

# Initial Application Part I

Received 6/10/21

*This application is placed in file for record. It MAY or MAY NOT have been reviewed to be determined Administratively Complete*

RECEIVED: <b>6/10/21</b>	REVIEWER:	TYPE: <b>SWD</b>	APP NO: <b>pBL2116243299</b>
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ABOVE THIS TABLE FOR OCD DIVISION USE ONLY

**NEW MEXICO OIL CONSERVATION DIVISION**  
 - Geological & Engineering Bureau -  
 1220 South St. Francis Drive, Santa Fe, NM 87505

**ADMINISTRATIVE APPLICATION CHECKLIST**

THIS CHECKLIST IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND  
 REGULATIONS WHICH REQUIRE PROCESSING AT THE DIVISION LEVEL IN SANTA FE

**Applicant:** Anthem Water Solutions, LLC **OGRID Number:** 330069  
**Well Name:** Elf Owl 182129 Federal SWD 1 **API:** 30-015-XXXXX  
**Pool:** SWD; Devonian-Silurian **Pool Code:** 97869

**SUBMIT ACCURATE AND COMPLETE INFORMATION REQUIRED TO PROCESS THE TYPE OF APPLICATION  
 INDICATED BELOW**

**1) TYPE OF APPLICATION:** Check those which apply for [A]

A. Location – Spacing Unit – Simultaneous Dedication

☐ NSL☐ NSP (PROJECT AREA)☐ NSP (PRORATION UNIT)☐ SD

B. Check one only for [ I ] or [ II ]

[ I ] Commingling – Storage – Measurement

☐ DHC☐ CTB☐ PLC☐ PC☐ OLS☐ OLM

[ II ] Injection – Disposal – Pressure Increase – Enhanced Oil Recovery

☐ WFX☐ PMX☒ SWD☐ IPI☐ EOR☐ PPR**SWD-2423****2) NOTIFICATION REQUIRED TO:** Check those which apply.A. ☒ Offset operators or lease holdersB. ☐ Royalty, overriding royalty owners, revenue ownersC. ☒ Application requires published noticeD. ☒ Notification and/or concurrent approval by SLOE. ☒ Notification and/or concurrent approval by BLMF. ☒ Surface ownerG. ☒ For all of the above, proof of notification or publication is attached, and/or,H. ☐ No notice required**FOR OCD ONLY**☐

Notice Complete

☐Application  
Content  
Complete

- 3) CERTIFICATION:** I hereby certify that the information submitted with this application for administrative approval is **accurate** and **complete** to the best of my knowledge. I also understand that **no action** will be taken on this application until the required information and notifications are submitted to the Division.

**Note: Statement must be completed by an individual with managerial and/or supervisory capacity.**

**Marshall Tippen**

Print or Type Name

Signature

6/9/2021

Date

**(972) 795-4201**

Phone Number

**mtippen@anthemwsllc.com**

e-mail Address



6/9/2021

New Mexico Oil Conservation Division  
1220 South St. Francis Drive  
Santa Fe, New Mexico, 87505

Re: Application of Anthem Water Solutions, LLC to drill and permit the saltwater disposal well Elf Owl 182129 Federal SWD 1 located in Unit O, Section 18, Township 21 South, Range 29 East, NMPM, Eddy County, New Mexico.

To Whom it May Concern:

Please find the enclosed C-108 Application for Authority to Inject, supporting the above-referenced request for saltwater disposal. The well will be operated as a commercial endeavor offering operations in the area additional options for produced water disposal. Please find the enclosed C-108 Application for Authority to Inject along with supporting documents.

I would like to point out that this application for a proposed Devonian-Silurian SWD interval includes the following: Published legal notice ran 5/25/2021 in Carlsbad Current-Argus and all offset operators and other interested parties have been notified individually. The legal notice affidavit is included herein. This application also all information required for a completed Form C-108, as well as a wellbore schematic, area of review maps, affected party plat and other required and pertinent information. This well is located on federal land and federal minerals; a copy of the application has been sent to the appropriate regulatory bodies.

I respectfully request that the approval of this saltwater disposal well proceed swiftly and if your staff requires additional information or has any questions, please do not hesitate to call or email me.

Sincerely,


A handwritten signature in blue ink, appearing to read "Marshall Tippen".

Marshall Tippen

Anthem Water Solutions

[mtippen@anthemwsllc.com](mailto:mtippen@anthemwsllc.com) | (972) 795-4201

**APPLICATION FOR AUTHORIZATION TO INJECT**

- I. PURPOSE: \_\_\_\_\_ Secondary Recovery \_\_\_\_\_ Pressure Maintenance   X   Disposal \_\_\_\_\_ Storage  
Application qualifies for administrative approval?   X   Yes \_\_\_\_\_ No
- II. OPERATOR:   Anthem Water Solutions, LLC    
ADDRESS:   5914 W. Courtyard Drive, Suite 320, Austin TX 78730    
CONTACT PARTY:   Marshall Tippen   PHONE:   (979) 795-4201
- III. WELL DATA: Complete the data required on the reverse side of this form for each well proposed for injection.  
Additional sheets may be attached if necessary.
- IV. Is this an expansion of an existing project? \_\_\_\_\_ Yes   X   No  
If yes, give the Division order number authorizing the project: \_\_\_\_\_
- V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.
- VI. Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.
- VII. Attach data on the proposed operation, including:
1. Proposed average and maximum daily rate and volume of fluids to be injected;
  2. Whether the system is open or closed;
  3. Proposed average and maximum injection pressure;
  4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and,
  5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).
- \*VIII. Attach appropriate geologic data on the injection zone including appropriate lithologic detail, geologic name, thickness, and depth. Give the geologic name, and depth to bottom of all underground sources of drinking water (aquifers containing waters with total dissolved solids concentrations of 10,000 mg/l or less) overlying the proposed injection zone as well as any such sources known to be immediately underlying the injection interval.
- IX. Describe the proposed stimulation program, if any.
- \*X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division, they need not be resubmitted).
- \*XI. Attach a chemical analysis of fresh water from two or more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and dates samples were taken.
- XII. Applicants for disposal wells must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground sources of drinking water.
- XIII. Applicants must complete the "Proof of Notice" section on the reverse side of this form.
- XIV. Certification: I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.
- NAME:   Marshall Tippen   TITLE:   Director of Engineering    
SIGNATURE:      DATE:   6/9/2021    
E-MAIL ADDRESS:   mtippen@anthemwsllc.com
- \* If the information required under Sections VI, VIII, X, and XI above has been previously submitted, it need not be resubmitted. Please show the date and circumstances of the earlier submittal: \_\_\_\_\_



### III. WELL DATA

A. The following well data must be submitted for each injection well covered by this application. The data must be both in tabular and schematic form and shall include:

- (1) Lease name; Well No.; Location by Section, Township and Range; and footage location within the section.
- (2) Each casing string used with its size, setting depth, sacks of cement used, hole size, top of cement, and how such top was determined.
- (3) A description of the tubing to be used including its size, lining material, and setting depth.
- (4) The name, model, and setting depth of the packer used or a description of any other seal system or assembly used.

Division District Offices have supplies of Well Data Sheets which may be used or which may be used as models for this purpose. Applicants for several identical wells may submit a "typical data sheet" rather than submitting the data for each well.

B. The following must be submitted for each injection well covered by this application. All items must be addressed for the initial well. Responses for additional wells need be shown only when different. Information shown on schematics need not be repeated.

- (1) The name of the injection formation and, if applicable, the field or pool name.
- (2) The injection interval and whether it is perforated or open-hole.
- (3) State if the well was drilled for injection or, if not, the original purpose of the well.
- (4) Give the depths of any other perforated intervals and detail on the sacks of cement or bridge plugs used to seal off such perforations.
- (5) Give the depth to and the name of the next higher and next lower oil or gas zone in the area of the well, if any.

### XIV. PROOF OF NOTICE

All applicants must furnish proof that a copy of the application has been furnished, by certified or registered mail, to the owner of the surface of the land on which the well is to be located and to each leasehold operator within one-half mile of the well location.

Where an application is subject to administrative approval, a proof of publication must be submitted. Such proof shall consist of a copy of the legal advertisement which was published in the county in which the well is located. The contents of such advertisement must include:

- (1) The name, address, phone number, and contact party for the applicant;
- (2) The intended purpose of the injection well; with the exact location of single wells or the Section, Township, and Range location of multiple wells;
- (3) The formation name and depth with expected maximum injection rates and pressures; and,
- (4) A notation that interested parties must file objections or requests for hearing with the Oil Conservation Division, 1220 South St. Francis Dr., Santa Fe, New Mexico 87505, within 15 days.

NO ACTION WILL BE TAKEN ON THE APPLICATION UNTIL PROPER PROOF OF NOTICE HAS BEEN SUBMITTED.

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NOTICE: Surface owners or offset operators must file any objections or requests for hearing of administrative applications within 15 days from the date this application was mailed to them.

## Item III – Subject Well Data (Attachment 1)

### A. Well Data

#### 1) General Well Data

Operator: Anthem Water Solutions, LLC

Lease Name and Well Number: Elf Owl 182129 Federal SWD 1

Location Footage Calls: 70' from FSL, 2196' from FEL

Legal Location: Unit O, Section 18, Township 21 South, Range 29 East, NMPM

Ground Elevation: 3288 feet

Proposed Injection Interval: 13,702 - 14,598 (open hole)

County: Eddy

#### 2) - 3) Casing , Tubing & Cement Information

Casing Information						
Type	Conductor (1)	Surface (2)	Intermediate (3)	Production (4)	Liner (5)	Open Hole (6)
OD	30"	16"	13 3/8"	9 5/8"	7 5/8"	N/A
Weight	N/A	84 lb / ft	68 lb / ft	53.5 lb / ft	39 lb / ft	N/A
Grade	N/A	J-55 BTC	L-80 EZ-GO FJ3	HCP-110 BTC	HCP-110 EZ-GO FJ3	N/A
Hole Size	N/A	18 1/8"	14 3/4"	12 1/4"	8 1/2"	6 1/2"
Depth Set Top	-	-	-	-	10,734	13,702
Depth Set Bottom	120	242	3,028	10,934	13,702	14,598
TOC	Surf	Surf	Surf	Surface	0	0
TOC Method	Circ	Circ	Circ	Circ	CBL	0
Volume (Sacks)	250	122	540	3,222	492	N/A
DV Tool 1	N/A	N/A	N/A	3,128	N/A	N/A
DV Tool 2	N/A	N/A	N/A	8,651	N/A	N/A

Tubing Information		
Type	Upper String (7)	Lower String (8)
OD	5 1/2"	4 1/2"
Weight	20 lb / ft	18 lb / ft
Grade	HCL-80 BTC	HCL-80 LTC
Hole Size	N/A	N/A
Depth Set Top	-	10,634
Depth Set Bottom	10,634	13,652

*\*Wellbore Diagram Attached*

#### 4) Packer Information:

Arrowset AS1-X or equivalent packer set at approximately 13652 feet

*\*Packer Schematic Attached*

## B. Completion Information

- 1) **Injection Formation Name:** Devonian-Silurian  
**Pool Name:** SWD; Devonian-Silurian  
**Pool Code:** 97869
- 2) **Injection Interval:** 13,702 - 14,598 (open hole)
- 3) **Drilling Purpose:** Drilled for injection
- 4) **Overlying Oil and Gas Zones:** Below are approximate tops for known oil and gas producing zones in the area.
  - Delaware: 2978'
  - Bone Spring: 7754'
  - Wolfcamp: 10052'
  - Strawn: 11390'
  - Atoka: 11753'
  - Morrow: 12386'
- 5) **Underlying Oil and Gas Zones:** No underlying oil and gas zones exist.

## **Item V – Well and Lease Maps (Attachment 2)**

- 1) **2-mile oil & Gas Well Map**
- 2) **1-mile Well Detail List**
- 3) **2-Mile Lease Map**
- 4) **2-Mile Mineral Ownership Map**
- 5) **2-Mile Surface Ownership map**
- 6) **1.5-Mile Deep SWD Map (Devonian-Silurian)**
- 7) **Potash Lease Map**

## **Item VI – AOR Well List (Attachment 2)**

There have been 8 wells drilled within the 1-mile AOR. None of these wells nor any new or permitted wells penetrate the injection zone.

## **Item VII – Proposed Operation (Attachment 3)**

- 1) **Proposed Maximum Injection Rate:** 30,000 bwpd  
**Proposed Average Injection Rate:** 15,000 bwpd
- 2) A **closed system** will be used.
- 3) **Proposed Maximum Injection Pressure:** 2740 psi (surface)
- 4) **Proposed Average Injection Pressure:** 1644 psi (surface)
- 5) **Source Water Analysis:** It is expected that the injected fluid will consist of water produced from the Wolfcamp and Bone Springs formations. Water samples from these formations are included in Attachment 3.
- 6) **Injection Formation Water Analysis:** The proposed SWD will be injecting water into the Devonian-Silurian formation which is a non-productive zone known to be compatible with formation water from the Wolfcamp and Bone Springs formations. Water analyses from the Devonian-Silurian formation in the area are included in attachment 3.

## **Item VIII – Geologic Description**

The proposed injection interval includes the Devonian–Silurian formation from 13,702 feet to 14,598 feet. This formation consists of interbedded carbonate rocks consisting of dolomites and limestones with some interbedded siltstones and shales. Several thick sections of porous and permeable intervals capable of taking water are present within the subject formations in the area.

The base of the lowermost Underground Source of Drinking Water (USDW) is at a depth of approximately 142 feet. The USDW is covered by 16-inch casing set at 242 feet and cemented to surface, additionally the USDW is covered by intermediate casing set at 3028 feet and cemented to surface. Geophysical log assessment was conducted to accurately determine the top of the Rustler formation, as well as the top and base of the Salado formation in the area.

## **Item IX – Proposed Stimulation**

A small cleanup acid job may be used to remove mud and drill cutting from the formation. However, no other formation stimulation is currently planned.

## **Item X – Logging and Test Data**

Log data will be submitted to the OCD upon completion of this well.

## **Item XI – Fresh Groundwater Samples (Attachment 4)**

Based on a review of the data from the New Mexico Office of State Engineer there are no fresh water wells within a 1-mile radius of the proposed location. As a result, no groundwater samples were obtained.

## **XII – No Hydrologic Connection Statement (Attachment 5)**

Anthem has examined available geologic and engineering data, and has found no evidence of faulting present in the area that would provide a hydrologic connection between the injection interval and overlying USDWs. Additionally, the casing and cementing program has been designed to further insure there will be no hydrologic connection between the injection interval and overlying USDWs. A letter from a knowledgeable and qualified expert stating that there is a low risk of seismic activity from the proposed injection activities is included in Attachment 5.

## **XIII – Proof of Notice (Attachment 6)**

A Public Notice was filed with Carlsbad Current-Argus and an affidavit is included in Attachment 6.

A copy of the application was mailed to the OCD District Office, landowners, appropriate regulatory bodies, and leasehold operators within a 1-mile radius of the proposed SWD location. A list of recipients, as well as delivery confirmations, is included in Attachment 6.

## **Attachments Table of Content:**

### **Attachment 1:**

C-102

Proposed Wellbore Diagram

Packer Schematic

### **Attachment 2:**

2-mile Oil & Gas Well Map

1-mile Well Detail List

2-Mile Lease Map

2-Mile Mineral Ownership Map

2-Mile Surface Ownership map

1.5-Mile Deep SWD Map (Devonian-Silurian)

Potash Lease Map

### **Attachment 3:**

Source Water Analysis

Formation Water Analysis

### **Attachment 4:**

1-Mile Fresh Ground Water Map

Fresh Ground Water Samples

### **Attachment 5:**

Letter of Seismic Activity

### **Attachment 6:**

Public Notice Affidavit

List of Notification Applicants & Delivery Confirmations

## Attachment 1: Form C-102

District I  
1625 N. French Dr., Hobbs, NM 88240  
Phone: (575) 393-6161 Fax: (575) 393-0720  
District II  
811 S. First St., Artesia, NM 88210  
Phone: (575) 748-1283 Fax: (575) 748-9720  
District III  
1000 Rio Brazos Road, Aztec, NM 87410  
Phone: (505) 334-6178 Fax: (505) 334-6170  
District IV  
1220 S. St. Francis Dr., Santa Fe, NM 87505  
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico  
Energy, Minerals & Natural Resources Department  
OIL CONSERVATION DIVISION  
1220 South St. Francis Dr.  
Santa Fe, NM 87505

Form C-102  
Revised August 1, 2011  
Submit one copy to appropriate  
District Office  
☐ AMENDED REPORT

## WELL LOCATION AND ACREAGE DEDICATION PLAT

<sup>1</sup> API Number 30-015-XXXXXX		<sup>2</sup> Pool Code 97869		<sup>3</sup> Pool Name SWD; Devonian-Silurian	
<sup>4</sup> Property Code		<sup>5</sup> Property Name Elf Owl 182129 Federal SWD			<sup>6</sup> Well Number 1
<sup>7</sup> OGRID No. 330069		<sup>8</sup> Operator Name Anthem Water Solutions, LLC			<sup>9</sup> Elevation 3288

<sup>10</sup> Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
O	18	21S	29E		70	South	2,196	East	Eddy

<sup>11</sup> Bottom Hole Location If Different From Surface

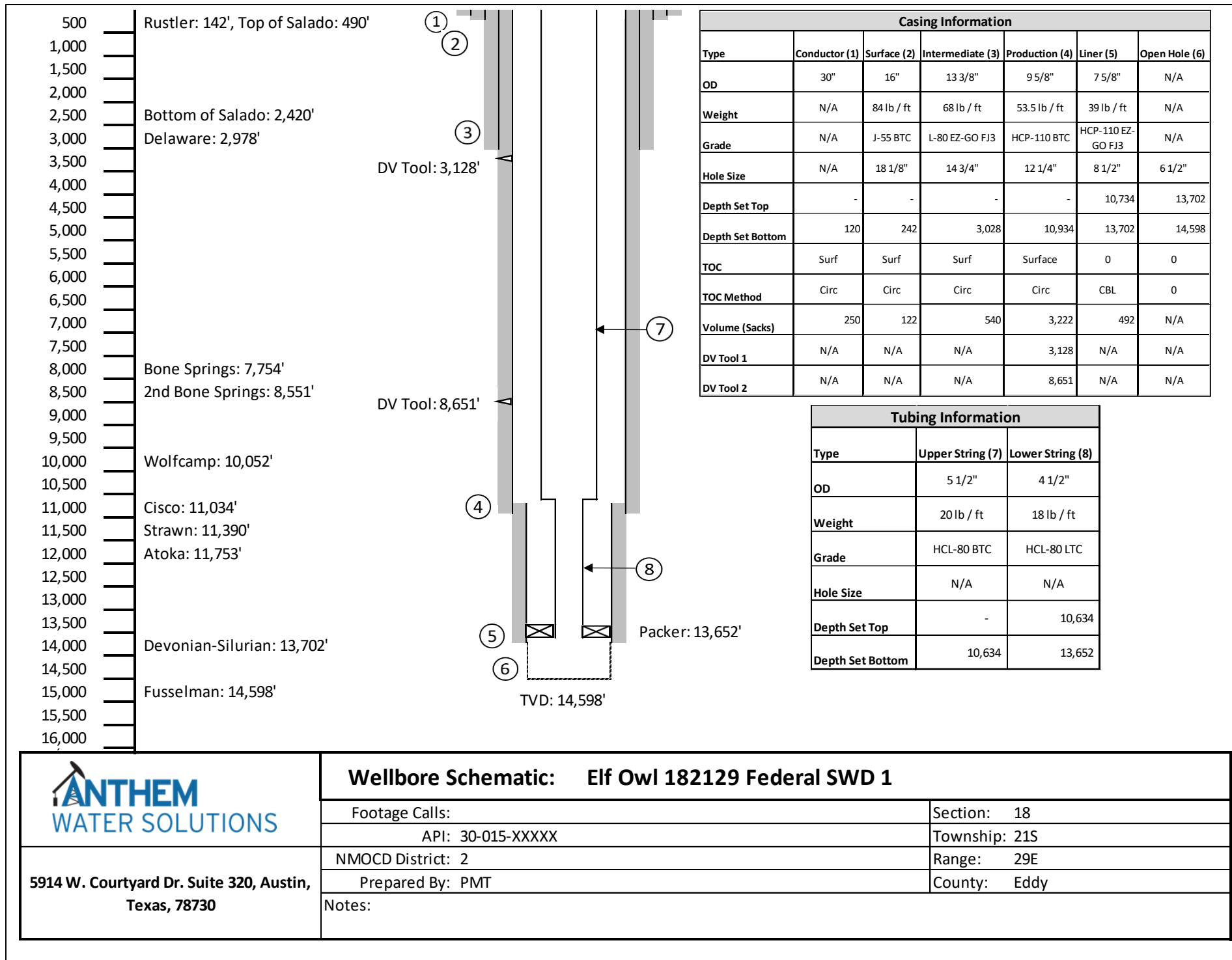
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
<sup>12</sup> Dedicated Acres		<sup>13</sup> Joint or Infill		<sup>14</sup> Consolidation Code		<sup>15</sup> Order No.			

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

	<p><b><sup>17</sup> OPERATOR CERTIFICATION</b></p> <p><i>I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</i></p> <p>Signature _____ Date _____</p> <p>Printed Name _____</p> <p>E-mail Address _____</p>
	<p><b><sup>18</sup> SURVEYOR CERTIFICATION</b></p> <p><i>I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.</i></p> <p>Date of Survey _____</p> <p>Signature and Seal of Professional Surveyor: _____</p>
	<p><b>PRELIMINARY</b></p> <p>Certified survey to be conducted and submitted upon C-108 approval.</p> <p>Certificate Number _____</p>



# Attachment 1: Proposed Wellbore Diagram



Casing Information						
Type	Conductor (1)	Surface (2)	Intermediate (3)	Production (4)	Liner (5)	Open Hole (6)
OD	30"	16"	13 3/8"	9 5/8"	7 5/8"	N/A
Weight	N/A	84 lb / ft	68 lb / ft	53.5 lb / ft	39 lb / ft	N/A
Grade	N/A	J-55 BTC	L-80 EZ-GO FJ3	HCP-110 BTC	HCP-110 EZ-GO FJ3	N/A
Hole Size	N/A	18 1/8"	14 3/4"	12 1/4"	8 1/2"	6 1/2"
Depth Set Top	-	-	-	-	10,734	13,702
Depth Set Bottom	120	242	3,028	10,934	13,702	14,598
TOC	Surf	Surf	Surf	Surface	0	0
TOC Method	Circ	Circ	Circ	Circ	CBL	0
Volume (Sacks)	250	122	540	3,222	492	N/A
DV Tool 1	N/A	N/A	N/A	3,128	N/A	N/A
DV Tool 2	N/A	N/A	N/A	8,651	N/A	N/A

Tubing Information		
Type	Upper String (7)	Lower String (8)
OD	5 1/2"	4 1/2"
Weight	20 lb / ft	18 lb / ft
Grade	HCL-80 BTC	HCL-80 LTC
Hole Size	N/A	N/A
Depth Set Top	-	10,634
Depth Set Bottom	10,634	13,652

## Attachment 1: Packer Schematic

# AS1-X MECHANICAL PACKER



The ACT AS1-X Packer is the most versatile of the mechanically set retrievable packers and may be used in any production application. Treating, testing, injecting, pumping wells, flowing wells, deep or shallow, the AS1-X is suited for all. The packer can be left in tension or compression, depending on well conditions and the required application. A large internal by-pass reduces swabbing when running and retrieving. The by-pass closes when the packer is set and opens prior to releasing the upper slips when retrieving to allow pressure equalization.

The J-slot design allows easy setting and releasing: 1/4 turn right-hand set, right-hand release. A patented upper-slip releasing system reduces the force required to release the packer. A non directional slip is released first, making it easier to release the other slips. The AS1-X packer can withstand 7,000 psi (48 MPa) of differential pressure above or below.

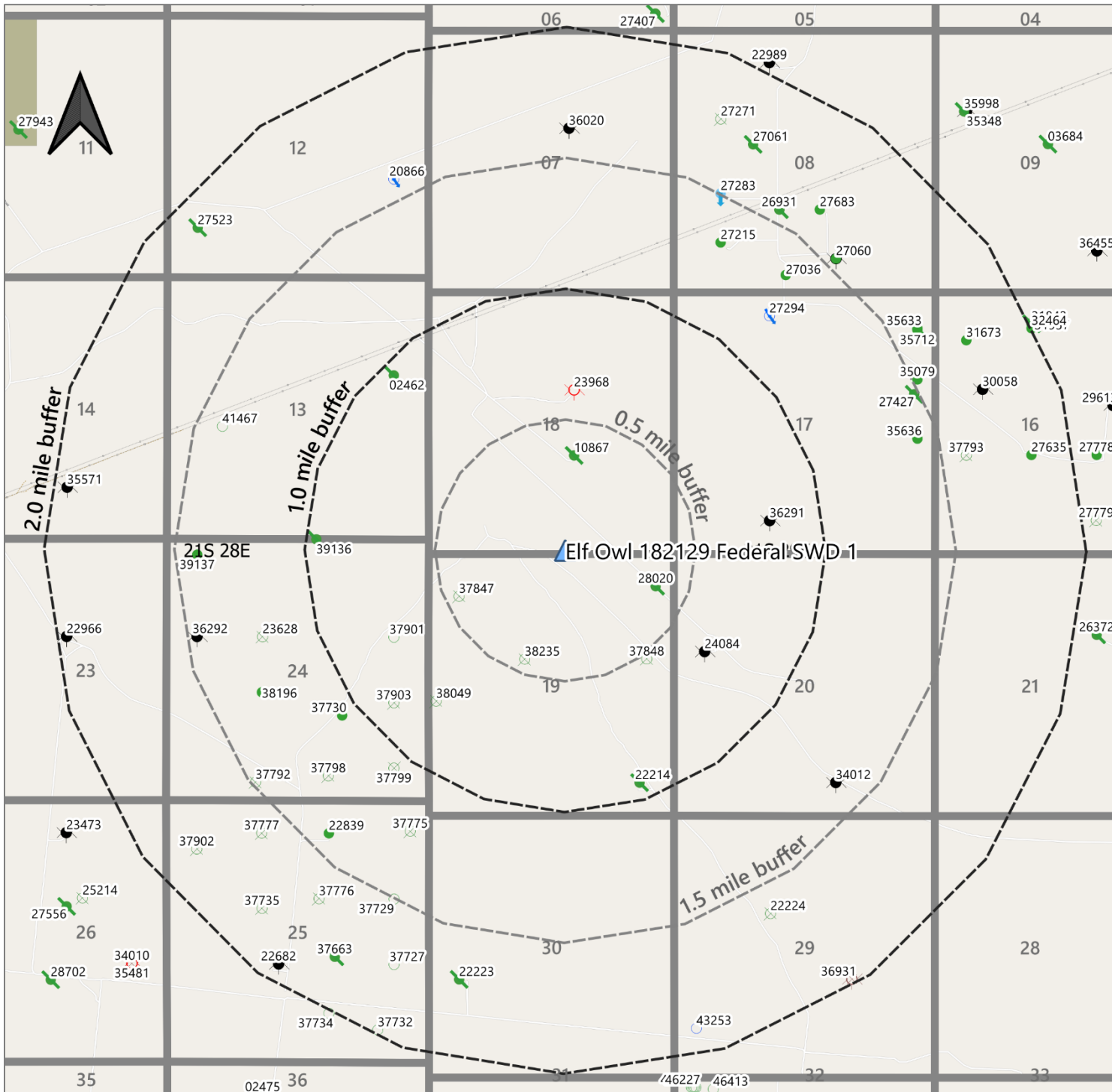
### FEATURES, ADVANTAGES AND BENEFITS:

- The design holds high differential pressure from above or below, enabling the packer to meet most production, stimulation, and injection needs
  - The packer can be set with compression, tension, or wire line, enabling deployment in shallow and deep applications
  - The packer can be set and released with only a one-quarter turn of the tubing
  - The bypass valve is below the upper slips so that debris are washed from the slips when the valve is opened, reducing the times for circulation and total retrieval
- 
- The full opening enables unrestricted flow and the passage of wire line tools and other packer systems
  - The packer can be run with the T-2 on-off tool, which enables the tubing to be disconnected and retrieved without retrieving the packer

### OPTIONS:

- Elastomer options are available for hostile environments
- Optional safety releases are available

## Attachment 2: 2-Mile Oil & Gas Map



## Legend

- Gas, Active
- Gas, Cancelled
- Gas, Plugged (site released)
- Injection, Active
- Oil, Active
- Oil, Cancelled
- Oil, New
- Oil, Plugged (site released)
- Salt Water Disposal, Active
- Salt Water Disposal, New

Sec 18 21S 29E  
Eddy County  
New Mexico

**Offset Well Review  
Area of Review**

Elf Owl 182129 Federal  
SWD 1

01/25/2021

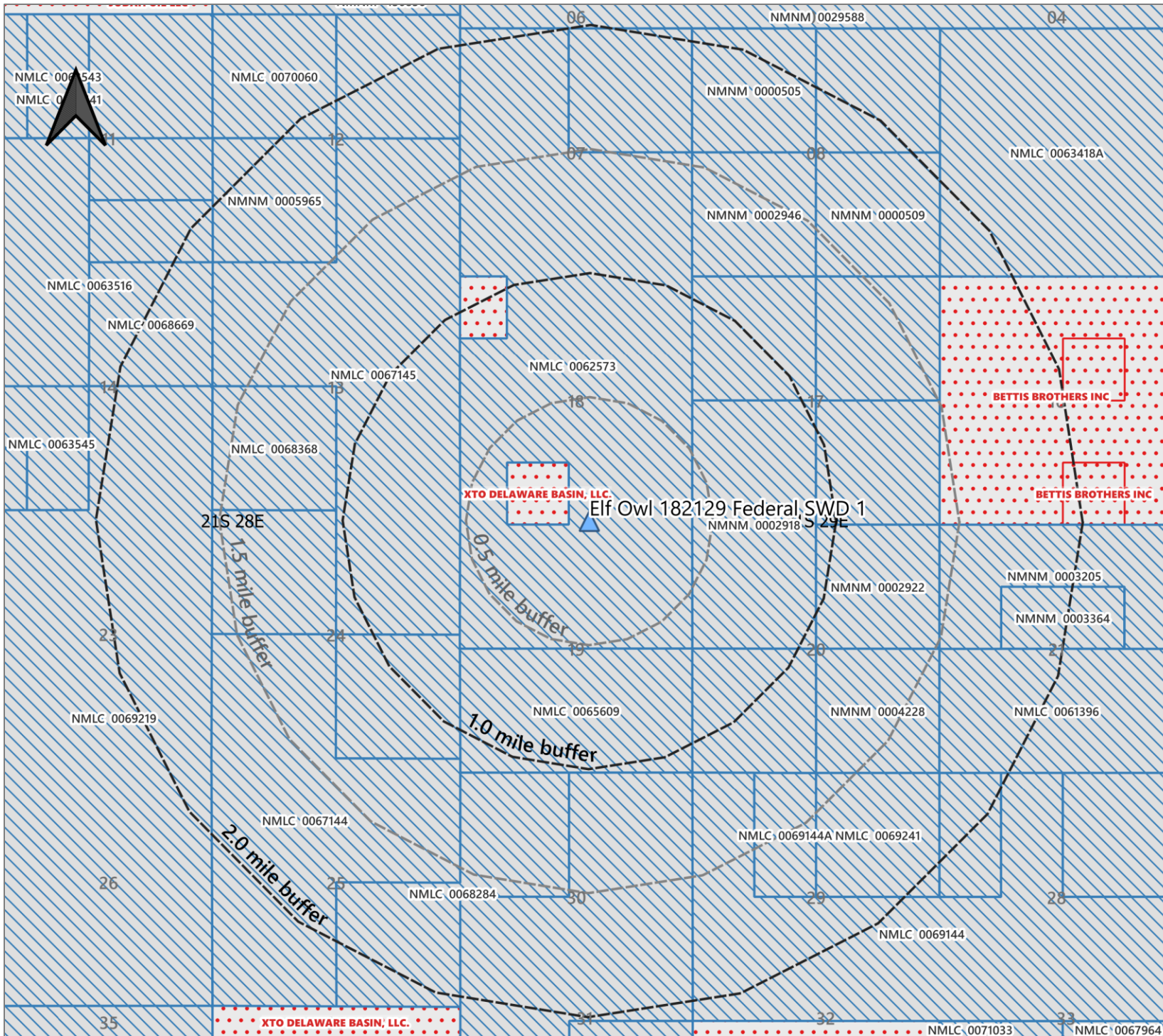


## Attachment 2: 1-mile Well Detail List

AOR Tabulation for Elf Owl 182129 Federal SWD 1 (Top of Injection Interval: 13,702')								
Well Name	API #	Well Type	Well Status	Operator	Spud Date	Location (Sec, Tn, Rg)	Total Vertical Depth	Penetrate Inj Zone
NORTH INDIAN FLATS 24 FEDERAL #003H	30-015-37901	Oil	New (Permit Expired)	XTO PERMIAN OPERATING LLC.	N/ A	H-24-21S-28E	3,400	No
BIG EDDY UNIT #084	30-015-23968	Gas	Plugged (site released)	BEPCO, LP	11/19/1981	G-18-21S-29E	12,725	No
BIG EDDY UNIT #094	30-015-24084	Gas	Active	XTO PERMIAN OPERATING LLC.	6/23/1982	E-20-21S-29E	12,265	No
PRE-ONGARD WELL #055	30-015-22214	Oil	Plugged (site released)	PRE-ONGARD WELL OPERATOR (Perry R Bass)	9/13/1977	P-19-21S-29E	6,612	No
PRE-ONGARD WELL #016	30-015-10867	Oil	Plugged (site released)	PRE-ONGARD WELL OPERATOR (Pan American Petroleum Corp)	9/14/1966	J-18-21S-29E	12,977	No
BIG EDDY UNIT #191	30-015-36291	Gas	Active	XTO PERMIAN OPERATING LLC.	10/20/2008	N-17-21S-29E	12,725	No
GOLDEN E FEDERAL #001	30-015-28020	Oil	Plugged (site released)	BEPCO, LP	8/17/1994	19-21S-29E	5,100	No
NORTH INDIAN FLATS 24 FEDERAL #014	30-015-39136	Oil	Plugged (site released)	BOPCO, L.P.	7/5/2011	B-24-21S-28E	3,200	No
PRE-ONGARD WELL #001	30-015-02462	Oil	Plugged (site released)	PRE-ONGARD WELL OPERATOR (Manetas Nick)	No Data	H-13-21S-28E	No Data	No
<b>Notes:</b> No Wells within a 1-mile radius penetrated the injection interval.								



## Attachment 2: 2-Mile Oil & Gas Lease Map



### Legend

- Federal, O&G Leases
- State, O&G Leases

Sec 18 21S 29E  
Eddy County  
New Mexico

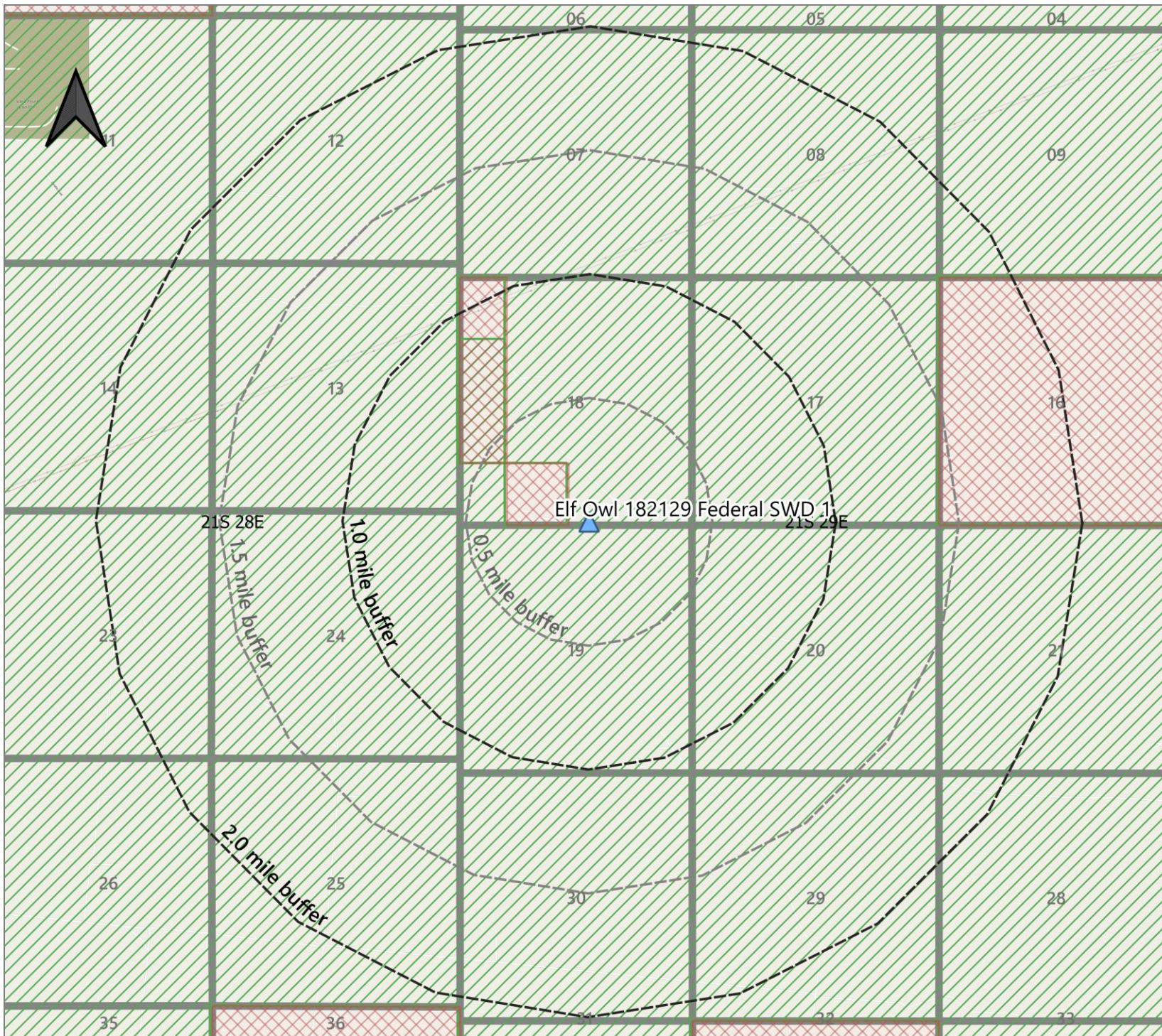
**Mineral Leasehold  
Area of Review**

Elf Owl 182129 Federal  
SWD 1

01/25/2021



## Attachment 2: Mineral Ownership Map



### Legend

- BLM Mineral\_Ownership
- State, Combined
- Fee, Subsurface

Sec 18 21S 29E  
Eddy County  
New Mexico

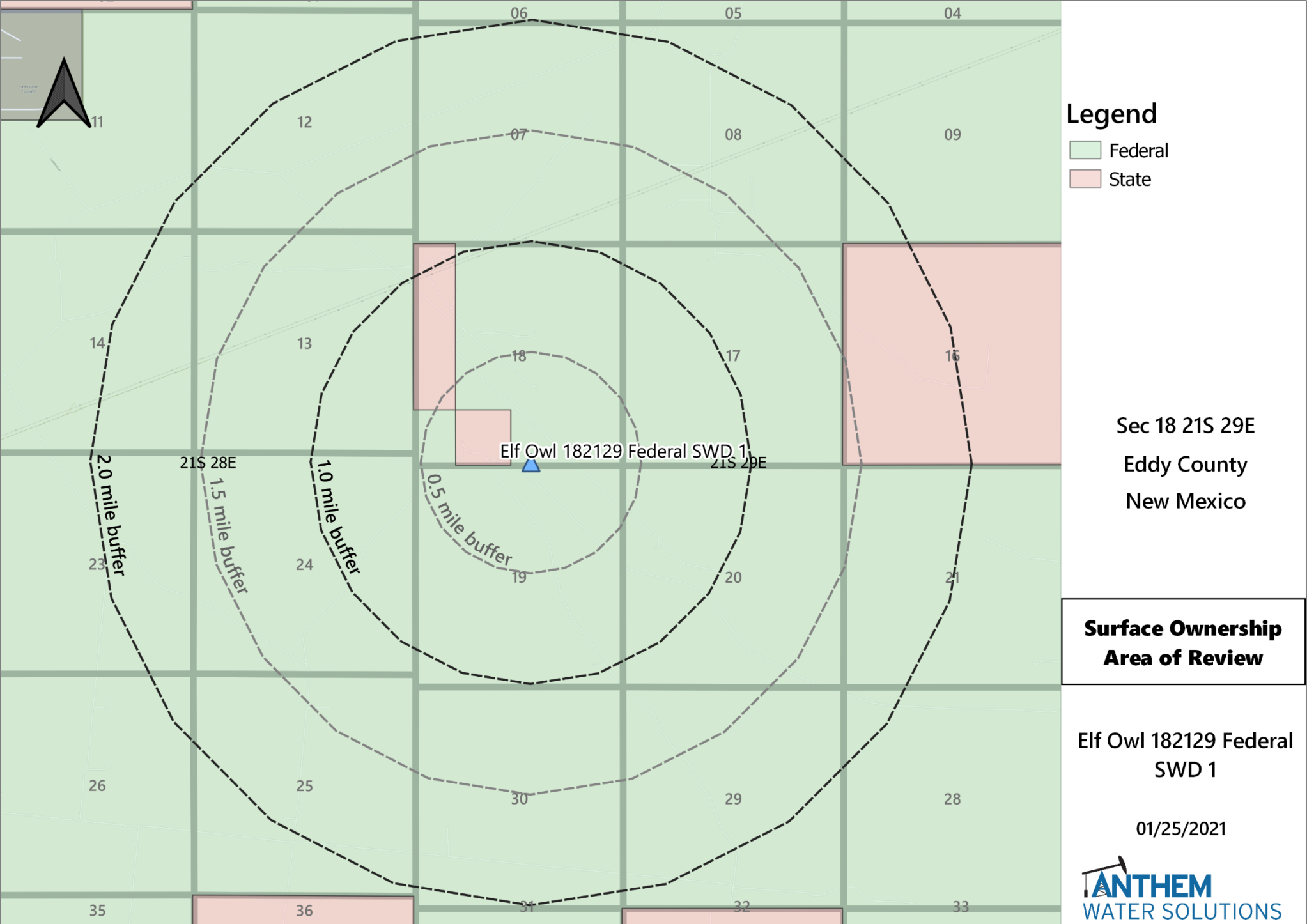
### Mineral Ownership Area of Review

Elf Owl 182129 Federal  
SWD 1

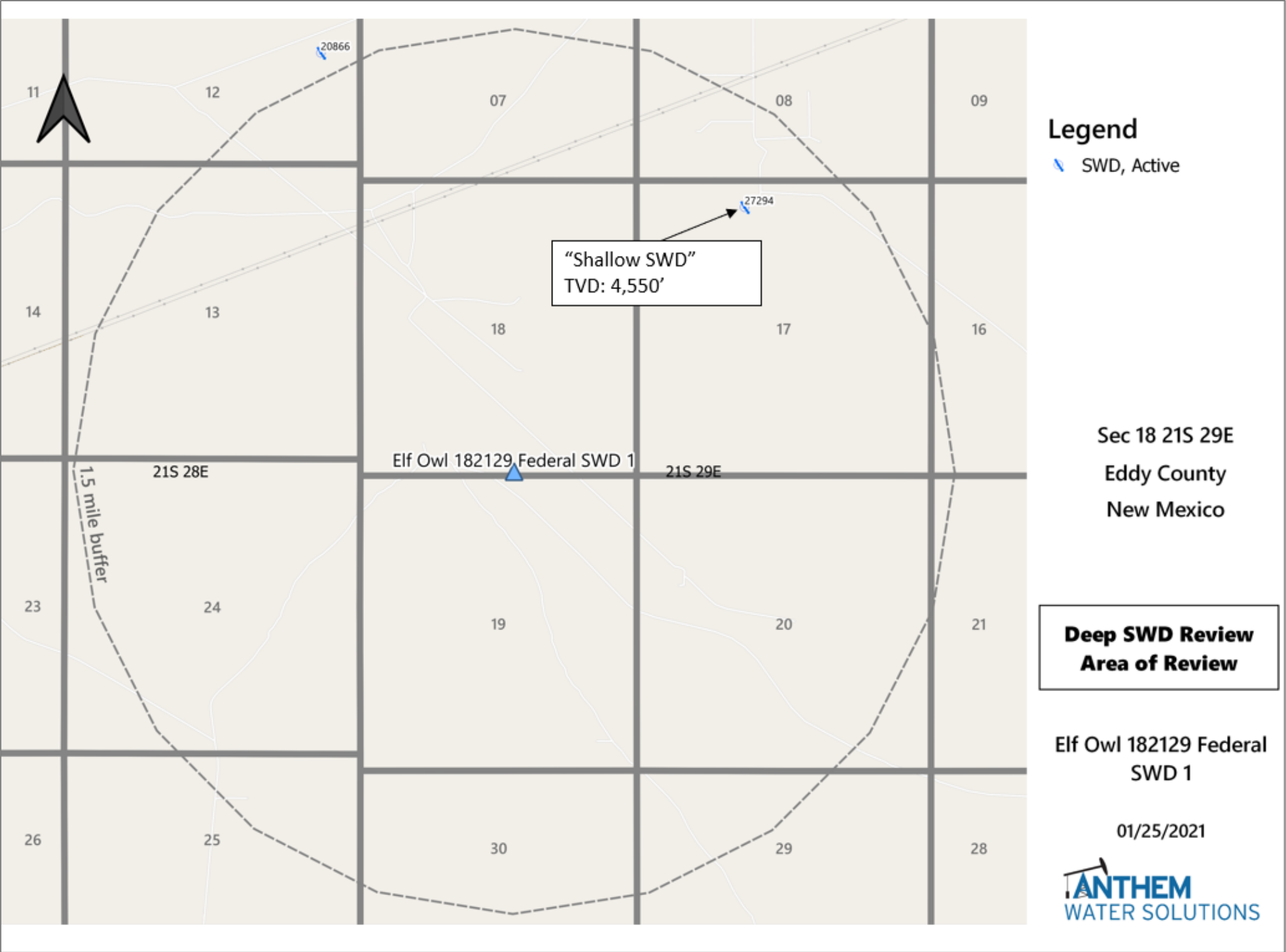
01/25/2021



Attachment 2: Surface Ownership Map

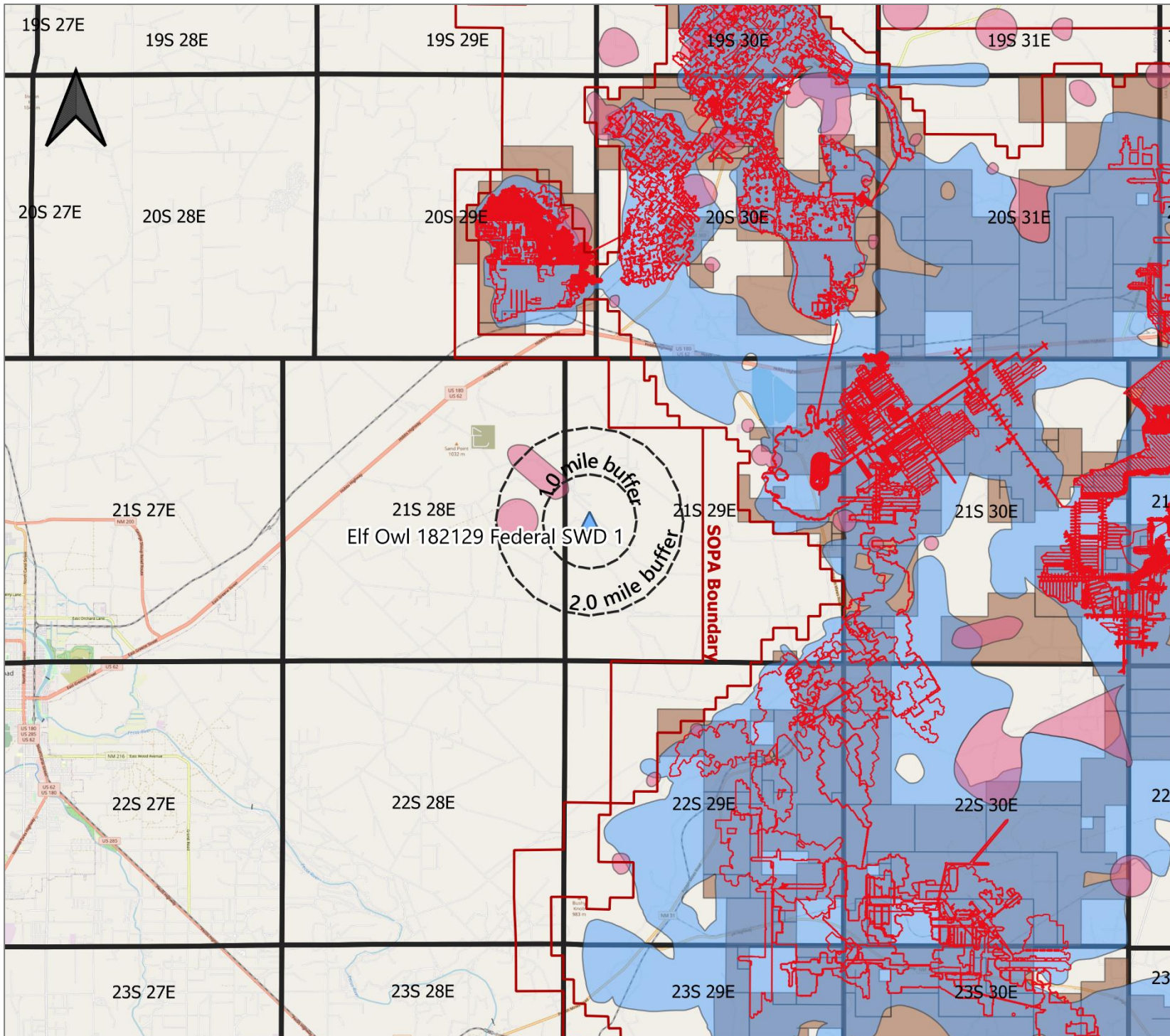


Attachment 2: 1.5 Mile Deep SWD Map





## Attachment 2: Potash Lease Map



### Legend

- Potash, Working Mines
- Potash, Ore Indicated
- Potash, Ore Measured
- Potash, Active Leases
- SOPA

Sec 18 21S 29E  
Eddy County  
New Mexico

**Potash Map  
Area of Review**

Elf Owl 182129 Federal  
SWD 1

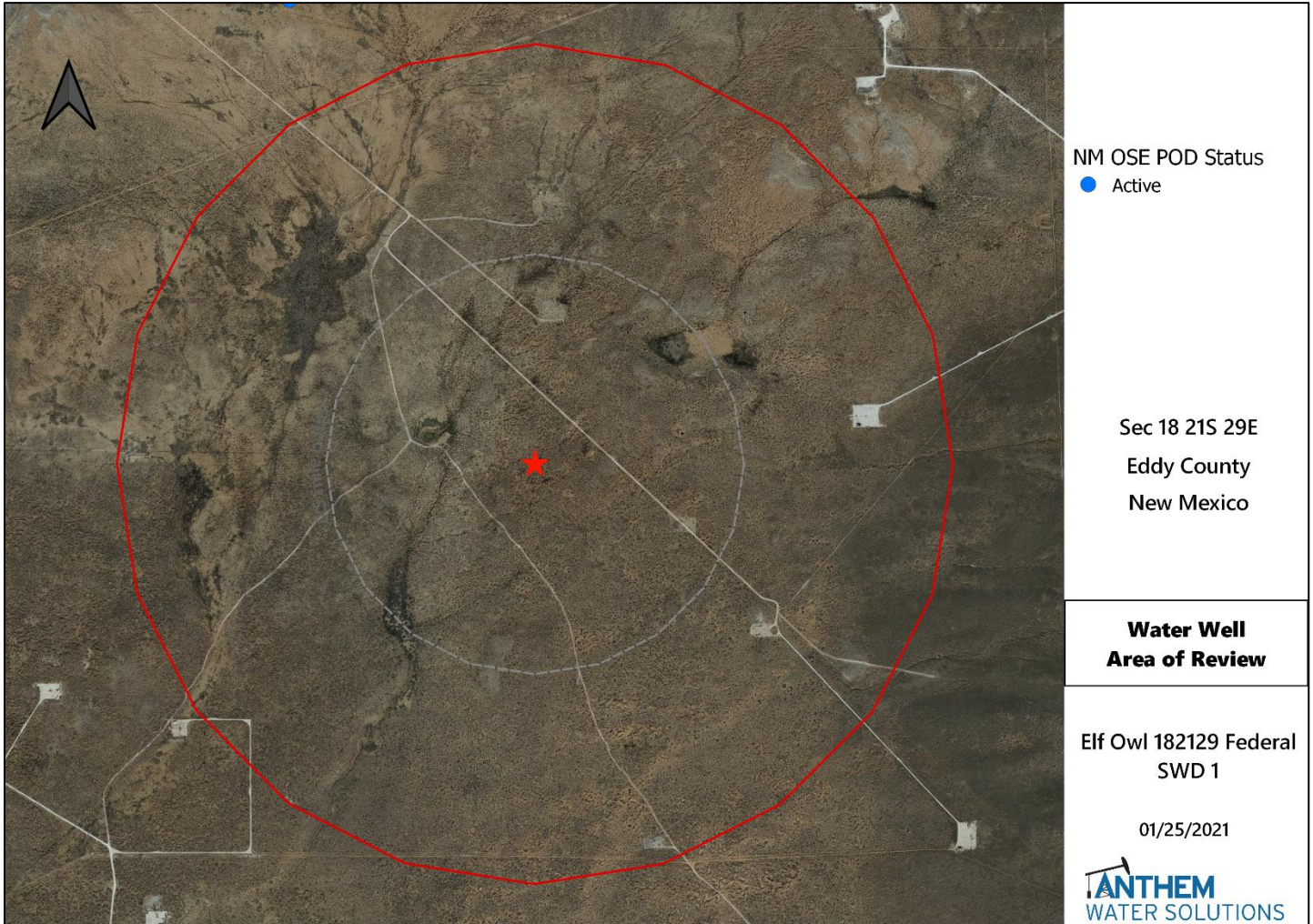
01/25/2021

### Attachment 3: Formation & Source Water Analysis

Injection Formation Water Analysis													
Anthem Water Solutions, LLC													
Well Name	API	Latitude	Longitude	Section	Township	Range	County	State	Field	Formation	TDS (Mg/L)	Bicarbonate (MG/L)	Sulfate (Mg/L)
PRE-ONGARD WELL #001	30-015-02416	32.5527229	-104.1623917	22	20S	28E	Eddy	NM		DEVONIAN	39,605	810	1,618
PRE-ONGARD WELL #001	30-015-02475	32.4421539	-104.042305	36	21S	28E	Eddy	NM		DEVONIAN	50,026	762	1,150
PRE-ONGARD WELL #001	30-015-03537	32.6839676	-104.0347595	1	19S	29E	Eddy	NM		DEVONIAN	29,011	520	1,500
WHITE CITY PENN GAS COM UNIT 1 #001	30-015-00408	32.1937523	-104.3088455	29	24S	26E	Eddy	NM	WHITE CITY	DEVONIAN	#N/A	653	1,336
REMUDA BASIN UNIT #001	30-015-03691	32.2886238	-103.9360428	24	23S	29E	Eddy	NM	REMUDA	DEVONIAN	271,010	130	100
BIG EDDY SWD #001	30-015-05819	32.5968154	-103.8504983	3	20S	31E	Eddy	NM	SWD	DEVONIAN	137,989	1,420	1,751
COTTON DRAW UNIT #084	30-015-29728	32.1592751	-103.7438736	2	25S	31E	Eddy	NM	PADUCA	DEVONIAN	85,799	59	389
COTTON DRAW UNIT #076	30-015-29252	32.1565857	-103.737999	1	25S	31E	Eddy	NM	PADUCA	DEVONIAN	128,947	317	481
COTTON DRAW UNIT #086	30-015-29850	32.1446877	-103.7278824	12	25S	31E	Eddy	NM	PADUCA	DEVONIAN	131,450	353	542
Source Water Analysis													
Anthem Water Solutions, LLC													
Well Name	API	Latitude	Longitude	Section	Township	Range	County	State	Field	Formation	TDS (Mg/L)	Bicarbonate (MG/L)	Sulfate (Mg/L)
PRE-ONGARD WELL #001	30-015-02416	32.5527229	-104.1623917	22	20S	28E	Eddy	NM		WOLFCAMP	55,965	252	2,260
PRE-ONGARD WELL #004	30-015-02280	32.6479454	-104.1791229	21	19S	28E	Eddy	NM	MILLMAN EAST	WOLFCAMP	118,720	2,700	1,080
SERRANO 29 FEDERAL #001H	30-015-37763	32.1901523	-104.2192003	29	24S	27E	Eddy	NM	SULPHATE DRAW	WOLFCAMP	102,136	183	#N/A
HABANERO 17 FEDERAL COM #001H	30-015-36108	32.2218759	-104.2189611	17	24S	27E	Eddy	NM	BLACK RIVER	WOLFCAMP	108,205	146	#N/A
WHITE CITY PENN GAS COM UNIT 1 #001	30-015-00408	32.1937523	-104.3088455	29	24S	26E	Eddy	NM	WHITE CITY	WOLFCAMP	#N/A	653	1,336
STATE AC COM #001	30-015-22299	32.5572166	-104.1806107	21	20S	28E	Eddy	NM	BURTON FLAT	WOLFCAMP	144,926	37	1,350
PURE GOLD C-17 FEDERAL #002	30-015-26021	32.3057258	-103.7987356	17	23S	31E	Eddy	NM	SAND DUNES WEST	WOLFCAMP	11,361	1,708	#N/A
PARKWAY WEST UNIT #015	30-015-32363	32.6353531	-104.0734329	28	19S	29E	Eddy	NM	PARKWAY WEST UNIT #015	BONE SPRING	215,934	98	702
APACHE 25 FEDERAL #009	30-015-32797	32.361248	-103.8309479	25	22S	30E	Eddy	NM	APACHE 25 FEDERAL #009	BONE SPRING	160,590	146	856
TODD 22 G FEDERAL #007	30-015-32881	32.2917137	-103.7635422	22	23S	31E	Eddy	NM	TODD 22 G FEDERAL #007	BONE SPRING	269,658	37	10
PARKWAY #021	30-015-32686	32.6253433	-104.0725937	28	19S	29E	Eddy	NM	PARKWAY #021	BONE SPRING	214,972	85	715
TODD 15 M FEDERAL #013	30-015-33118	32.2989769	-103.7720947	15	23S	31E	Eddy	NM	TODD 15 M FEDERAL #013	BONE SPRING	292,473	85	490
APACHE 25 FEDERAL #005	30-015-32720	32.3612404	-103.8266678	25	22S	30E	Eddy	NM	APACHE 25 FEDERAL #005	BONE SPRING	300,667	61	17
STRAWBERRY 7 FEDERAL #003	30-015-37171	32.6812553	-103.9148483	7	19S	31E	Eddy	NM	STRAWBERRY 7 FEDERAL #003	BONE SPRING	185,540	183	600
STRAWBERRY 7 FEDERAL #007	30-015-38485	32.6812526	-103.9012376	7	19S	31E	Eddy	NM	STRAWBERRY 7 FEDERAL #007	BONE SPRING	187,930	98	940
REMUDA BASIN UNIT #001	30-015-03691	32.2886238	-103.9360428	24	23S	29E	Eddy	NM	REMUDA BASIN UNIT #001	BONE SPRING	271,010	130	100
JONES FEDERAL B #003	30-015-10394	32.6405487	-103.8334885	23	19S	31E	Eddy	NM	JONES FEDERAL B #003	BONE SPRING	178,015	305	721
LONETREE STATE #001	30-015-21920	32.478508	-104.1454086	13	21S	27E	Eddy	NM	LONETREE STATE #001	BONE SPRING	244,966	122	1,013
FEDERAL HJ-27 #001	30-015-25780	32.6335258	-103.863533	27	19S	31E	Eddy	NM	FEDERAL HJ-27 #001	BONE SPRING	176,639	305	530
HANLEY FEDERAL #001	30-015-26068	32.7674713	-103.9105911	7	18S	31E	Eddy	NM	HANLEY FEDERAL #001	BONE SPRING	204,076	293	1,515
ALLIED 7 FEDERAL #001	30-015-25900	32.7638435	-103.9067764	7	18S	31E	Eddy	NM	ALLIED 7 FEDERAL #001	BONE SPRING	225,562	122	740
APACHE 25 FEDERAL #002	30-015-27478	32.3576164	-103.8298492	25	22S	30E	Eddy	NM	APACHE 25 FEDERAL #002	BONE SPRING	9,546	183	51
ORE IDA 14 FEDERAL #009	30-015-29278	32.2118607	-103.9491348	14	24S	29E	Eddy	NM	ORE IDA 14 FEDERAL #009	BONE SPRING	190,367	244	539
H B 11 FEDERAL #003	30-015-29249	32.2272186	-103.9569855	11	24S	29E	Eddy	NM	H B 11 FEDERAL #003	BONE SPRING	195,306	256	650
HACKBERRY 18 FEDERAL #001	30-015-29780	32.654953	-103.9065323	18	19S	31E	Eddy	NM	HACKBERRY 18 FEDERAL #001	BONE SPRING	180,325	85	850
WEST SHUGART 19 FEDERAL #002	30-015-30780	32.7271385	-103.9094238	19	18S	31E	Eddy	NM	WEST SHUGART 19 FEDERAL #002	BONE SPRING	144,906	390	850
WEST SHUGART 30 FEDERAL #003	30-015-30776	32.7247467	-103.9067154	30	18S	31E	Eddy	NM	WEST SHUGART 30 FEDERAL #003	BONE SPRING	136,715	244	675
ROOKIE STATE #001	30-015-10060	32.4134165	-104.3325848	7	22S	26E	Eddy	NM	ROOKIE STATE #001	BONE SPRING	67,985	61	1,148



## Attachment 4: 1-mile Fresh Water Map and Tabular List



Water Well Sampling Rational					
Elf Owl 182129 Federal SWD 1					
Water Wells	Owner	Available Contact Information	Use	Sampling Required	Notes
There are not fresh water wells within a 1-mile radius					



NM Oil Conservation Division  
1220 S. St. Francis Dr.  
Santa Fe, NM 87505

**Re: Geology Statement**  
**Anthem Water Solutions, LLC**  
**Elf Owl 182129 Federal SWD No. 1**  
**Section 18, T. 21S, R. 29E**  
**Eddy County, New Mexico**

To whom it may concern:

Publicly available geologic and engineering data related to the proposed well have been thoroughly reviewed, and no evidence for open faults or any other hydrologic connection between the proposed Devonian-Silurian injection zone and any underground sources of drinking water has been found. Please see the attached seismic risk assessment for additional information.

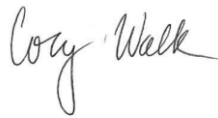
Sincerely,

A handwritten signature in dark ink that reads "Cory Walk". The signature is written in a cursive, flowing style.

Cory Walk  
Geologist

**Seismic Risk Assessment**  
**Anthem Water Solutions, LLC**  
**Elf Owl 182129 Federal SWD No. 1**  
**Section 18, Township 21 South, Range 29 East**  
**Eddy County, New Mexico**

**Cory Walk, M.S.**

A handwritten signature in cursive script that reads "Cory Walk". The signature is written in black ink and is positioned below the printed name.

**Geologist**  
**Permits West Inc.**

**May 19, 2021**

## GENERAL INFORMATION

Elf Owl 182129 Federal SWD No. 1 is located in the SE 1/4, section 18, T21S, R29E, about 11 miles northeast of Carlsbad, NM in the Permian Basin. Anthem Water Solutions proposes the injection zone to be within the Devonian-Silurian formation through an open hole from 13,702'-14,598' below ground surface. This report assesses concerns relating to induced seismicity along deep penetrating Precambrian faults or the connection between the injection zone and known underground potable water sources.

## SEISMIC RISK ASSESSMENT

### *Historical Seismicity*

**Searching the USGS earthquake catalog resulted in no (0) earthquakes above a magnitude 2.5 within 6 miles (9.7 km) of the proposed deep disposal site since 1970 (Fig. 1).** The nearest earthquake occurred on November 28, 1974 about 13.2 miles (~21.2 km) southwest of the proposed SWD site and had a magnitude of 3.9.

### *Basement Faults and Subsurface Conditions*

A structure contour map (Fig. 1) of the Precambrian basement shows the Elf Owl 182129 Federal SWD #1 is approximately 18.4 miles from the nearest basement-penetrating fault inferred by Ewing et al (1990). **Information about nearby faults is listed in Table 1.**

Snee and Zoback (2018) state, "In the western part of Eddy County, New Mexico,  $S_{Hmax}$  is ~north-south (consistent with the state of stress in the Rio Grande Rift; Zoback and Zoback, 1980) but rotates to ~east-northeast-west-southwest in southern Lea County, New Mexico and the northernmost parts of Culberson and Reeves counties, Texas." **Around the Elf Owl 182129 Federal SWD site, Snee and Zoback indicate a  $S_{Hmax}$  direction of N010°E and an  $A_\phi$  of 0.57, indicating an extensional (normal) stress regime.**

Induced seismicity is a growing concern of deep SWD wells. Software developed by the Stanford Center for Induced and Triggered Seismicity allows for the probabilistic screening of deeply penetrating faults near the proposed injection zone (Walsh et al., 2016; Walsh et al., 2017). This software uses parameters such as stress orientations, fault strike/dip, injection rates, fault friction coefficients, etc. to estimate the potential for fault slip. Using this software, Snee and Zoback (2018) indicate that the nearest fault (18 miles to the northeast) has a 0% probability of fault slip (Fig. 2). Other faults greater than 20 miles away have higher FSP probabilities but due to their distance, the proposed SWD is unlikely to have any major effect on them.

## GROUNDWATER SOURCES

Quaternary Alluvium acts as the principal aquifer used for potable ground water near the Elf Owl 182129 Federal SWD #1 location (Hendrickson and Jones, 1952). Nicholson and Clebsch (1961) state, "Potable ground water is not available below the Permian and Triassic unconformity but, because this boundary is not easily defined, the top of the Rustler anhydrite formation is regarded as the effective lower

limit of ‘potable’ ground water.” Around the Elf Owl 182129 Federal SWD #1, the top of the Rustler Formation lies at a depth of approximately 142’ bgs.

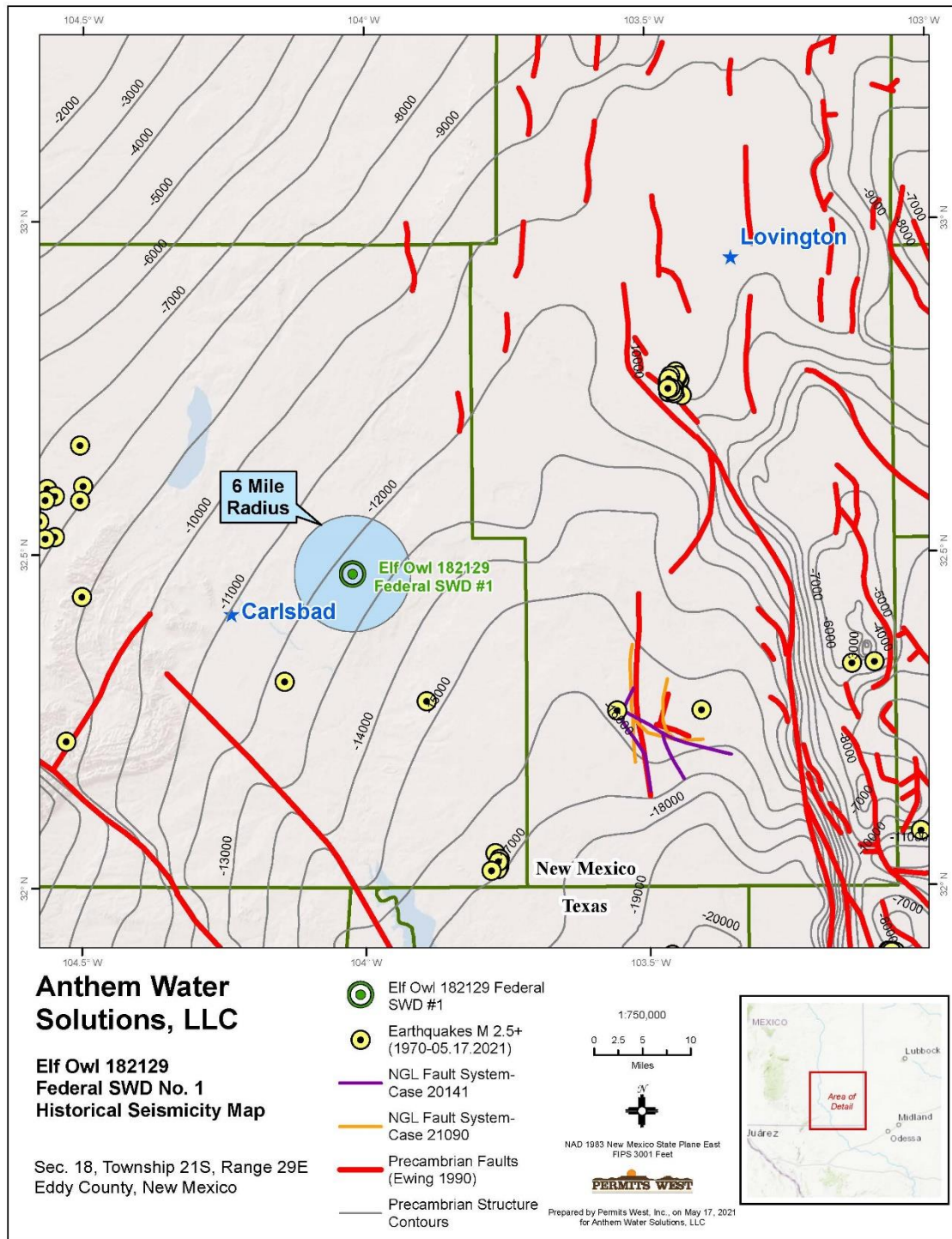
### **VERTICAL MIGRATION OF FLUIDS**

Permeability barriers exist above (Woodford shale; 100 ft thick) and below (Simpson Group; 180 ft thick) the targeted Devonian-Silurian injection zone (Plate 2, Comer et al., 1991; Fig. 8, Frenzel et al., 1988). Precambrian structure contours (Ruppel, 2009) show the basement to be at a depth of approximately 15,710’ in this area. Therefore, the injection zone lies approximately 1,115’ above the Precambrian basement and approximately 13,560’ below the previously stated lower limit of potable water at the top of the Rustler anhydrite formation. The stratigraphy suggests that the Woodford Shale and Simpson Group are adequate confining barriers that would prevent the vertical migration of injected fluids.

### **CONCLUSION**

After examination of publicly available geologic and engineering data, there is no evidence of open faults or any other hydrologic connection between the disposal zone and any underground sources of drinking water.







**Table 1: Nearby Fault Information**

Fault Number	Distance to proposed SWD (mi)	Strike (°)	Dip (°)	FSP (%)
1	18.4	168	50-90	0
2	20.9	315	50-90	0
3	21.3	220	50-90	20-30

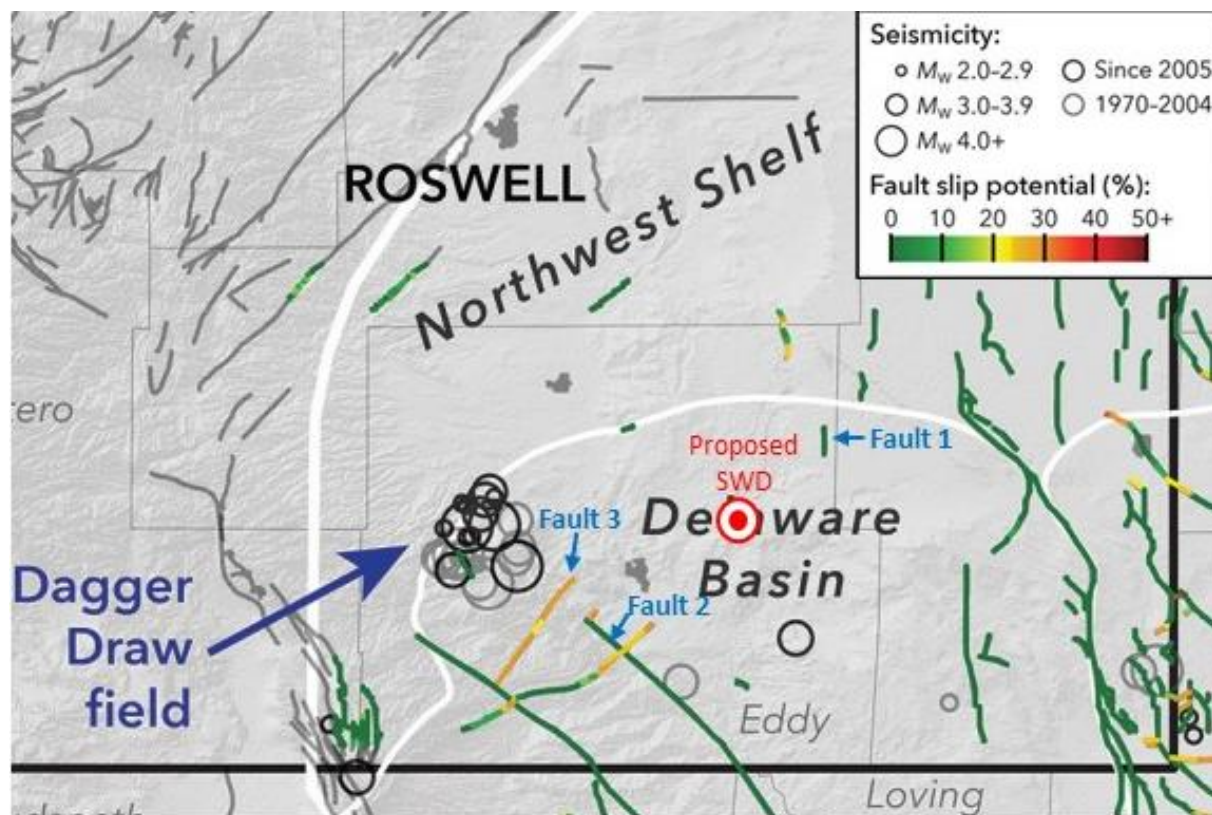


Figure 2. Modified Figure 3 from Snee and Zoback (2018). Map showing proposed location of Elf Owl 182129 Federal SWD #1 in relation to Snee and Zoback's results of their FSP analysis.

## References Cited

- Comer, J. B., 1991, Stratigraphic Analysis of the Upper Devonian Woodford Formation, Permian Basin, West Texas and Southeastern New Mexico: The University of Texas at Austin, Bureau of Economic Geology, Report of Investigations No. 201, 63 p.
- Ewing, T. E., 1990, The tectonic map of Texas: Austin, Bureau of Economic Geology, The University of Texas at Austin.
- Frenzel, H. N., Bloomer, R. R., Cline, R. B., Cys, J. M., Galley, J. E., Gibson, W. R., Hills, J. M., King, W. E., Seager, W. R., Kottowski, F. E., Thompson, S., III, Luff, G. C., Pearson, B. T., and Van Siclen, D. C., 1988, The Permian Basin region, in Sloss, L. L., ed., Sedimentary cover—North American Craton, U.S.: Boulder, Colorado, Geological Society of America, The Geology of North America, v. D-2, p. 261–306.
- Hendrickson, G. E., and Jones, R. S., 1952, Geology and Ground-Water Resources of Eddy County, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Ground-Water Report 3, 179 pp., 6 plates.
- Hurd, O; Zoback, MD, 2012, Intraplate earthquakes, regional stress and fault mechanics in the Central and Eastern U.S. and Southeastern Canada. *Tectonophysics*, 581:182-92.
- Nicholson, A., Jr., and Clebsch, A., Jr., 1961, Geology and ground-water conditions in southern Lea County, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Ground-Water Report 6, 123 pp., 2 plates.
- Ruppel, S.C., 2009, Integrated synthesis of the Permian basin: data and models for recovering existing and undiscovered oil resources from the largest oil-bearing basin: U.S. Oil & Natural Gas Technology, Bureau Economic Geology, The University of Texas at Austin, p. 1-959.
- Snee, J.-E.L., Zoback, M.D., 2018, State of stress in the Permian Basin, Texas and New Mexico: Implications for induced seismicity: *Leading Edge*, v. 37, p. 127–134.
- Walsh, F. R., and Zoback, M. D., (2016) Probabilistic assessment of potential fault slip related to injection induced earthquakes: Application to north central Oklahoma, USA, *Geology*, Data Repository item 2016334, doi:10.1130/G38275.1
- Walsh, F. R., Zoback, M. D., Pais, D., Weingarten, M., and Tyrrell, T. (2017) FSP 1.0: A Program for Probabilistic Estimation of Fault Slip Potential Resulting From Fluid Injection, User Guide from the Stanford Center for Induced and Triggered Seismicity, available at SCITS.Stanford.edu/software
- Zoback, M. L., and M. D. Zoback, 1980, State of stress in the conterminous United States: *Journal of Geophysical Research*, 85, no. B11, 6113–6156, <https://doi.org/10.1029/JB085iB11p06113>.

Attachment 6: Public Notice Affidavit

**Carlsbad Current Argus.**  
PART OF THE SUNSHINE NETWORK

**Affidavit of Publication**

Ad # 0004748775

**This is not an invoice**

**ANTHEM WATER SOLUTIONS, LLC**  
5914 W. COURTYARD DR, STE 320

**AUSTIN, TX 78730**

I, a legal clerk of the **Carlsbad Current Argus**, a newspaper published daily at the City of Carlsbad, in said county of Eddy, state of New Mexico and of general paid circulation in said county; that the same is a duly qualified newspaper under the laws of the State wherein legal notices and advertisements may be published; that the printed notice attached hereto was published in the regular and entire edition of said newspaper and not in supplement thereof on the date as follows, to wit:

**05/25/2021**

  
Legal Clerk

Subscribed and sworn before me this May 25, 2021:

  
State of WI, County of Brown

NOTARY PUBLIC

  
1-7-25

My commission expires

**APPLICATION FOR  
AUTHORITY TO INJECT  
NOTICE IS HEREBY GIVEN;**  
That Anthem Water Solutions, LLC, 5914 W. Courtyard Dr., Suite 320, Austin Texas, 78730, is requesting that the New Mexico Oil Conservation Division administratively approve the **APPLICATION FOR AUTHORITY TO INJECT** as follow:

**PURPOSE:** The intended purpose of the injection well is to dispose of salt water produced from permitted oil and gas wells.

**WELL NAME AND LOCATION:** Elf Owl 182129 Federal SWD 1 Located 13 miles northeast of Carlsbad. SW 1/4 of the SE 1/4 Section 18, Township 21S, Range 29E, 70' from South Line & 2196' from East Line, Eddy County, New Mexico.

**NAME AND DEPTH OF DISPOSAL ZONE:** Devonian-Silurian (13,702' - 14,598')

**EXPECTED MAXIMUM INJECTION RATE:** 30,000 barrels/day

**EXPECTED MAXIMUM INJECTION PRESSURE:** 2740 psi (surface)

Objections or requests for hearing must be filed with the New Mexico Oil Conservation Division within fifteen (15) days. Any objections or requests for hearing should be mailed to the Oil Conservation Division, 1220 South St. Francis Dr., Santa Fe, New Mexico 87505.

Additional information may be obtained by contacting Marshall Tippen (972) 795-4201.

May 25, 2021

KATHLEEN ALLEN  
Notary Public  
State of Wisconsin

Ad # 0004748775

PO #: Elf Owl

# of Affidavits 1

**This is not an invoice**

## Attachment 6: List of Notification Applicants & Delivery Confirmations

Elf Owl 182129 Federal SWD 1 - Notice of Application Receipts				
Entity	Address	City	State	Zip Code
Landowner and Mineral Owner				
New Mexico BLM	620 E Greene St.	Carlsbad	NM	88220
OCD District				
NMOCD District 2	811 S. First St	Artesia	NM	88210
Leasehold Operators (1-mile)				
XTO DELAWARE BASIN LLC	6401 HOLIDAY HILL RD	MIDLAND	TX	79707
Notes: The table above shows the Entities who were identified as parties of interest requiring notification on either the 1-mile well detail list (Attachment 2) or on the 2-mile Mineral Lease Map (Attachment 2).				



Marshall Tippen  
Anthem Water Solutions, LLC  
3300 North A Street, Building 2, Suite 222  
Midland, Texas 79705

New Mexico BLM  
620 E Greene St.  
Carlsbad, NM 88220

**APPLICATION FOR AUTHORITY TO INJECT**

To Whom it May Concern,

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Regards,

A handwritten signature in black ink, appearing to read 'Marshall Tippen', written in a cursive style.

Marshall Tippen



Marshall Tippen  
Anthem Water Solutions, LLC  
3300 North A Street, Building 2, Suite 222  
Midland, Texas 79705

NMOCD District 2  
811 S. First St  
Artesia, NM 88210

**APPLICATION FOR AUTHORITY TO INJECT**

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Additional information may be obtained by contacting Marshall Tippen (972) 795-4201.

Regards,

A handwritten signature in black ink, appearing to read 'Marshall Tippen', is written over a light blue horizontal line.

Marshall Tippen



Marshall Tippen  
Anthem Water Solutions, LLC  
3300 North A Street, Building 2, Suite 222  
Midland, Texas 79705

XTO DELAWARE BASIN LLC  
6401 HOLIDAY HILL RD  
MIDLAND, TX 79707

**APPLICATION FOR AUTHORITY TO INJECT**

To Whom it May Concern,

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Additional information may be obtained by contacting Marshall Tippen (972) 795-4201.

Regards,

A handwritten signature in black ink, appearing to read 'Marshall Tippen', is written over a light blue horizontal line.

Marshall Tippen





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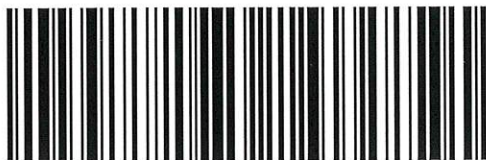
Jack Ball  
Anthem Water Solutions  
5914 W. Courtyard Dr., Ste 320  
Austin TX 78730-4924

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Carlsbad NM 88220

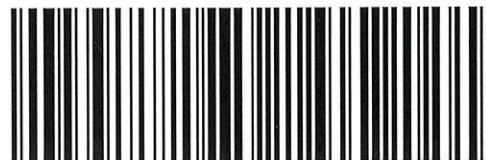
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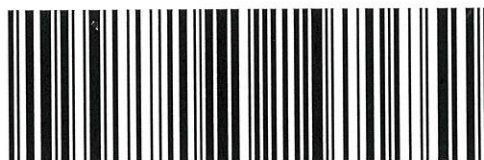


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