design\Drawings\19-141 3GPNN.dwg

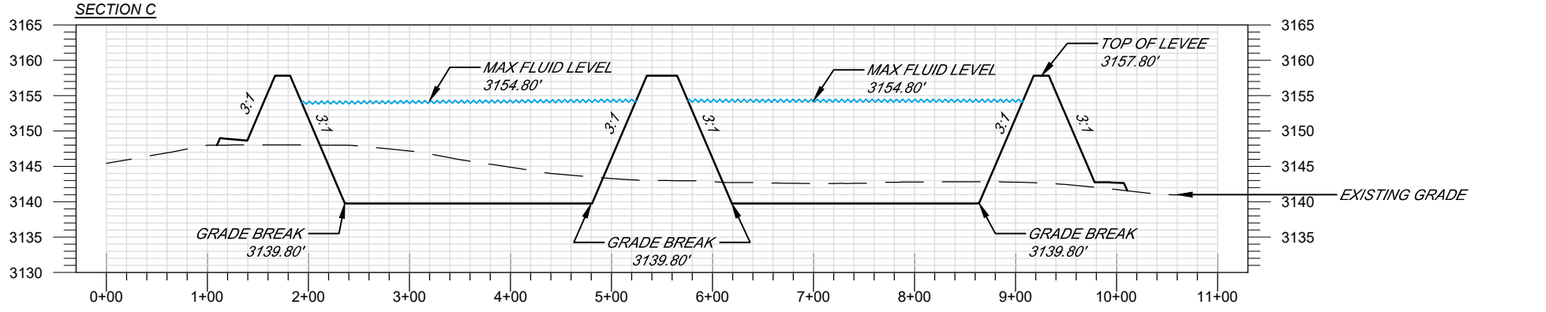
SECTION A



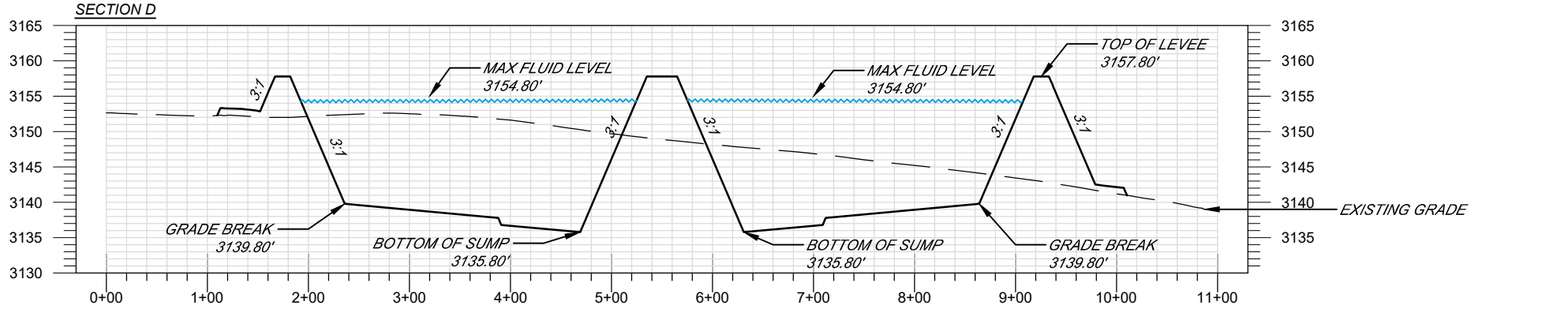
SECTION B



SECTION C



SECTION D



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CROSS SECTIONS

HORIZONTAL SCALE: 1"=150'	VERTICAL SCALE: 1"=25.5'
PRINT DATE: 12/12/2019	DESIGNED BY: RW
PROJECT NO. 19-141	CHECKED BY: CSC/EMH
SUBSET: GRADING PLAN	SHEET: 3GP02

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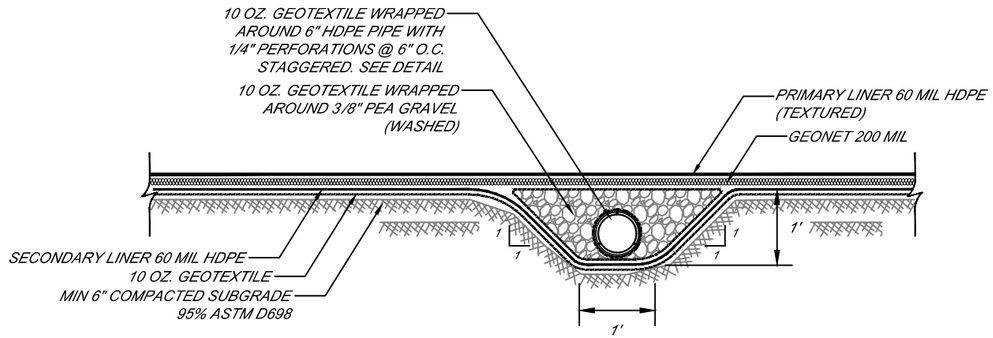
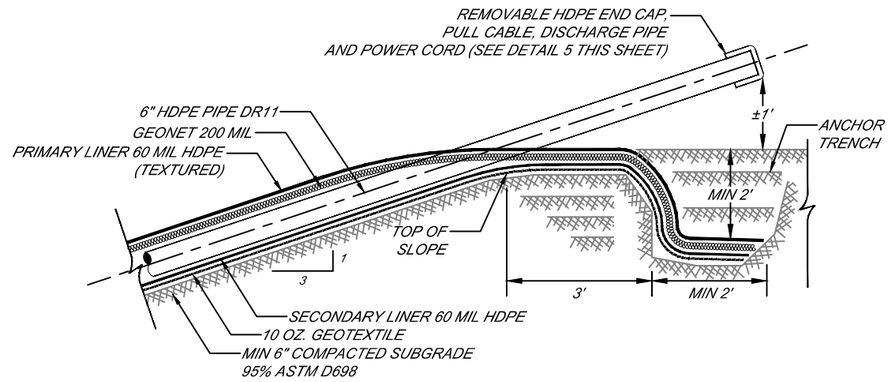
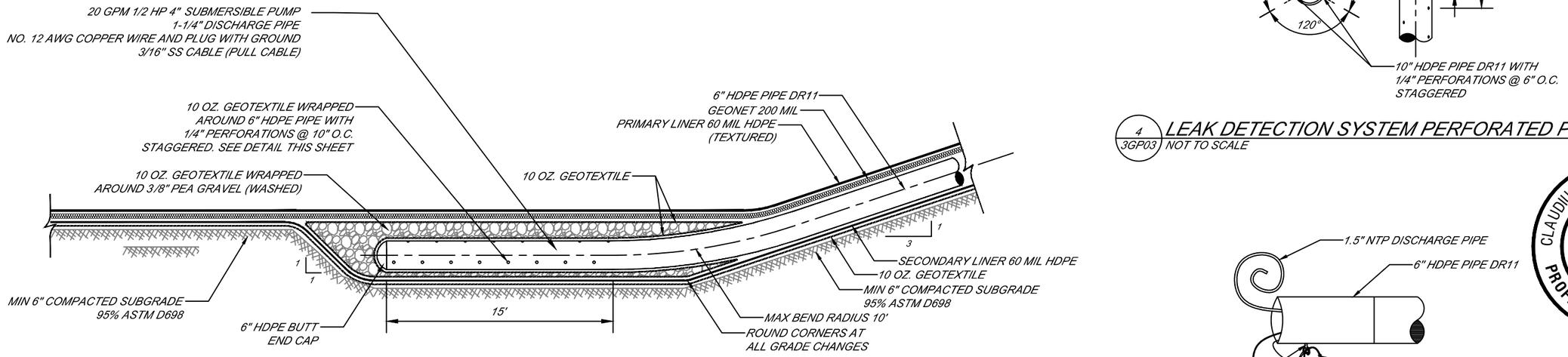


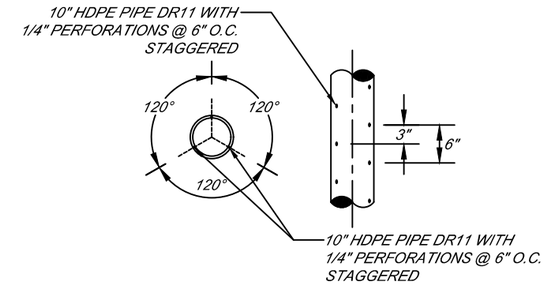
1 / 3GP03 **LEAK DETECTION SYSTEM SECTION A**
NOT TO SCALE



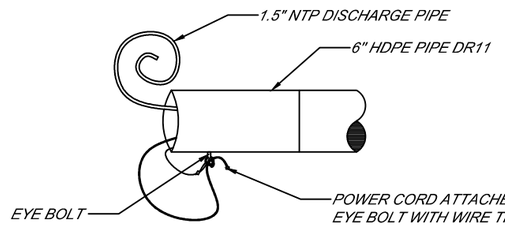
2 / 3GP03 **LEAK DETECTION SYSTEM PIPE RISER**
NOT TO SCALE



3 / 3GP03 **LEAK DETECTION SYSTEM SECTION B**
NOT TO SCALE



4 / 3GP03 **LEAK DETECTION SYSTEM PERFORATED PIPE**
NOT TO SCALE



5 / 3GP03 **DISCHARGE PIPE, PULL CABLE AND POWER CORD**
NOT TO SCALE

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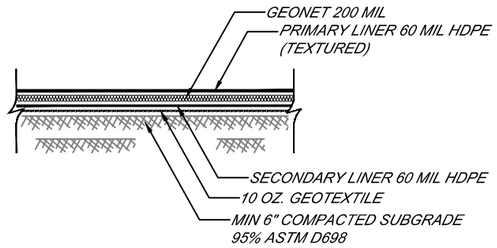
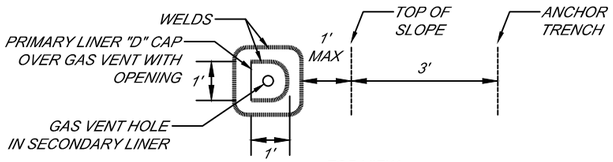
LEAK DETECTION SYSTEM DETAILS

HORIZONTAL SCALE: NTS	VERTICAL SCALE: NTS
PRINT DATE: 2/24/2020	DESIGNED BY: RW
PROJECT NO. 19-141	CHECKED BY: CSC/EMH
SUBSET: GRADING PLANS	SHEET: 3GP03

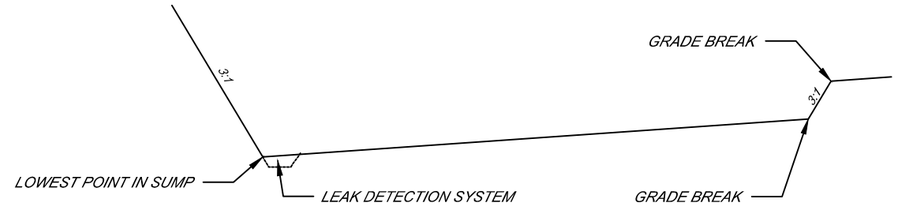
Drawing File: Z:\Shared\Documents\Projects\19-141 Conoco Superman Pit\04_CIVIL\CADD\Design\Drawings\19-141 Details.dwg



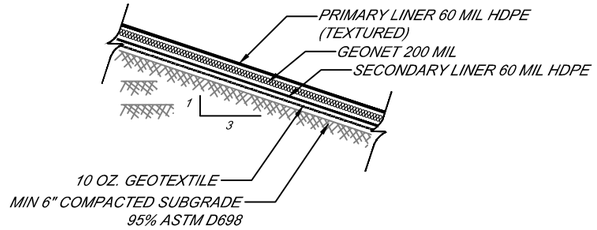
1 / 3GP04 **TYPICAL POND BOTTOM LINER**
NOT TO SCALE



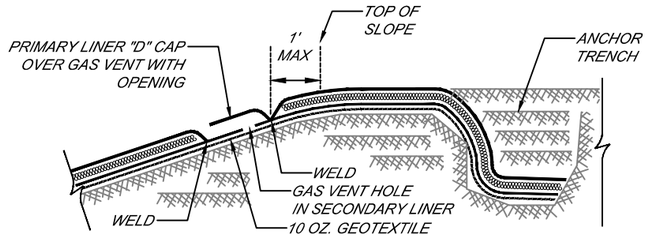
TOP VIEW



SIDE VIEW



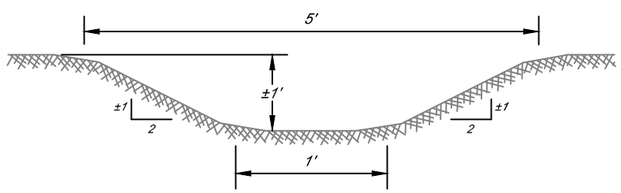
2 / 3GP04 **TYPICAL POND SLOPE LINER**
NOT TO SCALE



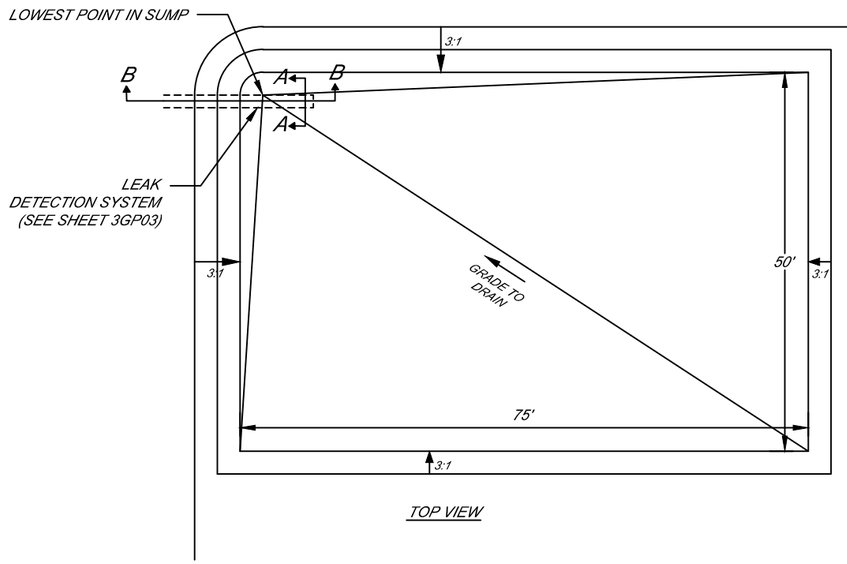
SIDE VIEW

NOTE:
GAS VENT SPACING SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS

4 / 3GP04 **TYPICAL GAS VENT**
NOT TO SCALE



3 / 3GP04 **TYPICAL DRAINAGE SWALE**
NOT TO SCALE



TOP VIEW

5 / 3GP04 **SUMP DETAIL**
NOT TO SCALE

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02/24/2020

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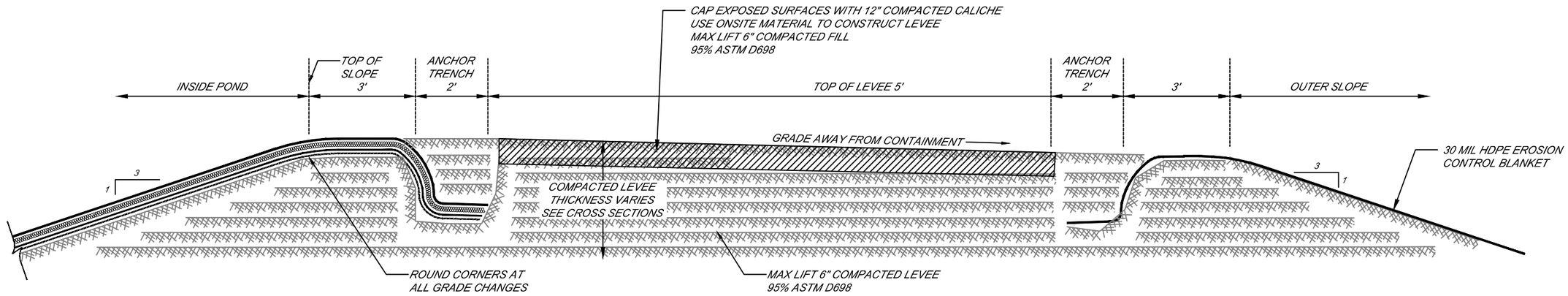
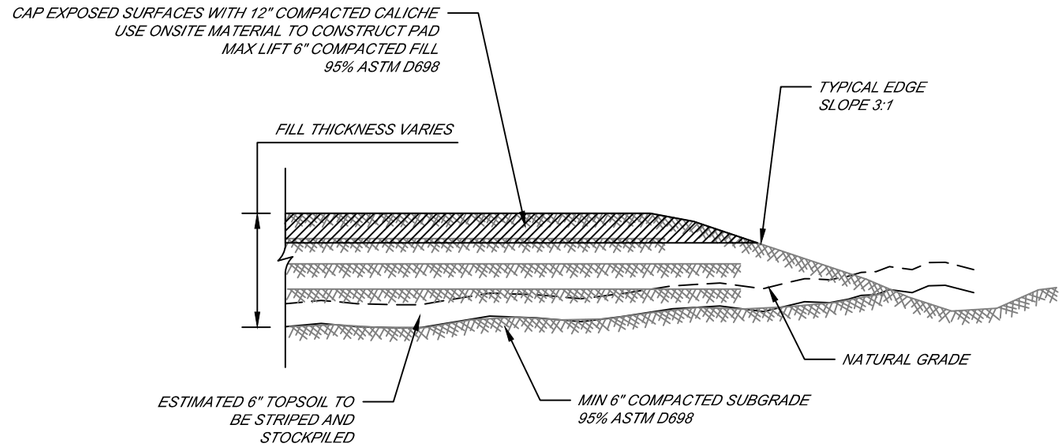
MISCELLANEOUS DETAILS

HORIZONTAL SCALE: NTS	VERTICAL SCALE: NTS
PRINT DATE: 2/24/2020	DESIGNED BY: RW
PROJECT NO. 19-141	CHECKED BY: CSC/EMH
SUBSET: GRADING PLANS	SHEET: 3GP04

Drawing File: Z:\Shared\Documents\Projects\19-141 Conoco Superman Pit\04_CIVIL\CADD\Design\Drawings\19-141 Details.dwg



1 / 3GP05 **TYPICAL LEVEE SECTION**
NOT TO SCALE



2 / 3GP05 **WATER TRANSFER OPERATIONS PAD**
NOT TO SCALE

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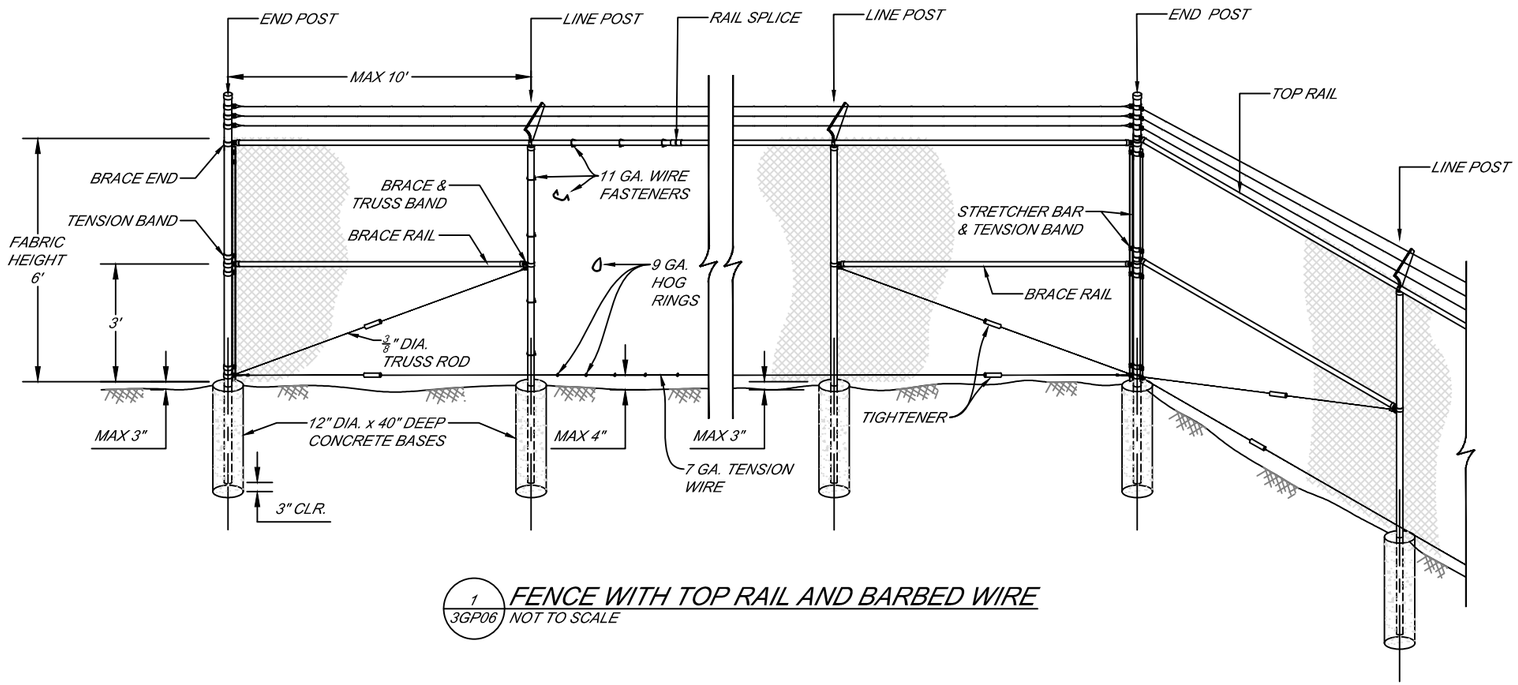
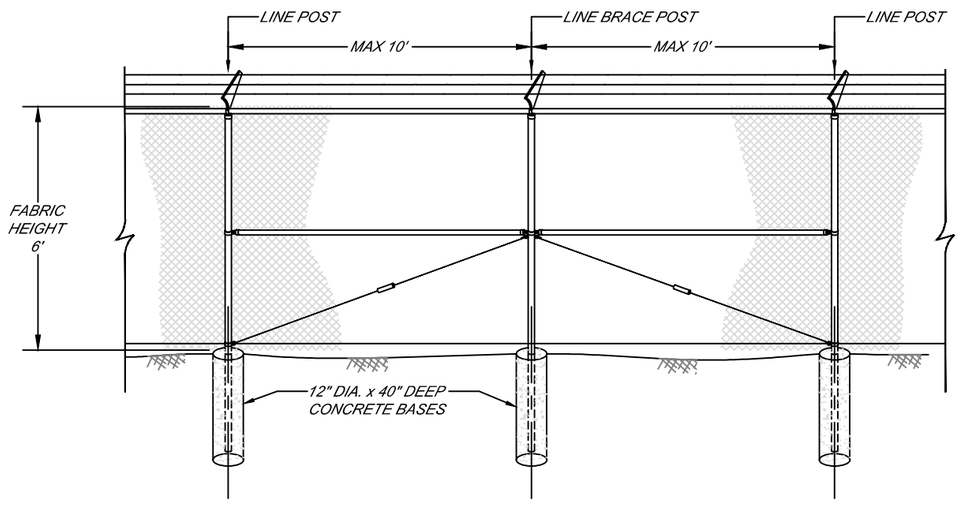
LEVEE AND PAD DETAILS

HORIZONTAL SCALE: NTS	VERTICAL SCALE: NTS
PRINT DATE: 2/24/2020	DESIGNED BY: RW
PROJECT NO. 19-141	CHECKED BY: CSC/EMH
SUBSET: GRADING PLANS	SHEET: 3GP05

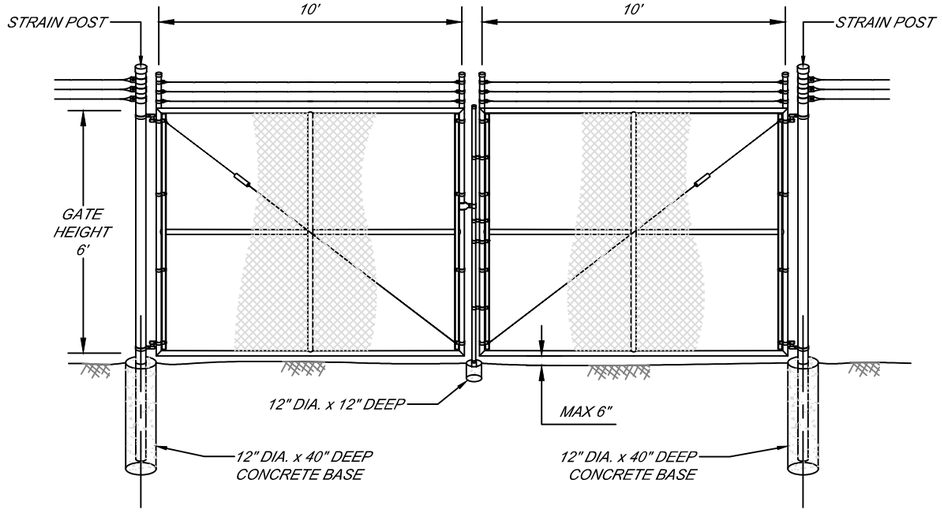
Drawing File: Z:\Shared\Documents\Projects\19-141 Conoco Superman Pit\04_CIVIL\CADD\Design\Drawings\19-141 Details.dwg



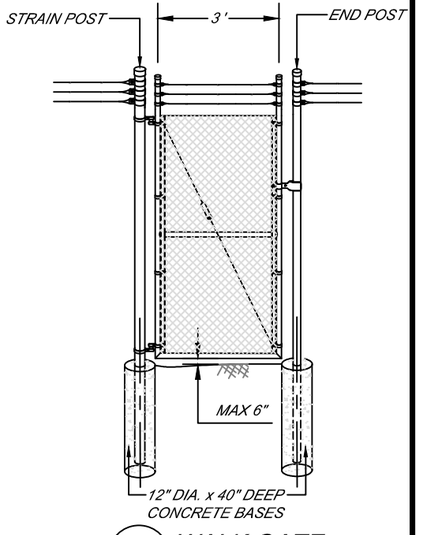
1 / 3GP06 **FENCE WITH TOP RAIL AND BARBED WIRE**
NOT TO SCALE



3 / 3GP06 **LINE BRACE SECTION**
NOT TO SCALE



4 / 3GP06 **DOUBLE GATE**
NOT TO SCALE



5 / 3GP06 **WALK GATE**
NOT TO SCALE

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02/24/2020

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Midland, TX 79701
(432) 999-2737
www.magrym.com
TBPE F-19848

R-X	DESCRIPTION	DATE	BY

REVISIONS (OR CHANGE NOTICES)

ConocoPhillips
15 W London Rd
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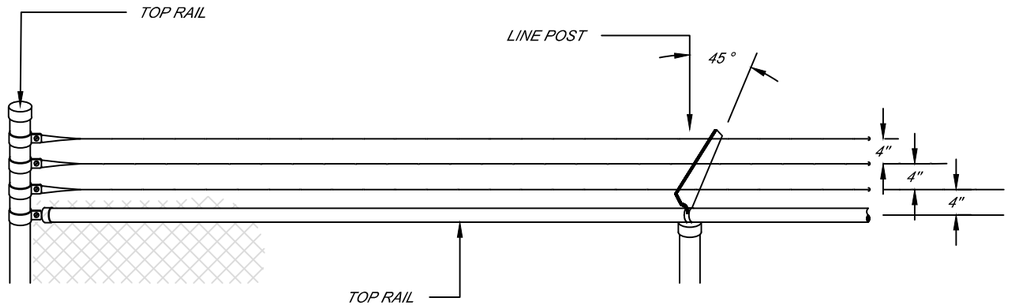
Loving, NM 88256
www.conocophillips.com

ZIA HILLS WATER TREATMENT AND REUSE FACILITY
S30, T26S, R32E
LEA COUNTY, NM
CONOCOPHILLIPS

FENCE DETAILS

HORIZONTAL SCALE: NTS	VERTICAL SCALE: NTS
PRINT DATE: 12/12/2019	DESIGNED BY: RW
PROJECT NO. 19-141	CHECKED BY: CSC/EMH
SUBSET: GRADING PLANS	SHEET: 3GP06

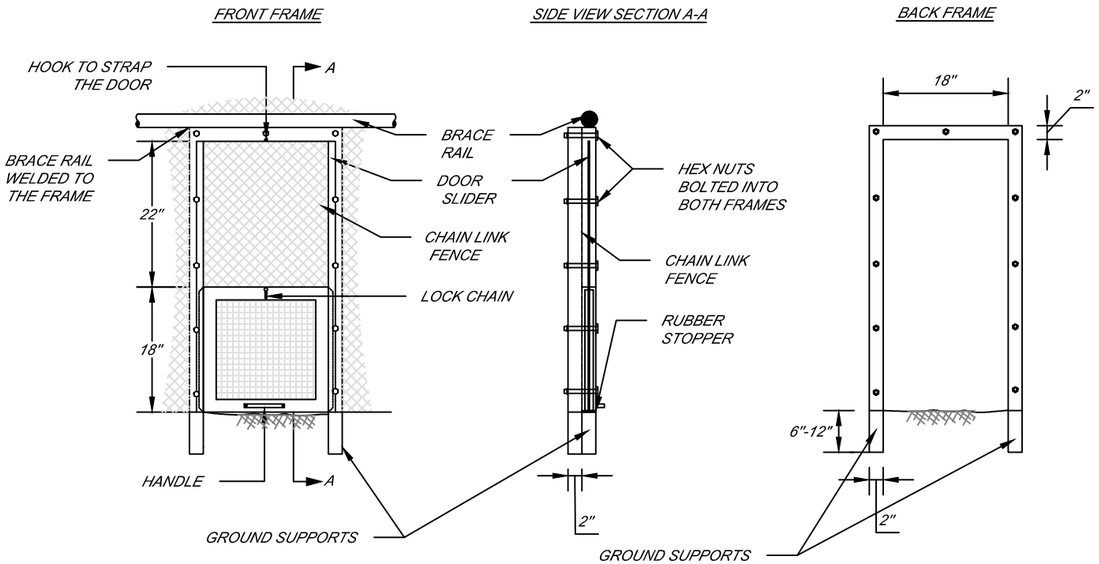
Drawing File: Z:\Shared\Documents\Projects\19-141 Conoco Superman Pit\04_CIVIL\CADD\Design\Drawings\19-141 Details.dwg



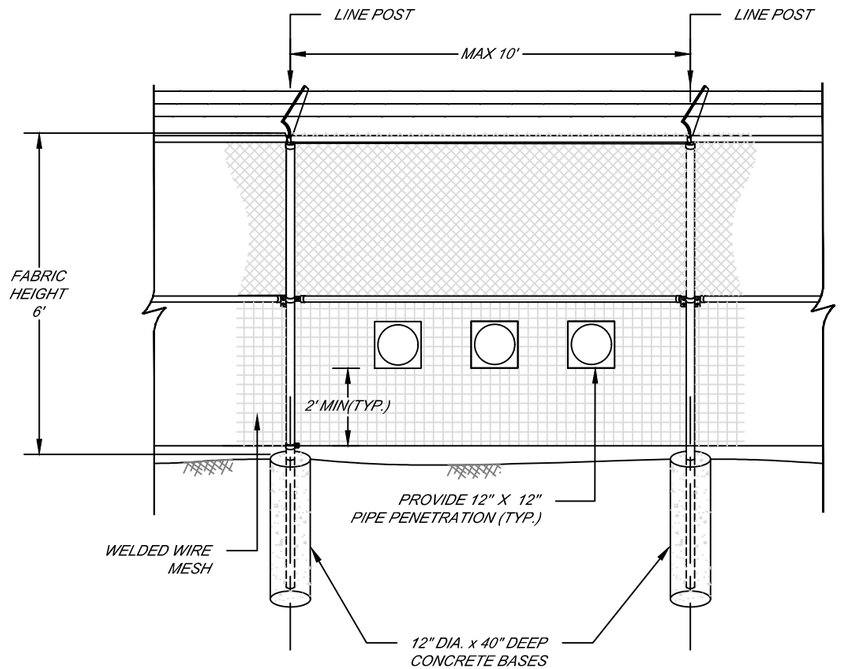
1 / 3GP07 **BARBED WIRE TOP**
NOT TO SCALE

FENCE MATERIAL	
FABRIC HEIGHT (FT)	8
COMPONENT	ROUND PIPE I.D. (IN)
END, CORNER AND LINE BRACE POSTS	3
LINE POSTS	2
TOP AND BRACE RAILS	1.5
STRAIN POSTS	4
GATE FRAME	2
BRACING PIPE	2

NOTES:
1. FOR WOVEN WIRE, TOP AND BOTTOM STRANDS SHALL BE 12½ GAUGE OR HEAVIER; INTERMEDIATE STRANDS SHALL BE 14½ GAUGE OR HEAVIER.
2. FOR BARBED WIRE, EACH LINE WIRE SHALL CONSIST OF 2 TWISTED STRANDS OF 12½ GAUGE WIRE OR HI-TENSILE STRENGTH WIRE OF 15½ GAUGE. THE BARBS SHALL BE EITHER 2-POINT BARBS ON APPROXIMATE 4 INCH CENTERS OR 4-POINT BARBS ON APPROXIMATE 5 INCH CENTERS.
3. ALL WIRE SHALL HAVE CLASS III GALVANIZATION.
4. STANDARD WOVEN WIRE FENCES MAY HAVE LINE POSTS SPACED UP TO 15 FEET APART. HI-TENSILE WOVEN WIRE FENCE MAY HAVE LINE POSTS SPACED UP TO 20 FEET APART. CLOSER SPACING IS REQUIRED WHERE NEEDED FOR INCLINES OR CHANGES IN TOPOGRAPHY.
5. CONCRETE FOOTINGS SHALL HAVE TOPS CROWNED.
6. TO PREVENT WIRE FROM SLIPPING ON STEEL POST, DOUBLE WRAP ALL WIRE AROUND STEEL POST OR WELD CHAIN LINK LOOPS.
7. MAXIMUM 3 PENETRATIONS VIA TEN FOOT FENCE SECTION



2 / 3GP07 **GUILLOTINE GATE**
NOT TO SCALE



3 / 3GP06 **LINE BRACE SECTION WITH PENETRATION**
NOT TO SCALE

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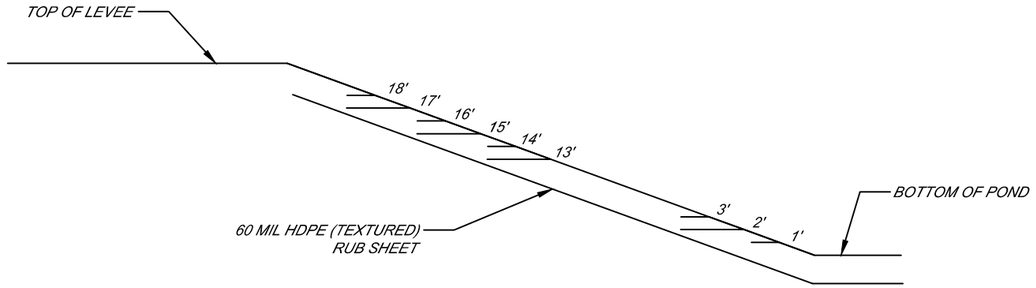
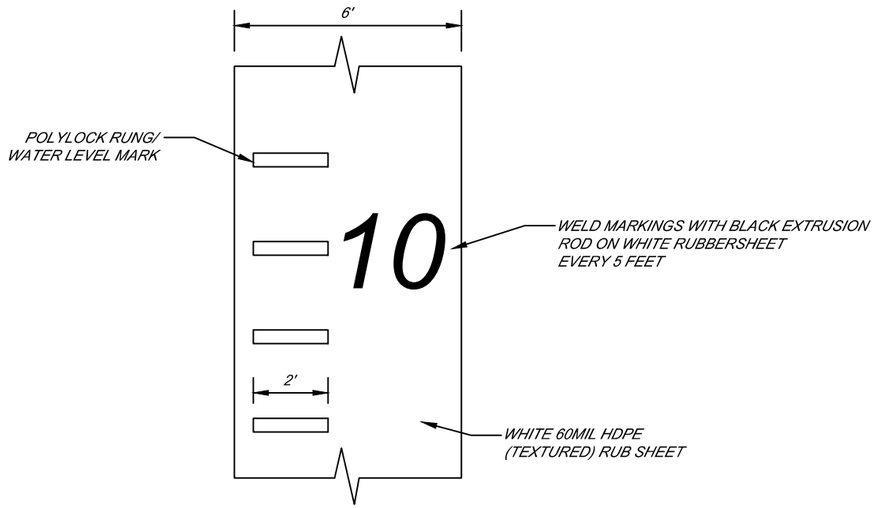
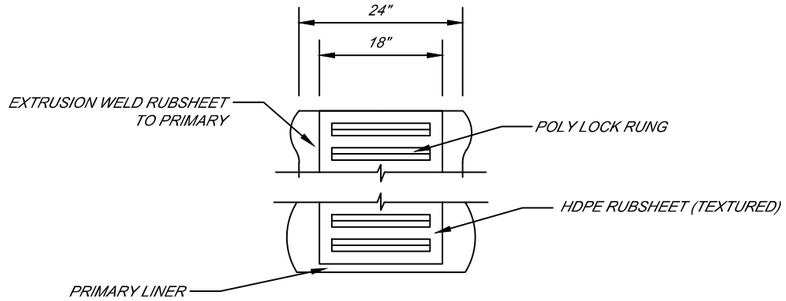
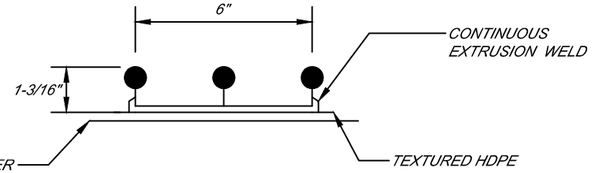




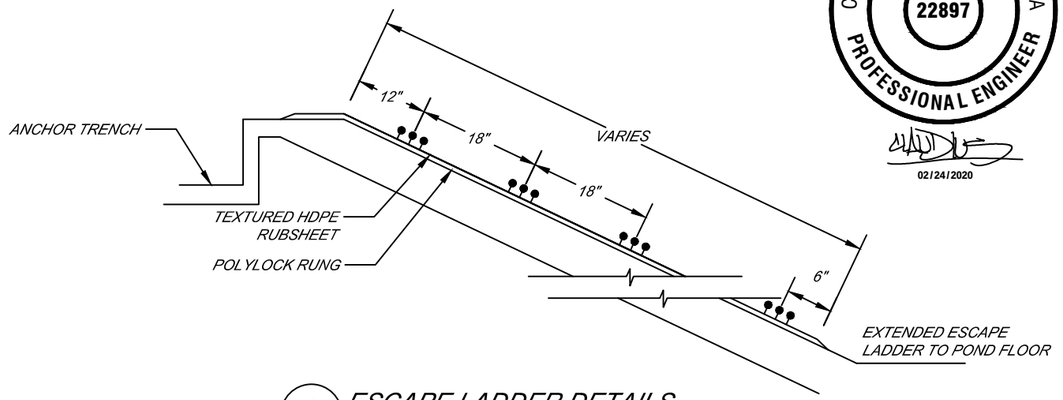
1 3GP08 **WATER LEVEL MARKS**
NOT TO SCALE



ESCAPE LADDER FRONT VIEW



POLY LOCK RUNG



2 3GP08 **ESCAPE LADDER DETAILS**
NOT TO SCALE

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ESCAPE LADDER AND GAGE DETAILS

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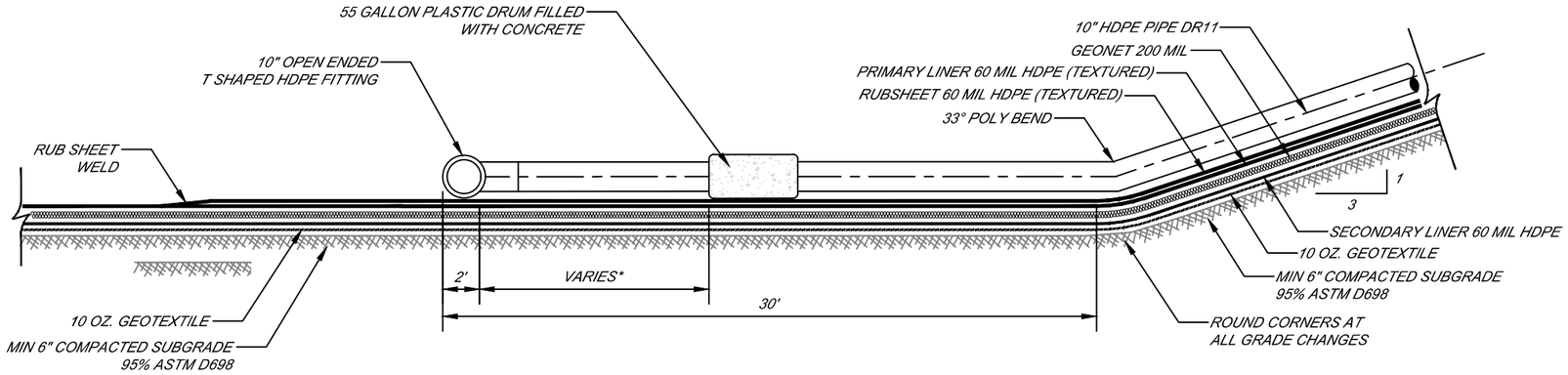
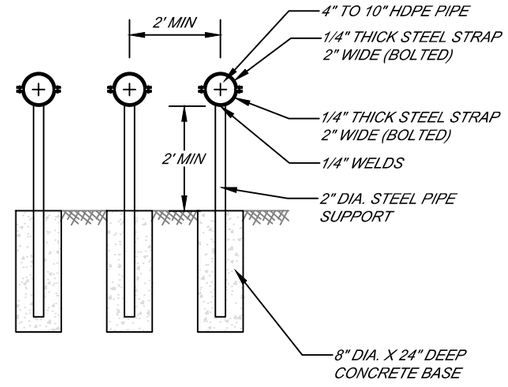


1 / 3GP09 **10" SUCTION LINE - SUMP**
NOT TO SCALE



2 / 3GP09 **PIPE SUPPORT DETAIL**
NOT TO SCALE

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SUCTION LINE DETAILS

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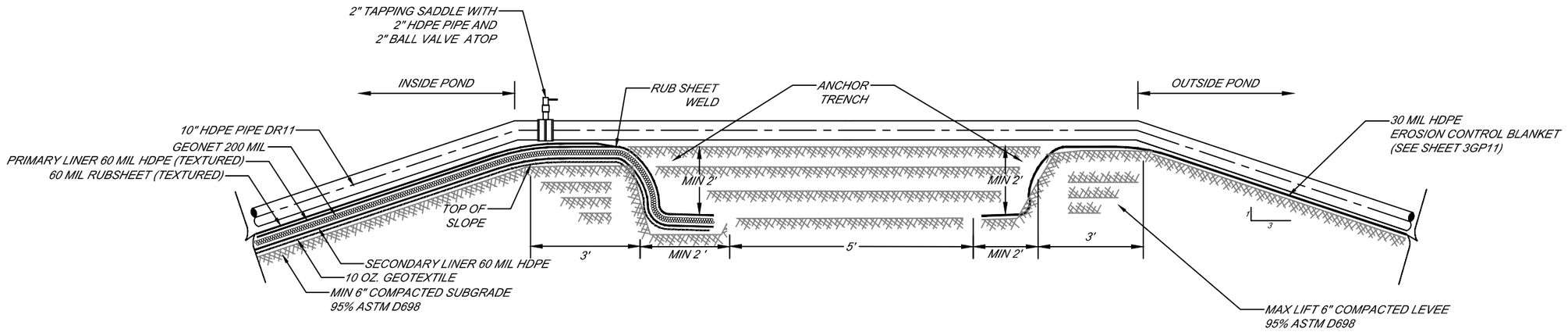
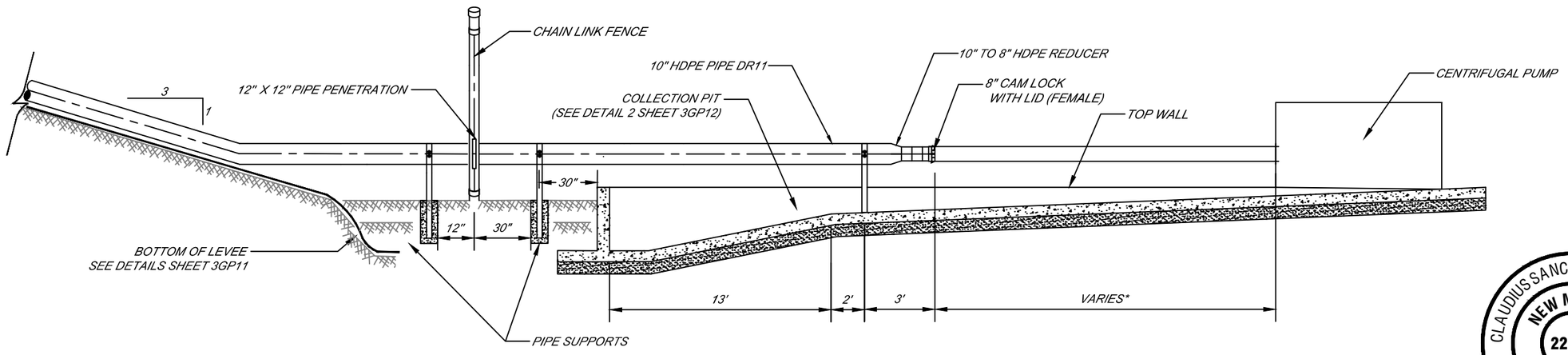


1 / 3GP10 **10" SUCTION LINE - TOP OF LEVEE**
NOT TO SCALE



2 / 3GP10 **10" SUCTION LINE - COLLECTION PIT**
NOT TO SCALE

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SUCTION LINE DETAILS

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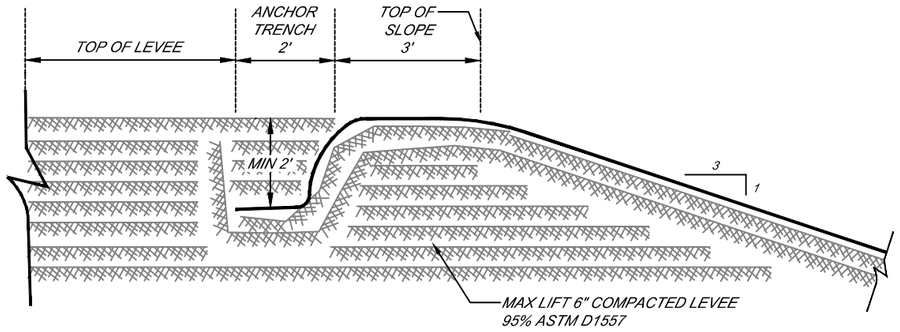
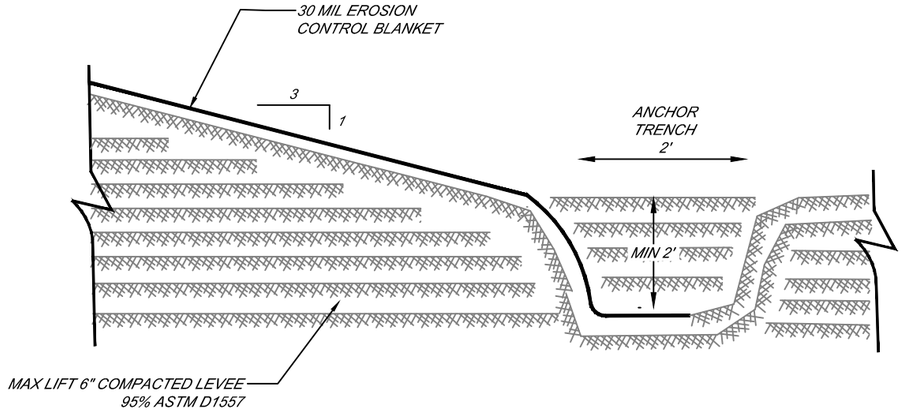


1 / 3GP11 **EROSION CONTROL BLANKET DETAIL - TOP OF LEVEE**
NOT TO SCALE



2 / 3GP11 **EROSION CONTROL BLANKET DETAIL - BOTTOM OF LEVEE**
NOT TO SCALE

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EROSION CONTROL BLANKET DETAILS

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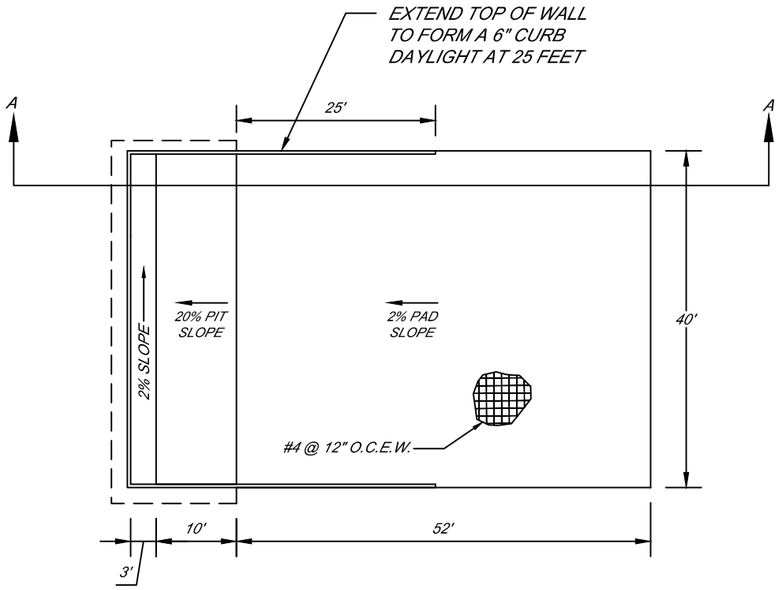
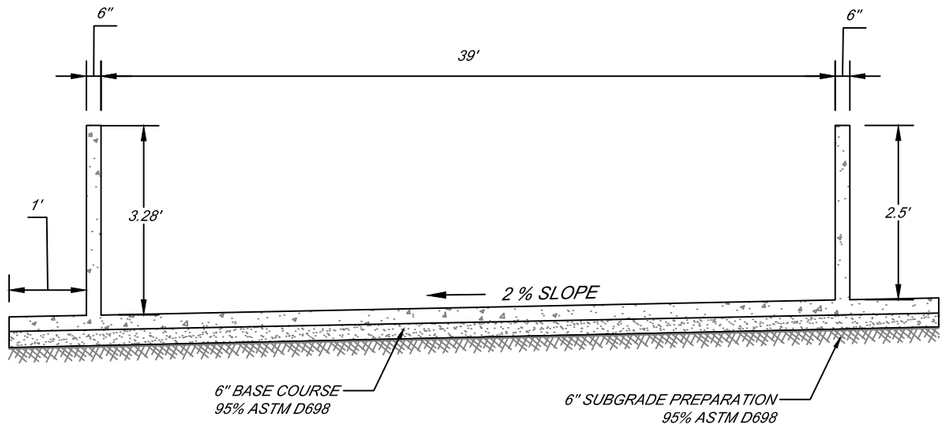
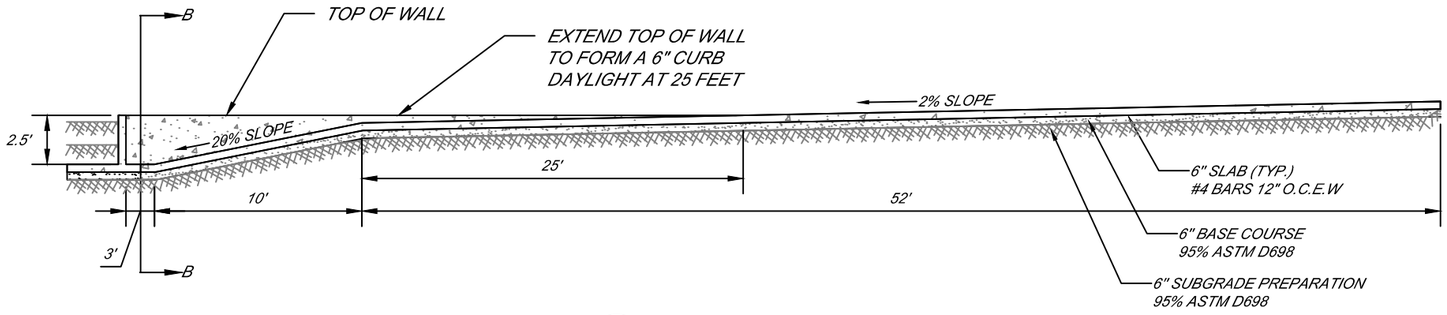


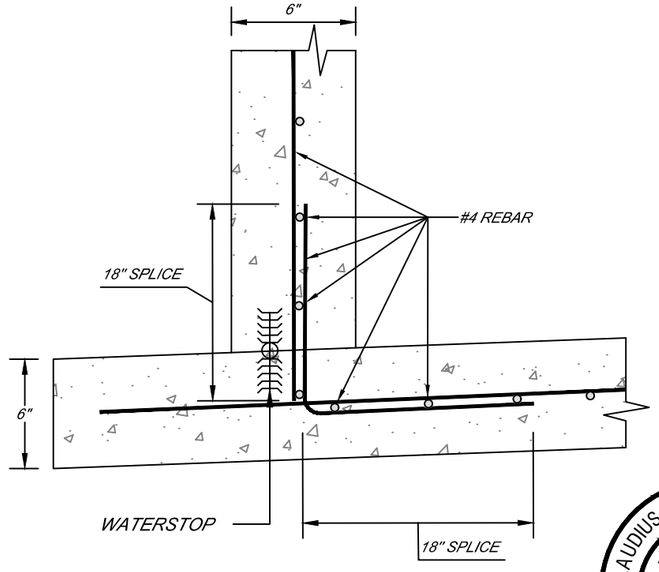
1 3GP12 **COLLECTION PIT- TOP VIEW**
NOT TO SCALE



3 3GP12 **CROSS SECTION B**
NOT TO SCALE



2 3GP12 **CROSS SECTION A**
NOT TO SCALE



4 3GP12 **REBAR DETAIL**
NOT TO SCALE

GENERAL NOTES

1. FOR ALL CONCRETE, THE DESIGN COMPRESSIVE STRENGTH AT 28 DAYS SHALL BE 3,000 PSI @ 28 DAYS, 6 SAC MIX AND MAXIMUM AGGREGATE SIZE OF 3/4 INCH.
2. ONE SET OF CONCRETE SAMPLING TO BE TAKEN FOR EACH 50 CUBIC YARDS PLACED OR A MINIMUM OF ONE SMAPLE PER DAY, WHICHEVER IS GREATEST.

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COLLECTION PIT DETAILS	
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EFFECTIVE WIDE-AREA BIRD CONTROL!

Mega Blaster PRO
sonic bird repeller
covers 30 acres!

- NEMA Rated Case
- Crystal-Clear Digital Sounds

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.

- *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.

CONFIGURATIONS AVAILABLE:

- Agricultural
  # MEGA-AG
- Crow / Raven
  # MEGA-CROW
- Woodpecker
  # MEGA-WP
- Marine / Gull
  # MEGA-MAR

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.

BIRD-X

The Bird Control 'X'-Perts

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

HEARING PROTECTION RECOMMENDED

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

Placement

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

Factors to consider when selecting the best location include:

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

DESIGN PLAN

OPERATION AND MAINTENANCE PLAN

CLOSURE 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)**

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.

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

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.

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

Signage

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

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

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

Fencing

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

As stated in the O&M plan, the operator will ensure that all gates associated with the fence are closed and locked when responsible personnel are not onsite.

Netting and Protection of Wildlife

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

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

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

The avian protection plan includes the use of a Bird-X Mega Blaster Pro 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.

The O&M plan calls for the operator to inspect (per BLM, at least once every two weeks) for and, within 30 days of discovery (24 hours for federally protected bird or wildlife), report the discovery of dead migratory birds or other wildlife to the appropriate wildlife agency and to the division district office in order to facilitate assessment and implementation of measures to prevent incidents from reoccurring.

Earthwork

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

19.15.34.12 A
(2) A recycling containment shall have a properly constructed foundation and interior slopes consisting of a firm, unyielding base, smooth and free of rocks, debris, sharp edges or irregularities to prevent the liner's rupture or tear. Geotextile is required under the liner when needed to reduce localized stress-strain or protuberances that otherwise may compromise the liner's integrity…

Appendix A provides the stamped drawings for the containment with the following design/construction specifications:

a) levee has inside grade no steeper than two horizontal feet to one vertical foot (2H: 1V).
b) levee outside grade is no steeper than three horizontal feet to one vertical foot (3H: 1V)
c) top of the levee is wide enough to install an anchor trench and provide adequate room for inspection and maintenance.

d) The containment floor design calls for a slope toward the sump in the corner(s).

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 operator plans to use 60 mil HDPE as both primary and secondary liner in Zia Hills Containment.

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 slope's toe.
vi. use qualified personnel to perform field welding and testing.

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…

vii. avoid excessive stress-strain on the liner
viii. The edges of all liners are anchored in the bottom of a compacted earth-filled trench that is at least 18 inches deep

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

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

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

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

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

Pumping from the containment to hydraulic fracturing operations is the responsibility of stimulation contractors. Typically, lines are permanently placed in the containment with floats attached to prevent damage to the liner system. The containment may be equipped with permanent HDPE stinger (supported by a sacrificial liner or geotextile) for withdrawal of fluid if the owner deems necessary during operations.

Leak Detection and Fluid Removal System Installation

The leak detection system, contains the following design elements

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

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. The containment will not be used for the disposal of produced water or other oilfield waste.

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

The operation of the containment is summarized below.

- Produced water generated from nearby oil and gas wells is delivered to a treatment system located as indicated in the C-147.
- Unless specified in the transmittal letter, after treatment, the produced water discharges into the containment.
- 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.
- Whenever the maximum fluid capacity of the containment is reached, treatment and discharge to the containment ceases (see Freeboard and Overtopping Plan, below).
- 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).
- 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.
- The containment shall be deemed to have ceased operations if less than 20% of the total fluid capacity is used every six months

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.

19.15.34.13 C
A recycling containment shall be deemed to have ceased operations if less than 20% of the total fluid

following the first withdrawal of produced water for use. If temporary production needs decline, and there is a delay in use of fluids, a variance will be requested. 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.

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. A variance request from this mandate during active hydraulic stimulation is presented in Volume 3.
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. The operator will 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, as well as immediate notification of BLM.
7. The containment will be operated to prevent the collection of surface water run-on.

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

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

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

8. The operator will maintain the containment free of miscellaneous solid waste or debris.
9. The operator will maintain at least three feet of freeboard for the containment and will use a free-standing staff gauge to allow easy determination of the required 3-foot of freeboard.
10. As described in the design/construction plan, the injection or withdrawal of fluids from the containment is accomplished through hardware that prevents damage to the liner by erosion, fluid jets or impact from installation and removal of hoses or pipes.
11. The operator shall ensure that all gates associated with the fence are closed and locked when responsible personnel are not onsite.
12. The operator will maintain the fences in good repair.

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

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

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

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

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.
- Inspect the containment for dead migratory birds and other wildlife. Within 30 days of discovery (24 hours if federally protected), 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.

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 as noted above, including immediate notification of BLM.

Monthly, the operator will:

- 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.
- 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.

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.

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:

- Cease discharging produced water to the containment.
- Accelerate re-use of the produced water for purposes approved by the Division.
- Transfer produced water from the containment to injection wells.

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

Protocol for Leak Detection Monitoring, Fluid Removal and Reporting

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

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

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

1. Re-measure fluid levels in the monitoring riser pipe on a daily basis for one week to determine the rate of seepage. BLM is to be immediately notified.
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). If leak identified below fluid surface, all fluid above leak will be removed within 48 hours. BLM is to be immediately notified.
4. Install a pump into the monitoring riser pipe sump to continually (manually on a daily basis or via automatic timers) remove fluids from the leak detection system into the containment until the liner is repaired or replaced.
5. Dispatch a liner professional to inspect the portion of the containment suspected of leakage

during a "low water" monitoring event.

6. Provide NMOCD a second report describing the inspection and/or repair within 20 days of the initial notification.

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

Quarterly Inspection Log Sheet - In Ground Recycling Containment

Operator name: Conoco Phillips								
Well Name: Zia Hills In Ground 1 and 2								
Inspect weekly while fluids present (>1 foot); Monthly when fluids <1 foot								
Inspection Date	**Inspector Initials**	**Describe any 1. Tear of Liner 2. Break in Berms and Run-on of Stormwater 3. Dead Wildlife 4. Oil on Fluid**				**Report Fluid Freeboard**	**Leak Detection System Functioning (yes/no)**	**Comments**
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			
			None Observed		Yes Describe			

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.
- Inspect the containment for dead migratory birds and other wildlife. Within 30 days of discovery (24 hours if federally protected), 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.

Monthly, the operator will:

- 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.
- Record sources and disposition of all recycled water.

Closure Plan
In Ground Containments

Overview

After operations cease, the operator will remove all fluids and commence reclamation efforts immediately. Final reclamation to be completed within 3 months from the date the operator ceases operations from the containment for use.

19.15.34.14 A
Once the operator has ceased operations, the operator shall remove all fluids within 60 days and close the containment within six months from the date the operator ceases operations from the containment for use.

The operator shall substantially restore the impacted surface area to

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

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

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

The surface owner will impose a closure design that conforms to their needs for the site. The operator understands that a variance will be submitted to OCD to allow for any alternative closure protocol (BLM requirements will supersede OCD rules if equal or better for protection of freshwater, human health and the environment.

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

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.

proceeding with closure.

b. If all contaminant concentrations are less than or equal to the parameters listed in Table I, then the operator will proceed to
    i. backfill with non-waste containing, uncontaminated, earthen material - Or
    ii. undertake an alternative closure process pursuant to a variance request after approval by OCD.

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

Reclamation and Re-vegetation

a. The operator will reclaim the containment's location to a safe and stable condition that blends with the surrounding undisturbed area.
b. Topsoils and subsoils shall be replaced to their original relative positions and contoured so as to achieve erosion control, long-term stability and preservation of surface water flow patterns.
c. The disturbed area shall then be reseeded with BLM defined seed mixture within the first 3 months following closure of a recycling containment in accordance with BLM requirements.

19.15.34.14 E
Once the operator has closed the recycling containment, the operator shall reclaim the containment's location to a safe and stable condition that blends with the surrounding undisturbed area. Topsoils and subsoils shall be replaced to their original relative positions and contoured so as to achieve erosion control, long-term stability and preservation of surface water flow patterns. The disturbed area shall then be reseeded in the first favorable growing season following closure of a recycling containment.

Closure Documentation

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

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

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

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

19.15.34.14 F
Reclamation of all disturbed areas no longer in use shall be considered complete when all ground surface disturbing activities at the site have been completed, and a uniform vegetative cover has been established that reflects a life-form ratio of plus or minus fifty percent (50%) of pre-disturbance levels and a total percent plant cover of at least seventy percent (70%) of pre-disturbance levels, excluding noxious weeds.

GENERAL SITING CRITERIA DEMONSTRATION AND SITE SPECIFIC GROUNDWATER DATA

8.
Siting Criteria for Recycling Containment

Instructions: The applicant must provide attachments that demonstrate compliance for each siting criteria below as part of the applica 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 FIGURES 1-2

Within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended.
- Written confirmation or verification from the municipality; written approval obtained from the municipality FIGURE 3

Within the area overlying a subsurface mine.
- Written confirmation or verification or map from the NM EMNRD-Mining and Minerals Division FIGURE 4

Within an unstable area.
- Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; topographic map FIGURE 5 a-e

Within a 100-year floodplain. FEMA map FIGURE 6

Within 300 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse, or lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark).
- Topographic map; visual inspection (certification) of the proposed site FIGURE 7

Within 1000 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application.
- Visual inspection (certification) of the proposed site; aerial photo; satellite image 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
- NM Office of the State Engineer - iWATERS database search; visual inspection (certification) of the proposed site

Within 500 feet of a wetland. FIGURE 9
- US Fish and Wildlife Wetland Identification map; topographic map; visual inspection (certification) of the proposed site

Distance to Groundwater

Figure 1, Figure 2, and the discussion below demonstrates that groundwater (fresh water as defined by NMOCD Rules) is greater than 100 feet beneath the area of interest that is the location of the proposed recycling containment.

Figure 1 is a geologic/ topographic map that shows:
1. The Superman Containment and recycling facility area is identified by the blue square.
2. Water wells from the OSE database as a blue triangle inside colored circles that indicate well depth. OSE wells are often miss-located in the WATERS database as older wells are plotted in the center of the quarter, quarter, quarter, of the Section Township and Range. OSE wells showing no depth to water and no date are typically issued permits for wells that may or not be in existence at the time of writing this submission.
3. Water wells from the USGS database as large triangles color-coded to the formation from which the well draws water.
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. wells).
5. The depth-to-water from the most recent available measurement for each well is provided adjacent to the well symbol.

Figure 2 is an area map that shows:
1. The Superman Containment and recycling facility area identified by the blue square with the estimated surface elevation of 3137.
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.
4. Isocontour lines displaying the elevation of the groundwater surface.

Geology

The proposed recycling containment is located on an outcrop of Quaternary Age Older Alluvium deposits (Qoa on Figure 1). These deposits, often with a common caliche cap, have also been identified as the Plio-Pleistocene Gatuna Formation[1][2]. The Gatuna/Older Alluvium is the uppermost source of fresh water in the area. As suggested in Figure 1, Quaternary piedmont and eolian deposits (Qe/Qp and Qe) overlie the Older Alluvium to the north and southeast. Underlying the Gatuna/Older Alluvium at the proposed recycling storage containment is probably the Triassic Dockum/Chinle Formation (terminology of this unit varies by author), which crops out five miles to the northeast. The Santa Rosa Sandstone is the base of the Triassic units and underlies the Dockum/Chinle. The Permian Quartermaster Formation (aka Dewey Lake Formation) is generally not considered a source of fresh water, but the Dockum/Chinle and Santa Rosa Formations yield potable water to wells in the area. Beneath the Quartermaster is the Rustler Formation, the upper portion of which is considered an underground source of drinking water by BLM and OCD.

[1] https://nmgs.nmt.edu/publications/guidebooks/downloads/31/31_p0213_p0217.pdf
[2] https://nmgs.nmt.edu/publications/guidebooks/downloads/44/44_p0219_p0230.pdf

Additional data and discussion of the geology of the area as it relates to karst potential is included in a subsequent section of this submission.

Groundwater Data

We relied upon the most recent data measured by the USGS to create the water table elevation map shown in 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. Based upon our field survey and examination of Google Earth images, we are confident that the wells shown in Figure 2 are accurate.

During our field examinations, we did not find any evidence, either on the ground or in recent or past Google Earth images, of USGS-9638 or USGS-9642 at the mapped locations. As is sometimes the case, the locations of wells in the public database are incorrect. We strongly suspect that the water level data shown on Figures 1 and 2 are correct, but were obtained from the Hackberry Windmill, which is the only well in the area.

We found two driller's logs filed at the Office of the State Engineer within the area shown by Figures 1 and 2:

- C-01777 near the northwest corner of the maps (estimated depth to water of 300 feet) and
- C-03829, which is within the cluster of wells labeled as C-02090 near the north center of the maps and records an estimated depth to water of 350 feet

These well logs, which are included in Appendix A, have a very limited description of penetrated strata. At well C-01777 we conclude that the contact between the Alluvium (Gatuna Formation) and the Chinle/Dockum Formation is at a depth of 150 feet and the water-bearing unit is a sandstone at a depth of 300 feet. The log for well C-03829, we believe the Alluvium/Triassic contact is at a depth of 271 feet and the Santa Rosa Formation may be yielding water from the depth interval 390-610 feet.

For the potentiometric surface map (Figure 2), we honored all data that we know are accurate to the best of our knowledge. From the data presented in Figures 1 and 2, we conclude:

- The Hackberry Windmill, southeast of the location, probably draws water from the Gatuna Formation and possibly from sandstone units in the Dockum/Chinle.
- As indicated by the well logs in Appendix A, groundwater in wells north of the Superman recycling containment produced groundwater from Triassic strata
- The elevation of the groundwater surface beneath the area in which the Superman Containment will be constructed is estimated from the data as 2960 feet above mean sea level (Figure 2).
- Using these data, distance between ground surface and the potentiometric surface of the regional aquifer is (3137-2960 =) 177 feet.

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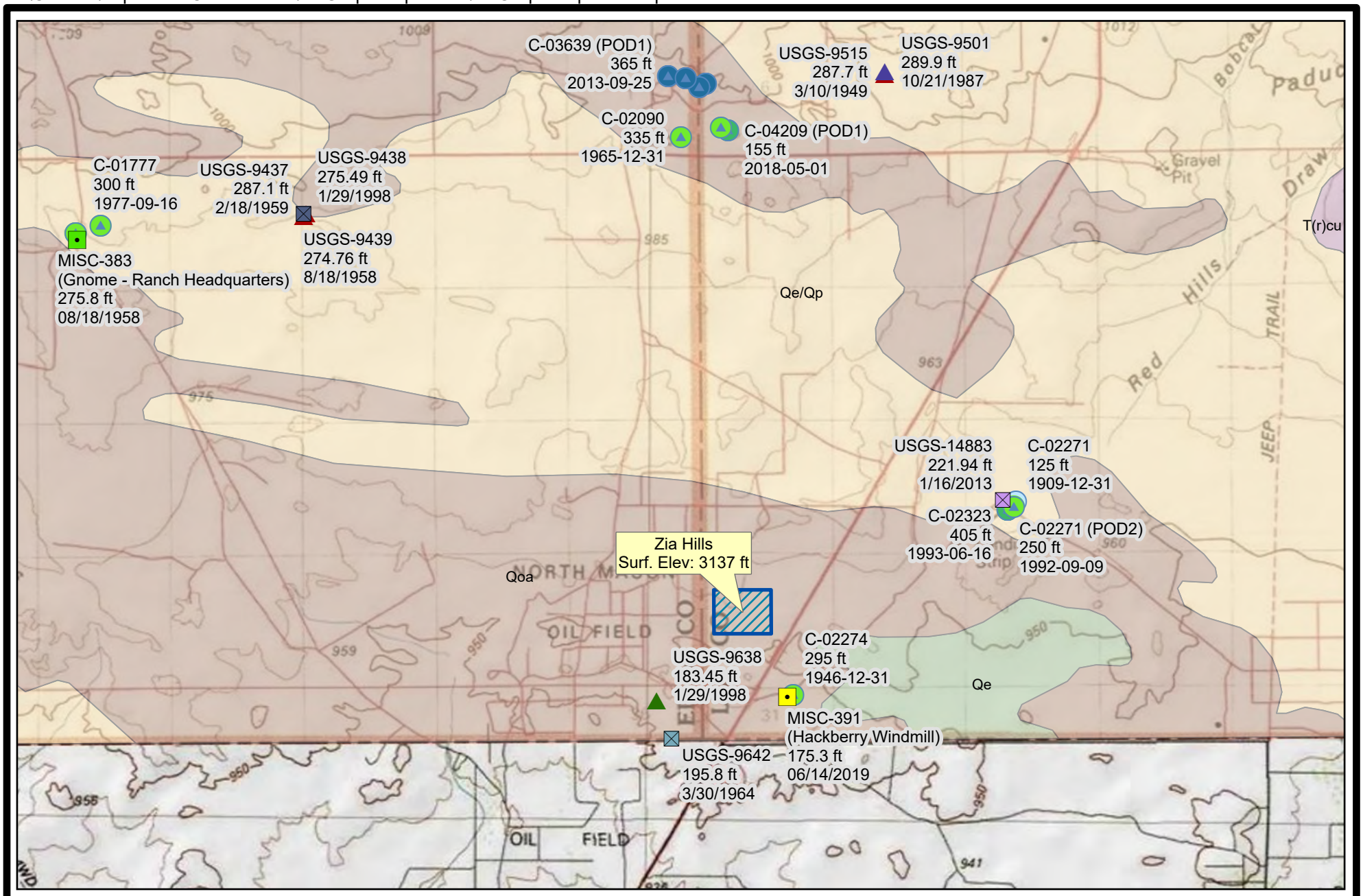

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Depth to Water with Geology

Figure 1

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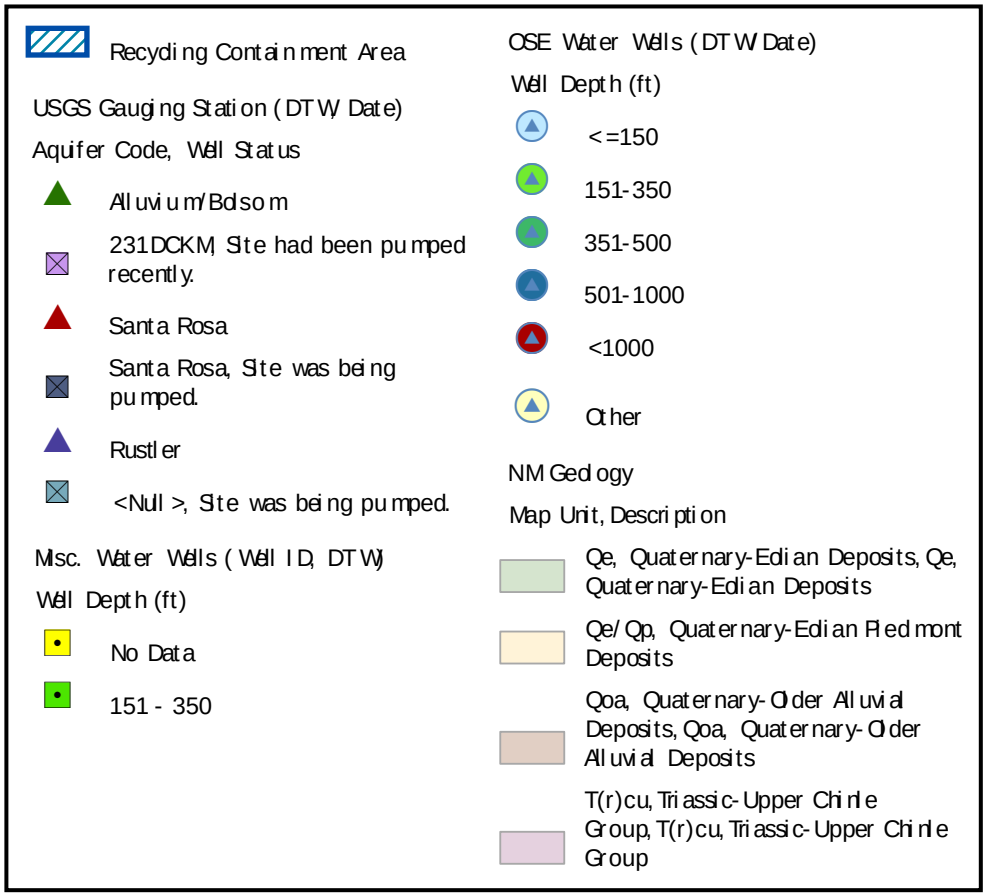

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	LEGEND Depth to Water with Geology	Figure 1 LEGEND
	ConocoPhillips Zia Hills Produced Water Recycling Containment	Nov. 3, 2019

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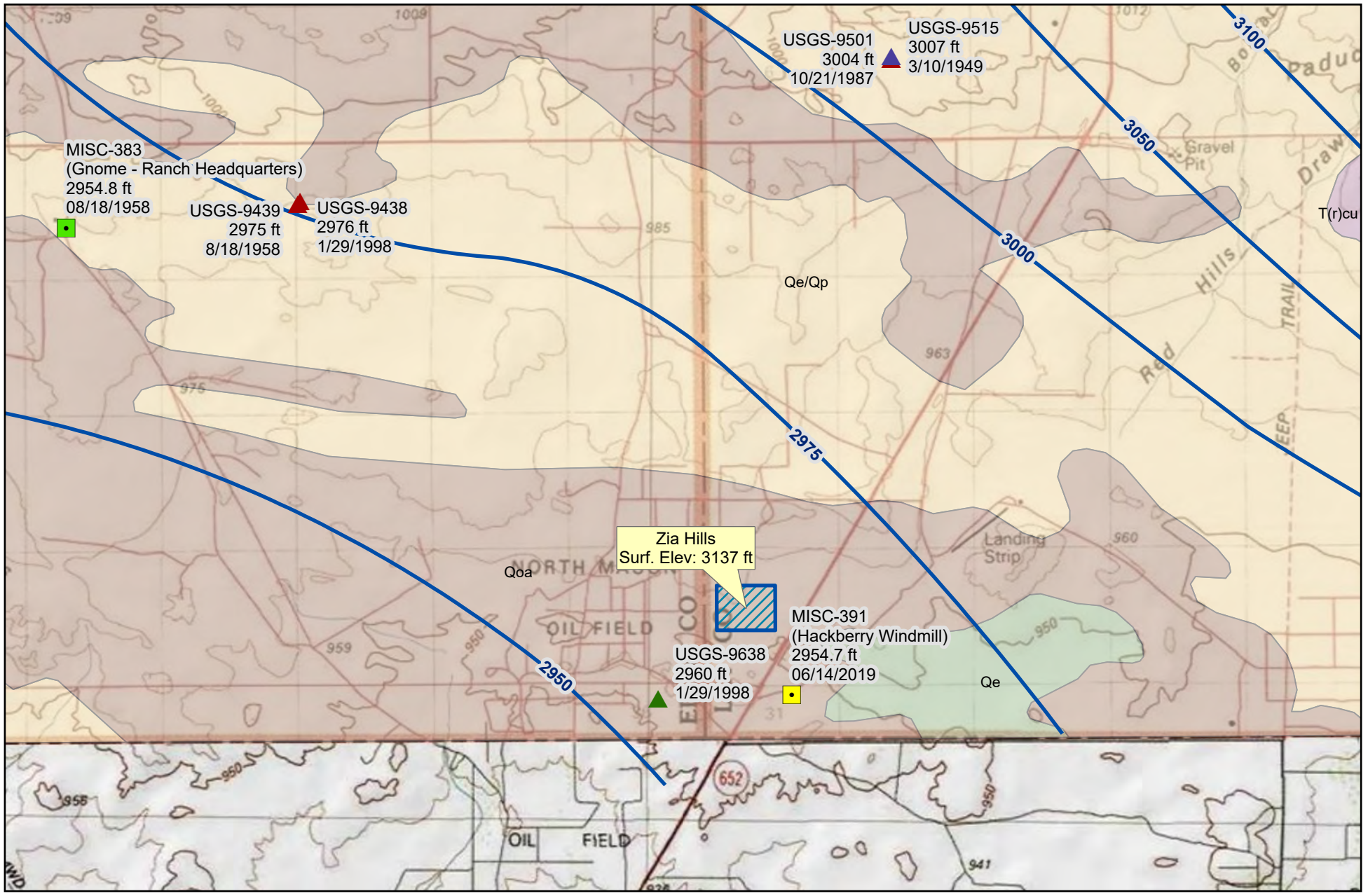

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Groundwater Elevation and Potentiometric Surface

Figure 2

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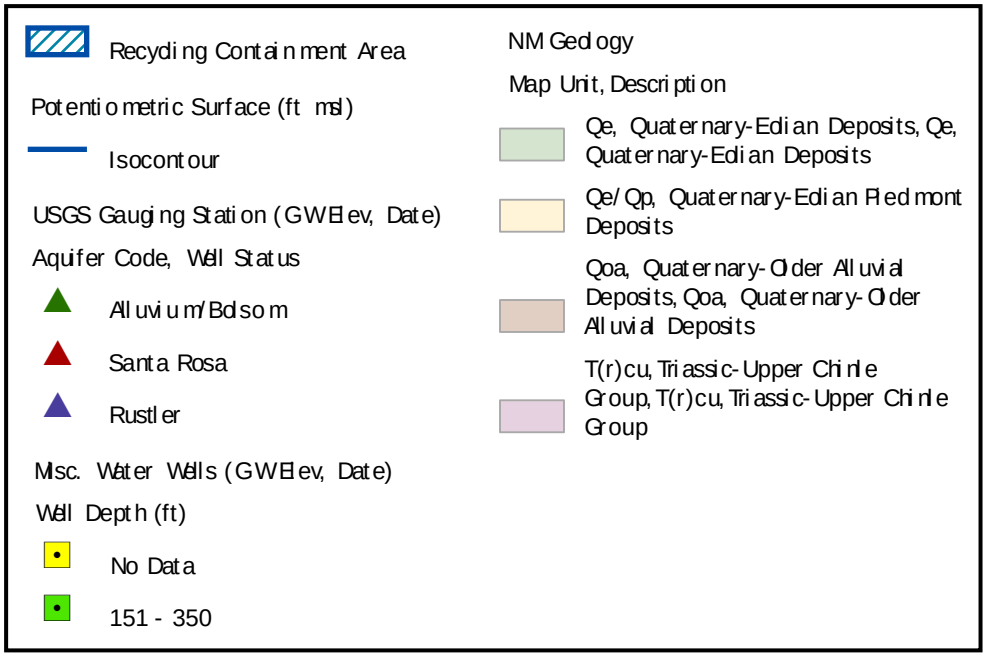

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Groundwater Elevation and Potentiometric Surface	Figure 2 LEGEND
	ConocoPhillips Zia Hills Produced Water Recycling Containment	Nov. 3, 2019

Distance to Municipal Boundaries and Fresh Water Fields

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

- The closest municipality is Malaga, NM approximately 25 miles to the northwest.
- The closest mapped public well field is near Jal, NM, about 31 miles to the east.

Distance to Subsurface Mines

Figure 4 and our general reconnaissance of the area demonstrate that the nearest mines are rock quarries. The area of interest is not within an area overlying a subsurface mine.

- The nearest mapped caliche pit is abandoned and lies approximately 1000 feet to the east.
- An unmapped abandoned pit is shown as a "Gravel Pit" on Figure 4 and is about 750 feet south of the southeast corner of the containment.

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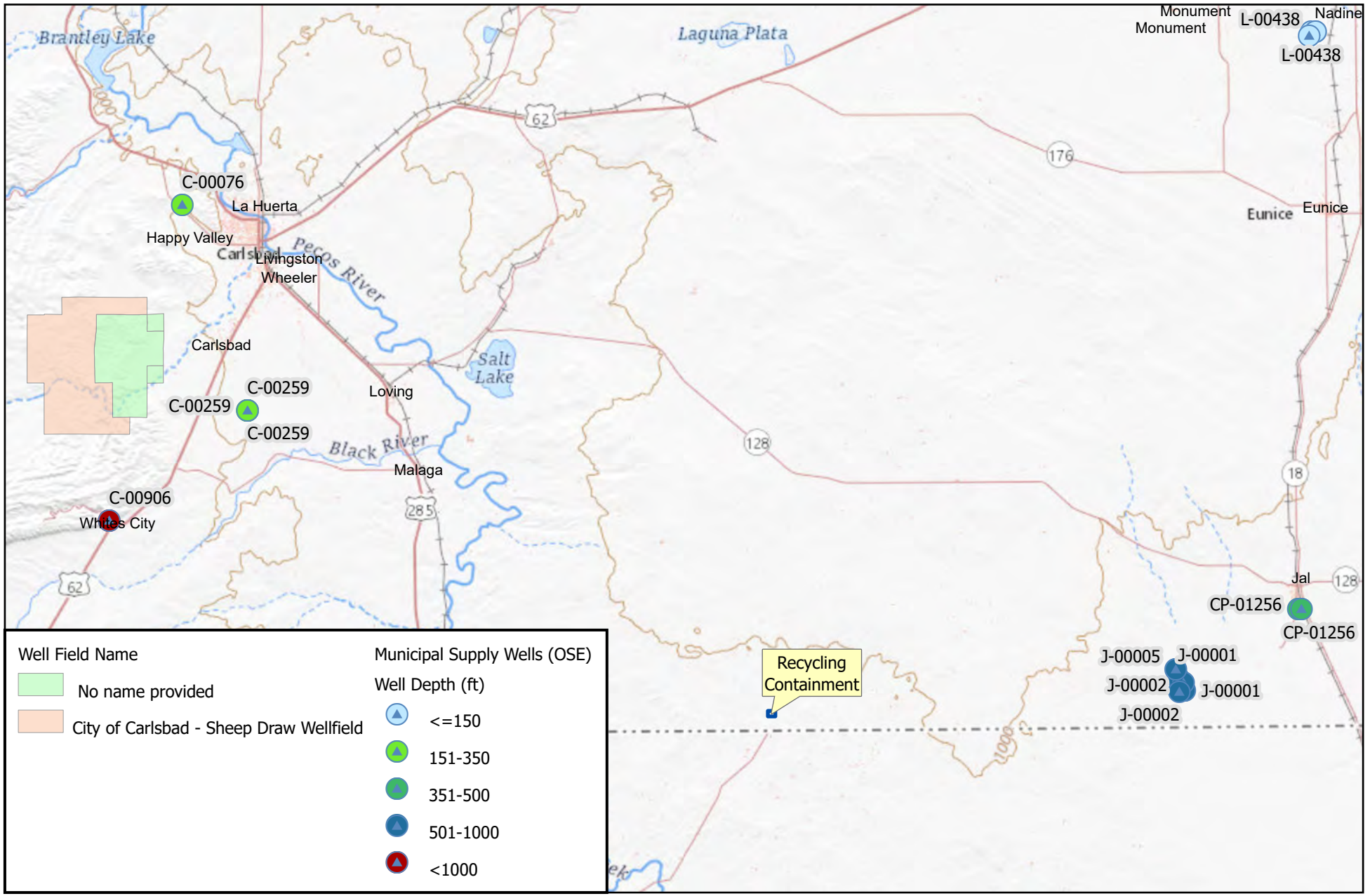

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Well Fields and Municipal Supply Wells ConocoPhillips Zia Hills Produced Water Recycling Containment	Figure 3 Nov. 3, 2019

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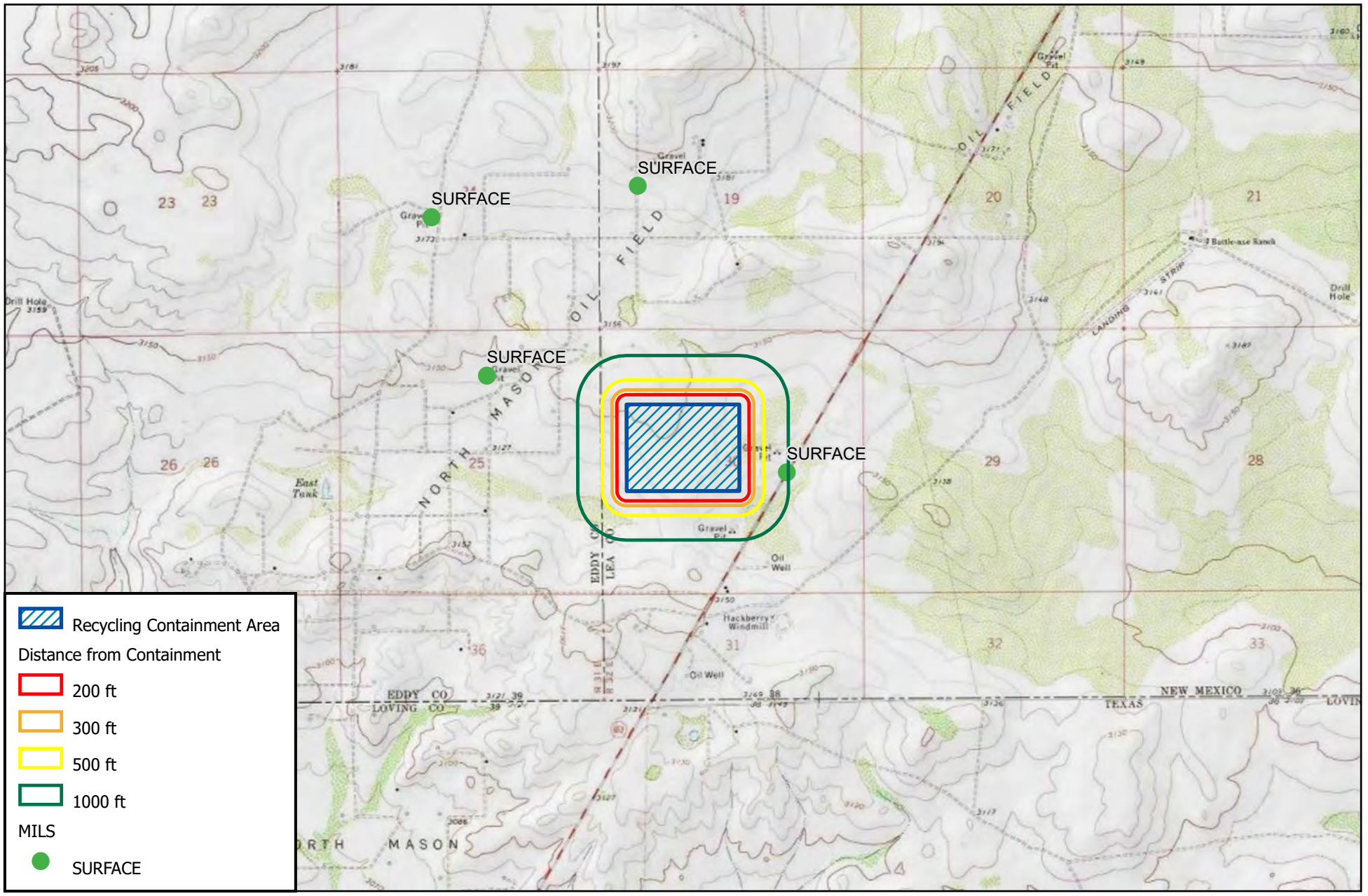

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Mines and Minerals

Figure 4

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Distance to High or Critical Karst Areas

The presence of karst features within an area proposed for the storage of treated recycle water for E&P uses (e.g. hydraulic stimulation) can be problematic for two reasons. First, as suggested in Part 34.11 of OCD Rules, a produced water recycling containment must be located within a stable area. A portion of Part 34 is presented below with **emphasis** added:

19.15.34.11 SITING REQUIREMENTS FOR RECYCLING CONTAINMENTS:
A. An operator shall ***not locate a recycling containment****:*
(8) ***within an unstable area*** *unless the operator demonstrates that it has incorporated engineering measures into the design to ensure that the containment's integrity is not compromised;*

Unstable area is defined in 19.15.2.7 as
U.(6) "Unstable area" means a location that is susceptible to natural or human-induced events or forces capable of impairing the integrity of some or all of a division-approved facility's structural components. ***Examples of unstable areas are*** *areas of poor foundation conditions, areas susceptible to mass earth movements and* ***karst terrain*** *areas where karst topography is developed as a result of dissolution of limestone, dolomite or other soluble rock. Characteristic physiographic features of karst terrain include sinkholes, sinking streams, caves, large springs and blind valleys.*

In addition to potential instability of the containment foundation, karst features, such as sinkholes, open fractures or other conduits can provide a direct link between the land surface (or beneath a containment) and groundwater. Thus, a release from the containment within an area of high karst could impact groundwater very quickly and efficiently.

Figures 5a through 5e show the location of the Superman treated water storage containment with respect to BLM Karst areas. The proposed containment is located within an area mapped by BLM as "high" potential karst area (Figure 5a). Figure 5b presents the same data as Figure 5a on a larger scale, with a recent air photograph as a base map and without the crosshatch symbology for high karst potential. Note the northwest-southeast linear vegetation pattern south of the proposed containment and sub-parallel to the high karst/medium karst boundary in the northeast corner of the map. Figure 5c is a topographic map of the area around the containment that shows the two caliche pits identified in Figure 4. Figure 5c also shows closed depressions south of the proposed containment that coincide with the vegetation pattern discussed above and closed depressions sub-parallel to the high/medium karst potential boundary. Figure 5d shows the location of a geologic cross-section that defines the depths of Rustler and Quartermaster (Dewey Lake) Formations. This cross section and a geology log, which is Appendix B, was prepared by Mr. Joshua Day, a geologist of ConocoPhillips. Figure 5e is a large-scale air photograph showing the locations of two abandoned caliche pits east and southeast of the proposed containment and the two closed depressions south of the proposed containment. Also attached as Appendix C are photographs of the area showing the nature of the ground surface and data from a recent excavation at the site.

The data and discussion below permit a conclusion that geologic evidence does not support a classification of this area as "high karst potential" as it applies to the two characteristics described above.

In the area of the proposed containment, the top of the Rustler is 940-1030 feet, as defined by geophysical and geologic logs in Appendix B. This finding is supported by BLM evaluation of proposed depth of surface casing (to protect the fresh ground water resources of the upper Rustler) for the Buck 30 Federal Com W1 4H well (30-025-42746). The application for this well estimated the top of the Rustler at 1550 feet below surface and proposed surface casing from 0-1000 feet. Evaluators from BLM increased the depth of surface casing to 1150 feet, as shown in the inset. The log for this well (Appendix B) shows the top of the Rustler as 1030 feet and the base of the Rustler as 1415 feet – which demonstrates that BLM was correct with respect to the appropriate depth of surface casing.

See COA

4. Proposed Casing Program
*All tubulars used for this design will be new.

1150

Hole Size (in)	Casing (in)	Wt/Ft	Grade	Connection	Depth (ft)	Depth (ftTVD)	Depth (ftMD)	BOPE System
17 1/2	13 3/8	54.5	J-55	BTC	~~0-1000~~	~~1000~~	~~1000~~	N/A
12 1/4	9 5/8	40.0	L-80	BTC	0-4300	4300	4300	5M
8 3/4	7 5/8	33.7	P-110	Wedge 523	0-12039	11701	12093	5M
6 5/8	5	21.4	P-110	BTC	0-18670	11701	18670	10M

The estimate of the top of the Rustler in Appendix B is also supported by data presented in the 2016 publication Identification of Potential Brackish Groundwater Production Areas – Rustler Formation[3]. Figure 5-7 of this publication, the relevant portion of which is reproduced on the following page, shows two wells proximal to the proposed recycling containment:

- 05897 is about 1-mile west and
- 30782 is about 1-mile southwest.

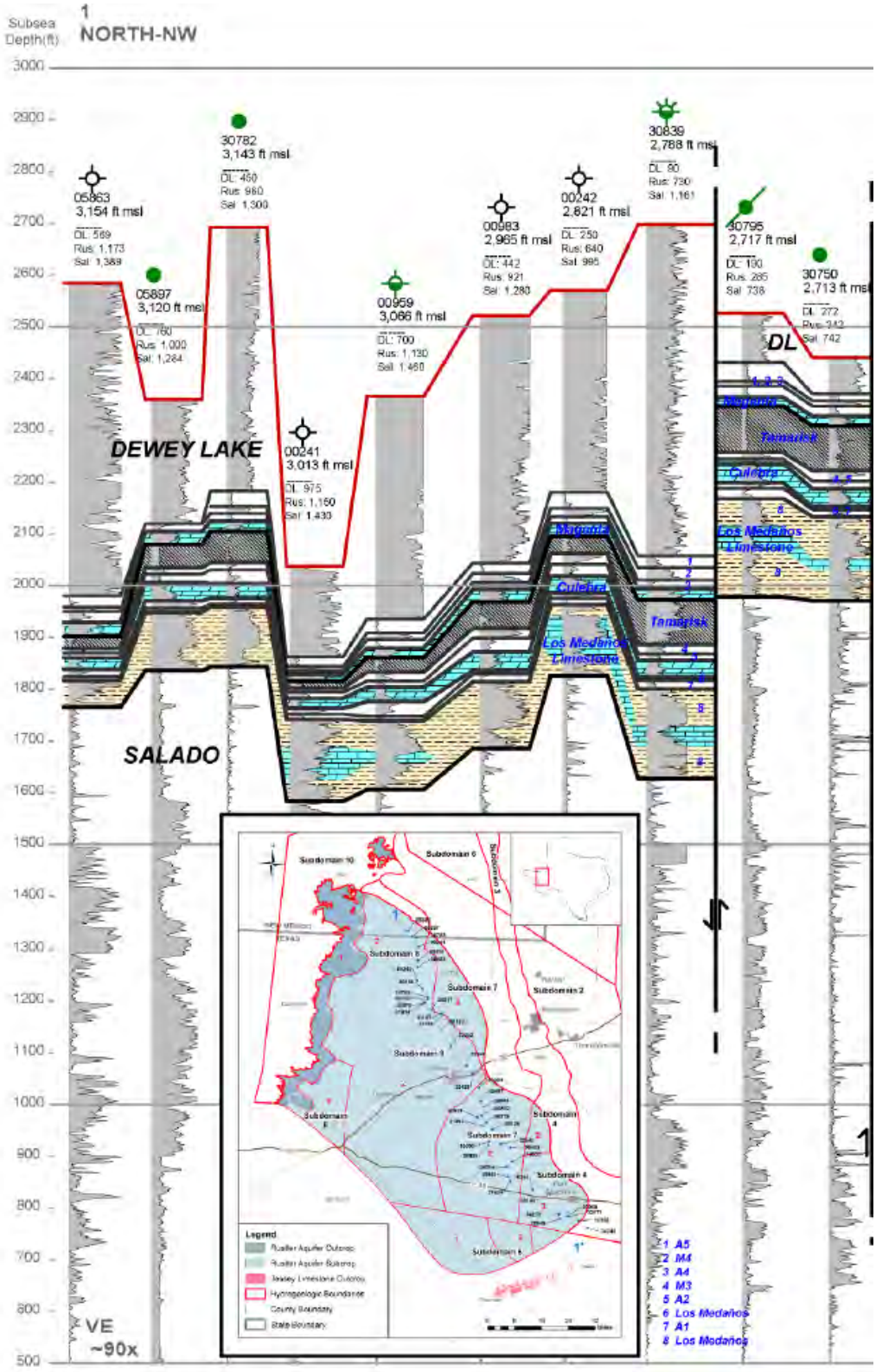
For these wells the depth to the top of the Rustler is 1000 and 960 feet respectively and the thickness of the Rustler is 284 and 340 feet. Figure 5-7 also shows the depth and thickness of the Quartermaster Formation (aka Dewey Lake). In well 05897, the top of the Quartermaster is 750 feet below land surface and the thickness of this unit is 240 feet. Well 30782 reports a depth of 450 feet and thickness of 510 feet.

As shown on the following page and in Table 1, in the area of the proposed containment, the base and top of the Rustler Formation is based upon the data in Appendix B, resulting in a calculated thickness of 382 feet. The thickness of the Quartermaster is not available in the logs of Appendix B, but measured sections and test hole data in Miller (1966[4]) and the data in Figure 5-7 provide the data shown in Table 1. The estimated 75-foot thickness of the Santa Rosa is based upon a paper of Lucas and Anderson[5]. The depth to the base and top of this formation is calculated by knowing the top of the Quartermaster. The 305-foot thickness of the Dockum/Chinle is an estimate based upon using a 300-foot thickness for the Gatuna Formation (see Lucas and Anderson, 1993[6]) and the fact that the top of the Gatuna Formation is ground level.

Table 1 Shallow Stratigraphy
Buck 30 Federal Com W1 4H

	Depth from GL		
	Top	Bottom	Thickness
Gatuna	0	300	300
Dockum/Chinle	300	605	305
Santa Rosa	605	680	75
Quartermaster	680	1030	350
Rustler	1030	1412	382
units are feet			

[3] https://www.twdb.texas.gov/innovativewater/bracs/projects/HB30_Rustler/index.asp#finalreport
[4] https://www.wipp.energy.gov/information_repository/information_repository_a/supplemental_information/Miller%201955.pdf
[5] https://nmgs.nmt.edu/publications/guidebooks/downloads/44/44_p0231_p0235.pdf
[6] https://nmgs.nmt.edu/publications/guidebooks/downloads/44/44_p0219_p0230.pdf



Northern portion of Figure 5-7 from *Identification of Potential Brackish Groundwater Production Areas – Rustler Formation.*

The stratigraphy clearly demonstrates that the soluble horizons of the Rustler are not the cause of the northwest-southeast oriented closed depressions that may cause one to conclude that soluble formations beneath the land surface have collapsed. The nature of the soluble caliche horizon that caps the Gatuna Formation is the cause of these closed depressions. Removal of caliche from the surface downward is described in Gustuvson, Holliday and Hovorka (1995[7]). As explained in this publication (and others) formation of closed depressions, such as playas, within an area capped by caliche (e.g. Llano Estacado) are localized features that are stable landforms.

A similar geomorphic pattern of closed depressions with a northwest-southeast lineation is observed about 9 miles northeast of the proposed containment in T26S R33E (inset). This area is mapped as Ogallala Formation by the USGS and low karst potential by the Carlsbad BLM.

It is beyond the scope of this submission to determine the origin of aligned closed depressions such as those around the Superman containment location. We believe the photographs in Appendix C and a field visit can provide the evidence to support a conclusion that these closed depressions are not sufficient evidence to consider this area high karst potential as it relates to the storage of treated water for recycling in double-lined containments with leak detection.

Appendix D provides the results of the geotechnical investigation to support a finding that the area is suitable for a recycling containment with respect to ground stability.

[7] https://store.beg.utexas.edu/reports-of-investigations/1192-ri0229.html

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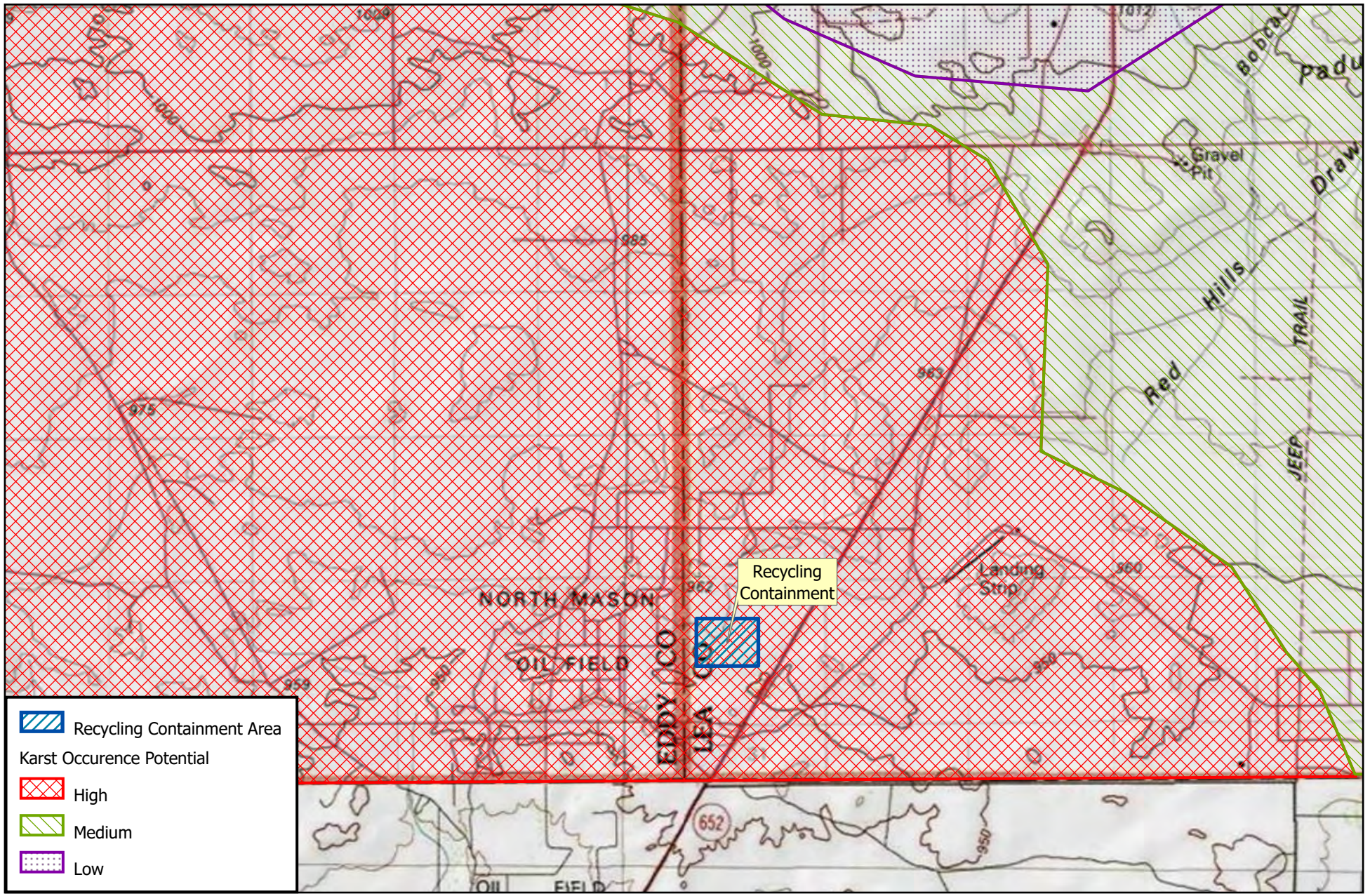

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Karst

Figure 5a

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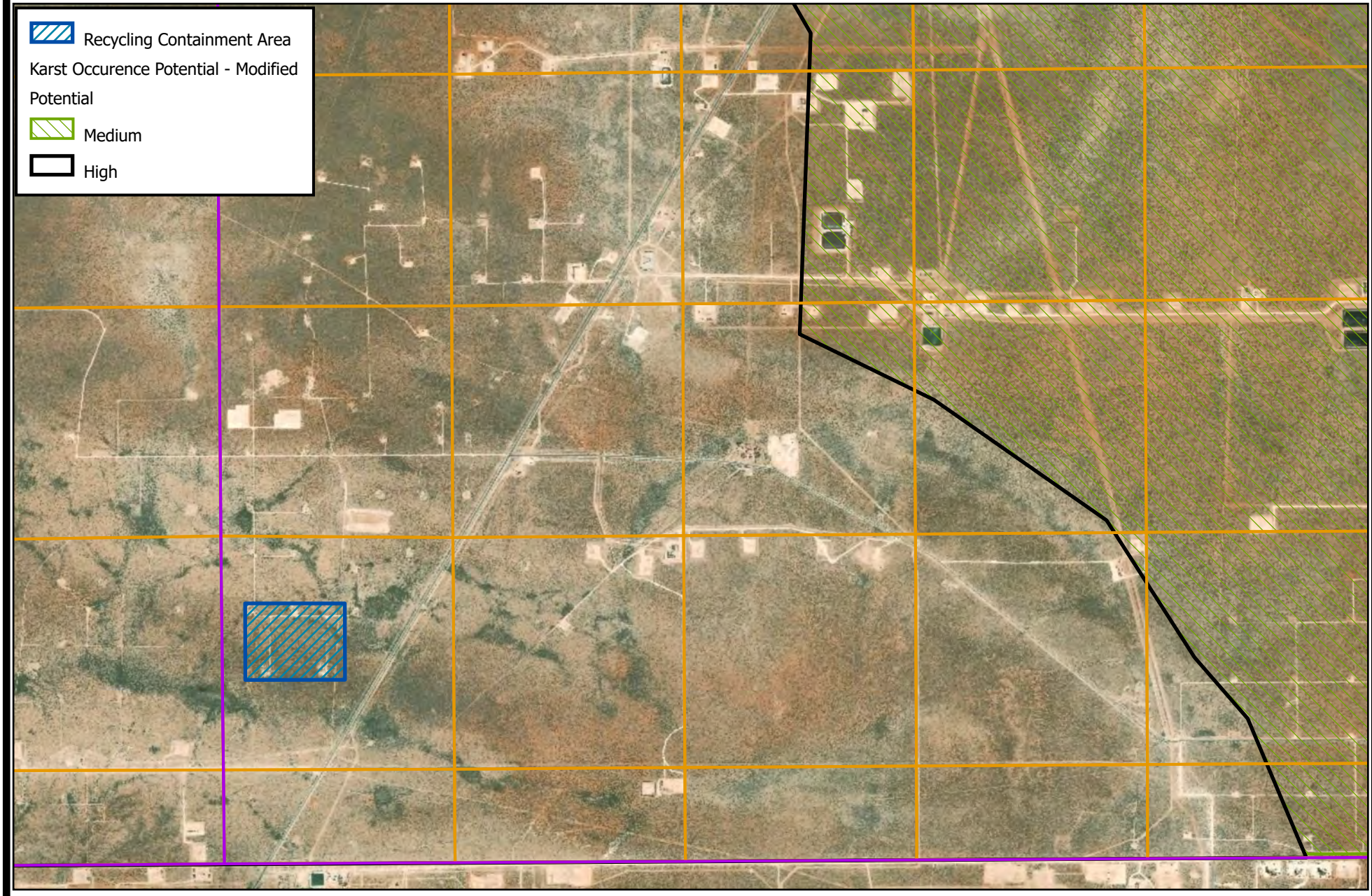

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Air Photo Showing High and Medium Karst

Figure 5b

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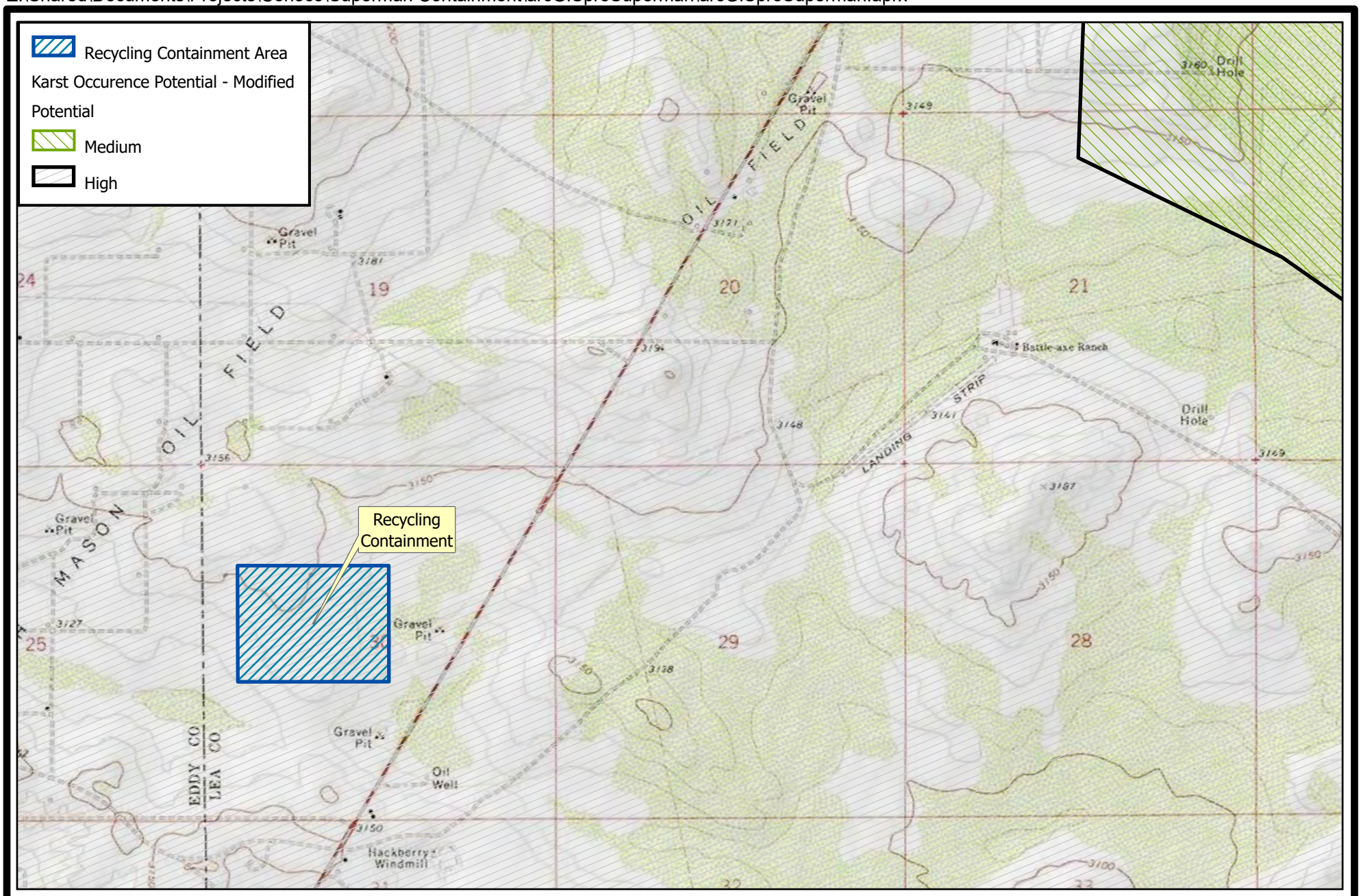

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Topographic Map with High and Medium Karst Overlay

Figure 5c

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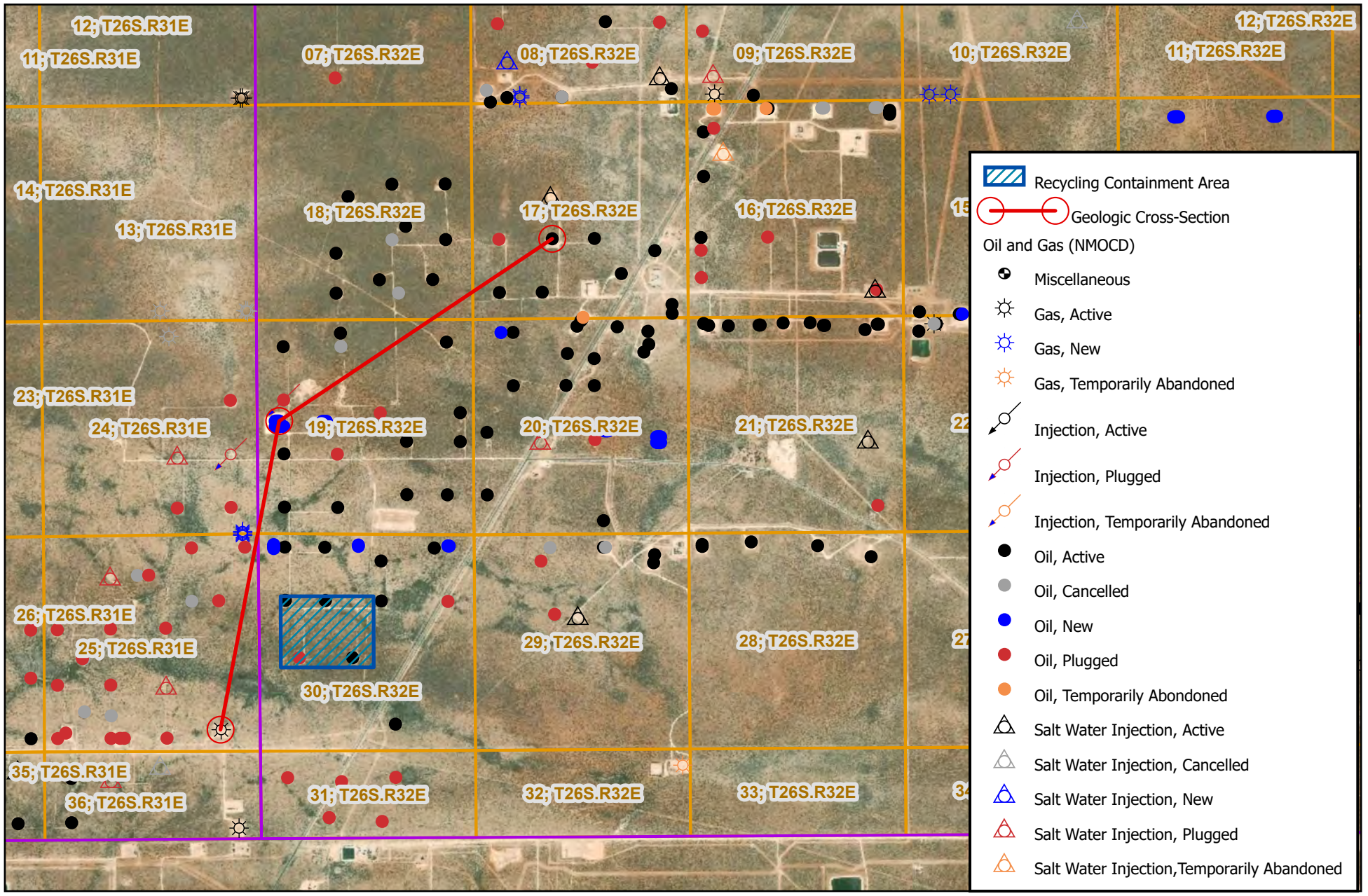

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Air Photo with Cross Section Overlay

Figure 5d

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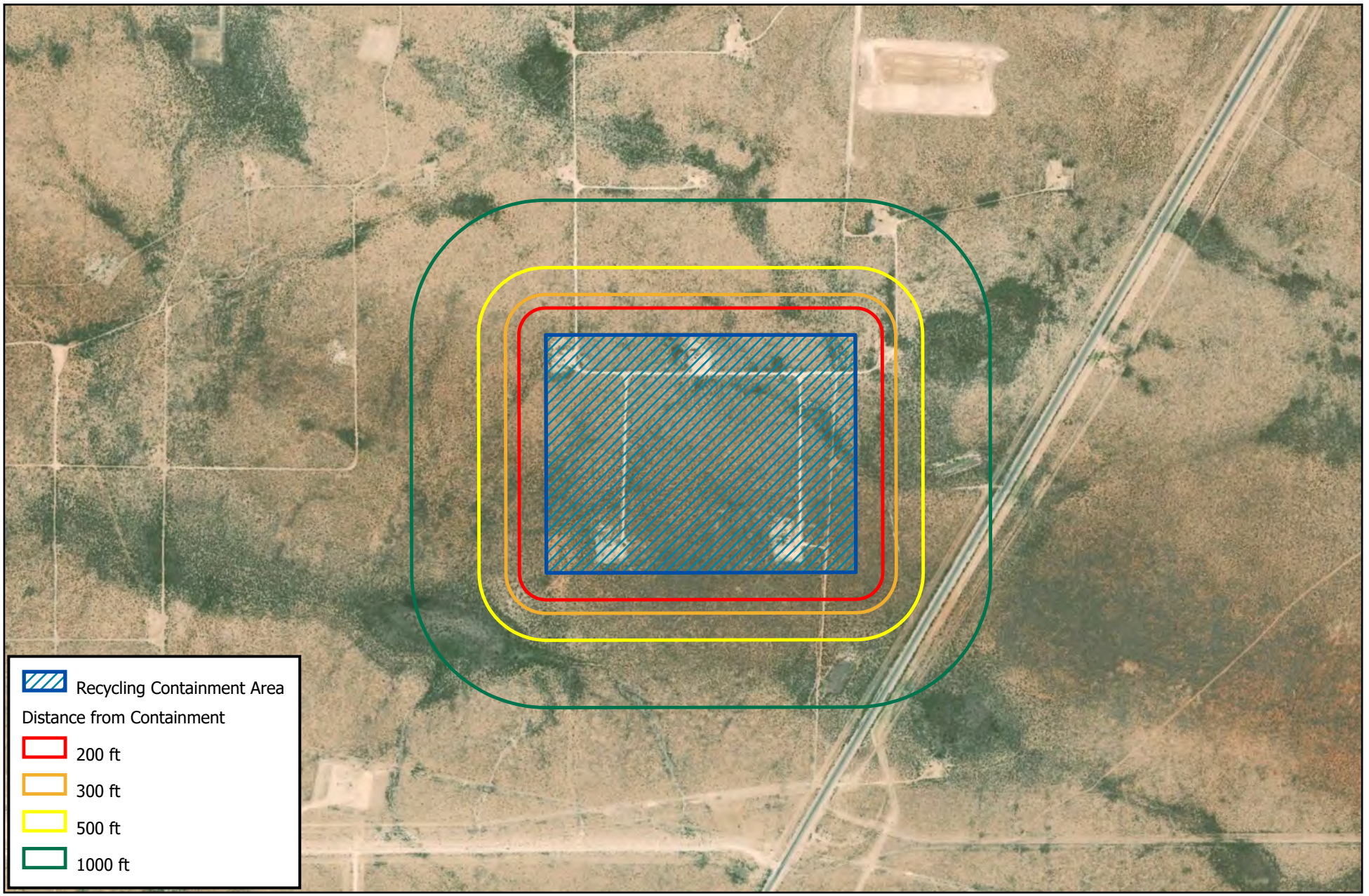

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Recycling Containment Area Relative to Air Photo

Figure 5e

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Distance to 100-Year Floodplain

Figure 6 demonstrates that the area of interest is within Zone X as designated by the Federal Emergency Management Agency with respect to the Flood Insurance Rate 100-Year Floodplain.

- Zone X is described as Areas Outside the 0.2% Annual Chance Floodplain.
- Our field inspection and examination of the topography permits a conclusion that the area of interest is not within any floodplain and has low risk for flooding.
- Two areas west of the containment lie within areas having a 1% chance of flooding

Distance to Surface Water

Figure 7 and the site visit demonstrates that the area of interest 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.

- The map depicts an "intermittent stream" and tributaries located about 2 miles west of the Superman location
- Three "lake/ponds" exist within 1.5 miles of the proposed recycling containment
- No continuously flowing watercourses, significant watercourse or other water bodies, as defined by NMOCD Rules, exist within the prescribed setback criteria for the siting of a recycling containment.
- No springs were identified in Figure 7 or in the site visit.
- No playa lakes or lakebeds were identified by the site visit or databases.

Distance to Permanent Residence or Structures

Figure 8 and the site visit demonstrates that the area of interest 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 structures are well pads.

Distance to Non-Public Water Supply

Figures 1 and 7 demonstrates that the area of interest 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; the nearest water well is located approximately 3,300 feet to the southeast (Hackberry Windmill). There are no known domestic water wells located within the mapping area.
- No domestic water wells are located within 1,000 feet of the recycling area.
- No springs were identified within the mapping area (see Figure 7).

Distance to Wetlands

Figure 9 demonstrates the area of interest is not within 500 feet of wetlands.

- The nearest designated wetlands are associated with
    - A small closed depression adjacent to the Hackberry Windmill located 0.5 miles southeast, and

- A small closed depression labeled "East Tank" on the topographic map (Figure 7), located 1.2 miles west of the proposed containment

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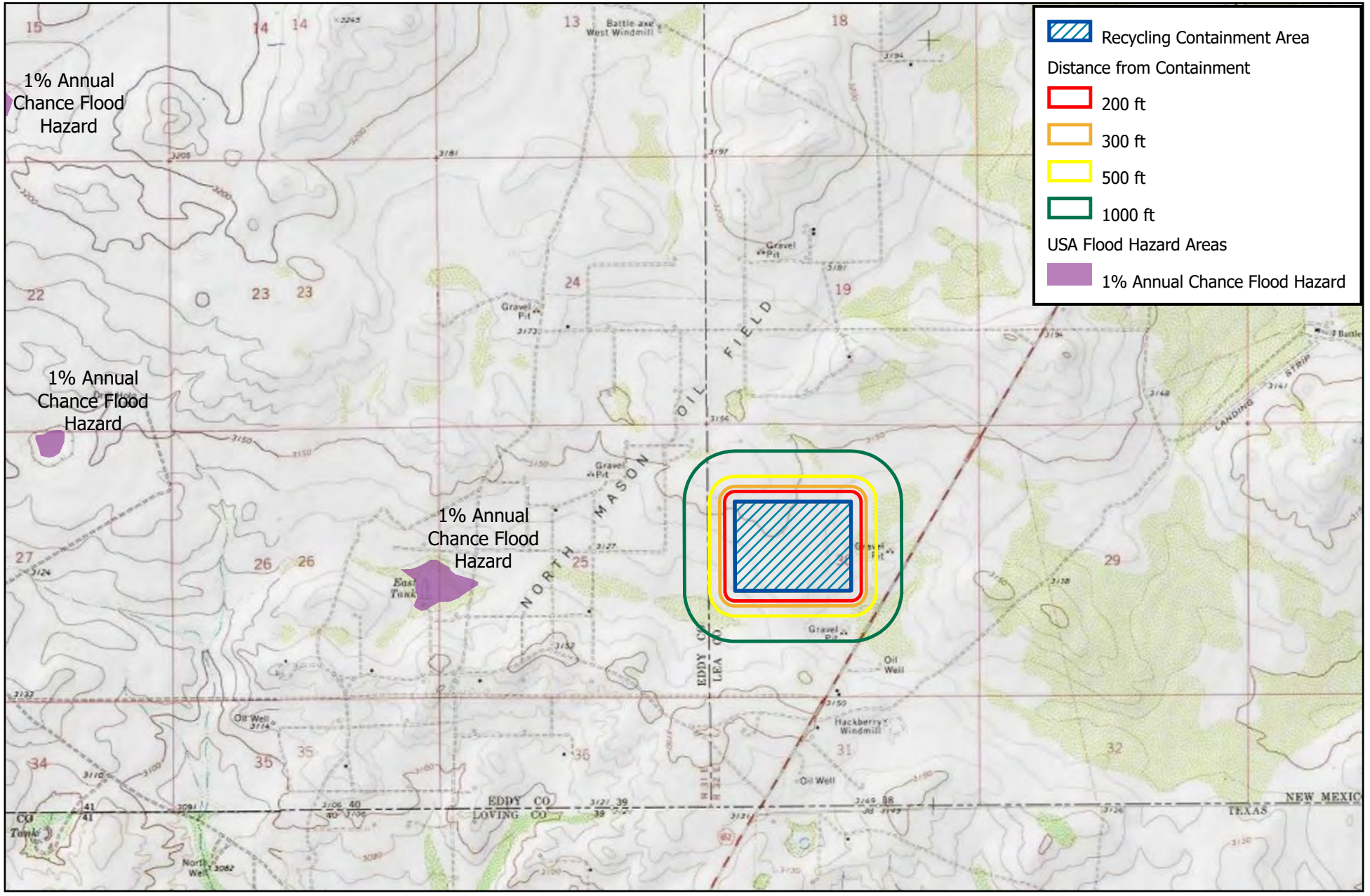

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FEMA Flood Hazard

Figure 6

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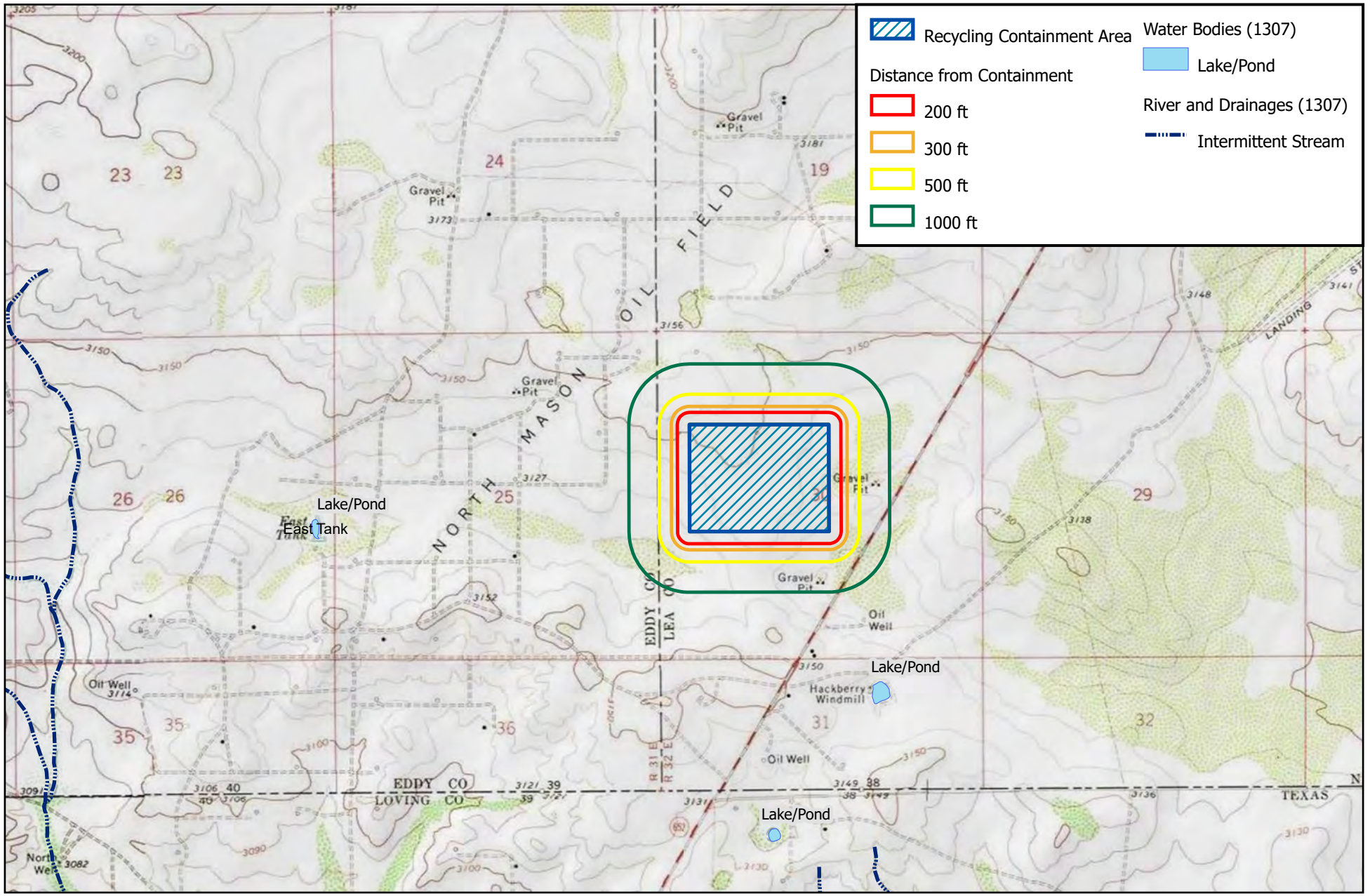

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Surface Water

Figure 7

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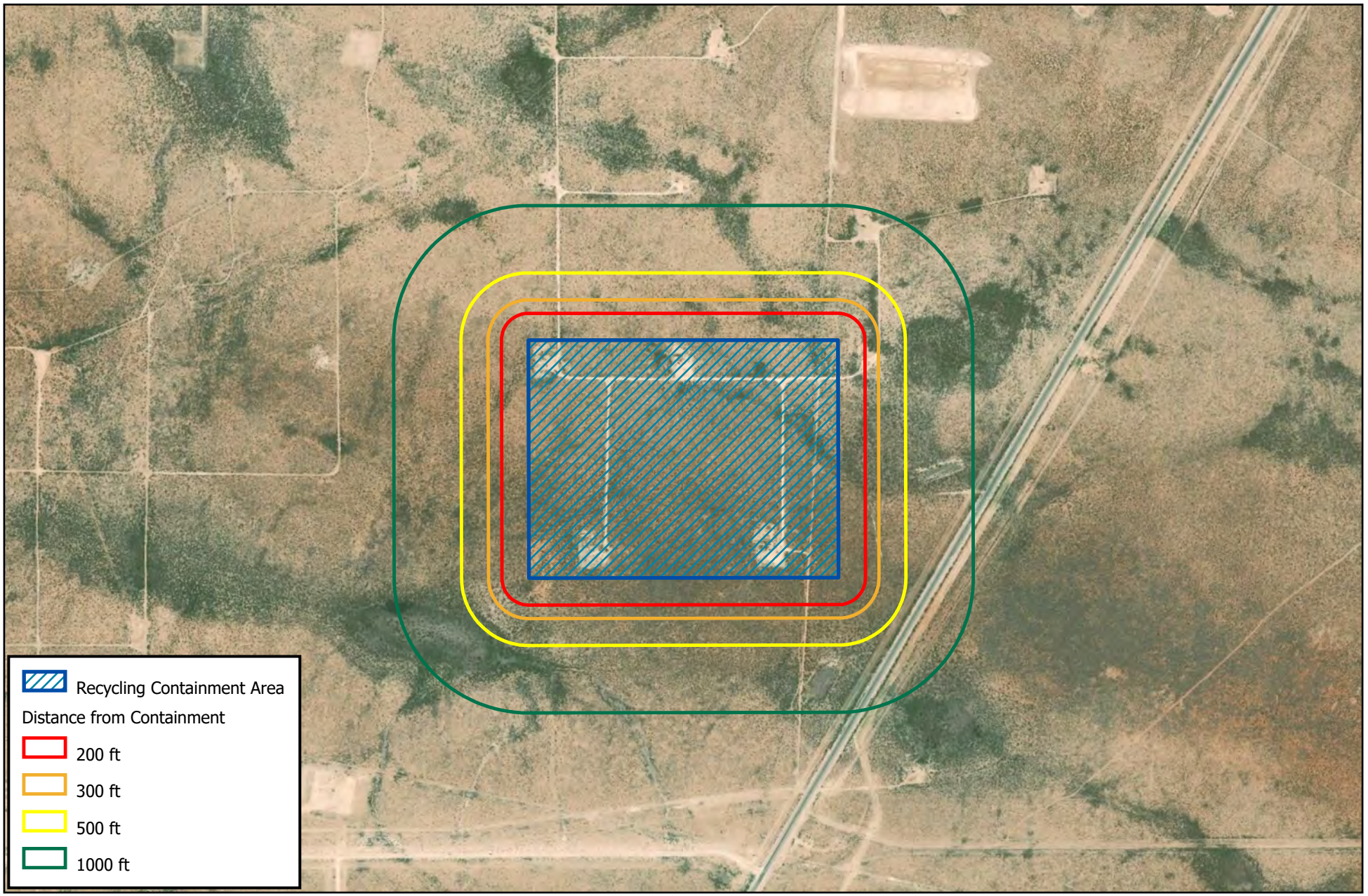

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Nearby Structures

Figure 8

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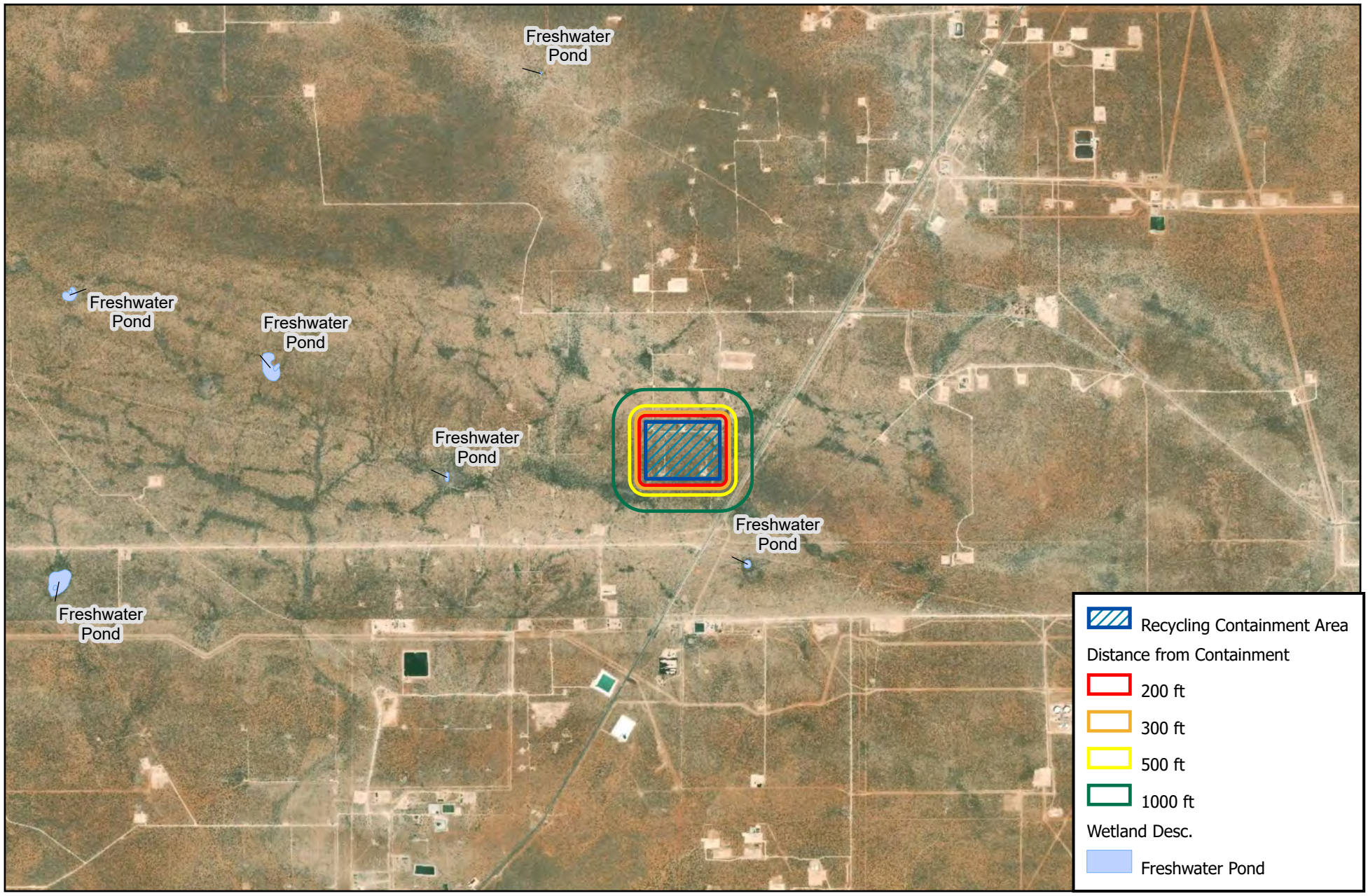

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Wetlands

Figure 9

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Zia Hills Produced Water Recycling Containment

July 2019

APPENDIX A OSE WELL LOGS

WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

1. GENERAL AND WELL LOCATION

OSE POD NUMBER (WELL NUMBER)	OSE FILE NUMBER(S)
X	C-3829 POD 1
WELL OWNER NAME(S): GREGORY ROCKHOUSE INC.	PHONE (OPTIONAL): 575-706-5659
WELL OWNER MAILING ADDRESS: 1108 W PIERCE ST.	CITY: CARLSBAD STATE: NM ZIP: 88220

WELL LOCATION (FROM GPS)	DEGREES	MINUTES	SECONDS	
LATITUDE	32	04	21	N
LONGITUDE	103	43	19	W

* ACCURACY REQUIRED: ONE TENTH OF A SECOND

* DATUM REQUIRED: WGS 84

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

SW 1/4, SW 1/4, NW 1/4, (LOT2) SECTION 6, TOWNSHIP 26S, RANGE 32E

2. DRILLING & CASING INFORMATION

LICENSE NUMBER	NAME OF LICENSED DRILLER	NAME OF WELL DRILLING COMPANY
WD-1607	LUIS A. (TONY) DURAN	DURAN DRILLING

DRILLING STARTED	DRILLING ENDED	DEPTH OF COMPLETED WELL (FT)	BORE HOLE DEPTH (FT)	DEPTH WATER FIRST ENCOUNTERED (FT)
2/11/15	2/12/15	646	645	350

COMPLETED WELL IS: ○ ARTESIAN ○ DRY HOLE ◉ SHALLOW (UNCONFINED) — STATIC WATER LEVEL IN COMPLETED WELL (FT):

DRILLING FLUID: ○ AIR ◉ MUD ADDITIVES – SPECIFY: DRILLING MUD

DRILLING METHOD: ◉ ROTARY ○ HAMMER ○ CABLE TOOL ○ OTHER – SPECIFY:

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM (inches)	CASING MATERIAL AND/OR GRADE (include each casing string, and note sections of screen)	CASING CONNECTION TYPE	CASING INSIDE DIAM. (inches)	CASING WALL THICKNESS (inches)	SLOT SIZE (inches)
0	341	12	STEEL	STEEL PERF	7	1/4	-
341	645	12	STEEL PERF	STEEL	7	1/4	1/8

2015 FEB 23 AM 10 12

STATE ENGINEER OFFICE

3. ANNULAR MATERIAL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM. (inches)	LIST ANNULAR SEAL MATERIAL AND GRAVEL PACK SIZE-RANGE BY INTERVAL	AMOUNT (cubic feet)	METHOD OF PLACEMENT
~~0~~	~~20~~	~~12~~	~~22 BGS 80 LBS CEMENT~~		~~MIXER~~
20	645	12	26 YARDS 1/4 GRAVEL		

FOR OSE INTERNAL USE — WR-20 WELL RECORD & LOG (Version 06/08/2012)

FILE NUMBER	POD NUMBER	TRN NUMBER
C-3629	1	540002

Exp1

26S.32E.6.133

4. HYDROGEOLOGIC LOG OF WELL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	THICKNESS (feet)	COLOR AND TYPE OF MATERIAL ENCOUNTERED - INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES (attach supplemental sheets to fully describe all units)	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER-BEARING ZONES (gpm)
0	1	1	TOPSOIL	○ Y ◉ N	
1	18	17	CALICHE	○ Y ◉ N	
18	80	62	SAND	○ Y ◉ N	
80	84	4	CLAY	○ Y ◉ N	
84	271	187	SAND	○ Y ◉ N	
271	330	59	BROWN CALY	○ Y ◉ N	
330	337	7	SANDY GRAVEL	◉ Y ○ N	20
337	390	53	CLAY	○ Y ◉ N	
390	470	80	SAND	◉ Y ○ N	18
470	580	110	CLAY	○ Y ◉ N	
580	610	30	SAND	◉ Y ○ N	20
610	642	32	BLUE CLAY	○ Y ◉ N	
642	645	3	RED CLAY	○ Y ◉ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	

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

TOTAL ESTIMATED WELL YIELD (gpm): 58

RECEIVED 2015 FEB 23 AM 10 22 STATE ENGINEER OFFICE

5. TEST; RIG SUPERVISION

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

MISCELLANEOUS INFORMATION:

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

6. SIGNATURE

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

Luis A Duran Luis A. Duran — SIGNATURE OF DRILLER / PRINT SIGNEE NAME

2-12-15 — DATE

FOR OSE INTERNAL USE — WR-20 WELL RECORD & LOG (Version 06/08/2012)

FILE NUMBER	C-3829	POD NUMBER	1	TRN NUMBER	560002

Exp1

26S.32E.4.133

Revised June 1972

STATE ENGINEER OFFICE

WELL RECORD

77 DEC 8 AM 11 54

SANTA FE

STATE ENGINEER OFFICE
SANTA FE, N.M. 87501

Section 1. GENERAL INFORMATION

(A) Owner of well Buck Jackson Owner's Well No. _____
Street or Post Office Address Box 671
City and State Pecos, Texas 79772

Well was drilled under Permit No. C-1777 and is located in the:

a. _____ ¼ _____ ¼ _____ ¼ _____ ¼ of Section 8 Township ~~26-S~~ 26-S Range ~~XXXX~~ 31-E N.M.P.M.

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 W. L. Van Noy License No. WD-208
Address P. O. Box 74 Oil Center, N. M. 88266

Drilling Began Sept. 9, 1977 Completed Sept. 16, 1977 Type tools Spudder Size of hole 10 in.

Elevation of land surface or _____ at well is _____ ft. Total depth of well 325 ft.

Completed well is ☐ shallow ☐ artesian. Depth to water upon completion of well 300 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
300	325	25	course grey water sand.	

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
6 5/8	welded		0	325	325	none	295	325

Section 4. RECORD OF MUDDING AND CEMENTING

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

Section 5. PLUGGING RECORD

Plugging Contractor _____
Address _____
Plugging Method _____
Date Well Plugged _____
Plugging approved by:

_____
State Engineer Representative

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

FOR USE OF STATE ENGINEER ONLY

Date Received

Quad _____ FWL _____ FSL _____

File No. C-1777 Use D-5 Location No. 26.31.8.321434

Temp. SW COR. S. LINE

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	5	5	top soil
5	30	25	caliche
30	150	120	dry sand
150	160	10	blue shale
160	250	90	sandy red shale
250	300	50	red clay
300	325	25	course grey water sand
325	-	-	red bed.

Section 7. REMARKS AND ADDITIONAL INFORMATION

gravel packed 6 yds .

'77 SEP 28 AM 8 22
STATE ENGINEER OFFICE
ROSWELL, N. M.

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

W. L. Van Fray
Driller

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the appropriate district office of the State Engineer. All sections, e[illegible] Section 5, shall be answered as completel[illegible] accurately as possible when any well is drilled, repaired or deepened. When this f[illegible] is used as a plugging record, only Section 1(a) [illegible] Section 5 need be completed.

APPENDIX B CROSS-SECTION SHOWING RUSTLER FORMATION TO SURFACE

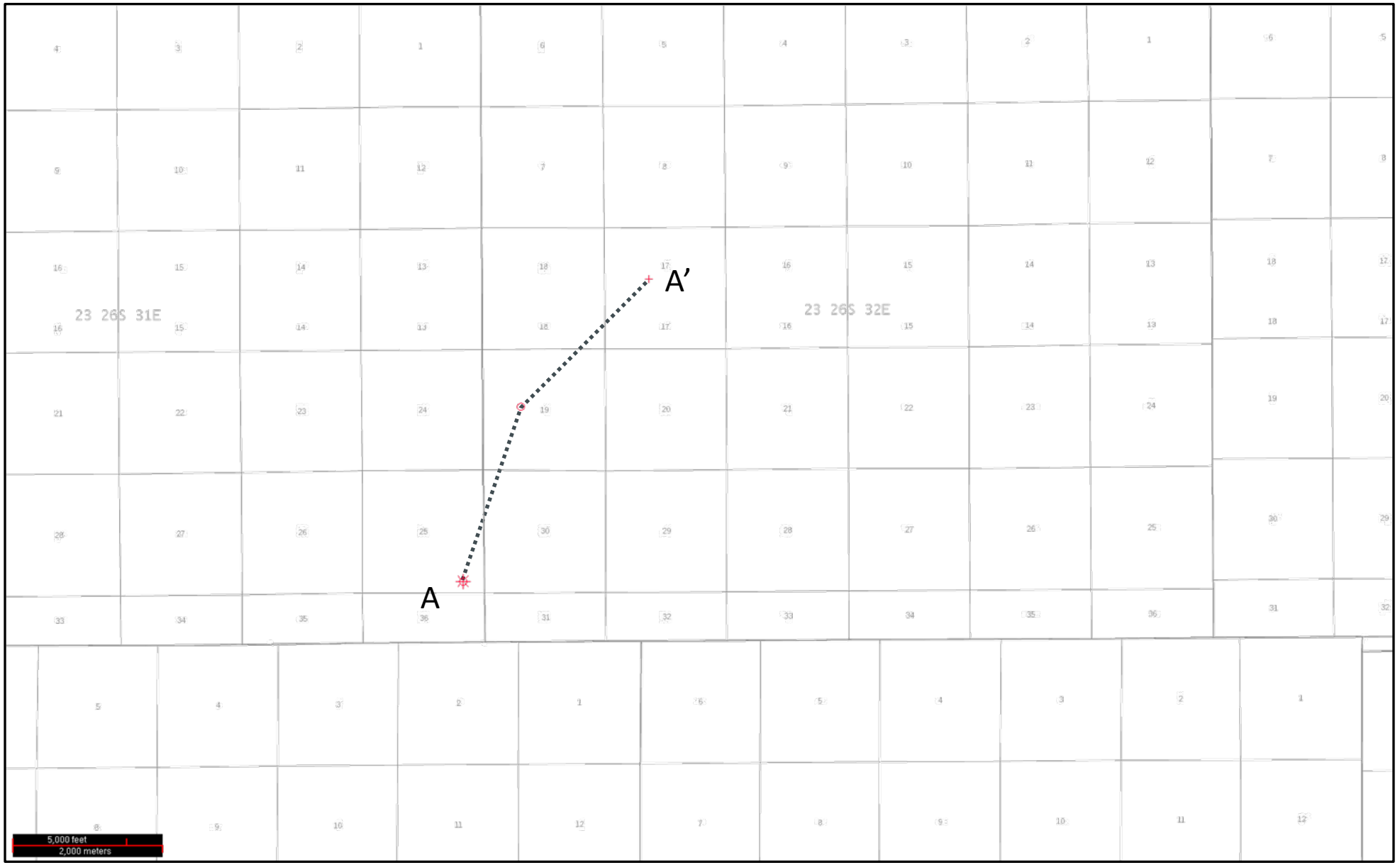
ConocoPhillips

Water Storage Facility – Karst Analysis

Rustler/Salado Depth in Zia Hills AOI

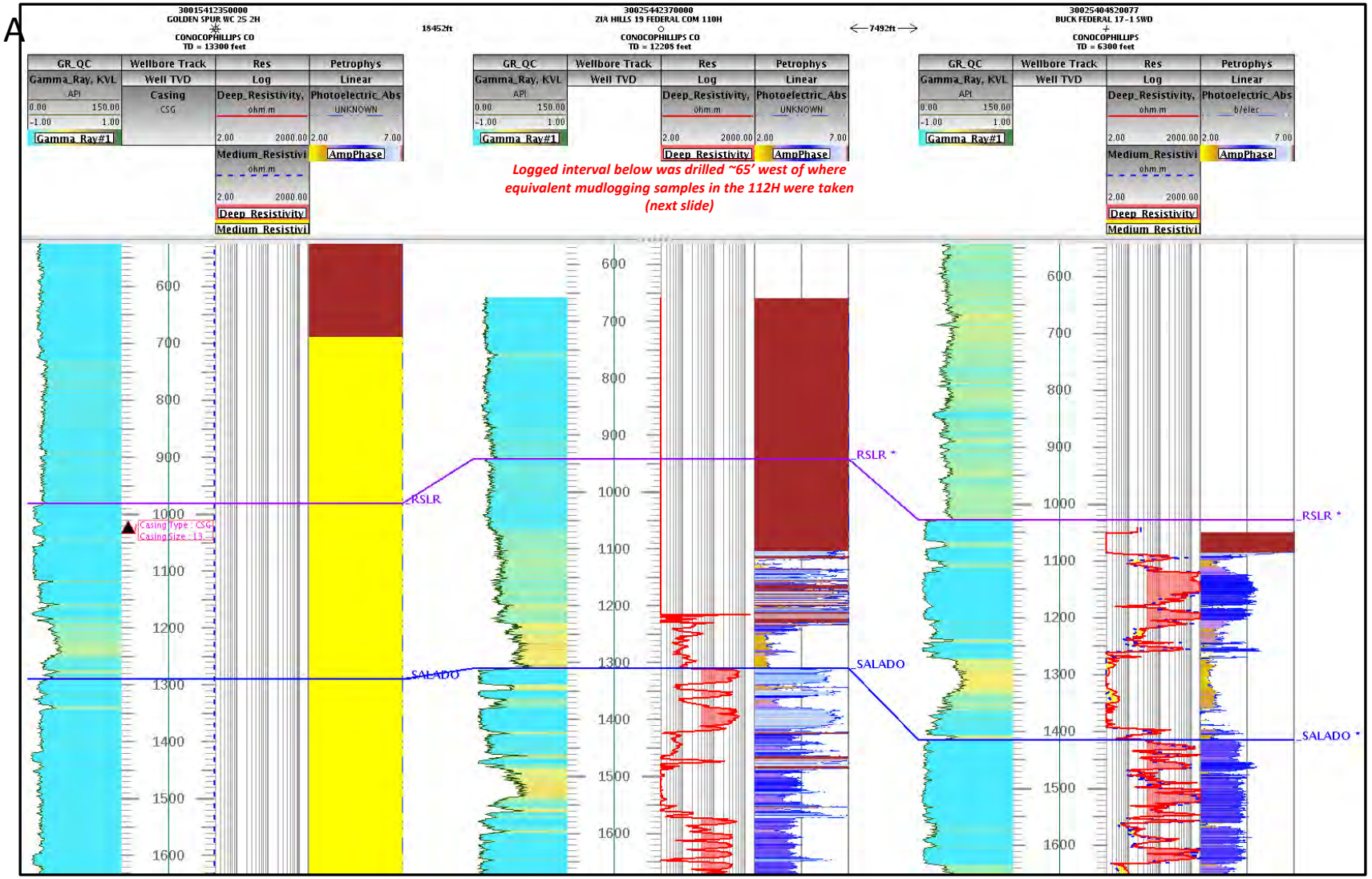
September 16, 2019

Area of Interest



Petrophysical Logs

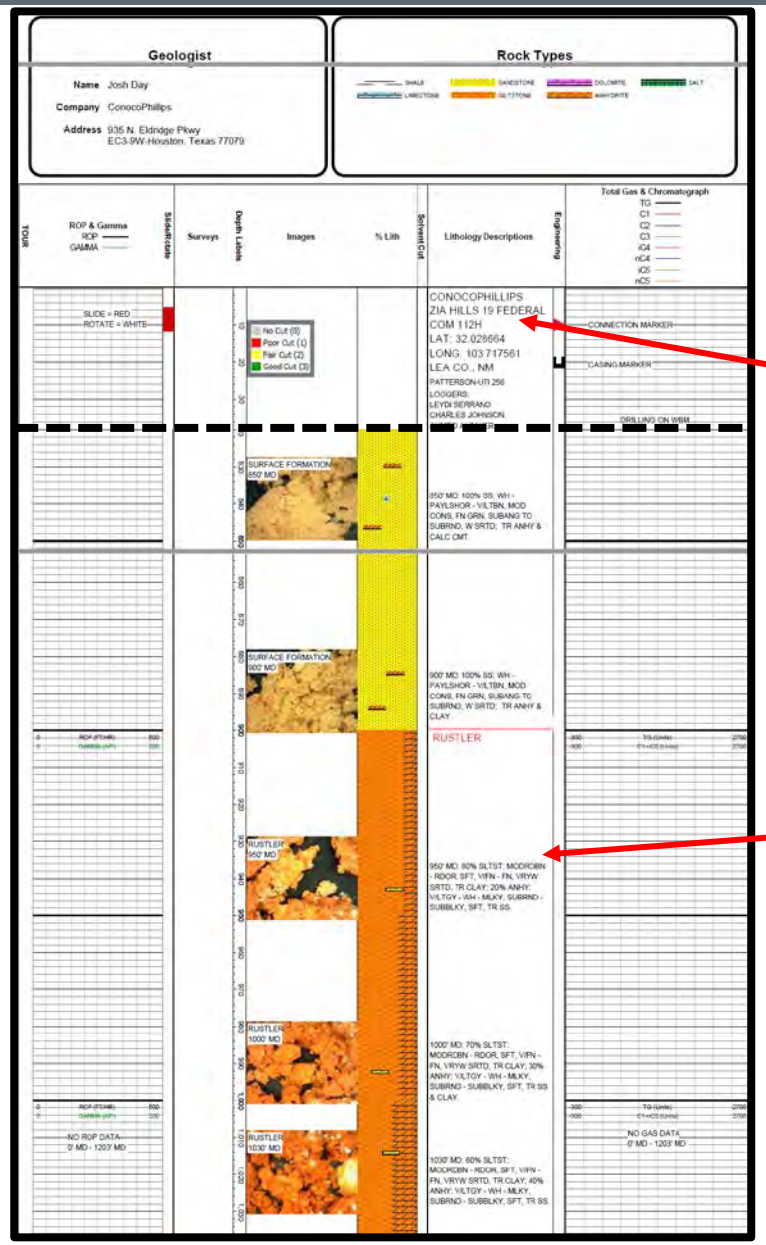
A



A'

Interpretation of Rustler Formation based off of definition and type logs published in:
Lupton et al., ed., 2016, Identification of Potential Brackish Groundwater Production Areas – Rustler Aquifer, TWDB Contract Number 1600011949
https://www.twdb.texas.gov/innovativewater/bracs/projects/HB30_Rustler/index.asp#finalreport

Mudlog



Zia Hills 19 Federal Com 112H (from same pad as the 110H in cross section)

First Rustler samples collected between 900 and 950' MD

ConocoPhillips

APPENDIX C SITE PHOTOGRAPHS

Figure C1 Image is view to the south from the northwest corner of the Superman containment pad.

Figure C2 This image is a view to the northeast from the northeast quadrant of the proposed containment. Caliche float is common throughout the area.

Figure C3 Image is a view to the north of northeast corner stake of Superman containment area. Caliche is exposed as float on ground surface within the thin veneer of eolian sand.

Figure C4 Image is a view to the southeast showing the southeast corner stake of the Superman containment

Figure C5 Image is view to the southeast from the northeastern edge of the closed depression south of the Superman containment (see Figure C6 , below). We walked the entire area of the depression and found no evidence of solution collapse or open conduits caused by karst. Burrows in this area that collects storm water were rare.

Figure C6 This Google Earth image shows the location of selected images described in this Appendix.

Figure C7 Image shows the flat bottom of the closed depression that strongly resembles shallow depressions overlying the Ogallala in Lea County. This image is on the Lea/Eddy line.

Figure C8 This image of the west side of the abandoned caliche pit located about 1200 feet southeast of the Superman containment. Here the caliche horizon is less than 10-feet thick.

Figure C9 This view to the east shows the abandoned caliche pit located about 1000 feet east of the proposed containment. The caliche horizon at this location is about 5-feet thick.

APPENDIX D GEOTECHNICAL REPORT

GEOTECHNICAL REPORT

ZIA HILLS WATER RECYCLING AND REUSE FACILITY TREATED PRODUCED WATER CONTAINMENT

LEA COUNTY, NEW MEXICO

CLIENT:
ConocoPhillips

PROJECT NUMBER:
19-141

REPORT DATE:
October 22, 2019

Magrym Consulting, Inc. • 1510 North Acres Drive • Lovington, NM 88260
phone (432) 999-2737 • web www.MAGRYM.com

October 22, 2019

Ms. Karen Work
Water Management Supervisor
ConocoPhillips
15 West London Road
Loving, New Mexico 88256

Re: Geotechnical Report
Zia Hills Water Treatment and Reuse Facility
Lea County, New Mexico
Project No. 19-141

Dear Ms. Work:

Magrym Consulting, Inc. is pleased to present this geotechnical report for the Zia Hills project in Lea County, New Mexico. This report includes the results of our exploration as well as recommendations for construction.

We appreciate the opportunity to work together. Should you have any questions, please do not hesitate to give us a call.

Sincerely,

Magrym Consulting, Inc.

10/22/2019

Claudius Sanchez Czyzewska, P.E.
Principal Engineer

TABLE OF CONTENTS

INTRODUCTION

This report presents the results of our geotechnical exploration for the Conoco Phillips – Zia Hills Water Treatment and Reuse Facility, located approximately 1 mile north of the Texas state line and 0.5 miles west of Highway 1 in Lea County, New Mexico. The work was performed with the authorization of Karen Work, Water Management Supervisor, ConocoPhillips.

The purpose of this exploration was to obtain subsurface data, to evaluate onsite conditions, and to provide recommendations for construction, harvesting and reuse of in situ soils for in-ground containments.

SCOPE OF SERVICES

The scope of services for this geotechnical exploration includes drilling three boreholes to depths of 30 to 31.5 feet below ground surface, collecting soil samples for laboratory testing and identification, and providing construction recommendations for in-ground containments.

PROPOSED DEVELOPMENT

The Zia Hills Water Treatment and Reuse Facility is situated in Section 30, Township 26 South, Range 32 East. The facility consists of a lease area with dimensions of 1000 feet by 1000 feet dedicated to in-ground storage of treated produced water and a nearby lease area with dimensions of 920 feet by 275 feet dedicated to water treatment. The in-ground storage area will include a dual cell in-ground containment, a topsoil stockpile area, a water transfer operations pad and access to the site. This water treatment and reuse facility will be constructed to support well stimulation and production operations in the North Mason Oil Field. This facility will be registered with the New Mexico Oil Conservation Division.

A dual cell in-ground earthen containment will provide a combined storage capacity of treated produced water of 1 million barrels at 3-foot of freeboard. Each of these containments will have a capacity of 500,000 barrels. They will be constructed with earthen levees and synthetic liners.

SITE OBSERVATIONS AND GEOLOGY

The Zia Hills site is currently undeveloped. The vegetation consists of low mesquite bushes and grasses with an approximate ground cover of 80 percent. The topography of the site is relatively flat with a mild slope to the southeast. The site drains into a depression approximately 500 feet to the southeast. Little to no hydraulic action and surface erosion was observed within the site vicinity.

The site is situated in the extreme southwest corner of Lea County, in a low south-facing scarpe known as Paduca Breaks[1]. The area is a continuation of the South Plain physiographic region, with irregular topography and no integrated drainage. The site geology consists of a thin sand veneer over caliche. Beneath the caliche (not encountered in BH-3) is reddish tan sand.

[1] Nicholson, Alexander Jr., & Clebsh, Alfred Jr., *Geology and Ground-Water Conditions in Southern Lea County, New Mexico* (Ground-Water Report 6). United States Geological Survey.

SITE EXPLORATION

On October 9, 2019, three exploratory borings were advanced to approximately 30 feet below ground surface utilizing a truck mounted drill rig and hollow stem auger. Borehole locations and details are summarized in Table 1.

Table 1: Borehole Locations

Borehole Number	Latitude	Longitude	Surface Elevation (ft)	Borehole Depth (ft)	Groundwater Depth
BH-1	N32°00'54.42"	W103°43'03.85"	3152.3	31.5	N/A
BH-2	N32°00'54.40"	W103°43'00.57"	3147.9	30.0	N/A
BH-3	N32°00'49.53"	W103°43'02.23"	3145.4	30.0	N/A

Soil samples were obtained at select intervals using Standard Penetration Tests (SPT) and a split-spoon sampling device. Drilling and sampling operations were performed in accordance with:

> ASTM D1586-11 *Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils.*

Soil samples were delivered to Beyond Engineering and Testing, LLC construction materials testing laboratory in Midland, Texas for testing. Laboratory testing was performed in accordance with the following ASTM Standards:

> ASTM D6913-17 *Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis*
>
> ASTM D4318-17 *Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils*
>
> ASTM D2487-17 *Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)*

All soils within the borings were identified as silty sand and poorly graded sand. These materials were dry and non-plastic. Laboratory test results are summarized in Table 2.

Table 2: Lab Testing Results Summary

Borehole Number	Interval Sample (feet)	Atterberg Limits	Percent Passing #200 Sieve	USCS Soil Classification
BH-2	15.0 to 16.5	Non Plastic	4.7	SP
BH-3	4.0 to 5.2	Non Plastic	17.9	SM

Based upon laboratory test results and field logs, a typical subsurface profile was developed for this site and illustrated in Table 3.

Table 3: Typical Subsurface Profile

Strata	Depth Interval (feet)	Description
Stratum 1	0 to 0.5	Silty Sand (Topsoil)
Stratum 2	0.5 to 8	Caliche
Stratum 3	8 to 30	Silty Sand

In general, the upper surface profile consists of reddish-brown silty sand. This stratum is approximately 0 to 10 inches thick and is covered with established vegetation.

Below the topsoil lies tan silty sand, known as caliche. This layer is exhibited in all borings but is the thickest in the southernmost boring (BH-3). In boring 3, the caliche is present from 10 inches to 30 feet below ground surface. The caliche is very dense at BH-3 and may be difficult to excavate. The caliche in two northern borings (BH-1 and BH-2) was less thick (8 to 10 feet) and significantly less dense, as shown in the attached boring logs.

Present only in BH-1 and BH-2 was a layer of poorly graded sand. This sand was reddish tan in color and contained minor amounts of fine-grained soil. Poorly graded sands are non-plastic and perform poorly as foundations when not confined.

In accordance with the United States Department of Agriculture Web Soil Survey, soil material used in the construction of levees must be resistant to seepage, piping and erosion and have favorable compaction characteristics.

The Unified Facilities Guide Specifications Division 35[2] states that all insitu soils encountered in this exploration are suitable for levee construction. While suitable for levee construction, these soils may prove challenging when used to elevate or raise engineered pads and levees above ground surface. The lack of cohesion may encourage sloughing when soils are dried out by wind, and gullying caused by rainfall.

If at the time of construction, soils appear to sluff, a caliche cap is recommended along the surface and keyed into the levees to encase the native soils and slow down the weathering process.

Groundwater was not encountered at the time of this exploration.

[2] Unified Facilities Guide Specifications Division 35 41 00 Levee Construction. November 2018. Part 1.3.4 Satisfactory Materials.

RECOMMENDATIONS

Topsoil shall be stripped and stockpiled on site, in accordance with New Mexico Administrative Code 19.15.34.12.B, for use during closure operations.

Topsoil with organic materials shall not be used or mixed with other materials for construction. Organic matter decays overtime creating voids which may lead to settlement.

Opportunities for harvesting of in-situ soils appear to be available. The caliche soils encountered are suitable for levee and pad construction. The recommended slope ratio shall not be steeper than three horizontal feet to one vertical foot (3H:1H).

Soils that are to be reused for construction of levees should be segregated to avoid mixing of soil types. If construction allows for a composite sample to be used, material should be processed in its entirety prior to sampling for maximum density (ASTM D 698).

Soils should be placed in 10-inch loose lifts for compaction.

Once placed, soils should be compacted to 95% maximum dry density of ASTM D 698 at the optimum (plus or minus 2 percent) moisture content.

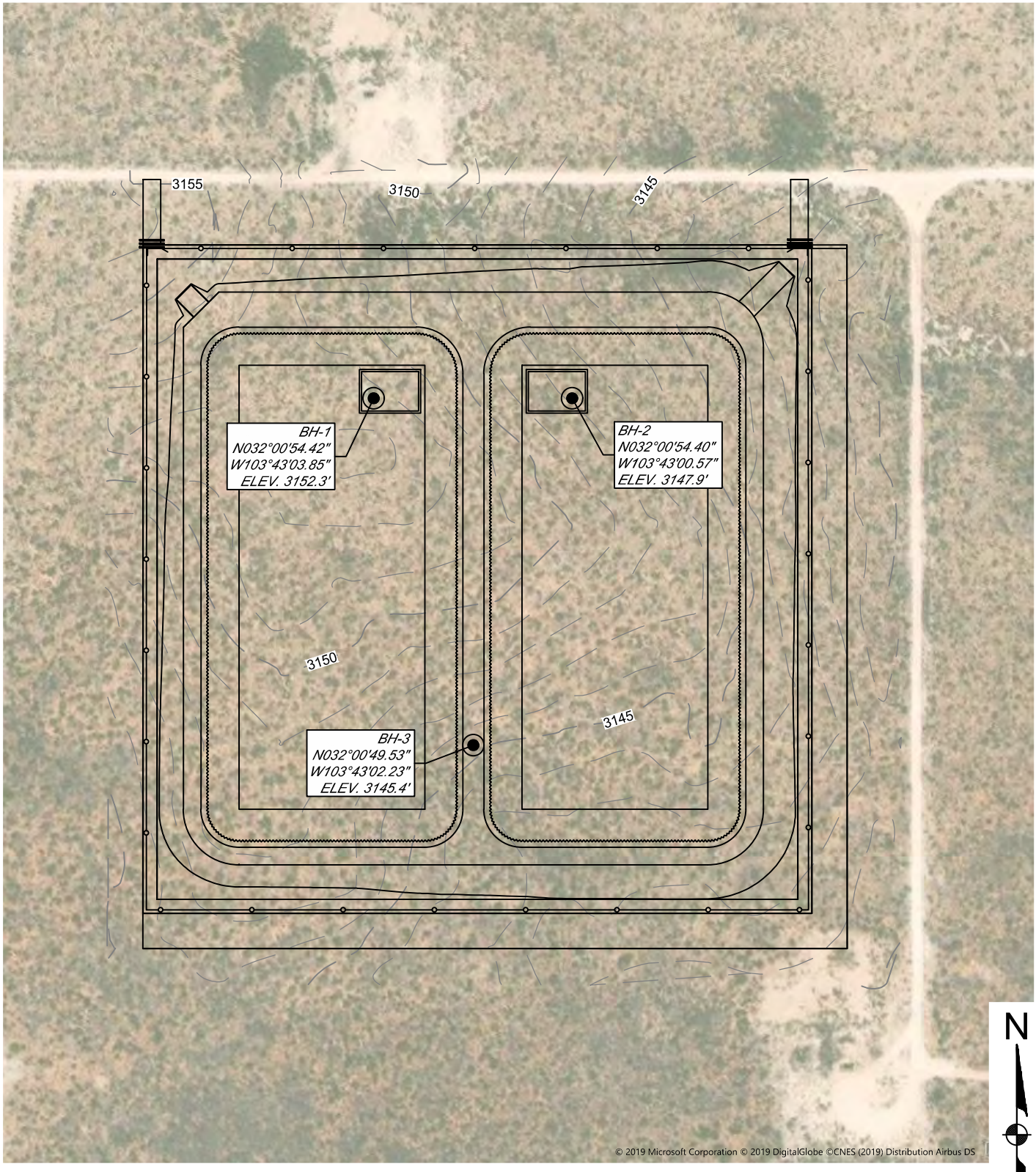
If the client and engineer decide to forgo testing, a qualified individual should provide daily construction observation to ensure good engineering practices are implemented.

CLOSURE

The geotechnical investigation was performed using the standard of care and skill ordinarily exercised by geotechnical engineers practicing in this area and under similar circumstances. No warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

The samples taken and used for testing and the observation are believed to be representative of the entire area. However, soil and geologic conditions can vary significantly between test pits. As in many developments, conditions revealed by excavations may differ with preliminary findings. The geotechnical engineer shall evaluate any discrepancies encountered in the field.

BOREHOLE MAP



Magrym Consulting Inc.
1510 North Acres Drive
Lovington, NM 88260
432-999-2737
www.magrym.com
TBPE F-19848

ZIA HILLS WATER TREATMENT AND REUSE FACILITY
S30, T26S, R32E
LEA COUNTY, NM

BOREHOLE MAP

PRINT DATE: 10/15/2019
PROJECT NO. 19-141
CLIENT:ConocoPhillips

Drawing File: C:\Users\Ranusha Watt\Desktop\Training Sample Drawings\magrym template -BH.dwg

BOREHOLE LOGS

Client:		Project Number:	Project:	MAGRYM
ConocoPhillips		19-141	Zia Hills/Superman	
Boring No.:		Date Drilled:	Drilling Contractor:	Drill Rig Type
BH-1		10/9/2019	Atkins Engineering	Hollow Stem Auger
Lat:	32.015117	Groundwater Depth:	Elevation:	Total Depth of boring:
Long:	-103.717736	N/A	3152.3'	31' 6"

Depth (feet)	Graphic Log	Sample Type	blows/foot (n-value)	Tests	Material Description and Comments	
					Brown Silty Sand (Topsoil) 6"	
1		SPT	17		**Tan Silty Sand (Caliche)**	*12" recovery*
2						
3		SPT	10			*12" recovery*
4						
5		SPT	28			*18" recovery*
6						
7		SPT	11			*18" recovery*
8						
9		SPT	11		**Reddish Tan Poorly Graded Sand**	*18" recovery*
10						
11		SPT	10			*18" recovery*
12						
13						
14						
15		SPT	19			*18" recovery*
16						
17						
18						
19						
20		SPT	24			*18" recovery*
21						
22						
23						
24						
25		SPT	39			*18" recovery*
26						
27						
28						
29						
30		SPT	31			*18" recovery*
31						
32						

Total Depth: 31' 6"

Client:	Project Number:	Project:	
ConocoPhillips	19-141	Zia Hills/Superman	MAGRYM
Boring No.:	Date Drilled:	Drilling Contractor:	Drill Rig Type
BH-2	10/9/2019	Atkins Engineering	Hollow Stem Auger
Lat: 32.015111	Groundwater Depth:	Elevation:	Total Depth of boring:
Long: -103.716825	N/A	3147.9'	30'

Depth (feet)	Graphic Log	Sample Type	blows/foot (n-value)	Tests	Material Description and Comments	
					Brown Silty Sand (Topsoil) 6"	
1		SPT	59		**Tan Silty Sand (Caliche)**	*12" recovery*
2						
3		SPT	15			*16" recovery*
4						
5		SPT	18			*12" recovery*
6						
7		SPT	11			*15" recovery*
8						
9		SPT	25			*15" recovery*
10		SPT	29		**Reddish Tan Poorly Graded Sand**	*12" recovery*
11						
12						
13						
14						
15		SPT	21	Sieve Analysis (%passing) 3/8"=100.0 ; No. 4=98; No. 40=98; No. 200=4.7 Non-Plastic 2.8% Moisture		*18" recovery*
16						
17						
18						
19						
20		SPT	30			*14" recovery*
21						
22						
23						
24						
25		SPT	79/11"			*11" recovery*
26						
27						
28						
29						
30		SPT	10/0"			*no sample recovery*
31						

Total Depth: 30'

Client:		Project Number:	Project:	MAGRYM
ConocoPhillips		19-141	Zia Hills/Superman	
Boring No.:		Date Drilled:	Drilling Contractor:	Drill Rig Type
BH-3		10/9/2019	Atkins Engineering	Hollow Stem Auger
Lat:	32.013758	Groundwater Depth:	Elevation:	Total Depth of boring:
Long:	-103.71728	N/A	3145.4'	30'

Depth (feet)	Graphic Log	Sample Type	blows/foot (n-value)	Tests	Material Description and Comments	
					Brown Silty Sand (Topsoil) 10"	
1		SPT	42		**Tan Silty Sand (Caliche)**	*16" recovery*
2						
3		SPT	56			*18" recovery*
4						
5		SPT	64/8"	Sieve Analysis (%passing) 3/8"= 100.0 ; No.4= 91; No.40= 57; No.200= 17.9	Non-Plastic 3.4% Moisture	*18" recovery*
6						
7		SPT	29/2"			*4" recovery*
8						
9		SPT	50/6"			*6" recovery*
10						
11		SPT	16/1"			*no sample recovery*
12						
13						
14						
15						
16		SPT	50/6"			*3" recovery*
17						
18						
19						
20						
21		SPT	78/11"			*17" recovery*
22						
23						
24						
25						
26		SPT	10/0"			*no sample recovery*
27						
28						
29						
30						
31		SPT	12/0"			*no sample recovery*

Total Depth: 30'

LABORATORY TESTS

www.BeyondET.com
3011-B South County Road 1260
Midland, Texas 79706
432.561.5780

TO: Magrym Consulting, PC
Attn: Claudius Sanchez
1510 North Acres Dr.
Loving, New Mexico 88260

PROJECT: Magrym Misc. Testing
--
--
PROJECT NO.: WT1909260

TECHNICIAN: V. Moreno

DATE: October 11, 2019
REPORT NO.: 909260.1011.7455A
PDF ID: 1011.7455A-MAQ

MATERIAL QUALIFICATIONS

Material Description: Brown Sand
Sample Date: 10/11/2019
Sample ID: S-620
Sample Information: Conoco Superman BH-2 15'-16'6"
Sample By: Client

Sieve Size	ASTM C136 & D1140 Percent Retained	ASTM D2216 Moisture Content
3/8"	0	2.8 %
No. 4	2	
No. 10	2	
No. 40	15	
No. 200	95.3	

ASTM D4318 Atterberg Limits		ASTM D2487 Soil Classification
Liquid Limit:	-	SP; Poorly graded sand
Plastic Limit:	Non Plastic	
Plasticity Index:	-	

Remarks:

Beyond Engineering and Testing, LLC

Quality Review

www.BeyondET.com
3011-B South County Road 1260
Midland, Texas 79706
432.561.5780

TO: Magrym Consulting, PC
Attn: Claudius Sanchez
1510 North Acres Dr.
Loving, New Mexico 88260

PROJECT: Magrym Misc. Testing
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PROJECT NO.: WT1909260

TECHNICIAN: V. Moreno

DATE: October 11, 2019
REPORT NO.: 909260.1011.7455B
PDF ID: 1011.7455B-MAQ

MATERIAL QUALIFICATIONS

Material Description: Tan Silty Sand
Sample Date: 10/11/2019
Sample ID: S-621
Sample Information: Conoco Superman BH-3 4'-5'2"
Sample By: Client

Sieve Size	ASTM C136 & D1140 Percent Retained	ASTM D2216 Moisture Content
3/8"	0	3.4
No. 4	9	
No. 10	22	
No. 40	43	
No. 200	82.1	

ASTM D4318 Atterberg Limits		ASTM D2487 Soil Classification
Liquid Limit:	-	SM; Silty sand
Plastic Limit:	Non Plastic	
Plasticity Index:	-	

Remarks:

Beyond Engineering and Testing, LLC

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