

Initial Application Part I

Received 6/10/2021

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

RECEIVED: 6/10/21	REVIEWER:	TYPE: SWD	APP NO: pBL2116242071
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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: Elk 122527 State 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**SWD-2421**

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**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

6/9/2021

Date

(972) 795-4201

Phone Number

mtippen@anthemwsllc.com

e-mail Address

Signature



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 Elk 122527 State SWD 1 located in Unit M, Section 12, Township 25 South, Range 27 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 5/20/2021 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 state land and state 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,

Marshall Tippen
Anthem Water Solutions
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.

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: Elk 122527 State SWD 1

Location Footage Calls: 129' from FSL, 289' from FWL

Legal Location: Unit M, Section 12, Township 25 South, Range 27 East, NMPM

Ground Elevation: 3,111 feet

Proposed Injection Interval: 13,965 - 14,890 (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	-	-	-	-	10,684	13,965
Depth Set Bottom	120	275	2,398	10,884	13,965	14,890
TOC	Surf	Surf	Surf	Surface	TOL	-
TOC Method	Circ	Circ	Circ	Circ	CBL	-
Volume (Sacks)	250	138	428	3,207	544	N/A
DV Tool 1	N/A	N/A	N/A	2,498	N/A	N/A
DV Tool 2	N/A	N/A	N/A	7,648	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	-	10,584
Depth Set Bottom	10,584	13,915

**Wellbore Diagram Attached*

4) Packer Information:

Arrowset AS1-X or equivalent packer set at approximately 13915 feet

**Packer Schematic Attached*

B. Completion Information

1) **Injection Formation Name:** Devonian-Silurian

Pool Name: SWD; Devonian-Silurian

Pool Code: 97869

2) **Injection Interval:** 13,965 - 14,890 (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: 2348'
- Bone Spring: 6858'
- Wolfcamp: 9063'
- Strawn: 11247'
- Atoka: 11447'
- Morrow: 12051'

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 7 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:** 2793 psi (surface)
- 4) **Proposed Average Injection Pressure:** 1675 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 13,965 feet to 14,890 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 175 feet. The USDW is covered by 16-inch casing set at 275 feet and cemented to surface, additionally the USDW is covered by intermediate casing set at 2398 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. Water well depths in the area range from approximately 21 feet – 133 feet below ground surface.

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

¹ API Number 30-015-XXXXX	² Pool Code 97869	³ Pool Name SWD; Devonian-Silurian
⁴ Property Code	⁵ Property Name Elk 122527 State SWD	⁶ Well Number 1
⁷ OGRID No. 330069	⁸ Operator Name Anthem Water Solutions, LLC	⁹ Elevation 3,111

¹⁰ Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	12	25S	27E		129	South	289	West	Eddy

¹¹ Bottom Hole Location If Different From Surface

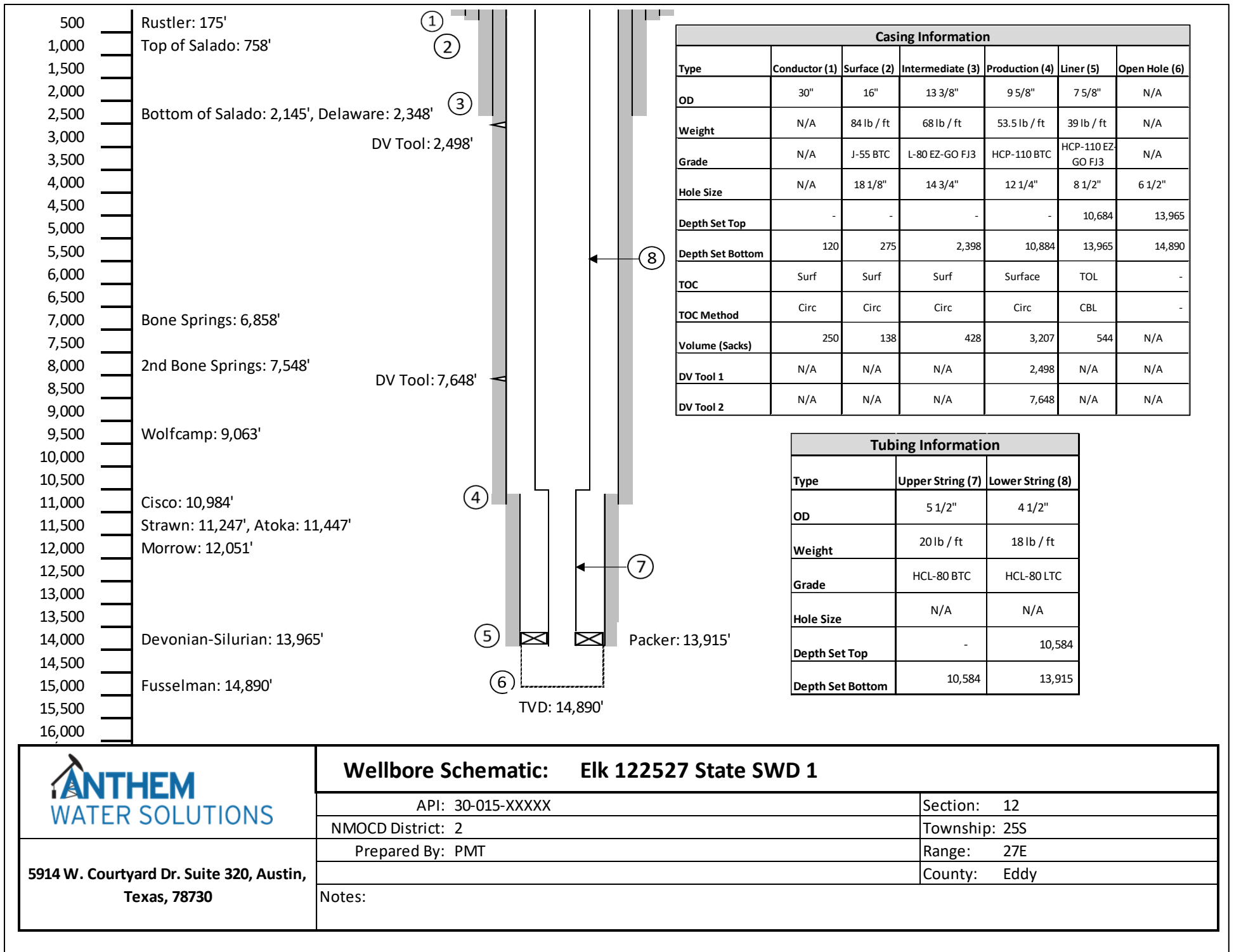
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County

¹² Dedicated Acres	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ 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.

LAT = 32.137649 N LONG = -104.151577 W					
D	C	B	A		
E	F	G	H		
GEODETIC DATA NAD 83 GRID – NM EAST					
L	K	J	I		
Elk 122527 State SWD 1 LAT = 32.137649 N LONG = -104.151577 W					
M	N	O	P		
289		129'			
¹⁷ OPERATOR CERTIFICATION <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>					
Signature _____ Date _____					
Printed Name _____					
E-mail Address _____					
¹⁸ SURVEYOR CERTIFICATION <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>					
Date of Survey _____					
Signature and Seal of Professional Surveyor: _____					
PRELIMINARY Certified survey to be conducted and submitted upon C-108 approval					
Certificate Number _____					

Attachment 1: Proposed Wellbore Diagram



Wellbore Schematic: Elk 122527 State SWD 1

API: 30-015-XXXXX

NMOCD District: 2

Prepared By: PMT

Notes:

Section: 12

Township: 25S

Range: 27E

County: Eddy

5914 W. Courtyard Dr. Suite 320, Austin,
Texas, 78730

Attachment 1: Packer Schematic

AS1-X MECHANICAL PACKER



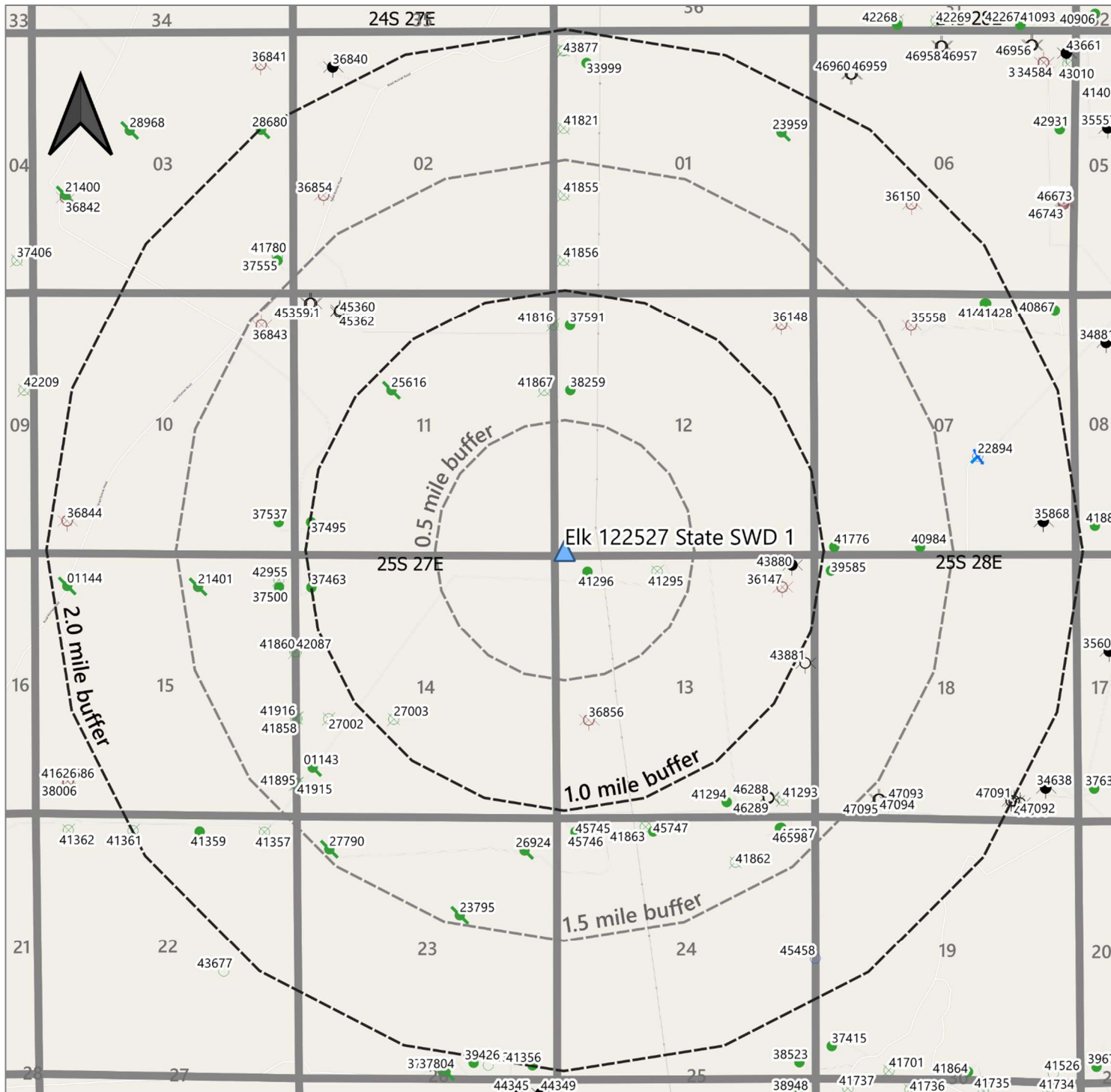
The ACT AS1-X Packer is the most versatile of the mechanically set retrievable packers and may be used in any production application. Treating, testing, injecting, pumping wells, flowing wells, deep or shallow, the AS1-X is suited for all. The packer can be left in tension or compression, depending on 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

Attachment 2: 2-Mile Oil & Gas Map



Legend

- Gas, Active
- ⊗ Gas, Cancelled
- Gas, New
- ⊗ Gas, Temporary Abandonment (expired)
- Oil, Active
- ⊗ Oil, Cancelled
- Oil, New
- Oil, Plugged (site released)
- Salt Water Disposal, New
- ⊗ Salt Water Disposal, Plugged (site released)

Sec 12 25S 27E
Eddy County
New Mexico

**Offset Well Review
Area of Review**

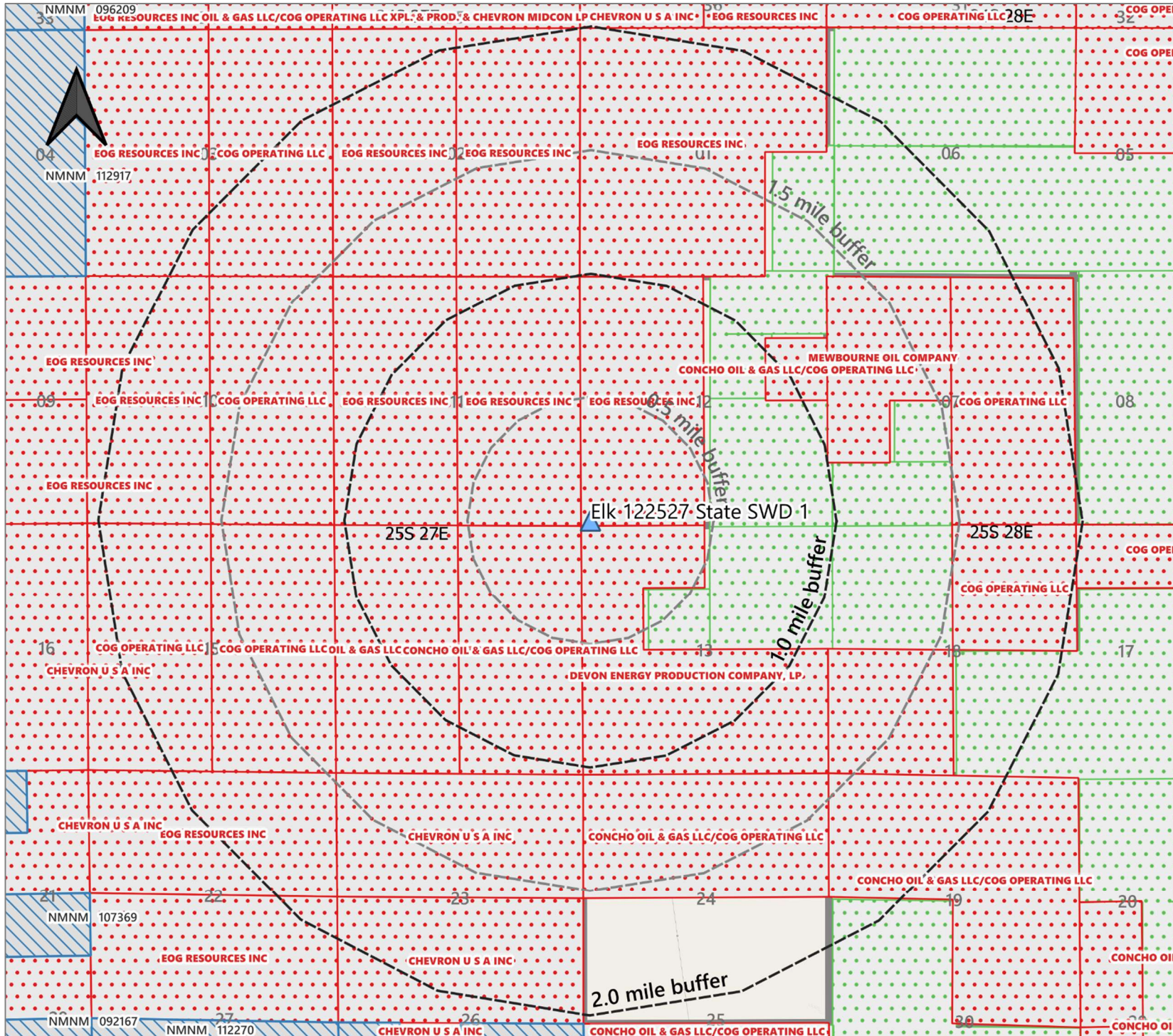
Elk 122527 State SWD 1

01/25/2021

Attachment 2: 1-mile Well Detail List

AOR Tabulation for Elk 122527 State SWD 1 (Top of Injection Interval: 13,965')								
Well Name	API #	Well Type	Well Status	Operator	Spud Date	Location (Sec, Tn, Rg)	Total Vertical Depth	Penetrate Inj Zone
PERFECTO BOX STATE COM #001H	30-015-37463	Oil	Active	EOG RESOURCES INC	2/26/2010	D-14-25S-27E	7,853	No
TORPEDO BOW STATE COM #001H	30-015-37495	Oil	Active	EOG RESOURCES INC	2/26/2010	M-11-25S-27E	7,732	No
PRE-ONGARD WELL #001	30-015-25616	Oil	Plugged (site released)	PRE-ONGARD WELL OPERATOR (Max Wilson Inc)	4/1/1986	F-11-25S-27E	4,200	No
OSCURO BBC STATE COM #001H	30-015-38259	Oil	Active	EOG RESOURCES INC	12/30/2010	E-12-25S-27E	7,897	No
TRANQUIL 13 STATE #004H	30-015-41296	Oil	Active	EOG RESOURCES INC	3/10/2015	D-13-25S-27E	7,871	No
SHERPA BOY STATE COM #001H	30-015-37591	Oil	Active	EOG RESOURCES INC	3/26/2010	D-12-25S-27E	6,267	No
DEVON 12 1 W2PI FEE COM #001H	30-015-43880	Gas	Active	MEWBOURNE OIL CO	7/1/2017	A-13-25S-27E	10,302	No
Notes: No Wells within a 1-mile radius penetrated the injection interval.								

Attachment 2: 2-Mile Oil & Gas Lease Map



Legend

- ⋯ State, O&G Leases
- ⋯ Fee, O&G Leases

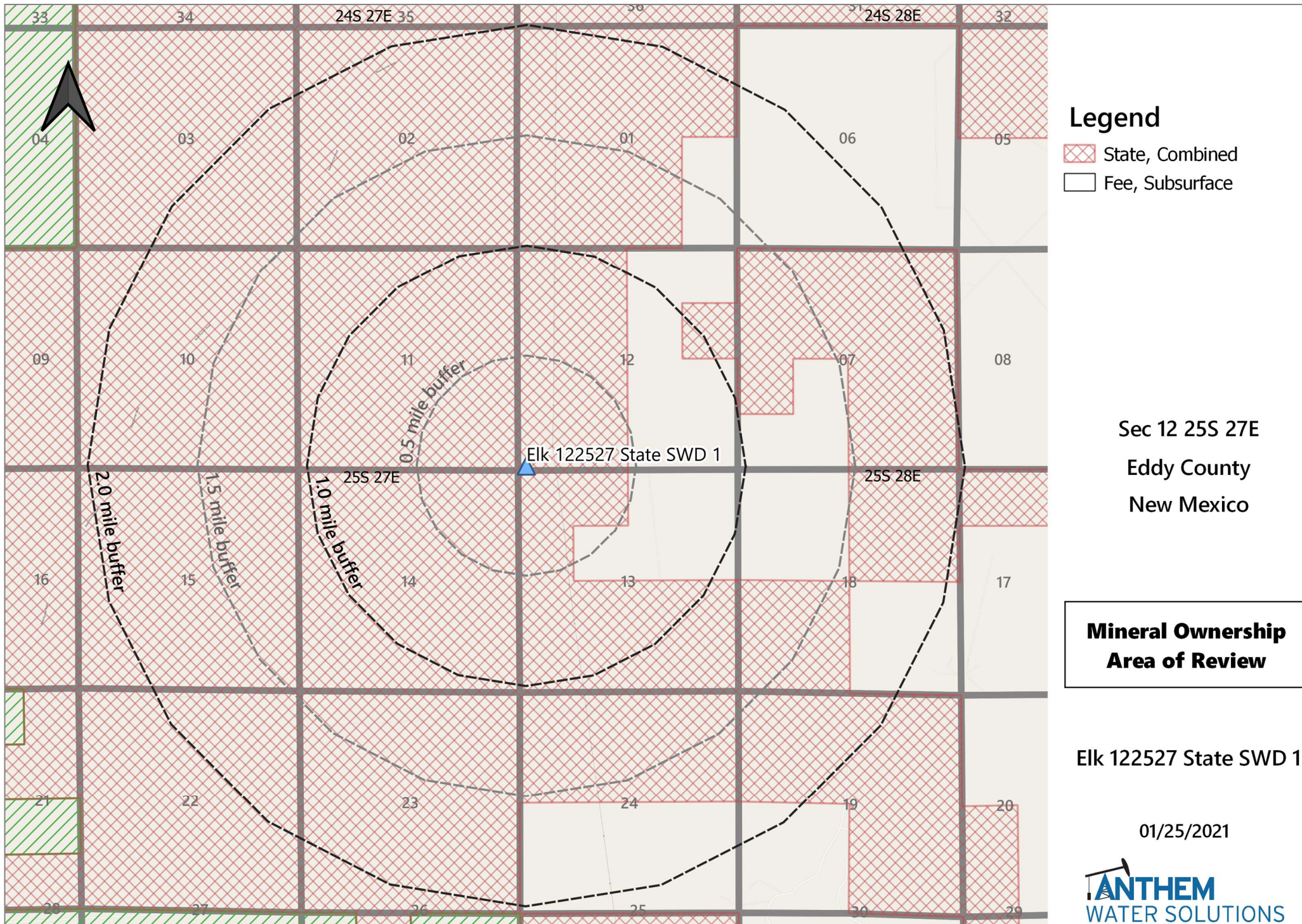
Sec 12 25S 27E
Eddy County
New Mexico

**Mineral Leasehold
Area of Review**

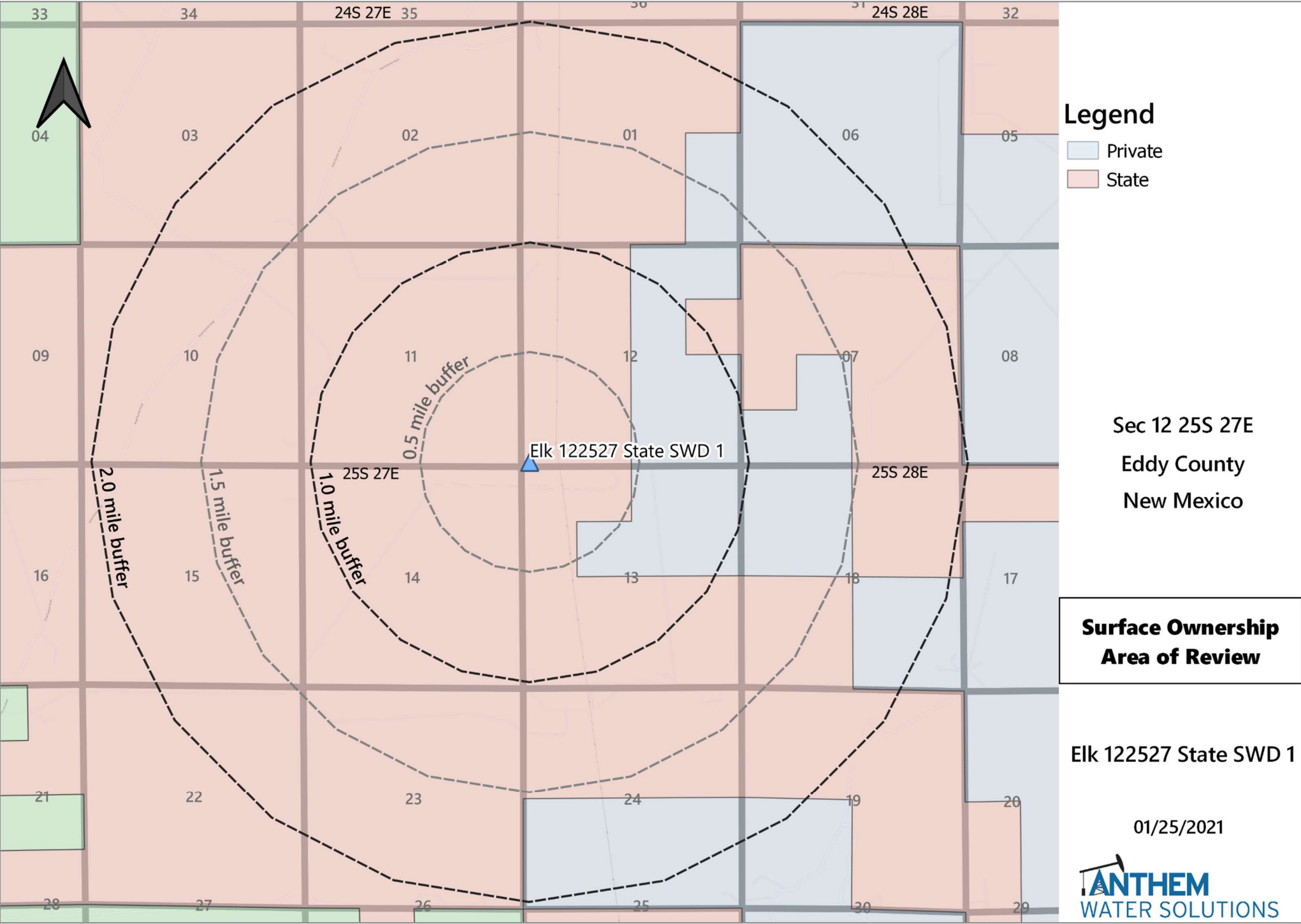
Elk 122527 State SWD 1

01/25/2021

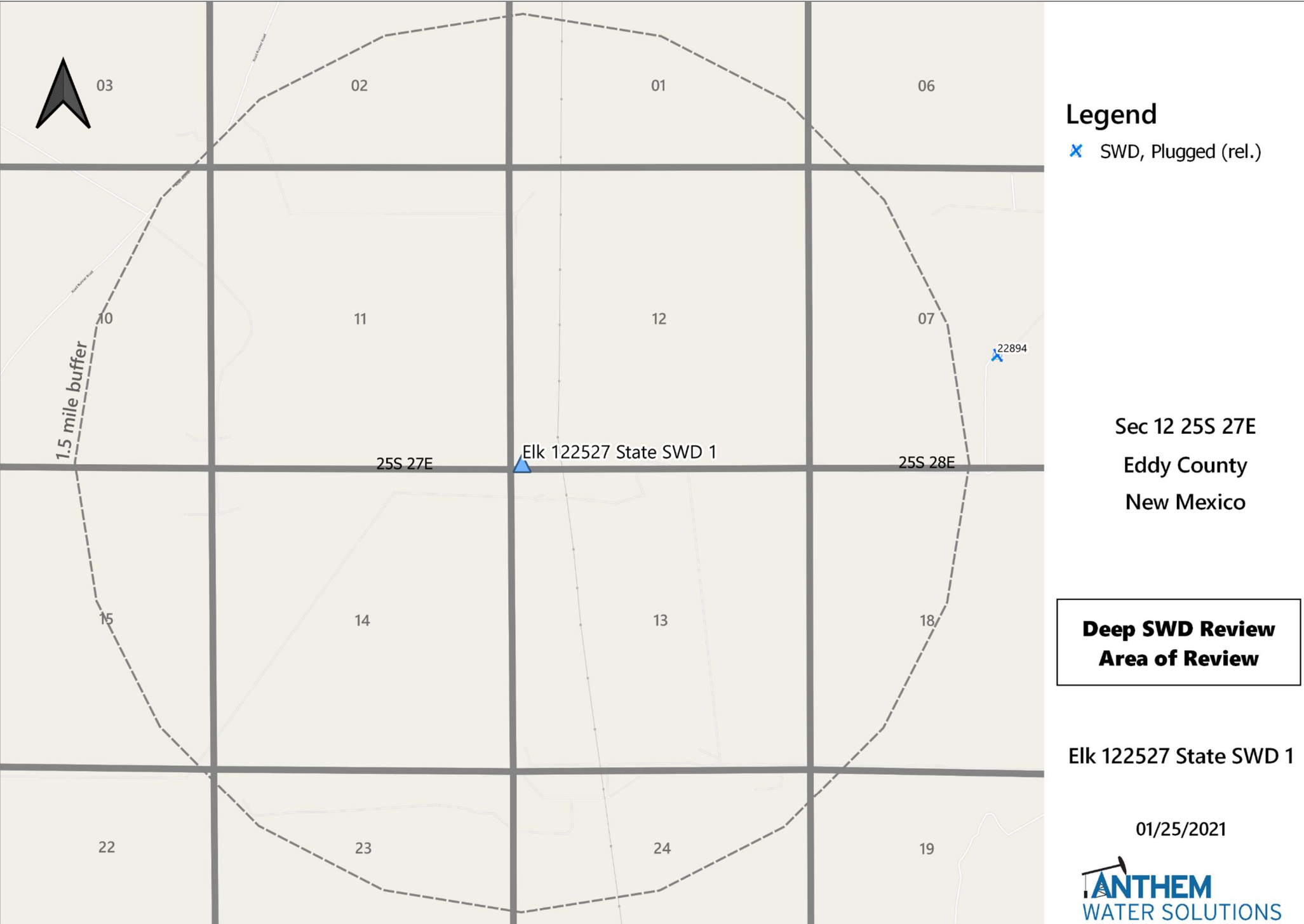
Attachment 2: Mineral Ownership Map



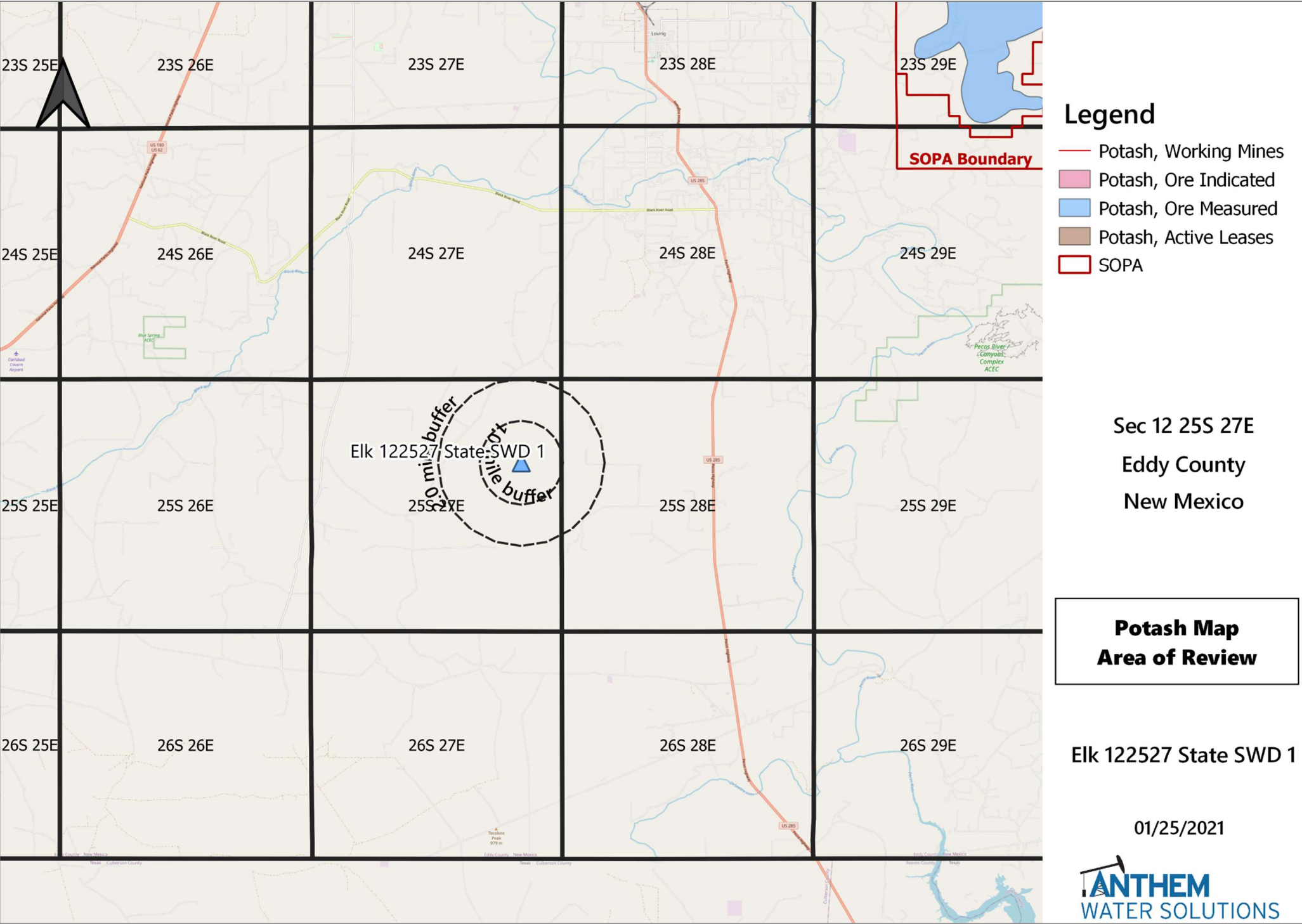
Attachment 2: Surface Ownership Map



Attachment 2: 1.5 Mile Deep SWD Map



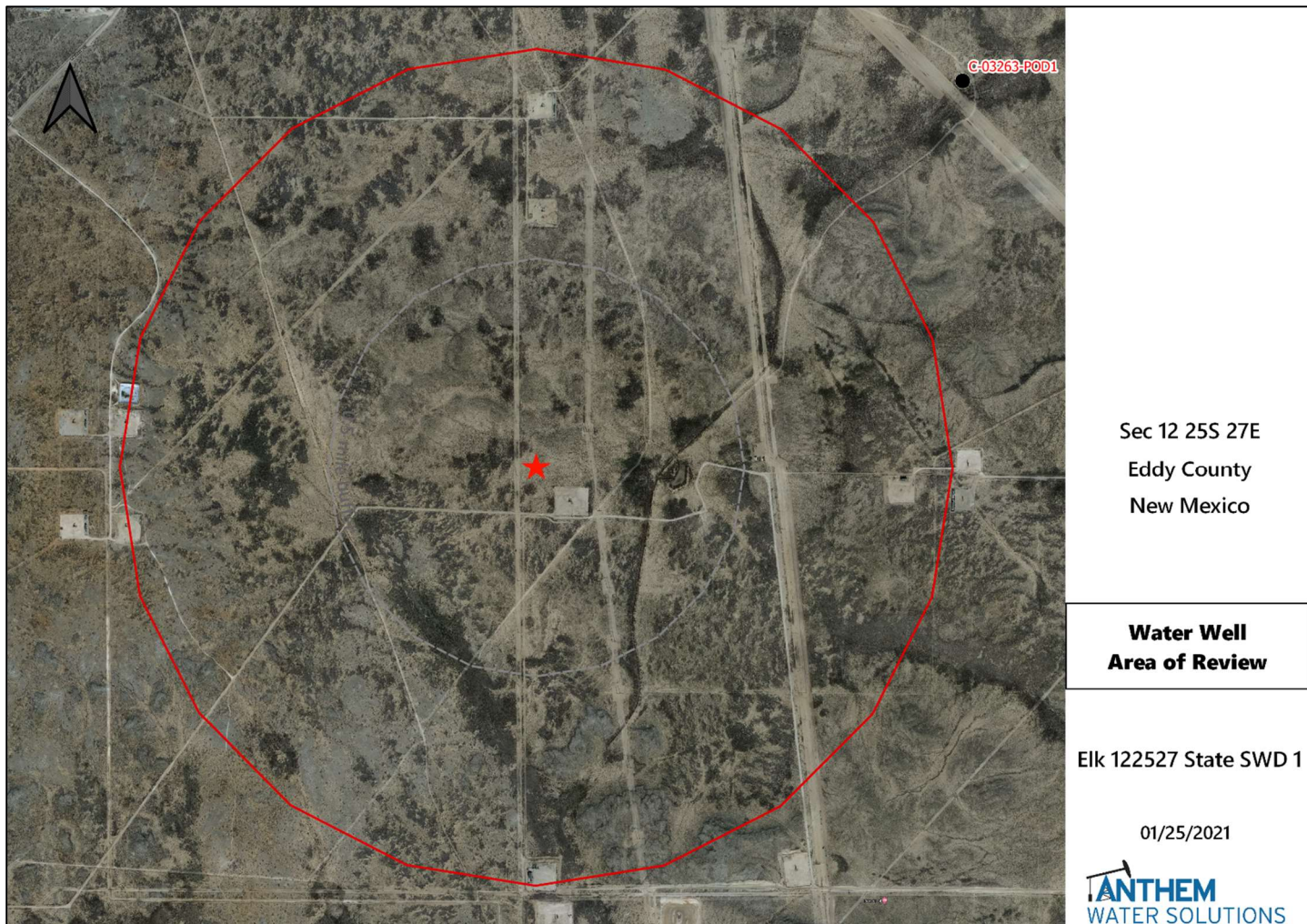
Attachment 2: Potash Lease Map



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					
Elk 122527 State SWD 1					
Water Wells	Owner	Available Contact Information	Use	Sampling Required	Notes
There are no 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
Elk 122527 State SWD No. 1
Section 12, T. 25S, R. 27E
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
Elk 122527 State SWD No. 1
Section 12, Township 25 South, Range 27 East
Eddy County, New Mexico

Cory Walk, M.S.

A handwritten signature in black ink that reads "Cory Walk". The signature is written in a cursive style with a large, stylized 'C' and 'W'.

Geologist
Permits West Inc.

May 14, 2021

GENERAL INFORMATION

Elk 122527 State SWD No. 1 is located in the SW 1/4, section 12, T25S, R27E, about 8 miles south of Malaga, NM in the Permian Basin. Anthem Water Solutions proposes the injection zone to be within the Devonian-Silurian formation through an open hole from 13,965'-14,890' 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 12.0 miles (~19.2 km) north 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 Elk 122527 State SWD #1 is approximately 0.5 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 Elk 122527 State SWD site, Snee and Zoback indicate a S_{Hmax} direction of N035°E and an A_ϕ of 0.52, 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 the best available data as input parameters (Table 2) including the subject well injecting at 30,000 bbls/day and all other existing and proposed SWDs within a 10 mile radius also injecting at 30,000 bbls/day (72 total SWD wells), the Fault Slip Potential (FSP) models suggest a zero (0.00) percent chance of slip on nearby faults, inferred by Ewing et al (1990), through the year 2045 (Fig. 2; Table 1). **This model also suggests a pore pressure increase of 1069.4 psi on the nearest fault (Fault 6; Fig. 3; Table 1) by the year 2045.** Geomechanical modeling shows that the primary fault of concern (fault 6) would need a pressure increase of 5095 psi to reach a 100% probability of slip on the fault. Even a 50% probability requires an increase of 2819 psi which is approximately 3x greater than the modeled increase of 1069 psi (Fig. 3).

GROUNDWATER SOURCES

Quaternary Alluvium and some members of the Rustler Formation act as the principal aquifers used for potable ground water in this location. Around the Elk 122527 State SWD #1, the base of the underground source of drinking water lies at a depth of approximately 175' bgs.

VERTICAL MIGRATION OF FLUIDS

Precambrian structure contours (Ruppel, 2009) show the basement to be at a depth of approximately 16,380' in this area. Therefore, the injection zone lies approximately 1,490' above the Precambrian basement and approximately 13,790' below the previously stated lower limit of potable water.

Permeability barriers exist above (Woodford shale; 121 ft thick) and below (Simpson Group; 148 ft thick) the targeted Devonian-Silurian injection zone (Plate 2, Comer et al., 1991; Fig. 8, Frenzel et al., 1988). However, the proximal fault could act as a conduit for the vertical migration of fluids. Analysis of the proposed Elk 122527 State SWD well in relation to publicly available fault data indicates the proposed well will drill through and potentially inject into a known fault (Fig. 4). The known fault does not penetrate the surface and likely would not allow a hydrologic connection between the disposal zone and any formation above the Bone Spring (Fig. 5). Therefore, there is no concern for produced water entering and contaminating underground sources of drinking water. However, a valid concern is the potential that produced water may migrate upward and water out overlying producing zones or downward into the Precambrian Basement.

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. However, there is evidence that drilling this well may allow for the vertical migration of fluids upward into overlying producing zones or downward into the Precambrian Basement.

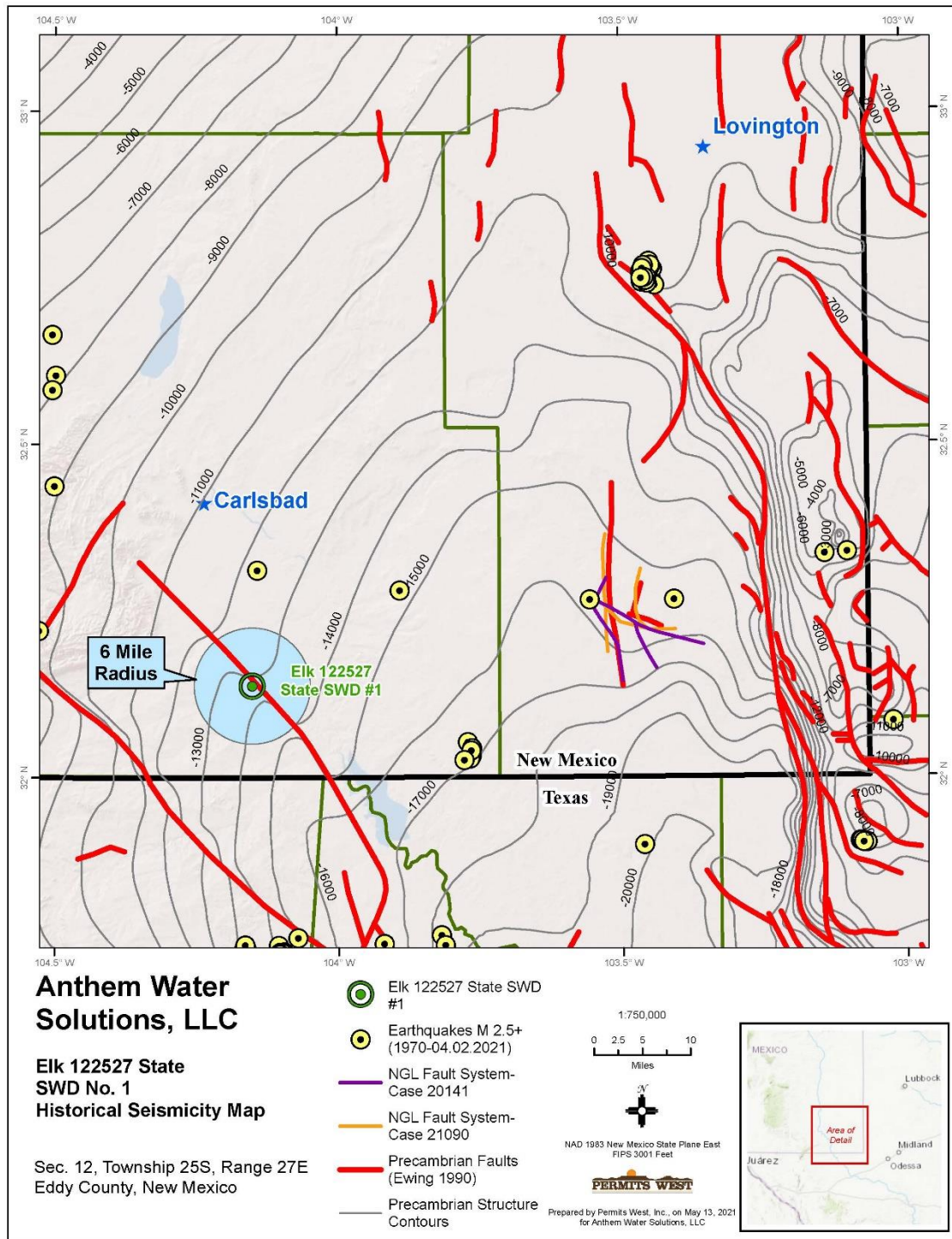


Figure 1. Structural contour map of the Precambrian basement in feet below sea level. Red lines represent the locations of Precambrian basement-penetrating faults (Ewing et al., 1990). Purple and orange lines represent the locations of basement-penetrating faults inferred by Todd Reynolds representing NGL in NMOCD Case Nos. 20141 and 21090. The Elk 122527 State SWD #1 well lies ~0.5 miles southwest of the closest deeply penetrating fault and ~12 miles south of the closest historic earthquake.

Table 1: Nearby Basement Fault Model Results

Fault Number	Distance to proposed SWD (mi)	Strike (°)	Dip (°)	FSP	Δ Pore Pressure after 25 years (psi)	Δ Pore Pressure needed for 100% FSP (psi)	Δ Pore Pressure needed for 50% FSP (psi)
6	0.5	317	50-90	0.00	1069.4	5095.2	2819.6
5	2.6	317	50-90	0.00	1009.1	5014.5	2800.4

Table 2: Fault Slip Potential model input parameters

Faults	Value	Notes
Friction Coefficient	0.58	Ikari et al. (2011)
Dip Angle (deg)	70	Snee and Zoback (2018)
Stress		
Vertical stress gradient (psi/ft)	1.1	Hurd and Zoback (2012)
Max Horizontal Stress Direction (deg)	35	Snee and Zoback (2018)
Depth for calculations (ft)	14890	Proposed injection zone
Initial Reservoir Pressure Gradient (psi/ft)	0.7	calculated from mud wt (ppg) used in drilling at these depths
A Phi Parameter	0.52	Snee and Zoback (2018)
Reference Friction Coefficient	0.58	Ikari et al. (2011)
Hydrology		
Aquifer thickness (ft)	1000	Proposed injection zone
Porosity (%)	6	
Permeability (mD)	150	
Injection Rate (bbl/day)	30000	Maximum proposed injection rate

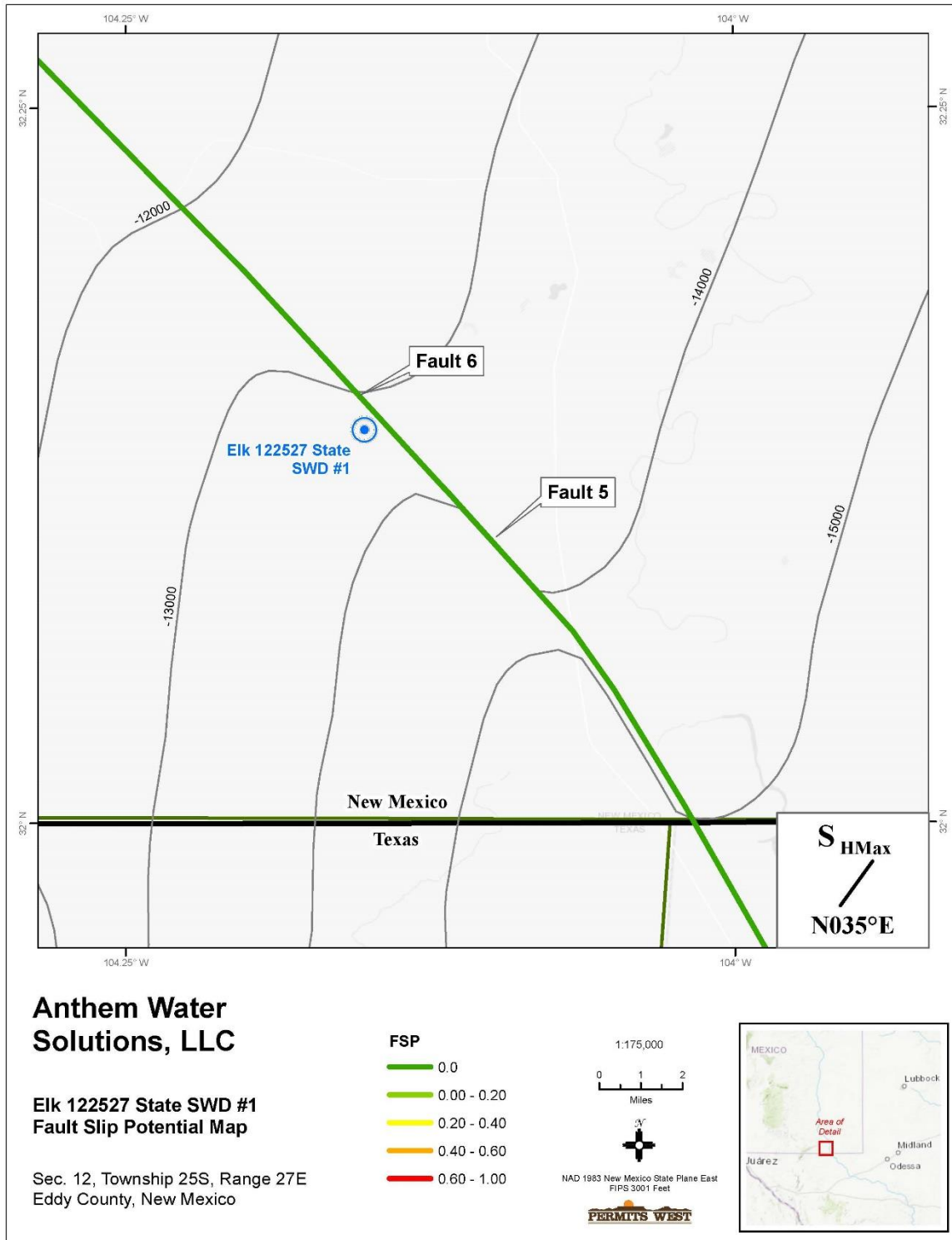


Figure 2. Precambrian fault map. Faults are colored based on probability of fault slip as modeled using Fault Slip Potential software (Walsh and Zoback, 2016). Labeled values represent the calculated fault slip potential using the parameters indicated in Table 2. Contours show the top of the Precambrian basement in feet below sea level.

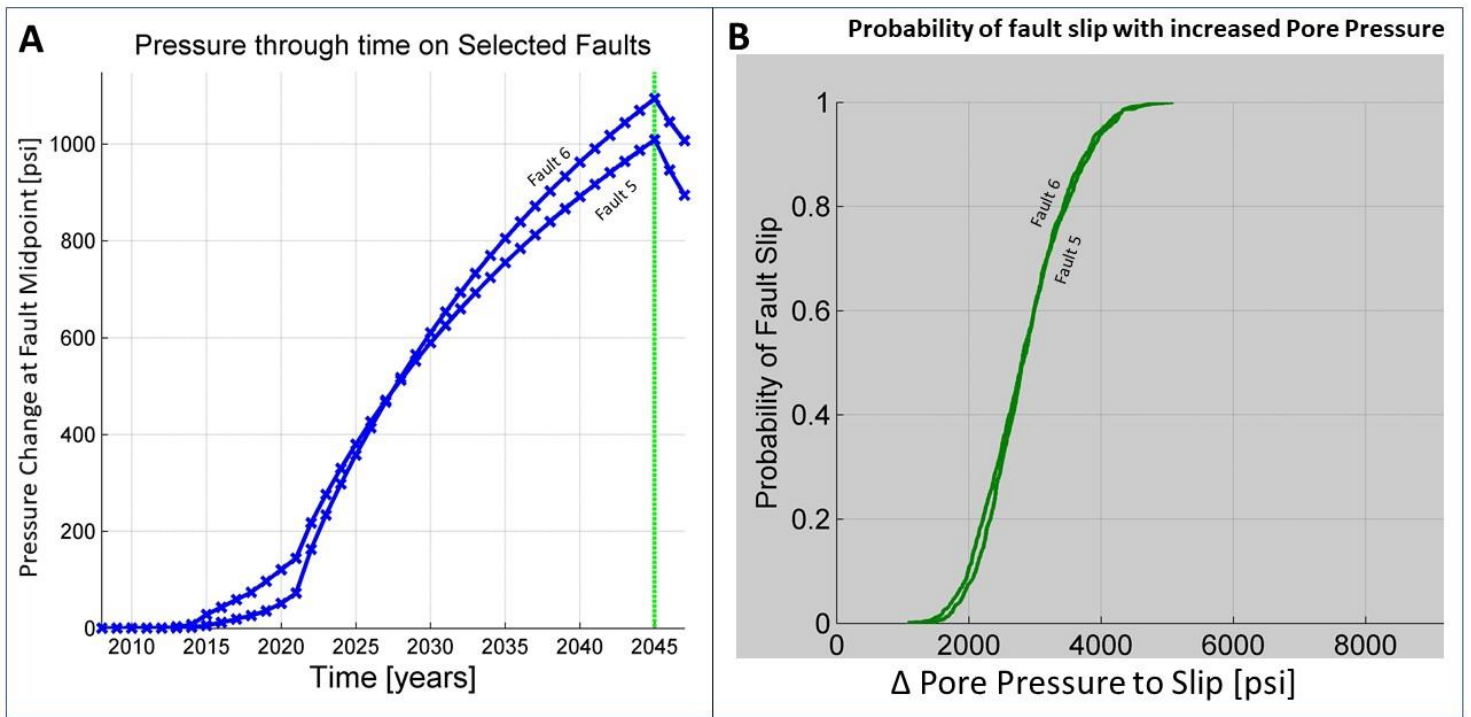


Figure 3. A) Plot showing the modeled change of pore pressure on nearby faults through time as a response to the proposed SWD well. B) Plot showing the required pore pressure increase needed to produce specific probabilities of fault slip on nearby faults.

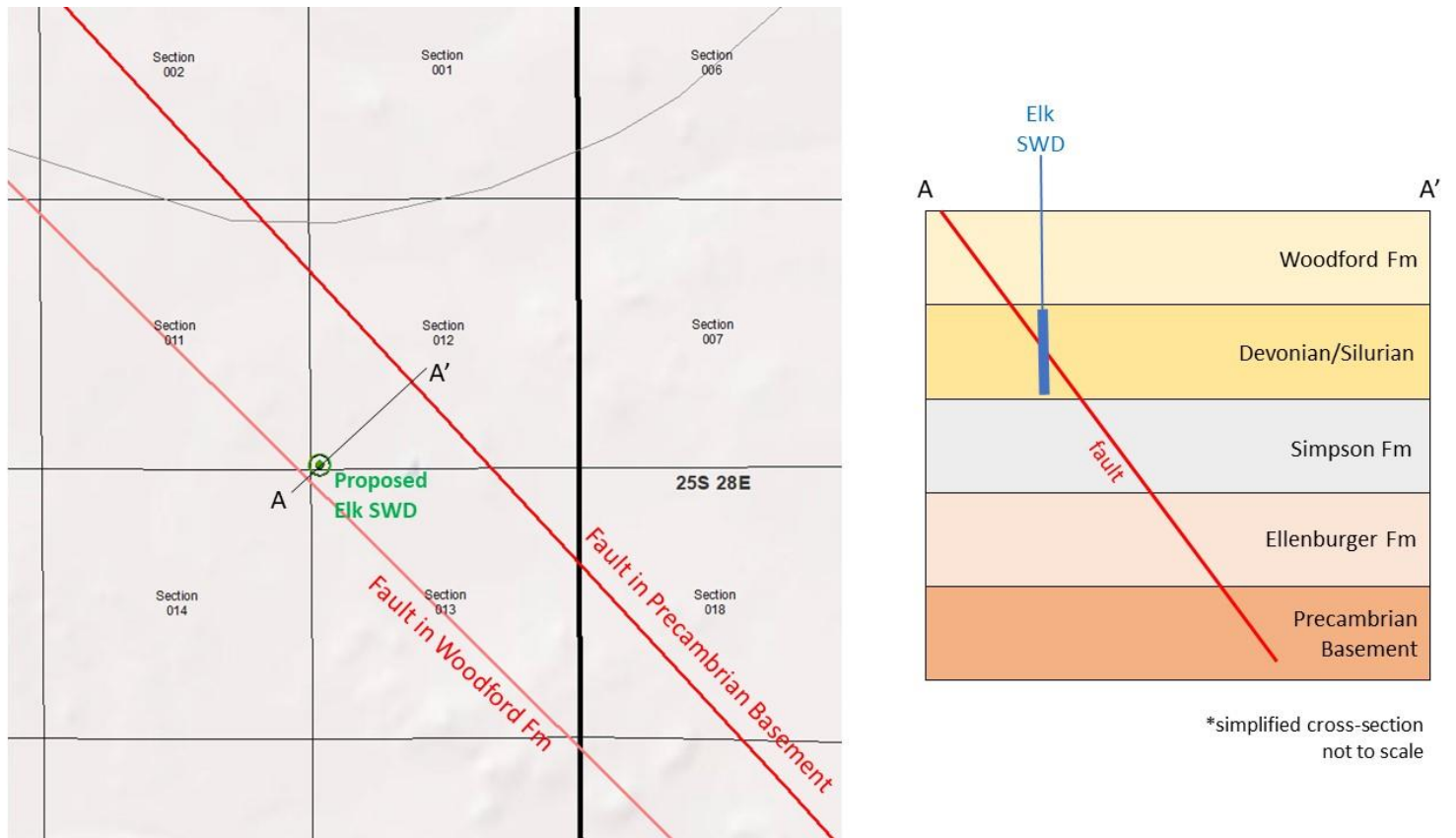


Figure 4. Map and simplified cross-section showing potential injection into a known fault. Fault data source: Ruppel, 2009.

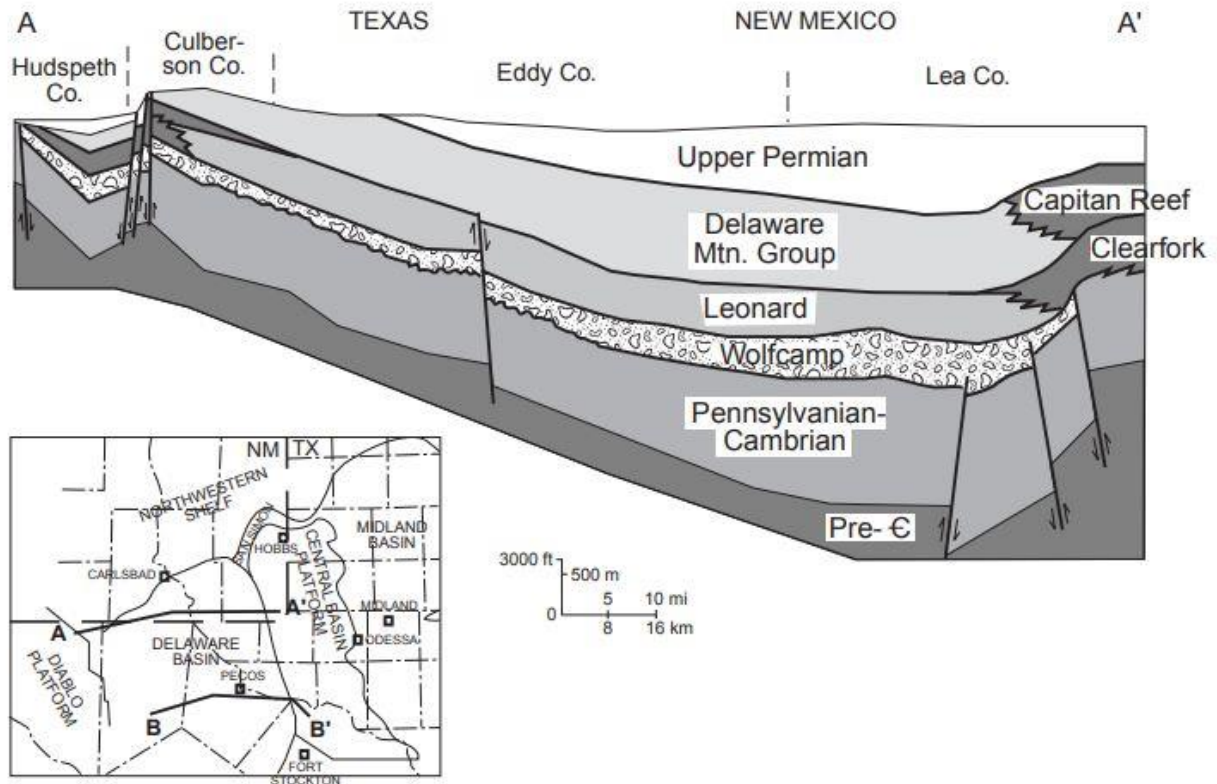


Figure 5. Cross section of the Permian Basin from Montgomery (1997). Notice the majority of basement faults only penetrate through the Leonard and deeper formations and therefore cannot act as conduits to the near surface potable water sources.

References Cited

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- 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 USA TODAY NETWORK)

Affidavit of Publication

Ad # 0004743191

This is not an invoice

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

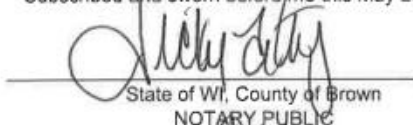
AUSTIN, TX 78730

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:

05/20/2021


Legal Clerk

Subscribed and sworn before me this May 20, 2021:


State of WI, County of Brown
NOTARY PUBLIC

9/19/21

My commission expires

VICKY FELTY
Notary Public
State of Wisconsin

Ad # 0004743191

PO #: Elk 122527 State SWD 1
of Affidavits 1

This is not an invoice

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: Elk 122527 State SWD 1 Located 7.6 Miles SW of Malaga, NM. SW 1/4 of the SW 1/4 Section 12, Township 25S, Range 27E, 129' from South Line & 289' from West Line, Eddy County, New Mexico.

NAME AND DEPTH OF DISPOSAL ZONE: Devonian-Silurian (13,965' - 14,890')

EXPECTED MAXIMUM INJECTION RATE: 30,000 barrels/day

EXPECTED MAXIMUM INJECTION PRESSURE: 2,793 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.

#4743191, Current Argus, May 20, 2021

Attachment 6: List of Notification Applicants & Delivery Confirmations

Elk 122527 State SWD 1 - Notice of Application Receipts				
Entity	Address	City	State	Zip Code
Landowner and Mineral Owner				
New Mexico State Land Office	310 Old Santa Fe Trail	Santa Fe	NM	87501
OCD District				
NMOCD District 2	811 S. First St	Artesia	NM	88210
Leasehold Operators (1-mile)				
EOG RESOURCES INC	P.O Box 4362	Houston	TX	77210
Conoco Phillips	925 N Eldridge Parkway	Houston	TX	77079
DEVON ENERGY PRODUCTION COMPANY, LP	333 West Sheridan Ave	Oklahoma City	OK	73102
OCCIDENTAL PERMIAN LIMITED PARTNERSHIP	5 GREENWAY PLAZA SUITE 110	Houston	TX	77046
TAP ROCK RESOURCES LLC	602 PARK POINT DRIVE SUITE 200	Golden	CO	80401
Mewbourne	P.O Box 7698	Tyler	TX	75711
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 State Land Office
310 Old Santa Fe Trail
Santa Fe, NM 87501

APPLICATION FOR AUTHORITY TO INJECT

To Whom it May Concern,

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NAME AND DEPTH OF DISPOSAL ZONE: Devonian-Silurian (13,965' – 14,890')

EXPECTED MAXIMUM INJECTION RATE: 30,000 barrels/day

EXPECTED MAXIMUM INJECTION PRESSURE: 2793 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.

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

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

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Marshall Tippen



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

EOG RESOURCES INC
P.O Box 4362
Houston, TX 77210

APPLICATION FOR AUTHORITY TO INJECT

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Regards,

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Marshall Tippen



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

Conoco Phillips
925 N Eldridge Parkway
Houston, TX 77079

APPLICATION FOR AUTHORITY TO INJECT

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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.

Regards,

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

Marshall Tippen



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

DEVON ENERGY PRODUCTION COMPANY, LP
333 West Sheridan Ave
Oklahoma City, OK 73102

APPLICATION FOR AUTHORITY TO INJECT

To Whom it May Concern,

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: Elk 122527 State SWD 1 Located 7.6 Miles SW of Malaga, NM. SW 1/4 of the SW 1/4 Section 12, Township 25S, Range 27E, 129' from South Line & 289' from West Line, Eddy County, New Mexico.

NAME AND DEPTH OF DISPOSAL ZONE: Devonian-Silurian (13,965' – 14,890')

EXPECTED MAXIMUM INJECTION RATE: 30,000 barrels/day

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Marshall Tippen



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

OCCIDENTAL PERMIAN LIMITED PARTNERSHIP
5 GREENWAY PLAZA SUITE 110
Houston, TX 77046

APPLICATION FOR AUTHORITY TO INJECT

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Marshall Tippen



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

TAP ROCK RESOURCES LLC
602 PARK POINT DRIVE SUITE 200
Golden, CO 80401

APPLICATION FOR AUTHORITY TO INJECT

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Marshall Tippen



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

Mewbourne
P.O Box 7698
Tyler, TX 75711

APPLICATION FOR AUTHORITY TO INJECT

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Marshall Tippen

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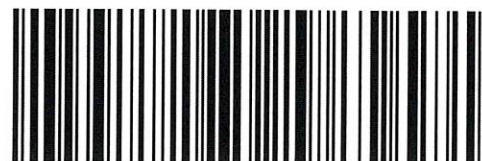


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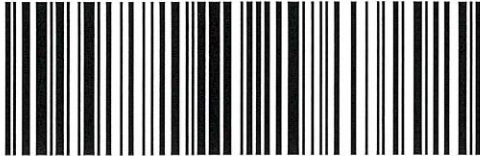
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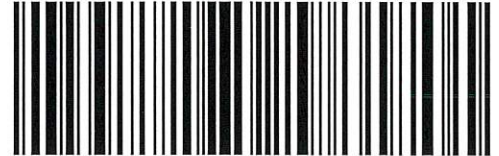
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Houston TX 77046-0521

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TAP ROCK R LLC
602 PARK POINT DRIVE SUITE 200
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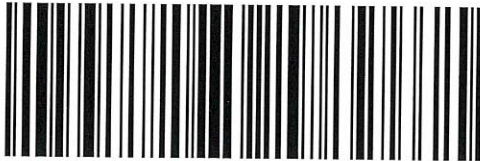


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