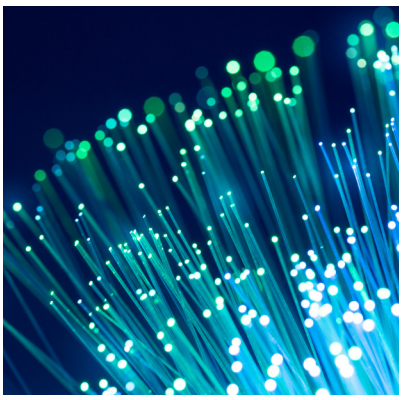
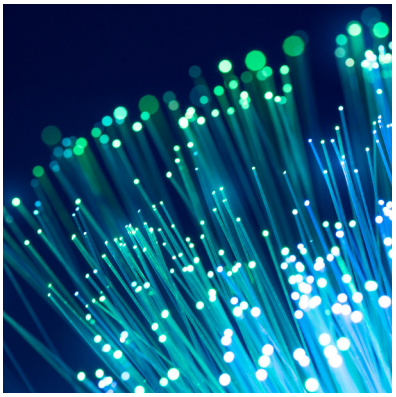
Kansas
Corporation Commission

2026

OIL AND GAS REMEDIATION SITE STATUS

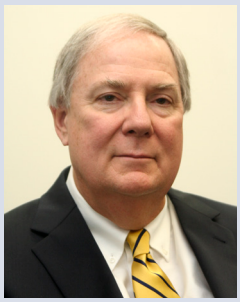


Serving the people of Kansas by regulating the State's energy infrastructure, oil and gas production and commercial trucking to ensure public safety.



About the Commission

Andrew J. French
Chairperson



Dwight D. Keen
Commissioner

Annie Kuether
Commissioner

The Commission consists of three members appointed by the Governor to overlapping four-year terms. No more than two members may be of the same political party. The authority of the Kansas Corporation Commission is derived from K.S.A. 74-601 to 74-631.

The Commission regulates investor-owned utilities operating in the state, the Kansas oil and gas industry and motor carrier safety. The KCC does not regulate most electric cooperatives, water cooperatives, municipalities, wireless telephone, long distance service, cable companies, or internet services.

To carry out its multi-faceted mission, the Commission is financed from assessments, registration fees, operating charges, federal funds, and other fee funding sources. The KCC does not receive funding from the state general fund.

FY2025

Business Meetings	**93**
Evidentiary Hearings	**9**
Public Hearings	**5**

2,813 Total orders issued by the Commission in FY2025.

The Commission meets bi-weekly at 10 a.m. on Tuesday and Thursday. The meeting is broadcast live on the KCC's YouTube channel. To preview the agenda in advance, sign up for meeting notifications at:

https://kcc.ks.gov/

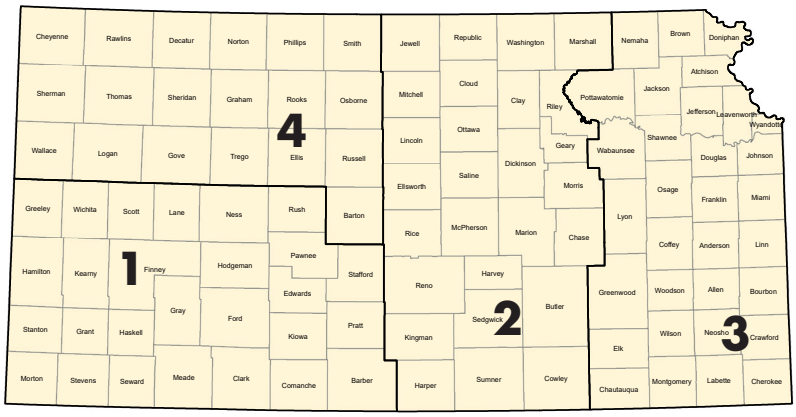
For more information, access the KCC Legislative reports at:

https://kcc.ks.gov/commission-activity reports-to-the-legislature/2026

Oil & Gas

KCC Conservation Division
Quick Reference

Conservation Division | Central Office
266 N. Main St., Ste. 220
Wichita, KS 67202-1513
Phone: (316) 337-6200



Conservation Division District Offices:

District Office No. 1
210 E. Frontview, Suite A
Dodge City, KS 67801
Phone: (620) 682-7933

District Office No. 2
3450 N. Rock Road
Building 600, Suite 601
Wichita, KS 67226
Phone: (316) 337-7400
Fax: (316) 630-4005

District Office No. 3
137 E. 21st Street
Chanute, KS 66720
Phone: (620) 902-6450

District Office No. 4
2301 E. 13th Street
Hays, KS 67601-2651
Phone: (785) 261-6250
Fax: (785) 625-0564

Oil & Gas

The KCC Conservation Division regulates, enforces laws, and supervises activities associated with the exploration and production of oil and natural gas. Conservation staff works to prevent degradation of land and water resources, prevent waste in the production of crude oil and natural gas resources, and protect correlative rights of mineral owners and royalty interest holders. The Conservation Division's main office is located in Wichita, with District Offices in Chanute, Dodge City, Hays and Wichita.

- Regulate oil and natural gas exploration and production.
- Inspect, license and monitor drilling and production operations.
- Oversight of abandoned well plugging and site remediation.

FY2025

316

Conservation Penalty Orders

with **$325,100**
in assessed fines.*

**Fines are payable to state general fund.*
The KCC receives no funding from the state general fund.

More wells will be plugged with federal funds

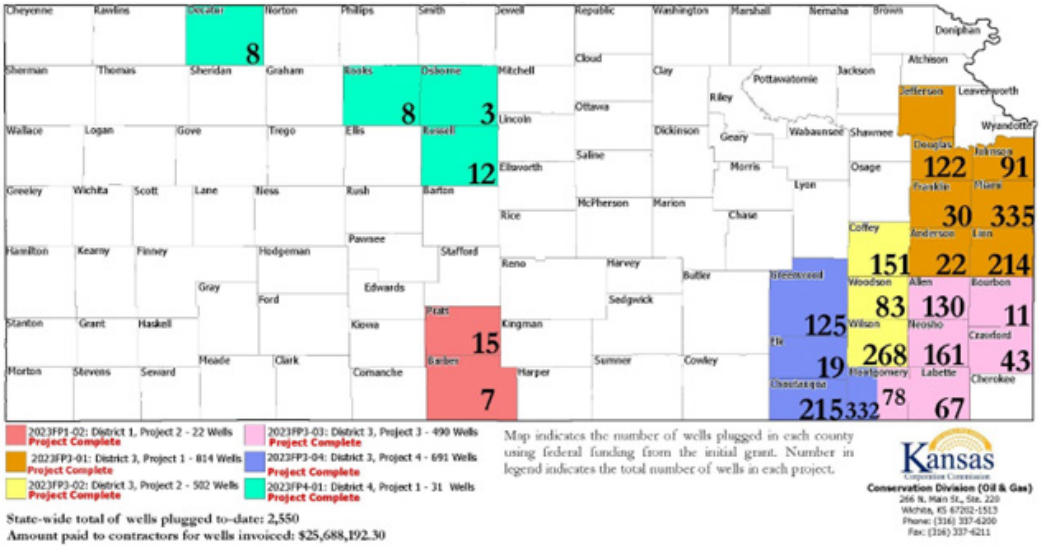
In 2026, there is an opportunity to plug and remediate thousands of abandoned wells. The KCC applied for and received a $33.6 million Formula Grant under the Infrastructure Investment and Jobs Act (IIJA). The KCC's Conservation Division has already identified 2,330 abandoned wells across the state and grouped them into 21 projects as shown in the map below. At the time of this report, the projects have been submitted to the Department of Administration, but had not yet been put out to bid.

This is the second Federal IIJA grant for well plugging the state has received. In 2023, Kansas was awarded a $25 million Initial Grant to plug abandoned wells. The grant, plus the sale of salvageable materials associated with the plugging jobs, paid for the plugging of 2300 abandoned wells between January 2023 and June 2025.

There are two other Federal Well Plugging Grants available at this time that could increase the amount of Federal monies accessible to the KCC to plug abandoned wells. KCC staff is monitoring these grants and any potential changes that may occur to the Federal guidance concerning their administration.

More information about the Federal Plugging Program is available at:
https://www.kcc.ks.gov/oil-gas/federal-plugging-program

Potential Federal Formula Grant Projects

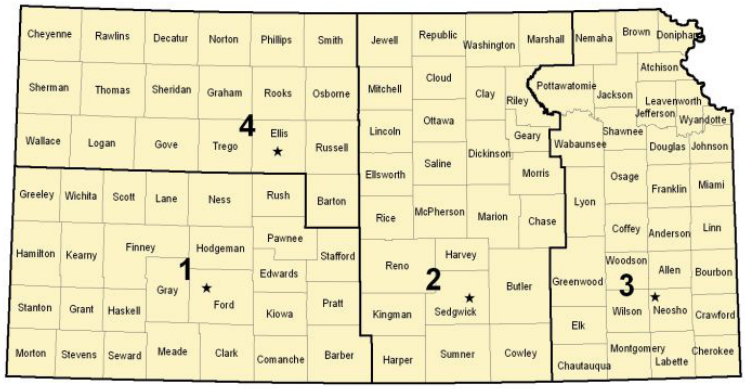


State plugging fund remains essential

The availability of Federal funds has greatly increased the number abandoned wells being plugged, but it doesn't eliminate the need for the state program, which is supported by the Abandoned Oil and Gas Well Fund. There are still more wells to be plugged than the Federal grants will cover. The plan is to plug as many wells as possible using both Federal and State funds. At the close of 2025, there were 4566 wells requiring action in the Abandoned Well database. The number may increase as staff responds to complaints, new well location techniques are adopted, and companies become insolvent. A well is considered "abandoned" when it has been permanently taken out of production, is not properly plugged to prevent possible air or groundwater pollution, and the rightful legal owner cannot be determined or located to take responsibility.

Abandoned Wells in Kansas

District 1	
Priority One	6
Priority Two	0
Total	6
District 2	
Priority One	105
Priority Two	2
Total	107
District 3	
Priority One	4,120
Priority Two	290
Total	4,392
District 4	
Priority One	61
Priority Two	0
Total	61



	2025**	2026**	Change
Total Wells Requiring Action	**4,566**	**4,566**	**0**
Total Wells Plugged with State Funds*	**11,315**	**11,420**	**105**

* Since creation of the Abandoned Well Plugging funds in 1996. ** Calendar year

Remediation sites prioritized based on risk

The KCC Conservation Division manages an inventory of contamination sites that have varying degrees of impact to groundwater, surface water, soil or wells. These sites have no responsible parties related to oil and gas exploration and production activities. The current evaluation period, January 1, 2025, through December 31, 2025, ended with one site resolved and no sites added, resulting in a total of 76 active sites. The 2025 Remediation Site Status report contains a description and evaluation of each site.

Impacted Resources	No. of Remediation Sites
Groundwater, Surface Water, Soil & Well Problems (Cavity, Abandoned)	68
Public Water Supply	7
Domestic Supply	19
Stock Supply	13
Irrigation Supply	9

Note: Some sites have impacts to multiple resources.

Immediacy Level	No. of Sites
Low & Low to Moderate	20
Moderate	11
Moderate to High & High	13
Other (Under Remediation)	3
Total	47

What does it cost?

The cost to plug an abandoned well depends on where it is located. Wells in western Kansas are typically deeper and cost more to plug. In the eastern part of the state, they tend to be shallow.

District 1 - Dodge City
$11,119.25*

District 2 - Wichita
$12,567.28*

District 3 - Chanute
$7,340.04*

District 4 - Hays
$5,594.89*

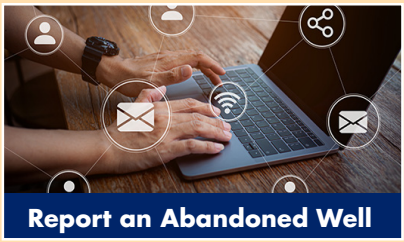
* Based on 5-year average

How to report an abandoned well

Oil and gas drilling in Kansas began in the 1860s. Record keeping by early operators was not as precise as it is today. It is not uncommon for older abandoned wells to be discovered by landowners who were unaware they existed.

The KCC is actively looking for abandoned oil and gas wells. Staff investigates these wells in order to determine if they pose a risk to public safety or the environment.

If you find an abandoned well, please report it. A form on the KCC website makes it easy.



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Kansas
Corporation Commission

Abandoned Oil and Gas Well / Remediation Site Fund
Remediation Sites
Status Report

Introduction

Enacted in 1996, K.S.A 55-192 and K.S.A. 55-193 create an Abandoned Oil and Gas Well / Remediation Fund for the Kansas Corporation Commission to plug abandoned wells and remediate contamination sites (sites and wells having no responsible parties related to oil and gas exploration and production activities). K.S.A 55-194 requires the Corporation Commission to prepare an annual Remediation Site Status Report for the office of the Governor and certain legislative committees. This report for the period January 1, 2025, through December 31, 2025, contains information for each of the sites with regard to the following: (1) A description and evaluation of the site; (2) the immediacy of the threat to public health and environment; (3) the level of remediation sought; (4) any unusual problems associated with the investigation or remediation; (5) any remedial efforts completed during the review period; (6) current contaminate level; (7) status of the site; (8) direct and indirect costs associated with remedial efforts; and (9) an estimate of the cost to achieve the recommended level of remediation or an estimate of the cost to conduct an investigation sufficient to determine the cost of remediation. The Site Remediation cash expenditures for FY2026 are projected to be approximately $175,000.

Site Inventory

This Remediation Site Status Report consists of 47 sites. This report includes sites that were transferred to the control of the Kansas Corporation Commission (KCC) from the Kansas Department of Health and Environment (KDHE) by legislative action in 1995 and in-house sites already under KCC jurisdiction. Of the original 109 sites, four were combined with other sites. During previous evaluation periods, 81 sites have been resolved and 23 sites have been added. The current evaluation period, January 1, 2025, through December 31, 2025, ended with one site resolved and no sites added, resulting in a total of 46 active sites. Summary tables for site impacts and immediacy levels as well as estimated costs are found at the beginning of the report. The tables below provide an overview of distribution of sites with respect to both resources impacted and the range of immediacy levels for required remediation.

Distribution of Active Sites with Respect to Impacted Resources

Impacted Resources	Number of Sites
Groundwater, Surface Water, Soil and Well Problems (Cavity, Abandoned)	68
Public Water Supply	7
Domestic Supply	19
Stock Supply	13
Irrigation Supply	9

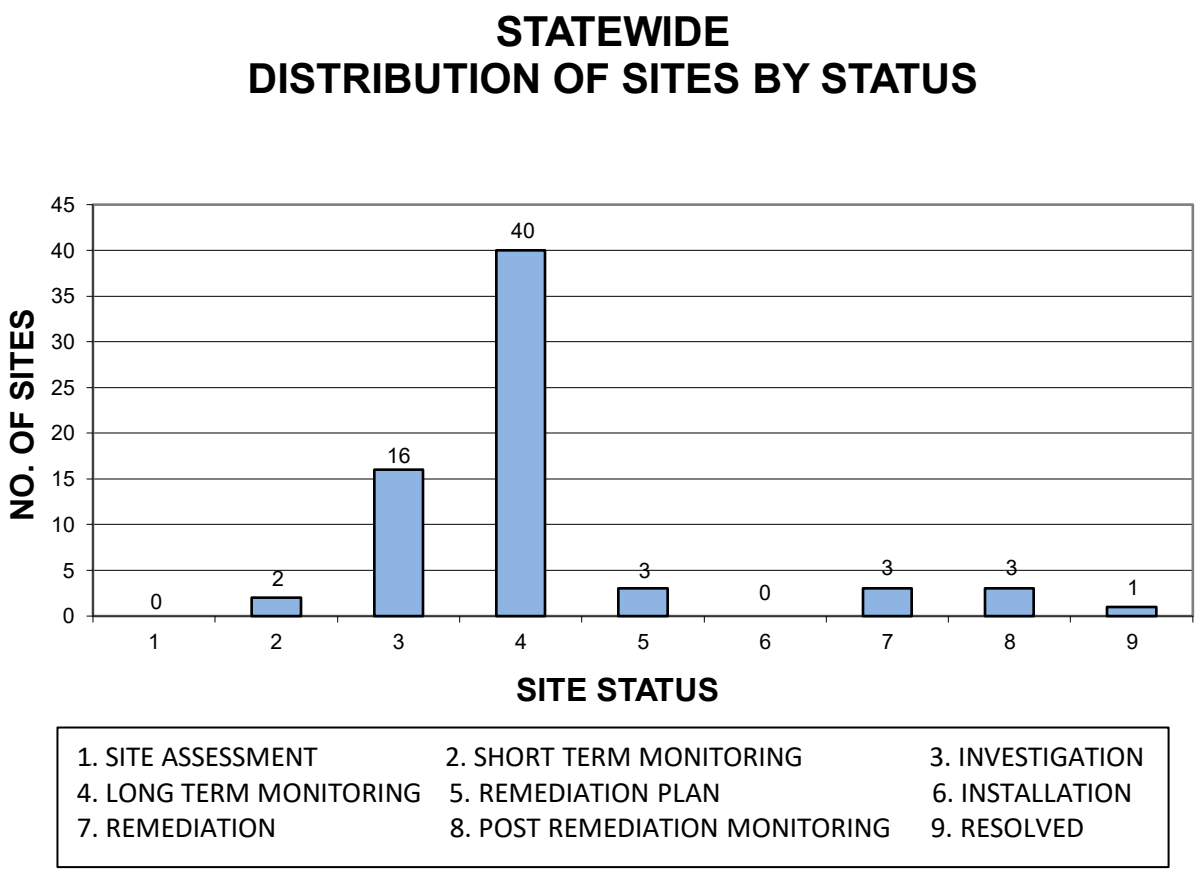
Note: Some sites have impacts to multiple resources.

Distribution of Active Sites with Respect to Immediacy Levels

Range of Immediacy Level	No. of Sites
Low & Low to Moderate	20
Moderate	11
Moderate to High & High	13
Other (Under Remediation)	3
Total	47

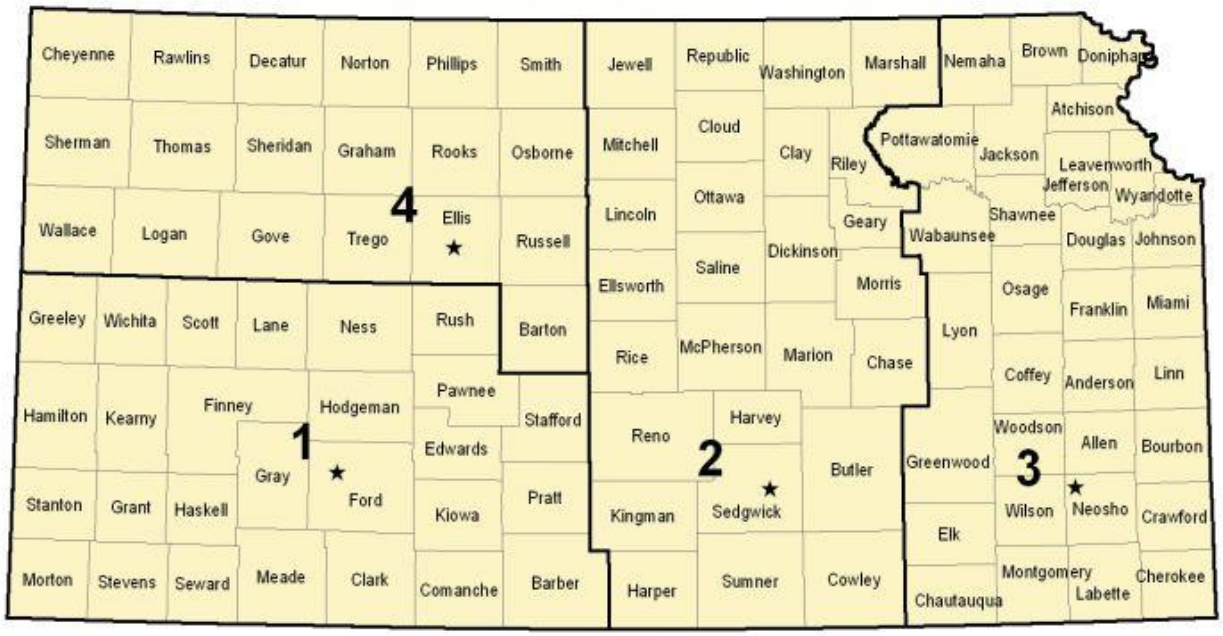
Site Status

In general, each contamination site has a definable life cycle. This cycle begins with, then follows a sequence of investigatory and possible remedial activities which move the site towards ultimate resolution. The first phase of the cycle is the site assessment. This phase defines general site parameters and conditions forming the basis for additional efforts at the site. Once the assessment is complete the site moves on to a new phase. This next phase may be short term or long term monitoring followed by resolution of the site. Another scenario might include an extensive investigation phase followed by the installation of a monitoring system whose sample results may indicate the necessity for certain remedial activities and additional post remediation monitoring prior to resolution of the site. The following graphs depict the current status of the 47 listed sites on a statewide and KCC District basis.

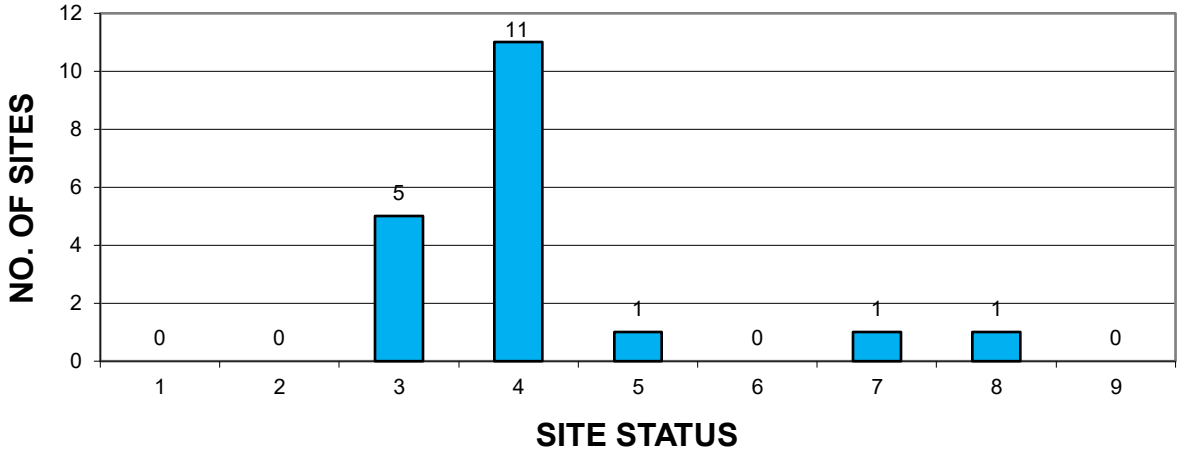


Note: Sites may have more than one status.

DISTRIBUTION OF SITES
IN EACH DISTRICT BY STATUS



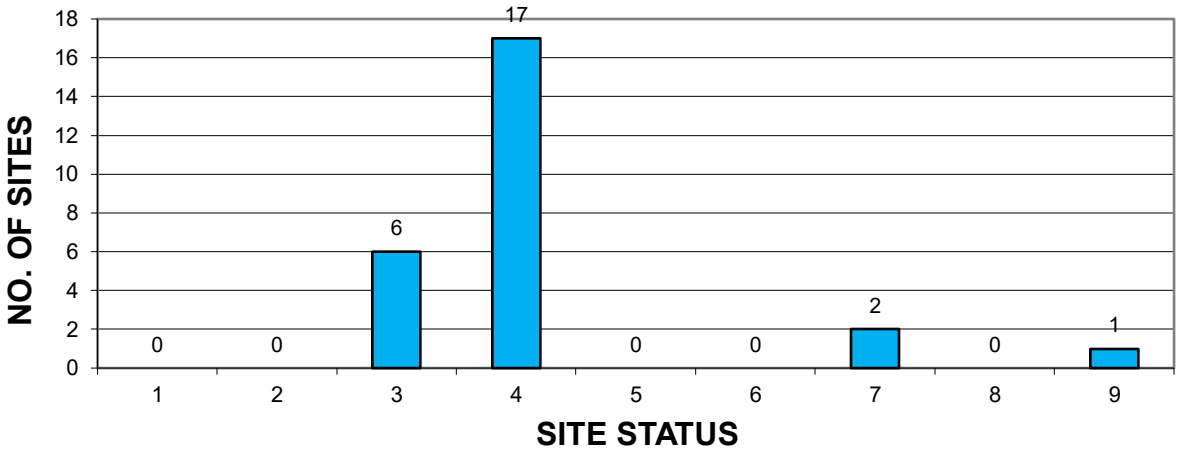
DISTRICT 1



1. SITE ASSESSMENT	2. SHORT TERM MONITORING	3. INVESTIGATION
4. LONG TERM MONITORING	5. REMEDIATION PLAN	6. INSTALLATION
7. REMEDIATION	8. POST REMEDIATION MONITORING	9. RESOLVED

Note: Sites may have more than one status.

DISTRICT 2



1. SITE ASSESSMENT	2. SHORT TERM MONITORING	3. INVESTIGATION
4. LONG TERM MONITORING	5. REMEDIATION PLAN	6. INSTALLATION

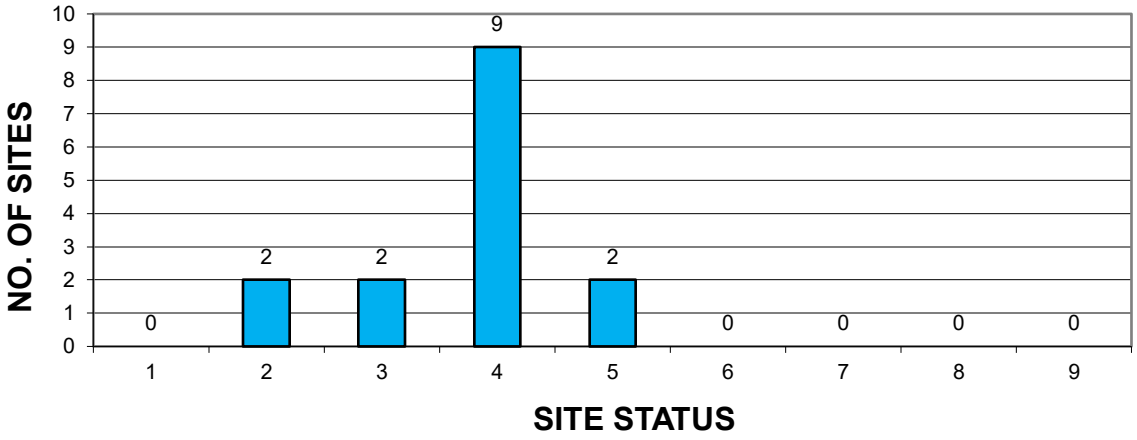
Note: Sites may have more than one status.

DISTRICT 3

1. SITE ASSESSMENT	2. SHORT TERM MONITORING	3. INVESTIGATION
4. LONG TERM MONITORING	5. REMEDIATION PLAN	6. INSTALLATION
7. REMEDIATION	8. POST REMEDIATION MONITORING	9. RESOLVED

Note: Sites may have more than one status.

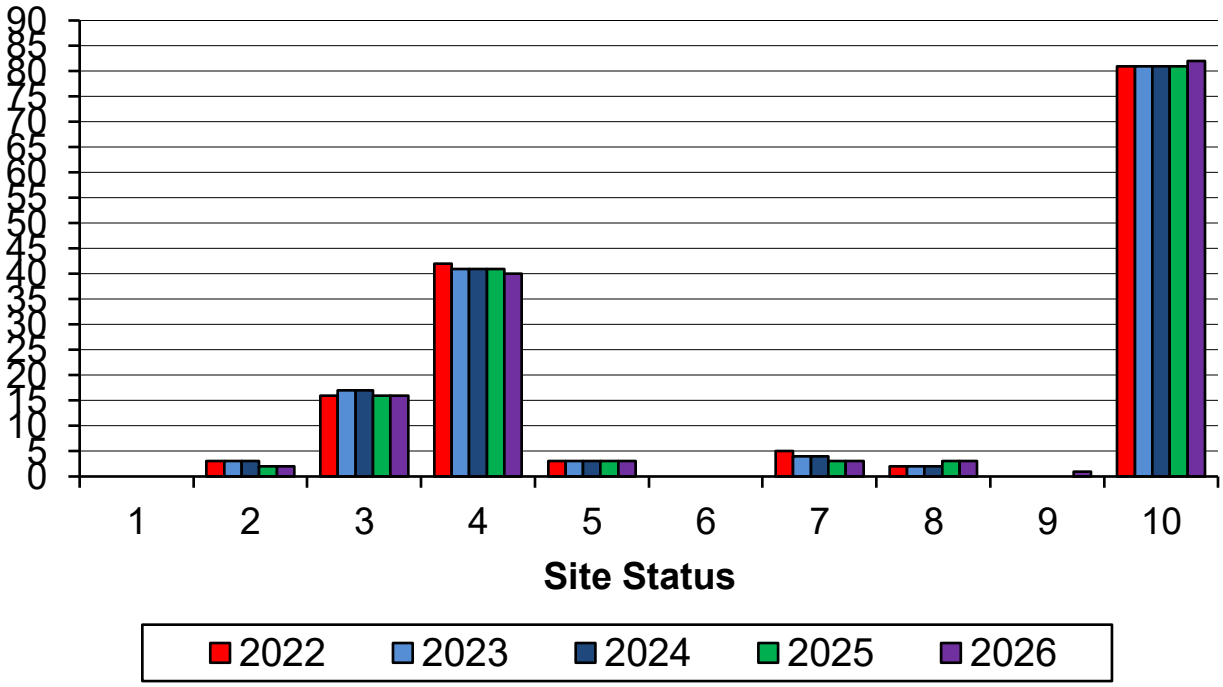
DISTRICT 4



1. SITE ASSESSMENT	2. SHORT TERM MONITORING	3. INVESTIGATION
4. LONG TERM MONITORING	5. REMEDIATION PLAN	6. INSTALLATION

Note: Sites may have more than one status.

Distribution of Sites by Status for Reporting Periods 2022 - 2026



1. SITE ASSESSMENT	2. SHORT TERM MONITORING	3. INVESTIGATION
4. LONG TERM MONITORING	5. REMEDIATION PLAN	6. INSTALLATION
7. REMEDIATION	8. POST REMEDIATION MONITORING	9. RESOLVED
10. RESOLVED - CUMULVATIVE		

Conclusions

This report provides information concerning the location, resource impact, immediacy level, and site description and status for 47 listed contamination / remediation sites related to exploration and production activities in the state. In addition, data is presented with regard to staff expenditures for site management, administration, and inspections, as well as authorization and/or expenditures against the Abandoned Well / Remediation fund for investigatory and remedial activities at the sites.

The Conservation Division of the Corporation Commission is committed to work with the oil and gas industry of the state, other state agencies and the public to provide a scientifically sound and technically based remediation program.

Impacts, Immediacy and Target Remediation Levels for Kansas Corporation Commission Contamination Sites

County	Site Name	KCC District	Impact	Immediacy	Target Level Of Remediation	Unusual Problems	Estimated Total Cost
Barber	Harbaugh	1	GW / Domestic / Stock Well	High	1000 ppm	Yes	$ 450,000*+
Barber	Hrencher	1	GW/ STK / Soil / SW	Mod-High	1000 ppm	No	$ 150,000
Barber	Packard	1	GW / DM / STK	Moderate	1000 ppm	Yes	$ 10,000
Barber	Wildboy's	1	GW / SW / PWSW	Mod-High	500 ppm	No	$ **
Decatur	Jennings	4	GW / DM / PWSW / SD	Mod-High	500 ppm	No	$ 2,000
Ellis	Dinkel	4	GW / Domestic (SS)	Low	500 ppm	No	$ 30,000
Ellis	Ruder	4	Groundwater / SW	Moderate	500 ppm	Yes	$ 29,000
Graham	Balthazor	4	GW / Domestic (SS)	Low	250 ppm	No	$ 10,000
Graham	Fink, Leon	4	Groundwater / Stock Well	Low	500 ppm	Yes	$ 2,000
Harvey	Hollow-Nikkel	2	GW / Domestic / Irrigation	Moderate	500 ppm	Yes	$ 75,000
Harvey/Reno	Burrton	2	GW / Domestic / Irrigation	High	Variable	Yes	$3,000,000+
Haskell	Clawson (Mesa)	1	Groundwater / Irrigation	Mod-High	500 ppm	Yes	$ 450(yr)*

County	Site Name	KCC District	Impact	Immediacy	Target Level Of Remediation	Unusual Problems	Estimated Total Cost
Hodgeman	Schraeder	1	Groundwater / Stock Well	Low	350 ppm	No	$ 30,000
Kingman	South Spivey	2	GW / SW / Stock Well	Low	750 ppm	Yes	$ 5,000*
Kingman	Trostle	2	GW / Soil / Stock Well	Low	500 ppm	No	$ 2,500*
Kingman	Yeoman	2	GW / DM /Stock Well	Moderate	NA	No	$ 56,000+
Linn	McDonald - East	3	GW / SW	Low	500 ppm	No	$ 1,500(yr)
McPherson	Galva City	2	GW / DM / PWSW	UR	500 ppm	Yes	$ 500,000
McPherson	Knackstedt	2	WP (Cavity)	Moderate	NA	Yes	$ 5,000
McPherson	McPherson Landfill	2	GW / DM / SD / INDWSW	UR	500 ppm	No	$ 26,500*
McPherson	Nikkel-Epps	2	GW / DMSS / IR	Mod-High	500 ppm	Yes	$ 20,000
McPherson	Running Turkey Creek	2	GW / DM / SW / SD	Mod-High	500 ppm	Yes	$ 125,000
McPherson	Selzer	2	Groundwater / SW	Moderate	500-750 ppm	Yes	$ 20,000
McPherson	Voshell	2	GW / SW / DM / IR / STK	High	500 ppm	Yes	$ 20,000+
Montgomery	Fowler	3	Soil	Low	300 ppm	Yes	$ 4,500
Montgomery	Mantooth	3	GW / SW	Moderate	500 ppm	Yes	$ 10,000+
Morton	Smith-Finn	1	Groundwater / Domestic	UR	500 ppm	Yes	$ 200,000*
Neosho	Brazil	3	SW / GW / PWS / Soil	Low-Mod	500 ppm	No	$ 63,000

County	Site Name	KCC District	Impact	Immediacy	Target Level Of Remediation	Unusual Problems	Estimated Total Cost
Pawnee	Enoch-Thompson	1	Groundwater / Stock Well	Low-Mod	1000 ppm	No	$ 500(yr)*
Pawnee	Macksville	1	Groundwater / IR / SW	Mod-High	300 ppm	Yes	$ 20,000(yr)*
Reno	Arlington	2	GW / Soil / DM / IR	Moderate	250 ppm	Yes	$ 7,500*
Rice	Brothers	2	Groundwater	Low	500 ppm	Yes	$ 4,000
Rice	Little River	2	Groundwater / PWSW	High	300 ppm	Yes	$ 46,500
Rice	Stowe-Zaid	2	Groundwater / Soil	Low	350 ppm	Yes	$ 12,000
Rooks	Elm Creek	4	GW / Domestic / Stock Well	Moderate	500 ppm	Yes	$ 300,000
Rooks	Irey - Hrabe	4	Groundwater	Moderate	500 ppm	No	$ 15,000
Rooks	Schruben-Rogers	4	Groundwater	Low	250 ppm	No	$ 2,000
Russell	Maupin	4	Groundwater / SW / STK	Low	500 ppm	No	$ 2,000
Russell	Russell City	4	GW / Domestic / Irrigation	Low	1000 ppm	Yes	$ 400,000
Russell	Russell RWD #1	4	Groundwater / PWSW	Low-Mod	250 ppm	Yes	$ 33,000
Russell	Sander	4	GW / Domestic / Stock Well	Low	1000 ppm	No	$ 300
Sedgwick	Sample	2	Groundwater	Low	500 ppm	Yes	$ 2,000
Sedgwick	Schulte Field	2	GW / Domestic / PWSW	Moderate	500 ppm	Yes	$ 300,000
Stafford	Curtis	1	Groundwater / Irrigation	Low-Mod	500-1000 ppm	Yes	$ 27,000

County	Site Name	KCC District	Impact	Immediacy	Target Level Of Remediation	Unusual Problems	Estimated Total Cost
Stafford	French Sink	1	WP (Cavity)	Mod-High	NA	Yes	$ 3,000
Stafford	Leesburg Sink	1	WP (Cavity)	Mod-High	NA	Yes	$ 62,000*
Wilson	Wingate	3	Groundwater / Soil	Low	500 ppm	Yes	$ 15,000
Total Estimated Cost							$6,099,250

ABDW=Abandoned Well DM=Domestic GW=Groundwater INDWSW=Industrial Water Supply Well IR=Irrigation Well
Mod=Moderate PWSW=Public Water Supply Well SD=Surface Damage STK=Stock Well SW=Surface Water
SS=Sole Source UR=Under Remediation WSW=Water Supply Well WP=Well Problem

*PRP – Potential Responsible Party involvement **See Harbaugh Site for costs +Actual costs have exceeded original estimate

CONTAMINATION SITE EXPENDITURES

SITE NAME	CONTROL NO.	STAFF HOURS	EXPENDITURE FOR STAFF HOURS	REMEDIATION FUND AUTHORIZATION / EXPENDITURE FY 2025/26 TOTAL	
ARLINGTON	20030016-001	19	$666.09		
BALTHAZOR	970023-00	12	$397.73		
BRAZIL	990040-001	26	$809.87		$10,791.18
BROTHERS	970029-00	7.5	$272.82		$4.26
BURRTON	970003-00	72	$2,446.94	$4,533.90	$1,012,271.32
CLAWSON	970005-00	3	$114.74		
CURTIS	970034-00	4	$148.34		$4,199.17
DINKEL	970035-00	6	$215.54		
ELM CREEK	970043-00	12	$417.15		$29,212.25
ENOCH THOMPSON	970044-00	4	$148.34		
FINK	970007-00	4	$148.34		
FOWLER	970046-00	10	$340.24		
FRENCH	990002-001	10	$349.95		$346.50
GALVA CITY AREA	980033-001	163	$5,628.20	$17,106.24	$544,643.29
HARBAUGH	970049-00	7	$249.15	$5,010.00	$718,223.92
HOLLOW NIKKEL	970009-00	18	$632.49	$2,489.20	$64,730.49
HRENCHER	970051-00	5	$181.94		$189.94
IREY-HRABE	970053-00	3	$114.74		
JENNINGS	970054-00	9	$301.78		
KNACKSTEDT	970060-00	21.5	$743.23		$29,759.39
LEESBURG SINK	20040003-001	3	$114.74		$6,266.00
LITTLE RIVER	20000057-001	18	$646.22		$3,112.20
MACKSVILLE	970066-00	4	$148.34	$1,585.00	$96,309.95
MANTOOTH	980058-001	34	$1,068.96		$17,349.00
MAUPIN	970068-00	9	$301.78		
MCDONALD-EAST	970070-00	27	$858.04		

SITE NAME	CONTROL NO.	STAFF HOURS	EXPENDITURE FOR STAFF HOURS	REMEDIATION FUND AUTHORIZATION / EXPENDITURE FY 2025/26	TOTAL
MCPHERSON LANDFILL	980034-001	12	$499.53	$533.40	$26,779.60
NIKKEL-EPPS	20100082-001	11.5	$407.21		$8,318.75
PACKARD	970075-00	5	$181.94		$310.09
RUDER	970082-00	4	$148.34		$12,960.00
RUNNING TURKEY CREEK	20010033-001	9	$330.08		$61,603.07
RUSSELL CITY	970083-00	4	$148.34		$1,192.60
RUSSELL RWD #1	970084-00	5	$177.09		
SAMPLE	970088-00	9.5	$340.01		
SANDER	970089-00	3	$114.74		
SCHRAEDER	970013-00	4	$148.34		$1,590.90
SCHRUBEN-ROGERS	970014-00	4	$148.34		
SCHULTE	970015-00	50	$1,707.72	$1,092.95	$185,569.17
SELZER	970093-00	16	$565.28		$12,133.50
SMITH-FINN	970095-00	3	$114.74		
SOUTH SPIVEY	970096-00	30	$1,035.70		
STOWE-ZAID	20000035-001	9.5	$340.01		$4,057.85
TROSTLE	980038-001	16	$565.28		
VOSHELL	20030059-001	29	$1,002.10	$311.15	$22,960.88
WILDBOY'S	970017-00	5	$181.94		
WINGATE	970107-00	21	$666.14		$8,296.00
YEOMAN	20060021-001	25	$867.69		$102,690.76
Totals:		786.5	$27,156.26	$32,661.84	$2,985,872.03

REMEDIATION

SITES

REPORT

2026

Project: ***Albert Harbaugh Contamination Site, Barber County, District 1***

Site Location: Legal location is the SE/4 of Section 20 & NE/4 of Section 29, Township 33 South, Range 11 West, Barber County.

Impact/Immediacy: The groundwater for domestic and stock wells has been contaminated from several sources on this project. This site is rated as high immediacy and remediation of the groundwater began on November 1, 1999.

Site Description: The site is located in the alluvial valley on the flood plain of the Medicine River, in the Rhodes Pool, approximately nine miles south of Medicine Lodge. This site covers an area approximately 1,000 feet wide and 3,500 feet long. This location and other sites in the area are continually increasing the chlorides in the groundwater aquifer of the Medicine River valley.

Unusual Problems: It is probable that all source areas of natural halite pollution into the aquifer have not been identified. Areas of suspected sources have not continued to contribute to the contamination since the remediation of the ground water has been implemented. These areas are suspected to have achieved a natural closure at this time. Unless all the source areas are located and plugged, the contamination will continue until there is natural closure.

Status of Project: Only 10 recovery wells along with all 11 monitoring wells were sampled due to the air compressor problems. According to the data, the plume has settled back to the Northwest portion of the site. An unidentified flowing core hole near these wells is the probable source of these chlorides with other sources contributing additional contamination across the rest of the remediation site. Differences in chloride values of wells in close proximity to each other are attributed to different screening depths.

Level of Remediation Sought:

Ideal: 250 ppm Chloride
Target: 1000 ppm Chloride

Recommendation for Future Work: Make the necessary repairs to return the recovery system back to operation, or the plugging of the recovery system. Review the data to continue taking a targeted approach at remediating the site. The plugging of more monitoring wells that are outside of the plume as well as recovery wells that are unusable will be evaluated for plugging. Repair wells MW-4, MW-25, and MW-27.

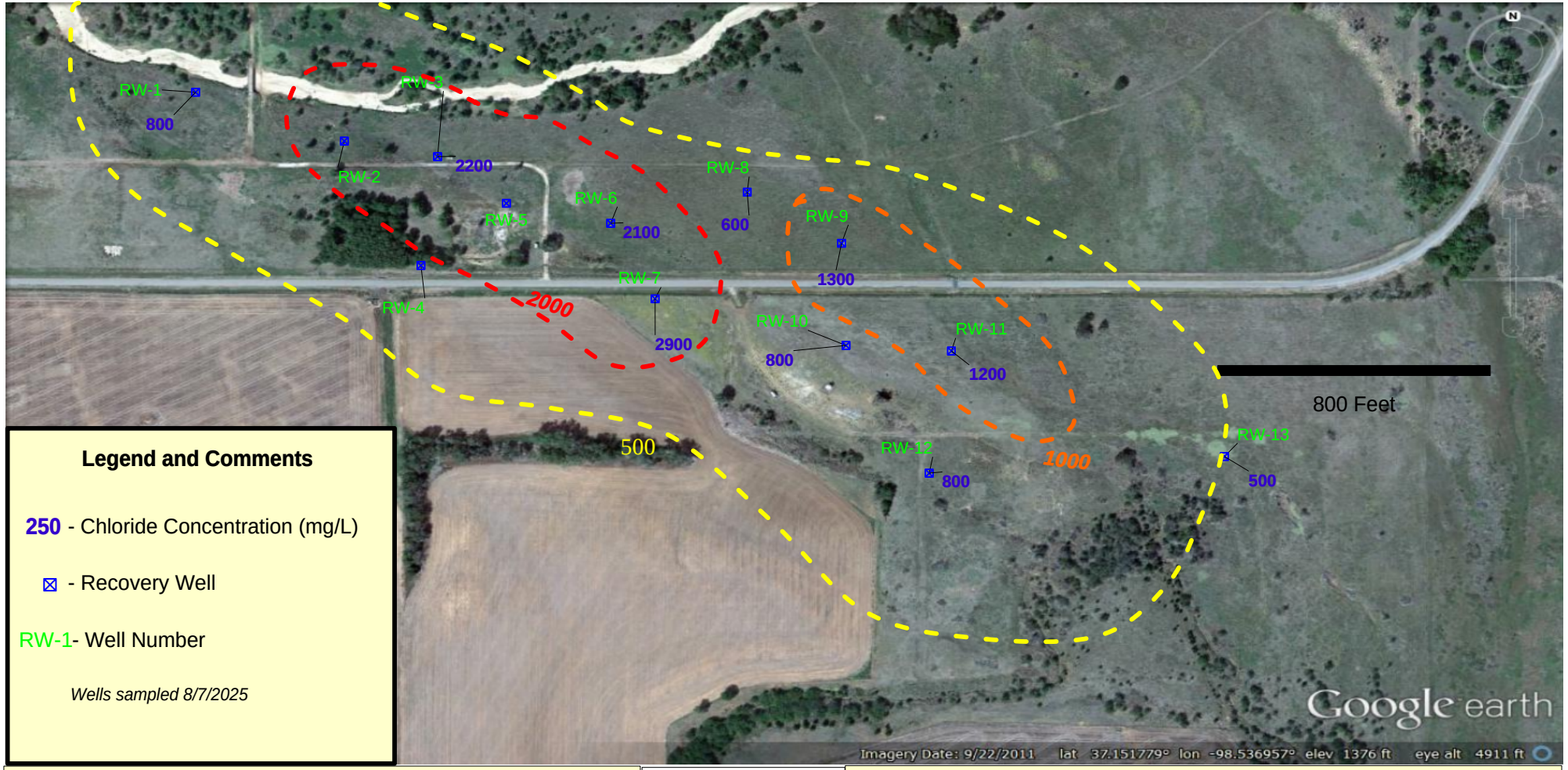
Estimated Total Cost: Total costs have exceeded the original estimate of $450,000. There will be additional costs for a pumper and maintenance.

Control No.	Staff Hours/Expenditures	Fund Expenditures FY 2025/26	Fund Expenditures Total
970049-00	7 Hrs. / $249.15	$5,010.00	$718,223.92

Current Contaminate Level: 500 ppm Cl- to 2,900 ppm Cl-

Status:

☐ 1. Site Assessment	☐ 2. Short Term Monitoring	☒ 3. Investigation
☒ 4. Long Term Monitoring	☐ 5. Remediation Plan	☐ 6. Installation
☐ 7. Remediation	☐ 8. Post Rem. Monitoring	☐ 9. Resolved



Legend and Comments

250 - Chloride Concentration (mg/L)

⊠ - Recovery Well

RW-1- Well Number

Wells sampled 8/7/2025

Kansas Corporation Commission

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Harbaugh Site

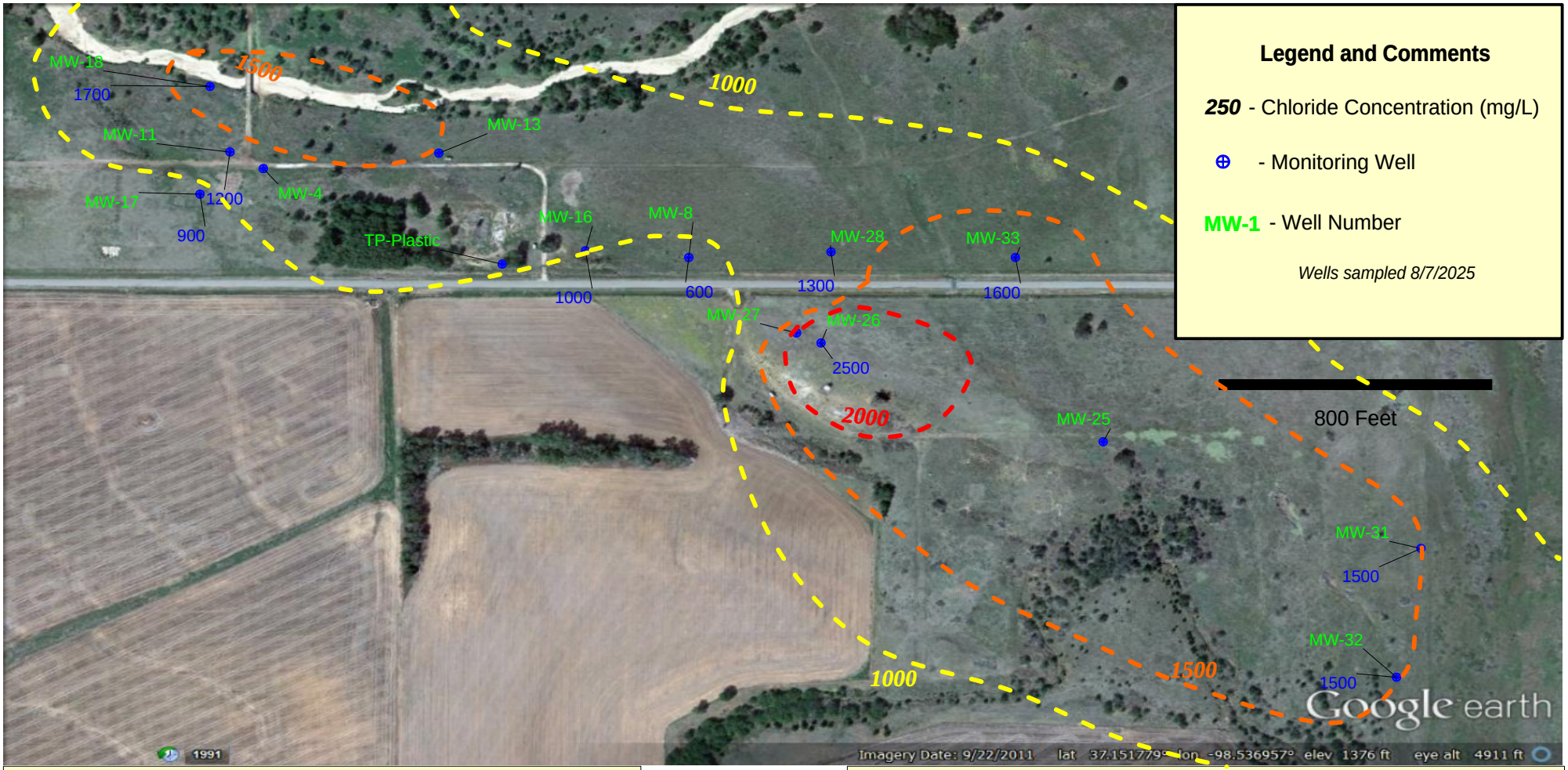
Sections 20/29-T-33S-R11W

Barber County, Kansas

2025 Area Recovery Well Map with Chlorides

KCC Control # 970049-00 District #1

N. Feldkamp 8/19/2025



Legend and Comments

250 - Chloride Concentration (mg/L)

⊕ - Monitoring Well

MW-1 - Well Number

Wells sampled 8/7/2025

Kansas Corporation Commission

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Harbaugh Site

Sections 20/29-T-33S-R11W
Barber County, Kansas

2025 Area Map with Monitoring Well Chlorides

KCC Control # 970049-00 District 1
N. Feldkamp 8/19/2025

Project: ***Hrencher Contamination Site, Barber County, District 1***

Site Location: Legal location is W/2 of Section 36, Township 32 South, Range 12 West, Barber County**.**

Impact/Immediacy: The salt-water intrusion in the area affected the groundwater, small pond, stock wells, and there is a salt scar near the pond. This site is classified as moderate to high for remediation.

Site Description: The surface area is predominately "red beds" of lower Permian age. The area is dissected by small drainage patterns and the alluvial channels filled with local parent material shale and gypsum. The area of high chlorides (1,000 ppm +) is a narrow channel 300 feet wide and approximately 8,000 feet long near the present stream. This small stream flows into the Medicine Lodge River within a half mile.

Unusual Problems: None.

Status of Project: Staff collected four groundwater samples on August 6, 2025. Chloride levels overall in the project area have remained consistent with previous years. Sometime during 2003-2011, MW-5, MW-7, and MW-11 were destroyed. MW-5 was originally drilled to provide a profile of the chlorides in the main channel, whereas MW-7 was drilled to eliminate additional sources of contamination and has historically been fresh. MW-11 was drilled in order to evaluate the down gradient concentration of chlorides, but since it has been destroyed, the leading edge of the plume is left undefined.

Level of Remediation Sought:

Ideal: 250 ppm Chloride
Target: 1,000 ppm Chloride

Recommendation for Future Work: Continue sampling on an annual basis. As chloride levels have continued to increase down gradient, it may be necessary to design and install a remedial system for this site. Additional monitoring wells need to be drilled to define the toe of the plume. Further investigation and sampling will continue to determine if a remedial system is appropriate for this site.

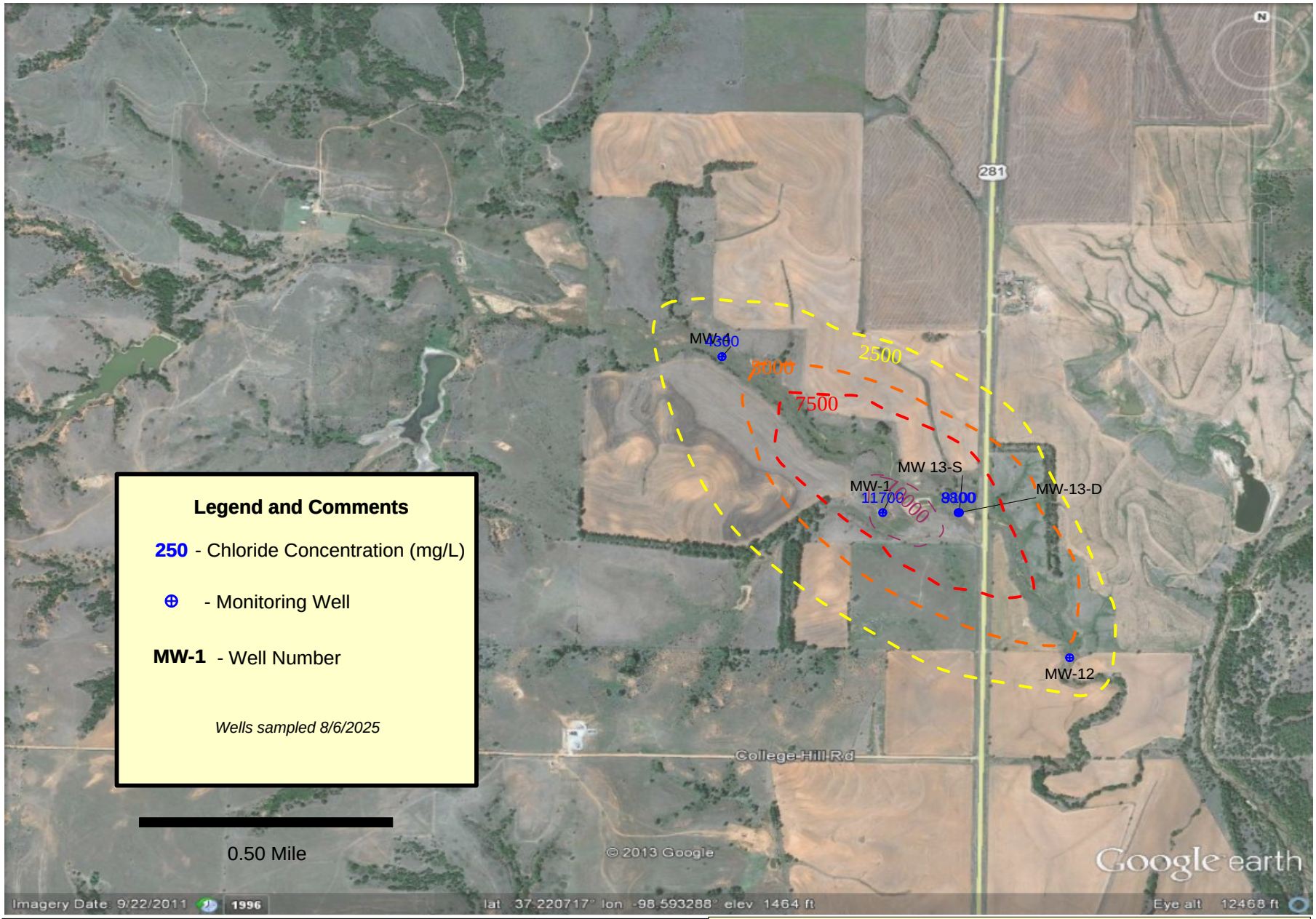
Estimated Total Cost: $150,000 if necessary to install a remediation system.

Control No.	**Staff Hours/Expenditures**	**Fund Expenditures FY 2025/26**	**Total**
970051-00	**5 Hrs. / $181.94**		**$189.94**

Current Contaminate Level: 4,300 ppm Cl- to 11,700 ppm Cl-

Status:

☐ **1. Site Assessment**	☐ **2. Short Term Monitoring**	☒ **3. Investigation**
☒ **4. Long Term Monitoring**	☐ **5. Remediation Plan**	☐ **6. Installation**
☐ **7. Remediation**	☐ **8. Post Rem. Monitoring**	☐ **9. Resolved**



Kansas Corporation Commission

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Hrencher Site

Sections 26/35/36-T-32S-R12W
Barber County, Kansas

2025 Area Map with Chlorides

KCC Control # 970051-00 District 1
N. Feldkamp 8/19/2025

Project: ***Packard Contamination Site, Barber County, District 1***

Site Location: Legal location is Section 15, 22, 23, Township 31 South, Range 13 West, in Barber County. Seven miles west of Medicine Lodge on River Road.

Impact/Immediacy: The groundwater and a very good water well have been contaminated with chlorides. Immediacy level is rated as moderate.

Site Description: The salt-water plume is moving to the south away from the Packard #1 oil well. It has contaminated the water supply well and could possibly damage the domestic well at the abandoned house, the supply well in the SE/4 of section 23, and the spring to the southwest.

Unusual Problems: The contamination could be from multiple sources.

Status of Project: A total of seven groundwater samples were collected on August 6, 2025. Four monitoring well samples were taken, in addition to a house well, stock well, and spring well. Chloride data shows the plume remains confined. Chlorides historically have decreased, but over the past several years have remained consistent. Monitoring well 5 saw a significant spike from last year.

Level of Remediation Sought:

Ideal: 250 ppm Chloride
Target: 1000 ppm Chloride

Recommendation for Future Work: Monitoring will continue on an annual basis as the area continues to be remediated by natural attenuation. As the groundwater in this area is relatively shallow, several holes may be augured to gather more comprehensive data on the size and location of the chlorides. Depending on the information gathered, additional permanent monitoring wells may need to be installed. Analysis may need to be run on the new south supply well to determine if the chlorides are of a natural source, or from oilfield activities.

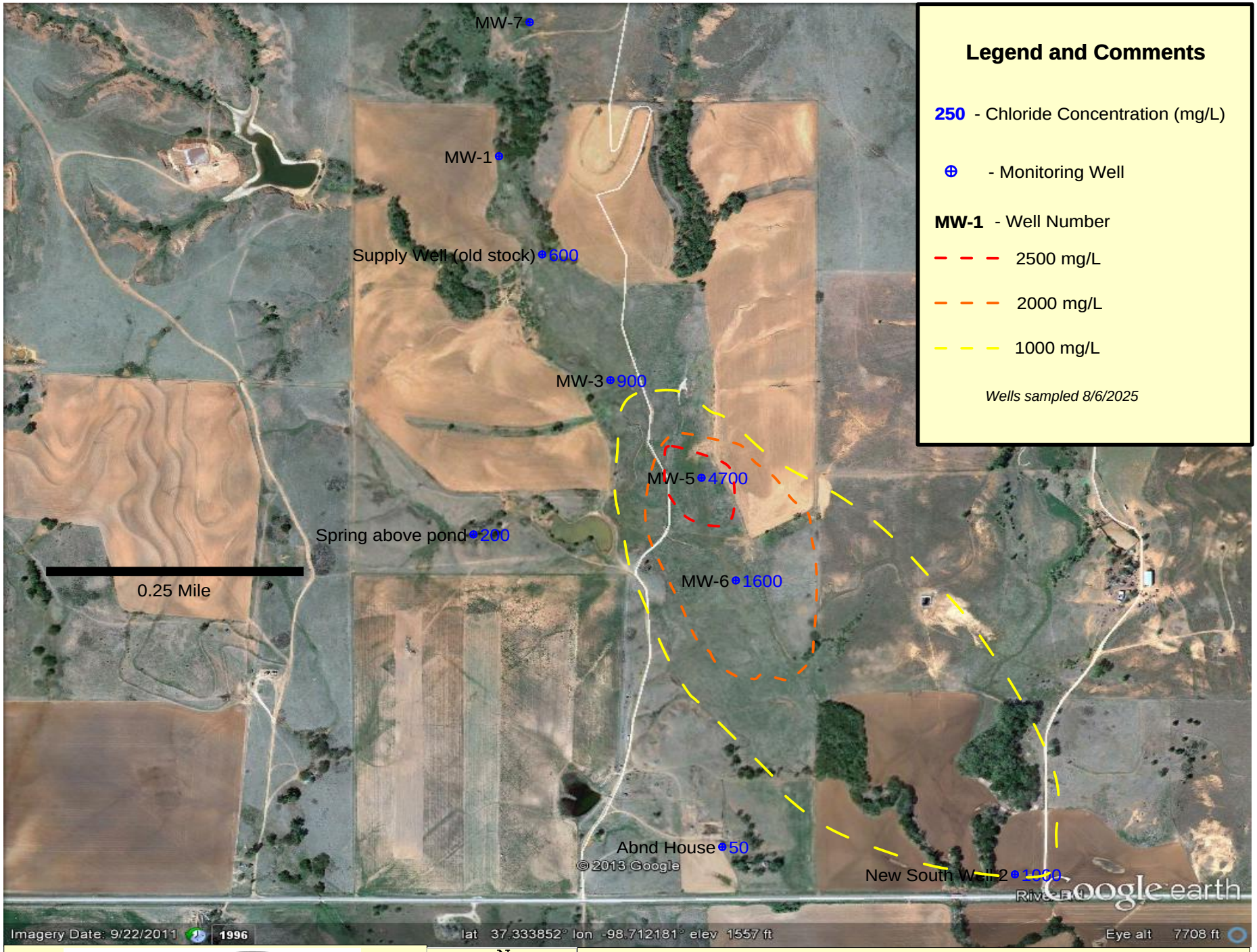
Estimated Total Costs: $10,000.

Control No.	**Staff Hours/Expenditures**	**Fund Expenditures**	
		FY 2025/26	**Total**
970075-00	**5 Hrs. / $181.94**		**$310.09**

Current Contaminate Level: 50 ppm Cl- to 4700 ppm Cl-

Status:

☐ **1. Site Assessment**	☐ **2. Short Term Monitoring**	☐ **3. Investigation**
☒ **4. Long Term Monitoring**	☐ **5. Remediation Plan**	☐ **6. Installation**
☐ **7. Remediation**	☐ **8. Post Rem. Monitoring**	☐ **9. Resolved**



Legend and Comments

250 - Chloride Concentration (mg/L)

⊕ - Monitoring Well

MW-1 - Well Number

2500 mg/L

2000 mg/L

1000 mg/L

Wells sampled 8/6/2025

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Kansas
Corporation Commission

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Packard Contamination Site

Sections 15/22/23-T31S-R13W
Barber, County Kansas
2025 Area Map with Chlorides
KCC Control # 970075-00 District1-N. Feldkamp 8/19/25

Project: ***Wildboy's Land & Cattle Contamination Site, Barber County, District 1***

Site Location: Legal location is NE/4 of Section 28, Township 33 South, Range 11 West, Barber County, nine miles south of Medicine Lodge on Highway 281, 1E, 1S, 1E into farmstead.

Impact/Immediacy: The impact is to the groundwater and surface water of the area. Immediacy level is rated at moderate to high.

Site Description: The site is located within the Medicine Lodge River Valley.

Unusual Problems: None.

Status of Project: On August 6, 2025, samples were collected from three monitoring wells and two stock wells. The east stock well was able to be sampled this year. The well site monitoring well was not accessible due to the landowner locking out access. In general, the chlorides at this site have been quite variable, but has been trending downward the last five sampling events.

Level of Chloride Sought:

Ideal: 250 ppm Chloride
Target: 500 ppm Chloride

Recommendations for Future Work: Continue annual sampling of the site.

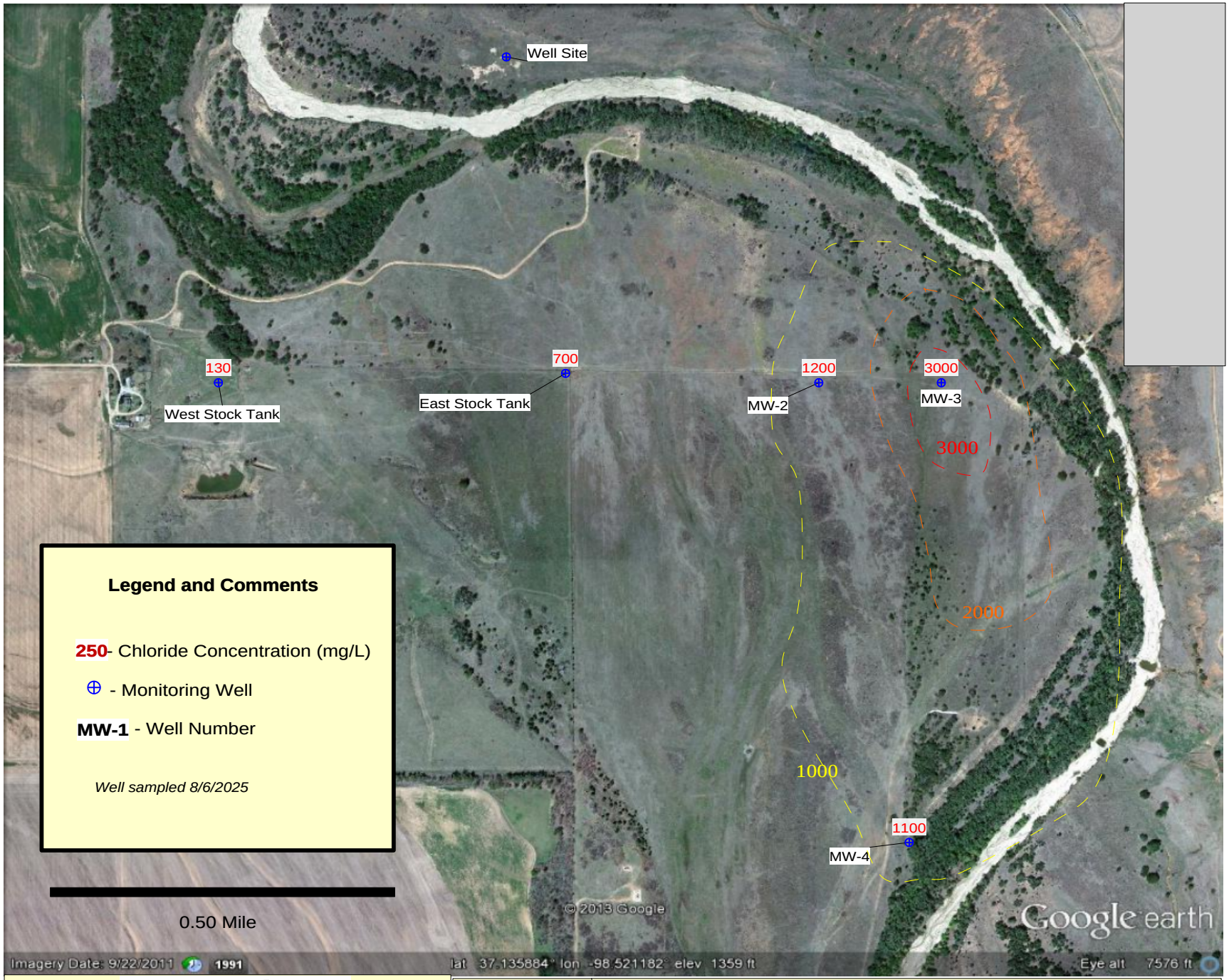
Estimated Total Cost: If necessary, installation of recovery system and disposal facility with long term monitoring. Costs associated with the installation of the disposal well are attached to the Harbaugh site.

Control No.	Staff Hours/Expenditures	Fund Expenditures FY 2025/26	Total
970017-00	5 Hrs. / $181.94		See Harbaugh

Current Contaminate Level: 130 ppm Cl- to 3,000 ppm Cl-

Status:

☐ 1. Site Assessment	☐ 2. Short Term Monitoring	☐ 3. Investigation
☒ 4. Long Term Monitoring	☐ 5. Remediation Plan	☐ 6. Installation
☐ 7. Remediation	☐ 8. Post Rem. Monitoring	☐ 9. Resolved



Kansas Corporation Commission

N W E S

Wildboys Site

2025 Area Map with Chlorides

Sections 28/33-T-33S-R11W

Barber County, Kansas

KCC Control # 970017-00 District 1

N. Feldkamp 8/19/2025

Project: ***Jennings Contamination Site, Decatur County, District 4***

Site Location: NW/4 of Section 25, Township 4 South, Range 27 West, Decatur County.

Impact/Immediacy: Groundwater contaminated by poor oil field practices including discharges and spills. Domestic water wells to the east and northeast of the Jennings Unit, including two former public water supply wells (PWS) have been impacted. A recent spill, and the observed increase in the chloride levels at the spill location and monitoring well, have fundamentally changed the site. Immediacy level is rated moderate to high.

Site Description: The current city water supply well is located west and upstream of the Jennings Unit, and it is not believed to have been impacted by oil field pollution at this time. The contaminated wells within the city limits are used for purposes other than human consumption. The site is situated within the stream valley of Prairie Dog Creek.

Unusual Problems: None.

Status of Project: Sampling of the monitoring well adjacent to the brine transfer station has established an overall downward trend punctuated by rapid increases in chloride levels, which may be correlated to spills at the transfer station. Because the chloride level of the PWS well up gradient of the Jennings Unit has remained steadily at background levels, it is evident that the elevated contamination in the monitoring well is the result of operations on the lease. In August 2021, a spill was discovered on the Jennings Unit, approximately ½ mile east of the PWS well, and ¼ mile west of the monitoring well. This spill was significant, and both brine and crude oil impacts to the surface, vegetation, and groundwater were discovered. In 2022, the groundwater at the site of the spill was approximately 90,000 ppm chloride. Following the spill, the monitoring well was sampled, and the chloride level was found to be 13,000 ppm, up from 60 ppm in 2020. Sampling in 2022 indicated that the concentration in the well was 40,500 ppm. Sampling in April 2023 indicated a strong downward trend at 18,000 ppm, and in 2024, the level was at 2,350 ppm. The contamination level continues to fall and is now 850 ppm.

Level of Remediation Sought:
Ideal: 250 ppm Chloride
Target: 500 ppm Chloride

Recommendations for Future Work: Bach Oil Production is the responsible party for contamination on the site. Due to the proximity of the recent spill to the PWS well, KDHE assumed the lead for the remedial efforts at this western portion of the site. Bach has entered the State Cooperative Program with the KDHE and has retained the services of geologic consultants and soil remediation companies. A geophysical survey was conducted to delineate the extent of the groundwater contamination at the spill location. This demonstrated that there is a discrete plume corresponding to the spill, and a separate source responsible for the pollution noted near the brine transfer station. Additional geophysics will be conducted, and the RP will be required to remediate the groundwater.

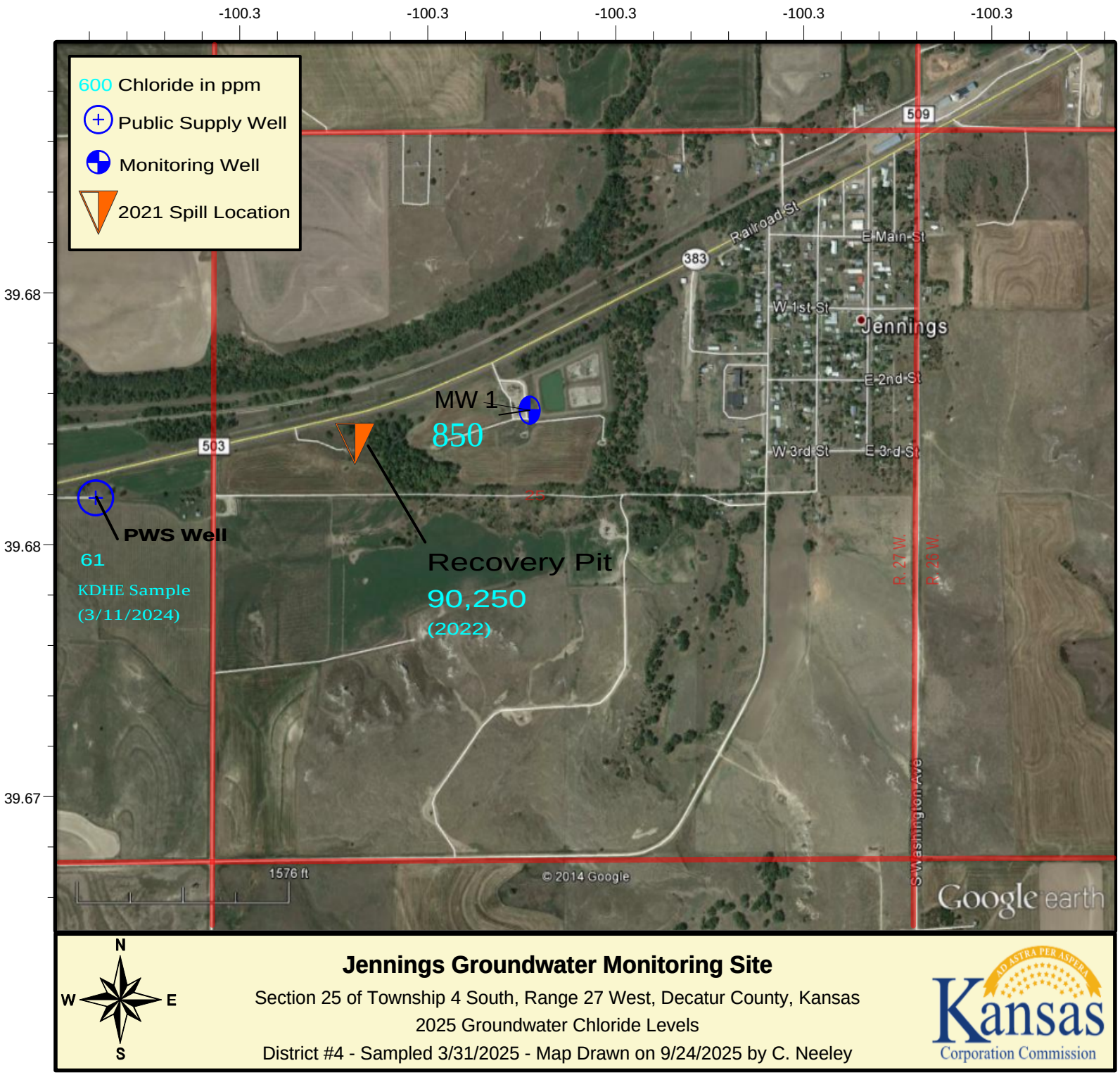
Estimated Total Costs: $2000.

Control No.	**Staff Hours/Expenditures**	**Fund Expenditures FY 2025/26**	**Total**
970054-00	**9 Hrs. / $301.78**		

Current Contaminate Level: 850 ppm Cl^-

Status:

☐ **1. Site Assessment**	☐ **2. Short Term Monitoring**	☐ **3. Investigation**
☐ **4. Long Term Monitoring**	☒ **5. Remediation Plan**	☐ **6. Installation**
☐ **7. Remediation**	☐ **8. Post Rem. Monitoring**	☐ **9. Resolved**



Jennings Groundwater Monitoring Site

Section 25 of Township 4 South, Range 27 West, Decatur County, Kansas

2025 Groundwater Chloride Levels

District #4 - Sampled 3/31/2025 - Map Drawn on 9/24/2025 by C. Neeley

Kansas Corporation Commission

Project: ***Dinkel Contamination Site, Ellis County, District 4***

Site Location: SE/4 of Section 32, Township 13 South, Range 17 West, Ellis County.

Impact/Immediacy: Brine from oil field operations has impacted a shallow aquifer within the Big Creek drainage. The affected water was originally the sole source of domestic water for the farmstead, which is now on rural water. The immediacy level for this site is rated as low.

Site Description: This site is bounded on the north by I-70, positioned within the Younger Oil Field, and has active oil wells, enhanced recovery wells, and disposal wells in the vicinity. Possible contaminant sources include an evaporation pit (permit revoked July 1, 1958), a shallow injection well (injection authorization revoked September 3, 1969), or drilling pits associated with a nearby well.

Unusual Problems: None.

Status of Project: A total of 16 holes were drilled on the site in August and September of 2000, and three were completed as monitoring wells. The household is on rural water, and the well water is now utilized for cattle. Pumping to waste may be utilized to remove contaminated water; however, the aquifer may not have the capacity to allow for appreciable gains when compared to the amount of water pumped. Because the house has a source of drinking water, and the chloride concentrations in the aquifer are not unsuitable for beef cattle, an intensive remediation project is not warranted. In 2019, the casing on MW 9 was broken off at ground level, which allowed the casing to become plugged. An attempt to reopen the well was unsuccessful, and the well was plugged according to KDHE regulations.

Well ID	2021 Chlorides	2022 Chlorides	2023 Chlorides	2024 Chlorides	2025 Chlorides
5	1,200 ppm	1,100 ppm	1,150 ppm	1,100 ppm	1,000 ppm
7	1,300 ppm	1,050 ppm	800 ppm	1,350 ppm	750 ppm
9	Plugged				

Level of Remediation Sought:
Ideal: 100 ppm Chloride
Target: 500 ppm Chloride

Recommendations for Future Work: Annual sampling will continue at this site.

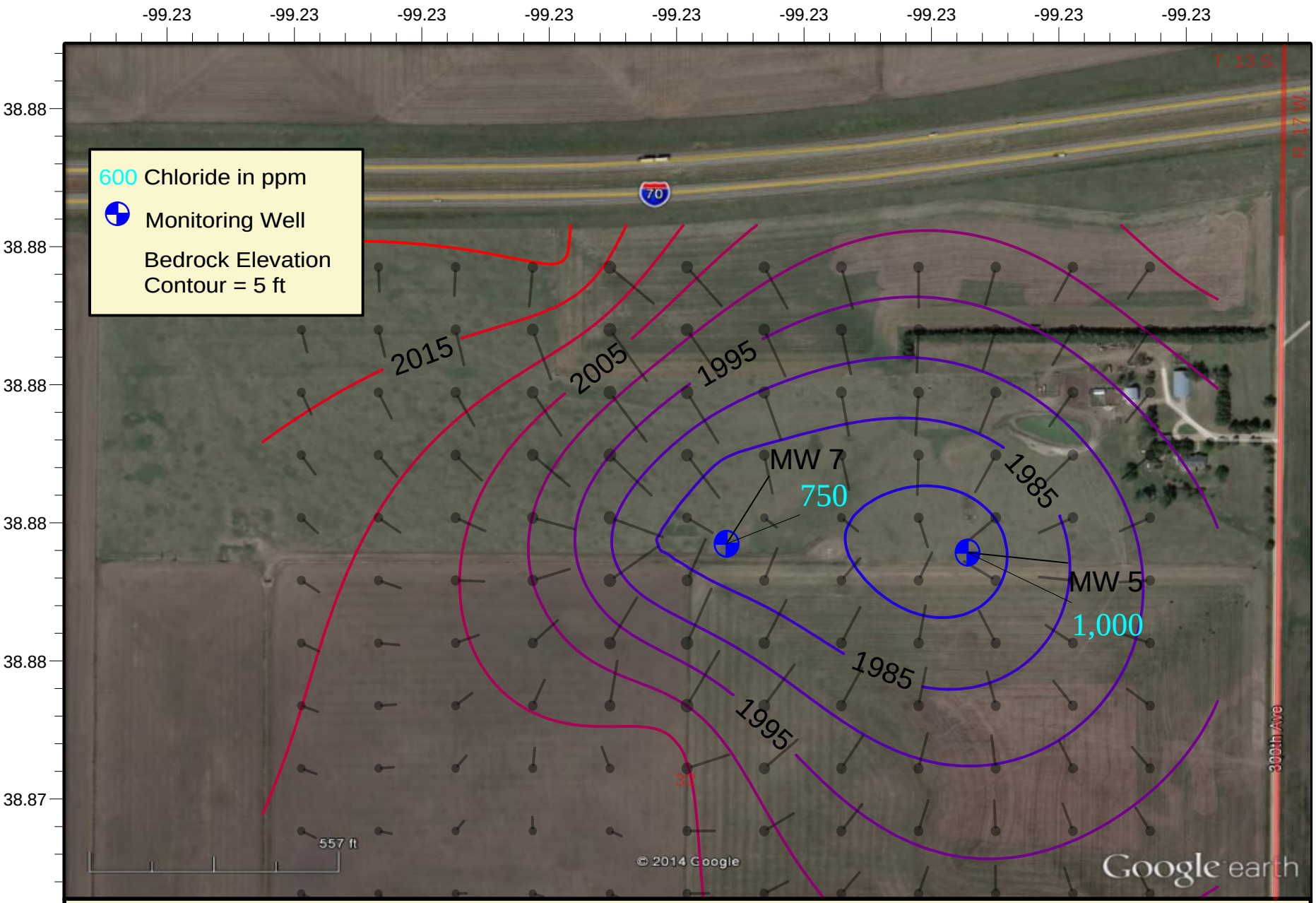
Estimated Total Costs: $28,000 to $30,000.

Control No.	**Staff Hours/Expenditures**	**Fund Expenditures FY 2025/26 Total**
970035-00	**6 Hrs. / $215.54**	

Current Contaminate Level: 750 ppm to 1,000 ppm Cl^-

Status:

☐ **1. Site Assessment**	☐ **2. Short Term Monitoring**	☐ **3. Investigation**
☒ **4. Long Term Monitoring**	☐ **5. Remediation Plan**	☐ **6. Installation**
☐ **7. Remediation**	☐ **8. Post Rem. Monitoring**	☐ **9. Resolved**



Dinkel Groundwater Monitoring Site

Section 32 of Township 13 South, Range 17 West, Ellis County, Kansas
2025 Groundwater Chloride Levels
District #4 - Sampled 9/4/2025 - Map Drawn on 9/24/2025 by C. Neeley

Kansas Corporation Commission

Project: ***Ruder Contamination Site, Ellis County, District 4***

Site Location: Sections 17, 20, and 28 of Township 15 South, Range 18 West, Ellis County.

Impact/Immediacy: The Ruder Creek Alluvial Aquifer has been impacted by brine intrusion due to surface ponds and artesian flow of saline water from the Cedar Hills Sandstone into shallower aquifers via old wellbores in the area. The immediacy level for this site is rated as moderate.

Site Description: Ruder Creek runs south from near Hays to the Smoky Hill River west of US Hwy 183 near Schoenchen. North of the site, Ruder Creek is divided into east and west branches, which come together into the main trunk in the northern section of the site. The area is almost exclusively rangeland with a subtle relief from the uplands to the bed of the stream. Documented oil field pollution has existed in the drainage since the 1930's, and correspondence made during 1954 states that the west branch was fresh while the east branch and the main trunk of the stream were heavily impacted by brine. Historical aerial photographs show many pits and tank battery locations directly adjacent to the stream. The sources of pollution in this area have been numerous, and geographically, as well as temporally widespread, complicating the investigation and remediation of the overall issue.

Unusual Problems: Proximity to the City of Hays public water supply well field.

Status of Project: Presently, the chloride concentrations in the monitoring wells range from 850 ppm in MW1 at the northern end of the site, to 200 ppm in the southern monitoring well near the Smoky Hill River. This north-south chloride gradient has persisted for many years. Appreciable decreases in chloride contamination have not been observed throughout the duration of sampling, and it is unknown if the input of additional contaminants has been halted by the closure of surface pits, plugging of flowing wells, and general improvement of lease practices. A test hole augured in 2018 approximately 100' northeast of the northern monitoring well (MW1) produced water with a concentration of only 600 ppm. It is not yet known if this is representative of the groundwater north of this well, and further work will be conducted to determine if MW1, which was not completed in alluvium, is anomalous.

Level of Remediation Sought:
Ideal: 250 ppm Chloride
Target: 500 ppm Chloride

Recommendations for Future Work: Conspicuous potential sources of pollution have been identified on a historical aerial photograph, and a conductivity survey will be carried out, combined with additional groundwater sampling. This site will continue to be monitored on an annual basis, and resources will be compiled to identify other possible sources of pollution.

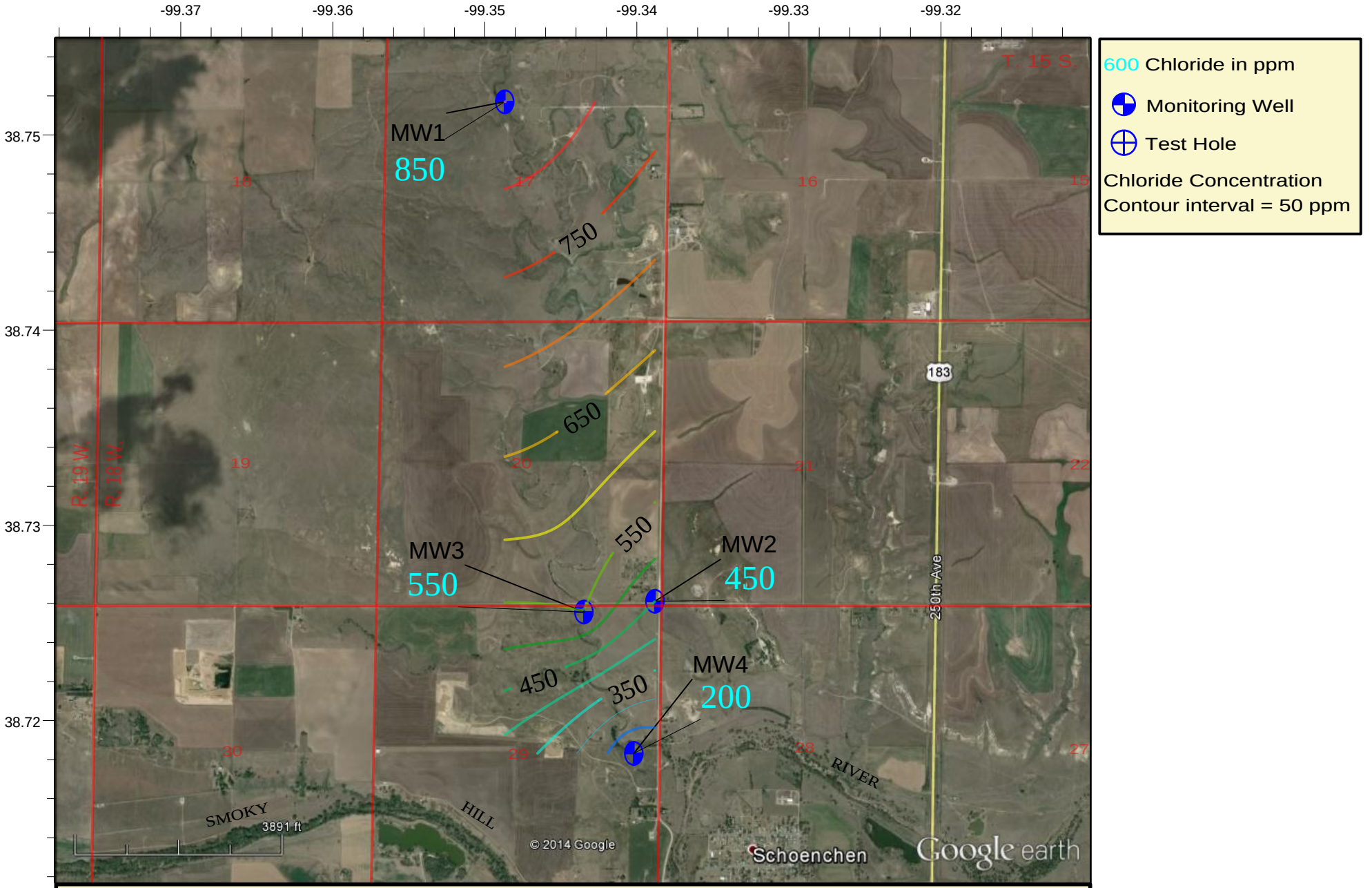
Estimated Total Costs: $29,000.

Control No.	Staff Hours/Expenditures	Fund Expenditures FY 2025/26	Total
970082-00	4 Hrs. / $148.34		$12,960.00

Current Contaminate Level: 200 ppm to 850 ppm Cl^-

Status:

☐ 1. Site Assessment	☐ 2. Short Term Monitoring	☒ 3. Investigation
☒ 4. Long Term Monitoring	☐ 5. Remediation Plan	☐ 6. Installation
☐ 7. Remediation	☐ 8. Post Rem. Monitoring	☐ 9. Resolved



Ruder Creek Groundwater Monitoring Site

Sections 17, 20, and 29 of Township 15 South, Range 18 West, Ellis County, Kansas

2025 Groundwater Chloride Levels

District #4 - Sampled 7/14/2025 - Map Drawn on 9/24/2025 by C. Neeley

Kansas Corporation Commission

Project: ***Balthazor Contamination Site, Graham County, District 4***

Site Location: Section 23 of Township 9 South, Range 21 West, Graham County.

Impact/Immediacy: Pollution from past oil field activity has impacted an aquifer which supplies domestic water to a homestead. The immediacy level is rated as low.

Site Description: At the time that the site was listed, a well in section 14 was the sole source of water for the residence. Though the chloride concentration was at 600 ppm when it was last tested in 2002, this well is no longer utilized by the landowner. The sole source of domestic water for the residence is a water well to the south in section 23. The quarter that the water well is located in has three oil wells that are dry and abandoned, four that are plugged and abandoned, and three producers. The majority of these wells were originally drilled in the 1940s.

Unusual Problems: None.

Status of Project: When the new stock/domestic well was drilled in 2011, the chloride level was 2,300 ppm. In 2022, the concentration was 375 ppm, and 575 ppm in 2024. The three monitoring wells on the location have remained relatively stable with a subtle overall decrease in contamination. The contamination levels in 2024 were 1,100 ppm, 1,300 ppm, and 20 ppm, and in 2025, 1,150 ppm, 1,250 ppm, and 250 ppm respectively.

Level of Remediation Sought:
Ideal: 250 ppm Chloride
Target: 250 ppm Chloride

Recommendations for Future Work: The source of the contamination is likely an old brine pit in the NW/4 of Section 23, Township 9 South, Range 21 West, and the feasibility of decreasing the contamination level through remediation will be considered but needs to be weighed against the site parameters. The contamination level will continue to be monitored.

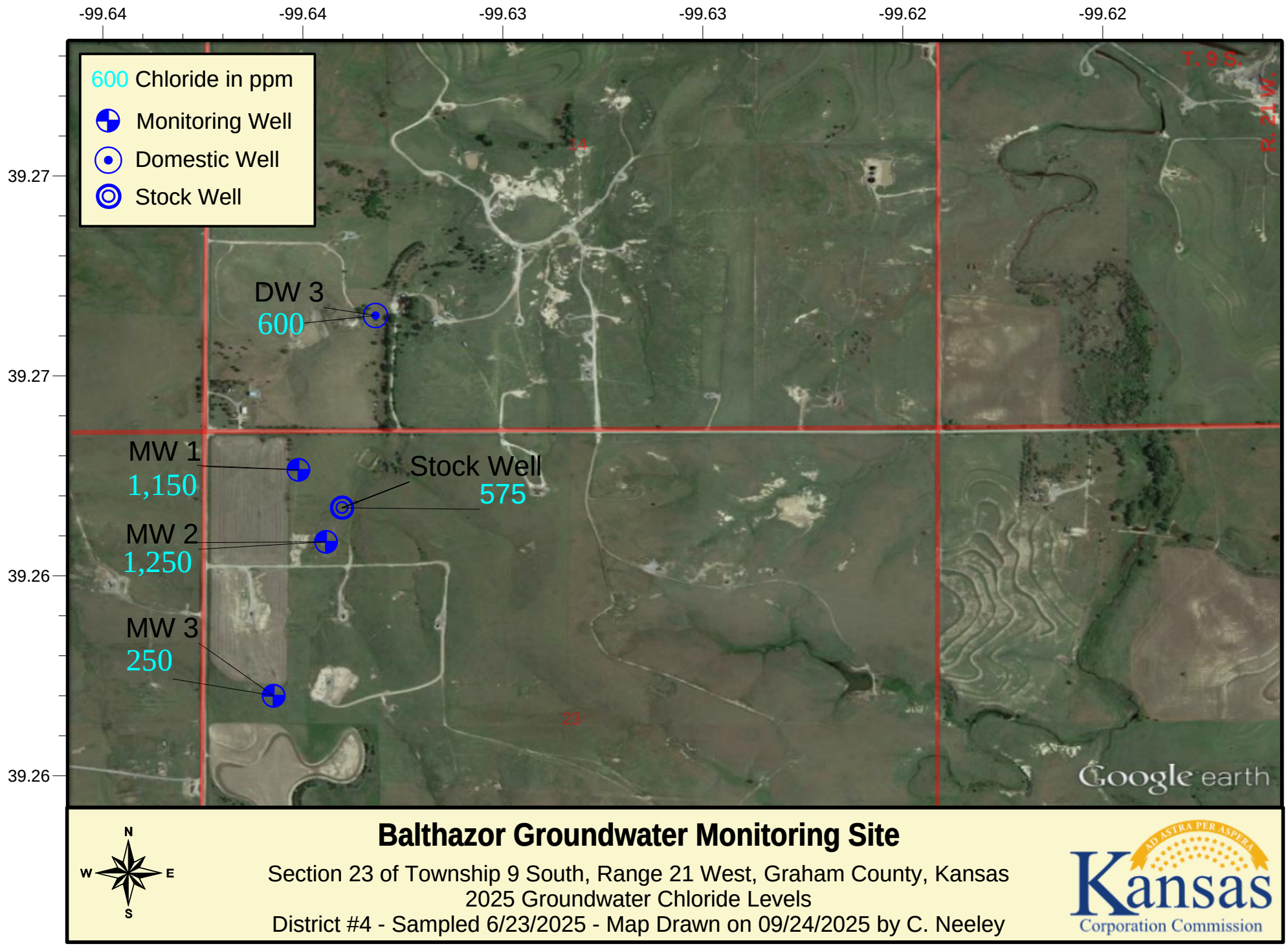
Estimated Total Costs: $10,000.00.

Control No.	**Staff Hours/Expenditures**	**Fund Expenditures FY 2025/26**	**Total**
970023-00	**12 Hrs. / $397.73**		

Current Contaminate Level: 250 ppm to 1,250 ppm Cl^-

Status:

☐ **1. Site Assessment**	☐ **2. Short Term Monitoring**	☐ **3. Investigation**
☒ **4. Long Term Monitoring**	☐ **5. Remediation Plan**	☐ **6. Installation**
☐ **7. Remediation**	☐ **8. Post Rem. Monitoring**	☐ **9. Resolved**



Balthazor Groundwater Monitoring Site

Section 23 of Township 9 South, Range 21 West, Graham County, Kansas
2025 Groundwater Chloride Levels
District #4 - Sampled 6/23/2025 - Map Drawn on 09/24/2025 by C. Neeley

Kansas Corporation Commission

Project: ***Leon Fink Contamination Site, Graham County, District 4***

Site Location: SE/4 of Section 22, and NE/4 of Section 27, Township 8 South, Range 22 West, Graham County.

Impact/Immediacy: A stock well drilled into the Codell Formation testing high in chlorides. The contaminant level is currently satisfactory for the aquifer's primary intended use. Immediacy level is rated as low.

Site Description: The site encompasses a stock well and a now abandoned domestic well. Both were drilled into the Codell Sandstone, which is a marginal aquifer in Graham County. The chloride in the stock well was initially very low, but it then rose sharply during the 1970's. Surface sources were considered, but due to the nature of the bedrock and the depth to the Codell Aquifer, it is more likely that the pollution originated from a source below ground. The Fink #2 saltwater disposal well (SWD) was originally completed as an oil well in 1954, and converted to an enhanced oil recovery well, before ultimately being converted back to a SWD. This well was long the subject of interest, but before the implementation of the Federal Underground Injection Control, there was little statutory authority to check the integrity of the well bore. For this reason, it was never proven or disproven that the well was the source. The construction of this well is highly suspect, and may or may not continue to be a conduit for saline water from brackish zones to enter the Codell, despite the fact that the well was plugged in 1984.

Unusual Problems: The depth to the contaminated zone is approximately 250 to 300 feet, making investigation and remediation difficult.

Status of Project: The domestic well has been abandoned due to a water level that is inadequate for use by the owner, and the house has been demolished. The last sample taken from this source in 2004 contained a chloride concentration of 200 ppm. Samples from the stock well continue to be tested, and the well is presently being utilized for livestock, which will contribute to a reduction in chloride concentrations if the source has been eliminated. An overall downward trend has been observed over the history of the site, and the current contamination concentration is at 700 ppm.

Level of Remediation Sought:
Ideal: 250 ppm Chloride
Target: 500 ppm Chloride

Recommendations for Future Work: This site should be monitored short-term to ascertain if the lowered chloride concentration will be maintained.

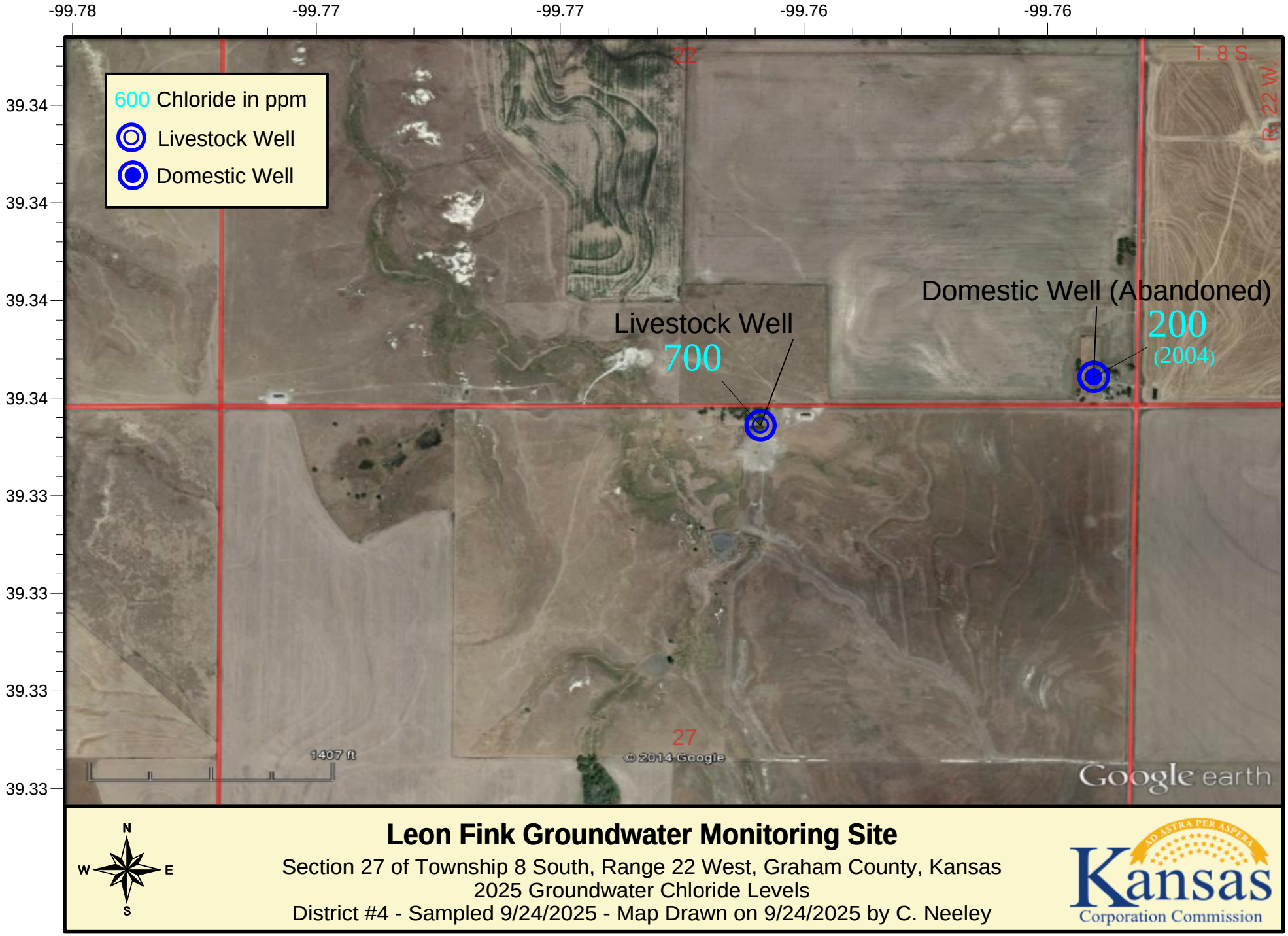
Estimated Total Costs: $2000.

Control No.	**Staff Hours/Expenditures**	**Fund Expenditures FY 2025/26 Total**
970007-00	**4 Hrs. / $148.34**	

Current Contaminate Level: 700 ppm Cl^-

Status:

☐ **1. Site Assessment**	☒ **2. Short Term Monitoring**	☐ **3. Investigation**
☐ **4. Long Term Monitoring**	☐ **5. Remediation Plan**	☐ **6. Installation**
☐ **7. Remediation**	☐ **8. Post Rem. Monitoring**	☐ **9. Resolved**



Leon Fink Groundwater Monitoring Site

Section 27 of Township 8 South, Range 22 West, Graham County, Kansas
2025 Groundwater Chloride Levels
District #4 - Sampled 9/24/2025 - Map Drawn on 9/24/2025 by C. Neeley

Kansas Corporation Commission

Project: ***Hollow-Nikkel Contamination Site, Harvey County, District 2***

Site Location: The Hollow Nikkel Site in northwestern Harvey County is approximately eighteen miles northwest of Newton. The site includes sections 7, 8, 17, 18, 19, 20, 29, and 30 in Township 22 South and Range 3 West. This site is within the boundaries of the Equus Beds Aquifer.

Impact: The potential impact is on irrigation and rural residential wells. The KCC currently rates this site at a moderate immediacy level. Over the last few years, the city of McPherson has completed a new public water supply system just south of the main plume, including Public Water supply wells, an associated processing plant, and a pipeline to the city.

Site Description: The project area covers approximately 15 square miles. The contaminated plume is aligned in a north-to-south configuration, about 2 miles wide and 4 miles long. Plume morphology appears to be controlled by the bedrock channel. This channel aligns like the plume. Contamination mapped to date is primarily confined to the lower zone of the Equus Beds aquifer, consisting of McPherson Formation Pleistocene unconsolidated sand and gravel deposits, at a depth of 200 to 250 feet on top of the Permian-aged Wellington Formation shales. However, the location near EB-34 shows contamination throughout all three aquifer zones.

Unusual Problems: To remediate this site, planning, land access acquisition, and developing a suitable water disposal method would be very time-consuming and financially intensive. Changes within the aquifer appear to result from brine water moving horizontally along the gradient and vertically into areas lacking a clay aquitard.

Status of the Project: The Ground Water Management District #2 conducts annual water sampling, funded by the KCC, to analyze the water samples. Due to the heavy rains, sampling was completed later in the summer, according to GMD2.

A Zone ranged from 781 mg/L at EB34A to 4.2 mg/L at EB23A. A Zone wells had modest chloride increases through the site's northern center. EB36A rose by 99 mg/L, and EB30A had a slight increase of 38 mg/L from 2024. EB-34A, historically the highest chloride well, increased by 127 mg/L last year but dropped by 149 mg/L this year. Local drought conditions for years, followed by rain during 2025, have probably influenced this.

The B zone had a high chloride level of 1,610 mg/L at EB34B and a low level of 5.2 in EB23B in 2025. B Zone wells remained stable overall with very modest increases within the middle wells, ranging from 26-50 mg/L in wells EB35 B, EB36B, EB34B, and EB45B. EB27B in the northeast rose by 93 mg/L. This well has shown increases over the years, and KCC will continue to research potential sources for this trend.

Historically, the C Zone has been shown to have the highest levels of chloride concentrations. This year, the C Zone had a high level of 6,700 mg/L in EB34C and a low of 3.8 mg/L in EB24C. EB36C, which is usually above 1,500 mg/L, this year had a result of 146 mg/L. After discussions with GMD2 regarding this massive drop in chloride, it was agreed that the data point could be an error. KCC did not use EB36C data in the production of models and maps for 2025. Other wells to the north of EB36C also showed lower chloride levels, though less extreme, with EB37C dropping by 311 mg/L since 2024. EB34C and EB35C, which have historically been high, rose again in 2025 by 700 mg/L and 260 mg/L, respectively.

Most wells outside the plumes showed stable salinity, with most changes occurring in and around the historical plume.

Level of Remediation Sought:

Ideal: 250 mg/l
Target: 500 mg/l

Recommendations for Future Work: KCC will continue to collect data from GMD #2 annually for monitoring purposes. The highest chlorides appear centered on EB-34 in all vertical zones. This has always been the case with the Hollow-Nikkel site. Adding new monitoring wells near EB-34, the heart of the plume, could help define the highest chlorides for successful remedial action. With the city of McPherson utilizing a public water supply source just south of the area, additional monitoring wells may be necessary to supplement those installed by the city. In addition, monitoring wells added north of the current site could further investigate the source of higher chlorides seen over the last five years in the northern wells, especially near EB27.

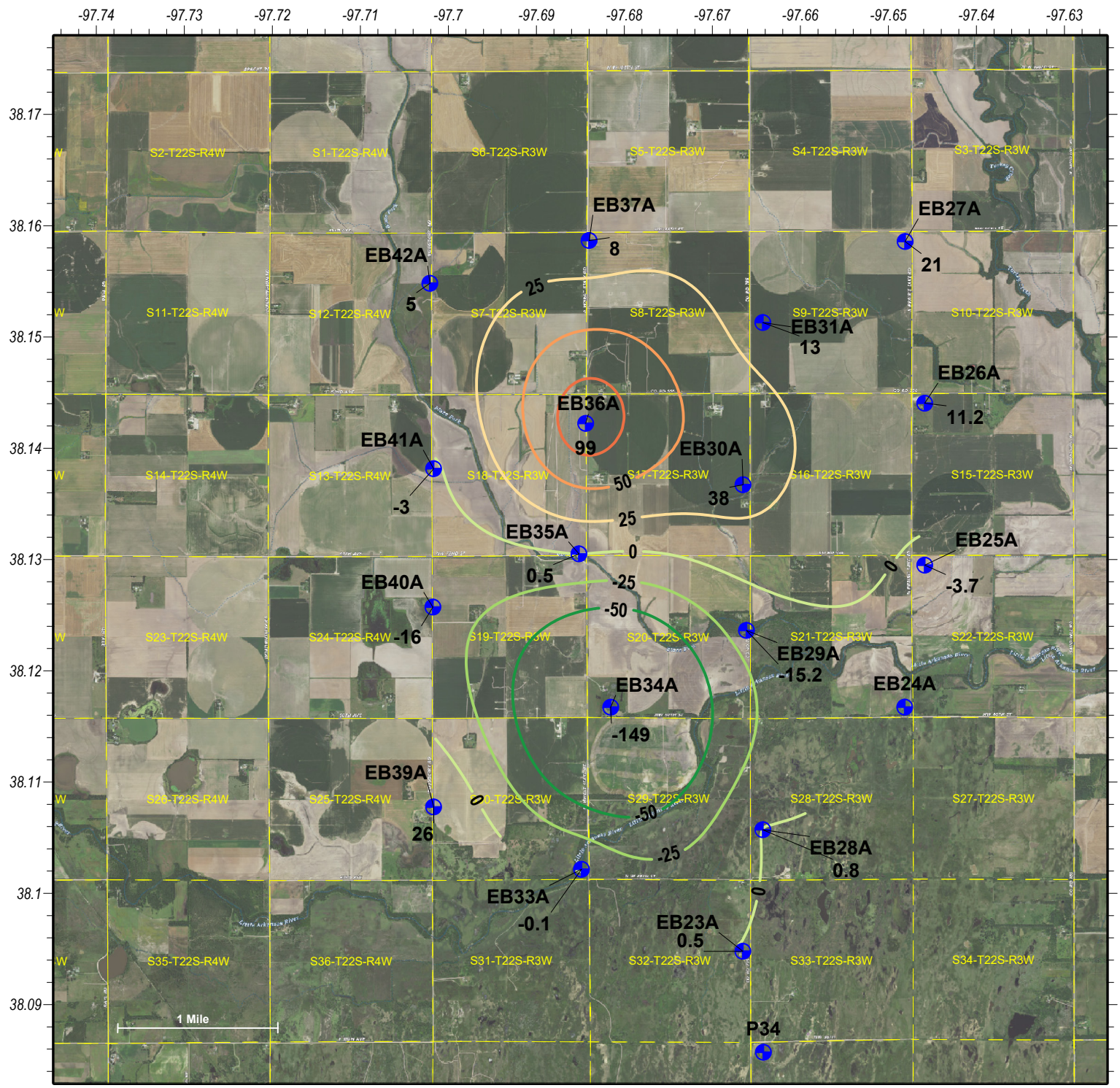
Estimated Total Costs: These costs include the time district personnel spend gathering and analyzing groundwater data from GMD #2, as well as researching possible remediation avenues and contamination sources.

Control No.	Staff Hours/Expenditures	Fund Expenditures FY 2025/26	Total
970009-00	18 Hrs. / $632.49	$2,489.20	$64,730.49

Current Contaminate Level: Varies; There are hot spots in each zone.

Status:

☐ 1. Site Assessment	☐ 2. Short Term Monitoring	☐ 3. Investigation
☒ 4. Long Term Monitoring	☐ 5. Remediation Plan	☐ 6. Installation
☐ 7. Remediation	☐ 8. Post Rem. Monitoring	☐ 9. Resolved



Key

EB1A -Well No.
-Monitoring Well
250 -Chloride Change (mg/L)

Contour Interval = 25 mg/L

Chloride Change (mg/L)

150
125
100
75
50
25
0
-25
-50

N
W
E
S

Scale (ft)
0 2640 5280 7920

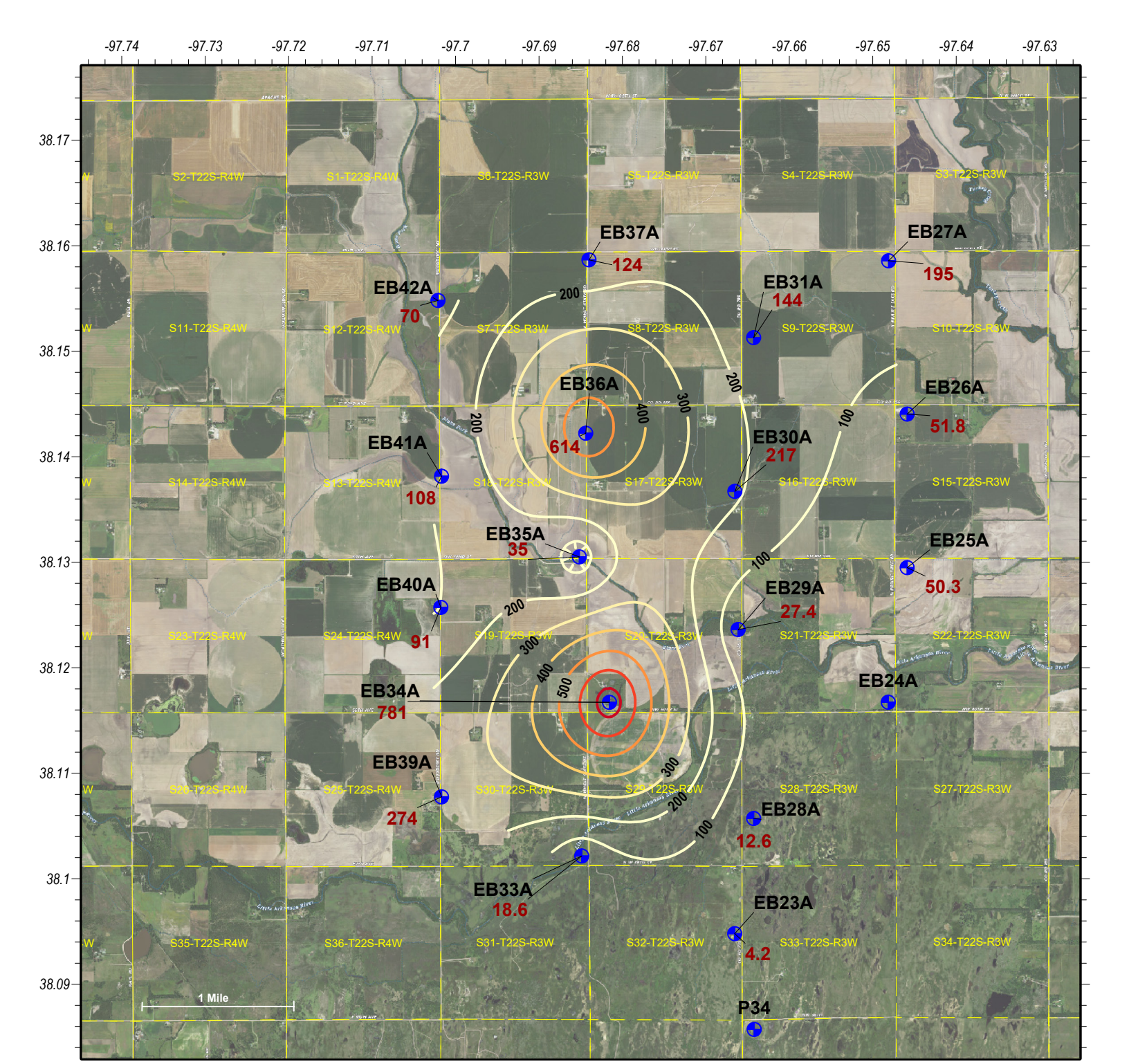
Kansas Corporation Commission

Hollow-Nikkel Brine Contamination Site
KCC Control #970009-00

Multiple sections of Townships 22 South and Range 3 & 4 West, Harvey County, Kansas

A Zone Change in Chlorides from 2024 to 2025

KCC District #2 Field Office - Wells sampled Summer of 2025 by GMD #2
Map Drawn on 10/15/2025 by D. Bollenback



Key

EB1A-Well No.
-Monitoring Well
250 -Chloride Level (mg/L)

Contour Interval = 100 mg/L

Chlorides (mg/L)
800
700
600
500
400
300
200
100

N
W
E
S

Scale (ft)
0 2640 5280 7920

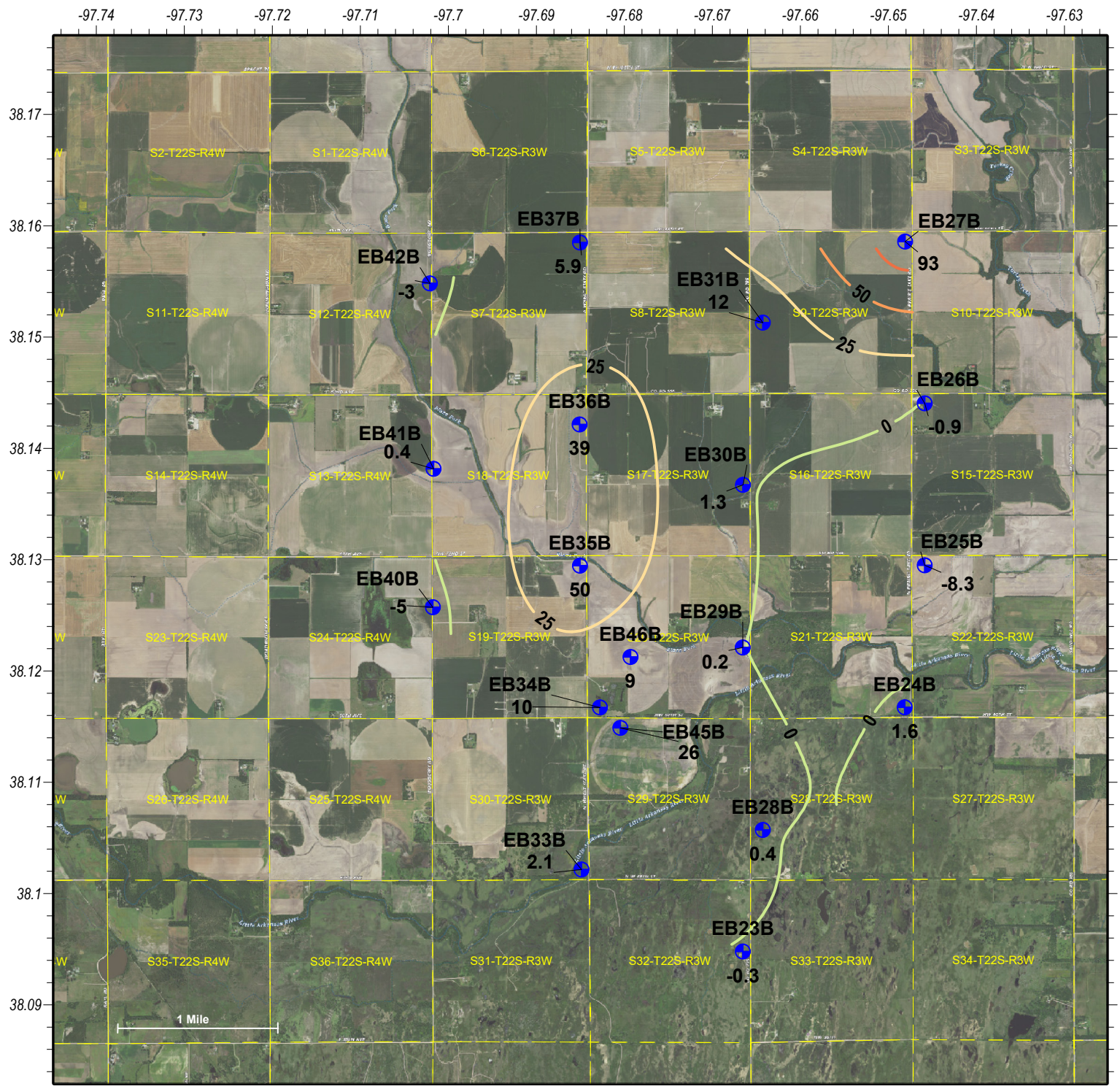
Kansas Corporation Commission

Hollow-Nikkel Brine Contamination Site
KCC Control #970009-00

Multiple sections of Townships 22 South and Range 3 & 4 West, Harvey County, Kansas

2025 Chloride Levels in the Equus Beds A Zone

KCC District #2 Field Office - Wells sampled Summer of 2025 by GMD #2
Map Drawn on 10/15/2025 by D. Bollenback



Key

EB1A -Well No.
-Monitoring Well
250 -Chloride Change (mg/L)

Contour Interval = 25 mg/L

Chloride Change (mg/L)

150
125
100
75
50
25
0
-25
-50

N
W
E
S

Scale (ft)
0 2640 5280 7920

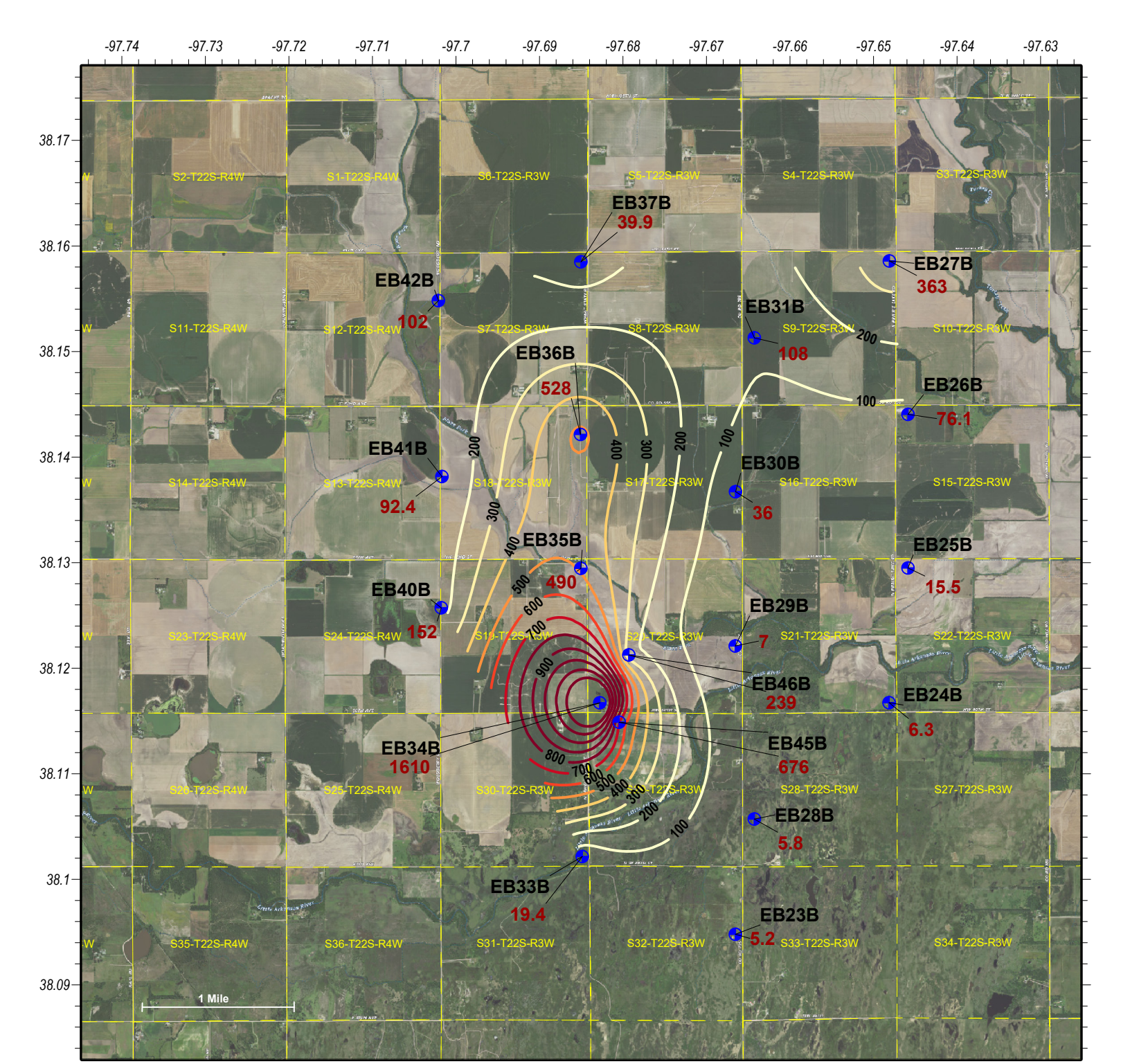
Kansas Corporation Commission

Hollow-Nikkel Brine Contamination Site
KCC Control #970009-00

Multiple sections of Townships 22 South and Range 3 & 4 West, Harvey County, Kansas

B Zone Change in Chlorides from 2024 to 2025

KCC District #2 Field Office - Wells sampled Summer of 2025 by GMD #2
Map Drawn on 10/15/2025 by D. Bollenback



Key

EB1A -Well No.
-Monitoring Well
250 -Chloride Level (mg/L)

Contour Interval = 100 mg/L

Chlorides (mg/L)
1200
1100
1000
900
800
700
600
500
400
300
200
100

N
W
E
S

Scale (ft)
0 2640 5280 7920

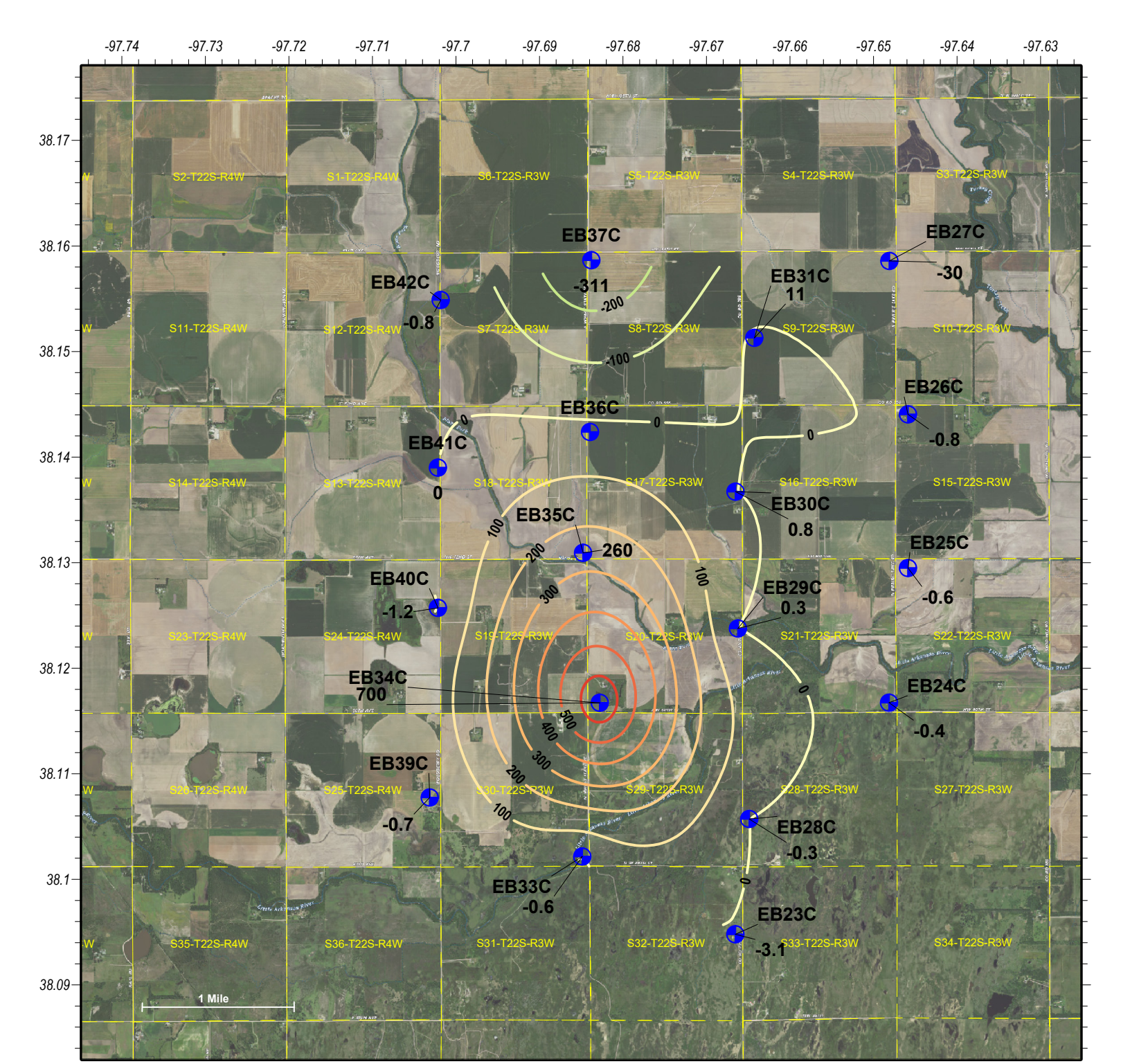
Kansas Corporation Commission

Hollow-Nikkel Brine Contamination Site
KCC Control #970009-00

Multiple sections of Townships 22 South and Range 3 & 4 West, Harvey County, Kansas

2025 Chloride Levels in the Equus Beds B Zone

KCC District #2 Field Office - Wells sampled Summer of 2025 by GMD #2
Map Drawn on 10/15/2025 by D. Bollenback



Key

EB1A -Well No.
-Monitoring Well
250 -Chloride Change (mg/L)

Contour Interval = 50 mg/L

Chloride Change (mg/L)

600
400
200
0
-200
-400
-600
-800
-1000
-1200

N
W
E
S

Scale (ft)
0 2640 5280 7920

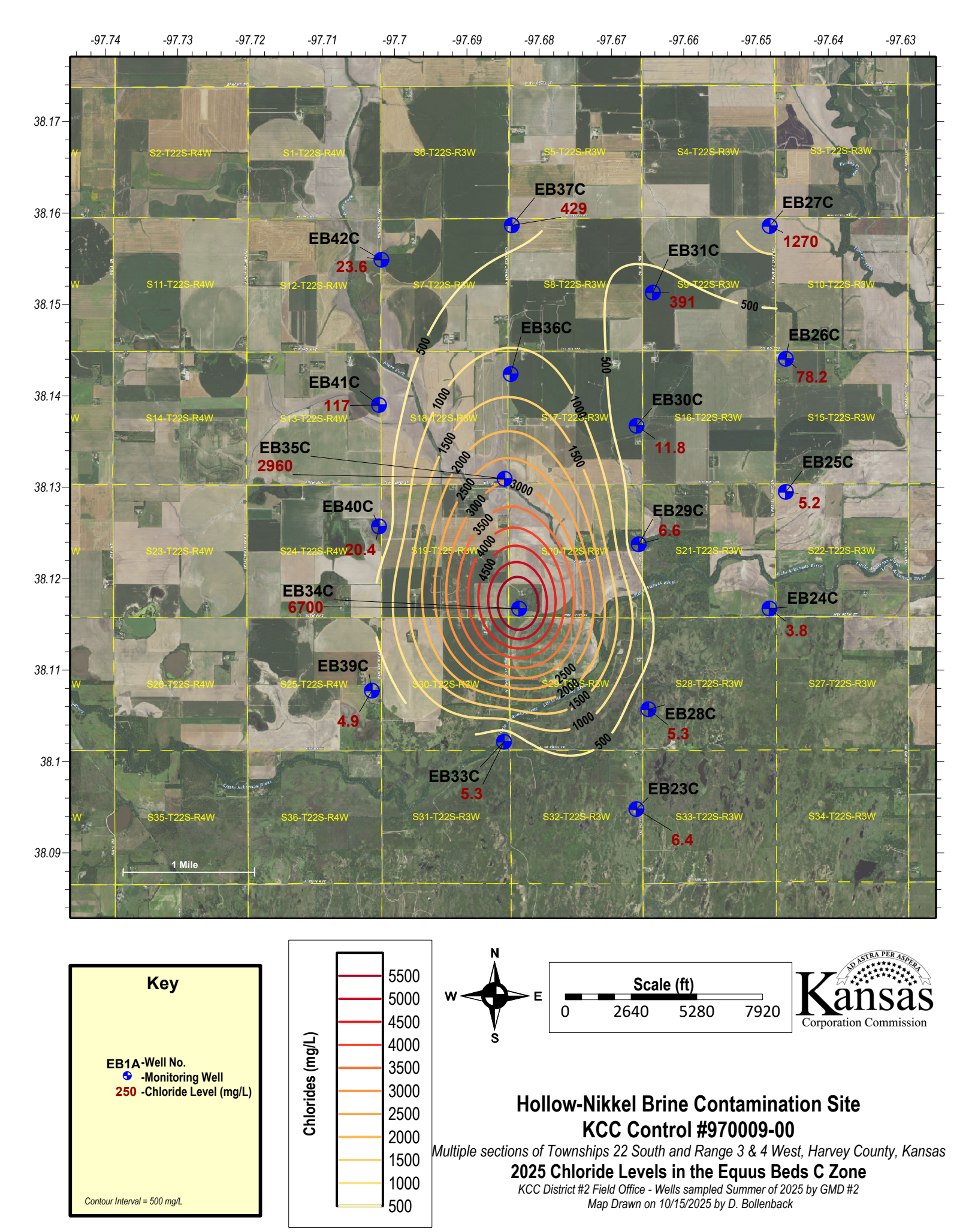
Kansas Corporation Commission

Hollow-Nikkel Brine Contamination Site
KCC Control #970009-00

Multiple sections of Townships 22 South and Range 3 & 4 West, Harvey County, Kansas

C Zone Change in Chlorides from 2024 to 2025

KCC District #2 Field Office - Wells sampled Summer of 2025 by GMD #2
Map Drawn on 10/15/2025 by D. Bollenback



Key

EB1A-Well No.
-Monitoring Well
250 -Chloride Level (mg/L)

Contour Interval = 500 mg/L

Chlorides (mg/L)
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
500

N
W
E
S

Scale (ft)
0 2640 5280 7920

AD ASTRA PER ASPERA
Kansas
Corporation Commission

Hollow-Nikkel Brine Contamination Site
KCC Control #970009-00

Multiple sections of Townships 22 South and Range 3 & 4 West, Harvey County, Kansas

2025 Chloride Levels in the Equus Beds C Zone

KCC District #2 Field Office - Wells sampled Summer of 2025 by GMD #2
Map Drawn on 10/15/2025 by D. Bollenback

Project: ***Burrton Contamination Site, Harvey & Reno Counties, District 2***

Site Location: The Burrton site is in western Harvey County and eastern Reno County, approximately 18 miles west of Newton and 12 miles east of the city of Hutchinson. The site includes acreage in Townships 23 and 24 South, Ranges 3 and 4 West.

Impact/Immediacy: The contamination site affects local domestic and irrigation wells. Hydrogeological computer modeling from 2007, funded by the KCC, indicates that portions of the plume could intercept parts of the Wichita Well Field within 50 years. In addition, the Equus Beds aquifer is a significant public water supply source for much of the population of Sedgwick County. Therefore, KCC ranks the Burrton Site at a very high level of immediacy based on the resources impacted and the site's geographical size.

Site Description: The total maximum area affected by the contamination covers approximately 25 to 30 square miles. Generally, the contaminated plumes align in a northeast-to-southwest configuration parallel with the associated producing areas. The local groundwater management district's water quality sampling network indicates oil field brine contamination of all three significant zones within the Equus Beds Aquifer. Depth to groundwater ranges from 10 to 35 feet, with saturated thickness in the order of 150 to 250 feet. The City of Wichita's ASR project, a multi-million-dollar investment, is directly attempting to slow the Burrton brine plume. In addition, District #2 investigates private groundwater wells and water quality in the area, including a geoprobe investigation to the northwest of Burrton in 2015. KCC installed 25 new monitoring wells throughout the Burrton IGUCA in the spring of 2023, utilizing a drilling technique called sonic drilling. KCC installed five new monitoring wells in 2024 in the far northwest of the Burrton site. These wells were used to find higher-quality groundwater for landowners in the immediate area.

Unusual Problems: The need for suitable disposal facilities and the extensive area of the plume make the cleanup of this site very costly and inefficient. The physical day-to-day maintenance and monitoring of a withdrawal and disposal system of this size would require a significant commitment of labor and resources. Additionally, over-pumping the aquifer as part of a remediation plan for oilfield brine could cause natural chlorides to migrate from the Arkansas River into the Equus Beds. Considering the variable conditions within the aquifer, different areas within the contaminated plume must be evaluated separately during cleanup to ensure fresh and usable water is preserved. Recovered fluids would be low in chlorides and well within the range of treatable water, so disposal of this fluid could be considered wasteful.

Status of the Project: GMD #2 sampled the monitoring wells in the summer of 2025. This site is under monitoring by the KCC, but other entities, including the city of Wichita, are actively researching the brine issues. The KWO, along with the City of Wichita and GMD2, has been actively proposing a remedial system within the Burrton Intensive Groundwater Use Area (IGUCA). KCC has been in contact with these entities regarding this possible future operation.

In 2025, the A zone wells were stable over most of the IGUCA, with a significant decrease in chlorides in EB3AA to -268 mg/L (second year in a row) and an increase of 146 mg/L in EB61A. There was a slight, -73 mg/L, decrease near the toe of the plume at EB20A.

B Zone chlorides showed minor increases and decreases across the entire IGUCA, with EB4B significantly rising by 240 mg/L in 2024 and then increasing by a further 90 mg/L this year. KCC will monitor this closely in the future to see if it is a continuing trend. The well has had higher chlorides in the historical record. Monitoring wells EB57B, EB58B, and EB61C showed increases but remained under a 100 mg/L change. Much of the eastern IGUCA showed decreases, though mostly small, except for EB9B, which went down by 77 mg/L, and EB20B (the most eastern well), which dropped by 161.5 mg/L.

C Zone levels dropped in the monitoring wells in the southwestern part of the IGUCA, with EB2C and EB59C dropping -95 mg/L and -246 mg/L, respectively. EB8C rose by 80 mg/L and is within the historical range of chloride levels in the well. However, this is the second year in a row that this well has increased. KCC plans to sample monitoring wells in the B and C zones in the southwestern area, and have the KGS analyze the water for a bromide/chloride ratio test to determine if chlorides may be natural mineralization from the Arkansas River.

The newest wells are located in the far northwest of the IGUCA area, in the sand hills, and are centered around a homestead that filed a complaint of brine water impaction in 2023. KCC has sampled the wells and has determined that the A zone in the local area is impacted, but brine was not found in the AA and B zones. KCC collaborated with the landowners and a local drilling company to design a plan for drilling a new well in an alternate zone. Cores from drilling were used to create and plan the construction of a new domestic well. As of 2025, KCC has communicated with the landowners, and they now have a good-quality water well for their homestead.

Level of Remediation Sought:

Ideal: 250 mg/L Chloride
Target: 300 mg/L

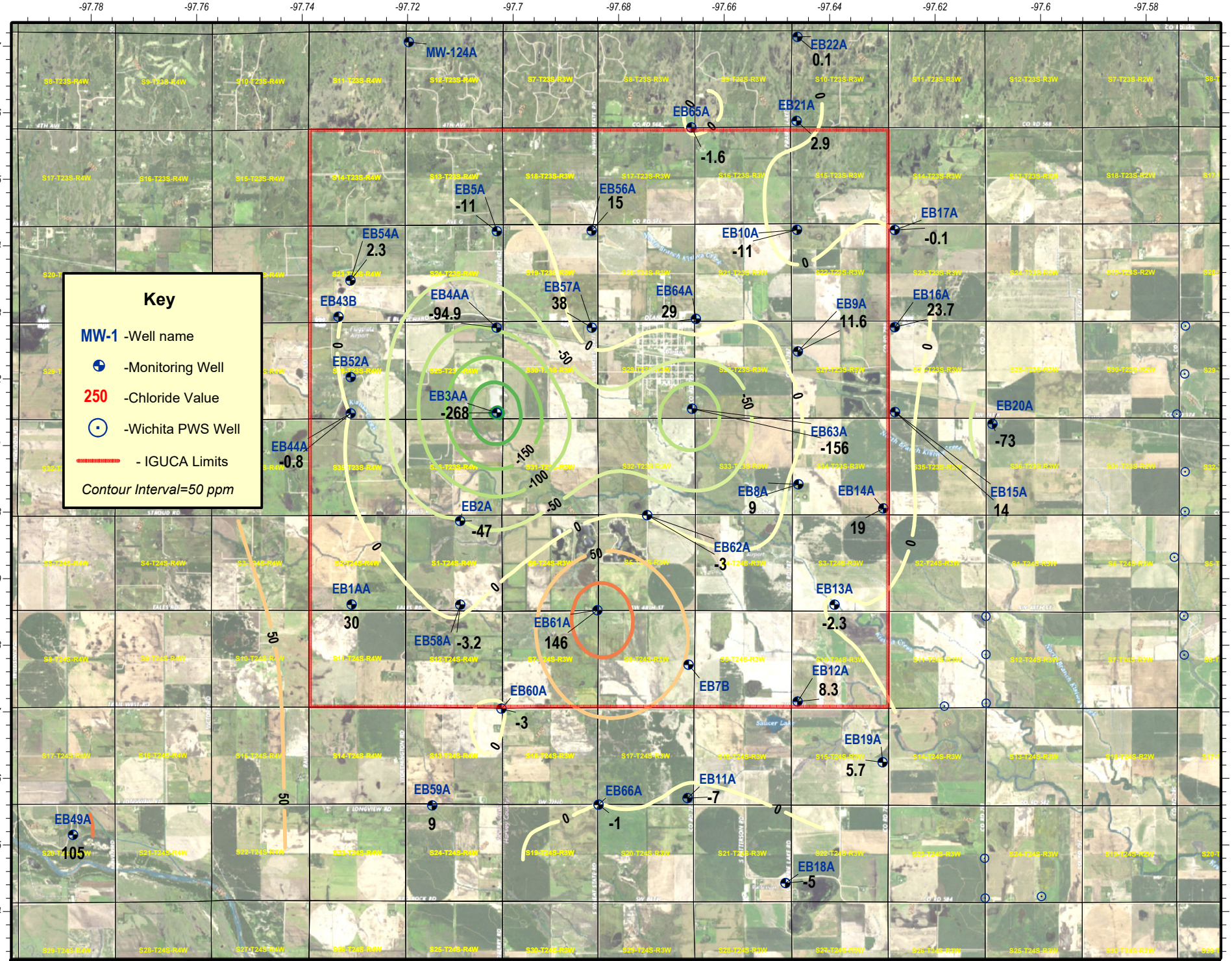
Recommendations for Future Work: Continue working with Groundwater Management District #2, including funding annual water well sampling and analyzing this high-priority data. KCC Staff attend many meetings and conferences regarding the work being done at the Burrton site and will continue to do so. Future monitoring well installations are also being discussed with GMD #2, with a priority on eastern edge delineation and internal plume delineation in the center of the IGUCA. Bromide/chloride ratio testing in the southwest portion of the IGUCA could shed light on possible natural mineralization intrusion.

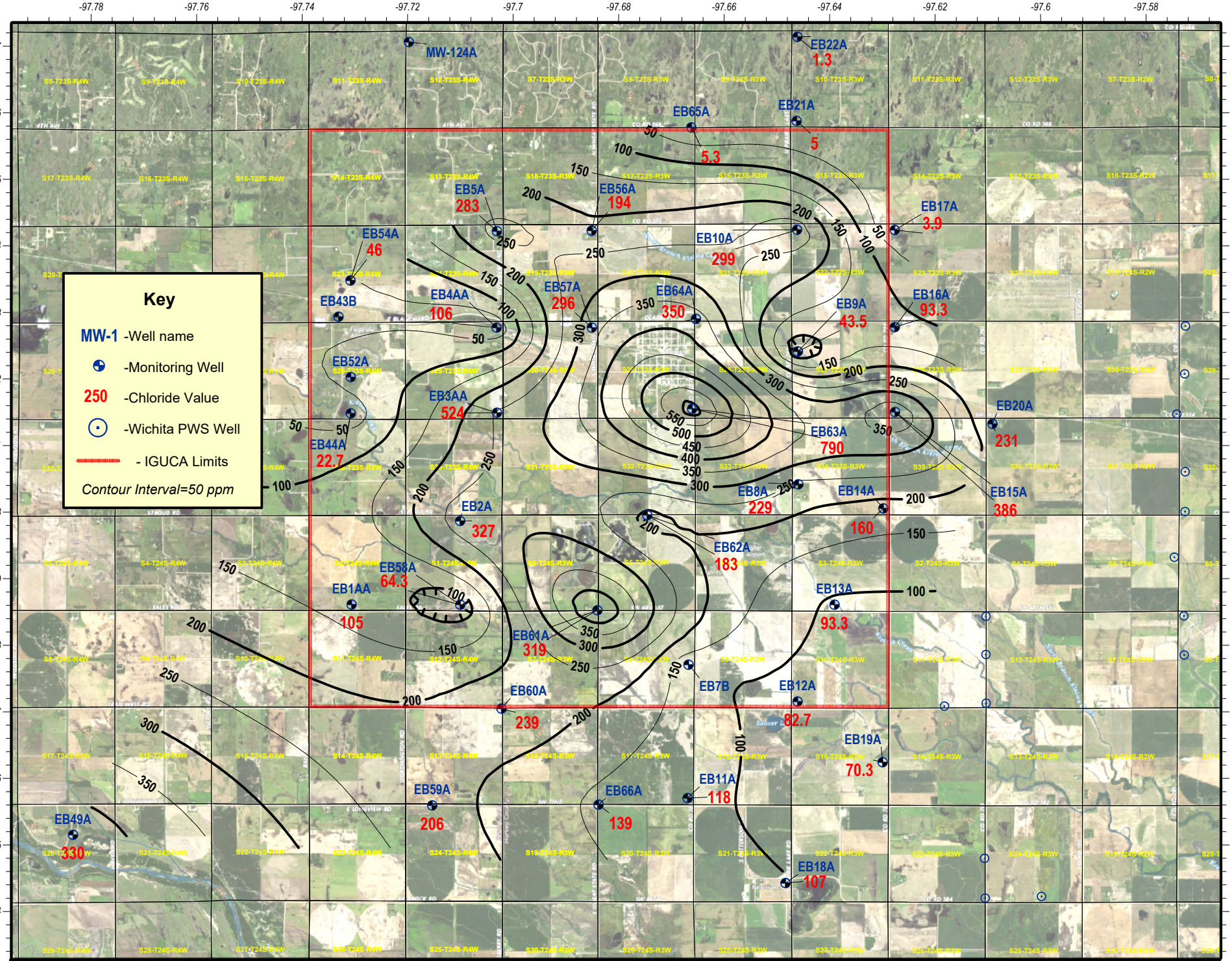
Estimated Total Cost: KCC pays for the analytical laboratory work for the GMD #2 in the IGUCA, estimated to cost around $8,000 for 2025. Other expenses include staff time spent reviewing the information and data related to the new well installation, as well as hydrological and geological research into the IGUCA area. Drilling new wells would have an extensive range depending on the number of wells, type of drilling technique utilized, and current prices, but a minimum of $100,000 should be expected.

Control No.	Staff Hours/Expenditures	Fund Expenditures FY 2025/26	Fund Expenditures Total
970003-00	72 Hrs. / $2,446.94	$4,533.90	$1,012,271.32

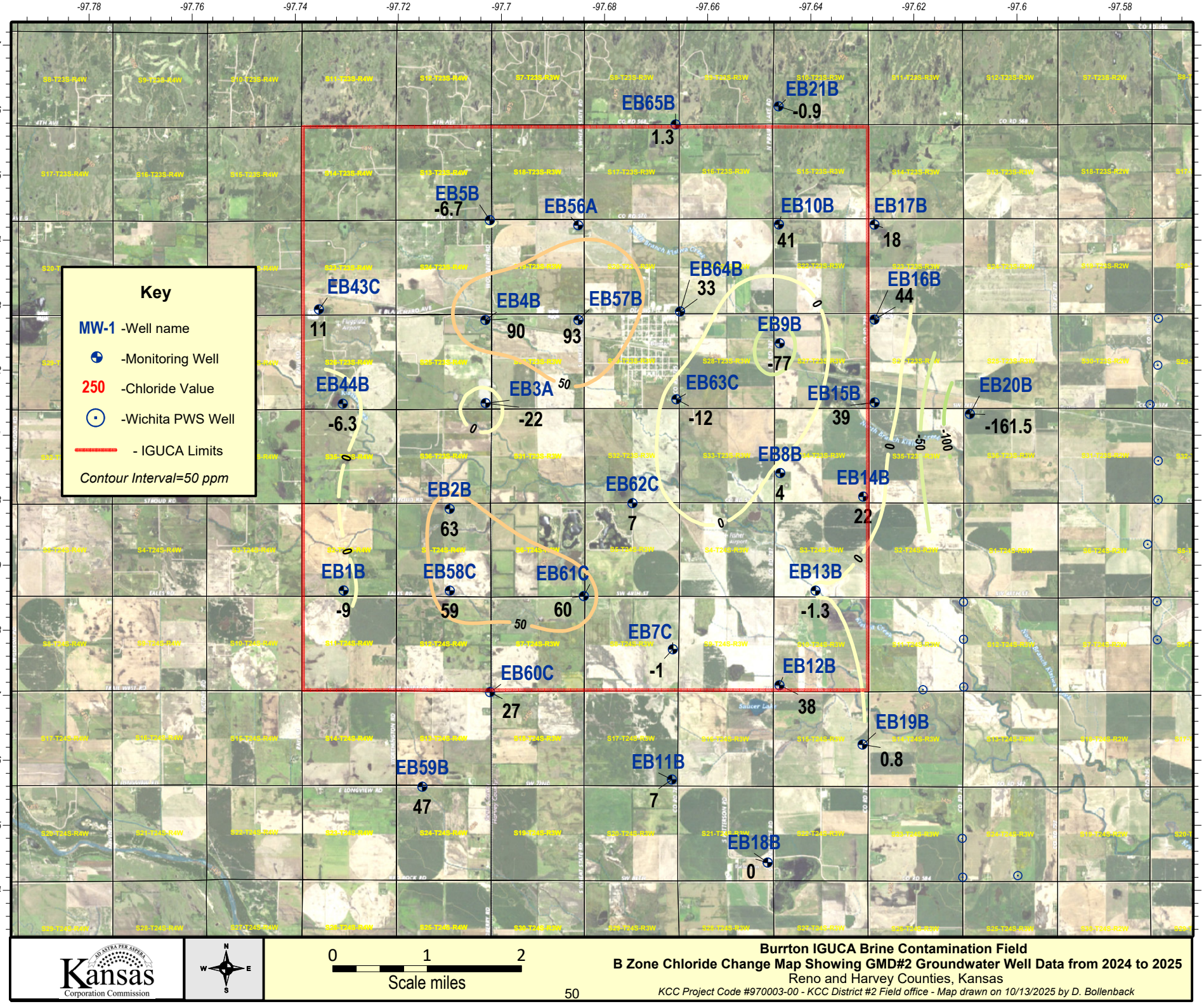
Current Contaminate Level: 1.3 mg/l to 1330 mg/l Cl^-
Status:

☐ 1. Site Assessment	☐ 2. Short Term Monitoring	☒ 3. Investigation
☒ 4. Long-Term Monitoring	☐ 5. Remediation Plan	☐ 6. Installation
☐ 7. Remediation	☐ 8. Post Rem. Monitoring	☐ 9. Resolved

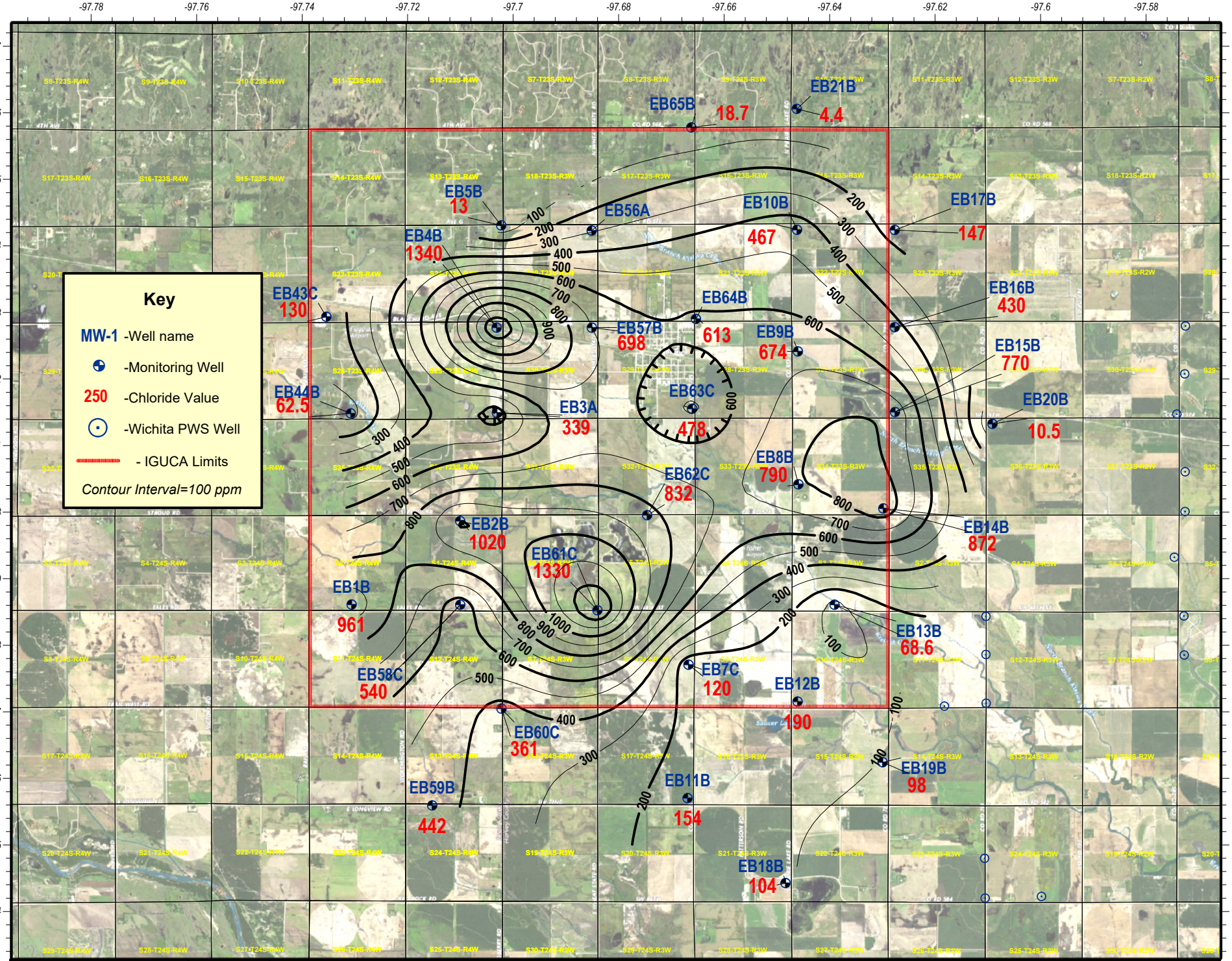

Key
MW-1 -Well name
-Monitoring Well
250 -Chloride Value
-Wichita PWS Well
- IGUCA Limits
Contour Interval=50 ppm
MW-124A
EB22A 0.1
EB65A -1.6
EB21A 2.9
EB5A -11
EB56A 15
EB17A -0.1
EB10A -11
EB54A 2.3
EB43B
EB4AA -94.9
EB57A 38
EB64A 29
EB9A 11.6
EB16A 23.7
EB52A
EB3AA -268
EB20A -73
EB63A -156
EB44A -0.8
EB15A 14
EB8A 9
EB14A 19
EB2A -47
EB62A -3
EB1AA 30
EB13A -2.3
EB58A -3.2
EB61A 146
EB12A 8.3
EB7B
EB60A -3
EB19A 5.7
EB59A 9
EB66A -1
EB11A -7
EB49A 105
EB18A -5
Kansas Corporation Commission
Scale miles
Burrton IGUCA Brine Contamination Field
A Zone Chloride Change Map Showing GMD#2 Groundwater Well Data from 2024 to 2025
Reno and Harvey Counties, Kansas
KCC Project Code #970003-00 - KCC District #2 Field office - Map drawn on 10/13/2025 by D. Bollenback



Burrton IGUCA Brine Contamination Field
A Zone Chloride Map Showing GMD#2 Groundwater Well Data from 2025
Reno and Harvey Counties, Kansas
KCC Project Code #970003-00 - KCC District #2 Field office - Map drawn on 10/13/2025 by D. Bollenback

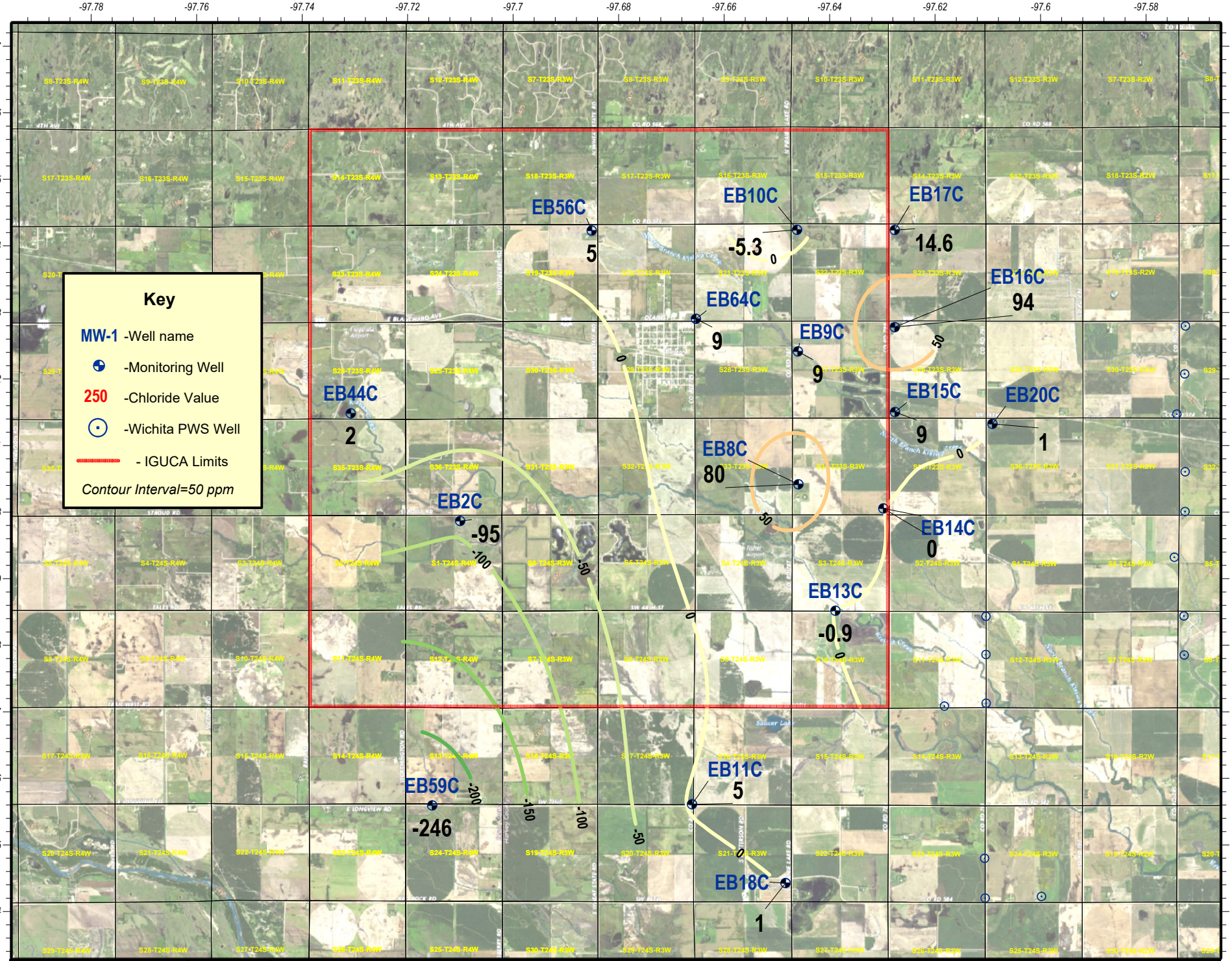


Burrton IGUCA Brine Contamination Field
B Zone Chloride Change Map Showing GMD#2 Groundwater Well Data from 2024 to 2025
Reno and Harvey Counties, Kansas
KCC Project Code #970003-00 - KCC District #2 Field office - Map drawn on 10/13/2025 by D. Bollenback

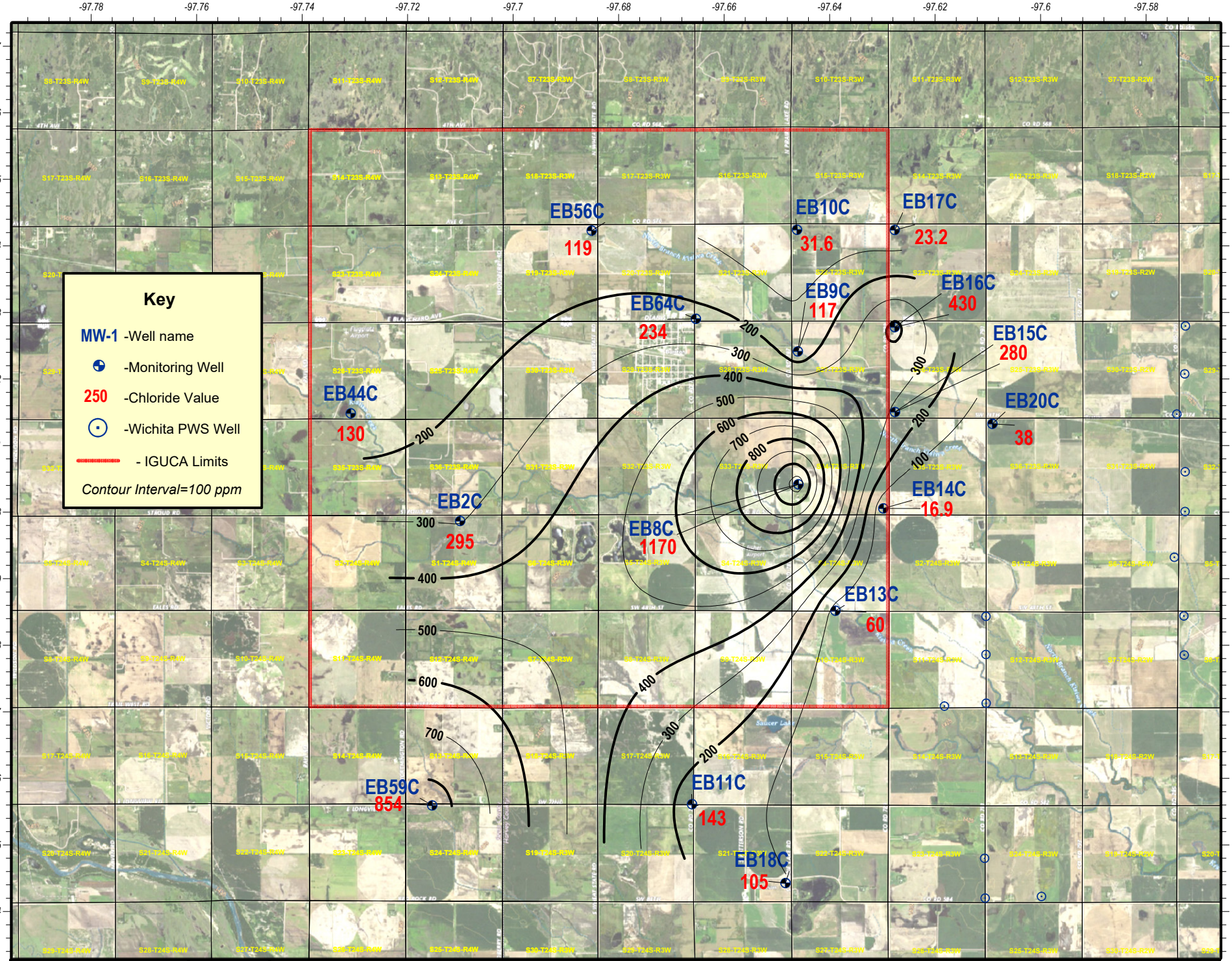


Kansas Corporation Commission

Burrton IGUCA Brine Contamination Field
B Zone Chloride Map Showing GMD#2 Groundwater Well Data from 2025
Reno and Harvey Counties, Kansas
KCC Project Code #970003-00 - KCC District #2 Field office - Map drawn on 10/13/2025 by D. Bollenback



Burrton IGUCA Brine Contamination Field
C Zone Chloride Change Map Showing GMD#2 Groundwater Well Data from 2024 to 2025
Reno and Harvey Counties, Kansas
KCC Project Code #970003-00 - KCC District #2 Field office - Map drawn on 10/13/2025 by D. Bollenback



Burrton IGUCA Brine Contamination Field
C Zone Chloride Map Showing GMD#2 Groundwater Well Data from 2025
Reno and Harvey Counties, Kansas
KCC Project Code #970003-00 - KCC District #2 Field office - Map drawn on 10/13/2025 by D. Bollenback

Project: ***Clawson Contamination Site, Haskell County, District 1***

Site Location: Legal location is east half of Section 33 and all of Section 34, Township 29 South, Range 34 West, Haskell County.

Impact/Immediacy: Irrigation well is contaminated and a pollution threat to other irrigation wells if contaminate is not contained to site. Site immediacy is rated at moderate to high and is under long term monitoring at the present time by the PRP.

Site Description: The site consists of a plume of brine-contaminated groundwater moving in an easterly direction. Area is blanketed by 500 feet of Ogallala sand and gravel. Bedrock underlying the Ogallala is the Dakota/Cheyenne formation. There is a total of 600 feet of freshwater bearing strata. Pollution occurs along a clay layer 360 feet below the surface (in the upper part of the freshwater aquifer). No domestic wells in the affected area. One irrigation well is currently polluted to the extent it cannot be used for irrigation purposes. Depth to groundwater is 300 feet. Depth to Cretaceous bedrock is 510 feet in the center of the SW/4 of Section 34. The Red Beds underlie the three aquifers at a depth of 635 feet.

Unusual Problems: High yield rates of the Ogallala formation and ongoing severe drought.

Status of Project: On October 9, 2025, the site consultants Daniel B. Stephens & Associates, Inc. sampled seven monitoring wells on the Clawson site. Samples ranged from 749mg/L chloride in 02-02 to 1960mg/L chloride in well 02-04. Overall, the historic chloride levels have dropped throughout this site, and that trend continued during this sampling event. The consultants also tested the bromide to chloride ratio in each sample, the results of which show the chloride concentrations are from oilfield brine mixing with groundwater. A new PRP took over the site on November 1, 2019.

Level of Remediation Sought:

Ideal: 250 ppm Chloride
Target: 500 ppm Chloride

Recommendations for Future Work: There have been ongoing discussions of groundwater modeling to see how starting up the irrigation well for agricultural use would affect the plume. The seven wells continue to be monitored until target concentrations are met. All of these expenses will be covered by the PRP and will only happen with the consent of the KCC.

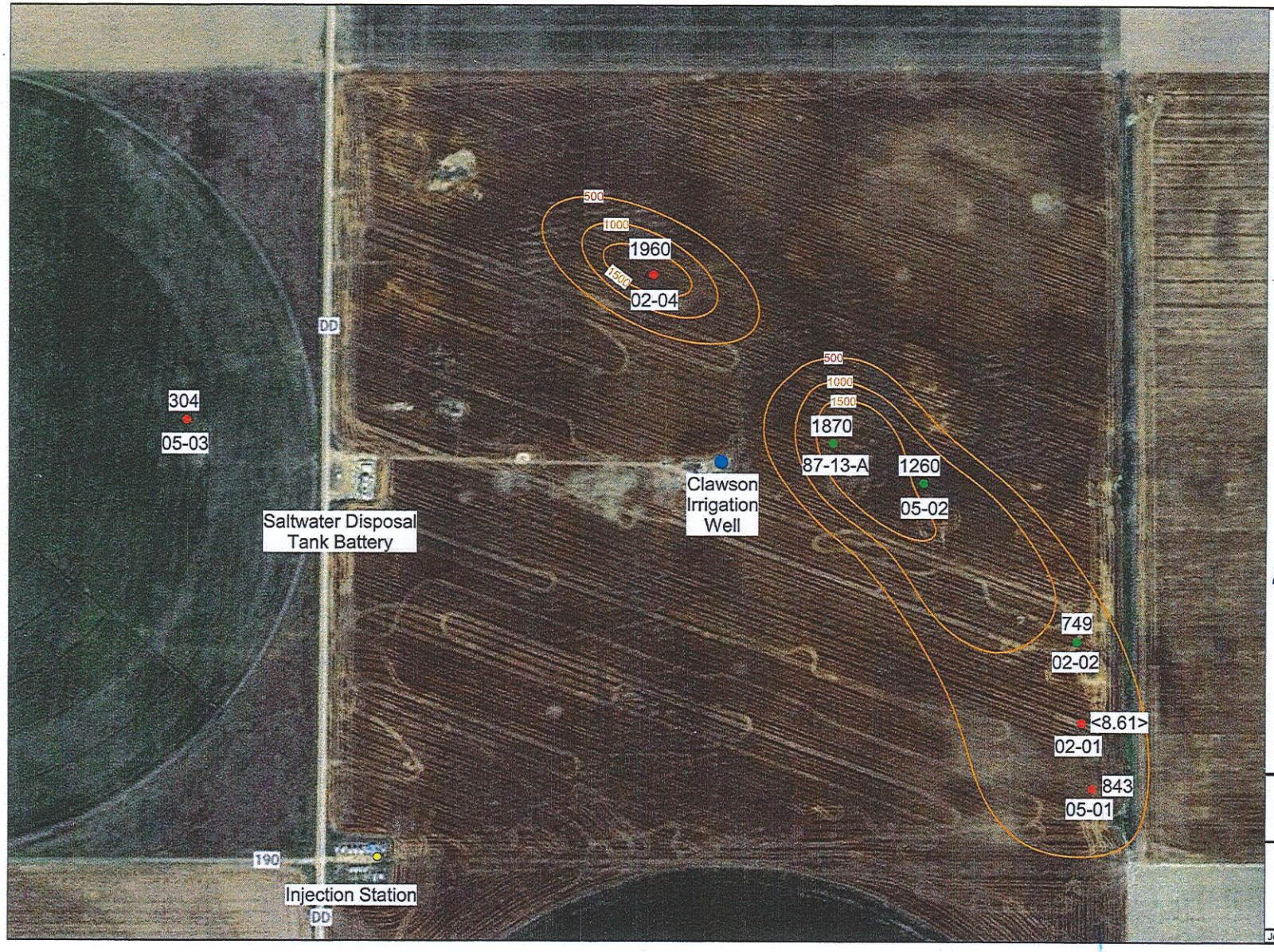
Estimated Total Costs: KCC - $450 a year. PRP – in excess of $2 million.

Control No.	**Staff Hours/Expenditures**	**Fund Expenditures FY 2025/26**
970005-00	**3 Hrs. / $114.74**	

Current Contaminate Level: 749 ppm Cl- to 1,960 ppm Cl-

Status:

☐ **1. Site Assessment**	☐ **2. Short Term Monitoring**	☐ **3. Investigation**
☒ **4. Long Term Monitoring**	☐ **5. Remediation Plan**	☐ **6. Installation**
☐ **7. Remediation**	☐ **8. Post Rem. Monitoring**	☐ **9. Resolved**



LEGEND

- Monitor well location
- Recovery well location
- Irrigation well location
- Injection well location

-2614- - Chloride concentration countour
Contour interval = 500 mg/L

<8.62> -Concentration not used

Note: All concentrations in milligrams per liter (mg/L)

N

WILLIAM R GOLDSBY
LICENSED
967
KANSAS
PROFESSIONAL GEOLOGIST

10.13.25

0 390 780
SCALE IN FEET

EnTech

Figure 6
Chloride Concentration Isopleth Map - 2025
Scout Energy Management L.L.C
Haskell County Brine Cleanup
Haskell County, Kansas
Stanton, Martin County, Texas
Lat: 37..478581°, Long -101.030476°

Job No.: SEMR25001 | DATE: 10/2025

Project: ***Schraeder Contamination Site, Hodgeman County, District 1***

Site Location: Legal location is E/2 of Section 3 and W/2 of Section 2, Township 24 South, Range 24 West, Hodgeman County.

Impact/Immediacy: Contamination to groundwater, stock wells, and possibly an irrigation well in the future. Immediacy level is rated as low.

Site Description: The chloride concentration of the Ogallala formation water supplying a stock well has been high in chlorides.

Unusual Problems: None.

Status of Project: Six groundwater samples were taken in 2025. Chlorides in these samples ranged from 90 ppm chlorides at Well A, to 430 ppm chlorides in Well D. The values across the site have decreased from the previous sample years. There has been a slow decline in the chlorides at this site due to natural attenuation; this trend is expected to continue in the future. Windmill G was running and was sampled this year.

Level of Remediation Sought:

Ideal: 250 ppm Chloride
Target: 350 ppm Chloride

Recommendations for Future Work: Continue annual monitoring of the site.

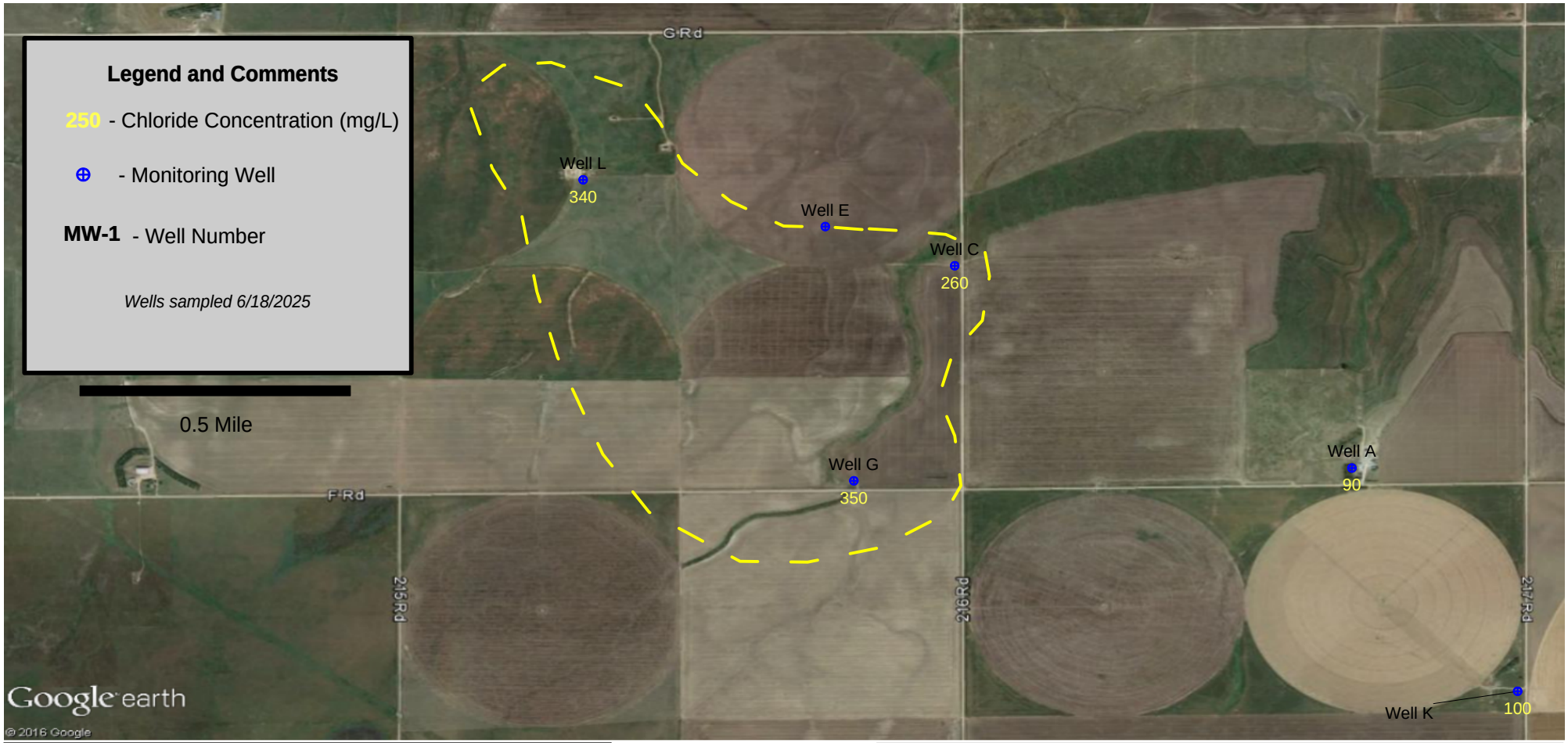
Estimated Total Costs: $30,000.00.

Control No.	Staff Hours/Expenditures	Fund Expenditures FY 2025/26	Total
970013-00	4 Hrs. / $148.34		$1,590.90

Current Contaminate Level: 90 ppm Cl- to 430 ppm Cl-

Status:

☐ 1. Site Assessment	☐ 2. Short Term Monitoring	☐ 3. Investigation
☒ 4. Long Term Monitoring	☐ 5. Remediation Plan	☐ 6. Installation
☐ 7. Remediation	☐ 8. Post Rem. Monitoring	☐ 9. Resolved



Kansas Corporation Commission

N
W E
S

Schraeder Site

Sections 2/3/11-T-24S-R24W
Hodgeman County, Kansas

2025 Area Map with Chlorides

KCC Control # 970013-00 District 1
N. Feldkamp 7/2/2025

Project: ***South Spivey Contamination Site, Kingman County, District 2***

Site Location: The area is 3.5 miles south of Spivey, near an unnamed tributary of the Chikaskia River. The legal location is Sections 27 and 34 of Township 30 South, Range 8 West, in Kingman County.

Impact: The impacts are on groundwater resources associated with local agricultural wells. KCC has rated this site as having a low immediacy level.

Site Description: The project area lies within an intermittently flowing creek bed within the large Spivey-Grabs oil and gas field. The location is remote, and the primary surface uses are cattle grazing, oil and gas production, and wind turbines. The geology in the area consists of unconsolidated Tertiary and Quaternary deposits overlying the Permian Nippewalla Group Shale. This shale is along the valleys of the Chikaskia River system and its tributaries. The unconsolidated sediments usually consist of poorly sorted sands, silts, and gravel and can be up to 60 feet thick. The Permian erosional surface dips to the north towards the Chikaskia River. Most locations overlain by unconsolidated sediments exhibit good infiltration from precipitation. Still, their horizontal permeability can vary due to a lack of sediment sorting or the development of less permeable silt. Groundwater tends to follow the slope of the Permian erosional surface. A PRP remediated this site in 1993 when an oil and gas lead line broke and flowed for some time, contaminating the alluvium. The PRP removed the remedial system once chloride levels dropped. It was unknown at the time how much brine water infiltrated the local alluvium.

The South Spivey Site is currently in an annual sampling program. Natural attenuation of the site occurs, but chloride readings have varied somewhat over the years in relation to annual precipitation amounts. The contaminated aquifer is so shallow that chloride levels change with yearly precipitation. The closest water well is over one mile down the gradient from the plume. Historical records indicate that the local ponds were utilized for saltwater disposal as early as 1957.

Unusual problems: The withdrawal rate can be low due to the low permeability of the aquifer if it lies outside the well-sorted paleochannels, especially at the south end of the site. Some monitoring wells have an excellent capacity for pumping groundwater, while others pump dry. The permeability differences within the alluvium channels allow brine plumes to move unpredictably.

Status of Project: MW-B2 and MW-B4 are the only monitoring wells that showed higher chlorides this year, increasing by 75 and 50 mg/L, respectively. Heavy rain occurred across Kansas during the early to late summer of 2025. The area was in extreme drought conditions, and groundwater elevation increased substantially. KCC sampled the wells via a submersible pump on August 14, 2025. Due to localized flooding and washed-out lease roads, MW-B5 was inaccessible. KCC discovered a cattle trough and a solar-powered water well west of MW-A2 and performed a field test, which showed fresh water in the range of 10-30 ppm. The pond south of the B wells was sampled this year, as it was full from recent rains, and tested at 100 mg/L chlorides. For the second time in recent years, all wells had chlorides below 1000 mg/L. The OB monitoring well and MW-B2 are the only wells above the target limit of 750 mg/L.

Level of Remediation Sought:

Ideal: 250 mg/l Chloride
Target: 750 mg/l Chloride

Recommendations for Future Work: KCC recommends that a staggered closure of the South Spivey Site begins over the next year. All southern A wells should be plugged. Two wells, OB and B2, remain over the target level of 750 mg/L of chlorides, but no monitoring wells exceed 1,000 mg/L. If the current trend continues, KCC will also plug out the Observation well and B wells next year. KCC will develop a plugging plan for the monitoring wells and restore the site to its pre-remedial conditions.

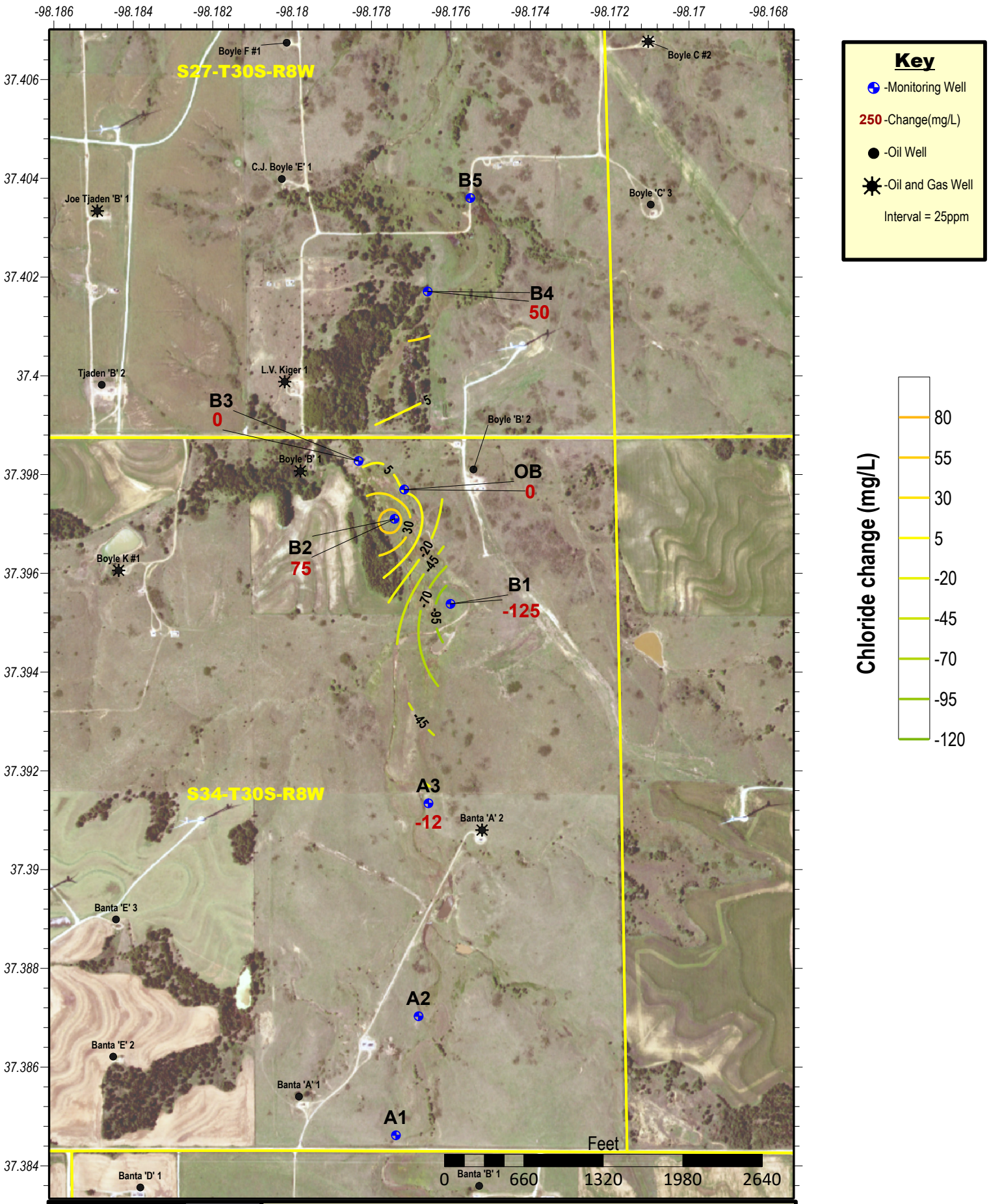
Estimated Total Costs: KCC estimates $700 per year for sampling, testing, and research. The cost to plug the wells would range from $ 1,000 to $ 5,000, depending on whether the work is performed in-house or outsourced to a licensed water well contractor.

Control No.	**Staff Hours/Expenditures**	**Fund Expenditures FY 2025/26**	**Total**
970096-00	**30 Hrs. / $1,035.70**		

Current Contaminate Level: 20 mg/L to 850 mg/L Cl^-

Status:

☐ **1. Site Assessment**	☐ **2. Short Term Monitoring**	☐ **3. Investigation**
☒ **4. Long Term Monitoring**	☐ **5. Remediation Plan**	☐ **6. Installation**
☐ **7. Remediation**	☐ **8. Post Rem. Monitoring**	☐ **9. Resolved**

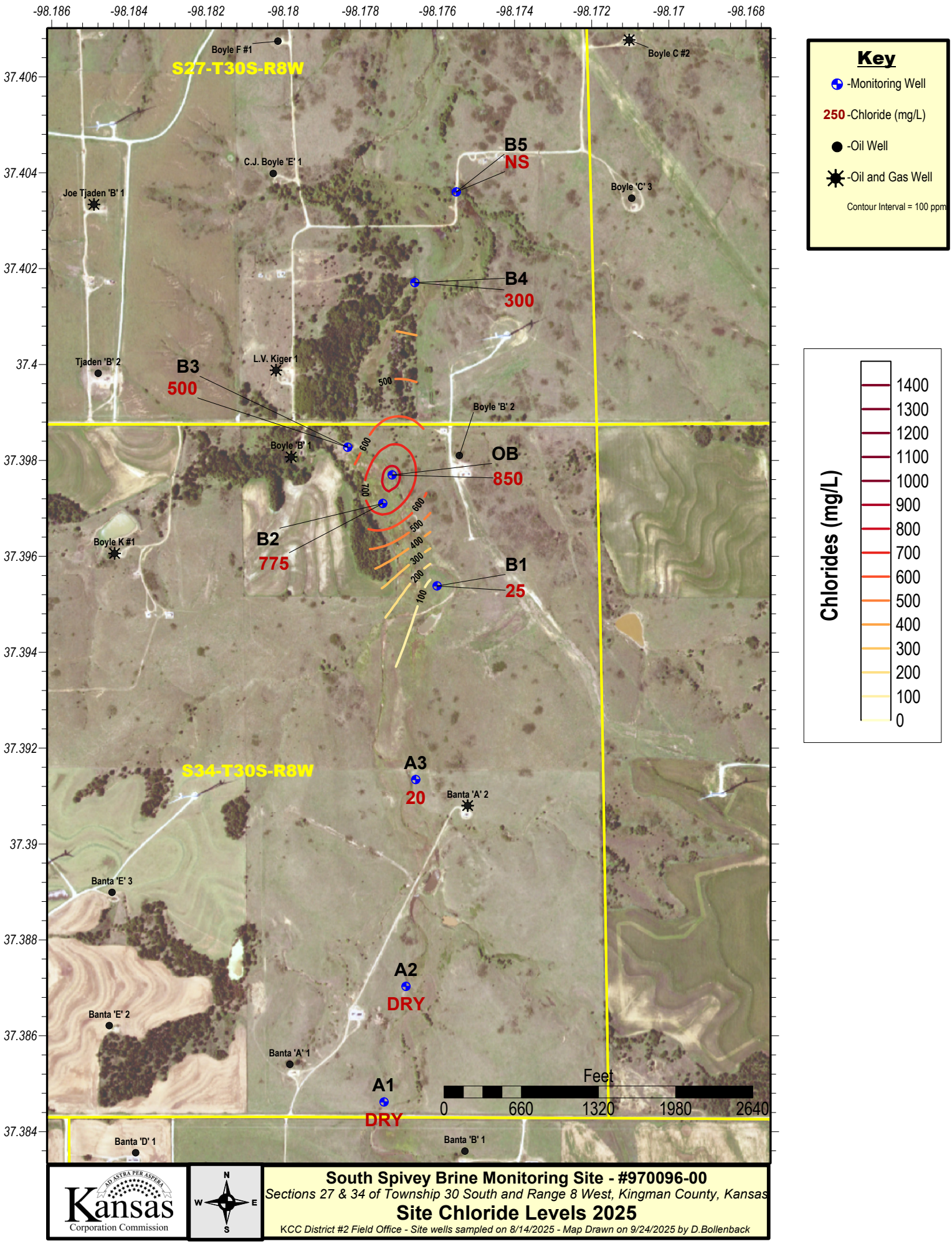


South Spivey Brine Monitoring Site - #970096-00

Sections 27 & 34 of Township 30 South and Range 8 West, Kingman County, Kansas

Chloride Change from 2024 to 2025

KCC District #2 Field Office - Site wells sampled on 8/14/2025 - Map Drawn on 9/24/2025 by D.Bollenback


-98.186
-98.184
-98.182
-98.18
-98.178
-98.176
-98.174
-98.172
-98.17
-98.168
37.406
37.404
37.402
37.4
37.398
37.396
37.394
37.392
37.39
37.388
37.386
37.384
S27-T30S-R8W
S34-T30S-R8W
Boyle F #1
Boyle C #2
C.J. Boyle 'E' 1
Joe Tjaden 'B' 1
Boyle 'C' 3
Tjaden 'B' 2
L.V. Kiger 1
Boyle 'B' 2
Boyle 'B' 1
Boyle K #1
Banta 'A' 2
Banta 'E' 3
Banta 'E' 2
Banta 'A' 1
Banta 'D' 1
Banta 'B' 1
B5
NS
B4
300
B3
500
OB
850
B2
775
B1
25
A3
20
A2
DRY
A1
DRY
500
600
700
600
500
400
300
200
100
Feet
0
660
1320
1980
2640
Key
-Monitoring Well
250 -Chloride (mg/L)
-Oil Well
-Oil and Gas Well
Contour Interval = 100 ppm
Chlorides (mg/L)
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
Kansas
Corporation Commission
AD ASTRA PER ASPERA
N
W
E
S
South Spivey Brine Monitoring Site - #970096-00
Sections 27 & 34 of Township 30 South and Range 8 West, Kingman County, Kansas
Site Chloride Levels 2025
KCC District #2 Field Office - Site wells sampled on 8/14/2025 - Map Drawn on 9/24/2025 by D.Bollenback

Project: ***Trostle Contamination Site, Kingman County, District 2***

Site Location: This site is 2.3 miles west and 2.75 miles south of Murdock, Kansas. The legal description is the northeastern quarter of Section 33, Township 28 South, and Range 6 West of Kingman County, Kansas. The site is situated within the drainage system of Sand Creek, located approximately one mile north of the site. Sand Creek is a tributary of the South Fork Ninnescah River.

Impact/Immediacy: High chloride levels could impact groundwater, affecting stock wells in the immediate area and draws, which are usually dry but contain water after significant rainfall. The aquifer is very low yielding. In addition, erosion affects the terrain without vegetation. There are no domestic wells nearby. Therefore, KCC has classified this site as low immediacy.

Site Description: Historically, the Trostle salt-water disposal well battery has been the most affected. Seven monitoring wells located below the Trostle salt-water disposal well also have elevated chloride levels. The most likely cause was something related to the salt-water tank, such as discharges or line leaks. A PRP remediated the plume via an interceptor trench. However, the PRP abandoned the system after the holding tanks failed, and the site moved into the monitoring phase of the investigation. There have only been two reported spills at the SWDW since 2007. Local hydrology is a perched aquifer system. Precipitation that infiltrates the Pleistocene Alluvium moves downward until it contacts the impermeable red Ninnescah shale. Groundwater then flows down a gradient over the shale. The general movement of fluids in the perched water table flows in a northwest direction.

Unusual Problems: None.

Status of Project: On June 20th, 2025, KCC staff sampled all eleven groundwater monitoring wells. Staff utilized a bailer to purge at least three well volumes of groundwater from each well before sampling. Wells with a historically known lack of recharge were sampled without purging the three well volumes. All monitoring wells that bailed dry were allowed to recharge before sampling due to the lack of groundwater to perform a complete purge. Groundwater samples from each monitoring well were collected in a single 250 milliliter polyurethane container for analysis at the KCC District #2 Laboratory.

Laboratory results showed lower chloride levels down gradient of the tank battery, mainly MW-8, which decreased by 1760 mg/L from 2024. KCC noted that the year prior, MW-8 increased by 1000 mg/L, so this year's cancellation of that increase resulted in a value almost twice as low. MW-8 showed the lowest chlorides across the entire site in 2025. MW-1, located along the east side of the battery, showed an increase of 2,400 mg/L. Historically, MW-1 and MW-3 have exhibited erratic fluctuations in chloride levels. Drought conditions occurred in the region in 2022, 2023, and 2024, but at the time of sampling, wet weather had just begun to affect the area, as the summer of 2025 experienced considerable precipitation. The static water levels in the wells have increased since 2025, averaging 2.02 feet higher across the site compared to last year. As noted, more rain occurred regionally after the sampling event in 2025, so it would be expected that a further increase in the local water table has occurred.

Level of Remediation Sought:

Ideal: 250 mg/l Chloride
Target: 500 mg/l Chloride

Recommendations for Future Work: Due to the limited amount of water resources affected and the recent data, KCC recommends continuing to sample the Trostle annually. KCC does not recommend expanding the monitoring well matrix at this time. A small, low-volume recovery system is an option; however, KCC is uncertain about the system's potential benefits due to the aquifer's low deliverability. Higher precipitation rates may help flush out the local system; however, KCC did not observe this in this

year's results, indicating that the chlorides near the tank battery may be trapped.

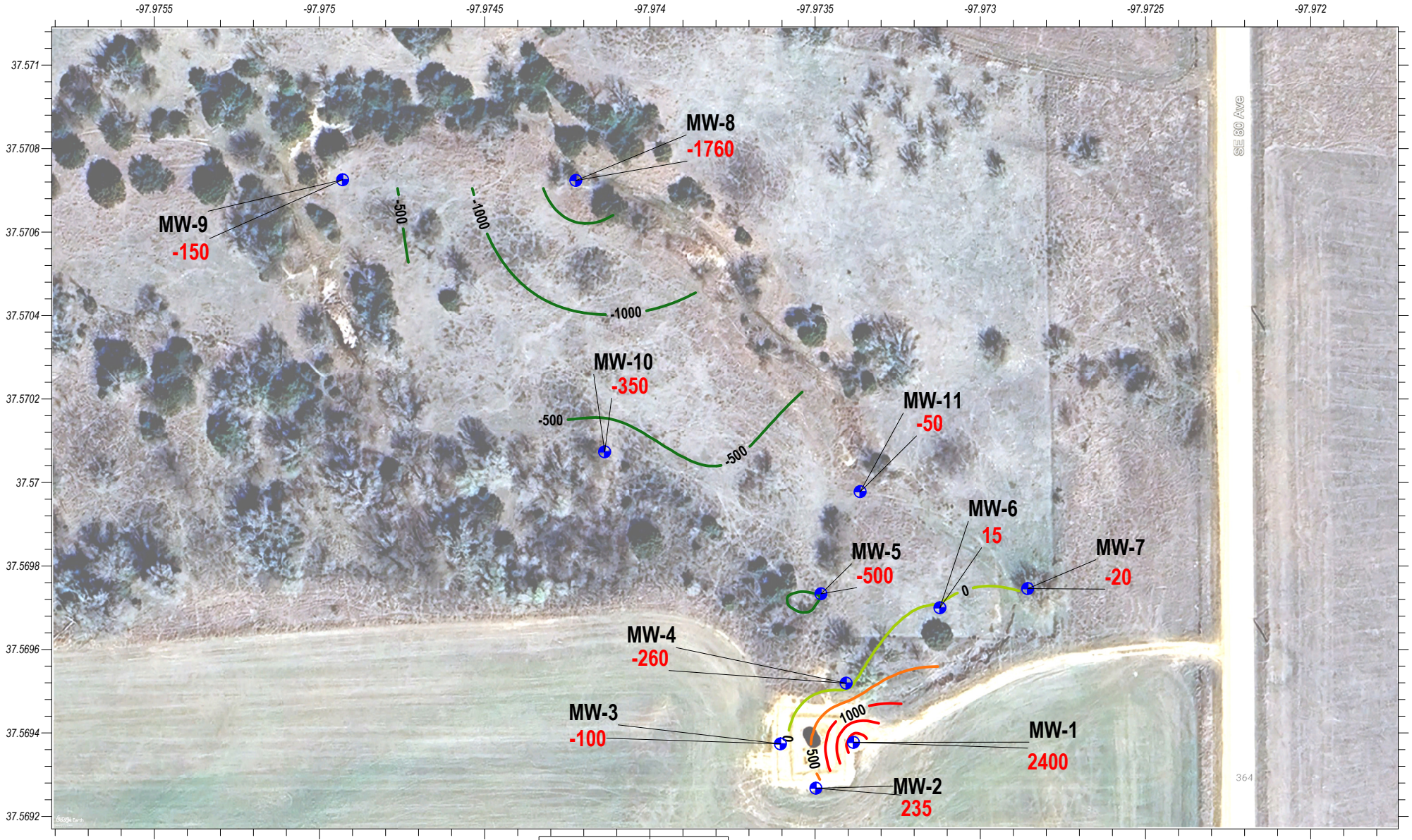
Estimated Long-Term Cost: The estimated annual cost to the KCC is $550, covering site inspections, water analysis, data preparation, and report generation.

Control No.	Staff Hours/Expenditures	Fund Expenditures FY 2025/26 Total
980038-001	16 Hrs. / $565.28	

Current Contaminate Level: 40 mg/L in MW-8 to 4,100 mg/L chlorides in MW-1

Status:

☐ 1. Site Assessment	☐ 2. Short Term Monitoring	☐ 3. Investigation
☒ 4. Long Term Monitoring	☐ 5. Remediation Plan	☐ 6. Installation
☐ 7. Remediation	☐ 8. Post Rem. Monitoring	☐ 9. Resolved



KEY

-Monitoring Well

Contour Interval = 500 ppm

Google Earth Air Photo dated 4-2023

Chloride Change (mg/L)

2500
2000
1500
1000
500
0
-500
-1000
-1500
-2000

64

N
W
E
S

Scale (feet)

0 100 200

Kansas Corporation Commission

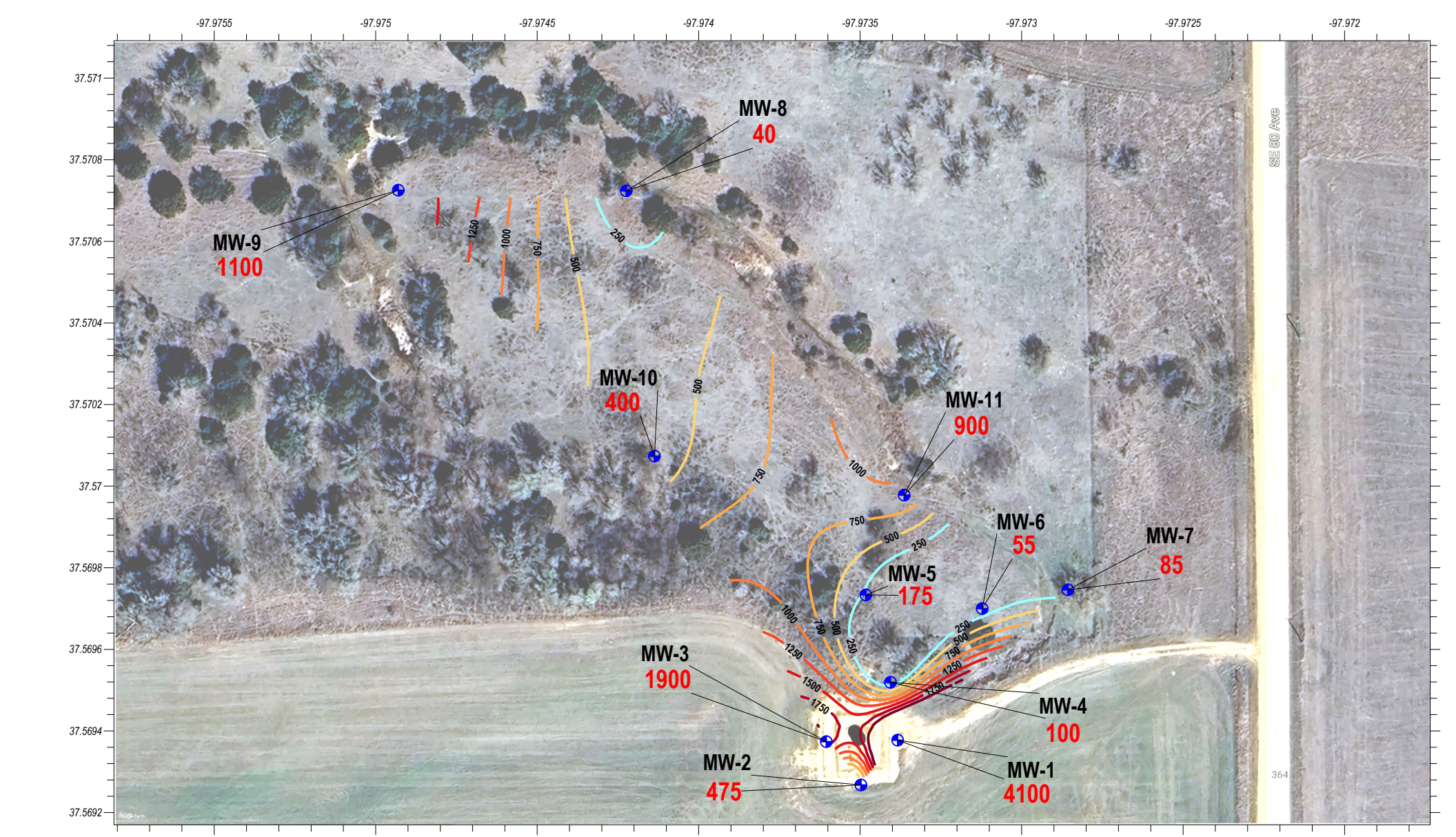
Trostle Brine Contamination Monitoring Site

Section 33 of Township 28 South and Range 6 West, Kingman County, Kansas

Chloride Change from 2024-2025

KCC District #2 Field Office - Control #980038-001

Wells Sampled on 6/20/2025 - Map Drawn on 9/22/2025 by D Bollenback



KEY

-Monitoring Well

Contour Interval = 250 ppm

Google Earth Air Photo dated 4-2023

Chloride Level

2000
1750
1500
1250
1000
750
500
250

N
W
E
S

Scale (feet)
0 100 200

Kansas Corporation Commission

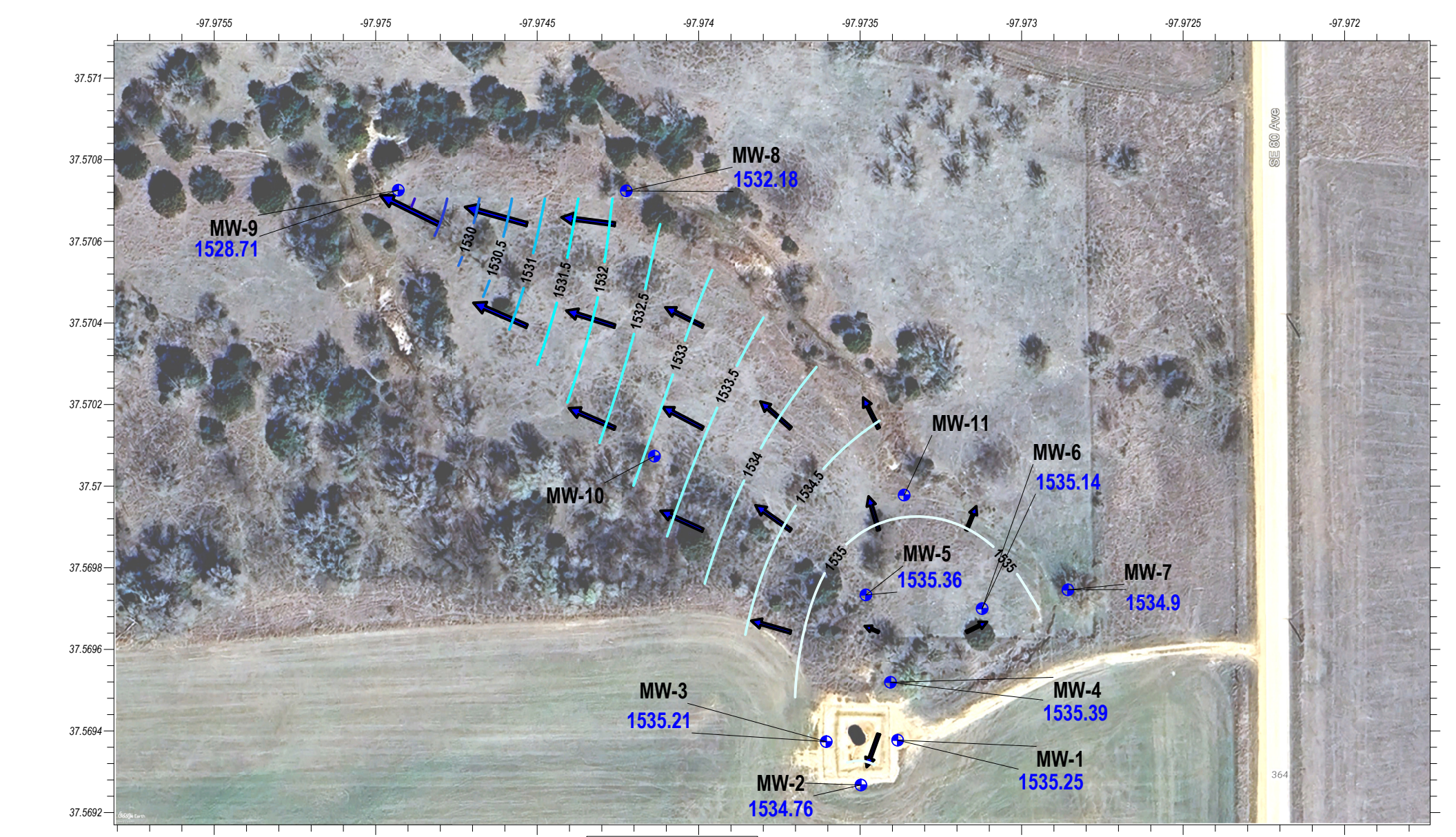
Trostle Brine Contamination Monitoring Site

Section 33 of Township 28 South and Range 6 West, Kingman County, Kansas

2025 Chloride Levels

KCC District #2 Field Office - Control #980038-001

Wells Sampled on 6/20/2025 - Map Drawn on 9/22/2025 by D Bollenback



KEY

-Monitoring Well

Contour Interval = 0.5 ft

Google Earth Air Photo dated 4-2023

Groundwater Elevation

1535.5
1534.5
1533.5
1532.5
1531.5
1530.5
1529.5
1528.5

N
W
E
S

Scale (feet)
0 100 200

Kansas Corporation Commission

Trostle Brine Contamination Monitoring Site

Section 33 of Township 28 South and Range 6 West, Kingman County, Kansas

Groundwater Levels 2025

KCC District #2 Field Office - Control #980038-001

Wells Gauged on 6/20/2025 - Map Drawn on 9/22/2025 by D Bollenback

Project: ***Yeoman Site, Kingman County, District 2***

Site Location: The Yeoman site is in the center of the southeast quarter of Section 35, Township 28 South, Range 7 West. This area is five miles south and three miles east of the city of Kingman in Kingman County.

Impact/Immediacy: The abandoned Yeoman #1, located in the center of the SE/4, may have contributed to the charged-up shallow zones in the Permian Red Beds with gas. However, it was found as an abandoned unplugged well with gas coming to the surface. The site classification is medium because of a small amount of remaining stray gas in place.

Site Description: The Yeoman #1 is in a pasture used for grazing cattle. The Permian Red Beds are encountered at a depth of 50', consisting of very soft, sandy, weathered red shale. The unconsolidated alluvium above the Red Beds consists of a fine to medium-grain sand that is the primary shallow aquifer for this area. Five recovery wells are offsetting the abandoned Yeoman #1. These wells, which were drilled in December 2005 to a total depth of 150 feet, encountered gas as shallow as 110 feet. Each recovery well has approximately 90 feet of 7-inch surface casing set.

In April 2010, the KCC District 2 office drilled six additional monitoring wells around the perimeter of section 36, located east of the Yeoman site. This was done to delineate the escaped gas and follow the upward trend of the Permian red beds to the northeast. Gas was found at all 6 locations with small initial shut-in pressures from 15 to 37 psi at the wellhead.

Unusual Problems: None currently.

Status of the Project: Currently, the six additional monitoring wells drilled in 2010 have little to no pressure, except for Well #6 at 18.5 psi, Well #7 at 12.0 psi, and Well #8 at 8.0 psi. Monitoring Well #9 has had no gas pressure for years, indicating that there is no longer a source charging the shallow zones. Wells #10 and #11 are behind a locked gate and were not checked in 2025, but in previous years, there was no pressure. The five recovery wells directly offsetting the Yeoman 1 are currently in a monitoring phase only and have been for multiple years now. The wells produced stray gas into a sales line from April 2006 to June 2019 with a total cumulative amount of 260,027 Mcf. (From KGS Production data.) Currently, the recovery wells will build up pressure ranging from 12 psi (RW7) to 21 psi (East RW), but will blow down to zero psi very quickly, demonstrating that there is not an active source of gas and that this is residual stray gas left in place.

On August 14, 2025, KCC measured and recorded gas pressures at three monitoring wells and four recovery wells. Shut-in pressures were lower at all three recovery wells than in 2024, and RW5 dropped by 11 psi. Wells #7 and #8 did show very modest pressure increases since 2024. The recovery wells were not flow tested in 2025 due to damage to the flow meter, but the 2023 (and earlier) flow tests clearly indicate that there is not an active source still feeding gas into the shallow Red Beds, and that this is residual stray gas left in place. KCC hopes to replace the flow meter for use at the Yeoman site, but with lower pressures, it may not be necessary.

Level of Remediation Sought:

Ideal: N/A

Target: N/A Complete the plugging of the Yeoman #1 once escaped gas has been depleted from the Red Beds.

Recommendation for Future Work: District staff will continue to flow test the recovery wells to ensure that flow rates and pressures continue to drop once an operational meter is obtained. Staff would recommend that the Yeoman #1 be plugged if gas pressure continues to fall. In February 2005, an attempt was made to plug the entire well.

However, because the shallow zones were charged with gas, the surface casing could not be cemented entirely in place, allowing gas to vent up the backside of the casing. Currently, there is no gas venting on the backside of the Yeoman #1. Very slight bubbles are released when the casing is disturbed, but this could also be due to bacteria, as it is open to the atmosphere.

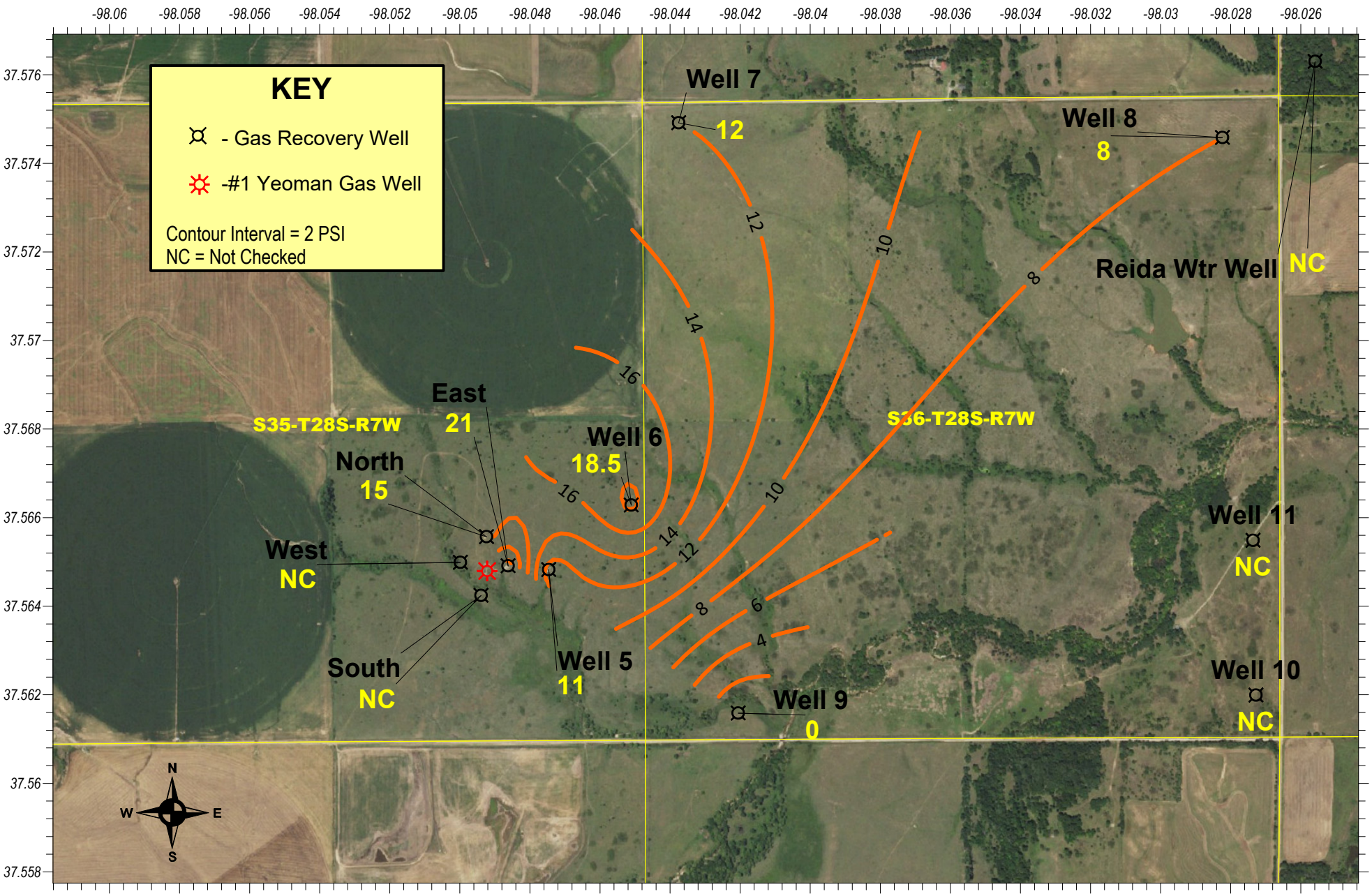
Estimated Total Costs: The plugging of Yeoman #1 will be covered through the KCC fee fund.

Control No.	**Staff Hours/Expenditures**	**Fund Expenditures**	
		FY 2025/26	**Total**
20060021-001	**25 Hrs. / $867.69**		**$102,690.76**

Current Contaminate Level: Shallow Aquifer <70 ppm Cl-
Water from Permian Red Beds tested 625 ppm Cl- in well #5 at 150' TD
Total Gas Produced to Date: 260,027 MCF (KGS Production Data)

Status:

☐ **1. Site Assessment**	☐ **2. Short Term Monitoring**	☐ **3. Investigation**
☒ **4. Long Term Monitoring**	☐ **5. Remediation Plan**	☐ **6. Installation**
☐ **7. Remediation**	☐ **8. Post Rem. Monitoring**	☐ **9. Resolved**



Kansas Corporation Commission

Scale (ft)

0 1320 2640

Yeoman Shallow Gas Site

SE/4 of Section 35 and All of Section 36-T28S-R7W, Kingman Co., KS

Gas Pressures in 2025

KCC Control #970015-00 - KCC District #2 Field Office

Wells sampled on 8/14/2025 - Map Drawn by D Bollenback on 10/9/2025

Project: ***McDonald-East Contamination Site, Linn County, District 3***

Site Location: NW/4 of Section 27, Township 19 South, Range 22 East, Linn County.

Impact/Immediacy: Impact is to the surface water. Immediacy level is rated as low.

Site Description: This site is located at the bottom of a small, fairly steep drainage in the Cherryvale Shale. A seep originating from this drainage tested 3,300 ppm chloride in 1991, 6,500 ppm chloride in 1992, 750 ppm chloride on September 26, 1995, and 380 ppm chloride on January 26, 1998. Seepage within the drainage is intermittent based on precipitation in the area.

Unusual Problems: None.

Status of Project: The State made an agreement with a local operator to put this lease back into production and plug several of the injection wells and older oil wells. The current operator of the lease is Crude Kin Oil Company, Inc. There are five active monitoring wells located on the McDonald East Site in the NW ¼ of Section 27, Township 19 South, Range 22 East. The following Cl- concentrations were obtained from the samples collected this year:

	MWE 02	***MWE 03***	***MWE 04***	***MWE 05***	***MWE 06***
03/13/2025	***700 ppm Cl-***	***270 ppm Cl-***	***800 ppm Cl-***	***600 ppm Cl-***	***600 ppm Cl-***
09/11/2025	***180 ppm Cl-***	***270 ppm Cl-***	***440 ppm Cl-***	***390 ppm Cl-***	***250 ppm Cl-***

Cl- levels spiked during 2010 but, since then, have been trending down with some seasonal variations seen in some wells. Further monitoring on an annual basis is recommended for this site. The lease operator continues to produce this lease, and future monitoring will determine if production activity has any impact on site.

Level of Remediation Sought:

Ideal: 200 ppm Chloride
Target: 500 ppm Chloride

Recommendation for Future Work: Continue sampling annually and monitoring injection activity on this lease. The ability to download and overlay historic aerial imagery will be utilized to help identify undocumented well locations within and near the site boundary.

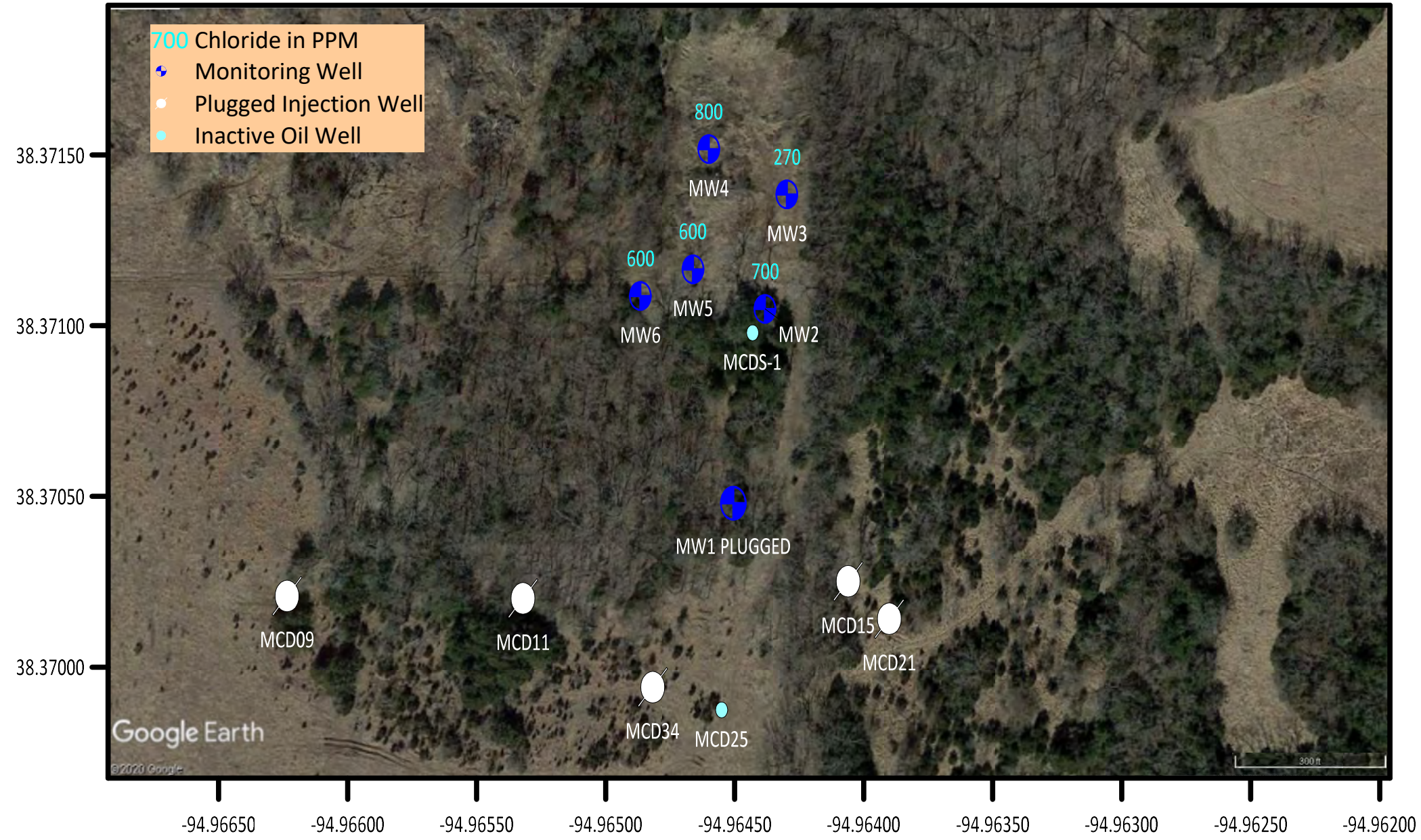
Estimated Total Costs: $1,500.00 yearly.

Control No.	**Staff Hours/Expenditures**	**Fund Expenditures FY 2025/26 Total**
970070-00	**27 Hrs. / $858.04**	

Current Contaminate Level: 180 ppm Cl- to 800 ppm Cl-

Status:

☐ **1. Site Assessment**	☐ **2. Short Term Monitoring**	☐ **3. Investigation**
☐ **4. Long Term Monitoring**	☐ **5. Remediation Plan**	☐ **6. Installation**
☐ **7. Remediation**	☒ **8. Post Rem. Monitoring**	☐ **9. Resolved**

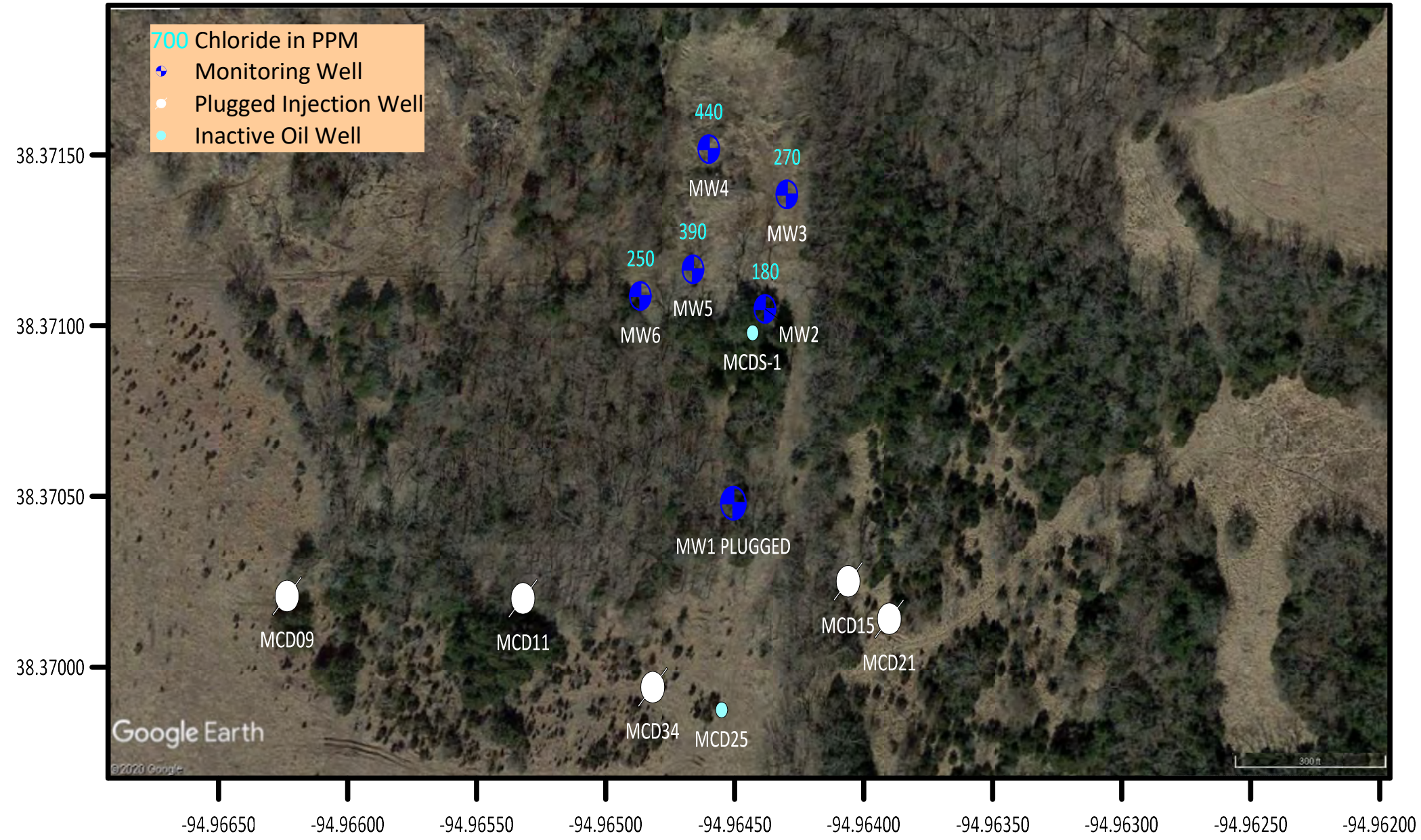


Kansas Corporation Commission

McDonald East Remediation Site

NW 27-T19S-R22E Linn County, Kansas
2025 Groundwater Chloride Levels - District #3 Sampled 3/13/2025
Map Drawn on 9/30/2025 by L. Short
Project 970070-00

N



Kansas Corporation Commission

McDonald East Remediation Site

NW 27-T19S-R22E Linn County, Kansas
2025 Groundwater Chloride Levels - District #3 Sampled 9/11/2025
Map Drawn on 9/30/2025 by L. Short
Project 970070-00

N

Project: ***Galva City Area Contamination Site, McPherson County, District 2***

Site Location: The Galva City Site is in Sections 15 and 22 of Township 19 South, Range 2 West, a half-mile north and a quarter-mile east of Galva in McPherson County.

Impact/Immediacy: This site is at a very high level of immediacy. Groundwater impact and the potential for contamination of domestic and public water supplies at Galva City are very high.

Site Description: The site is a rural area with a topography of gently sloping fields with small drainage streams located east and west, with the overall flow to the southwest. This site is in the Ritz-Canton oil field, which used brine pits for disposing of brine from oil production. The depth of the groundwater is $^{+/-}$17 feet. There are buried paleo-channels where the bedrock is encountered at approximately 60-100 feet. These channels usually hold the highest chloride levels near the top of the Wellington Shale. KCC has operated a recovery system at this site since 2005. In August 2014, KCC completed the Phase III package, including installing five monitoring wells and one recovery well. Data obtained from these additional wells shows a significant chloride source to the east/northeast of the remedial site in section 14. There are multiple suspected pits in that section, including the distillation refinery's last location and associated pits that were operational in the forties. Chlorides follow along the paleo-valley slope (top of the Wellington Formation) located northeast of Galva and pool in low areas. There is a paleo high directly below the city and its PWS wells. The city's high bedrock location suggests that the public water supply remains viable only because brine water is settling in the aquifer's lower zones. Chlorides from multiple sources are still incoming from section 14. Bedrock orientation and chloride levels in MW-114 support this idea.

Unusual Problems: The disposal well cannot take the necessary fluid to run all four recovery wells simultaneously. High chloride water deteriorates metal pumps, fittings, and other system equipment. Recovery pumps have short life spans, and the local groundwater has high iron levels that clog up lines and equipment. The site's age requires constant inspection and proactive and reactive repairs/modifications to keep it online.

Status of Project: The high chlorides across the site decreased in 2025 in many monitoring wells. Unlike last year, the remedial system was run during much of 2025, but due to the disposal wells' limitations, the recovery amount was less than the historical rates. The most significant decreases were within the traditional heart of the plume surrounding the recovery wells. As the system was running this year, it made sense that the active recovery system assisted in reducing chlorides in these wells, reversing the trend of last year. The increase at MW-314 indicates that chlorides continue to come in from the east, most likely from section 14, as MW-114 also showed an increase. MW-802 had a significant increase of 750 mg/L, KCC will be monitoring this well in the coming year. The region was experiencing an extreme drought, but the local area experienced a massive amount of precipitation in the summer of 2025. The pump in recovery well 3 failed this year, so recovery wells 1 and 2 were utilized for an extended period until the KCC replaced the pump. During the pump replacement, KCC had the contractor install a shroud at the bottom of the pump string. This was done to attempt to limit the coning of fresher water from above into the pump and remove more chlorides that are resting at the bottom of the well. During 2025, RW-1 had a chloride level ranging between 8,000-10,000 mg/L, RW-2 between 6,000-8,000 mg/L, and RW-3 ranged 18,000-20,250 mg/L. All recovery wells exhibit chloride recovery decrease the longer they run due to coning of the aquifer. This lowering with time shows that the chloride is stratified, and conning occurs, allowing fresher fluids to enter the pump.

KCC Galva remedial system meter readings show that the system had recovered approximately 15,388,800 gallons (366,400 bbls) of brine-impacted water as of October 17, 2025. Most of this recovery came from RW-3. RW-3 is considered the most critical recovery well by the KCC as it lies the farthest upgradient to the city of Galva and historically has the highest chlorides. RW-3 is the first well that intercepts the chlorides coming in from the northeast. The KCC disposal well, though accepting fluids, is doing so at a much lower rate than it historically was able to. KCC currently must utilize an acid program to maintain the current daily disposal amounts averaging 1267.82 barrels per day. Acid is siphoned into the well string quarterly. KCC is actively researching alternative disposal prospects for future system use, as the current one may go down again.

KCC installed five monitoring wells in the City of Galva in June/July 2024. These wells are localized upgradient from the Galva PWS #5. All the newer monitoring wells rose in 2025 ranging from 3mg/L to 90 mg/L. KCC plans to sample these wells on a biannual schedule from this point on.

Level of Remediation Sought:

Ideal: 250 mg/l chlorides

Target: 500 mg/l chlorides

Recommendations for Future Work: If the issues with the disposal well occur again, KCC plans to move forward with the alternatives it is actively researching. KCC will continue to work with the City of Galva, KDHE, and other entities regarding the many water issues. KCC has worked with geochemical consultants for the last two years to test recovery fluids with new products that inhibit iron scale formation in the system. Putting together a chemical treatment plan may help maintain the site's remedial system. KCC now has the disposal well on a quarterly acid treatment in attempt to maximize the amount of fluid this aging well can take. KCC may hand sample the newer monitoring wells multiple times a year as they are there to show potential chloride creep into the PWS of the City of Galva.

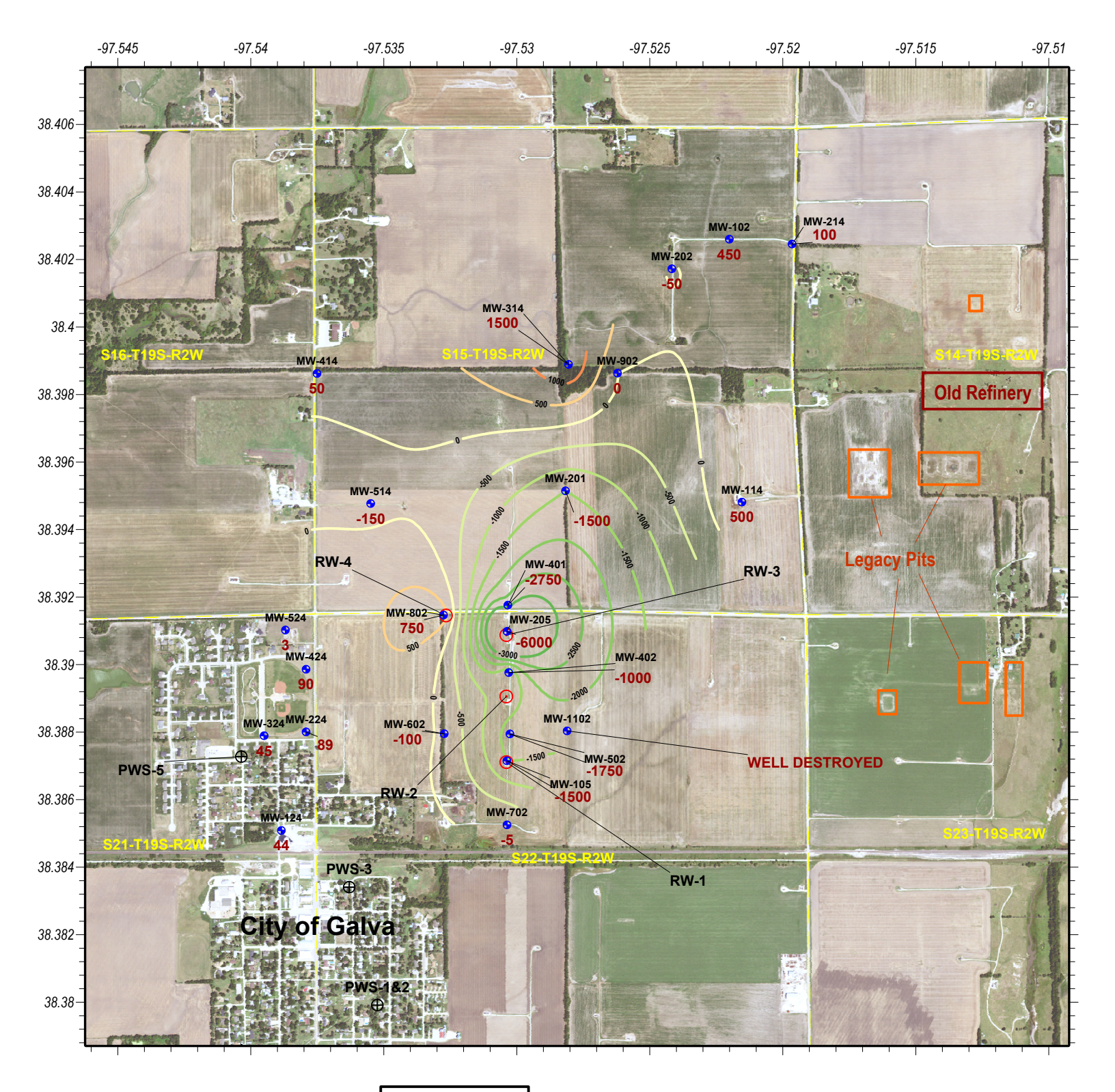
Estimated Total Costs: Regular annual costs are approximately $4,000-$6,000. Future expenses include fieldwork repairs on the remediation system, inspections, groundwater sampling, research, and report writing. Due to the upkeep of this essential remedial system, proactive maintenance and unknown repairs may add sizable costs. Finally, drilling a new disposal well would cost upwards of $350,000, but the associated cost of tanks, plumbing, and other expenditures would be well over $500,000.

Control No.	Staff Hours/Expenditures	Fund Expenditures FY 2025/26	Fund Expenditures Total
980033-001	163 Hrs. / $5,628.20	$17,106.24	$544,643.29

Current Contaminate Level: 25 mg/L (MW 702) to 29,250 mg/L (MW 401) chlorides for 2025

Status:

☐ 1. Site Assessment	☐ 2. Short Term Monitoring	☒ 3. Investigation
☒ 4. Long Term Monitoring	☐ 5. Remediation Plan	☐ 6. Installation
☒ 7. Remediation	☐ 8. Post Rem. Monitoring	☐ 9. Resolved



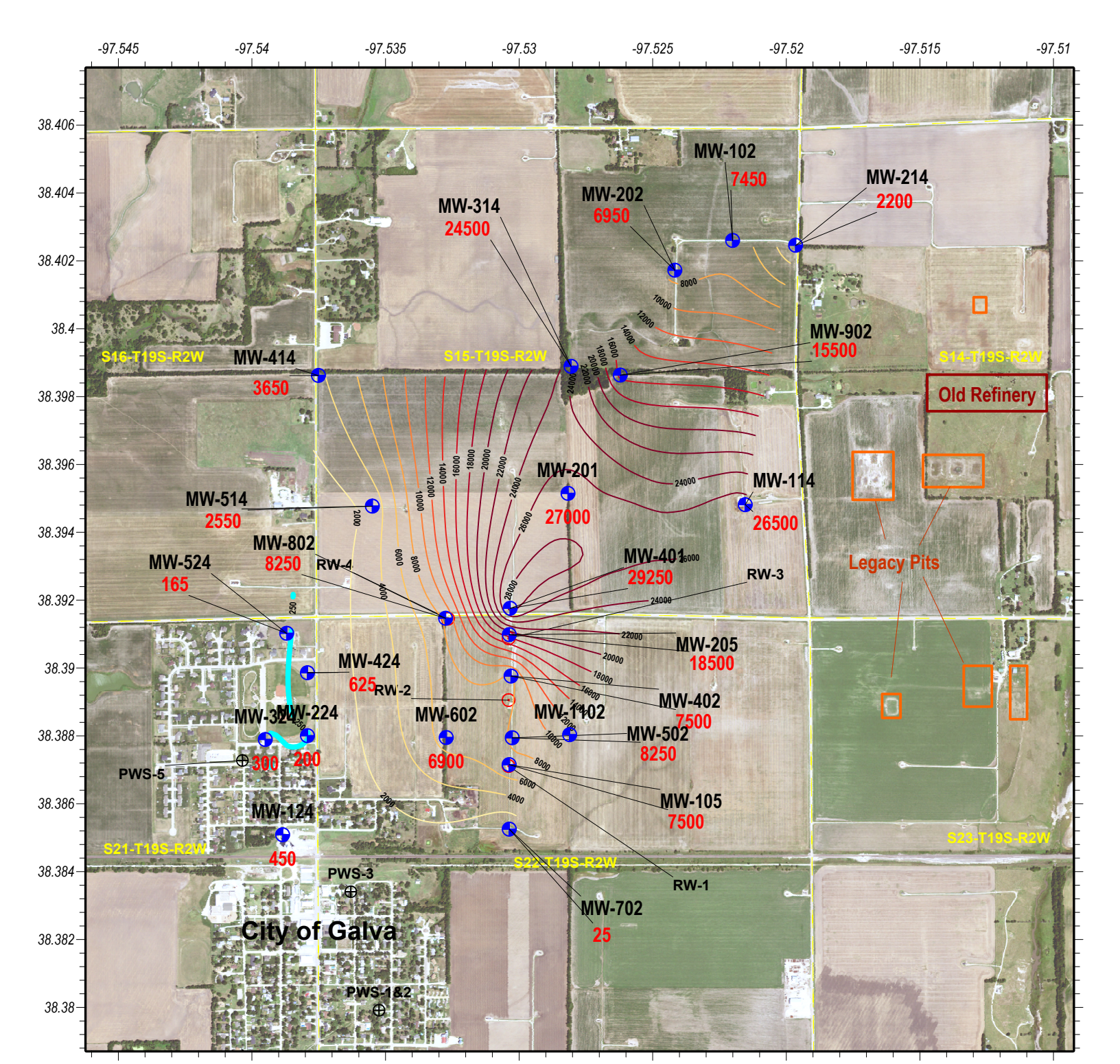
Galva City Brine Remediation Site

Sections 15, 16, 21,and 22 of T19S and R2W, McPherson County, Kansas

Chloride Change from 2024 to 2025

KCC Control #980033-01 - KCC District #2 Field Office

Wells sampled July 15 -18, 2025 - Map Drawn on 9/4/2025 by D.Bollenback



Key

MW-101 — Well No.
2500 — Chloride Level
- Monitoring Well
- Recovery Well
- Public Water Well

Contour Interval = 2,000 mg/L
Added 250 mg/L

Chloride Level (mg/L)

28000
26000
24000
22000
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
250

N
W
E
S

Scale (ft)
0 1320 2640

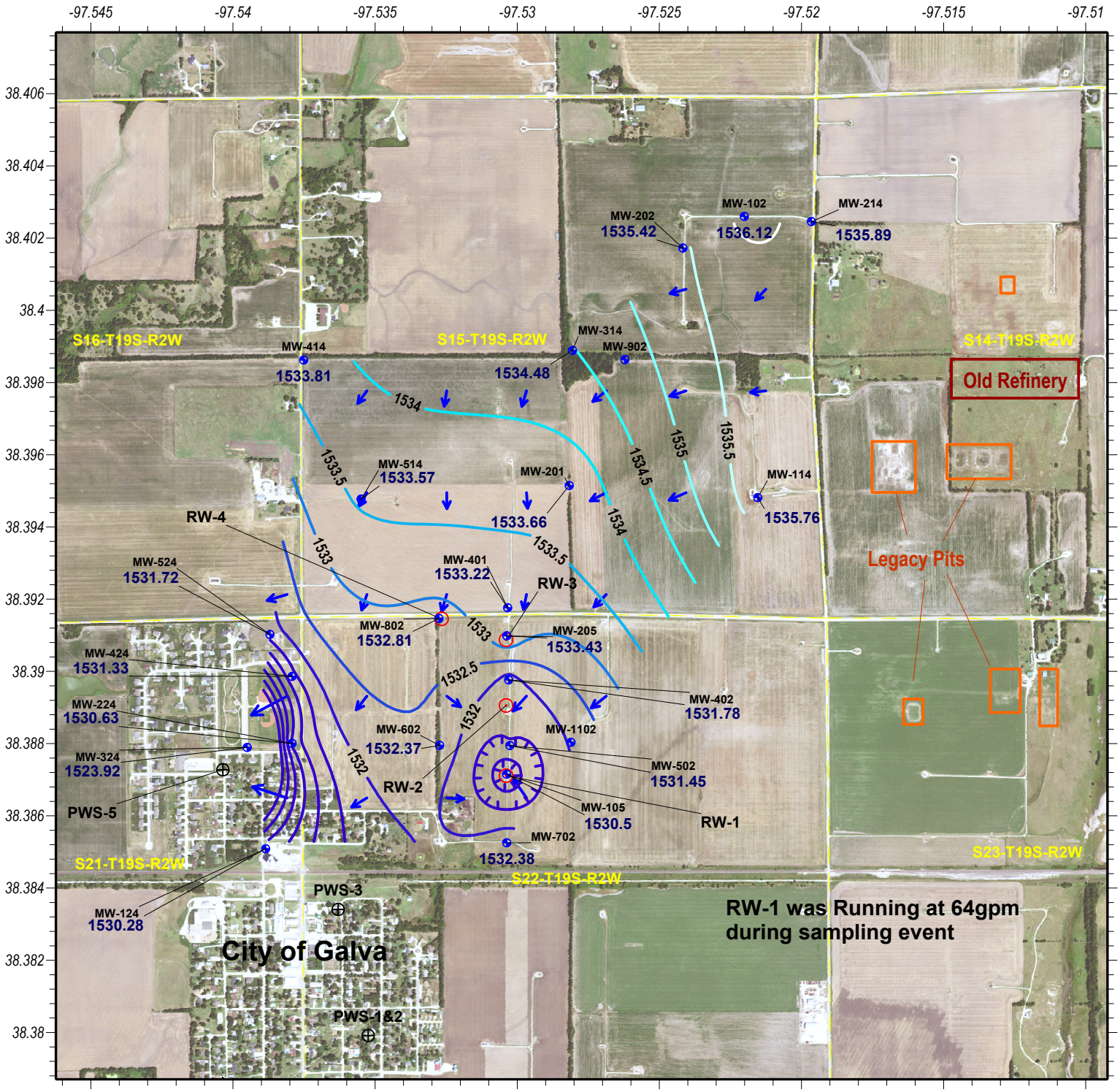
Kansas Corporation Commission

Galva City Brine Remediation Site

Sections 15, 16, 21,and 22 of T19S and R2W, McPherson County, Kansas

2025 Chloride Levels

KCC Control #980033-01 - KCC District #2 Field Office
Wells sampled July 15-18, 2025 - Map Drawn on 9/5/2025 by D.Bollenback



Key

MW-101 Well No.

- Monitoring Well

1532 Water Level Elevation

- Public Water Well

Contour Interval = 0.5 ft

Groundwater Elevation (ft)

1536
1535
1534
1533
1532
1531
1530
1529

N
W
E
S

Scale (ft)

0 1320 2640

Kansas Corporation Commission

Galva City Brine Remediation Site

Sections 15, 16, 21,and 22 of T19S and R2W, McPherson County, Kansas

Groundwater Elevations 2025

KCC Control #980033-01 - KCC District #2 Field Office

Wells Gauged Jult 15th-18th, 2025 - Map Drawn on 9/5/2025 by D.Bollenback

Project: ***Knackstedt Site, McPherson County, District 2***

Site Location: The site is eight miles west and four miles north of Inman, Kansas. The legal location is N/2 N/2 NW NW of Section 30, Township 20 South, and Range 5 West, in McPherson County.

Impact/Immediacy: Rerouting the local roadway affected by this site has mitigated public safety issues. The site ranked at a moderate level of immediacy.

Site Description: The site involves the unplugged Knackstedt #5 SWD, operated by Fell Oil & Gas Company. The well failed an MIT on 12/3/1983. Upon investigating the loss of the static water level with a wireline video, it was discovered that any casing and borehole walls were absent between 318 and 478 feet in depth. Casing failure led to the dissolution of the Hutchinson Salt Section and the development of an air-filled void around the well. The site is located immediately southeast of the intersection of Plum Street and Saxman Road. Land use is agricultural, with oil and gas activities in the area.

Unusual Problems: The cavity's air-filled nature makes designing an acceptable plugging project improbable. In 1993, the KCC drilled an exploration hole approximately 100 feet east of the Knackstedt SWD and did not encounter a large void, but various zones or fingers of dissolution in the salt section. The top of the Hutchinson Salt was encountered at 427' from the surface and drilled to 500 feet before being plugged. An attempt was made to fill the air-filled void with sediment, but it was abandoned after little success. The KGS completed a seismic survey in 1988 that provided a rough estimate of the void. A house is near the site to the east, but past ground-level elevation surveys indicate that surface elevations have been stable.

Status of the Project: To re-establish good elevation control points on the site and get a current void profile, the KCC worked with the Kansas Geological Survey (KGS) to perform a new time-lapse, high-resolution seismic reflection image of the void in 2019 and 2021. On September 25th and 26th of 2019, the KGS shot an initial Phase I 2-D east/west line approximately 3,650 feet long across the site. This line was long enough to gather native subsurface conditions away from the void and provide control for future north/south seismic lines. On April 5, 2021, KGS shot three north/south high-resolution seismic lines for Phase II of the project. Three lines were laid with the middle main line running approximately 1,600' in length, two adjacent parallel lines spaced about 240' east and west of the main line, and 800' in size.

Rick Miller, a Senior Scientist in Geophysics with the KGS, has indicated that the resolution is quite good and is working to integrate all the data to represent the salt section adequately. The hydraulic connectivity between this feature and the solution voids directly around the disposal well provides the outlet/drainage for any fluids, resulting in air-filled voids. Mr. Miller has indicated that the central void is directly around the old Knackstedt SWD, not a vast void extending away from the well. Based on the vertical extent of the void and the amount of sediment that remains within the original Hutchinson Salt interval, where solutions are evident on seismic sections, Mr. Miller says the cavity does not appear to have sufficient volume to accommodate the collapse of the entire column of overburden. KGS has potential plans to perform another seismic survey for additional data to interpret the site subsurface. KGS is currently reprocessing much of the older data to glean more information regarding possible dissolution in the immediate area.

On March 14, 2024, KCC collaborated with the KGS to perform a magnetic survey using a magnetometer attached to a drone. KCC had located multiple wells south of the Knackstedt #5 SWD well before the event. KCC used historical air photos and a handheld magnetometer. KGS requested that the locations of any KCC be unknown before running the survey. Once the survey data was captured, KGS took the data back for processing. KGS developed a map of the survey area showing four anomalies with excellent definitions. KCC confirmed that those anomalies match the KCC field spotted locations of four wells in the survey area. KGS hopes to assist the KCC similarly when an appropriate project presents itself.

On June 18th, 2025, KCC and KGS hosted the Kansas Legislative tour onsite. KGS flew their drones with magnetometers over the site which was witnessed by multiple agency heads and legislators.

Level of Remediation Sought: The Knackstedt Site will be monitored and surveyed in the long term.

Recommendations for Future Work: Install additional control points/benchmarks once the seismic lines have been processed, have them initially surveyed by a licensed surveyor, and perform a quarterly site survey.

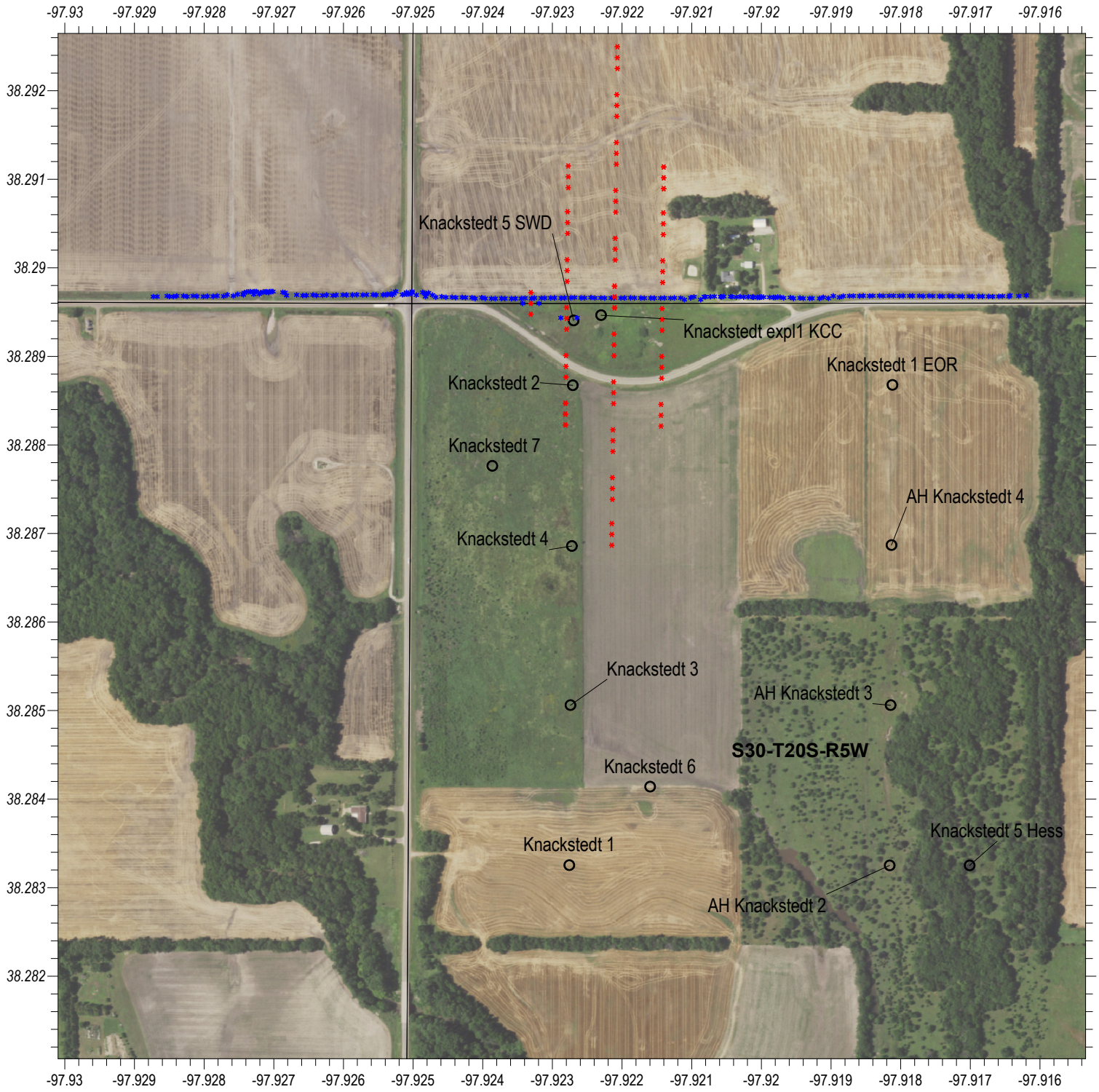
Estimated Total Costs: The KCC paid the KGS a fixed rate of $14,803.00 for acquiring the new time-lapse, high-resolution seismic reflection image of the void in 2019. Once new control points are installed, it is estimated that it would cost $1,500 to have them surveyed by a licensed surveyor. Staff time would involve the installation of the new control points and future surveying.

Control No.	Staff Hours/Expenditures	Fund Expenditures FY 2025/26	Fund Expenditures Total
970060-00	21.5 Hrs. / $743.23		$29,759.39

Current Contaminate Level: Unstable well cavity

Status:

☐ 1. Site Assessment	☐ 2. Short Term Monitoring	☐ 3. Investigation
☒ 4. Long-Term Monitoring	☐ 5. Remediation Plan	☐ 6. Installation
☐ 7. Remediation	☐ 8. Post Rem. Monitoring	☐ 9. Resolved



Key

- -Historical Oil and Gas Well
- -KGS 2019 Seismic Lines
- -KGS 2021 Seismic Lines

N
W
E
S

Scale (ft)
0 400 800

Kansas Corporation Commission

Kansas Corporation Commission

Section 30 of T20S and R5W, Mcpherson County, Kansas

KCC Seismic Lines and Historical Wells

KCC District #2 Field Office - Map Drawn on 10/15/2025

Project: ***McPherson Landfill-Johnson Oil Field Contamination Site, McPherson County, District 2***

Site Location: The McPherson Landfill is located in Section 34, Township 19 South, Range 3 West, in McPherson County, approximately .75 miles southeast of the city of McPherson. The affected areas include Sections 33 and 34, Township 19 South, Range 3 West, and Sections 3, 4, and 5, Township 20 South, Range 3 West.

Impact/Immediacy: The contamination has impacted industrial water supply wells for the CHS Refinery as well as domestic rural water wells. This site has a moderate immediacy level.

Site Description: The site is located in rural McPherson County near the old landfill and the CHS refinery. The area of contamination lies on the west side of the Johnson Oil Field, which is one probable source of the high salinity in the ground water.

Unusual Problems: None.

Status of Project: Since 2003, CHS has annually provided a report on their East Refinery Groundwater Quality Improvement Project, and the Groundwater Monitoring Plan. A full report from the consulting company, Trihydro Corporation, is on file with the KCC. The goals for this project include mitigating chloride impacted oil field brine water migrating from the Johnson Oil Field east of the refinery and preventing lateral movement of the identified hydrocarbon plume beneath the refinery toward the chloride remediation system. The remediation system consists of 12 recovery wells, RW-7 through RW-18, which are all screened in the lower portion of the Equus Beds aquifer. Due to the systems age and CHS's ability to remove chloride at their on-site reverse osmosis treatment plant, CHS has shut down the recovery system moving forward. The system will, however, remain in place and operational if needed. Reverse osmosis reject water is injected into the Arbuckle Aquifer through a Class I nonhazardous injection well. Overall, the 2024 Trihydro report stated that the recovery project was meeting its goals.

The August 2025 sampling of 13 deep screened CHS monitoring wells showed varied changes in chloride values. The two areas that continue to exhibit very elevated chlorides are around EB 402C (5,670 mg/L) and MW 118D (2,610 mg/L). EB 402C decreased by 130 mg/l to 5,670 mg/l, but these decreases in chloride values have been seen throughout the district in 2025 due to above average rainfall. The highest impact to groundwater is still around EB 402C that sits off in Section 3, southeast of the refinery, and appears to be trapped chlorides along the bedrock, as those values have always fluctuated between 4,000 to 5,000+ mg/L since 2005. KCC collected water samples from the KDHE monitoring wells that are located at the old landfill, which is where the site first originated.

Level of Remediation Sought:

Ideal: 250 ppm chlorides
Target: 500 ppm chlorides

Recommendations for Future Work: Collect data on an annual basis from CHS, GMD2, and the old landfill.

Estimated Total Costs: KCC provides funding to GMD2 for sampling surrounding EB monitoring wells.

Control No.	Staff Hours/Expenditures	Fund Expenditures FY 2025/26	Total
980034-001	12 Hrs. / $499.53	$533.40	$26,779.60

Current Contaminate Level: 61 mg/L (MW-2) to 5,670 mg/L (EB 402C) in 2025
Note: No RW were sampled during the 2025 sampling event.

Status:

☐ 1. Site Assessment	☐ 2. Short Term Monitoring	☐ 3. Investigation
☒ 4. Long Term Monitoring	☐ 5. Remediation Plan	☐ 6. Installation
☒ 7. Remediation (CHS)	☐ 8. Post Rem. Monitoring	☐ 9. Resolved

R 3 W

T 19 S

T 20 S

East Kansas Avenue
West Kansas Avenue
Old US Highway 81
13th Avenue
South Main Street
14th Avenue
County Road 305
County Road 2043
Lakeside Park
Athletic Park
Wall Bicentennial Park
CHS Refinery
Old MP Landfill
Johnson Oil Field

32 33 34 35
5 4 3 2
8 9 10 11

308 EB 407C
EB 400C
EB 418C
350
226
112D
415
RW 14
RW 13
RW 12
RW 11
RW 17
RW 15
RW 16
RW 10
RW 9
RW 8
RW 7
120D
900
9 10 5 6D&6S 8
1D&1S
2D&2S
4
7S&7D
838
113D
589
592
309
986
EB 401C
121D
MW 125
Well 8
MW 126
Well 9
ZLGD
110D
114D
118D
2610
1510
122D
452
409
115D
1930
123D
339
EB 405C
1280
755
124D
5670
EB 402C
81
EB 413C
2140
EB 406C
65
61
MW#1 aka EB 417C
MW#2 aka EB 410C
167
EB 403C

250 500 750 1000 1250 1500 1750 2000 2250 2500 2750 3000 3250 3500 3750 4000

LEGEND

- *Monitoring Well*
- *NCRA Recovery Well*
- *NCRA Water Supply Well*

1880 118D *Numbers in RED are Chloride Values*
Numbers in BLACK are Monitoring Well Numbers

Contour Interval = 250 mg/l

KANSAS CORPORATION COMMISSION

McPherson Landfill-Johnson Oil Field

2025 DEEP CHLORIDE MAP

T19S & T20S-R3W, McPheron County, KS

Dist. 2 Control No. 980034-01 10-13-2025 J. Klock

N W E S

Project: ***Nikkel-Epps, McPherson County, District 2***

Site Location: The Nikkel-Epps contamination site is in the NE/4 of Section 18, Township 20 South, Range 1 West, in McPherson County.

Impact/Immediacy: Medium-high immediacy level. Chlorides affect a shallow groundwater aquifer with multiple residences within a half-mile radius; some use the aquifer as their sole water source. There is crop irrigation in the area to the side and downgradient of the plume.

Site Description: The Nikkel-Epps site had known brine water contamination since 1953, when a local homestead complained that the domestic well had become unusable due to saltwater intrusion. KCC first investigated the issue in 2007 when an irrigation well battery was drilled in the northeast corner of section 18 and killed the soybean crop planted that year. KCC's research into past oil and gas practices in the area revealed numerous communications between landowners and state agencies regarding the pits southwest of the center of section 7. A paper trail has documented pond fluid testing for chlorides at 32,000 mg/L by state agency personnel on occasion. However, most agency interaction occurred after the pond policy was changed, making deep disposal necessary to curb brine intrusion into local aquifers.

The aquifer resides in the McPherson Formation, consisting of two to three sand units separated by clay layers. At the base of the aquifer lies the Wellington Shale. The aquifer contains several possible aquitards, such as impermeable clays separating the sands. It is unknown if these clays are continuous throughout the area. Due to the depth of the saltwater found, KCC believes that potential pathway(s) down to the Wellington Formation exist. The land surface is flat, irrigated farmland. Chlorides seem to settle on top of the Wellington Shale contact, which is the bedrock in the area. The contact with the McPherson sediments is an erosional disconformity. The erosion of the Wellington Formation has left high-relief channels and bumps at the bottom of the local shallow aquifer. Evidence suggests that the main brine plume has a source(s) in section 7, upgradient of the site. There are known legacy evaporation pit locations in the north.

Unusual Problems: Like many other chloride problems in the area, the chlorides can be hit and miss and contained in 'hot spots' down-gradient of old evaporation pits and settling in deeper pockets within the aquifer. Farming practices have destroyed half of the monitoring wells installed by the KCC.

Status of Project: On August 8, 2025, MW-2, MW-3, and MW-5 groundwater monitoring wells were gauged and sampled for chloride levels. MW-2 has historically had the highest chloride levels, which have increased by 200 mg/L since 2024, canceling out the 100 mg/L decrease the previous year. MW-3 showed a chloride decrease of 275mg/L, while MW-5 was nearly unchanged from 2024. Static groundwater levels have rebounded due to the heavy precipitation that occurred over the summer of 2025. KCC has approached GMD#2 about plugging the four irrigation wells drilled in 2007, as they remain in the agricultural field with poor surface control. KCC also discovered no plugging report for the closest oil and gas well, the #1 Boesker, but there is no supporting evidence at the surface of issues regarding this well. KCC developed a plan to install new monitoring wells to replace broken wells and help delineate the local plume if deemed in the future. Wellington Shale mapping has suggested that bedrock lows in the northeast and south of the Nikkel-Epps possibly allow chloride migration to the south.

Level of Remediation Sought:

Ideal: <250 ppm
Target: 500 ppm

Recommendations for Future Work: KCC recommends additional and replacement monitoring wells at the Nikkel-Epps Site. Without the northern monitoring wells, the site is currently complex to interpret regarding chloride migration. Due to local domestic and irrigation wells, the Nikkel-Epps Site is on the

priority list at a medium-high level. This site is now within the boundaries of the Groundwater Management District #2 in Halstead. No delineation to the north or south of the site exists. During the next two years, KCC recommends the installation of five monitoring wells. These wells would help the KCC devise a suitable remediation plan or assist the Ratslaff homestead in finding a new water source. In addition, other domestic and irrigation wells in the next section south of the site could be affected if the plume migrates. These new monitoring wells could warn those irrigators of the plume's approach. KCC could locate the #1 Boesker and perform soil borings to check for chloride contamination. With heavy crop rotation, this has not been easy to accomplish. If found, KCC could excavate the well and check the status of the plug of the early 1930s D/A well.

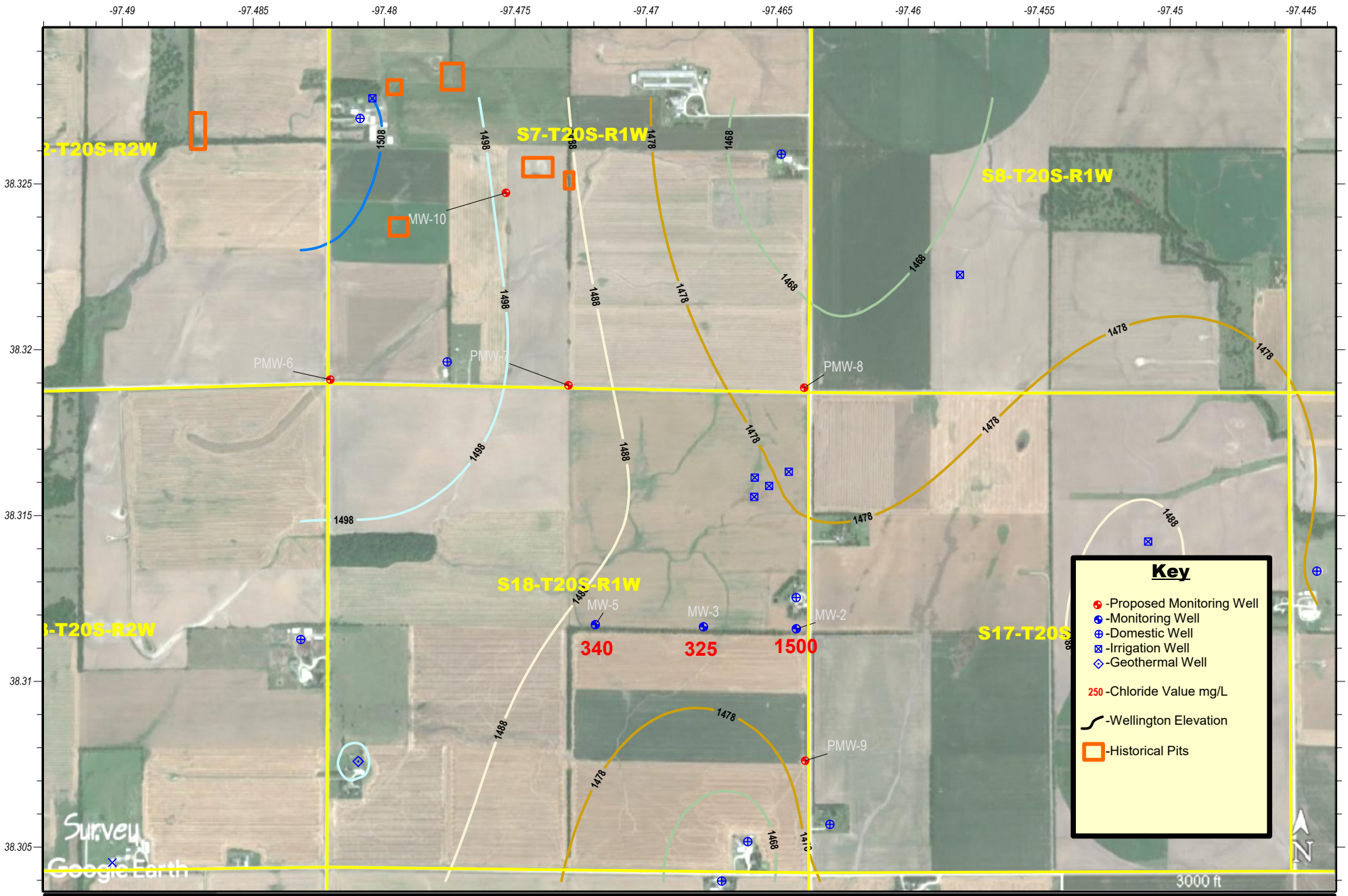
Estimated Total Costs: Future expenditures range from $50,000 to $75,000 for drilling new wells and repairing broken wells during a Phase II investigation. The Nikkel-Epps site will require KCC staff for sampling, research, and report preparation during 2026.

Control No.	Staff Hours/Expenditures	Fund Expenditures FY 2025/26	Total
20100082-001	11.5 Hrs. / $407.21		$8,318.75

Current Contaminate Level: 325 mg/L in MW-3 to 1,500 mg/L in MW-2

Status:

☐ 1. Site Assessment	☐ 2. Short Term Monitoring	☒ 3. Investigation
☒ 4. Long Term Monitoring	☐ 5. Remediation Plan	☐ 6. Installation
☐ 7. Remediation	☐ 8. Post Rem. Monitoring	☐ 9. Resolved



Kansas Corporation Commission

Nikkel-Epps Contamination Site

NE Section 18 of T20S & R1W, McPherson County, Kansas

2024 Chloride Levels and Future Monitoring Wells

District #2 - Control # 20100082-001 - Wells Sampled on 8/8/2025 - Drawn on 10/9/2025

Project*: Running Turkey Creek, McPherson County, District 2*

Site Location: The Running Turkey Creek site is in McPherson County, Kansas, between Galva and Canton, and spans multiple sections in Township 19 South and Range 2 West. The site has contaminated groundwater within the Running Turkey Creek drainage. It is estimated to be approximately eight square miles, extending from Mohawk Road south to Iron Horse Road in a strip two miles wide by four miles long. This site is within the boundaries of the Ritz-Canton Oilfield.

Impact/Immediacy: There are no public water supplies at the current site, but many domestic wells utilize the local aquifer. Historically, wells are found in areas yet affected by the plume or are completed higher in the aquifer to avoid most chlorides residing along the bedrock. Therefore, the immediacy rating is moderate to high.

Site Description: The area's topography is flat, with gently rolling hills. Most of the land is under cultivation. The groundwater generally flows in a south-to-southwest direction, with minor hydrologic anomalies. The groundwater contamination is highest near the bedrock contact. Local geology consists of fine-textured soils that exhibit hardpan clay development. These soils underlie loess deposits of the Quaternary Age, which lie on McPherson Formation sands and gravels. Depth to sands in the area ranges from as little as 5 feet to 60 feet. The Wellington Shale forms the bedrock in the area. The Wellington had been eroded before the McPherson deposition and is an erosional contact with various paleo-valleys and related structures. KCC has documented numerous historical evaporation pits via historical air photos and documents. KCC believes these pits are the source of contamination in the area.

Unusual Problems: A monitoring well matrix may have to spread considerably for site delineation. Ritz-Canton Oil Field brine contamination can have multiple sources, complicating delineation. In addition, it is unclear if the direct connection of the north and far south (South of Highway 56) wells is occurring or if they are separate plumes.

Status of the Project: This site is currently in a monitoring phase, as a remedial option is very economically expensive, and gaining access to a disposal well could be problematic. KCC sampled the monitoring wells using air-lift technology. Since last year's sampling event, most monitoring wells have been stable or have shown a drop in chloride concentration. MW-202 decreased by 1,000 mg/L chlorides, doubling last year's decrease of 500 mg/L. MW-1901 rose by 100 mg/L since the previous sampling event two years ago. MW-1801 in the far south of the site had a significant increase of 2,400 mg/L. KCC will monitor this uptick, but since this well is relatively shallow, it may be that this year's rains have pushed chloride south into it. MW-1801 has never been a stable data point as chlorides have fluctuated much in the well over the years.

This area is now within the GMD#2 boundaries, but no water-quality wells have yet been drilled by GMD #2. In addition, the known plume is not delineated north, south, or east. KCC put together a well installation package in early 2020, which comprised 10 new monitoring wells, and this project was out for bid. However, only three of the ten landowners would grant permission to install a monitoring well on their property. Therefore, the monitoring well expansion project is now on hold. KCC is investigating the use of right-of-way utility easements, or other similar locations to install monitoring wells in the future.

Level of Remediation Sought:

Ideal: 250 mg/l
Target: 500 mg/l

Recommendation for Future Works: KCC recommends the continued annual monitoring of the site, as the highest chlorides are still over 20,000 mg/L. The Running Turkey Creek Site is the right candidate for a remedial withdrawal system with high chloride values. Unfortunately, it would be a substantial economic expense for future operation and management. KCC continues re-evaluating the monitoring well installation project and is looking for alternative locations to benefit the chloride investigation. It is unclear if the downgradient plume is related or if more sources are south of the main plume. KCC is investigating the installation of additional protective equipment around current and future monitoring wells, especially near agricultural fields.

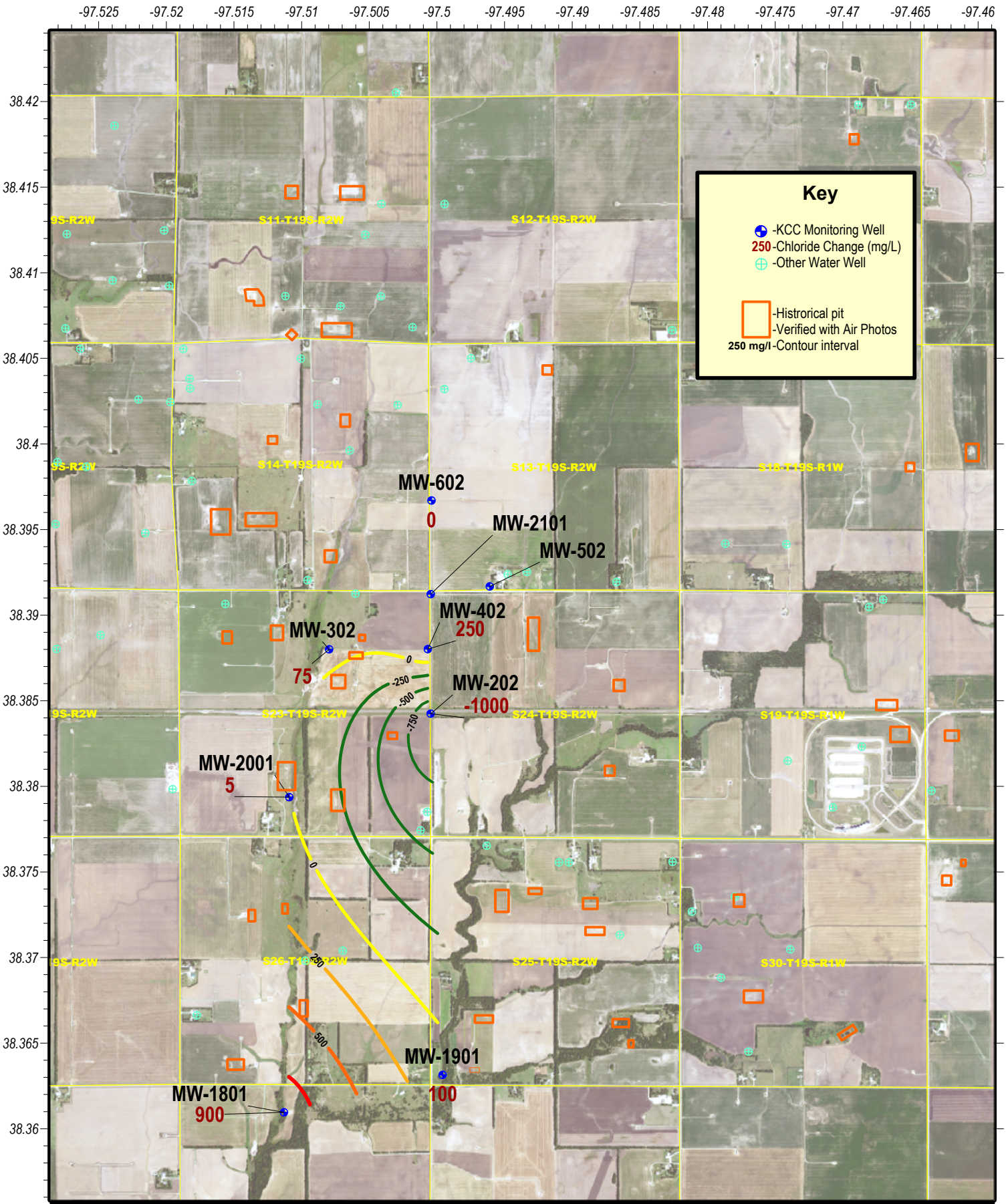
Estimated Total Cost: Annual sampling and research should be approximately $1000. Installing more monitoring wells would range from $50,000 to $75,000. The planning and construction of a remedial recovery system could cost over $750,000, depending on whether a new disposal well needs to be drilled or if a suitable workover candidate is identified.

Control No.	Staff Hours/Expenditures	Fund Expenditures FY 2025/26	Fund Expenditures Total
20010033-001	9 Hrs. / $330.08		$61,603.07

Current Contaminate Level: 35 mg/l Cl^- MW-2001 to 20,500 mg/l Cl^- MW-202 (Aquifer)

Status:

☐ 1. Site Assessment	☐ 2. Short Term Monitoring	☒ 3. Investigation
☒ 4. Long Term Monitoring	☐ 5. Remediation Plan	☐ 6. Installation
☐ 7. Remediation	☐ 8. Post Rem. Monitoring	☐ 9. Resolved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-97.52
-97.515
-97.51
-97.505
-97.5
-97.495
-97.49
-97.485
-97.48
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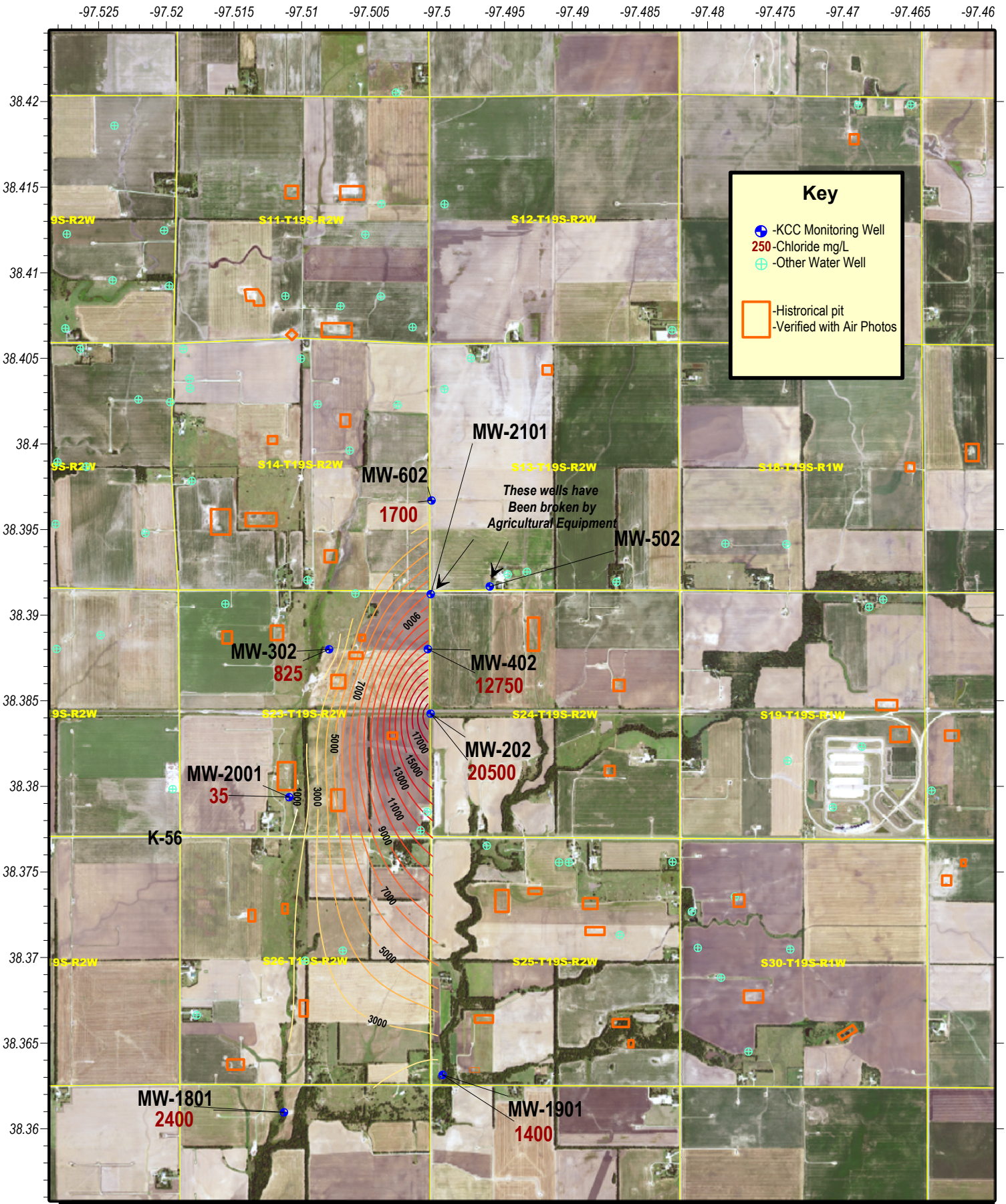
-97.47
-97.465
-97.46
38.42
38.415
38.41
38.405
38.4
38.395
38.39
38.385
38.38
38.375
38.37
38.365
38.36
Key
-KCC Monitoring Well
250 -Chloride Change (mg/L)
-Other Water Well
-Historical pit
-Verified with Air Photos
250 mg/l -Contour interval
S11-T19S-R2W
S12-T19S-R2W
S14-T19S-R2W
S13-T19S-R2W
S18-T19S-R1W
S23-T19S-R2W
S24-T19S-R2W
S19-T19S-R1W
S26-T19S-R2W
S25-T19S-R2W
S30-T19S-R1W
MW-602
0
MW-2101
MW-502
MW-402
250
MW-302
75
MW-202
-1000
MW-2001
5
MW-1901
100
MW-1801
900
0
-250
-500
-750
250
500
Kansas
Corporation Commission
N
W
E
S
Running Turkey Creek Contamination and Monitoring Site - KCC Control #20010033-001
Multiple sections in Township 19 South and Range 2 West, McPherson County, Kansas
Chloride Change from 2024 to 2025
District #2 - Sampled 7/10/2025 - Map Drawn on 9/9/2025 by D.Bollenback



Kansas Corporation Commission

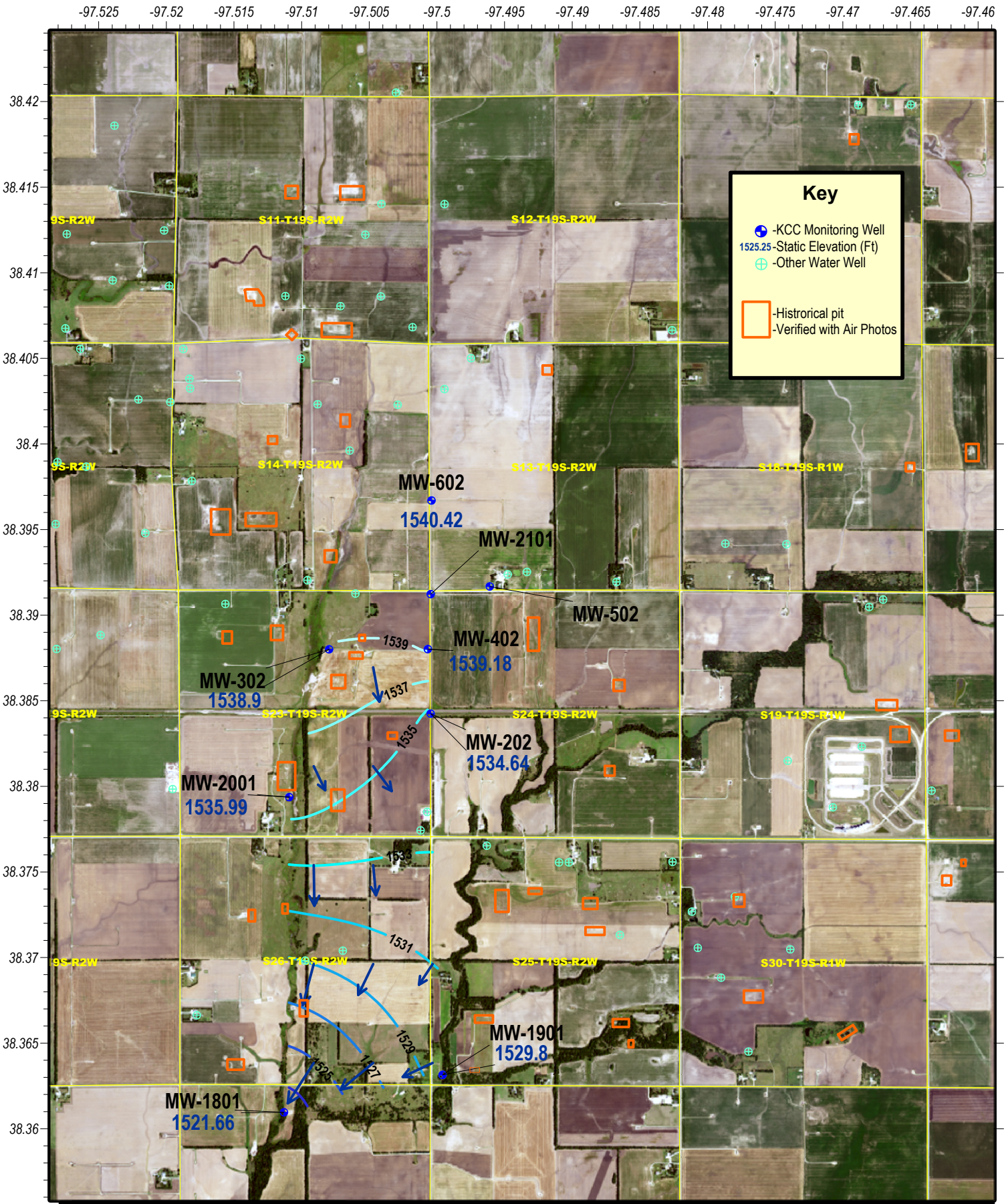
N
W E
S

Running Turkey Creek Contamination and Monitoring Site - KCC Control #20010033-001

Multiple sections in Township 19 South and Range 2 West, McPherson County, Kansas

2025 Chloride Levels

District #2 - Sampled 7/10/2025 - Map Drawn on 9/9/2025 by D.Bollenback



Running Turkey Creek Contamination and Monitoring Site - KCC Control #20010033-001

Multiple sections in Township 19 South and Range 2 West, McPherson County, Kansas

Local Groundwater Elevation Map

District #2 -Gauged 7/10/2025 - Map Drawn on 9/9/2025 by D.Bollenback

Project: ***Selzer-Bitikofer Contamination Site, McPherson County, District 2***

Site Location: The Selzer-Bitikofer Site is two miles east and two miles south of Canton, McPherson County, Kansas, centered approximately at the corner of Iron Horse Road and 29th Avenue, in Sections 35 and 36, Township 19 South, Range 1 West, and Sections 1 and 2, Township 20 South, Range 1 West. The Selzer-Bitikofer resides in agricultural fields, pastures, and residences.

Impact/Immediacy: The site affects West Emma Creek and local groundwater. KCC set the immediacy level of the site as moderate.

Site Description: Geologically, the site is located on the far eastern edge of the Lower Arkansas River basin and is characterized by fine-textured soil with a silty clay loam surface and a healthy clay pan development. Sediments at the site consist mainly of unconsolidated Pleistocene deposits of the McPherson Formation (KGS Bulletin 79). The immediate area is topographically flat, with slopes ranging from 0 to 3 percent. Based on the site evaluation, the underlying material to a depth of approximately 35 feet consists primarily of stiff clay or sandy clay, overlying fine to coarse sands of varying thickness. The sand member underlies an impermeable dense clay layer consistent throughout the site. Bedrock consists of the Kiowa Shale Formation and lies approximately 50-70 feet below the ground surface (KGS Bulletin 79). There are no documented encounters with bedrock during site activities for verification.

The groundwater flows within the perched aquifer to the south and southwest before turning west, approaching West Emma Creek. The principal water-bearing formation in the subject site area is thin, unconsolidated sand between clay layers. This sand varies from fine to coarse-grained and pinches off in some locations. Based on information from the Kansas Rural Water Association, the subject site area has access to the Marion Rural Water District (RWD) #4. However, not all farms have connected water services, including the Bitikofer Farm. Based on information from the KGS WWC5 Database, no public water supply (PWS) wells are within one mile of the subject site. There are three domestic wells (Bitikofer, Selzer, and Huebert) within a ¼ mile from the subject site, but there could be unregistered and other water wells in the area.

KCC investigations have shown that the southern contamination may be from a legacy evaporation pit east of the Klaassen homestead. Geoprobe borings indicate the pit, including the drainage leaving the pit location to West Emma Creek, as the source. In addition, other chloride plumes to the north of the site need to be investigated. Other possible sources include improperly plugged wells, legacy evaporation and workover pits, and historical spills.

Unusual Problems: An aggressive withdrawal system could dry the local water wells and West Emma Creek. Currently, there are no monitoring wells capable of delineating the multiple plumes. MW-3 and MW-4 are broken below the ground surface and are no longer viable monitoring wells.

Status of Project: On October 3rd, 2025, five groundwater monitoring wells (MW-1, MW-5, MW-6, MW-7, and Klaassen East) and the Bitikofer House well were sampled by the KCC field staff. The Klaassen West Well remains damaged by agricultural equipment, but has been secured by KCC. KCC gauged the water level this year and found the groundwater levels to be much higher due to the significant precipitation in the region during the summer of 2025. All Selzer Site monitoring wells were analyzed to be above 650 mg/L chlorides, ranging from 650 to 4,000 mg/L. The farthest eastern well, Klaassen East, decreased in chlorides by 200 mg/L, and MW-6 decreased by 450 mg/L over the last year. Due to the crops and lack of truck access, Klaassen East was sampled using a hand bailer instead of a submersible pump. MW-7, located across the creek from the main monitoring wells and the main plume, was sampled this year and measured 2,300 mg/L. This is within the range of historical data. The Emma Creek had water and was sampled at two locations. The northern location near MW-7 had much lower chlorides at 700 mg/L, while a sample taken at the bridge along the southern section road tested at 270 mg/L. West Emma Creek was very full due to the heavy rains, which is most likely the reason for the lower values from 2024.

The Bitikofer House water well tested at 140 mg/L chlorides in 2023 and 245 mg/L in 2024. This year, the level increased by 130 mg/L and reached 375 mg/L. Though higher, historical data indicate chlorides as high as 600 mg/L. KCC sampled from a livestock tank this year, but next year the plan is to run the house well for an extended period to obtain a better representative sample of the well. The spring in the Bitikofter pasture was full and tested to be 435 mg/L. This spring resides in the drainage that traverses the site's northern part and contains many healthy turtles, frogs, and other biota.

Level of Remediation Sought:

Ideal: 250 mg/l Chloride
Target: 500 to 750 mg/l Chloride

Recommendations for Future Work: Four monitoring wells are no longer usable at the Selzer site. Therefore, KCC has started a written scope of work to install multiple monitoring wells and investigatory borings. With elevated chlorides in most wells surrounding the Bitikofer house well, KCC recommends installing new monitoring wells in the future. KCC recommends the installation of these new monitoring wells to the north and east of the current well matrix. Conducting a deep soil boring down to the Kiowa Shale would be beneficial for increasing our knowledge of the local geology. Some historical oil and gas wells in section 36, north of the site, could be uncovered and investigated for plug integrity.

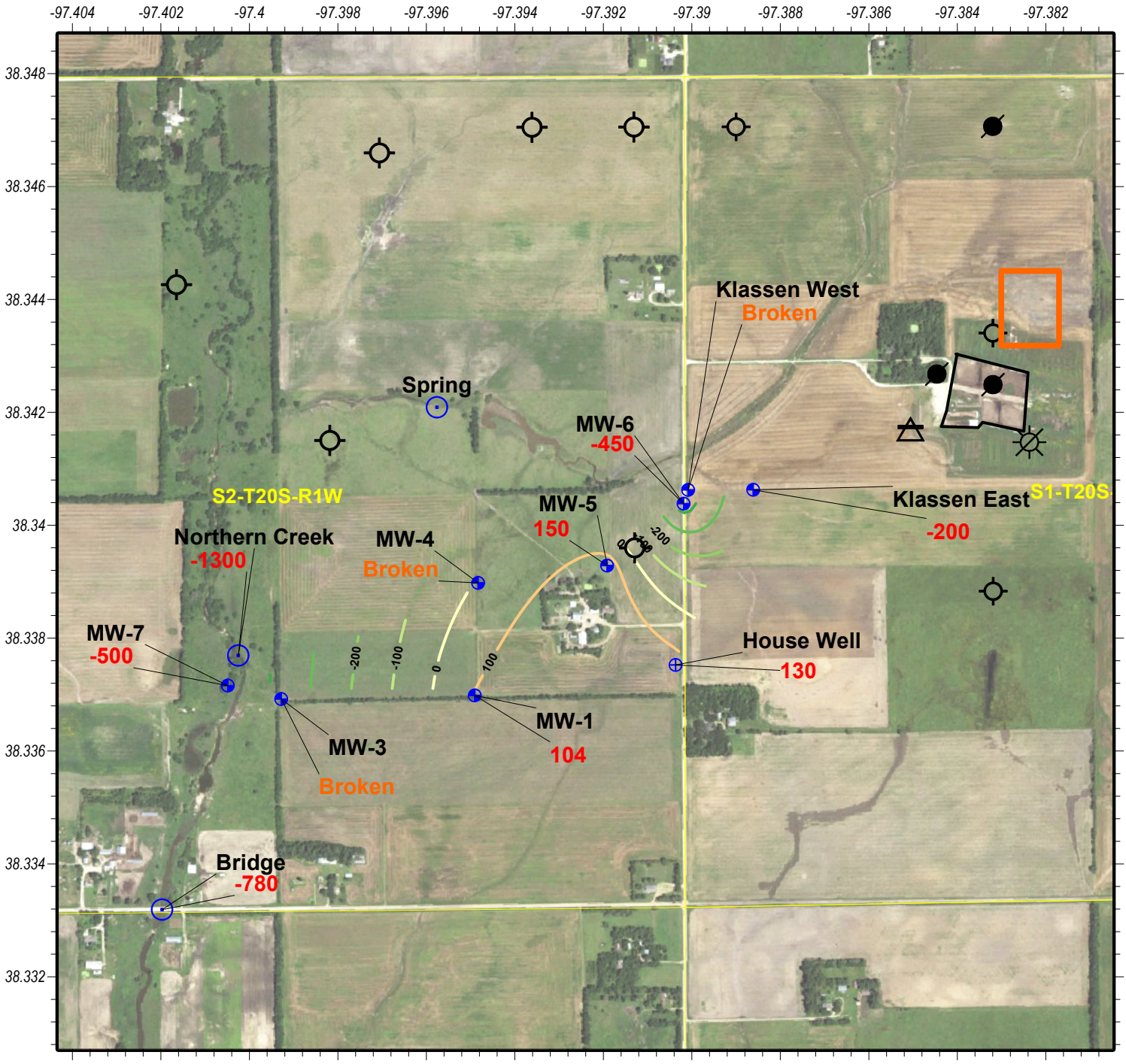
Estimated Total Cost: Moving forward with additional monitoring, well installation could cost around $50,000-$100,000, but this depends on the number of new wells and the method of drilling. Continued monitoring would cost between $500 and $ 1000. Plugging old monitoring wells would cost $1000 for grout, equipment, and staff time.

Control No.	Staff Hours/Expenditures	Fund Expenditures FY 2025/26	Total
970093-00	16 Hrs. / $565.28		$12,133.50

Current Contaminate Level: 270 mg/l (Bridge) to 4,000 mg/l Cl- (Klaassen East)

Status:

☐ 1. Site Assessment	☐ 2. Short Term Monitoring	☒ 3. Investigation
☒ 4. Long Term Monitoring	☐ 5. Remediation Plan	☐ 6. Installation
☐ 7. Remediation	☐ 8. Post Rem. Monitoring	☐ 9. Resolved



Key

- D&A Well
- Plugged Oil Well
- Plugged SWDW
- Plugged Gas Well
- Monitoring Well
- 250 -Chloride Value(mg/L)
- Domestic Well
- Surface Water
- Legacy Pit
- FeedLot

Chloride Change mg/L

200
100
0
-100
-200
-300
-400
-500

Scale (ft)

0 1320 2640

N
W E
S

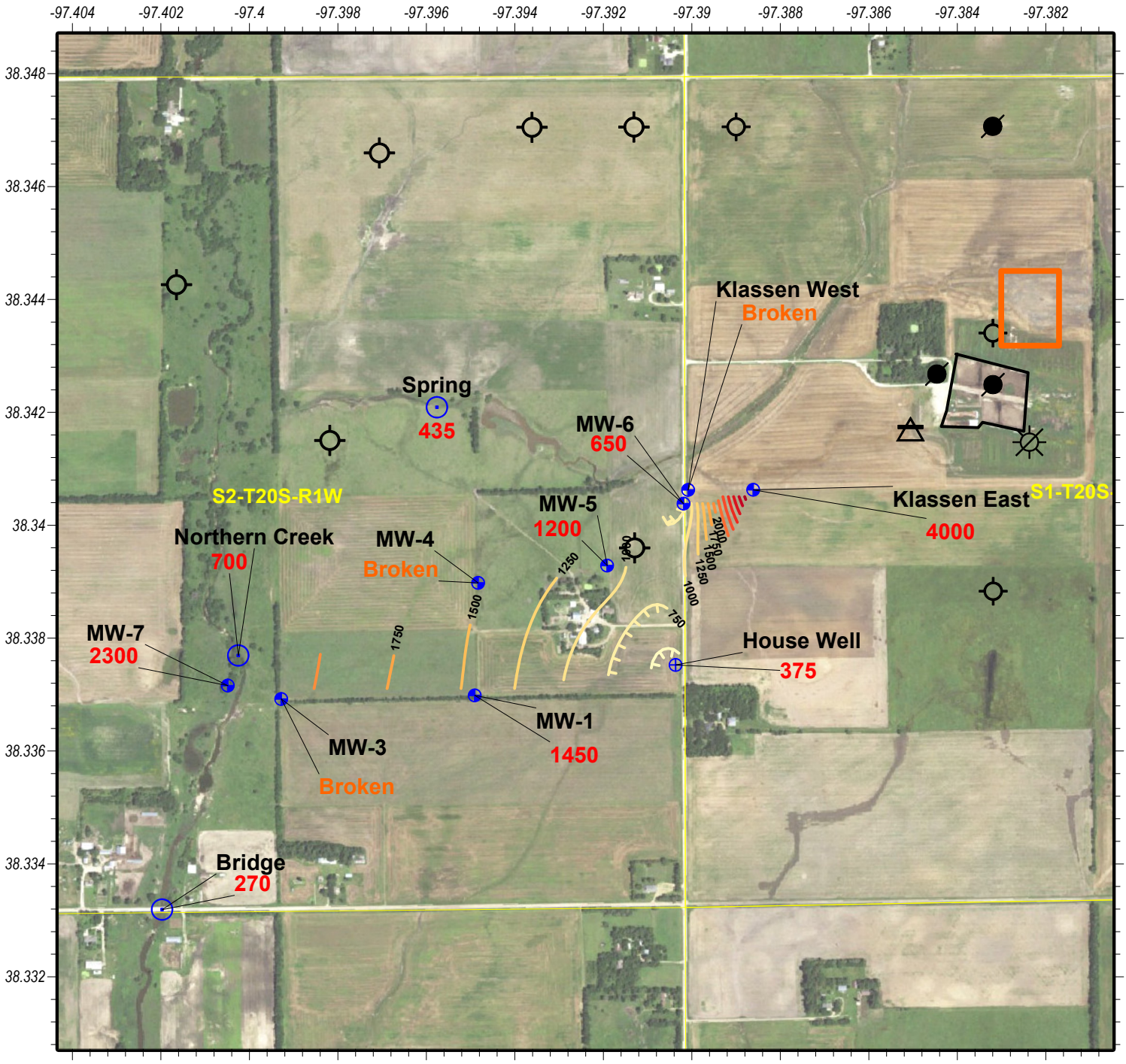
Seltzer-Bitikofer Brine Contamination Site

Sections 1 and 2 of Township 20 South and Range 1 West, McPherson County, Kansas

Chloride Level Chloride Level Changes from 2024-2025

KCC Project Code #970093-00 - KCC District #2 Field Office

Wells Sampled on 10/3/2025 - Map Drawn on 10/19/2025 by D.Bollenback



Scale (ft)

0 1320 2640

N
W E
S

Key

- -D&A Well
- -Plugged Oil Well
- -Plugged SWDW
- -Plugged Gas Well
- -Monitoring Well
- 250 -Chloride Value(mg/L)
- -Domestic Well
- -Surface Water
- -Legacy Pit
- -FeedLot

Chloride mg/L

3750
3500
3250
3000
2750
2500
2250
2000
1750
1500
1250
1000
750
500
250

Seltzer-Bitikofer Brine Contamination Site

Sections 1 and 2 of Township 20 South and Range 1 West, McPherson County, Kansas

2025 Chloride Levels

KCC Project Code #970093-00 - KCC District #2 Field Office

Wells Sampled on 10/3/2025 - Map Drawn on 10/19/2025 by D.Bollenback

Project: ***Voshell Site, McPherson County, District 2***

Site Location: The Voshell site includes a portion of the Voshell Oil Field and a large area between Elyria and Moundridge, Kansas. Parts of Townships 20 and 21 South and Ranges 2 and 3 West are within the site boundaries.

Impact/Immediacy: Impact is on the shallow Equus Beds underlying the Voshell Oil Field, which has been affected by elevated chloride levels. Resources impacted include domestic and irrigation wells. Therefore, KCC has classified Voshell as a high-level site.

Site Description: The land surface is flat irrigated farmland, dissected by Dry Turkey Creek and Running Turkey Creek. The aquifer ranges in thickness from forty feet at the eastern edge to approximately two hundred feet at the western wells in the site area. The relatively thick McPherson channel axis can be mapped from the center of Section 31, Township 21 South, Range 3 West, to the northwest corner of Section 19, to the center of Section 5, and then northward from that point. The aquifer contains several aquitards, which may or may not be continuous throughout the area. In May 2004, the Kansas Corporation Commission (KCC) and the Equus Beds Groundwater Management District No. 2 (GMD 2) agreed to drill ten groundwater monitoring wells in the Voshell oil field. GMD 2 is responsible for water sampling and providing water quality data regarding those wells to the KCC, which pays for the analytical data. The initial seven wells were drilled north to south through the project area and set on top of the Wellington shale bedrock. In addition, KCC moved approximately 21 wells associated with the Running Turkey Creek site to the Voshell site's control number in 2012, as this site is separate from the prior association with the Running Turkey Creek site. The KCC has been conducting water record research in the area west of the site, including creating a bedrock map. This bedrock map shows a shallow aquifer in the east that dives into a deeper one along the western edge of the current site. The northeastern wells are shallower than the southwestern region of the site.

Unusual Problems: The movement of the chloride plume toward irrigation wells can be somewhat accelerated by extensive irrigation well pumping. The plume continues to migrate toward the McPherson channel west of the Voshell Oil Field. In addition, new irrigation wells are often drilled in the immediate area, which can cause the plumes' erratic hydraulic movements.

Status of the Project: KCC staff sampled the Voshell monitoring wells from early August to early October in 2025. Due to the heavy rain in the region, the site could not be sampled in the typical consecutive multiday format done most years. Due to this, KCC did not build hydrogeological maps this year because the data dates were too far apart to provide an accurate reflection of the representative water table model. The known plumes have historically moved slowly to the southwest, and the year 2025 reflects similar chloride levels. Chloride levels both increased and decreased throughout the Voshell site in 2025. The central western EB monitoring well, EB-310, experienced a chloride level increase of 410 mg/L this year, countering the 380 mg/L decrease in 2024. EB-310 was the most significant increase across the site during 2025. There were substantial drops in chloride south of the southern plume, as MW-1502 and the associated monitoring wells to the south showed a decline. MW-306 has fallen by 525 mg/L since 2024. The closest downgradient well to the south of the hotspot at MW-1502 saw an increase of 350 mg/L (MW-105). EB-308, which is also downgradient, showed a rise of 110 mg/L. Unfortunately, some wells could not be sampled in 2025. MW-1301 was inside an electrified fence for cattle to graze on the associated agricultural field. The cluster of wells in the north central site was too muddy to access, and the well MW-1202 was infested with wasps.

Historical hydrological data show the overall groundwater movement to the west-southwest. KCC has no data from monitoring wells west of the western line to evaluate plume migration past the EB wells. However, research indicates that bedrock drops quickly west of the EB wells. Although the KCC did not produce a current hydrological model this year, it is predicted that the heavy rains over the summer of 2025 introduced a significant amount of fresh water to the system. Therefore, the influx of freshwater can potentially move chloride-impacted water down the hydrological gradient.

Level of Remediation Sought:

Ideal: 250 ppm Chloride
Target: 500 ppm Chloride

Recommendation Future Work: KCC has discussed with GMD #2 about adding additional monitoring wells on the west edge of the site. Adding other monitoring wells is becoming increasingly critical due to high chloride levels in some EB wells. Plume delineation within the site boundaries is also recommended, especially around known high-chloride plumes. KCC and GMD #2 could collaborate on optimal locations for new wells to ensure appropriate placement. KCC continues to sample the Voshell monitoring wells and fund the sampling of the GMD #2 EB monitoring wells. KCC plans to put together a multiple-well installation scope of work with the assistance of GMD #2 within the following year. The cost of a remedial system would be very high, and chloride levels are not high enough for effective improvement through a removal system.

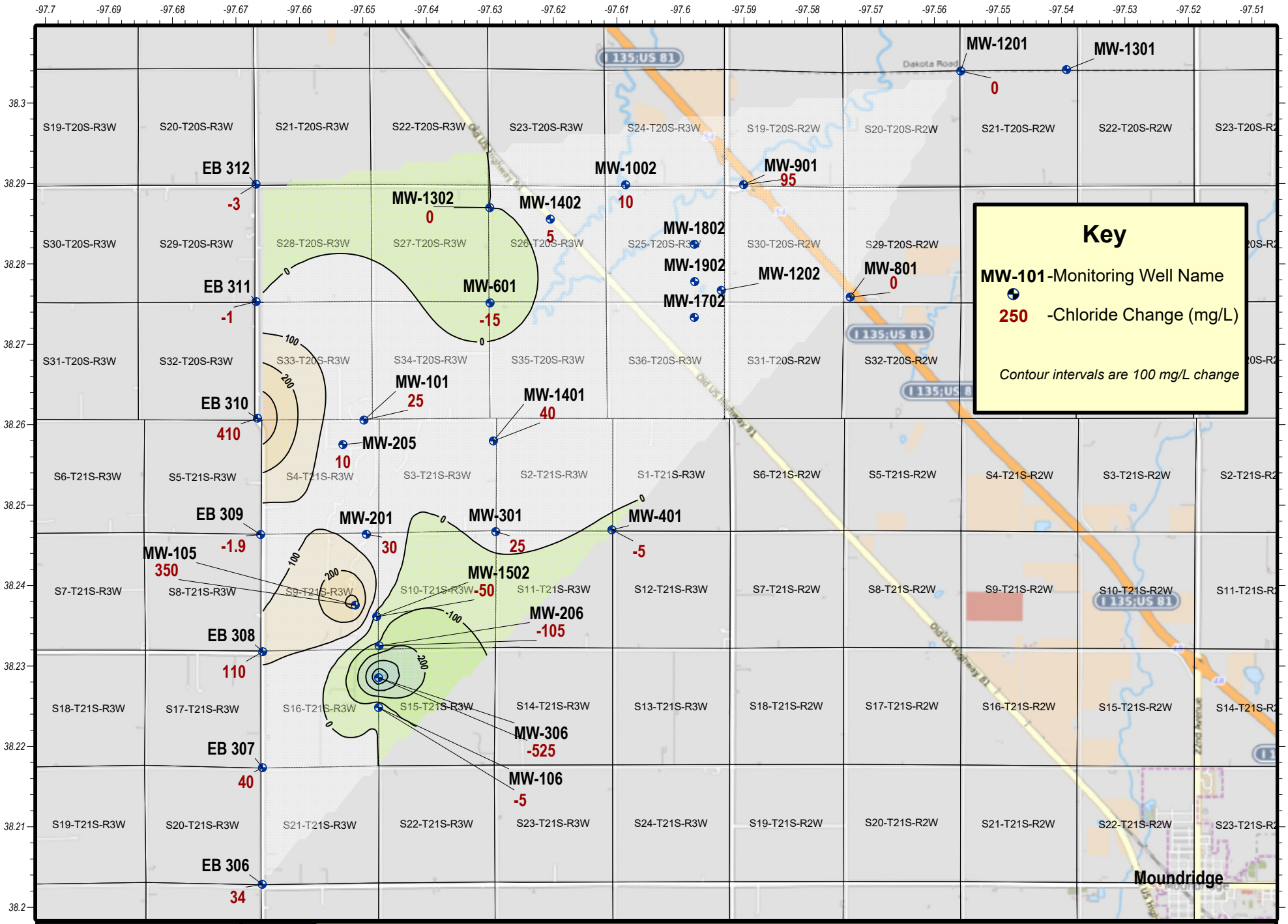
Estimated Total Costs: The cost of funding fieldwork on sampling should be approximately $1000-$1500. Office research into expanding the monitoring well network only costs staff time. KCC believes a cost estimate of $150,000 to $350,000 is needed to install new monitoring wells to delineate the site, depending on the number and depths of the new wells. New wells west of the current site could be deeper than 200 feet.

Control No.	**Staff Hours/Expenditures**	**Fund Expenditures**	
		FY 2025/26	**Total**
20030059-001	**29 Hrs. / $1,002.10**	**$311.15**	**$22,960.88**

Current Contaminate Level: MW 1502 – 3,500 mg/L.

Status:

☐ **1. Site Assessment**	☐ **2. Short Term Monitoring**	☒ **3. Investigation**
☒ **4. Long-Term Monitoring**	☐ **5. Remediation Plan**	☐ **6. Installation**
☐ **7. Remediation**	☐ **8. Post Rem. Monitoring**	☐ **9. Resolved**



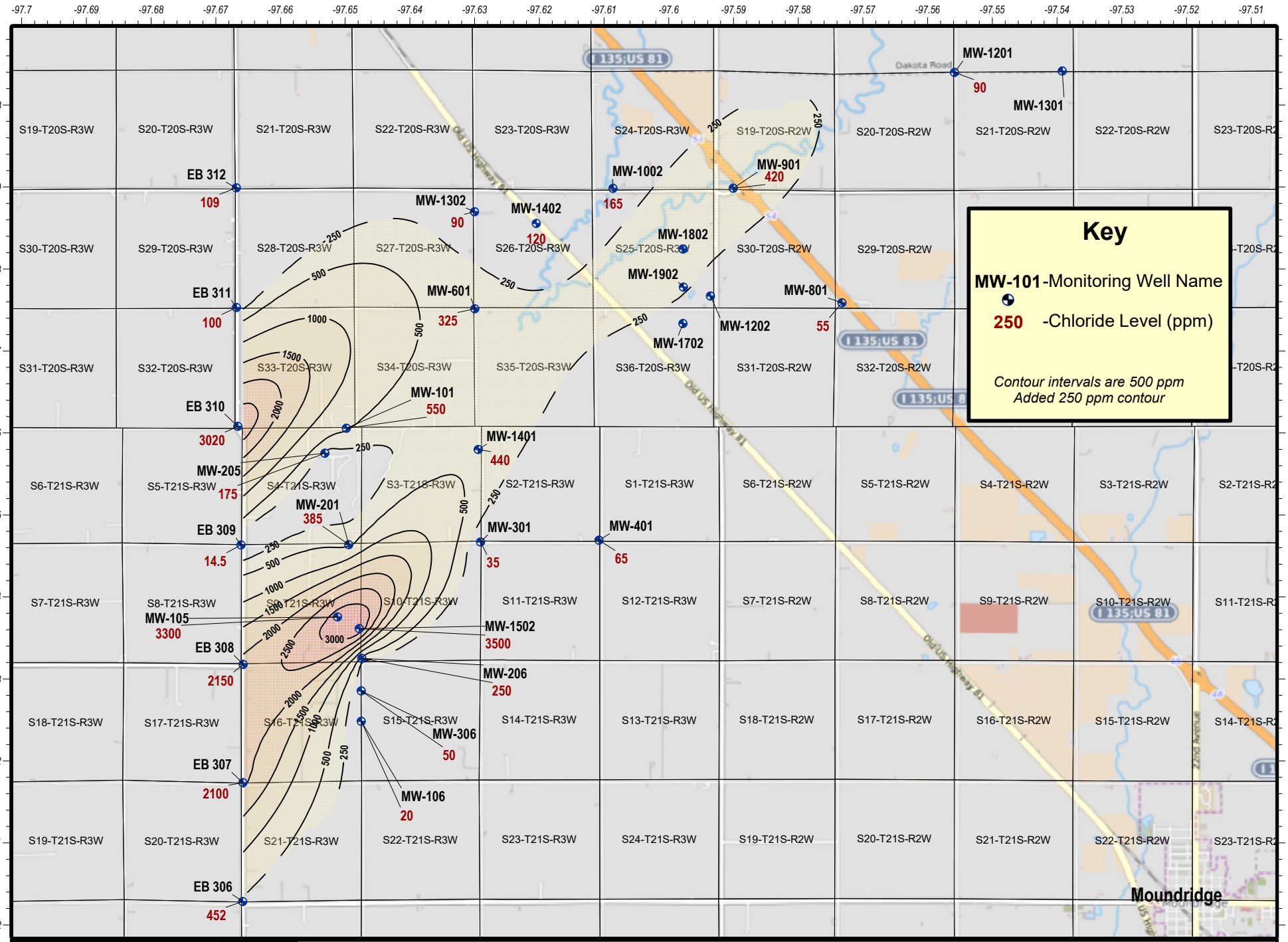
Kansas Corporation Commission

Voshell Contamination Site

Multiple Section of Townships 20 & 21 South and Range 2 & 3 West, McPherson County, Kansas

Change from 2024 to 2025 Chloride Level Map

District #2 - Control Number #20030059-001 - Sampled during the late summer of 2025 - Drawn on 10/14/2025 by D.Bollenback



Voshell Contamination Site

Multiple Section of Townships 20 & 21 South and Range 2 & 3 West, McPherson County, Kansas

2025 Groundwater Chloride Level Map

District #2 - Control Number #20030059-001 - Sampled in late Summer of 2025 - Drawn on 10/14/25 by D.Bollenback

Project: ***Fowler Contamination Site, Montgomery County, District 3***

Site Location: NE/4 of Section 19, Township 32 South, Range 14 East, Montgomery County.

Impact/Immediacy: Impact is to the soil. The immediacy is rated as low.

Site Description: Site is located below an old, three-cell storage/settling pond.

Unusual Problems: Access to dependable sample locations and lack of monitoring wells.

Status of Project: Monitoring of a small creek running through project area. The Fowler lease was approved for a Fee Fund Project in the fall of 2000. Approximately 112 wells were plugged by the end of the project. Surface water samples were collected from the creek where it enters the lease to the south and another from where it exits on the north side. It should be noted that the water levels in the creek during the September 25, 2025 sampling event were elevated above normal stream flow due to rain the previous two to three days and may reflect in the CL- concentrations of the water samples. Brine impacted areas continue to show significant improvement of vegetative growth as shown on 2022 aerial imagery.

	Sample Location #1	***Sample Location #2***
03/11/2025	***400 ppm Cl-***	***600 ppm Cl-***
09/25/2025	***300 ppm Cl-***	***200 ppm Cl-***

Overall CL- concentrations remain consistent with a gradual downward trend from the project initiation.

Level of Remediation Sought:

Ideal: 200 ppm Chloride
Target: 300 ppm Chloride

Recommendation for Future Work: Future work on this site will consist of post-remediation monitoring. The brine impacted area below the old three cell storage pit has successfully been remediated and landowner has filled the eastern third with construction debris consisting of soil, rock, and asphalt. The property to the south will be further investigated for potential buried well locations that have not been discovered.

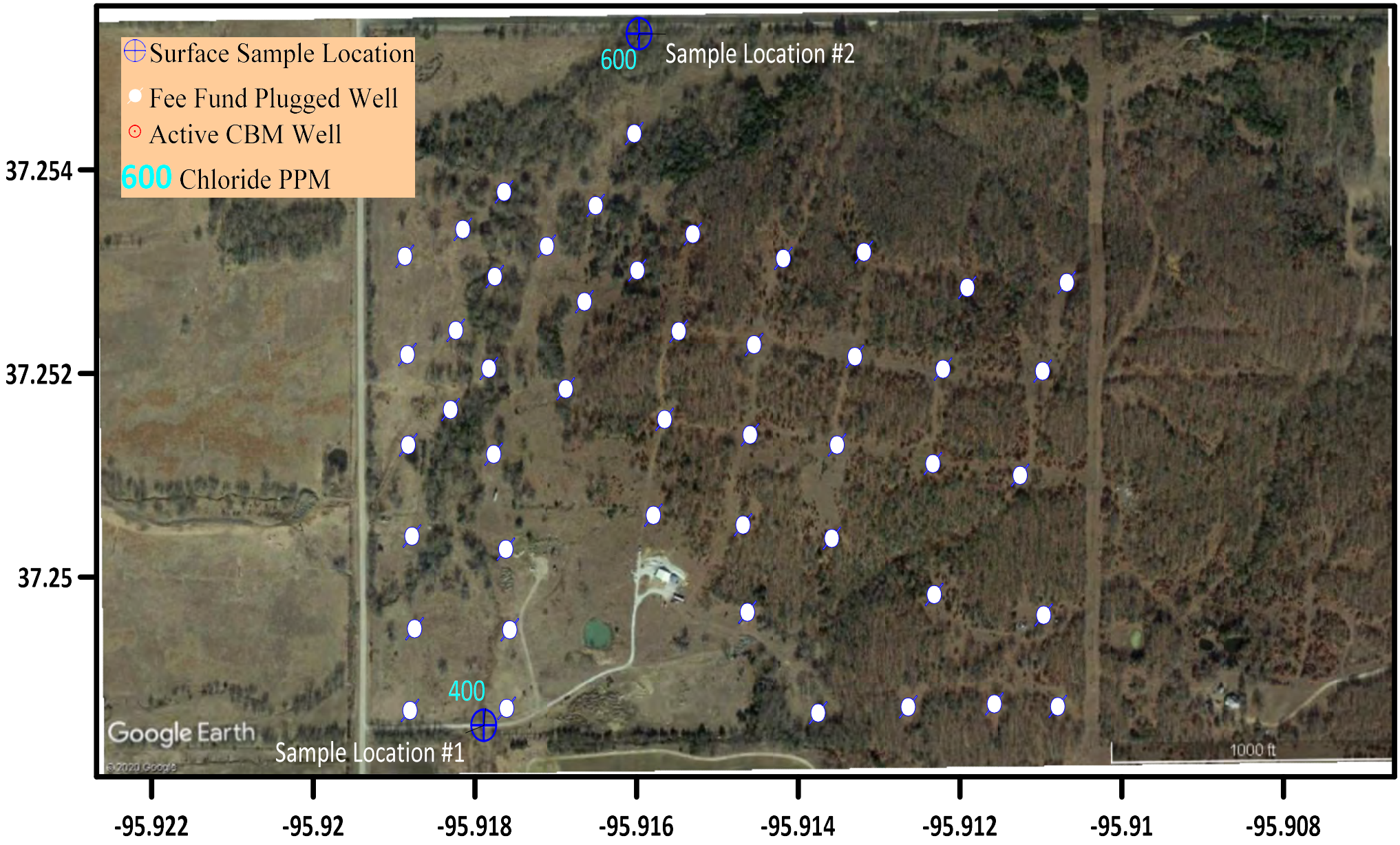
Estimated Total Costs: Monitoring cost approximately $1,500.00 per year.

Control No.	**Staff Hours/Expenditures**	**Fund Expenditures FY 2025/26 Total**
970046-00	**10 Hrs. / $340.24**	

Current Contaminate Level: 200 ppm to 600 ppm Cl-

Status:

☐ **1. Site Assessment**	☐ **2. Short Term Monitoring**	☐ **3. Investigation**
☐ **4. Long Term Monitoring**	☐ **5. Remediation Plan**	☐ **6. Installation**
☐ **7. Remediation**	☒ **8. Post Rem. Monitoring**	☐ **9. Resolved**



Kansas Corporation Commission

Fowler Remediation Site

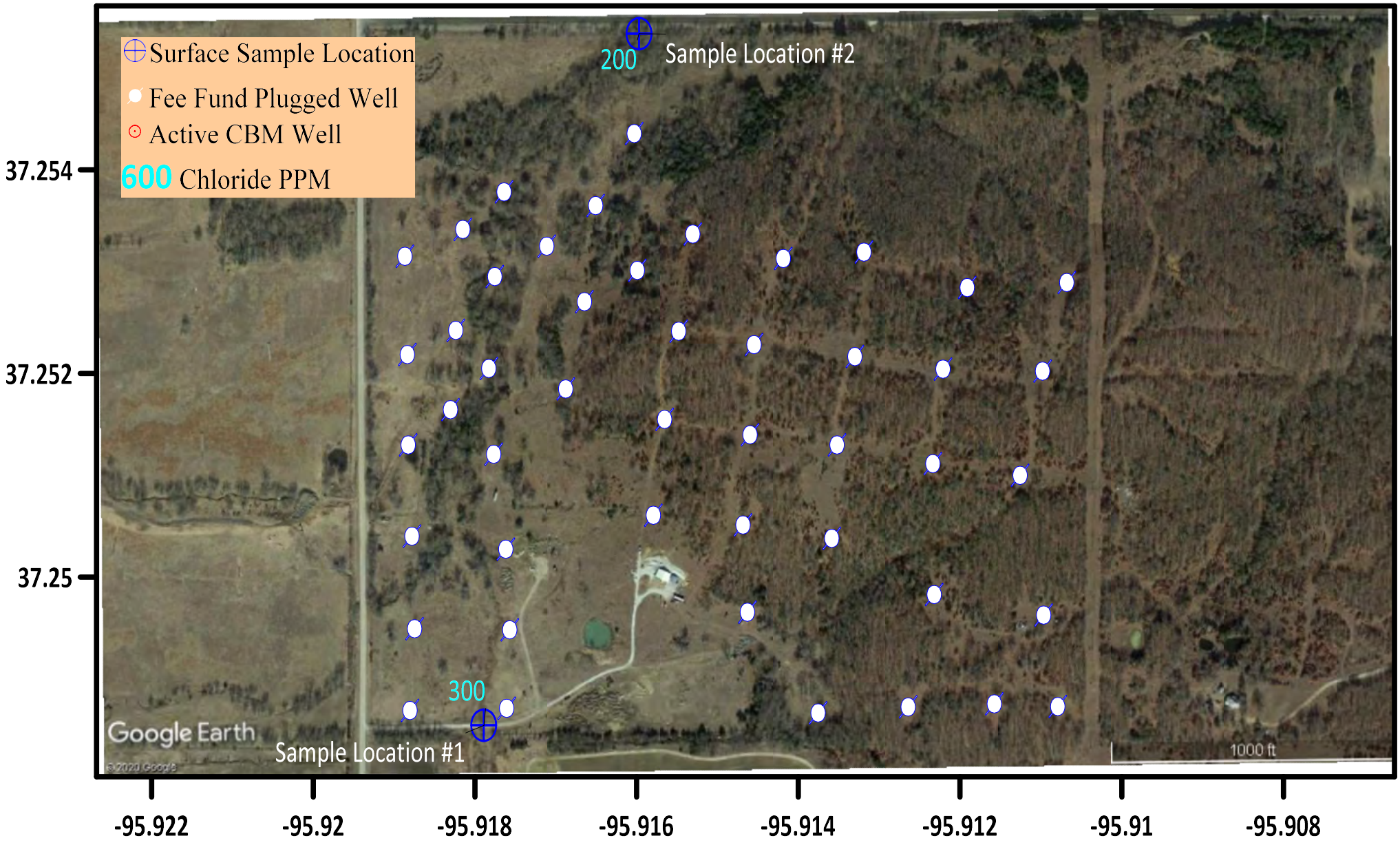
NE 19-T32S-R14E Montgomery County, Kansas

2025 Surface Water Chloride Levels - District #3 Sampled 03/11/2025

Map Drawn on 09/30/2025 by L. Short

Project 970046-00

N



Kansas Corporation Commission

Fowler Remediation Site

NE 19-T32S-R14E Montgomery County, Kansas
2025 Surface Water Chloride Levels - District #3 Sampled 09/25/2025
Map Drawn on 09/30/2025 by L. Short
Project 970046-00

N

Project: ***Mantooth Contamination Site, Montgomery County, District 3***

Site Location: Section 20 & 29, Township 33 South, Range 14 East, Montgomery County.

Impact/Immediacy: Impact is to surface water and groundwater. The immediacy level is rated as moderate.

Site Description: The initial investigation began in May of 1996 by personnel from the Chanute Office in response to a complaint of brine in Deer Creek. At that time, the site consisted of an abandoned oil lease with as many as 41 abandoned well locations, some of which were leaking brine at or near the surface and affecting both surface water and groundwater resources. The site is situated immediately north of Deer Creek, a tributary of the Caney River in the Verdigris River Basin. In the spring of 1999, funds were approved for the excavation of abandoned well sites on this property. During that investigation 25 abandoned wells were confirmed and referenced by GPS.

Unusual Problems: Lack of detailed lease data concerning the number and location of wells drilled in the area is a significant problem in properly and completely assessing potential contaminate source areas for this site. However, to date there have been 25 wells plugged in 1999 and an additional 10 wells in 2013. There are also several potential sources being investigated outside the physical lease boundaries of this site.

Status of Project: The primary Fee Fund Project for this site was completed in the summer of 2000. Twenty-five abandoned wells were plugged. In 2012, the area of interest was expanded, resulting in the discovery and plugging of an additional 10 wells in 2013. Data gathered from the well plugging operations and monitoring well sampling indicates that the source of the saltwater plume is most likely located in the south half of the project. RedBud Oil & Gas Operating, LLC is the current operator of the coal bed methane wells located on the project site. Leases immediately bordering this site are being inventoried and referenced by GPS to identify further environmental threats outside the original area of concern. The overall Cl- concentrations are still trending down or maintaining little change up or down. Six additional monitoring wells were completed in early 2012 to further evaluate the extent and to help determine the possible brine source. The following are the Cl- concentrations for this year's sampling:

	MWE 01	***MWE 02***	***MWE 03***	***MWE 04***	***MWE 05***	***MWE 06***	***MWE 07***
03/11/2025	***600 ppm Cl-***	***2000 ppm Cl-***	***1700 ppm Cl-***	***400 ppm Cl-***	***400 ppm Cl-***	***600 ppm Cl-***	***400 ppm Cl-***
09/25/2025	***2700 ppm Cl-***	***2300 ppm Cl-***	***1800 ppm Cl-***	***300 ppm Cl-***	***400 ppm Cl-***	***500 ppm Cl-***	***400 ppm Cl-***

Level of Remediation Sought:

Ideal: Less than 250 ppm Chloride

Target: 500 ppm Chloride

Recommendation for Future Work: Continue monitoring in order to verify whether the plugging of the existing abandoned wells eliminates the current source of saltwater contamination within the ground and surface water in the project area. Future work will be based upon the results of the sample analysis of the monitoring wells and Deer Creek. There have been 20 new CBM wells and associated SWD wells drilled in the last few years in sections 20 & 29. The ability to download and overlay historic aerial imagery will be utilized to help identify undocumented well locations within and near the site boundary. Possible well locations that are referenced on a recently discovered historical lease map of the site area will be investigated in the future.

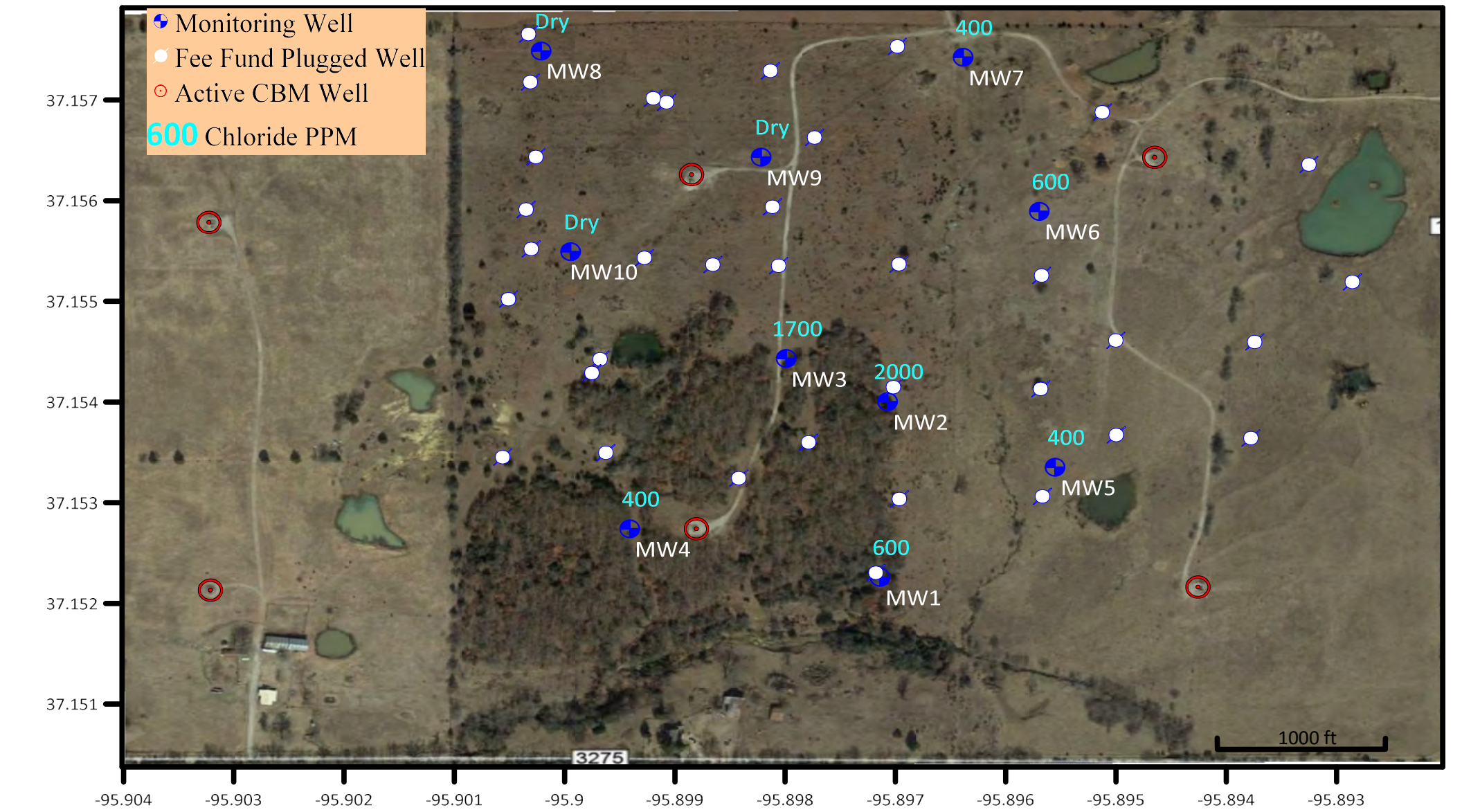
Estimated Total Costs: Fee Fund Plugging of 10 abandoned wells cost $77,926.

Control No.	Staff Hours/Expenditures	Fund Expenditures FY 2025/26	Total
980058-001	34 Hrs. / $1,068.96		$17,349.00

Current Contaminate Level: 300 ppm to 2,700 ppm Cl-

Status:

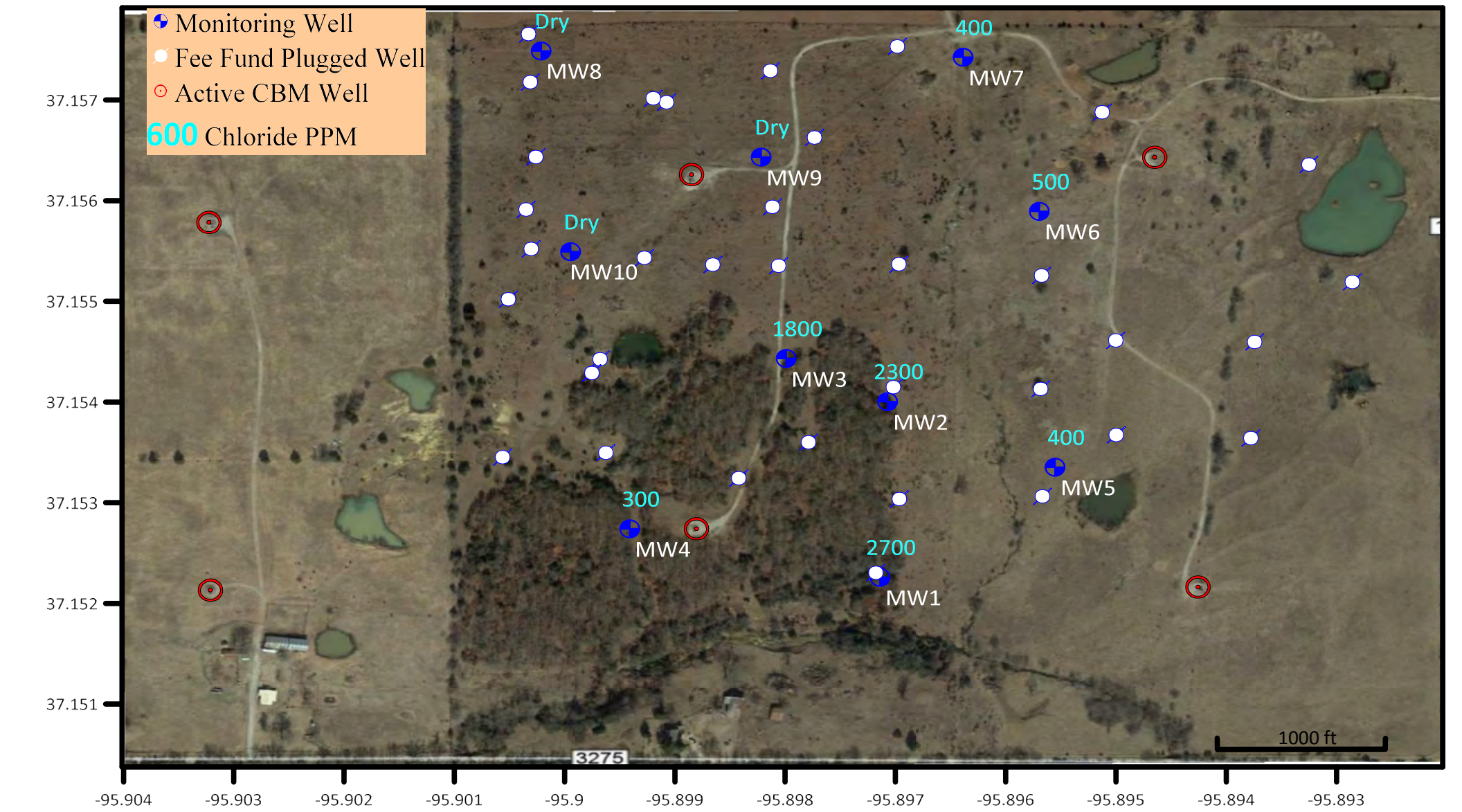
☐ 1. Site Assessment	☐ 2. Short Term Monitoring	☒ 3. Investigation
☒ 4. Long Term Monitoring	☐ 5. Remediation Plan	☐ 6. Installation
☐ 7. Remediation	☐ 8. Post Rem. Monitoring	☐ 9. Resolved



Kansas Corporation Commission

Mantooth Remediation Site

Sec 20 & 29-T33S-R14E Montgomery County, Kansas
2025 Groundwater Chloride Levels - District #3 Sampled 03/11/2025
Map Drawn on 9/30/2025 by L. Short
Project 980058-001



Kansas Corporation Commission

Mantooth Remediation Site

Sec 20 & 29-T33S-R14E Montgomery County, Kansas
2025 Groundwater Chloride Levels - District #3 Sampled 09/25/2025
Map Drawn on 9/30/2025 by L. Short
Project 980058-001

N

Project: ***Smith Finn Contamination Site, Morton County, District 1***

Site Location: Legal location is SE/4 of Section 8, Township 34 South, Range 43 West, in Morton County.

Impact/Immediacy: The impact is to a house domestic well, which has exhibited high chloride levels. The original PRP **(**Anadarko) drilled a new domestic well in January of 1989**.** This site has a moderate immediacy level.

Site Description: The project consists of a localized pollution of the groundwater in the Ogallala Formation. The area is on the south edge of the High Plains as the terrain begins to break downward to the Cimarron River valley, which is located one and one-half miles to the south.

Unusual Problems: The threat of contaminated groundwater moving from the Smith-Finn property to land owned by the BLM. Multiple sand layers with different levels of contamination.

Status of Project: On October 16, 2020, PRP spudded on a new SWD well for the recovery system. After work and permitting was completed, the recovery system was restarted in April 2021. PRP consultants are cycling pumping operations between two wells at a time and determining the most effective use of the recovery system. Overall, the chlorides have remained consistent since previous sampling events.

Level of Remediation Sought:

Ideal: 250 ppm Chloride
Target: 500 ppm Chloride

Recommendation for Future Work: Consultants will continue to sample quarterly. They will continue to simultaneously pump two wells at a time and alternate every three months.

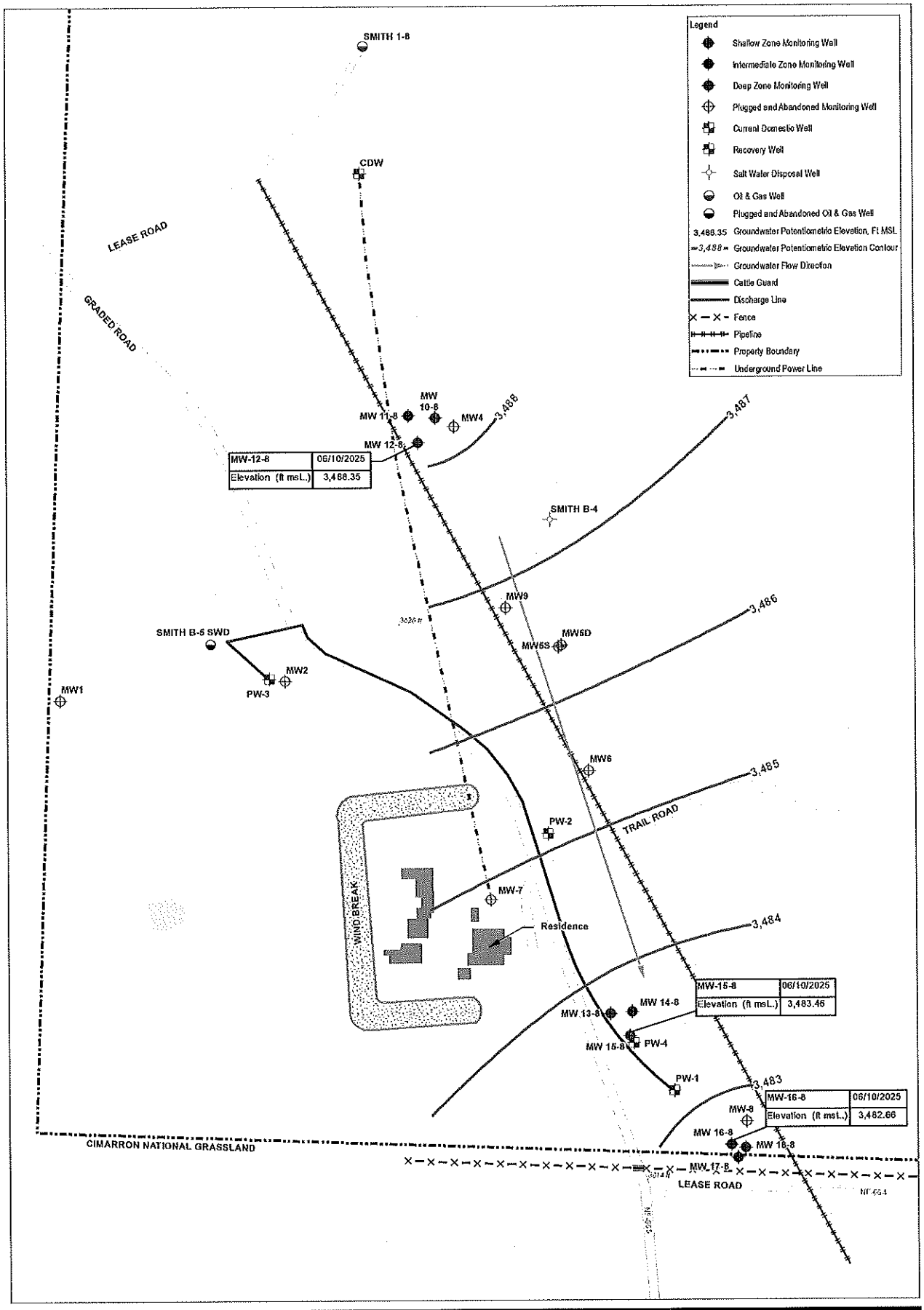
Estimated Total Costs: $200,000 for RP.

Control No.	**Staff Hours/Expenditures**	**Fund Expenditures FY 2025/26 Total**
970095-00	**3 Hrs. / $114.74**	

Current Contaminate Level: 247 ppm Cl- to 9,980 ppm Cl-

Status:

☐ **1. Site Assessment**	☐ **2. Short Term Monitoring**	☐ **3. Investigation**
☒ **4. Long Term Monitoring**	☒ **5. Remediation Plan**	☐ **6. Installation**
☒ **7. Remediation**	☐ **8. Post Rem. Monitoring**	☐ **9. Resolved**



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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane Kansas South FIPS 1502 Feet

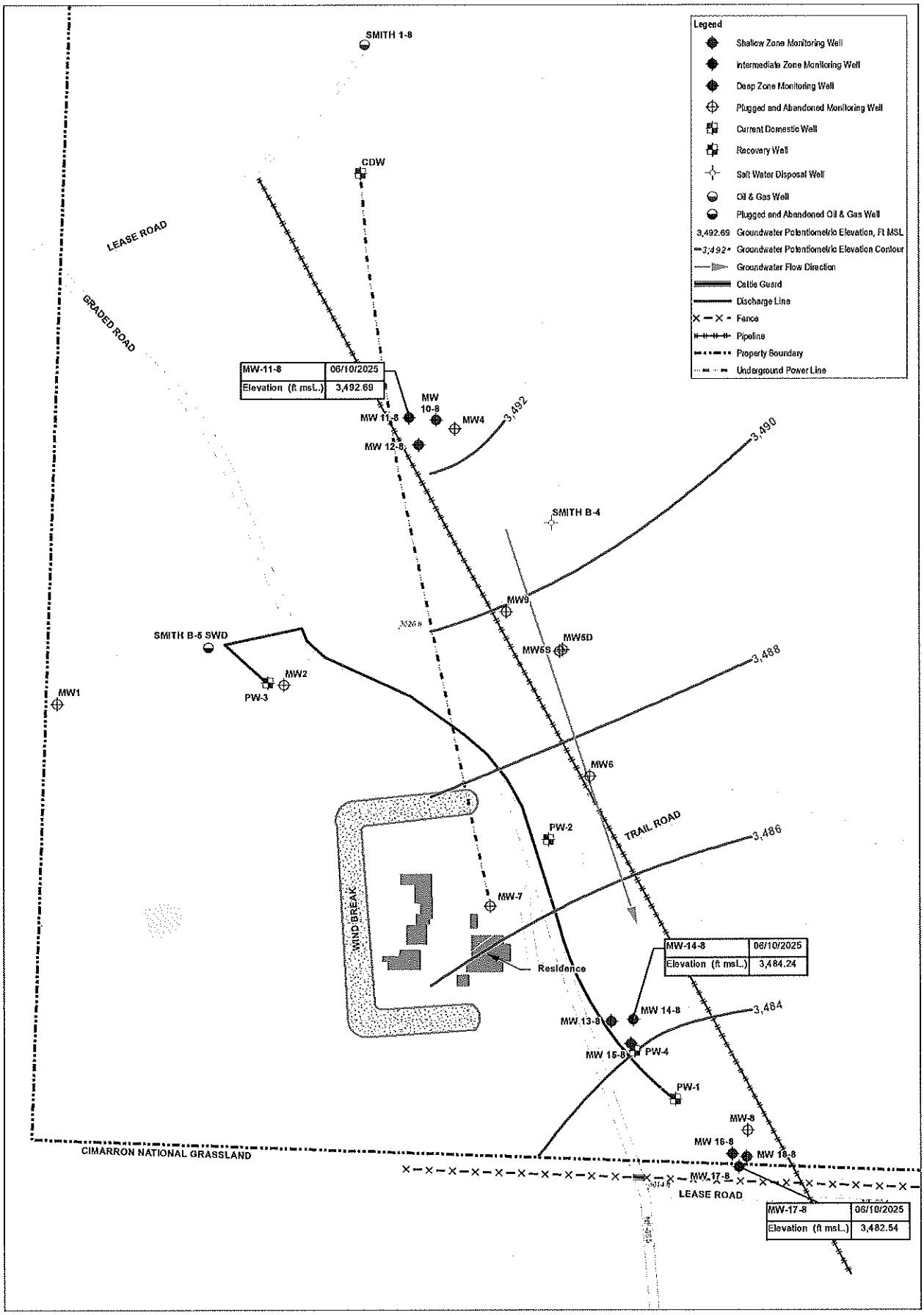
GHD

MERIT ENERGY COMPANY, LLC
SMITH-FINN
ELKHART, KANSAS

JUNE 2025 DEEP WELL POTENTIOMETRIC MAP

Project No. 11207252
Revision No. -
Date 2025-08-05

FIGURE 5



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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane Kansas South FIPS 1502 Feet

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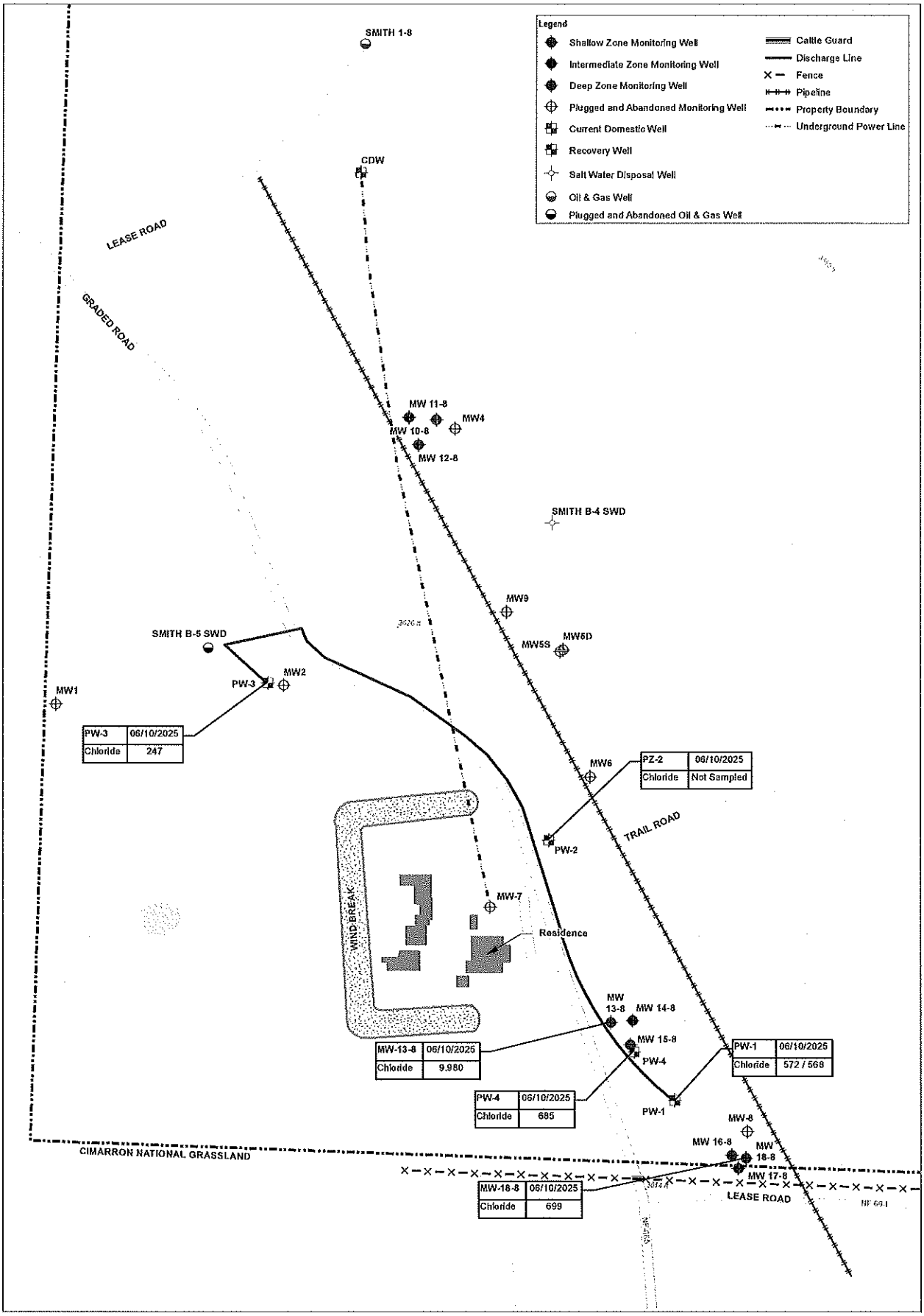
GHD

MERIT ENERGY COMPANY, LLC
SMITH-FINN
ELKHART, KANSAS

JUNE 2025 INTERMEDIATE WELL GROUNDWATER POTENTIOMETRIC MAP

Project No. 12601747
Revision No. -
Date 2025-08-05

FIGURE 4



Paper Size ANSI B

0 100 200

Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane Kansas South FIPS 1502 Feet

N

GHD

MERIT ENERGY COMPANY, LLC
SMITH-FINN
ELKHART, KANSAS
2025 ANNUAL
CHLORIDE ISOCONCENTRATION MAP
FOR SHALLOW WELLS

Project No. 12601747
Revision No. -
Date 2025-07-07

FIGURE 6

Project: ***Brazil Contamination Site, Neosho County, District 3***

Site Location: Section 27, Township 28 South, Range 18 East, Neosho County.

Impact/Immediacy: Chloride contamination at this site has verified impacts to both surface water and soil resources with a strong potential for ongoing impact to groundwater resources. The immediacy level is rated as low to moderate for water resources and low to moderate for soil resources.

Site Description: The site consisted of an abandoned oil lease with 30 abandoned wells. Surface runoff over areas of past brine spillage and near surface leakage from abandoned wells is affecting both surface water and soil resources. The surface drainage through this lease is a minor tributary to the Neosho River, which is a public water supply source.

Unusual Problems: None.

Status of Project: The Fee Fund Plugging Project for this lease was completed in early spring of 1999. Twenty-three wells were plugged while seven of the wells were determined to already have been plugged. River Rock Operating is the current operator of the CBM wells. Post Rock (previous operator) plugged an additional break out well in 2006. Four new monitoring wells were constructed in early 2012. These wells were specifically located to further determine the extent and possible source area of the chlorides impacting the area groundwater and surface soils. This property was leased by Post Rock and seven new gas wells have been drilled in this section since 2006. Two additional surface casing only wells that were cut off below surface were discovered, and then plugged, in 2018. The following sample results were obtained this year:

	MWE 01	***MWE 02***	***MWE 03***	***MWE 04***
03/12/2025	***900 ppm Cl-***	***800 ppm Cl-***	***120 ppm Cl-***	***900 ppm Cl-***
10/2/2025	***900 ppm Cl-***	***700 ppm Cl-***	***120 ppm Cl-***	***1300 ppm Cl-***

Overall CL- concentrations remain consistent with a gradual downward trend or are maintaining little change up or down from the project initiation.

Level of Remediation Sought:
Ideal: 250 ppm Chloride
Target: 500 ppm Chloride

Recommendation for Future Work: Future work at the site will include correlation of KGS well information with data collected from monitoring wells, Google Earth imagery, historical documents, and focused metal detector surveys. The sampling of constructed monitoring wells will continue, and possible construction of additional monitoring wells may be necessary. Additional field work will be performed to locate possible unplugged abandoned wells or old wells in which the initial plugs have failed, along with utilizing the ability to download and overlay historic aerial imagery. This information will assist in determining the location and extent of the brine impact.

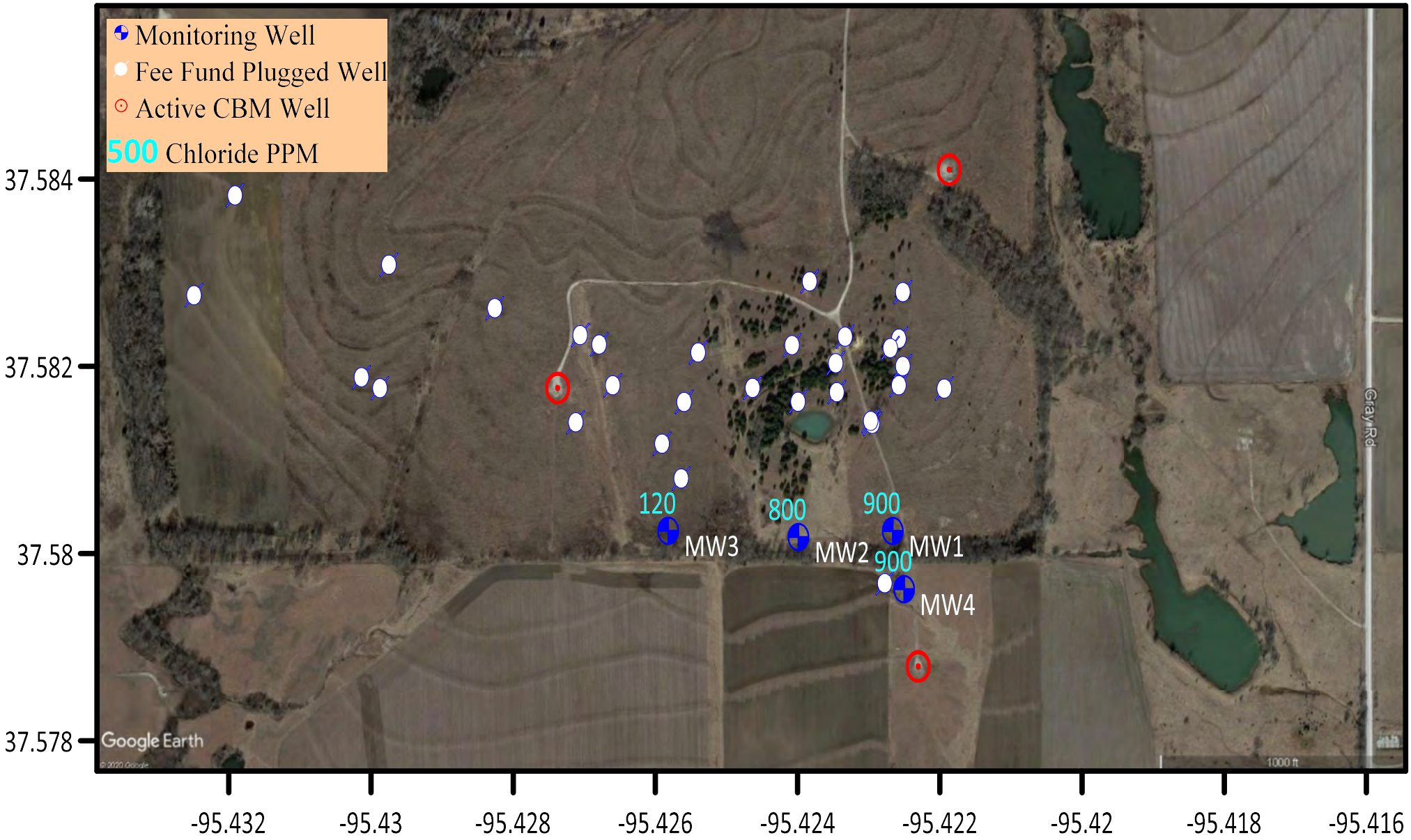
Estimated Total Cost: Plugging cost for this site totaled $57,697.10. Monitoring well construction completed in early 2012 totaled $8,196.00.

Control No.	**Staff Hours/Expenditures**	**Fund Expenditures FY 2025/26**	**Total**
990040-001	**26 Hrs. / $809.87**		**$10,791.18**

Current Contaminate Level: 120 ppm to 1,300 ppm Cl-

Status:

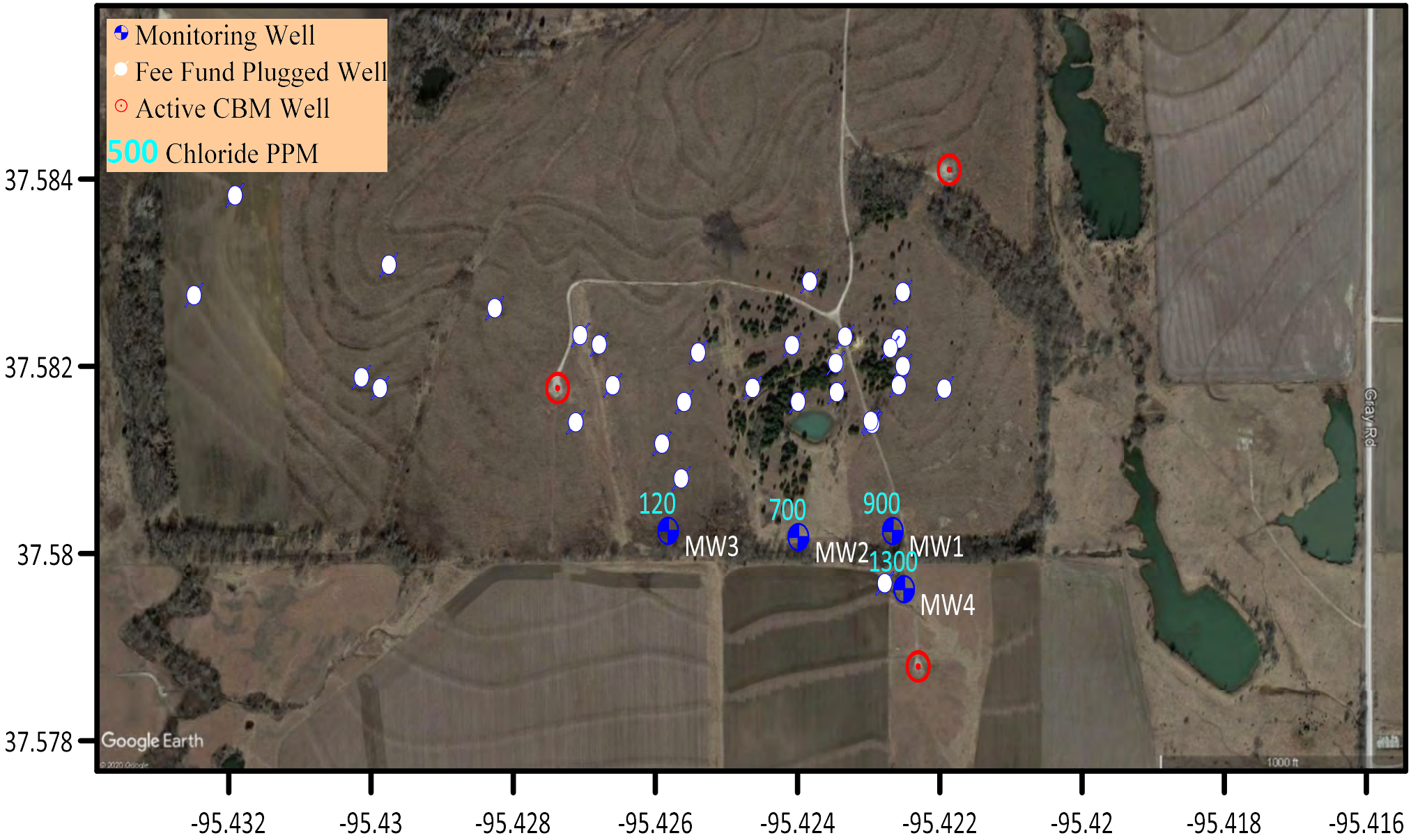
☐ **1. Site Assessment**	☐ **2. Short Term Monitoring**	☒ **3. Investigation**
☒ **4. Long Term Monitoring**	☐ **5. Remediation Plan**	☐ **6. Installation**
☐ **7. Remediation**	☐ **8. Post Rem. Monitoring**	☐ **9. Resolved**



Kansas Corporation Commission

Brazil Remediation Site
E1/2 27-T28S-R18E Neosho County, Kansas
2025 Groundwater Chloride Levels - District #3 Sampled 03/12/2025
Map Drawn on 09/30/2025 by L. Short
Project 990040-001

N



Kansas Corporation Commission

Brazil Remediation Site
E1/2 27-T28S-R18E Neosho County, Kansas
2025 Groundwater Chloride Levels - District #3 Sampled 10/02/2025
Map Drawn on 10/06/2025 by L. Short
Project 990040-001

N

Project: ***Enoch Thompson Contamination Site, Pawnee County, District 1***

Site Location: Legal location is NW/4 of Section 17, Township 21 South, Range 20 West, Pawnee County**.**

Impact/Immediacy: Stock well was damaged by chlorides from a line leak found near the SWDW. An irrigation well is located to the southwest of the site in the direction of the plume flow. Potential responsible parties drilled one recovery well and a replacement stock well in October 1988, thereafter the chlorides of which dropped through the years. The site is rated moderate to low in immediacy.

Site Description: The contamination is confined to a narrow alluvial scour channel filled with sandy gravel and silty clay. The high concentrate of brine water moved from the source area in the north to the south and contaminated Mr. Thompson's stock well.

Unusual Problems: None.

Status of Project: Three groundwater samples were collected in 2025. Chloride levels saw a moderate decrease across the site during this sampling event. The recovery system has been down since 2003 following the P&A of the disposal well due to wellbore problems. KDHE-1, which has historically been the highest in terms of chlorides, was destroyed in December of 2003. The chloride plume continues to be localized in a relatively small area of alluvial scour between the recovery well and the plugged disposal well. Without the recovery well operational, it is unlikely the site will see any significant change in chlorides.

Level of Remediation Sought:

Ideal: 250 ppm Chloride
Target: 1000 ppm Chloride

Recommendation for Future Work: Continue groundwater sampling on an annual basis to monitor movement of chloride plume through the area. Should a disposal well be drilled nearby, the feasibility of restarting the recovery well should be evaluated.

Estimated Total Cost: $500 for yearly sampling.

Control No.	**Staff Hours/Expenditures**	**Fund Expenditures FY 2025/26 Total**
970044-00	**4 Hrs. / $148.34**	

Current Contaminate Level: 70 ppm Cl- to 1600 ppm Cl-

Status:

☐ **1. Site Assessment**	☐ **2. Short Term Monitoring**	☐ **3. Investigation**
☒ **4. Long Term Monitoring**	☐ **5. Remediation Plan**	☐ **6. Installation**
☐ **7. Remediation**	☐ **8. Post Rem. Monitoring**	☐ **9. Resolved**

Kansas Corporation Commission

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Enoch Thompson Site

Section 17-T21S-R20W
Pawnee County, Kansas

2025 Area Map with Chlorides

KCC Control # 970044-00 District 1
N. Feldkamp 7/2/2025

Project: ***Macksville Contamination Site, Pawnee County, District 1***

Site Location: Legal location of the site is in the S/2 SW of Section 30, Township 23 South, Range 15 West, in Pawnee County.

Impact/Immediacy: An irrigation well is located in the NE/4 of this section which is in direct line with the natural flow of the groundwater. A new irrigation well was drilled and is being used to irrigate corn. Sampling shows that while the water in the well has been impacted, the water is below drinking water standards. The sinkhole itself seems to be growing to the north. Immediacy level is rated at moderate-high due to the growing sinkhole.

Site Description: A sinkhole developed around an abandoned salt-water disposal well on July 21, 1988. Brine from the old well and possibly other sources entered the freshwater aquifer. The aquifer consists of sand and gravel overlying the Wellington Formation of Permian age. The saltwater plume is monitored by six wells. The plume is moving to the northeast from the sinkhole area towards an irrigation well.

Unusual Problems: Ground usage is lost over several acres due to the development of the sink. The depression is still increasing in size.

Status of Project: Samples were collected from five monitoring wells and the pond in 2025. Chlorides overall saw a decrease with the 2020 event. Chlorides at this site are below ideal water level standards in all wells. Overall, the chlorides at this site have been steadily declining due to natural attenuation but will likely remain elevated over background chlorides due to the higher chlorides that still reside in the pond formed by the sink, which are at 1,400ppm.

Level of Remediation Sought:

Ideal: 250 ppm Chloride
Target: 300 ppm Chloride

Recommendations for Future Work: Chlorides, overall, have been stable for several years. Since none of the wells that currently remain are above the usable water standards, it is recommended to begin plugging all the wells at the site, starting with wells in the southwest quarter, and working back towards the fleeting plume. The feasibility of purchasing a new pump to drain the pond will be considered. The site should also continue to be surveyed on an annual basis to track the current rate of subsidence.

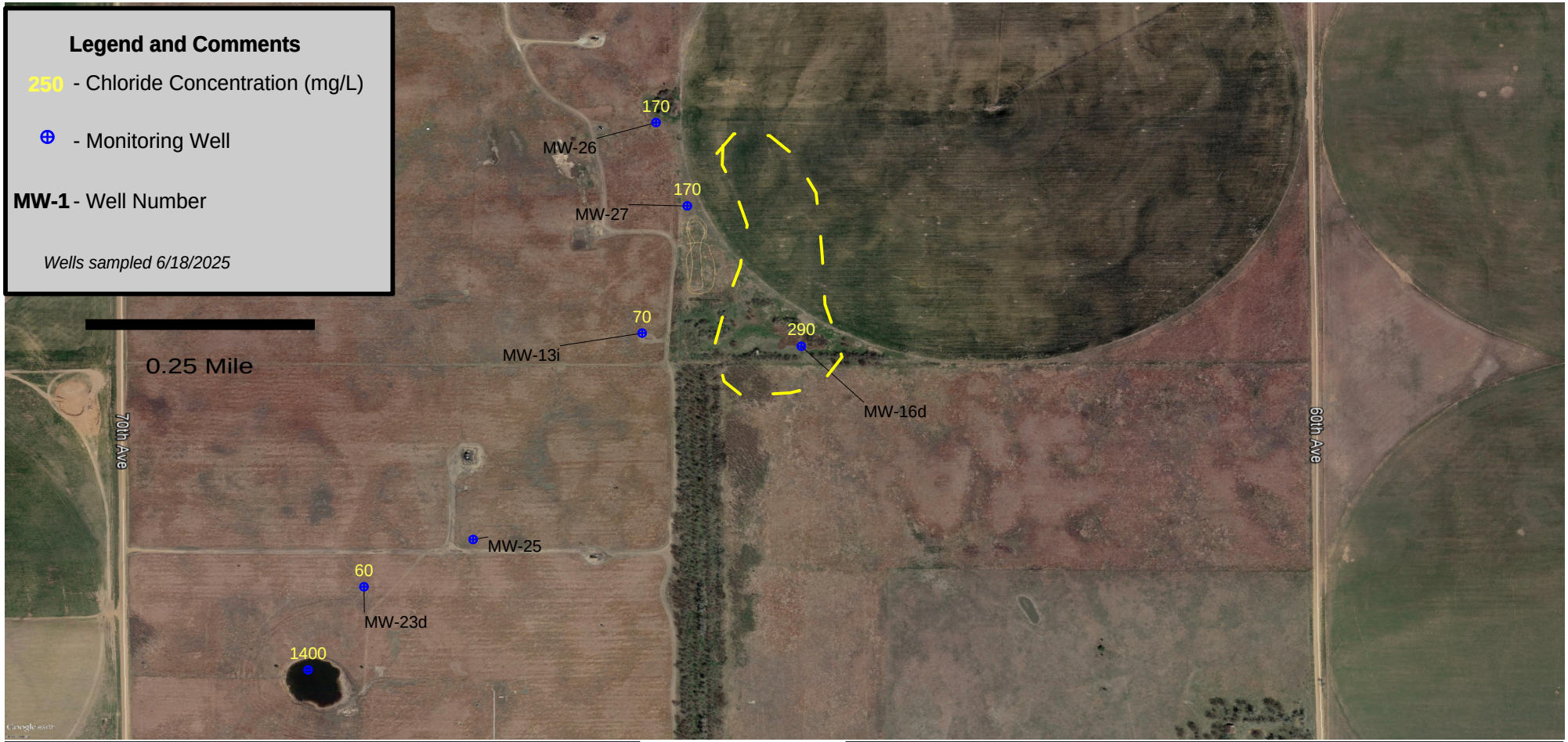
Estimated Total Cost: Costs to plug the wells have not yet been explored.

Control No.	**Staff Hours/Expenditures**	**Fund Expenditures**	
		FY 2025/26	**Total**
970066-00	**4 Hrs. / $148.34**	**$1,585.00**	**$96,309.95**

Current Contaminate Level: 60 ppm Cl- to 290 ppm Cl-

Status:

☐ **1. Site Assessment**	☐ **2. Short Term Monitoring**	☐ **3. Investigation**
☐ **4. Long Term Monitoring**	☐ **5. Remediation Plan**	☐ **6. Installation**
☐ **7. Remediation**	☒ **8. Post Rem. Monitoring**	☐ **9. Resolved**



Kansas Corporation Commission

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W E

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Macksville Site

Section 30-T-23S-R15W
Pawnee County, Kansas

2025 Area Map with Chlorides

KCC Control # 970066-00 District 1
N. Feldkamp 7/2/2025

Project: ***Arlington Site, Reno County, District 2***

Site Location: The site is approximately five miles west and one mile south of Arlington, Kansas. The brine spill, which was the source of the contamination, occurred on the Henson lease, located in the northeast quarter (NE/4) of Section 14, Township 25 South, Range 9 West, of Reno County. Rama Operating Company is the Primary Responsible Party and the past operator of the Henson lease. The Henson lease was plugged and abandoned in 2009.

Impact/Immediacy: A massive saltwater line leak in August 2000 had a local effect on soil and groundwater. Initially, the spill impacted irrigation wells in the SE/4 of Section 11 and a domestic well on the lease in late 2001. As a result, the PRP relocated the domestic well. Additionally, the irrigation well in Section 11 was taken out of use for several seasons, allowing the saltwater plume to migrate back to the southeast, where a remediation system was subsequently installed in the northeast quarter (NE/4) of Section 14. KCC lists this site as having a moderate immediacy level.

Site Description: The southern half of Section 11 and the northwestern section of Section 13 are cultivated farmland, with various crops grown. There is circular irrigation in the southern half of Section 11 and in the northwest quarter of Section 13. The north half of Section 14 is in CRP, and the topography is relatively flat, with only eleven feet of total relief across the area. The subsurface strata consist of 3 to 4 feet of topsoil and brown clay, grading into sands ranging from very fine to coarse, mixed with clay layers, down to the Harper Siltstone. Bedrock depths range from 47 to 56 feet. The highest chloride concentrations have been found on the bedrock, indicating that the clay layers across the area are not contiguous aquitards. The only visible remnant of the line leak at the surface is a soil scar approximately 10 feet by 3 feet located near the center of the NE/4. This scar has shrunk substantially over the years.

Since 2001, Rama Operating Company has installed 16 monitoring wells and eight recovery wells within the Arlington contamination site area. Due to high chloride levels, the PRP (Rama) installed a pump and lines to RW-8 and ran that recovery well during the summers of 2014-2018. In those years, Rama disposed of recovery water into their Banium 1-12 disposal well. However, a routine Mechanical Integrity Test on the Banium 1-12 failed in early 2019. As a result, the plugging of the Banium 1-12 SWD occurred on April 8, 2019. Without the disposal well, the Arlington site could not dispose of recovery water, and the remedial system was shut down.

Unusual Problems: Water quality can fluctuate during the summer growing season due to the offsetting irrigation wells to the east. This location is highly susceptible to plume movement due to irrigation in a limited aquifer. Due to the site's age, it is difficult to determine the top of the surveyed casing. Standard PVC glues that lock the casings in place do not withstand exposure to the elements above ground. There is no longer a disposal well near the location where a remediation system can dispose of recovery fluids.

Status of the Project: On July 22, 2025, KCC was on-site to sample the monitoring wells at the Arlington Site. KCC used air-lift equipment to purge groundwater from each well. Due to sediment entering the well screens, this method helps clear the well casing during sampling. Groundwater samples from each monitoring well were collected in one 250 (ml) polyurethane container for analysis at the KCC District #2 Laboratory. KCC analyzed each sample for this monitoring event for the presence of chloride utilizing the United States Environmental Protection Agency USEPA Silver Nitrate Burette Titration Method - Method 8225. All purge water with elevated chlorides was trucked to a KCC disposal well via KCC equipment.

The Arlington site is in a long-term monitoring status. During this year's sampling event, the east battery of irrigation wells was not observed running; however, due to the tall corn crop in the field, confirmation was difficult. Hydrological data in the field indicated an increase in the average water table static levels by 3.96’, which would be beneficial for crop irrigation this year. The recent drought has severely dropped the water table over the last few years. The rains in 2025 have brought some relief to the low groundwater levels at the site. KCC's hydrological mapping for this year indicates an overall gradient from southwest to northeast. This change in typical direction is attributed to the pumping of the irrigation well just north of the site. Annual sampling by KCC had shown that the chloride plume remained mainly in the NE/4 of Section 14; however, using the irrigation well to the north or the irrigation battery east of the site may pull groundwater in those directions during use. KCC believes, based on past hydrological data, that the natural groundwater gradient trends east-southeast into Section 13; however, the alluvium aquifer shallows and may trap chlorides in low areas near MW-6.

Bedrock mapping of the Harper Siltstone reveals a slight depression along the bedrock at MW #6 (7,750 mg/L); this location also contains the highest concentration of saltwater at the site. Overall, chloride values for the area decreased, except for

MW-15 in the northeast of the site, which showed a 525 mg/L increase. KCC will monitor MW-15 for increasing chlorides in the upcoming sampling events. The southern delineating wells have minimal increases of 20 mg/L or less. The highest decrease was observed in MW-6, which dropped by 2,250 mg/L. KCC interprets this as resulting from higher groundwater levels, which can dilute sampling during purging. Stratified chlorides at the bottom of the well are mixed with fresher groundwater from aquifer coning. All delineating wells to the north of the site have been destroyed or plugged over the years.

Level of Remediation Sought:

Ideal: 30 to 80 ppm (background)
Target: 250 ppm

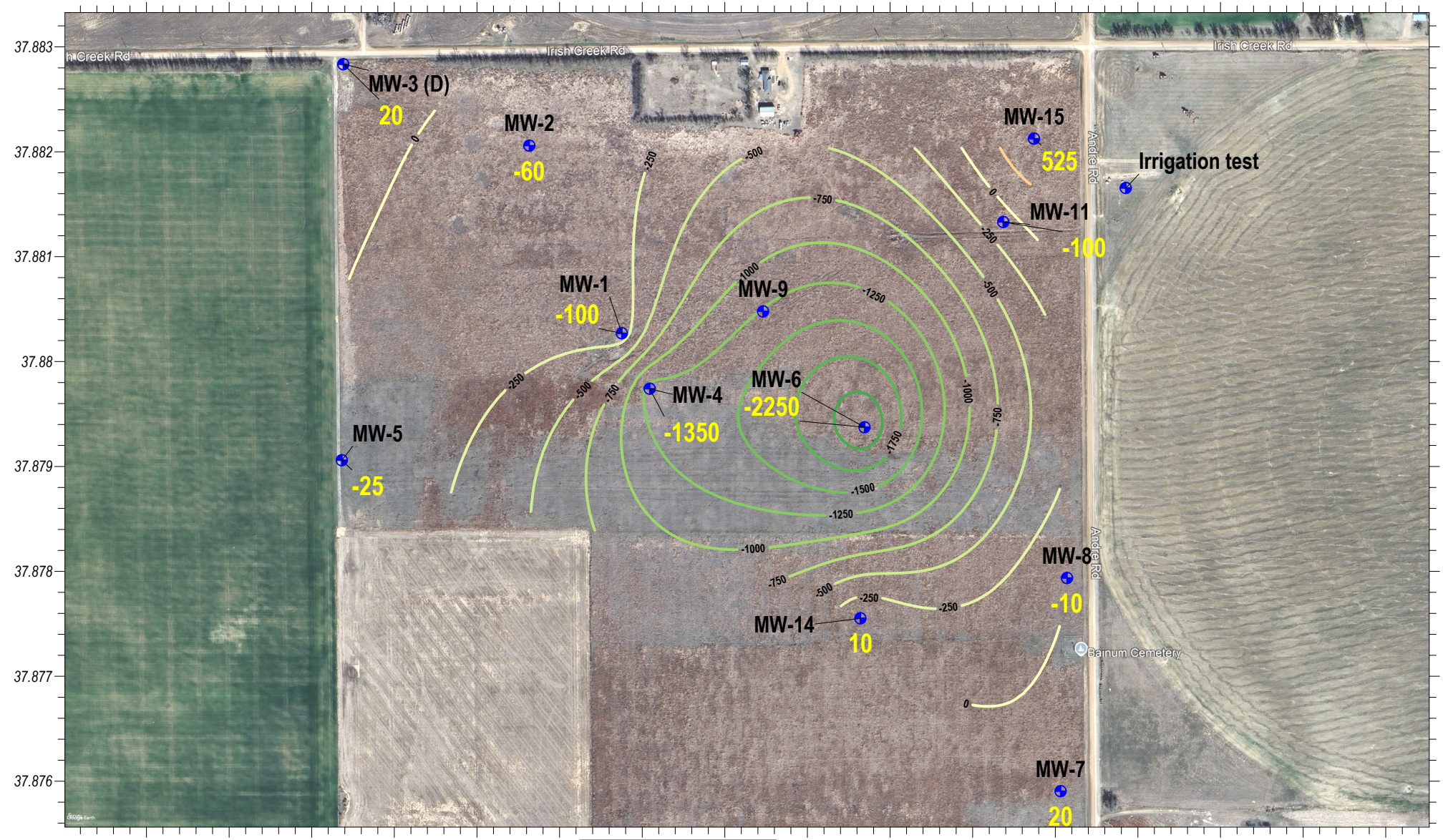
Recommendation for Future Work: As remedial efforts have ceased, some older recovery wells could be plugged by the PRP. KCC recommends that the site continue to be sampled annually by the District #2 Office. Rama Operating Company will be informed of any plume movement off-site. The irrigation wells could be sampled before the irrigation season begins to check for chloride migration. KCC may add screws to these casing joints to ensure more secure connections and eliminate confusion during future gauging of the surveyed top of the casing. If MW-15 continues to increase in chlorides, KCC may investigate the hydrological cause of the increase.

Estimated Total Cost: Costs for 2026 are expected to be $2,500 for Annual Groundwater sampling, well repair, and possible surveying. The PRP would cover the cost of any wells that are plugged.

Control No.	Staff Hours/Expenditures	Fund Expenditures FY 2025/26	Fund Expenditures Total
20030016-001	19 Hrs. / $666.09		

Current Contaminate Level: 7,750 mg/l in MW-6

☐ 1. Site Assessment	☐ 2. Short Term Monitoring	☐ 3. Investigation
☒ 4. Long Term Monitoring	☐ 5. Remediation Plan	☐ 6. Installation
☐ 7. Remediation	☐ 8. Post Rem. Monitoring	☐ 9. Resolved



KEY

MW-1 -Well Name

-Monitoring Well

1000 -Chloride Level Change(mg/L)

Contour Interval = 1000 mg/l with 250 added

Air Photo - 3/4/2024 Google Maps

Chloride Change (mg/L)

500
0
-500
-1000
-1500
-2000
-2500

120

N
W
E
S

Scale (ft)

0 200 400 600 800

Kansas Corporation Commission

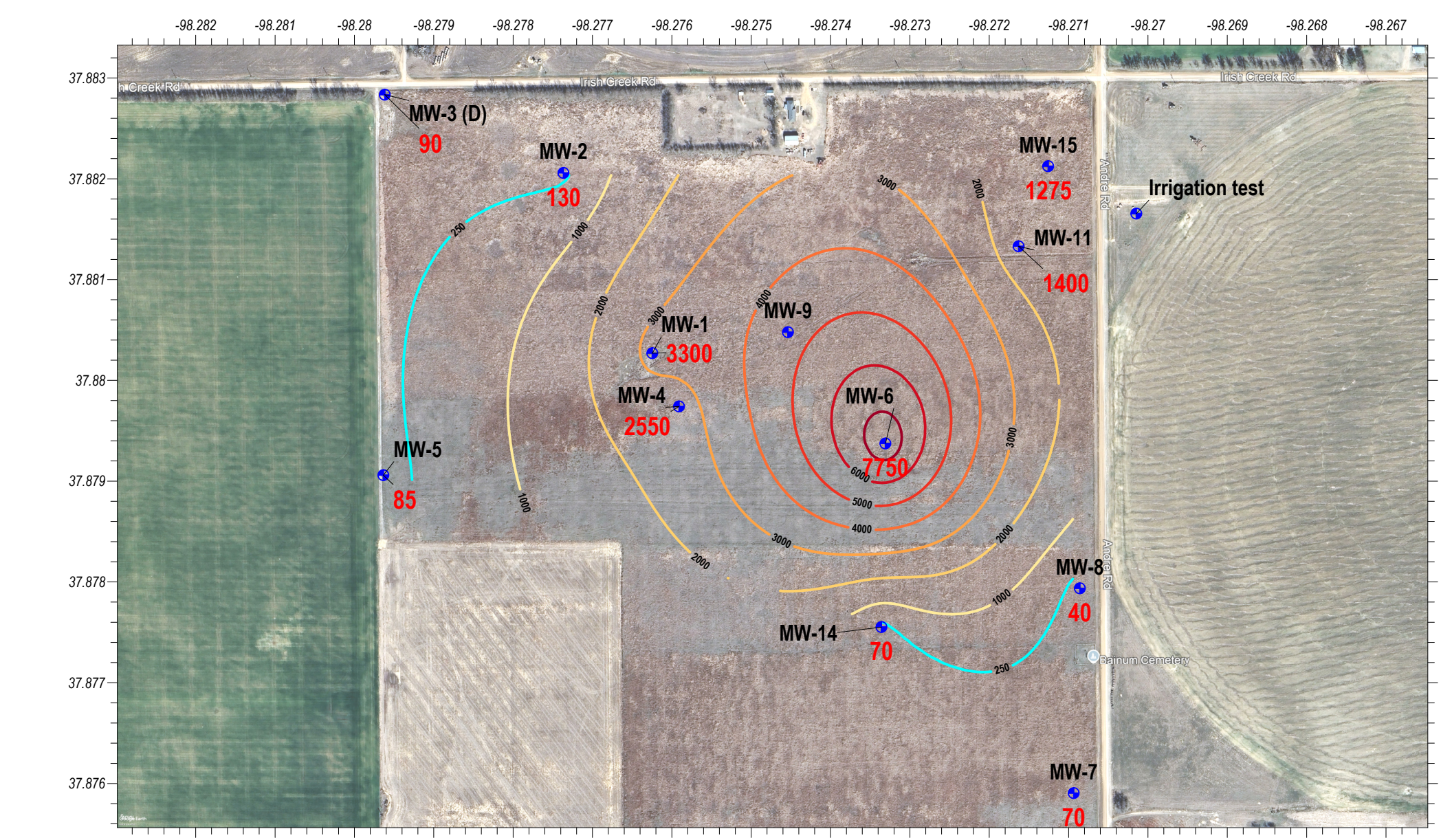
Arlington Contamination Site

Section 14 of Township 25 South and Range 9 West, Reno County, Kansas

Chloride Level Change from 2024 to 2025

KCC Project Code #20030016-001 - KCC District #2 Field Office

Wells Sampled on 8/22/2025 - Map Drawn on 9/8/2025 by D Bollenback



KEY

MW-1 -Well Name

-Monitoring Well

1000 -Chloride Level (mg/L)

Contour Interval = 1000 mg/l with 250 added

Air Photo - 3/4/2024 Google Maps

Chlorides (mg/L)

7000
6000
5000
4000
3000
2000
1000
250

121

N
W
E
S

Scale (ft)
0 200 400 600 800

Kansas Corporation Commission

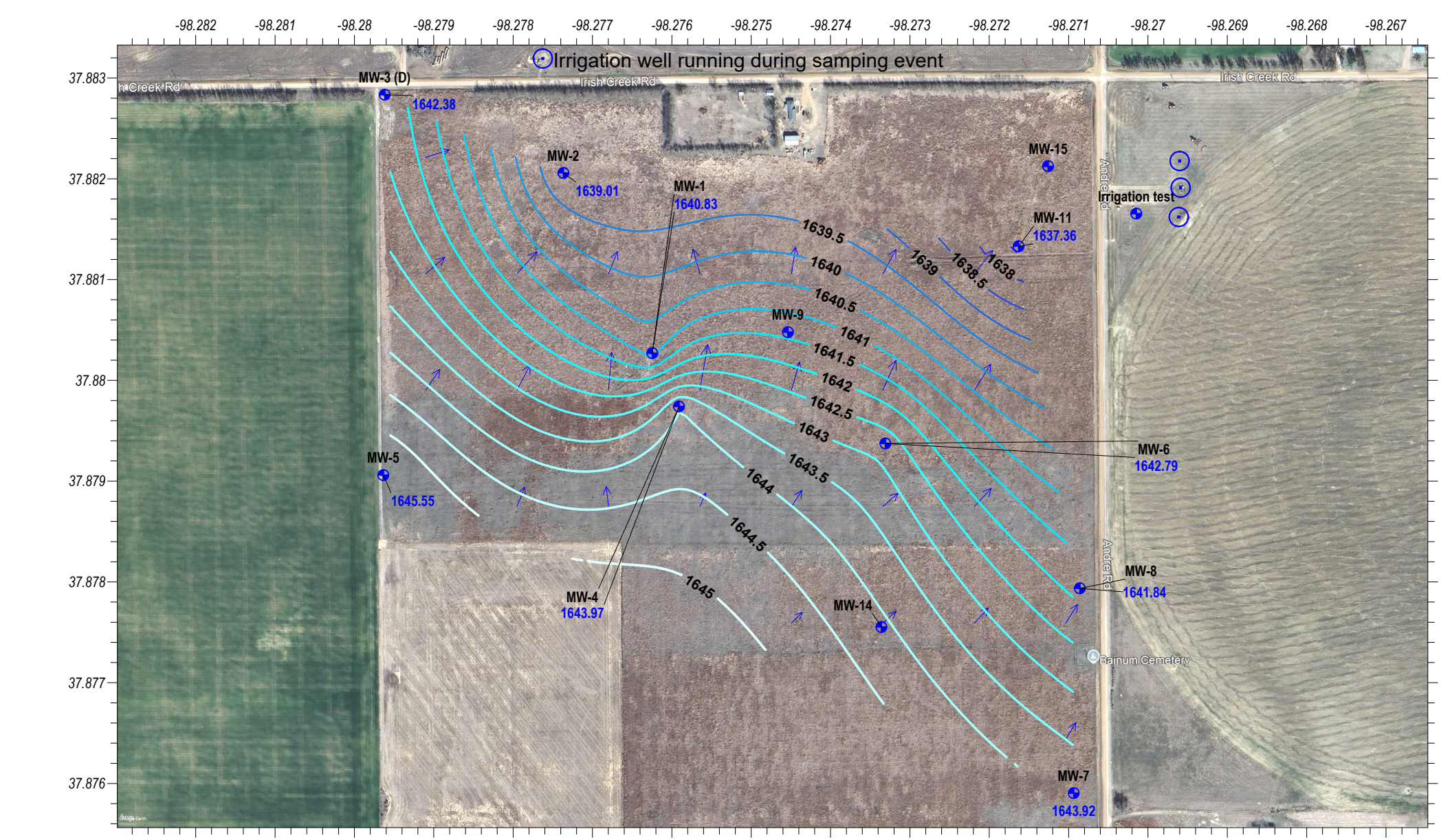
Arlington Contamination Site

Section 14 of Township 25 South and Range 9 West, Reno County, Kansas

2025 Chloride Levels

KCC Project Code #20030016-001 - KCC District #2 Field Office

Wells Sampled on 8/22/2025 - Map Drawn on 9/8/2025 by D Bollenback



KEY

MW-1 -Well Name

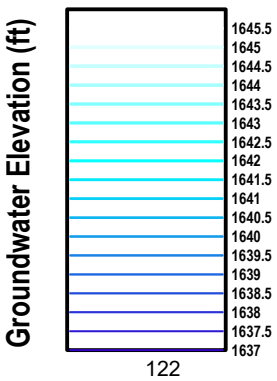
-Monitoring Well

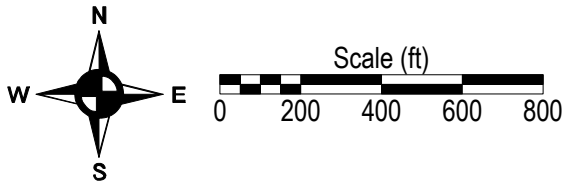
-Irrigation Well

1641 -Static Elevation (ft)

Contour Interval = 0.5'

Air Photo - 3/4/2024 Google Maps





Kansas Corporation Commission

Arlington Contamination Site

Section 14 of Township 25 South and Range 9 West, Reno County, Kansas

2025 Groundwater Elevations

KCC Project Code #20030016-001 - KCC District #2 Field Office

Wells gauged on 8/22/2025 - Map Drawn on 9/5/2025 by D Bollenback

Project: ***Brothers Contamination Site, Rice County, District 2***

Site Location: The Brothers contamination site is nine miles east, two and one-half miles north of Sterling. The legal location is S/2 NE of Section 12, Township 21 South, and Range 7 West, Rice County, Kansas.

Impact/Immediacy: Low immediacy. There are residential wells over a mile to the southeast, located on a side gradient to groundwater flow. Most contamination resides in the upper sands, which are too shallow for use as domestic wells.

Site Description: The location is in the Sand Hills of Rice County. The contaminated groundwater aquifer is a shallow, permeable zone of Pleistocene Dune Sand, consisting of poorly sorted medium to fine sands with silt lenses. Below the upper sands, the Sandborn formation contains dark brown silty clay interbedded with coarser materials, which occur as an aquitard at the site. The Sandborn changes into the Meade Formation, a good water-bearing coarse gravel and sand aquifer. The Meade Formation appears protected from contamination at the Brothers site. The groundwater flow is south-southwest within the Meade, but the upper sands are perched and move via topographic highs and lows during precipitation on top of the Sandborn.

Unusual Problem: Monitoring wells in the Pleistocene Dune Sand onsite have shown that the aquifer has low deliverability in the upper aquifer and is limited, especially during periods of drought. Hydrology in the upper perched aquifer directly connects with precipitation and is hindered by a varying aquitard elevation that stops penetration. This variable elevation can create issues with the entrapment of chlorides and water movement, which does not align with the actual downward gradient.

Status of Project: KCC visited the site in an attempt to collect water samples on September 16th, 2024. This site now only has two monitoring wells and the pond, which KCC sampled annually until 2024. KCC noted that a new No Trespassing sign was hung at the only gate KCC is aware of to enter the site. The gate was heavily barbed-wire closed. KCC did not attempt to access the site due to this new access issue. KCC research shows that The L Shaped, LLC has purchased the land. This entity seems to be located in Madison, Mississippi. KCC has found a mailing address but not a phone number to contact the landowner. KCC noted that many other parcels in the area appeared to have the same new signs installed. KCC attempted to mail a letter to the address found regarding access, but to date has not received a reply. No water samples were taken during 2025.

Level of Remediation Sought:

Ideal: 250 mg/l Chloride
Target: 500 mg/l Chloride

Recommendations for Future Work: KCC recommends that the Brothers Site be closed during the 2025-26 years. There is now only one monitoring well in the upper aquifer, which severely limits hydrological studies of the site. The deeper well shows no contamination. The upper well's chloride is less than 1000 mg/L, although it remains above the 500 mg/L target. Additionally, no domestic or agricultural water wells are near the site. If one were installed in the future, the deeper aquifer would suit most needs, and current water well regulations would prevent the upper sand interval from mingling with the lower aquifer. KCC plans another attempt to contact the landowner for access and to plug the two monitoring wells.

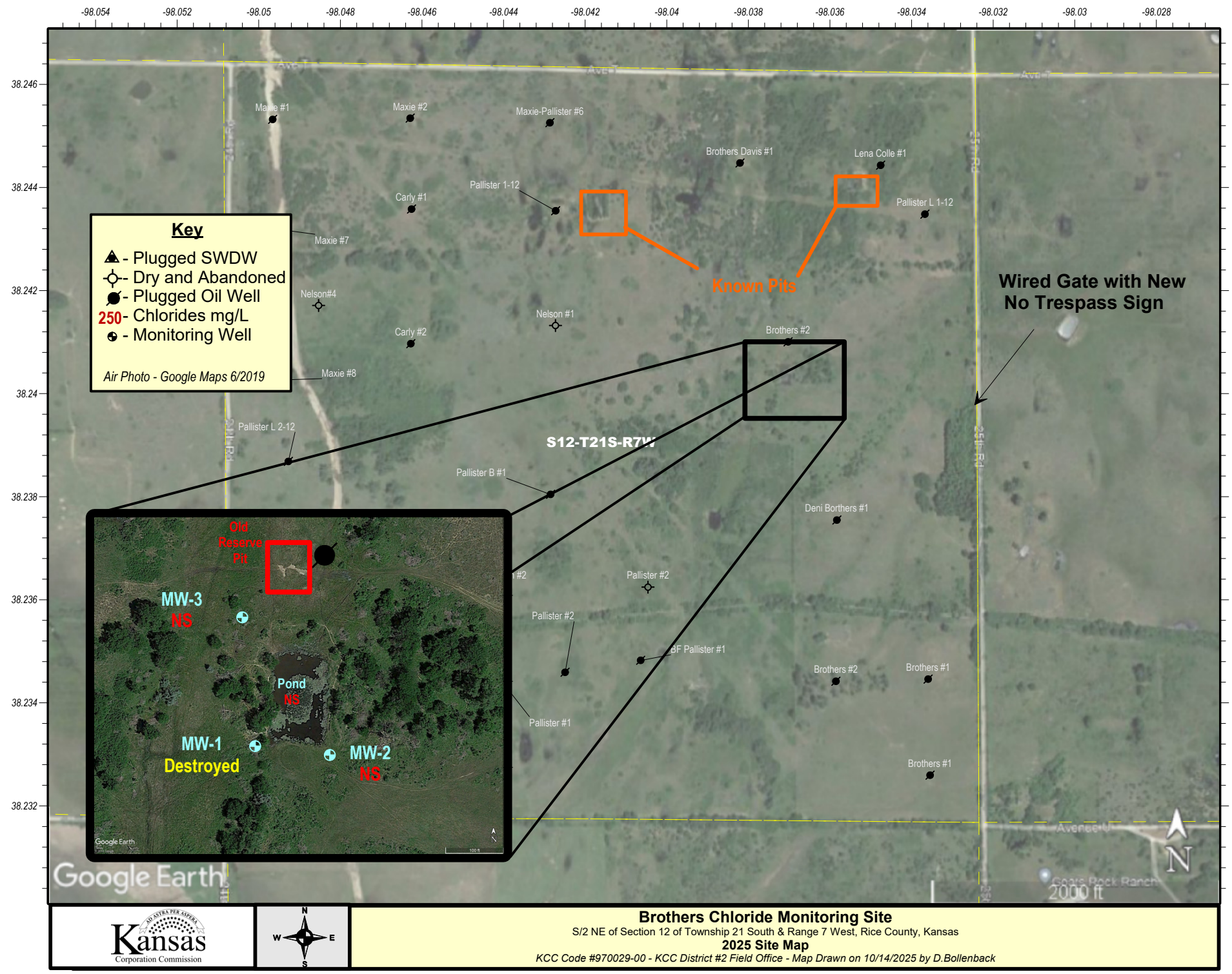
Estimated Total Costs: $1000 for access, plugging, and report writing.

Control No.	Staff Hours/Expenditures	Fund Expenditures FY 2025-26 Total
970029-00	7.5 Hrs / $272.82	$4.26

Current Contaminate Level: Not Sampled **10/14/2025**

Status:

☐ 1. Site Assessment	☐ 2. Short Term Monitoring	☐ 3. Investigation
☐ 4. Long Term Monitoring	☐ 5. Remediation Plan	☐ 6. Installation
☐ 7. Remediation	☐ 8. Post Rem. Monitoring	☒ 9. Resolved



Kansas Corporation Commission

Brothers Chloride Monitoring Site

S/2 NE of Section 12 of Township 21 South & Range 7 West, Rice County, Kansas

2025 Site Map

KCC Code #970029-00 - KCC District #2 Field Office - Map Drawn on 10/14/2025 by D.Bollenback

Project: ***Little River Site, Rice County, District 2***

Site Location: The Little River site is 3.5 miles north and 0.5 miles east of the northeast edge of the city of Little River. The area of contamination is in the SE/4 of Section 29 and NE/4 of Section 32, Township 18 South, and Range 6 West, Rice County.

Impact/Immediacy: The impact is on the city of Little River's groundwater supply from various oil field sources. The KCC has rated the immediacy as high due to its potential impact on the existing public water supply wells.

Site Description: The Little River water wellfield is part of the Odessa Oil Field. The groundwater table in this area is at a depth of thirty feet in the upper Kiowa Sandstone with an aquitard of blue Kiowa Shale at fifty to sixty feet. Groundwater moves slowly toward the south-southeast. The source of the initial contamination was a combination of historical evaporation pits and historical large spills dating back to the late 1950's through 1960's. Spills and line leaks to present day may have also contributed to contamination of the aquifer.

Unusual Problems: There appear to be multiple sources of contamination from past oil and gas production. It is challenging to determine whether samples taken from the PWS wells are properly purged. KCC utilizes conductivity readings during the purging of each well to check for stabilization of conductivity before sampling.

Status of Project: KCC sampled the public water supply wells (PWS) and monitoring wells (MW) on August 15th, 2025. PWS-7 is no longer sampled, as bailers can become caught on an unknown object in the unused well. This well is usually locked to protect the chlorination system for the public water supply; however, it is not in use. The last sampled event for PWS-7 occurred in 2021, at which time the concentration was 200 mg/L, significantly lower than in past sampling events. PMW-8's building is now locked and was not sampled this year. The Little River Site remained stable over the year, with only MW-1 (an increase of 50 mg/L) and PMW-11 (a decrease of 40 mg/L) showing changes exceeding 10 mg/L.

Level of remediation sought:

Ideal: 60 mg/L
Target: 300 mg/L

Recommendation for Future Work: Due to the threat to the public water supply, KCC recommends annual sampling of the public water supply and monitoring wells for 2026. Remedial work is not economical because the chlorides are too low for effective removal techniques, and the aquifer capacity dynamics are too low for recovery wells. KCC will contact the City of Little River regarding access to PMW-8 during the next sampling event.

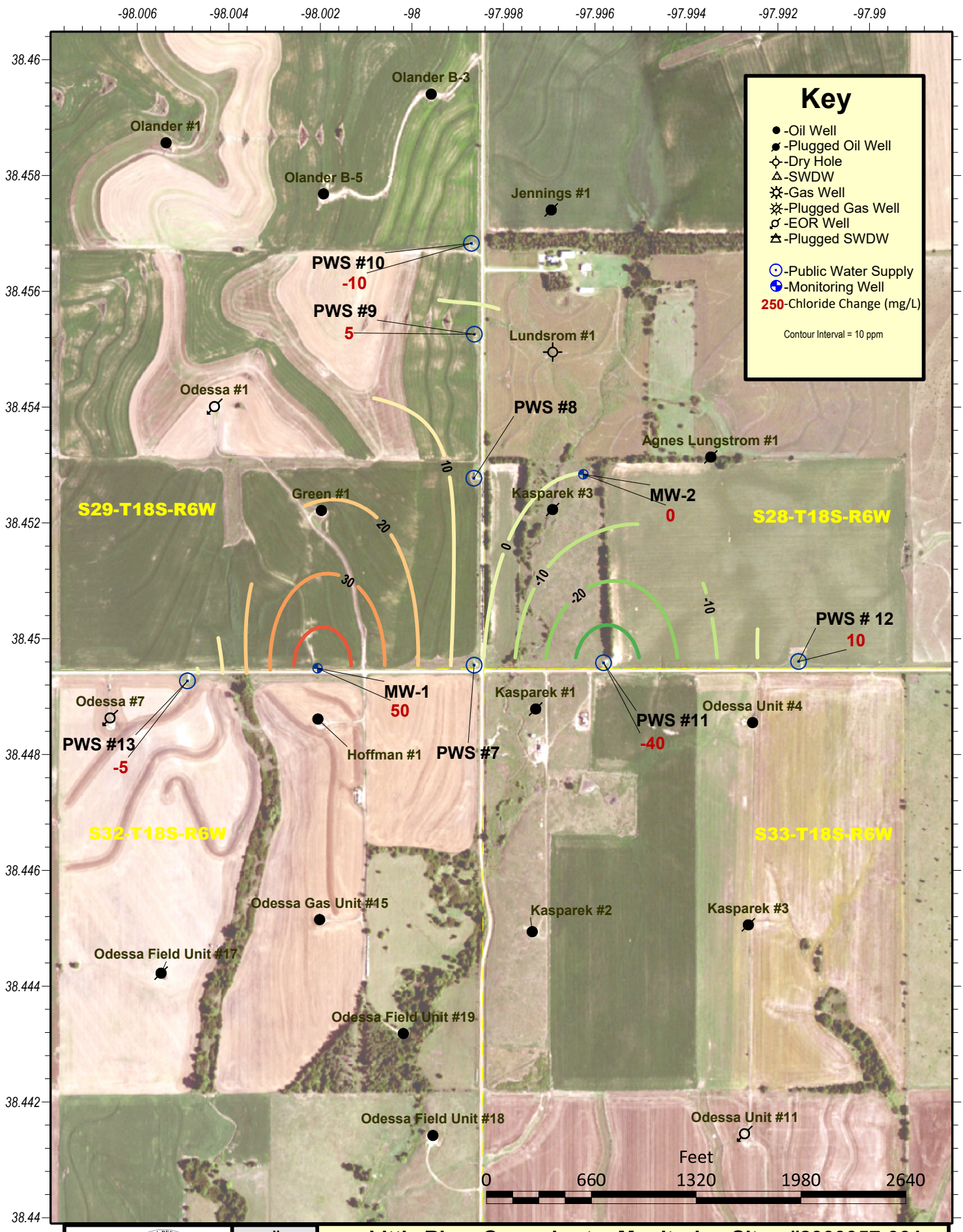
Estimated Total Costs: Time for staff to mobilize to the site and sample the wells over the next year, perform the laboratory work, data entry, mapping, and report creation. The costs should be in the range of $500 to $700.

Control No.	Staff Hours/Expenditures	Fund Expenditures FY 2025/26 Total
20000057-001	18 Hrs. / $646.22	$3,112.20

Current Contaminate Level: 800 mg/L Cl- in MW #1

Status:

☐ 1. Site Assessment	☐ 2. Short Term Monitoring	☐ 3. Investigation
☒ 4. Long Term Monitoring	☐ 5. Remediation Plan	☐ 6. Installation
☐ 7. Remediation	☐ 8. Post Rem. Monitoring	☐ 9. Resolved



Kansas Corporation Commission

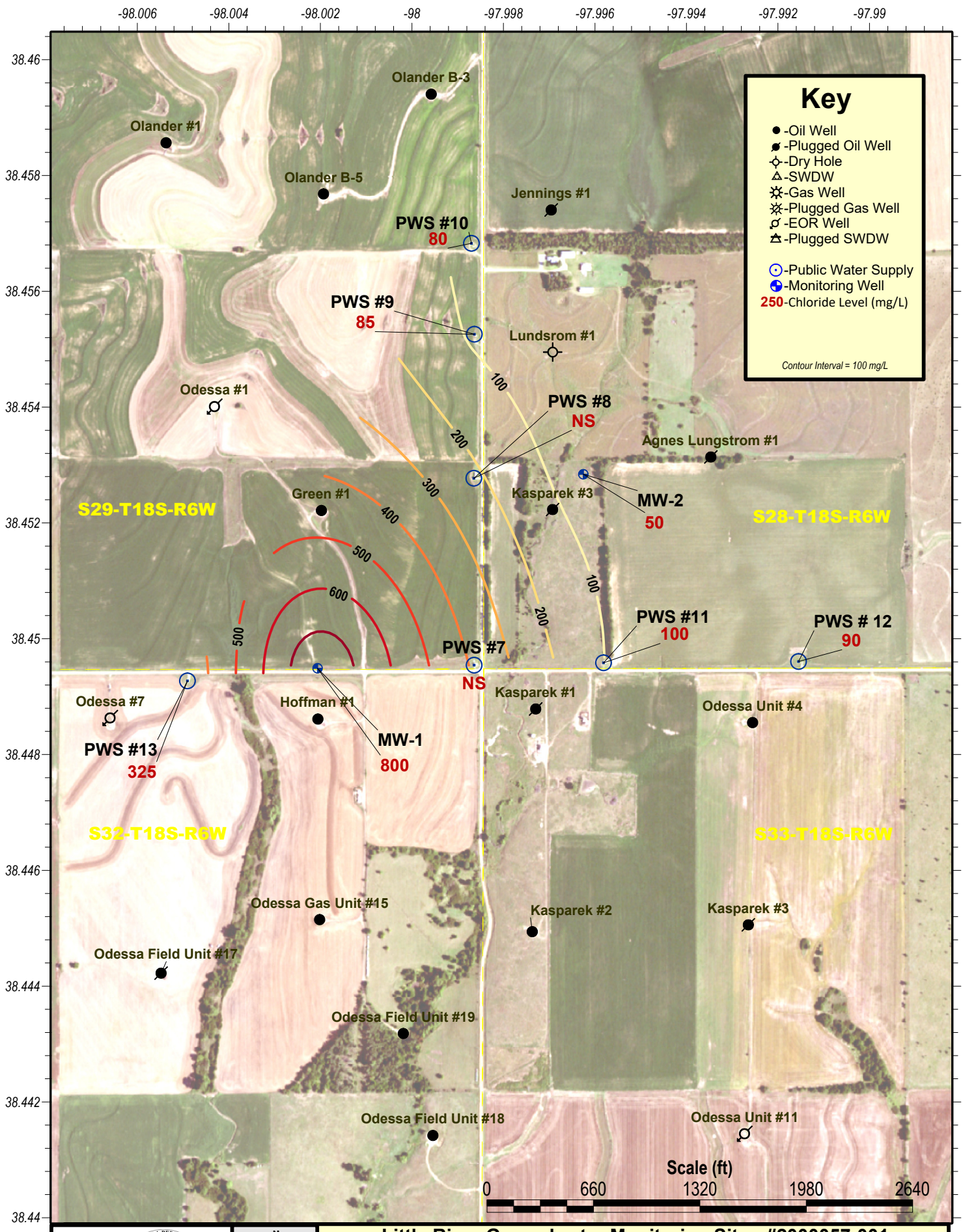
N W E S

Little River Groundwater Monitoring Site - #2000057-001

Section 29 of Township 18 South & Range 6 West, Rice County, Kansas

Change in Chloride Levels from 2024 to 2025

District #2 - Sampled on 8/15/2025 - Map Drawn on 9/24/2025 by D.Bollenback



Kansas Corporation Commission

Little River Groundwater Monitoring Site - #2000057-001

Section 29 of Township 18 South & Range 6 West, Rice County, Kansas

2025 Chloride Levels

District #2 = Sampled on 8/16/2025 - Map Drawn on 9/24/2025 by D. Bollenback

Project: *Stowe-Zaid Contamination Site*, Rice County, District 2

Site Location: The site is five miles south of US 56 and Plum Street on the east side of Rice County. This site is located in the northwest of the Welch-Bornholdt oil field, and the lease no longer has active oil and gas production. The location is the SE/4 of the NE/4 of Section 24, Township 20 South, Range 6 West, in Rice County.

Impact/Immediacy: Brine contamination impacts local soil and groundwater. KCC has classified this site as low immediacy. KCC monitors this site due to the potential for the chloride plume to impact domestic and stock wells, as well as the aquifer of the Little Arkansas River. A rural water line in the area can provide services to the homes.

Site Description: Permian contact with the Quaternary sediments transects this site from northwest to southeast. The erosion of the Ninnescah Shale by the Little Arkansas River has filled the floodplain with alluvium. There are approximately 40-50 feet of elevation change in the northeast corner of the section. There has been a historical scar in the alluvium just south and west of this contact. A 1954 aerial photograph shows numerous oil and gas wells in Section 24. Historically, a tank battery was located on the west side of Plum Road and northeast of the scar. The battery was positioned within the Ninnescah Shale beds and at a higher elevation than the scar. Higher historical elevation suggests that possible spills and leaks from the tank battery may have entered the subsurface and flowed down a gradient on top of the shale or through fractures and bedding planes until entering the Floodplain Alluvium, including the scar's location. Significant remnants of evaporation pits exist in the north and east of the site.

Unusual Problems: The groundwater table is very shallow due to the proximity to the Arkansas River. MW-2 is located at an agricultural boundary, where the local farmer plants within a foot of each other, making access difficult. KCC has had to repair this well multiple times over the years.

Status of the Project: KCC performed groundwater sampling on September 16, 2025. Due to crops and access issues, KCC hiked to the wells and hand-bailed them instead of utilizing a submersible pump. The lower aquifer well, MW-1D, was tested at the KCC lab and had a chloride concentration of 230 mg/L, 10 mg/L lower than last year. This well has decreased in the last two years. MW-2, at the toe of the scar, also showed an 800 mg/L decrease in chlorides from 2024 to 1,000 mg/l. The substantial drop in chlorides is most likely due to the heavy precipitation that has occurred in the region during the summer of 2025. It should be noted that both wells have risen over the past years. In 2010, MW-1D was 170 mg/L, while MW-2 was only 800 mg/L. During the 2025 sampling, the landowner planted sunflowers in the field, which KCC noted grew exceptionally well within the historical scar.

Level of Remediation Sought:

Ideal: 50 mg/l
Target: 350 mg/l

Recommendation for Future Work: KCC recommends continuing to sample the monitoring wells. The site has only two monitoring wells, one in the shallow toe and the other in the deep aquifer. If the immediacy of this site increases, the first step would be to drill and install more monitoring wells to delineate the plume. In addition, long-term monitoring is recommended for the site unless the lower aquifer continues to experience a substantial increase in chlorides, which would warrant further investigation into the source. A deep aquifer investigation will trigger if the deep aquifer (MW-1D) reaches the 350 mg/L target level.

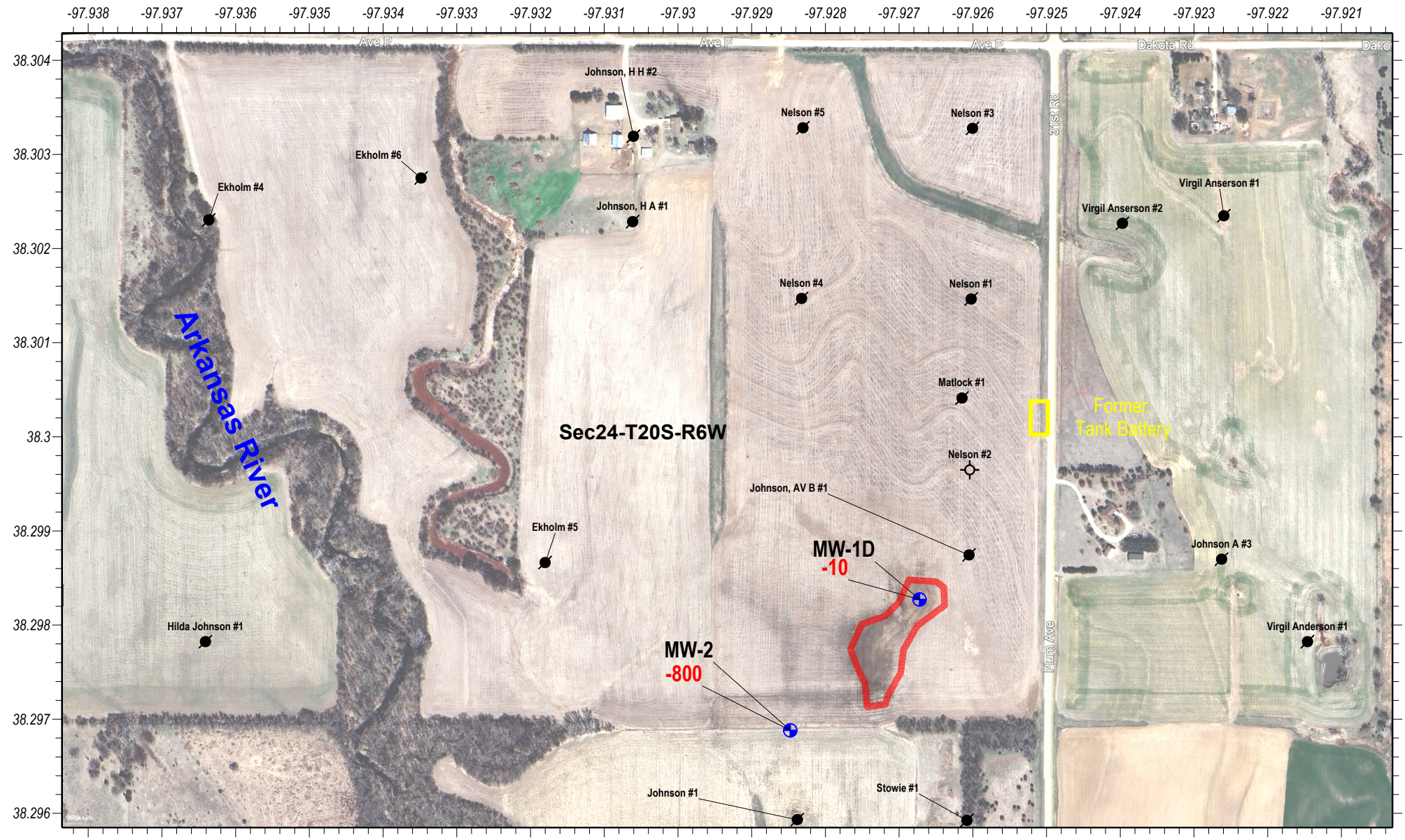
Estimated Total Costs: This site is expected to incur annual costs of $350 for field inspections, monitoring, reporting, and well repair. KCC could research ideas/alternatives to remediate the site or expedite the attenuation.

Control No.	Staff Hours/Expenditures	Fund Expenditures FY 2025/26	Fund Expenditures Total
20000035-001	9.5 Hrs. / $340.01		$4,057.85

Current Contaminate Level: 1,000 mg/l Cl-, MW #2
230 mg/l Cl-, MW-1 Deep Aquifer

Status:

☐ 1. Site Assessment	☐ 2. Short Term Monitoring	☐ 3. Investigation
☒ 4. Long Term Monitoring	☐ 5. Remediation Plan	☐ 6. Installation
☐ 7. Remediation	☐ 8. Post Rem. Monitoring	☐ 9. Resolved



Key

- -Monitoring Well
- 20 -Chloride Level mg/L
- - Historical Scar

Air Photo = Google Maps 4/1/2024

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Scale (ft)
0 300 600

Kansas Corporation Commission

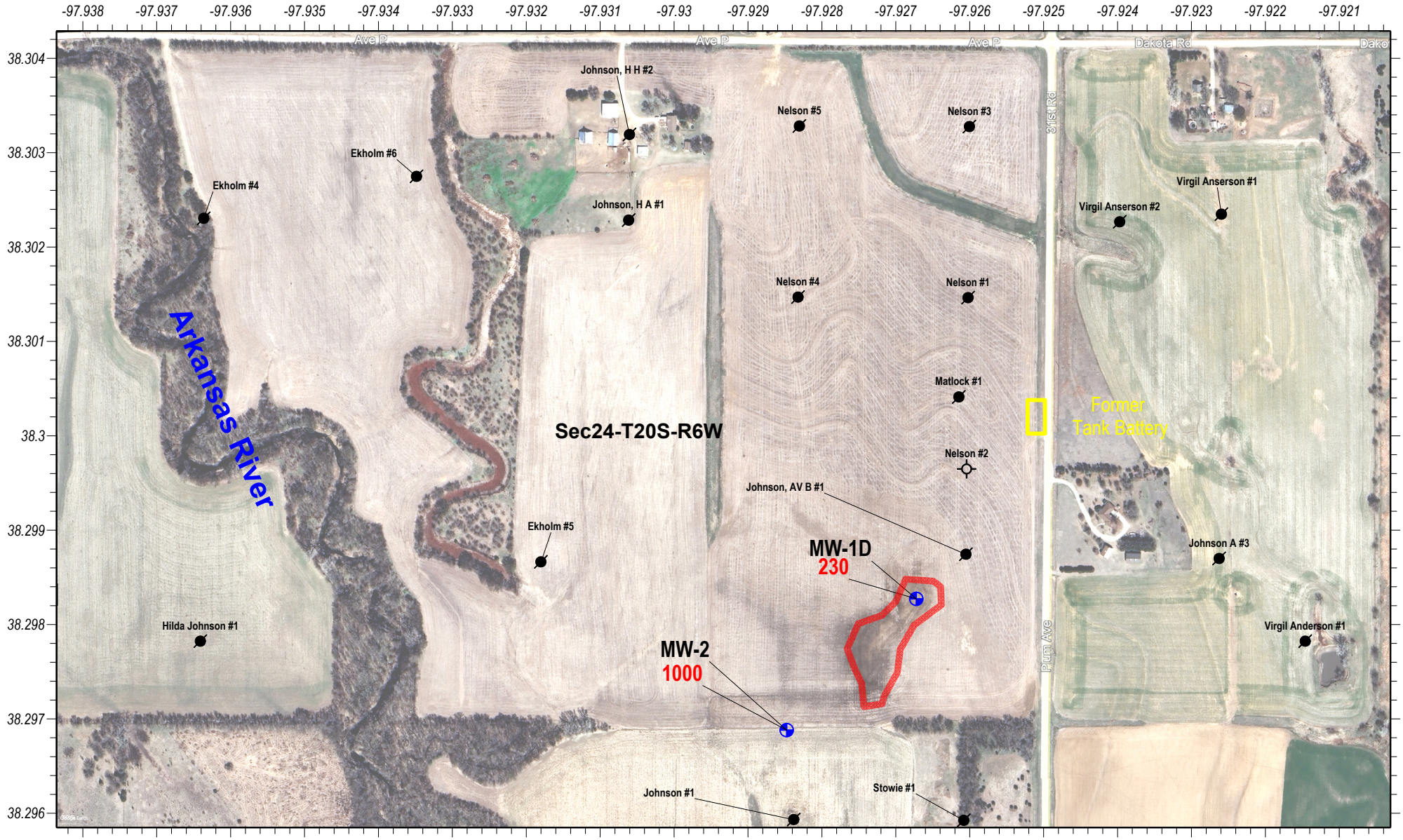
Stowe-Zaid Shallow Brine Monitoring Site

Section 24 of Township 20 South and Range 6 West, Rice County, Kansas

Chloride Level Change from 2024 to 2025

KCC District #2 Field Office - KCC# 20000035-001

Wells sampled on 9/16/2025 - Map drawn on 9/29/2025 by D.Bollenback



Key

- -Monitoring Well
- 20 -Chloride Level mg/L
- - Historical Scar

Air Photo = Google Maps 4/1/2024

N
W
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Scale (ft)
0 300 600

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Kansas
Corporation Commission

Stowe-Zaid Shallow Brine Monitoring Site

Section 24 of Township 20 South and Range 6 West, Rice County, Kansas

2025 Chloride Levels

KCC District #2 Field Office - KCC# 20000035-001

Wells sampled on 9/16/2025 - Map drawn on 9/29/2025 by D.Bollenback

Project: ***Elm Creek Contamination Site, Rooks County, District 4***

Site Location: Sections 19, 20, 29, 30, 31, and 32 of Township 7 South, Range 17 West
Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, and 32 of Township 8 South, Range 17 West
Sections 5 and 6 of Township 9 South, Range 17 West, Rooks County

Impact/Immediacy: The Elm Creek alluvial aquifer has been contaminated by past oil field activity. Both domestic and stock wells are affected. The area is serviced by Rooks County Rural Water District #3, and the immediacy level for this site should be rated as moderate.

Site Description: Elm Creek is a tributary to the South Fork Solomon River, which it enters just downstream of Stockton, Kansas. Numerous complaints beginning in the mid 1900's led to widespread sampling, and the designation of approximately 20 square miles as the site. A series of monitoring wells were completed in the alluvial deposits of the drainage near the confluences of other streams with Elm Creek in an attempt to constrict the size of the contamination site by identifying the direction from which pollution originated. The installation of the monitor well net was completed in May of 1998, and sampled for 5 years by a third party. Following the sunset of the sampling contract, the well net was sampled quarterly for three years, and biannually for two years. Sampling is now performed annually by KCC staff.

Unusual Problems: The history of contamination in the Elm Creek area is extensive, and many of the possible sources of pollution were insufficiently documented. Additionally, the large areal extent of the site poses challenges for investigation and remediation.

Status of Project: Long-term monitoring has revealed that the chloride concentrations in the monitoring wells have remained the highest near the south end of the site. Presently, the chloride level in even the most severely impacted areas of the site does not preclude use of the water for stock use, irrigation of certain plants, or general non-potable use. Only one monitoring well contains chloride ions in concentrations which are above what is considered to be freshwater (500 ppm), there are four below the freshwater threshold, but above drinking water standards (250 ppm), and eight wells are at or below the chloride concentration threshold for water suitable for human consumption. One well has been destroyed. An attempt to repair the well will be made.

Level of Remediation Sought:
Ideal: 250 ppm Chloride
Target: 500 ppm Chloride

Recommendations for Future Work: While the trend in contamination distribution has remained relatively stable, long-term monitoring should continue until the target level is reached, or the site parameters change in such a way as to warrant further investigation and remedial efforts.

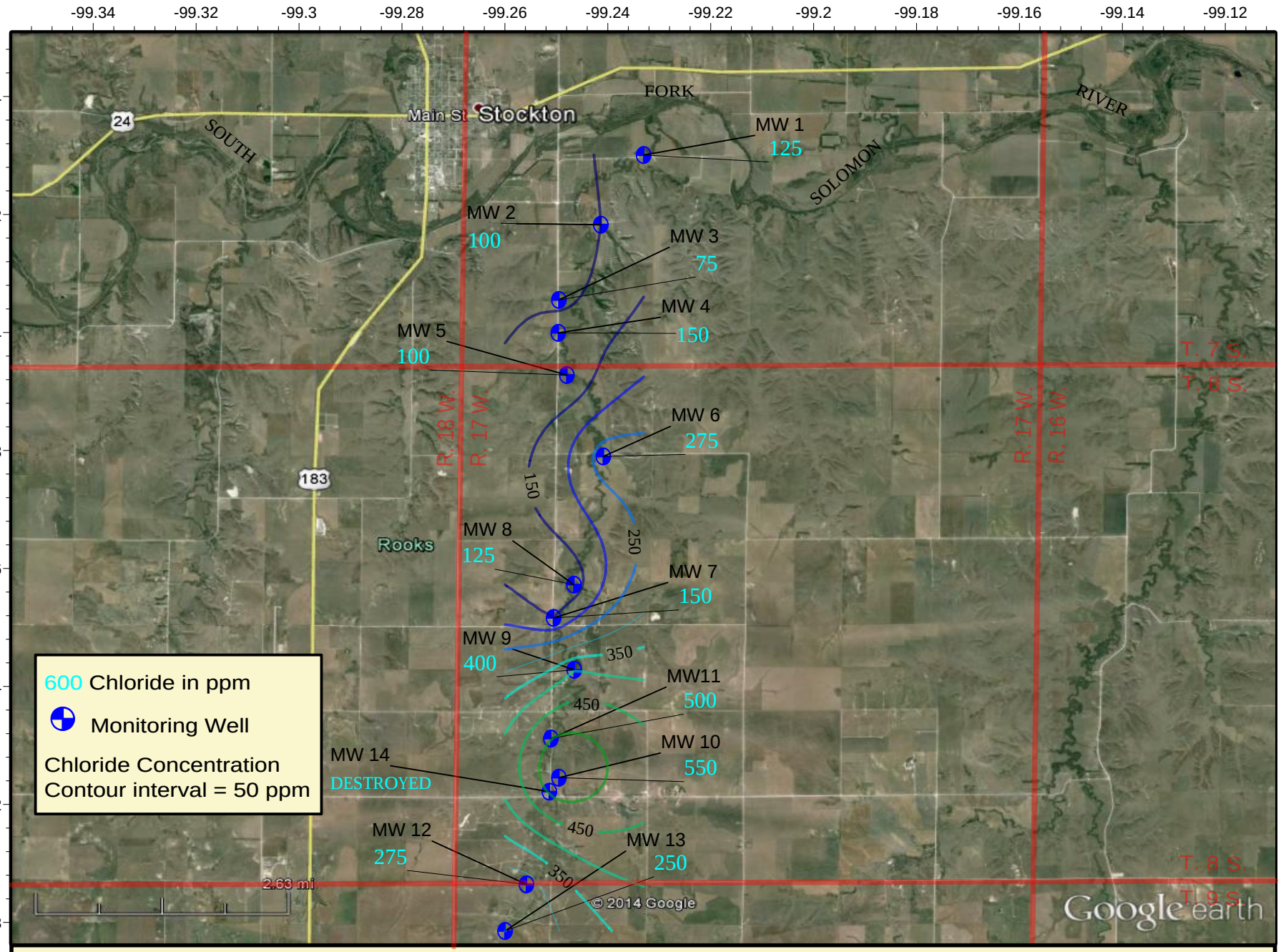
Estimated Total Cost: If warranted, remediation costs could reach a total of $250,000.

Control No.	**Staff Hours/Expenditures**	**Fund Expenditures FY 2025/26**	**Total**
970043-00	**12 Hrs. / $417.15**		**$29,212.25**

Current Contaminate Level: 75 ppm to 550 ppm Cl^-

Status:

☐ **1. Site Assessment**	☐ **2. Short Term Monitoring**	☐ **3. Investigation**
☒ **4. Long Term Monitoring**	☐ **5. Remediation Plan**	☐ **6. Installation**
☐ **7. Remediation**	☐ **8. Post Rem. Monitoring**	☐ **9. Resolved**



Elm Creek Groundwater Monitoring Site

N W E S

Multiple Sections of Townships 7, 8, and 9 South, Range 17 West, Rooks County, Kansas
2025 Groundwater Chloride Levels
District #4 - Sampled September 2025 - Map Drawn on 9/30/2025 by C. Neeley

Kansas Corporation Commission

Project: ***Irey-Hrabe Contamination Site, Rooks County, District 4***

Site Location: Section 1 and 12 of Township 9 South, Range 17 West, Rooks County.

Impact/Immediacy: The groundwater near a former homestead has been impacted by repeated releases of brine on the surface and in the subsurface. The immediacy for this site is rated as moderate.

Site Description: A subtle drainage runs through the site from south to north and an abandoned farmstead is situated near this draw. Six water wells were dug on the property, and the historical information indicates that these may be producing water from the Codell Sandstone and near surface deposits concurrently; however, this has not been confirmed. Contamination at the site can be attributed to an injection well which had pressurized a number of near-surface formations through failed casing, and over pressurization. Additional sources are the numerous spills that have occurred over a period of 50 years, and multiple surface pit.

Unusual Problems: None.

Status of Project: The open wells were sampled early in 2017, and the concentrations of chlorides had dramatically increased to 44,000 ppm in one, and 7,500 ppm in another. The well closest to the abandoned farmstead was 1,150 ppm. The open wells with the highest chlorides were pumped out, and the water was taken to a SWD well. The groundwater coming into the south well was sampled and determined to be approximately 3,500 ppm. Test holes were hand augured to a depth of 6' to 10' in 2018, and the concentrations ranged from 1,100 ppm to 17,000 ppm. These tests conform to the known site history and will be used to plan future exploratory and remedial work. In 2024, the three hand dug windmills were 10,250 ppm, 8,250 ppm, and 2,250 ppm. In 2025, The contamination in the dug well nearest the road remained at 8,250, and the third well, closest to the former home fell to 1,550 ppm.

Level of Remediation Sought:
Ideal: 250 ppm Chloride
Target: 500 ppm Chloride

Recommendations for Future Work: While samples have been collected through existing wells, these do not meet quality control standards for groundwater sampling. A network of monitoring wells and exploratory test holes should be drilled at this site to delineate the extent of the pollution. The open wells will be pumped out on a periodic basis and eventually plugged. The funding source for plugging operations must be determined, as water wells are generally outside of the Corporation Commission's jurisdiction.

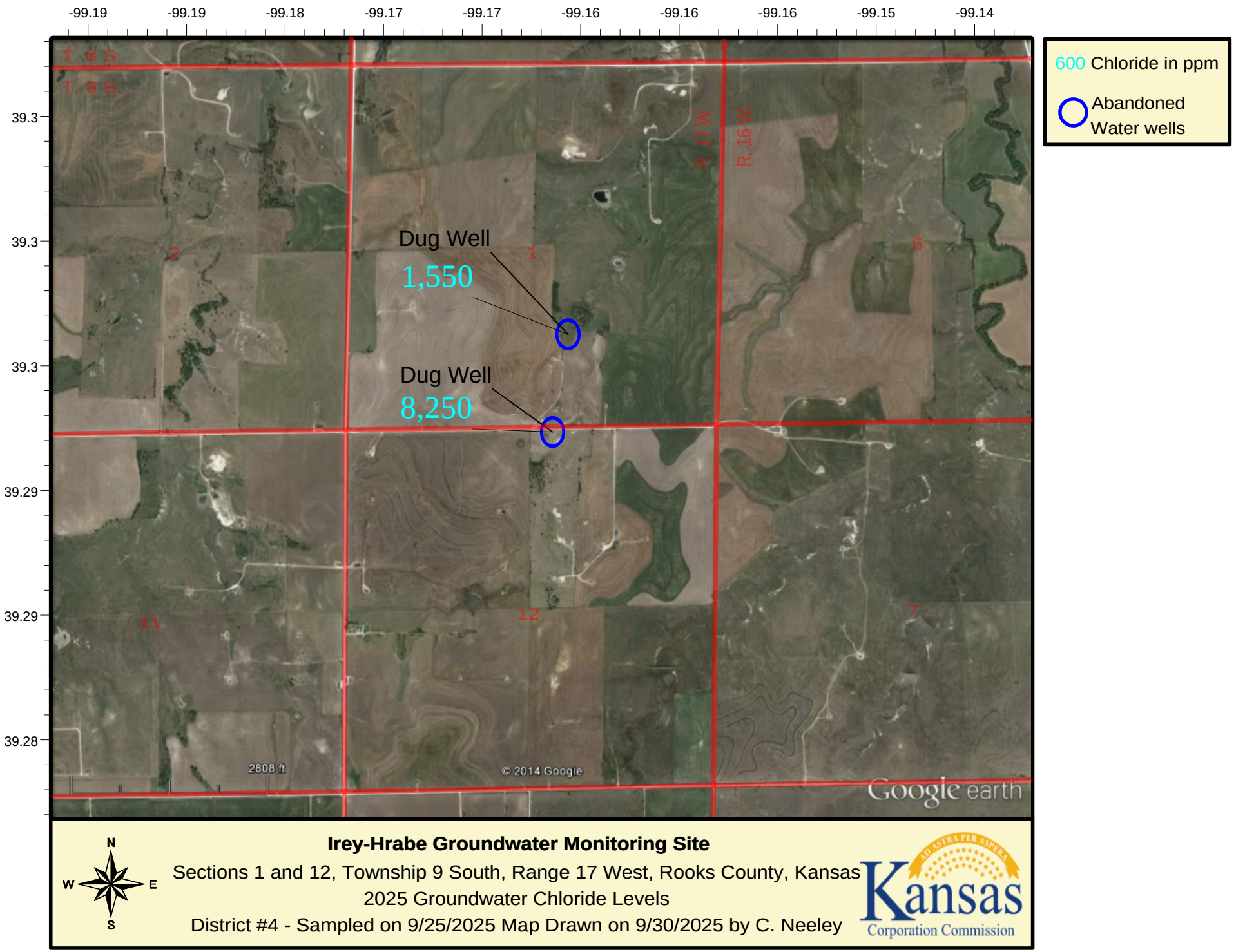
Estimated Total Costs: $15,000.00.

Control No.	**Staff Hours/Expenditures**	**Fund Expenditures FY 2025/26 Total**
970053-00	**3 Hrs. / $114.74**	

Current Contaminate Level: 1,550 to 8,250 ppm

Status:

☐ **1. Site Assessment**	☐ **2. Short Term Monitoring**	☒ **3. Investigation**
☒ **4. Long Term Monitoring**	☐ **5. Remediation Plan**	☐ **6. Installation**
☐ **7. Remediation**	☐ **8. Post Rem. Monitoring**	☐ **9. Resolved**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T. 8 S.
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R. 17 W.
R. 16 W.
Dug Well
1,550
Dug Well
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11
12
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2808 ft
© 2014 Google
Google earth
600 Chloride in ppm
Abandoned Water wells
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Irey-Hrabe Groundwater Monitoring Site
Sections 1 and 12, Township 9 South, Range 17 West, Rooks County, Kansas
2025 Groundwater Chloride Levels
District #4 - Sampled on 9/25/2025 Map Drawn on 9/30/2025 by C. Neeley
AD ASTRA PER ASPERA
Kansas
Corporation Commission

Project: ***Schruben-Rogers Contamination Site, Rooks County, District 4***

Site Location: SE/4 of Section 18, Township 7 South, Range 17 West, Rooks County.

Impact/Immediacy: Groundwater contained in an alluvial aquifer has been impacted by oil field brine. The immediacy for this site is rated as low.

Site Description: This site is located on the eastern edge of the City of Stockton, approximately one third of a mile from the South Fork Solomon River. The water wells in the area are used primarily for lawn and garden and stock purposes, and draw water from an alluvial terrace. The soil in the area of the impacted wells is rapidly permeated by contaminants, making the water quality sensitive to lease practices. Extensive past studies failed to identify a primary source for the brine, but a number of potential causes of the pollution were noted. These potential sources are generalized as oil field practices rather than delineated definitively, and contribute to an accumulative effect. Remediation was not initiated because a significant reduction in the chlorides in the area wells was observed, and there is the availability of other methods for obtaining water, i.e. municipal sources and reverse osmosis treatments.

Unusual Problems: None.

Status of Project: Multiple potential sources of pollution in the area have been removed over the last several years. The chloride concentration in the well on the Rogers' property has fallen appreciably since 1986, when the chloride concentration was 8,450 ppm. Since 2008, the chloride levels have remained relatively stable in the range of 450 ppm to 750 ppm. In 2018, the chloride concentration was determined to be 400 ppm, 325 ppm in 2019, and 375 ppm in 2020. In 2021, the concentration was 450 ppm, 475 ppm in 2022, 550 ppm in 2023, 450 ppm in 2024, and 425 ppm in 2025.

Level of Remediation Sought:
Ideal: 100 ppm Chloride
Target: 250 ppm Chloride

Recommendations for Future Work: This site will be monitored annually to determine if the removal of potential sources has contributed to the reduction in contaminant levels. If additional work is warranted due to a rise in contaminant levels, additional geophysical and field research may be conducted in an effort to better delineate a source.

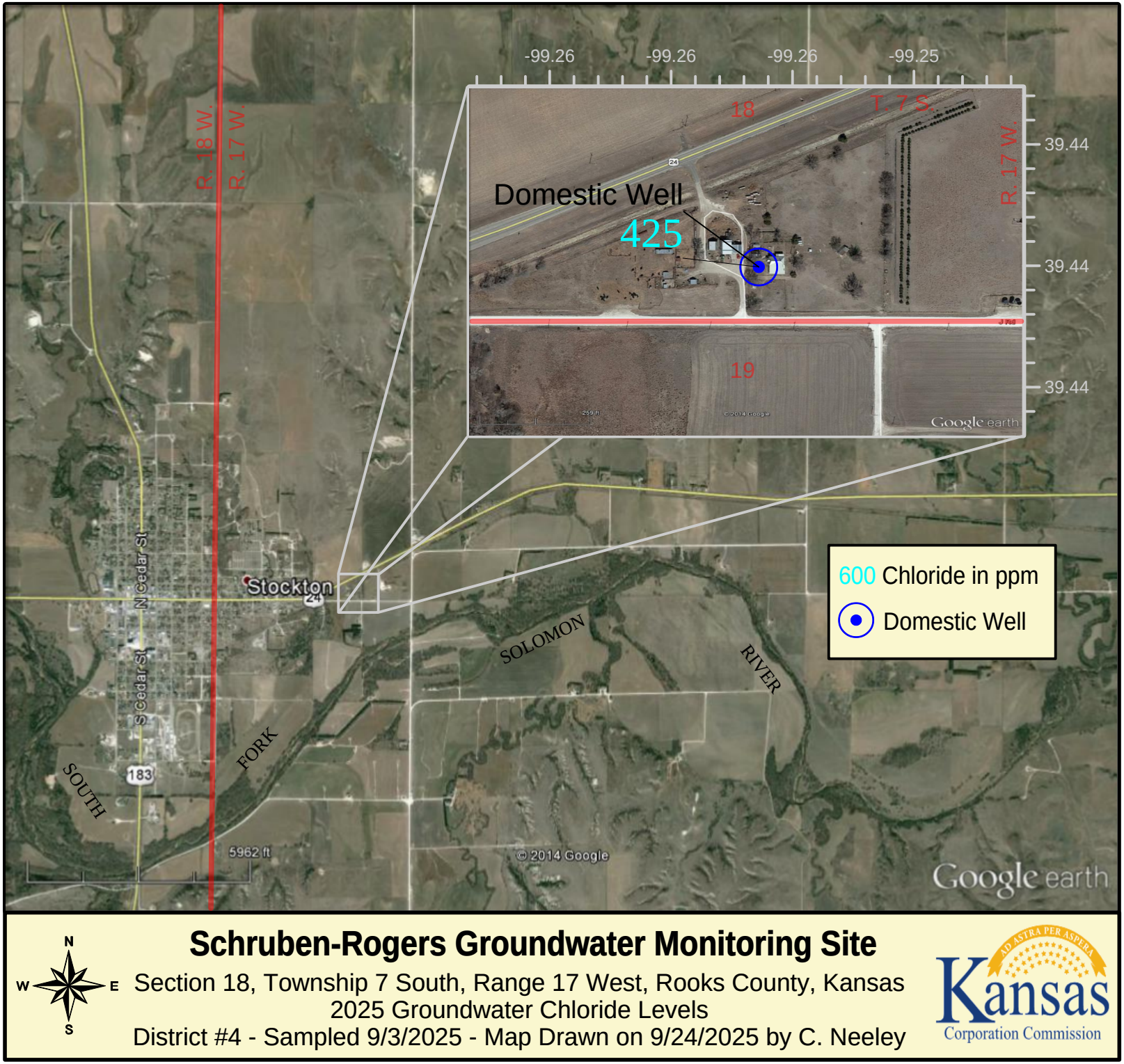
Estimated Total Costs: $2000.

Control No.	**Staff Hours/Expenditures**	**Fund Expenditures FY 2025/26**	**Total**
970014-00	**4 Hrs. / $148.34**		

Current Contaminate Level: 425 ppm Cl^-

Status:

☐ **1. Site Assessment**	☐ **2. Short Term Monitoring**	☐ **3. Investigation**
☒ **4. Long Term Monitoring**	☐ **5. Remediation Plan**	☐ **6. Installation**
☐ **7. Remediation**	☐ **8. Post Rem. Monitoring**	☐ **9. Resolved**



Schruben-Rogers Groundwater Monitoring Site

Section 18, Township 7 South, Range 17 West, Rooks County, Kansas
2025 Groundwater Chloride Levels
District #4 - Sampled 9/3/2025 - Map Drawn on 9/24/2025 by C. Neeley

Kansas Corporation Commission

Project: ***Maupin Contamination Site, Russell County, District 4***

Site Location: SE/4 of Section 9, Township 11 South, Range 15 West, Russell County.

Impact/Immediacy: Brine contamination of a shallow aquifer and spring which is utilized for cattle. Immediacy level is rated as low.

Site Description: The site is rangeland at the head of a drainage within the Saline River Basin. Originally, the primary source of water for cattle in the pasture was a spring which had been developed by diverting its water to an open stock tank. Nearby water wells and ponds were experiencing increases in chloride concentration by 1956, and a complaint regarding high chlorides in this spring was made in 1991. Following an investigation, five monitoring wells were drilled on the location, and the waters of this basin ranged in chlorides, including the spring, from 200 ppm to 3,400 ppm throughout the history of sampling. The pasture is now served by the Ellsworth Rural Water District #1, and an additional stock tank filled by this source is available for the cattle to consume

Unusual Problems: None.

Status of Project: The chloride concentrations in the monitoring wells are 350 ppm at monitoring well 3, and 750 ppm at monitoring well 5. The concentration of the spring-fed stock tank is 800 ppm. Currently, these levels do not warrant additional action.

Level of Remediation Sought:
Ideal: 250 ppm Chloride
Target: 500 ppm Chloride

Recommendations for Future Work: This site will continue to be monitored on an annual basis until closure.

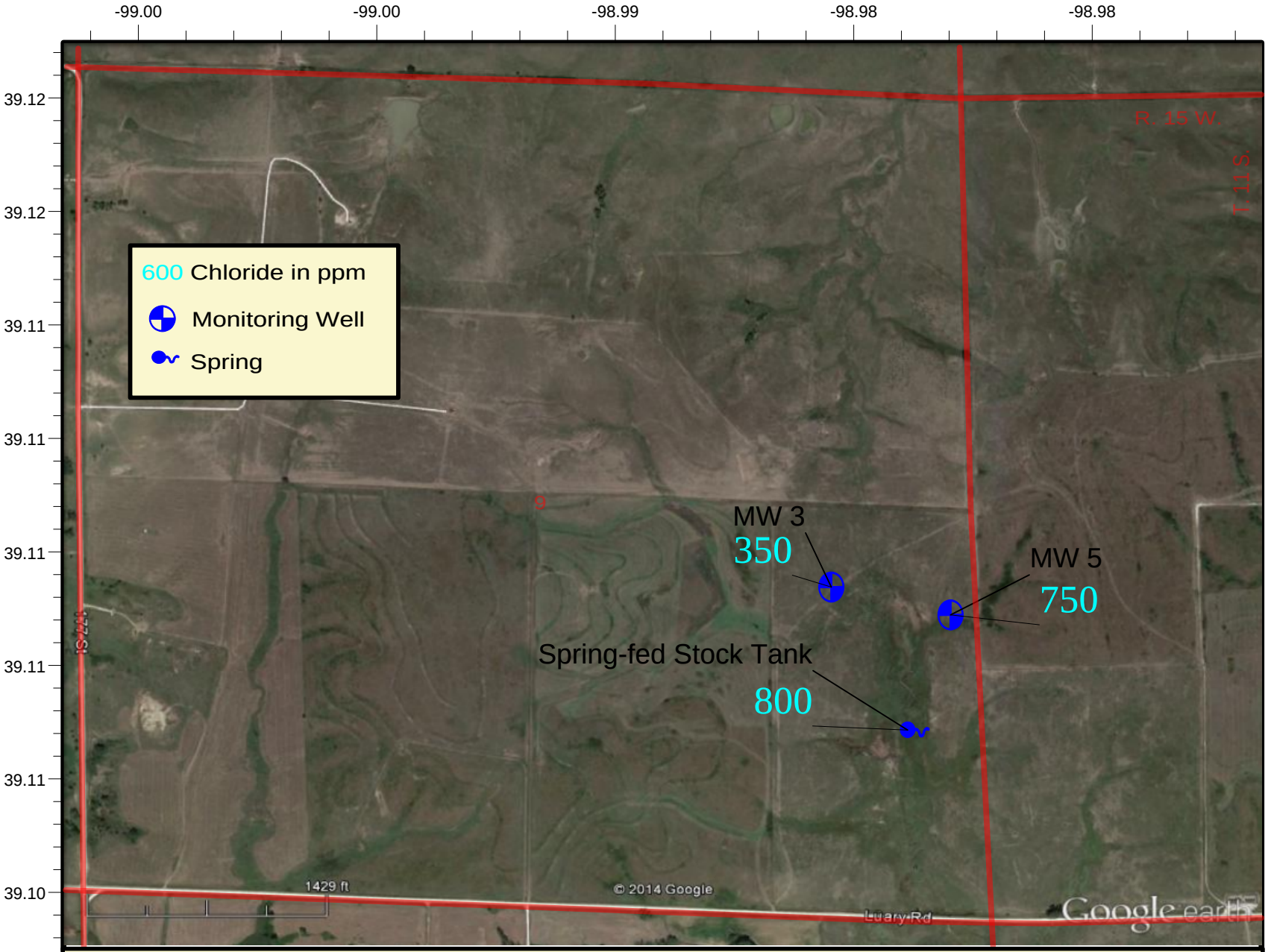
Estimated Total Costs: $2000.00.

Control No.	**Staff Hours/Expenditures**	**Fund Expenditures FY 2025/26 Total**
970068-00	**9 Hrs. / $301.78**	

Current Contaminate Level: 350 ppm to 800 ppm Cl^-

Status:

☐ **1. Site Assessment**	☐ **2. Short Term Monitoring**	☐ **3. Investigation**
☒ **4. Long Term Monitoring**	☐ **5. Remediation Plan**	☐ **6. Installation**
☐ **7. Remediation**	☐ **8. Post Rem. Monitoring**	☐ **9. Resolved**



Maupin Groundwater Monitoring Site

Section 9, Township 11 South, Range 15 West, Russell County, Kansas

2025 Groundwater Chloride Levels

District #4 - Sampled on 3/11/2025 Map Drawn on 9/24/2025 by C. Neeley

Kansas Corporation Commission

Project: ***City of Russell Contamination Site, Russell County, District 4***

Site Location: Within and around the City of Russell, in parts of Township 13 South, Range 14 West and Township 14 South, Range 14 West, Russell County.

Impact/Immediacy: Brine contamination of a shallow aquifer utilized primarily for lawn and garden purposes such as irrigation of lawns. Immediacy level is rated as low.

Site Description: Potential sources include the approximately 334 wells drilled either in the city limits or in close proximity to the city limits, and the associated drill pits, lead lines, tank battery sites, brine tanks, brine lines, and emergency pits. In addition, there are 36 oil wells and UIC wells within this site that are either abandoned or have little or no documentation to confirm that they have been plugged. Test holes were drilled in the area during the summer of 2001 to delineate the source of the contamination. Data collected through the test holes and other research indicated that the major contributor of chloride ions may be a former brine pit located to the northwest of the city. However, there has been extensive oil and gas development in the same vicinity, and the contributions from old drill pits and line leaks has not been determined.

Unusual Problems: The investigation of all potential contamination sources would be costly and not without challenges. If remediation is initiated, the disposal of contaminated water would incur severe costs and logistical problems. Access is an issue for this site, as there are no KCC owned monitoring wells. Monitoring is achieved through the use of privately owned wells.

Status of Project: Between 2019 and 2023, three wells have been sampled. The three wells form an east-west line of evenly spaced wells approximately 350' in length at the north end of the neighborhood, near a small drainage running southeast through town. The western-most well was sampled last in 2019 and was 700 ppm. A well across the street to the east was sampled in 2020 and was 670 ppm. In 2021 and 2022, it was 650 ppm but increased to 1,250 ppm in 2023. The eastern well was sampled in 2021 and was at 1,600 ppm.

Level of Remediation Sought:
Ideal: 500 ppm Chloride
Target: 1000 ppm Chloride

Recommendations for Future Work: Further research may be needed to determine whether remediation is justifiable, and what action should be taken. Additional samples will be collected in the future to determine the configuration of the brine plume. Monitoring wells should be drilled on city-owned easements to address access limitations.

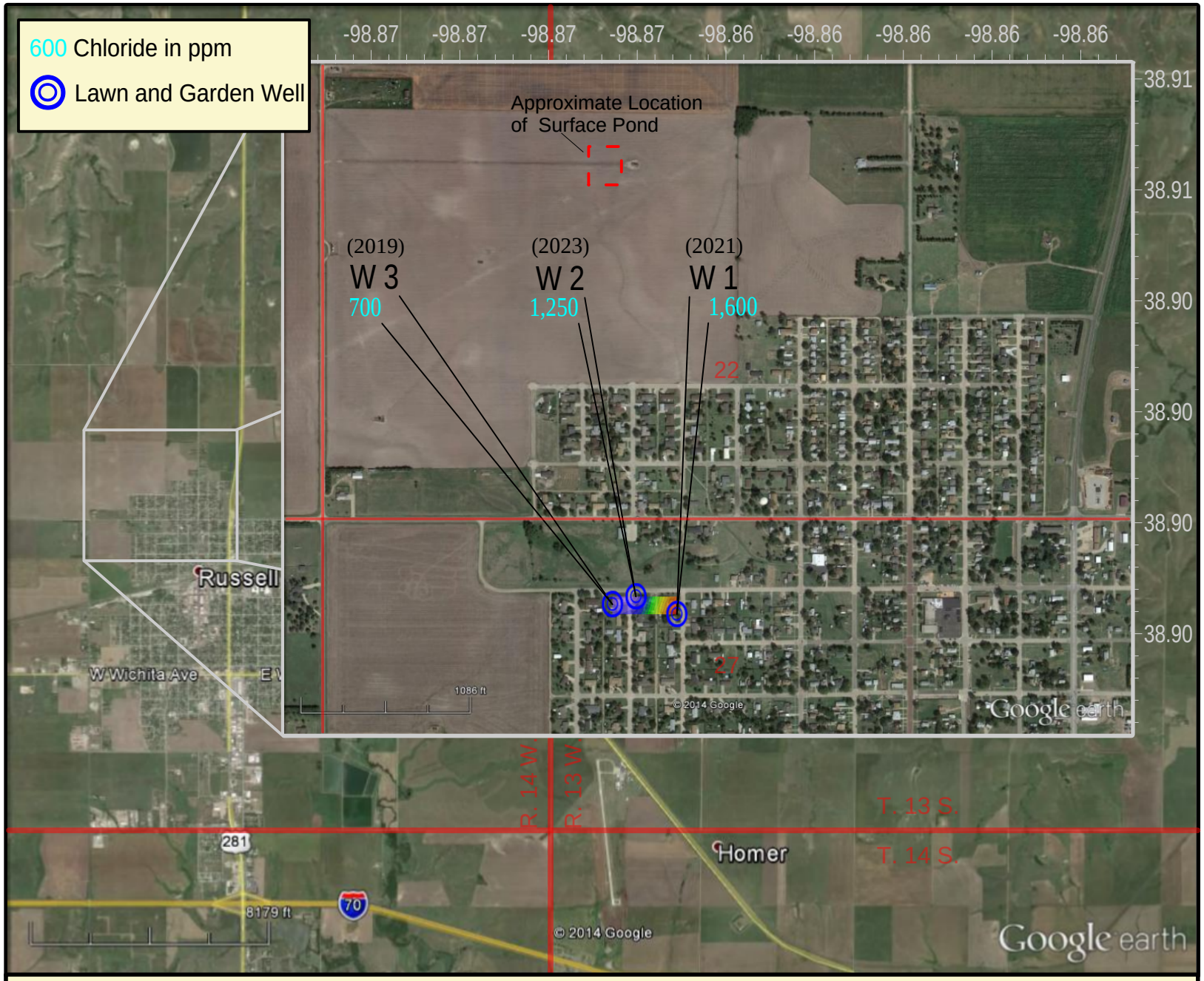
Estimated Total Costs: $400,000.

Control No.	Staff Hours/Expenditures	Fund Expenditures FY 2025/26	Fund Expenditures Total
970083-00	4 Hrs. / $148.34		$1,192.60

Current Contaminate Level: 700 ppm to 1,600 Cl^-

Status:

☐ 1. Site Assessment	☐ 2. Short Term Monitoring	☐ 3. Investigation
☒ 4. Long Term Monitoring	☒ 5. Remediation Plan	☐ 6. Installation
☐ 7. Remediation	☐ 8. Post Rem. Monitoring	☐ 9. Resolved



City of Russell Groundwater Monitoring Site

Sections 22 and 27, Township 13 South, Range 14 West, Russell County, Kansas
2025 Contamination Site Update
District #4 - Map Updated on 9/30/2025 by C. Neeley

Kansas Corporation Commission

Project: ***Russell Rural Water District #1, Russell County, District 4***

Site Location: Section 34 and 35, Township 14 South, Range 14 West, Russell County.

Impact/Immediacy: A public water supply well is producing water with elevated chloride content. The immediacy level is rated as low to moderate.

Site Description: The hydrology of the area is complicated through the interaction of a shallow drainage mantled with alluvial deposits of the Smoky Hill Aquifer overlying the Dakota Sandstone Aquifer. The geology of the area may not provide a seal between the otherwise fresher, shallow aquifers and the Dakota Aquifer. The public water supply well was drilled to the north of the river, in hope of utilizing the alluvium. However, the well is sufficiently deep to be drawing water from the Dakota either through the Smoky Hill Aquifer, or directly from the Dakota. Although the area has undergone significant oil and gas development, no active sources for the pollution have been identified. Furthermore, the Dakota Sandstone was an early disposal formation in the area.

Unusual Problems: Research conducted by the Kansas Geological Survey in 1991 and 1992 showed that the chloride content of the Smoky Hill River in the vicinity of this site ranged from 843 ppm to 1,879 ppm, with oil field brines contributing 11% to 29% of the total concentration. The major natural chloride source is the dissolution of natural salt deposits in Permian strata, which migrates into and through the Dakota Sandstone into the alluvium and river itself. Because of the difficulty in locating the source of the oil field brines, and the natural input of saline water, remediation of this site would not be feasible. However, each household served by the RWD is utilizing a reverse osmosis filtration system, mitigating the problem to some degree.

Status of Project: Over the previous six years, the chloride concentrations of the monitoring wells have remained steady between 450 ppm and 900 ppm. Presently, the wells contain chloride concentrations of 450 ppm in MW 1, 600 ppm in MW 3, and 750 ppm in MW 5.

Level of Remediation Sought:
Ideal: 100 ppm Chloride
Target: 250 ppm Chloride

Recommendations for Future Work: This site should be monitored on an annual basis.

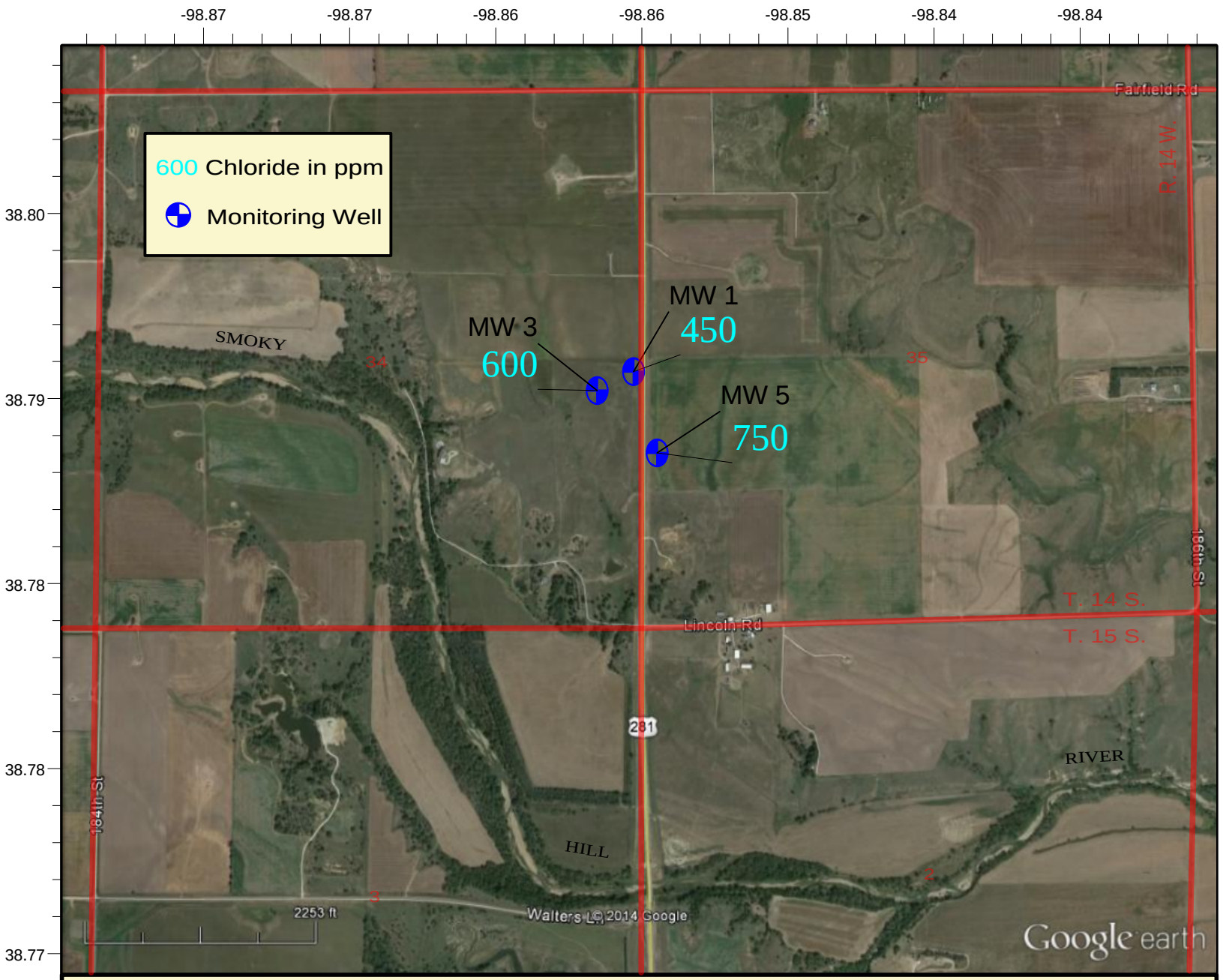
Estimated Total Costs: The estimated costs to the KCC and the KDHE for extensive studies in the past have been $30,000 or greater. Continued monitoring costs will be $3,000.00.

Control No.	**Staff Hours/Expenditures**	**Fund Expenditures FY 2025/26 Total**
970084-00	**5 Hrs. / $177.09**	

Current Contaminate Level: 450 ppm to 750 ppm Cl^-

Status:

☐ **1. Site Assessment**	☐ **2. Short Term Monitoring**	☐ **3. Investigation**
☒ **4. Long Term Monitoring**	☐ **5. Remediation Plan**	☐ **6. Installation**
☐ **7. Remediation**	☐ **8. Post Rem. Monitoring**	☐ **9. Resolved**



Russell Rural Water District #1 Groundwater Monitoring Site

Sections 34 and 35, Township 14 South, Range 14 West, Russell County, Kansas

2025 Groundwater Chloride Levels

District #4 - Sampled 4/8/2025 - Map Drawn on 9/24/2025 by C. Neeley

Kansas Corporation Commission

Project: ***Sander Contamination Site, Russell County, District 4***

Site Location: Section 3, Township 14 South, Range 15 West, Russell County.

Impact/Immediacy: A shallow aquifer and small drainage have been impacted by poor oil field practices. A stock well serves as the monitoring well. The immediacy level for this site is rated as low.

Site Description: The site is situated near the head of a small, intermittent tributary to Big Creek. The soils are Harney and Roxbury silt loam, and the area is divided equally between pasture along the creek, and cultivation in the higher portions of the location. Near-surface geological information is limited to data obtained through a few water well records covering many square miles. A reasonable hypothesis would be to expect topsoil to a depth of approximately six feet, atop sand about ten feet thick. Shale bed rock is likely to be encountered at a depth of 15 to 20 feet below the surface, and a common depth for the area water wells is roughly 30 feet. The site is located within the Gorham oil field, which was discovered in 1926, and multiple water flood projects have been implemented within the field.

Unusual Problems: None.

Status of Project: Chloride levels were at 1,650 ppm in the stock well when it was tested in October 2005. Chloride concentrations dropped to 1,500 ppm in 2007 and to 1,250 ppm in 2008. Samples were not collected between 2008 and 2014, due to the pump being in disrepair and incapable of lifting a sample. The sample gathered in 2014 was obtained from a domestic water well to the north in Section 34, Township 13 South, Range 15 West. The sample from this well was tested and contained 300 ppm chloride. Neither well was available to district staff in 2015. The stock well is now equipped with an electric pump and float switch, which will enable sampling to be carried out. In 2018, a sample was collected directly from the well and was 900 ppm. In 2020, the level was 1,000 ppm, 1,400 ppm in 2021, 1,200 ppm in 2022, and 850 ppm in 2023. In 2024, the power to the well was off, and in 2025, the chloride is 900 ppm. The site will continue to be sampled to determine if the contaminant has stabilized below the target level.

Level of Remediation Sought:
Ideal: 500 ppm Chloride
Target: 1000 ppm Chloride

Recommendations for Future Work: Continue to monitor in the short term.

Estimated Total Costs: $300.00.

Control No.	**Staff Hours/Expenditures**	**Fund Expenditures FY 2025/26 Total**
970089-00	**3 Hrs. / $114.74**	

Current Contaminate Level: 900 ppm Cl^-

Status:

☐ **1. Site Assessment**	☒ **2. Short Term Monitoring**	☐ **3. Investigation**
☐ **4. Long Term Monitoring**	☐ **5. Remediation Plan**	☐ **6. Installation**
☐ **7. Remediation**	☐ **8. Post Rem. Monitoring**	☐ **9. Resolved**

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Sander Groundwater Monitoring Site

Section 3, Township 14 South, Range 15 West, Russell County, Kansas
2025 Groundwater Chloride Levels
District #4
Sampled on 9/11/2025 - Map Drawn on 9/24/2025 by C. Neeley

Kansas Corporation Commission

Project: ***Sample Contamination Site, Sedgwick County, District 2***

Site Location: The contamination area is located at the intersection of 45th Street North and Rock Road in Wichita. The legal location is the NW/4 NW/4 of Section 29, Township 26 South, Range 2 East, Sedgwick County.

Impact\Immediacy: This site has very low immediacy. The chloride intrusion affects a groundwater aquifer in a meager volume. Housing development in the area could see a rise in water well installation for domestic and heating/cooling systems.

Site Description: The site is located in northeast Wichita and is bordered by Elk Creek Addition in Bel Aire to the northwest, Sawmill Creek in Wichita directly north, and Willowbend Golf Course to the south. The topsoil is hard clay (Wellington formation). The underlying aquifer is a thin, low-volume zone in clay and shale, directly affected by precipitation.

Unusual problems: A portion of the chlorides are natural and cannot readily be remediated. The aquifer has a low volume and is difficult to clean up. The total depth of the monitor well is 19 feet, and it always pumps off after one volume of water is removed. The urban setting logistically makes remediation difficult. The groundwater table is in hard rock, which is problematic for designing an effective remedial system. Continued residential development could see increased use of groundwater in the area.

Status of Project: The KCC water sample collected on September 25th, 2025, during the annual sampling tested to be 4,150 mg/L chlorides. The region has experienced significant precipitation over the summer of 2025. In 2023, MW-1 tested at 4,696 mg/L, and in 2024, the chloride values were at 5100 mg/L. Most of the state of Kansas during 2023 and 2024 experienced an extreme drought, which may affect these higher chloride levels. The change in chloride fluctuates because this is a perched water table in the Wellington shale, influenced by rainfall. High levels of precipitation may be the reason for the lower chloride values this year.

Level of Remediation Sought:

Ideal: 250 mg/L Chloride
Target: 500 mg/L Chloride

Recommendations for Future Work: A water sample from the monitoring well, tested by the Kansas Geological Survey for a bromide/chloride ratio test, could indicate where this falls in the range of oilfield brine. Sampling the well at the business at the corner of 45th Street or other local wells would help KCC check the water quality over a larger area. If deeper zones indicate chloride values less than 250 mg/L and a bromide/chloride test shows a mixing of natural and oil field brines, KCC will close this site. With no information regarding this monitoring well, KCC believes it was installed prior to July 1, 1995, when KCC took over the site.

Estimated Total Costs: KCC expects approximately $200 per year for site inspection, sample collection, and research.

Control No.	Staff Hours/Expenditures	Fund Expenditures FY 2025/26	Fund Expenditures Total
970088-00	9.5 Hrs. / $340.01		

Current Contaminate Level: 4,150 mg/L Chlorides

Status:

☐ 1. Site Assessment	☐ 2. Short Term Monitoring	☐ 3. Investigation
☒ 4. Long Term Monitoring	☐ 5. Remediation Plan	☐ 6. Installation
☐ 7. Remediation	☐ 8. Post Rem. Monitoring	☐ 9. Resolved

Kansas Corporation Commission

Sample 'A' Groundwater Monitoring Site

NW NW Section 29 of Township 26 South & Range 2 East, Sedgwick County, Kansas

2025 Area Map with Chloride Level of MW-1

KCC Project Code #970088-00 - District #2 Field Office - Site Sampled on 9/26/2025- Map Drawn on 10/9/2025 by D.Bollenback

Project: ***Schulte Brine Remediation Site, Sedgwick County, District 2***

Site Location: The legal description is the eastern half of Sections 7 and 8, Township 28 South, Range 1 West, Sedgwick County, Kansas. To the northeast lies the Eisenhower Airport. The site is in the drainage systems of Cowskin Creek and Dry Creek. Dry Creek is a tributary of Cowskin Creek and flows easterly across the site's southern part. The confluence of the two creeks is approximately three miles southeast of Schulte.

Impact/Immediacy: The effect is on groundwater resources, including public supply wells and domestic water wells. KCC has rated the immediacy level as moderate.

Site Description: The location is situated in the Arkansas River Valley region. The valley consists of unconsolidated alluvial deposits ranging in age from the late Pleistocene to the Holocene. The Permian-aged Wellington Shale underlies these deposits and reportedly has a depth of approximately 120 feet. The apparent source of the contamination is the saltwater disposal ponds associated with activities in the Schulte oil field, located in sections 6 and 7. The site resides between Wichita Eisenhower Airport to the northeast and the unincorporated town of Schulte to the west.

Land use is a combination of light industrial, agricultural, and residential. The aquifer consists of Pleistocene unconsolidated sand, clay, and gravel deposits. New construction of commercial/industrial complexes has occurred directly east of the recovery wells at the site, and a new industrial building has been constructed between the two recovery wells in section 7. The local geology consists of topsoil underlain by a brown to reddish clay, intermixed with silty clay and sand lenses. The upper clay thickness ranges from 8.5 feet to 33 feet, from east to west. Below the top clay, poorly sorted sand and gravel beds intermix with thin clay and silt lenses. This sand unit thins to the west, unlike the clays above. Under the top sand unit is a brown to red, silty-clay aquitard that can be up to 60 feet in thickness near the west end of the site. Below the middle clay aquitard is another sand unit. This sand unit is poorly sorted, ranging from fine to coarse-grained, with gravel and interbedded clay and silt layers. A bottom clay layer separates the sand from the blue Wellington Formation bedrock. Local hydrology is based on the two sand units above the Permian Wellington Formation bedrock but between substantial clay layers. The middle clay aquitard separates the two aquifers, and historical investigations suggest that the brine plume has, in the past, migrated along the top of this aquitard. Groundwater below the aquitard in the plume area has been tested and appears historically uncontaminated. The groundwater movement is to the east-southeast and almost easterly along the site's eastern edge. The KCC began remediation at this site on November 1st, 2001. The site currently consists of two recovery wells, 10 monitoring wells, and one saltwater disposal well, which was historically used to dispose of brine-impacted water. The recovery wells were not utilized during 2025.

Unusual Problems: The construction of new structures over the possible plume downgradient of the recovery system limits future recovery in that direction. Much of the area is for sale for future industrial expansion, which could complicate the continuation of the site's remediation. Upgradient has seen significant residential expansion to the North and West of the site. Water wells are being drilled for lawn irrigation, and future complaints about brine contamination could result if historical contamination is discovered.

Status of Project: On June 26th, 2025, nine groundwater monitoring wells (MW-1, MW-6, MW-7, MW-8, MW-9, MW-15, MW-101, MW-301, and MW-401) were gauged and sampled. MW-201 could not be accessed due to wet conditions and the presence of rampant poison ivy at the location. KCC pumped all monitoring wells utilizing a Proactive submersible pump to purge the wells. KCC took continuous conductivity measurements, and fluids with high salinity were containerized for disposal. Lab results have shown possible plume movement over the last two years down-side gradient across Maize Road towards MW-9. MW-8 has historically been one of the higher chloride wells, but it has dropped by 100 mg/L in chlorides over the last year, marking its second consecutive year of decline in chlorides. MW-9, a monitoring well located south of MW-8, has risen over the last five years but has decreased by 100 mg/L this year. MW-9 is located in an industrial area with multiple groundwater wells, some of which have large diameters. The recent drought and high pump rates from industry south of Maize Road may contribute to the recent increases in MW-9.

KCC did not utilize the recovery system in 2025, as it was determined that the chloride levels in the recovered water were too low to be removed from the local hydrological system. Lamp #1 SWDW, typically operated by the KCC for fluid recovery disposal, was not used in 2025. KCC has offered the use of this well to the KGS for the studies of the Arbuckle formation, but this possibility has yet to be confirmed. KCC periodically checked the #1 Lamp's fluid level during 2025 using a sonic meter. Fluid Levels were stable at approximately 124' below the ground surface.

The initial break in the drought had already raised the local groundwater table by 0.71' since spring 2024. Heavy precipitation events continued after the sampling event, so it is expected that the water table has risen well over that amount over the summer of 2025.

Level of Remediation Sought:

Ideal: 250 mg/l Chloride
Target: 500 mg/l Chloride

Recommendations for Future Work: KCC recommends installing 4-5 new monitoring wells to delineate the plume's northern side when resources are available. The area of concern is currently on agricultural land, but KCC believes that further industrial and residential growth and construction will occur. Knowledge of the current hydrological status, particularly groundwater mineralization, would benefit local land-use planning. Monitoring the plume will be a long-term endeavor, especially with the current domestic and industrial urbanization encroachment. Plume delineation is vital for tracking potential brine impaction downgradient.

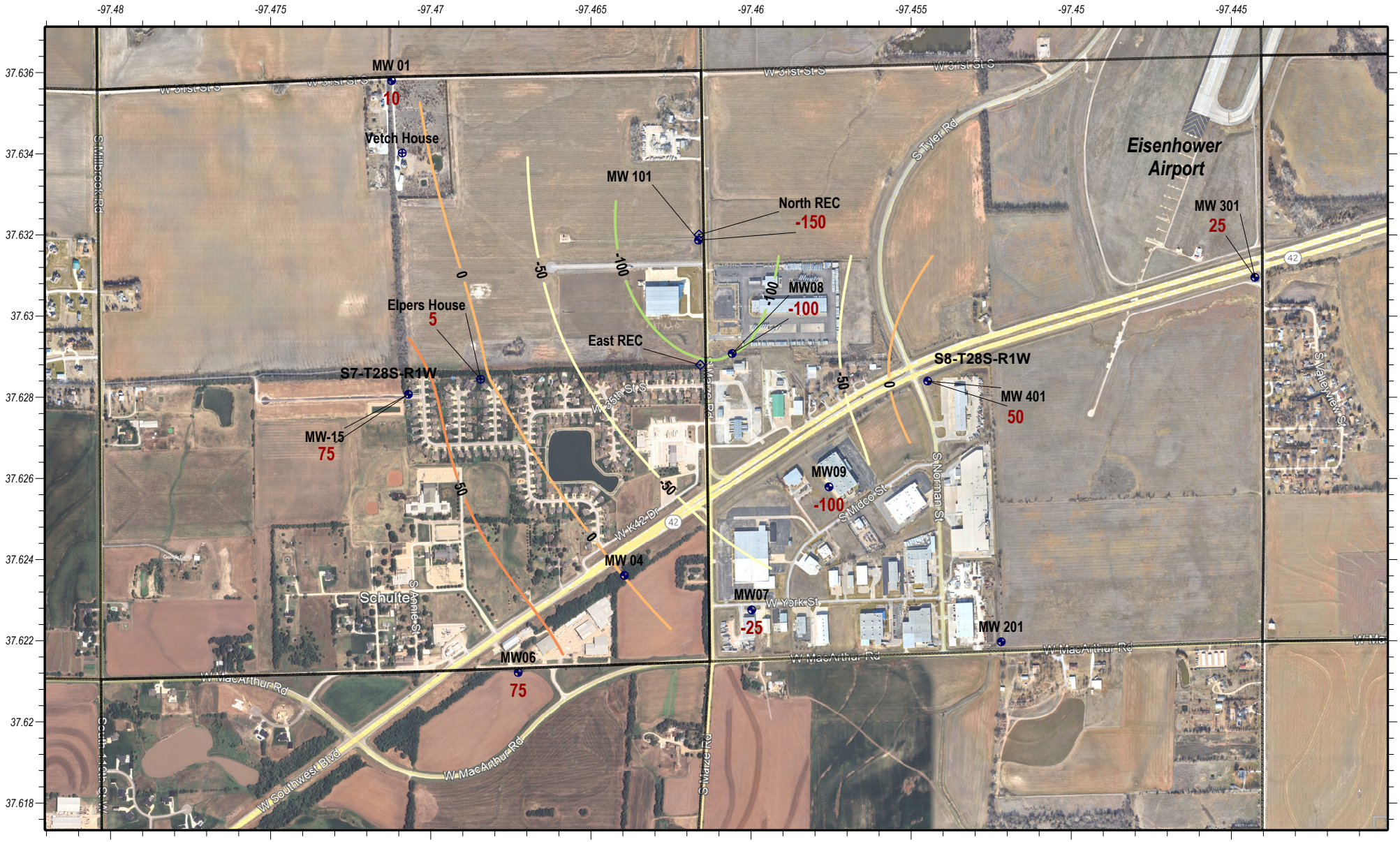
Estimated Total Costs: $2,500 to upkeep the remediation system, perform annual groundwater sampling, and continue investigating new domestic water wells installed inside the known plume. KCC estimates that $25,000 to $50,000 will be needed to drill and install new monitoring wells. If it is not utilized, $20,000 will be required to plug the Lamp SWDW.

Control No.	Staff Hours/Expenditures	Fund Expenditures FY 2025/26	Total
970015-00	50 Hrs. / $1,707.72	$1,092.95	$185,569.17

Current Contaminate Level: 50 mg/L in MW #1 to 2,550 mg/L in MW #101

Status:

☐ 1. Site Assessment	☐ 2. Short Term Monitoring	☐ 3. Investigation
☒ 4. Long Term Monitoring	☐ 5. Remediation Plan	☐ 6. Installation
☐ 7. Remediation	☐ 8. Post Rem. Monitoring	☐ 9. Resolved



KEY

- -Monitoring Well
- -Recovery Well
- -Domestic Well

Contour Interval = 50 ppm
Google Earth Air Photo dated 7-2024

Change in Chlorides

200
150
100
50
0
-50
-100
-150
-200

N
W
E
S

Feet
0
1500
3000

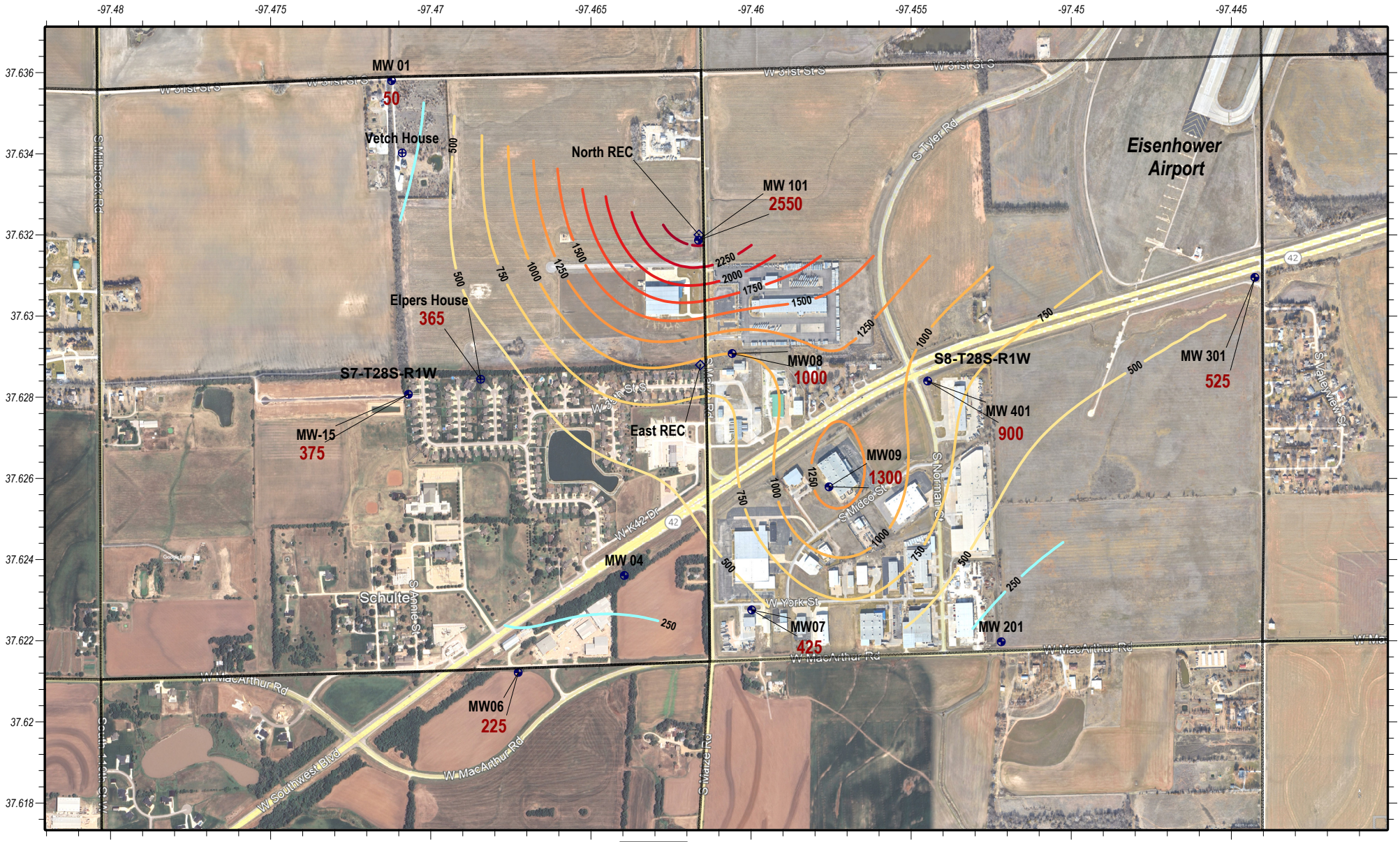
Kansas Corporation Commission

Schulte Remediation Site

Sections 7 & 8,of Township 28 South & 1 West, Sedgwick County, Kansas

Chloride Level Change from 2024

KCC Control #970015-00 - KCC District #2 Field Office
Wells sampled on 6/26/2025 - Map Drawn by D Bollenback on 9/22/2025



KEY

-Monitoring Well

-Recovery Well

-Domestic Well

Contour Interval = 250 ppm

Google Earth Air Photo dated 7-2024

Chloride (ppm)

2500
2250
2000
1750
1500
1250
1000
750
500
250

N
W
E
S

Feet
0
1500
3000

Kansas
Corporation Commission

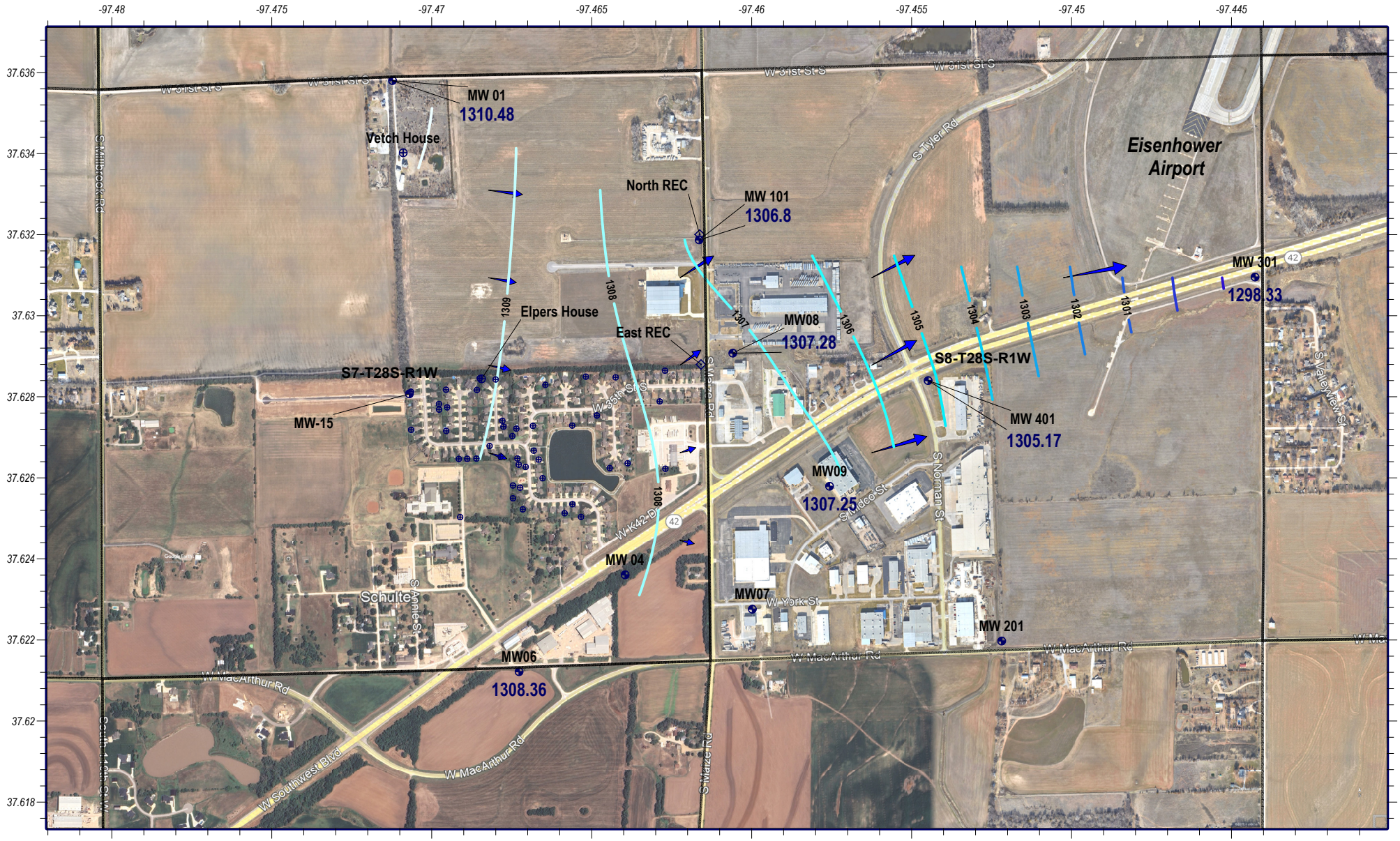
Schulte Remediation Site

Sections 7 & 8,of Township 28 South & 1 West, Sedgwick County, Kansas

Chloride Levels 2025

KCC Control #970015-00 - KCC District #2 Field Office

Wells sampled on 6/26/2025 - Map Drawn by D Bollenback on 9/22/2025



KEY

-GW flow Vector

-Monitoring Well

-Recovery Well

-Domestic Well

Contour Interval = 1' foot

Google Earth Air Photo dated 7-2024

GW Elevation (Ft)

1311 1310 1309 1308 1307 1306 1305 1304 1303 1302 1301 1300 1299 1298 1297 1296 1295 1294

N W E S

Feet

0 1500 3000

Kansas Corporation Commission

Schulte Remediation Site

Sections 7 & 8,of Township 28 South & 1 West, Sedgwick County, Kansas

Groundwater Elevation Map

KCC Control #970015-00 - KCC District #2 Field Office

Wells guaged on 6/26/2025 - Map Drawn by D Bollenback on 9/22/2025

Project: ***Curtis Contamination Site, Stafford County, District 1***

Site Location: The legal location is Sections 23, 24, 25 & 26 of Township 24 South, Range 14 West, Stafford County.

Impact/Immediacy: The impact is to groundwater resources that have been contaminated by the flow of salt water from an old core drill hole. The core hole thought to be the source of contamination was plugged in 1988. This site has a low to moderate immediacy rating.

Site Description: This site was investigated after the Curtis irrigation well was reported salty. The aquifer in this area consists of unconsolidated material consisting mostly of sand and gravel, and is, in general, ninety feet thick. Several thin aquitards were encountered in the unconsolidated material. Bedrock consists of clay shale of various colors and was encountered at approximately 90 to 100 feet. The Curtis irrigation well tested salty upon completion and it was reportedly never used. It was also reported that no preliminary test boreholes were made before drilling the irrigation well. The irrigation well was probably drilled into the top of the bedrock and may have pumped chloride contaminated water from this zone.

Unusual Problems: The old core hole may have allowed cross flow of brine into the groundwater aquifer of the Rattlesnake Creek for more than forty years. The plume from this massive intrusion of brine extends to the northeast approximately two miles from the original source area.

Status of Project: Samples were collected from four monitoring wells in 2025. The chlorides have remained steady in the area. The plume remains confined around MW-1. Only two of the wells remain above the ideal level of 250 ppm chloride.

Level of Remediation Sought:

Ideal: 250 ppm
Target: 500-1000 ppm

Recommendation for Future Work: Continued monitoring of the site is recommended. The plume has migrated to the northeast away from the original location near the old core hole. Monitoring wells 3-10 should be plugged as they have remained fresh for several sampling cycles. The possibility of repairing MW-11 or drilling a replacement well will be explored.

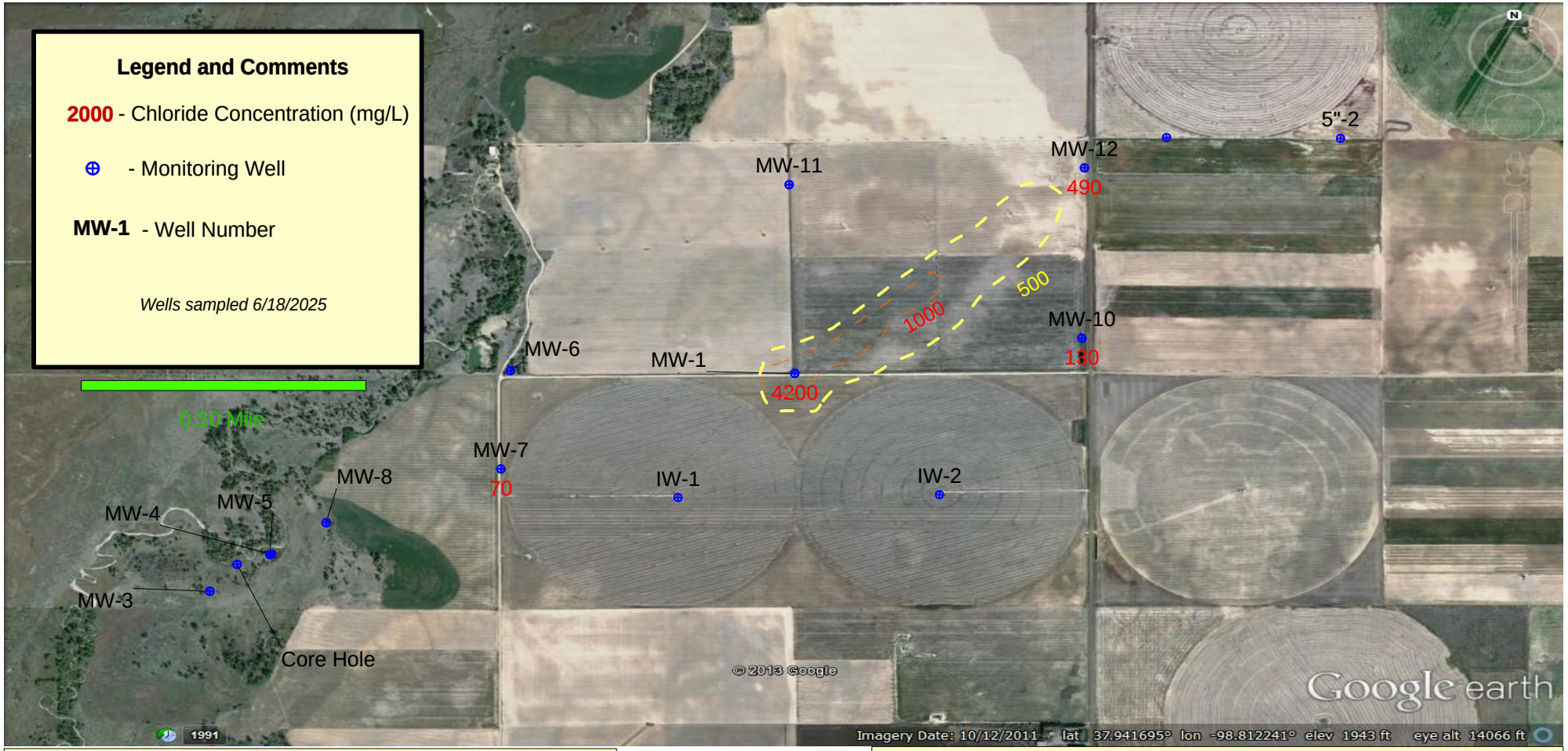
Estimated Total Costs: $27,000.

Control No.	Staff Hours/Expenditures	Fund Expenditures FY 2025/26	Total
970034-00	4 Hrs. / $148.34		$4,199.17

Current Contaminate Level: 70 ppm Cl- to 4200 ppm Cl-

Status:

☐ 1. Site Assessment	☐ 2. Short Term Monitoring	☒ 3. Investigation
☒ 4. Long Term Monitoring	☐ 5. Remediation Plan	☐ 6. Installation
☐ 7. Remediation	☐ 8. Post Rem. Monitoring	☐ 9. Resolved



Kansas Corporation Commission

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Curtis Site

Sections 19/23/24/25/26-T24S-R14W
Stafford County, Kansas

2025 Area Map with Chlorides

KCC Control # 970034-00 District 1
N. Feldkamp 7/2/2025

Project: ***French Contamination Site, Stafford County, District 1***

Site Location: The site is located in Section 17, Township 23 South, Range 13 West, Stafford County.

Impact/Immediacy: Potential exists for impacts on stock and irrigation resources. Subsidence around the French "A" 1 has developed into a sinkhole. Worst-case scenario would be a catastrophic collapse taking part of an east-west county road and several acres of farm ground. Probable action is a gentle downward movement of the area until stable. The site has a moderate to high rating.

Site Description: The site consists of an unplugged saltwater disposal well whose operation led to the development of a solution cavity. The site is located in a rural setting 330' north of a county road. Land use is agricultural with oil activities in the area. The subsidence at the site now covers an area of approximately 600' x 1000' in size.

Unusual Problems: A solution cavity was determined to exist under the existing location by a seismic survey conducted by the KGS. The seismic survey indicates the cavity is approximately 60' thick.

Status of the Project: Replaced benchmark and set three new sample points around the sinkhole for future elevation shots. It is recommended the site continued to be surveyed annually. Additionally, a point in the center of the sink should be added in order to more thoroughly describe the movement if it is accessible (low/no water).

Level of Remediation Sought:

Ideal: Stabilize cavity and plug well bore in accordance with KCC rules and regulations.

Target: Safely monitor site. Determine an acceptable plugging procedure, which will adequately address groundwater resources.

Recommendations for Future Work: Resume the annual survey of the site to establish a current rate of subsidence.

Estimated Total Costs: $3000.00.

Control No.	**Staff Hours/Expenditures**	**Fund Expenditures FY 2025/26**	**Total**
990002-001	**10 Hrs. / $349.95**		**$346.50**

Current Contaminate Level: Unknown.

Status:

☐ **1. Site Assessment**	☐ **2. Short Term Monitoring**	☒ **3. Investigation**
☒ **4. Long Term Monitoring**	☐ **5. Remediation Plan**	☐ **6. Installation**
☐ **7. Remediation**	☐ **8. Post Rem. Monitoring**	☐ **9. Resolved**

Kansas Corporation Commission

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French Sinkhole

SW 1/4 Section 17-T23S-R13W

Change in Elevation Map

KCC Control #970002-001 District #1

N. Feldkamp 9/22/2025

Project: ***Leesburg Sink Hole Site, Stafford County, District 1***

Site Location: The site is located in Section 12, Township 25 South, Range 13 West, Stafford County.

Impact / Immediacy: Potential exists for impacts on stock and irrigation resources. Subsidence around the Leesburg #302 and Leesburg #303 may develop into a sinkhole. Worst-case scenario would be a catastrophic collapse taking several acres of farm ground. Probable action is a gentle downward movement of the area until stable. The site has a moderate to high rating.

Site Description: The site consists of a plugged saltwater disposal well whose operation led to the probable development of a solution cavity. The site is located in a rural setting approximately 990' FEL and 2310' FSL of section 12. Land use is agricultural with oil activities in the area. The subsidence at the site now covers an area of approximately 350'x 400' in size.

Unusual Problems: A solution cavity is thought to exist under the existing location.

Status of the Project: Elevation was shot on October 1, 2025, by Advantage Elevations. The point remained the exact same as previously shot in 2024. It was noted the water level has risen since the last event. The average rate of subsidence has leveled out to 0.00' per year since 2020. The elevation was shot as close to center and lowest point as possible.

Recommendations for Future Work: It is recommended the site continued to be surveyed annually. The ground level at the stake on the east side should be surveyed in addition to the Leesburg 302 if it is accessible (low/no water). Additional points on the north and south edges of the sink, as well as a point in the center of the sink, should be added in order to more thoroughly describe the movement.

Level of Remediation Sought:

Ideal: Stabilize cavity.
Target: Safely monitor site.

Estimated Total Costs: RP -$62,000, plugging costs, seismic and installation of monitor wells.

Control No.	Staff Hours/Expenditures	Fund Expenditures FY 2024/25	Total
2004003-001	3 Hrs. / $114.74		$6,266.00

Current Contaminate Level: Unknown

Status:

☐ 1. Site Assessment	☐ 2. Short Term Monitoring	☒ 3. Investigation
☒ 4. Long Term Monitoring	☐ 5. Remediation Plan	☐ 6. Installation
☐ 7. Remediation	☐ 8. Post Rem. Monitoring	☐ 9. Resolved

ADVANTAGE ELEVATIONS
OIL FIELD SURVEYORS

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(620) 672-6491

827253
INVOICE NO.

LYONS & LYONS INC.
OPERATOR

SINK HOLE
NO.

SAUNDER LEASE
FARM

STAFFORD CO. KS
COUNTY

12
S

25s
T

12w
R

NW NE SE
LOCATION

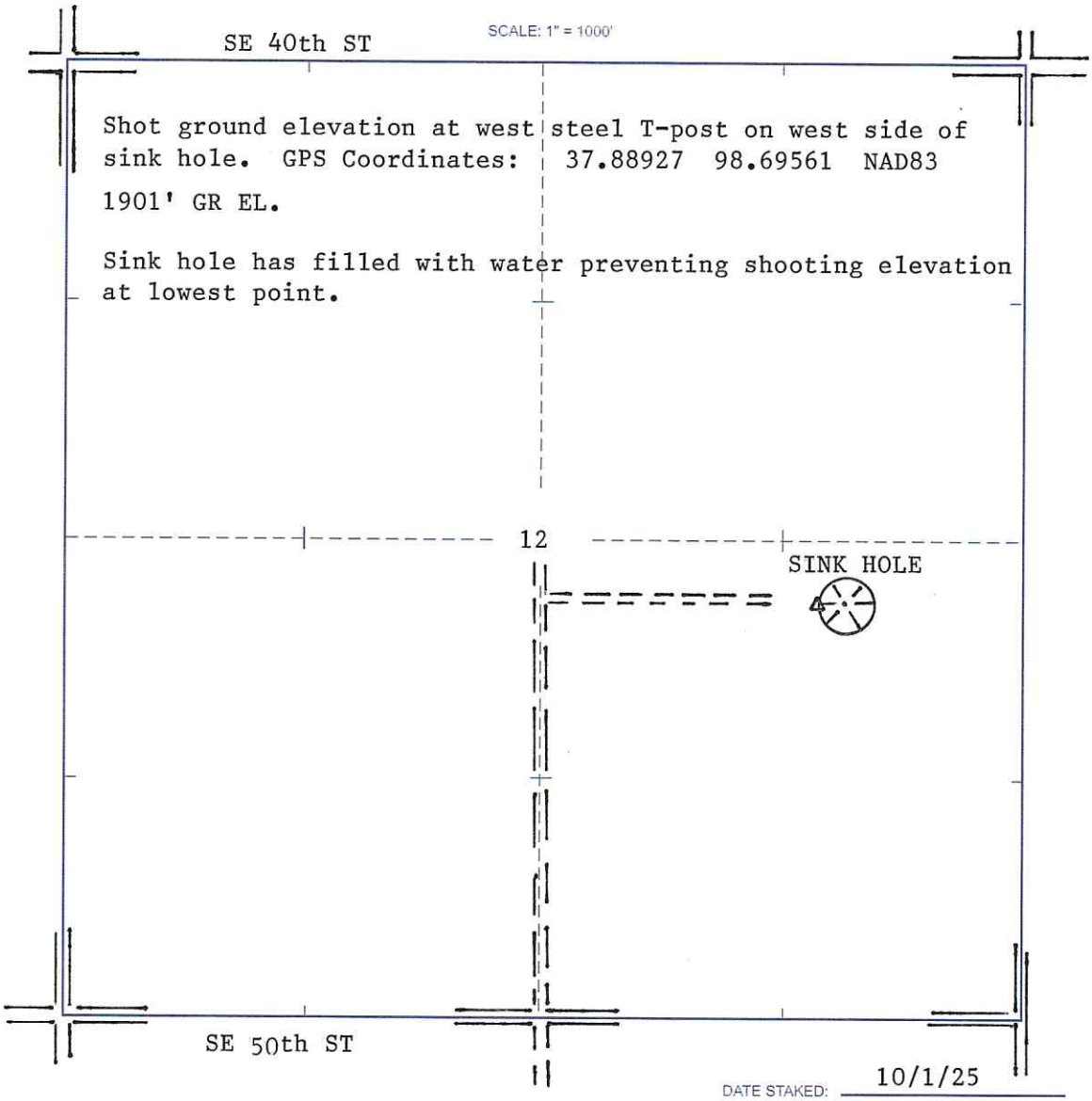
ELEVATION: 1901' GR

LYONS & LYONS INC.
1519 S. Baltimore Ave.
Tulsa, OK 74119

N

AUTHORIZED BY: _____

SCALE: 1" = 1000'



DATE STAKED: 10/1/25

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LYONS & LYONS INC.
SAUNDER LEASE
Sec 12-25s-12w
STAFFORD CO. KS
GPS COORDINATES: NAD83
Legend
37.88927 -98.69561
37.88927 -98.69561
SE 50th St
SE 50th St
Google Earth
Image © 2025 Airbus
2000 ft
N

Project: ***Wingate Contamination Site, Wilson County, District 3***

Site Location: NE/4 of Section 17, Township 29 South, Range 17 East, Wilson County.

Impact/Immediacy: Impact is to the groundwater and soil. Immediacy level is rated as low.

Site Description: This site is located on gently sloping land used for agriculture. Much of the scar is located in a low-lying drainage area next to or within a waterway. Brine seepage originates from the Thayer coal bed or Cottage Grove Sandstone Member, which overlies the Chanute Shale in the higher areas.

Unusual Problems: This property is leased by River Rock Operating. The Mary Douglas property, located in the next ¼ section to the east, contained 22 abandoned wells, many of which had high fluid levels and were old-style completions. These abandoned wells are contributing to the source of the brine commingling with the shallow aquifer impacting the Wingate property. These wells were plugged by the State and the project was completed in February of 2009.

Status of Project: Four new monitoring wells were constructed on this project in early 2012. Statistical analysis of samples collected from these four new monitoring wells indicates Cl- concentrations are directly impacted by precipitation events and oil & gas producing activities within the immediate vicinity. The sample results for 2025 are as follows:

	MWE 01	***MWE 02***	***MWE 03***	***MWE 04***
03/12/2025	***1300 ppm Cl-***	***600 ppm Cl-***	***900 ppm Cl-***	***1800 ppm Cl-***
09/16/2025	***2200 ppm Cl-***	***910 ppm Cl-***	***1300 ppm Cl-***	***1600 ppm Cl-***

Level of Remediation Sought:

Ideal: 250 ppm Chloride
Target: 500 ppm Chloride

Recommendation for Future Work: Sample site annually. This site should possibly be expanded to include the Mary Douglas property located in the NW/4 of 16-T29S-R17E and the SE/4 of 17-T29S-R17E. Graphical analysis of the Cl- concentrations in these four wells indicates that chlorides are on a downward trend since the project was initiated. Factors, such as an increase in flood and/or disposal fluids from active operations completed within the same zone, or CBM wells that have been shut in or are pumping at reduced rates, can temporarily increase formation pressures allowing greater communication with possible undiscovered open bore holes and increase chloride levels. Further monitoring of existing wells and possible additional monitoring wells will help to delineate the extent and condition of this aquifer. Further review of KGS well data and GIS information along with the ability to download and overlay historic aerial imagery may provide information on additional possible locations of abandoned wells for further field investigation.

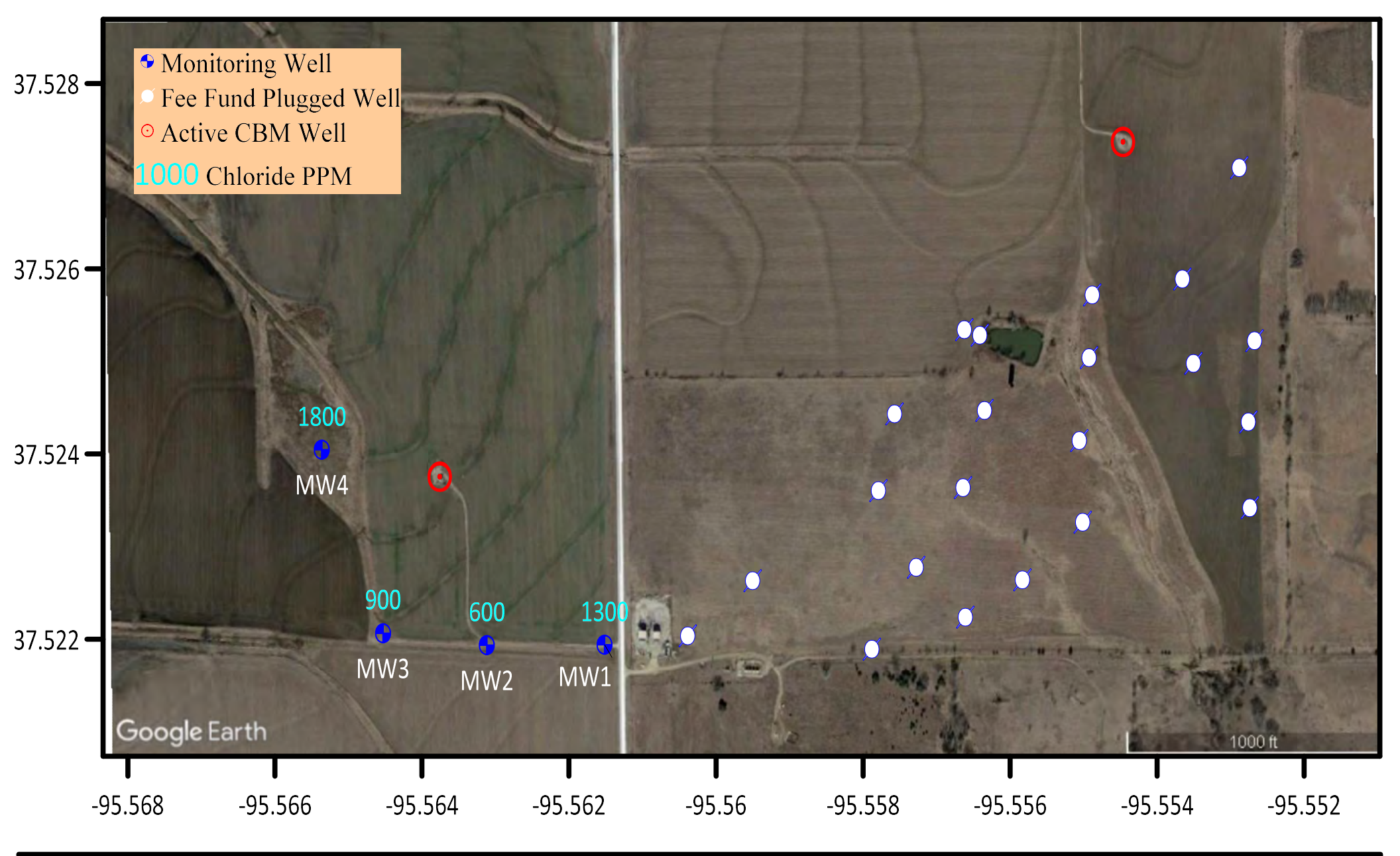
Estimated Total Costs: Four new monitoring wells were completed at a cost of $8,196 in 2012.

Control No.	**Staff Hours/Expenditures**	**Fund Expenditures**	
		FY 2025/26	**Total**
970107-00	**21 Hrs. / $666.14**		**$8,296.00**

Current Contaminate Level: 600 ppm Cl- to 2,200 ppm Cl-

Status:

☐ **1. Site Assessment**	☐ **2. Short Term Monitoring**	☒ **3. Investigation**
☒ **4. Long Term Monitoring**	☐ **5. Remediation Plan**	☐ **6. Installation**
☐ **7. Remediation**	☐ **8. Post Rem. Monitoring**	☐ **9. Resolved**



Kansas Corporation Commission

Wingate Remediation Site

NE 17-T29S-R17E Wilson County, Kansas

2025 Groundwater Chloride Levels - District #3 Sampled 03/12/2025

Map Drawn on 09/30/2025 by L. Short

Project 970107-00

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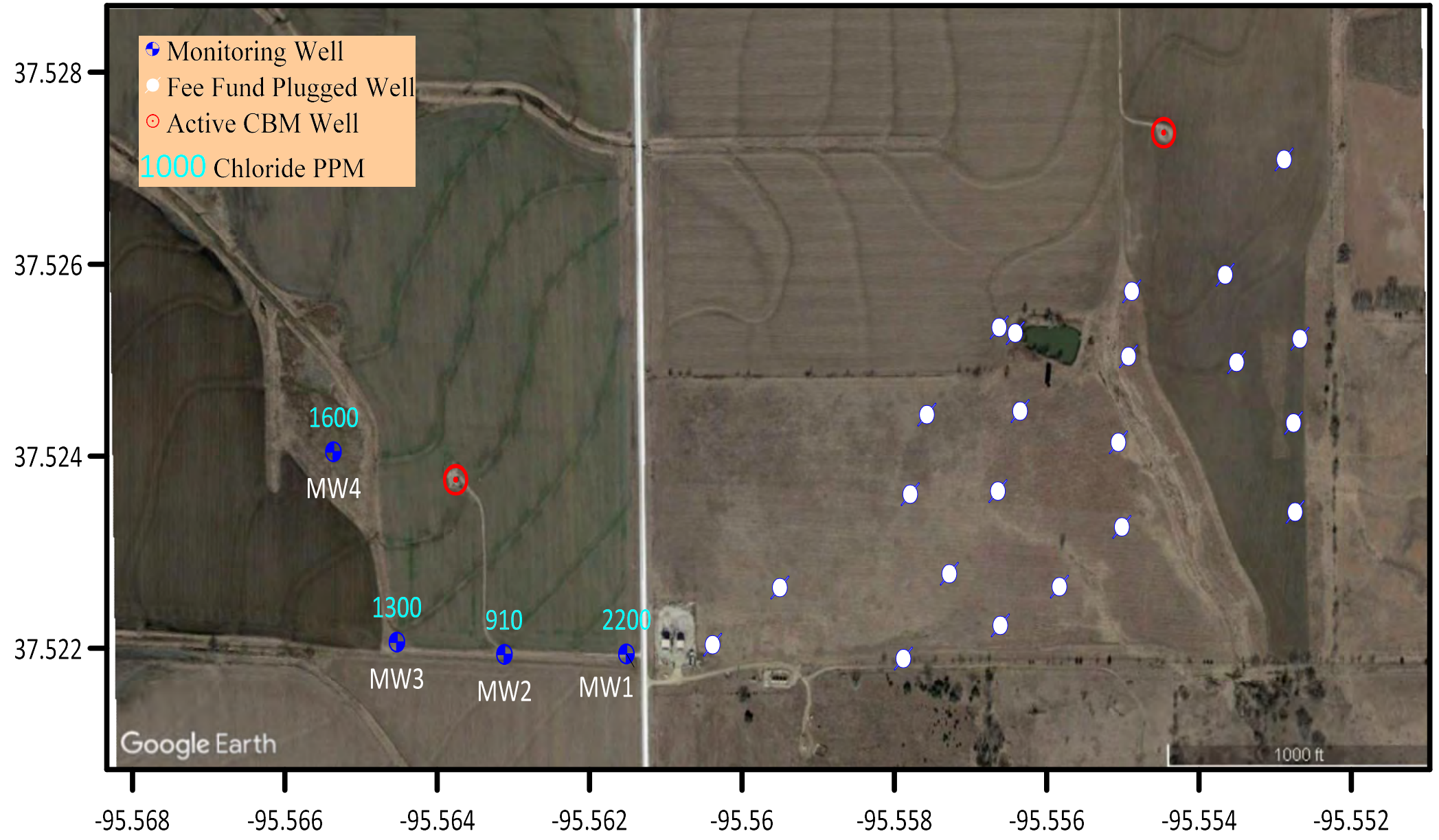

Kansas Corporation Commission

Wingate Remediation Site

NE 17-T29S-R17E Wilson County, Kansas

2025 Groundwater Chloride Levels - District #3 Sampled 09/16/2025

Map Drawn on 09/30/2025 by L. Short

Project 970107-00

N

Kansas Corporation Commission

2026 QUICK REFERENCE

We serve the people of Kansas...

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