

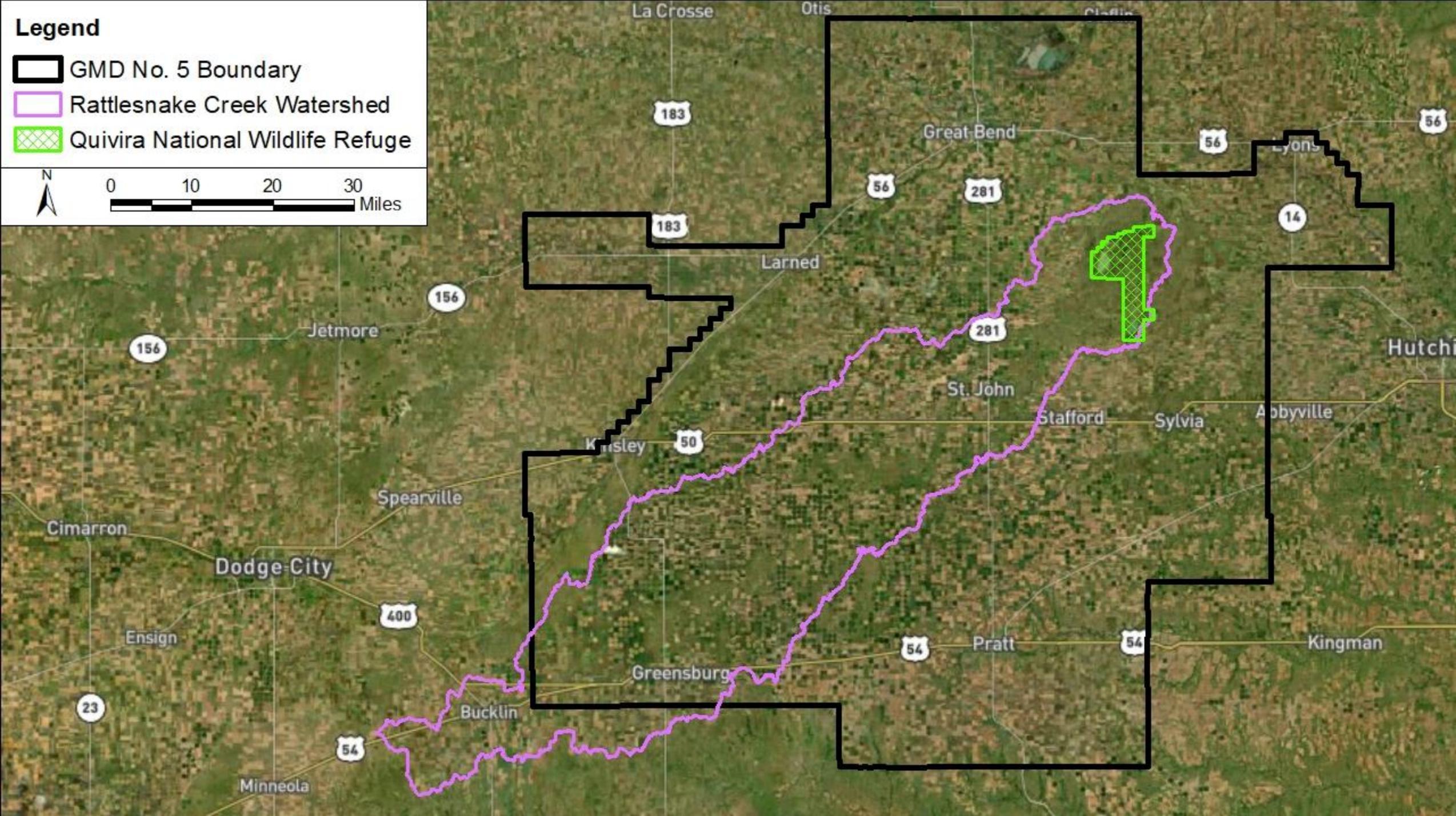


# Rattlesnake Creek Field Work

**Legend**

-  GMD No. 5 Boundary
-  Rattlesnake Creek Watershed
-  Quivira National Wildlife Refuge

 0 10 20 30 Miles

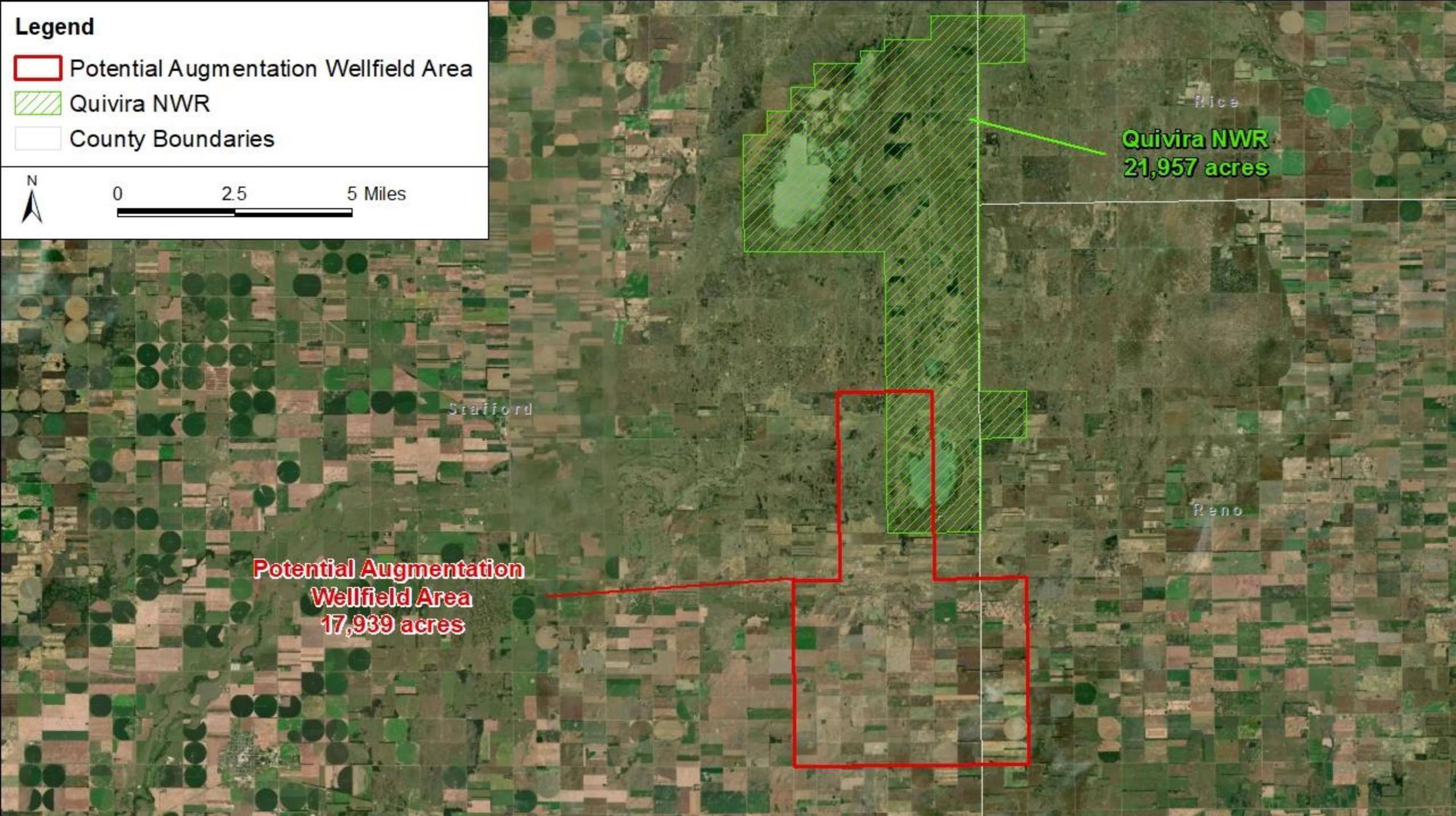


**Legend**

-  Potential Augmentation Wellfield Area
-  Quivira NWR
-  County Boundaries

N

0 2.5 5 Miles



# Previous Studies

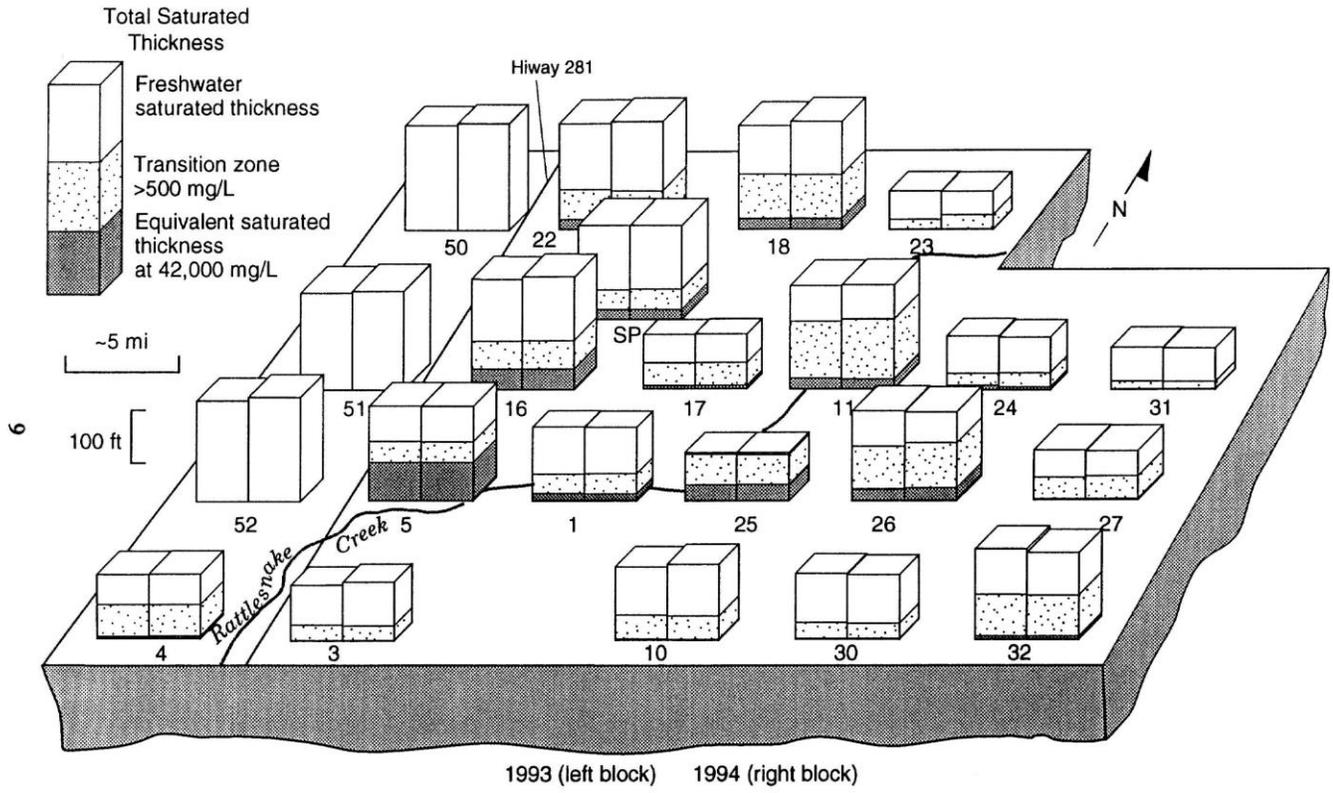


Figure A5. A representation of the total saturated thickness (height of column) and the saturated thickness that would be occupied by the volume of Permian brine equivalent to the salt content of the total water column (height of dark column). At each site, 1993 values are on the left, 1994 on the right. The height of 500 mg/L limit of the mixed zone is shown by light stippling; this has no budgetary significance, but shows the extent of vertical mixing and the amount of usable fresh water at each site.

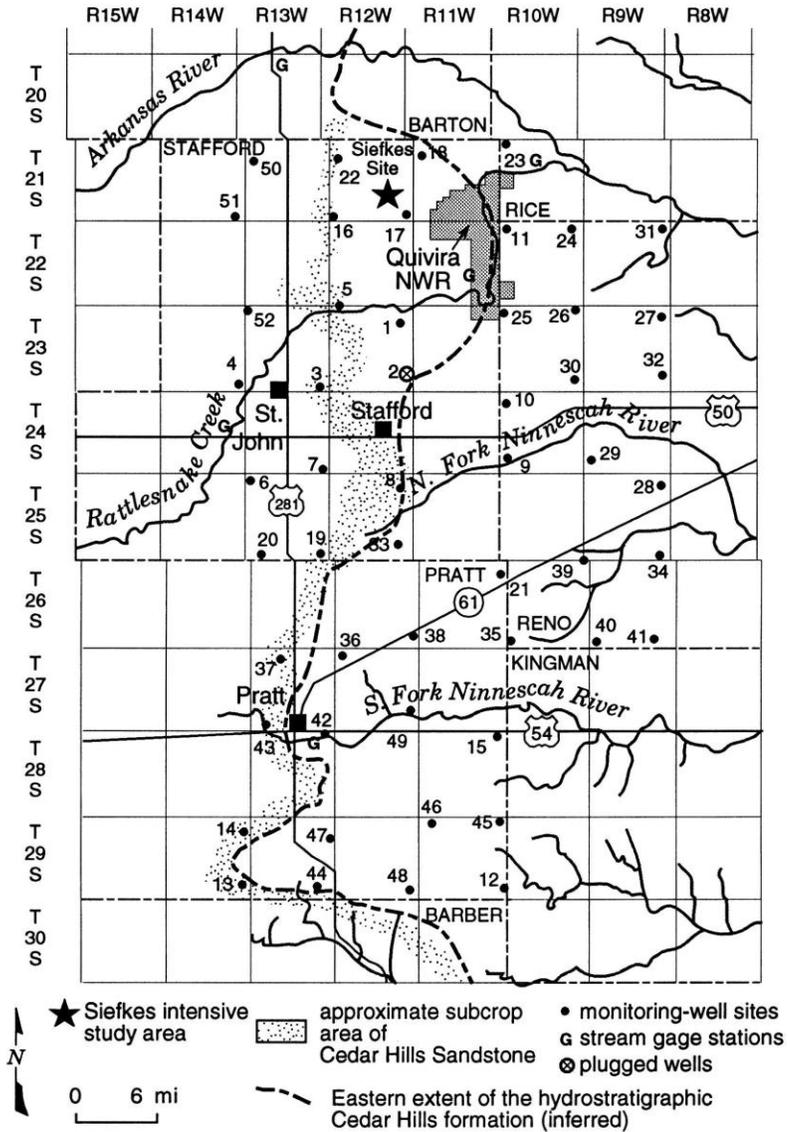
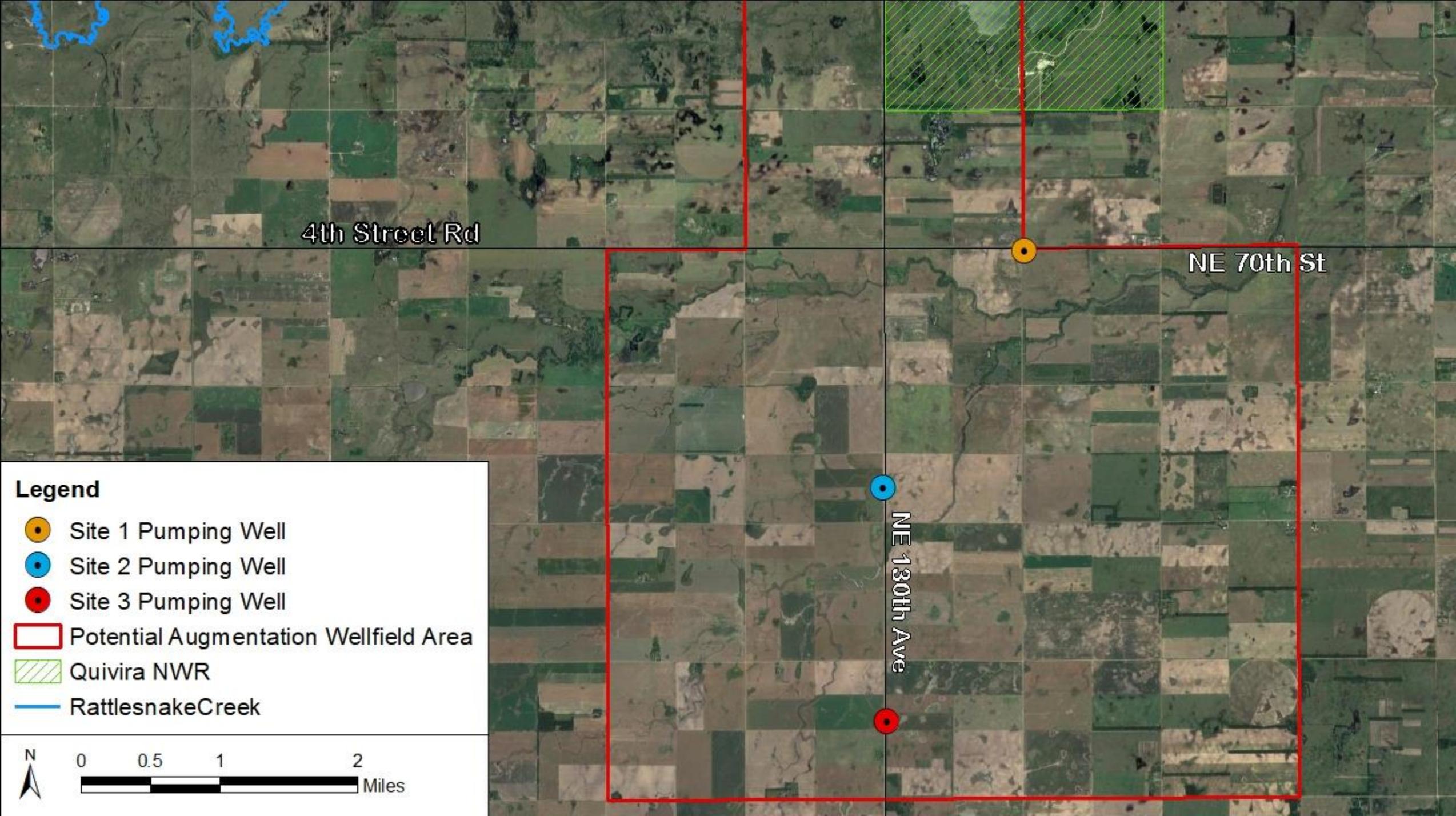


Figure A2. Observation wells and other physical features in the area of the KGS/GMD5 monitoring-well network.



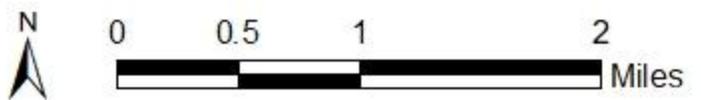
4th Street Rd

NE 70th St

NE 130th Ave

**Legend**

- Site 1 Pumping Well
- Site 2 Pumping Well
- Site 3 Pumping Well
- Potential Augmentation Wellfield Area
- ▨ Quivira NWR
- RattlesnakeCreek



# Site 1



olsson®



# Site 2



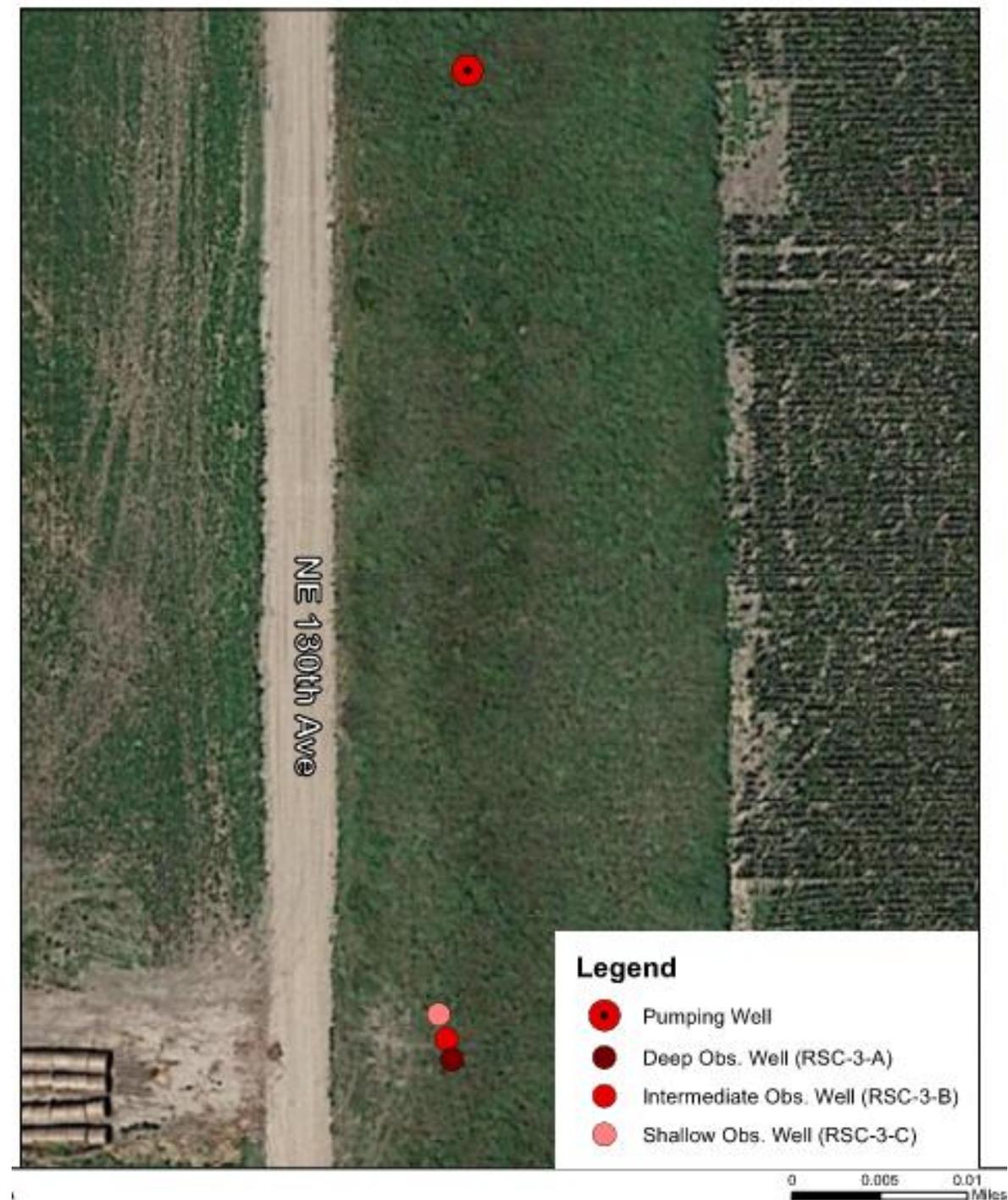
olsson®



# Site 3



olsson®



# Observation Well Drilling





Air Compressor     Horn  
 Air Lines     Lights: head -  
 Battery     tail - dash - tu  
 Brake Accessories     Mirrors

DRILLER'S TEST LOG

Customer Name: GMD #5  
 Address: \_\_\_\_\_  
 County: \_\_\_\_\_ Quarter: NW Section: 35

Drilled Footage		Description of Strata	Indicate T	
From	To		NW	NE
0	3	Top Soil	NW	NE
3	15	Soft Sandy clay with Hard Tan clay	SW	SE
15	25	Soft Sandy Clay	NW	NE
25	48	Sand and Gravel Small, Medium clean.	SW	SE
48	49	Tan clay streak	NW	NE
49	65	Sand and Gravel small, Medium clean Course	SW	SE
65	<del>68</del> 75	Green clay - Gravel mix	NW	NE
75	<del>80</del> 85	Sand and Gravel Small, Medium clean Course	SW	SE
85	89	Sand and Gravel with Calishi, Small medium	NW	NE
89	96	Green tint clay, White Clay, Cemented Sand	SW	SE
96	98	Calishi	NW	NE
98	99	Tan clay	SW	SE
99	125	light Gray Clay with fine Sand Streaks	NW	NE
125	143	Sand and Gravel small, Medium clean, Course	SW	SE
143	145	Red Bed.	NW	NE

Static Water L \_\_\_\_\_  
 Remarks: \_\_\_\_\_  
 Depth of well \_\_\_\_\_  
 Type of Casing \_\_\_\_\_  
 Casing size: \_\_\_\_\_  
 Perf: 10 t \_\_\_\_\_  
 Plain: 135 t \_\_\_\_\_  
 Gravel ft: 14 \_\_\_\_\_  
 Grout type: \_\_\_\_\_  
 footage: \_\_\_\_\_  
 Contaminati \_\_\_\_\_  
 direction \_\_\_\_\_  
 Casing above \_\_\_\_\_  
 Bore hole si \_\_\_\_\_  
 Chlorinated \_\_\_\_\_  
 Garmin GPS \_\_\_\_\_  
 Latitude: \_\_\_\_\_  
 Longitude: \_\_\_\_\_  
 Elevation: \_\_\_\_\_  
 Driller: \_\_\_\_\_  
 Spot Locatio \_\_\_\_\_

ROSENCRANTZ-BEMIS EQUIPMEN  
 Telephone (620) 792-2488 or (620) 792-  
 P.O. Box 713, Great Bend, KS 67530



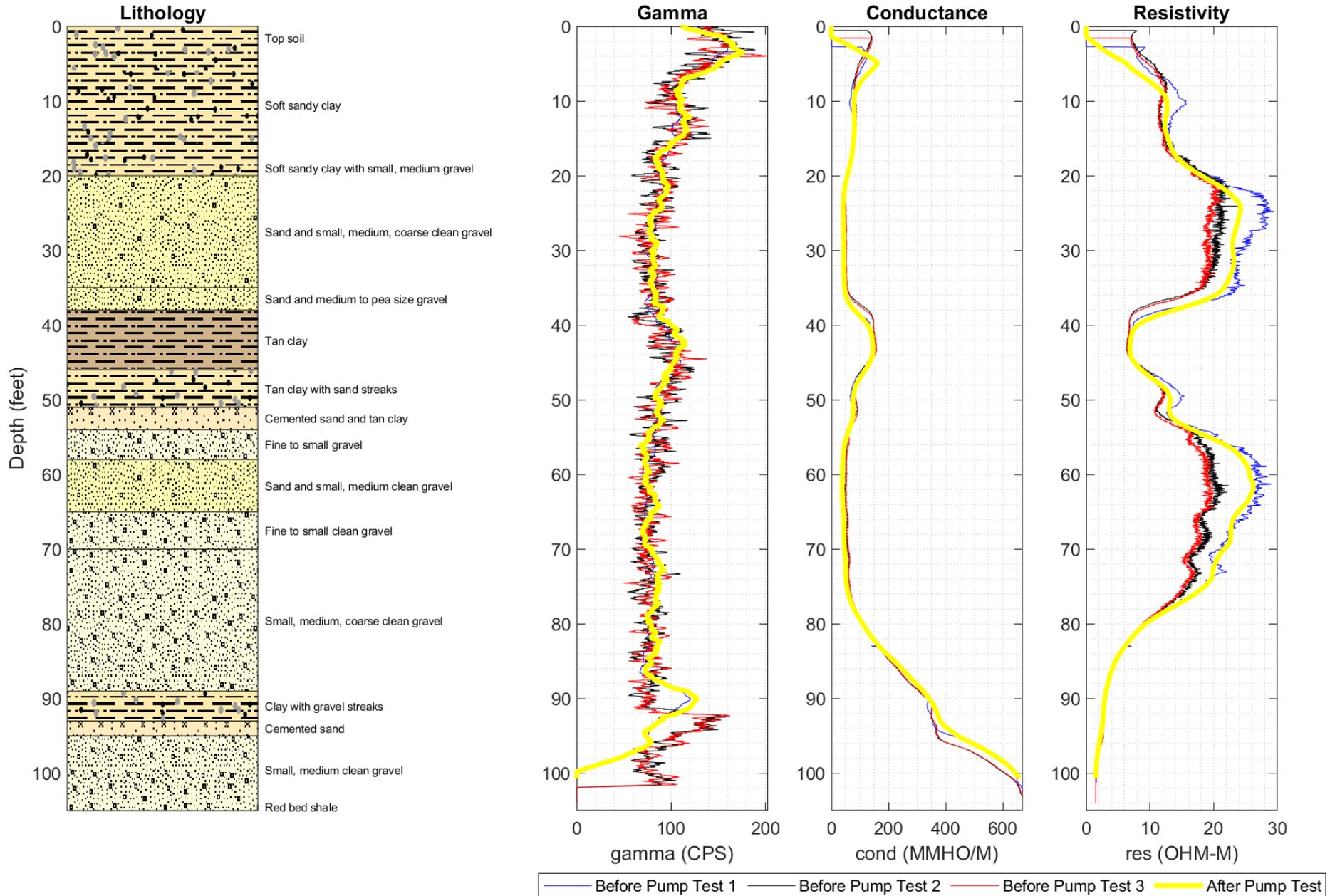
# Well Construction

---

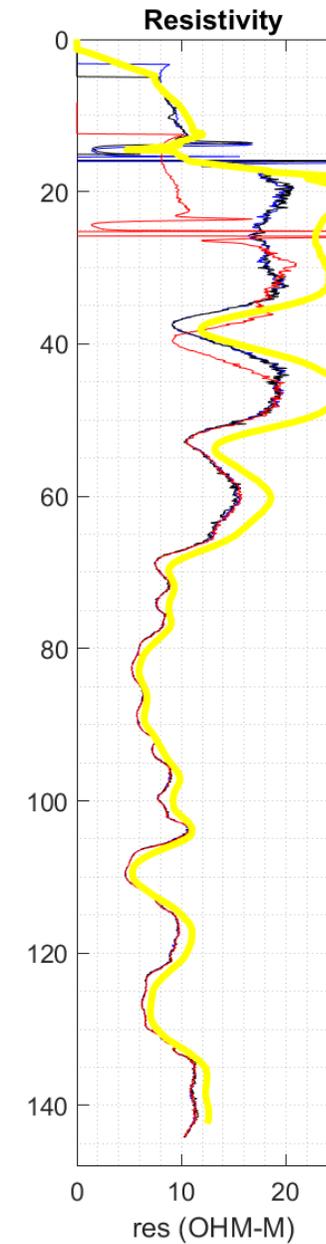
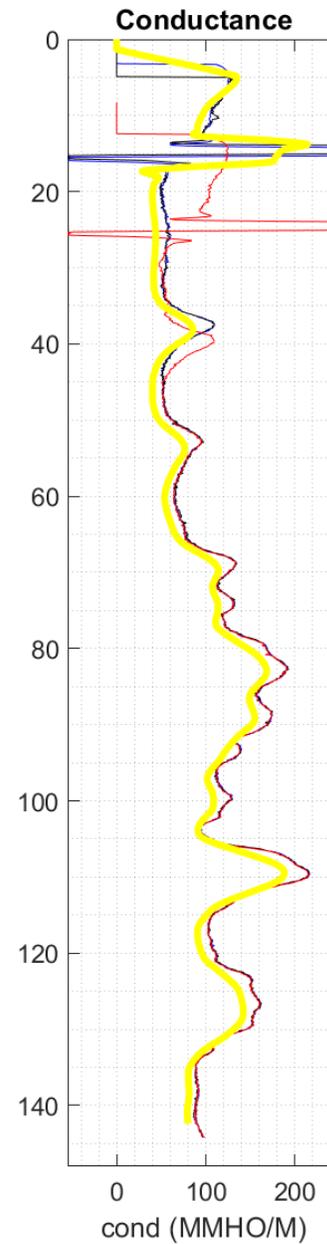
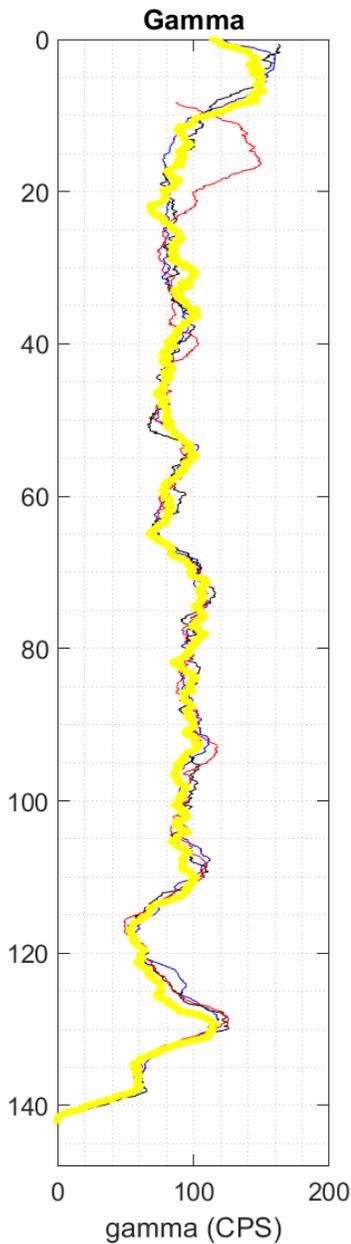
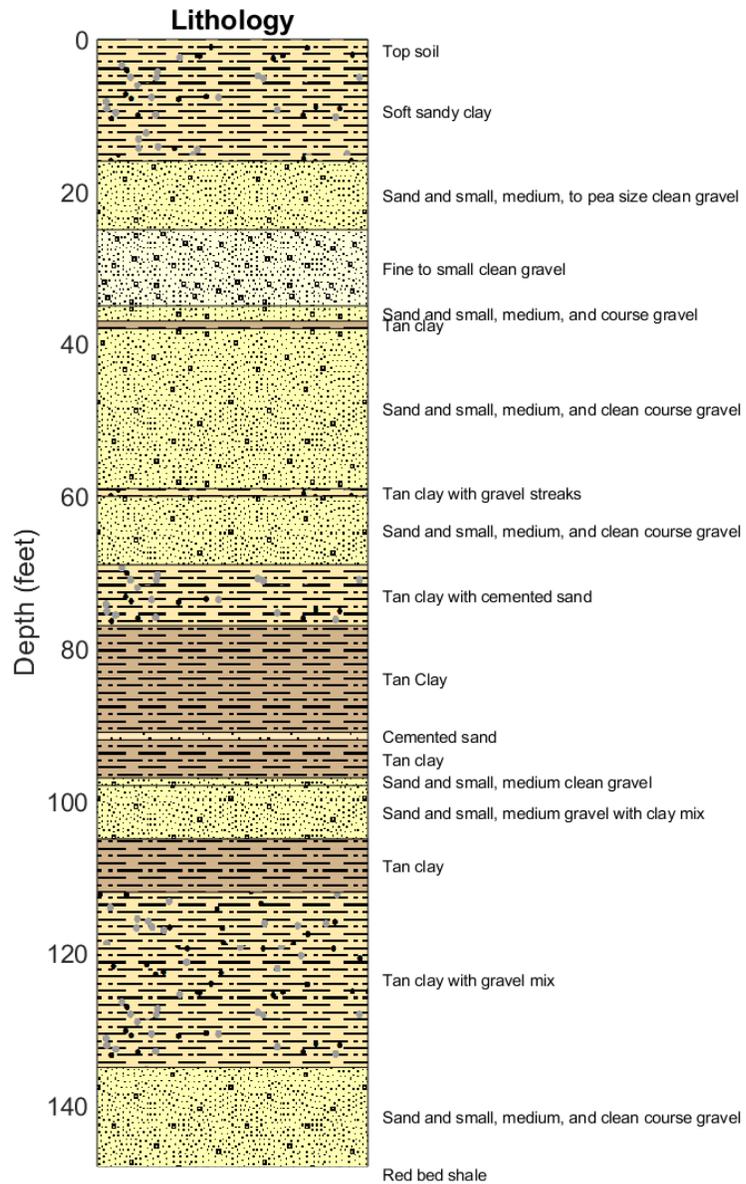
# Borehole Logging



# Site 1 Well Log (RSC-1-A)

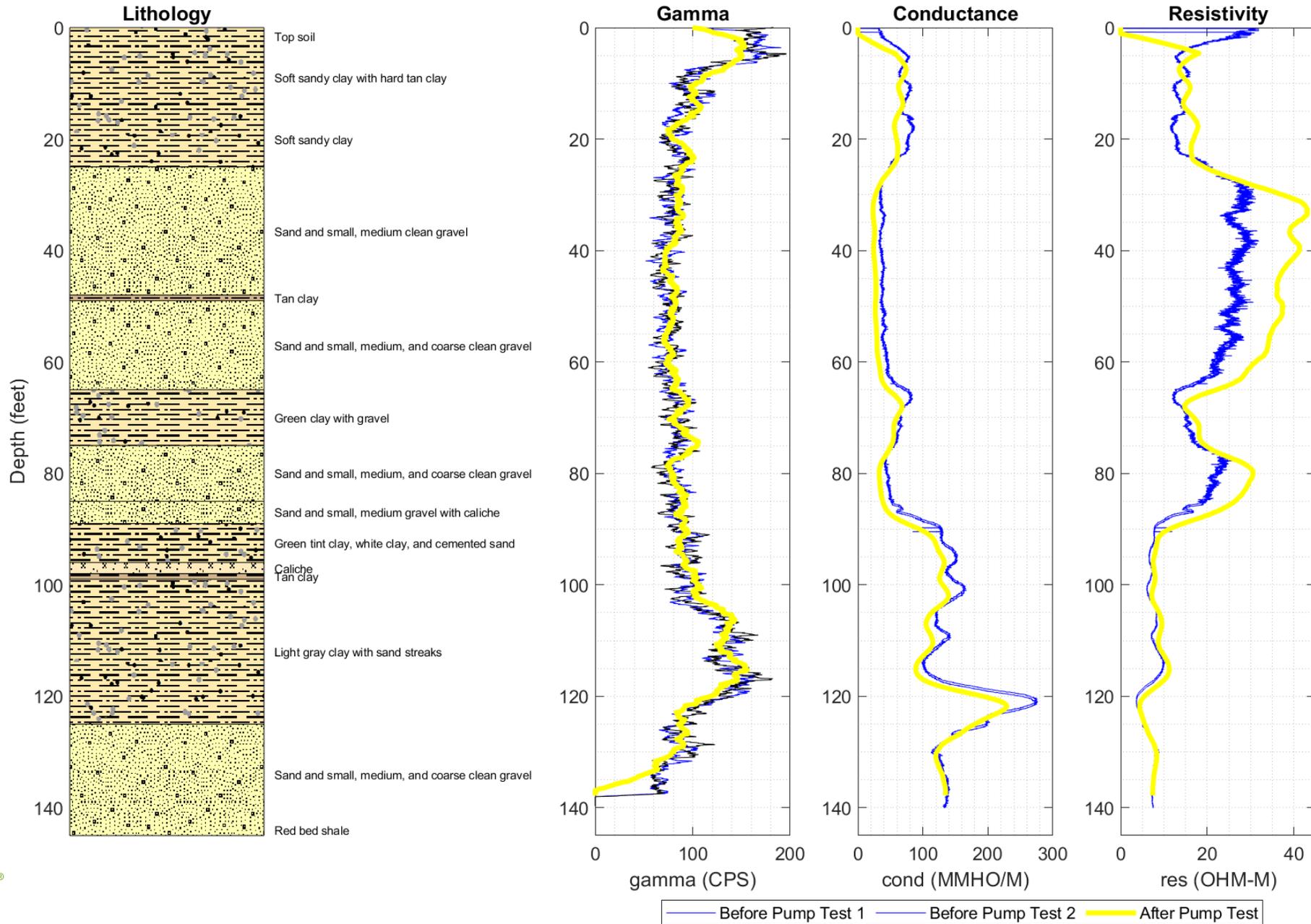


# Site 2 Well Log (RSC-2-A)

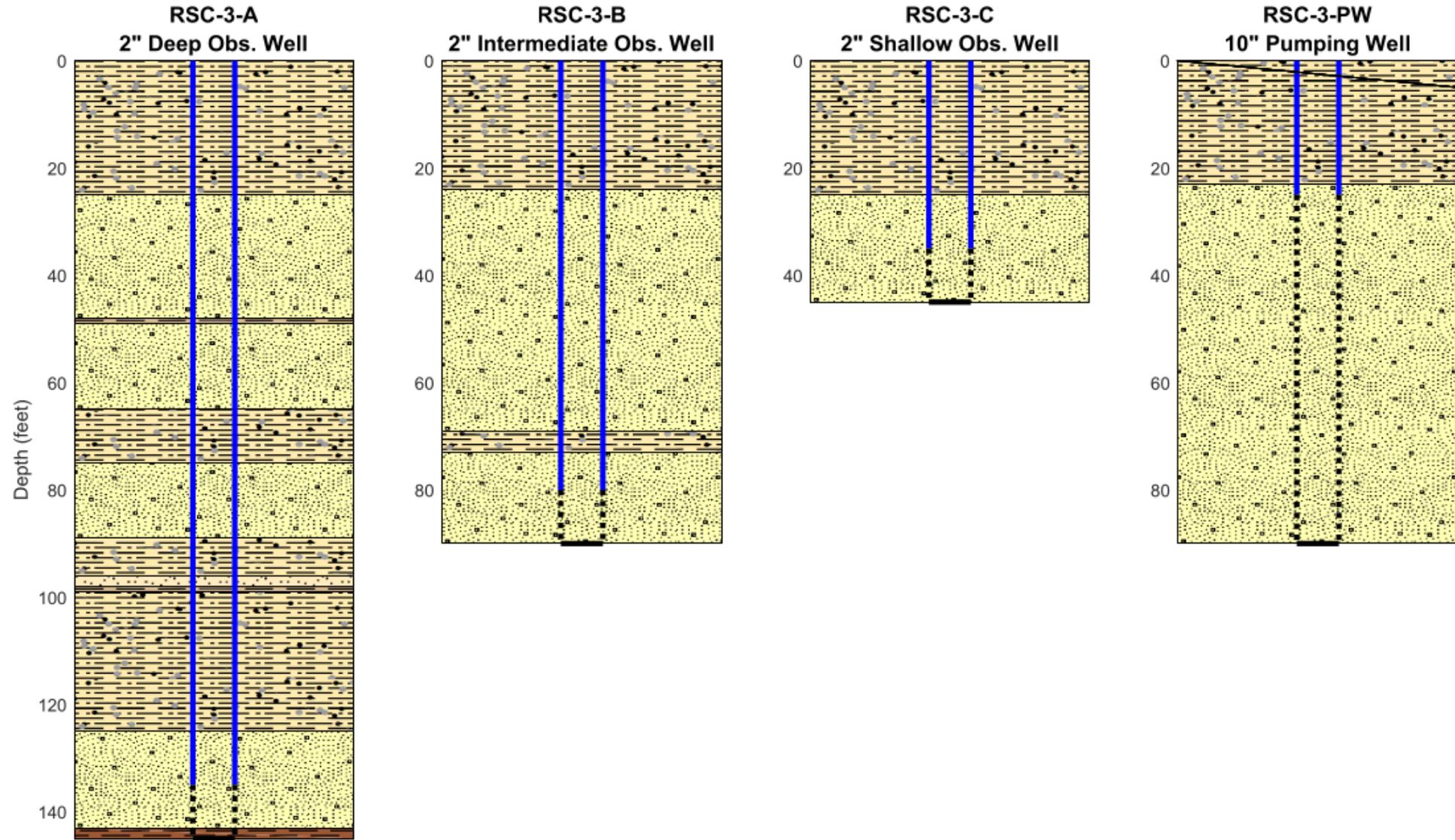


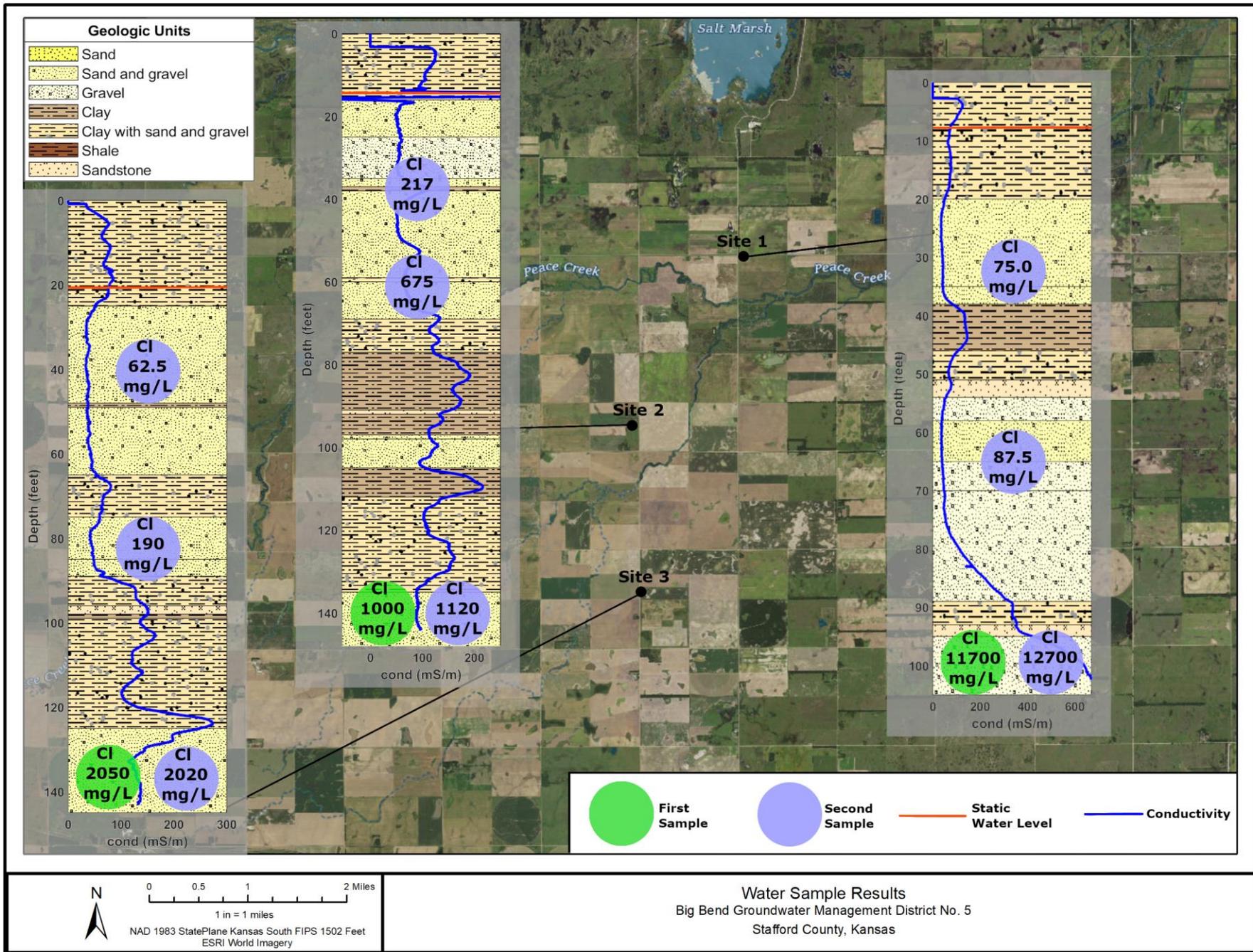
— Before Pump Test 1    — Before Pump Test 2    — Before Pump Test 3    — After Pump Test

# Site 3 Well Log (RSC-3-A)



# Site 3 Well Logs





# Chloride Concentration (mg/L)

	Site 1	Site 2	Site 3
Pumping Well	280*	Not Yet Received	165*
Shallow Obs. Well	75	217	62.5
Intermediate Obs. Well	87.5	675	190
Deep Obs. Well	12,700	1,120	2,020

\*Sample data shown taken in pumping well after 24-hour pump test.

## Conductivity ( $\mu\text{mho/cm}$ )

	Site 1	Site 2	Site 3
Pumping Well	1,610*	Not Yet Received	1,090*
Shallow Obs. Well (C)	1,000	1,350	727
Intermediate Obs. Well (B)	775	2,750	1,180
Deep Obs. Well (A)	38,400	3,870	6,700

\*Sample data shown taken in pumping well after 24-hour pump test.

# Drill Production Wells and Step Test



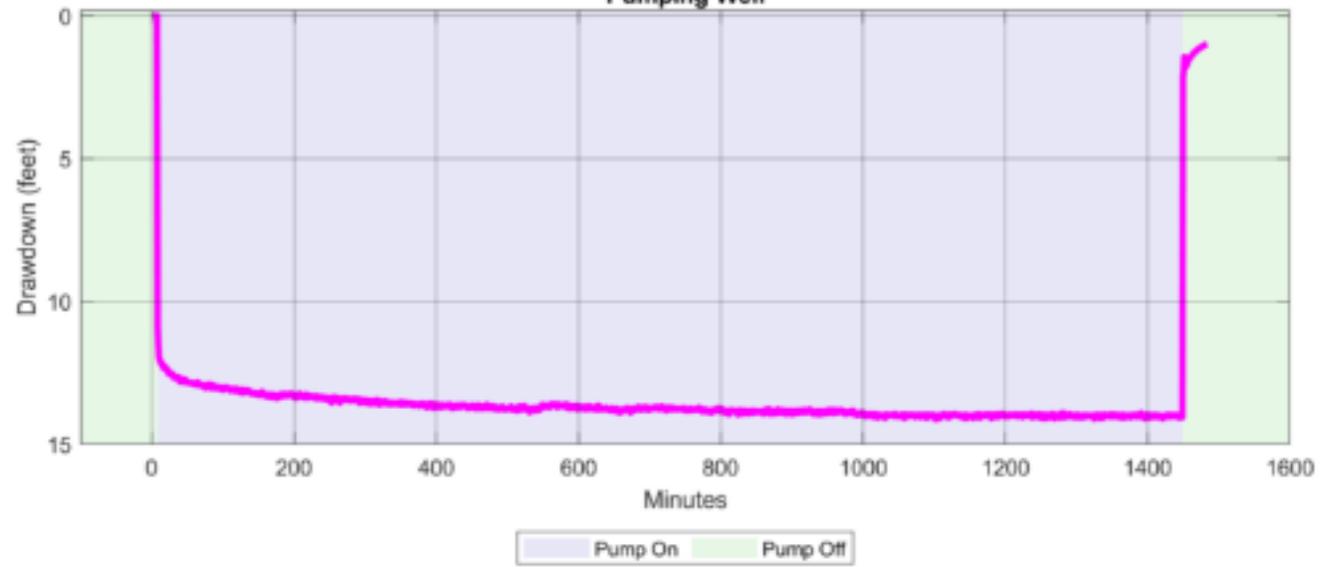
# 24-hour pump test



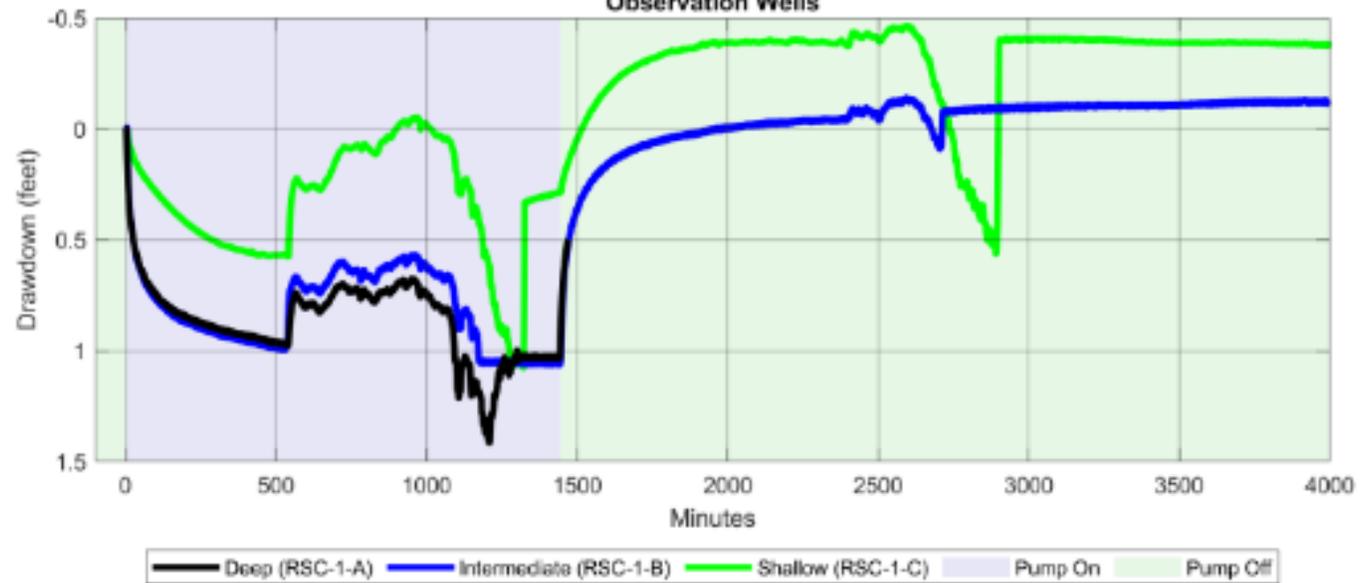
# Data loggers

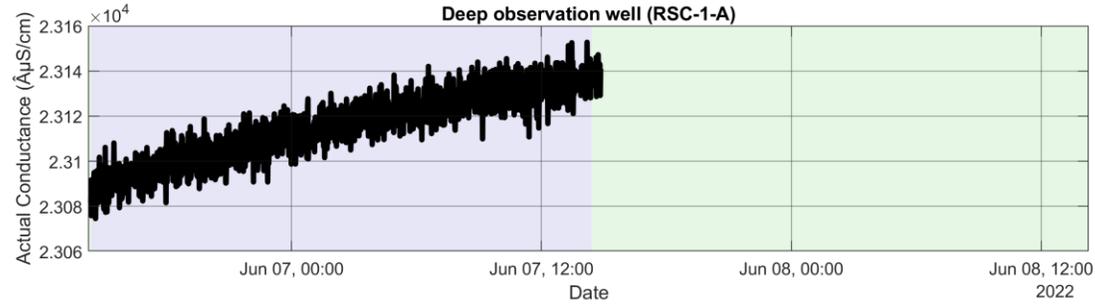
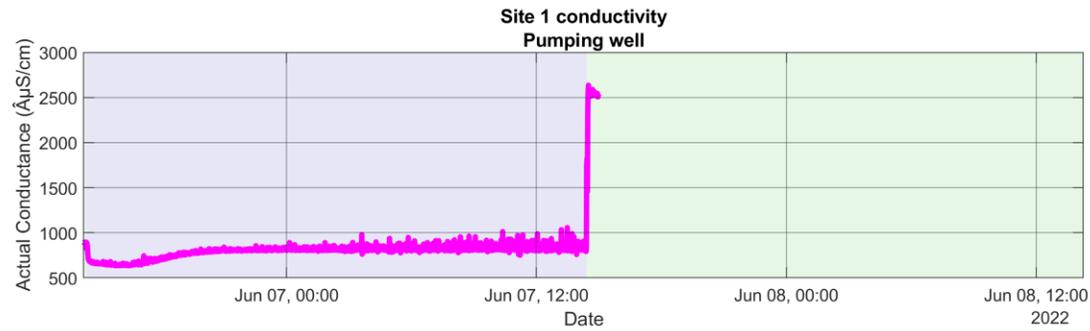


24-hour pump test at Site 1  
Pumping Well

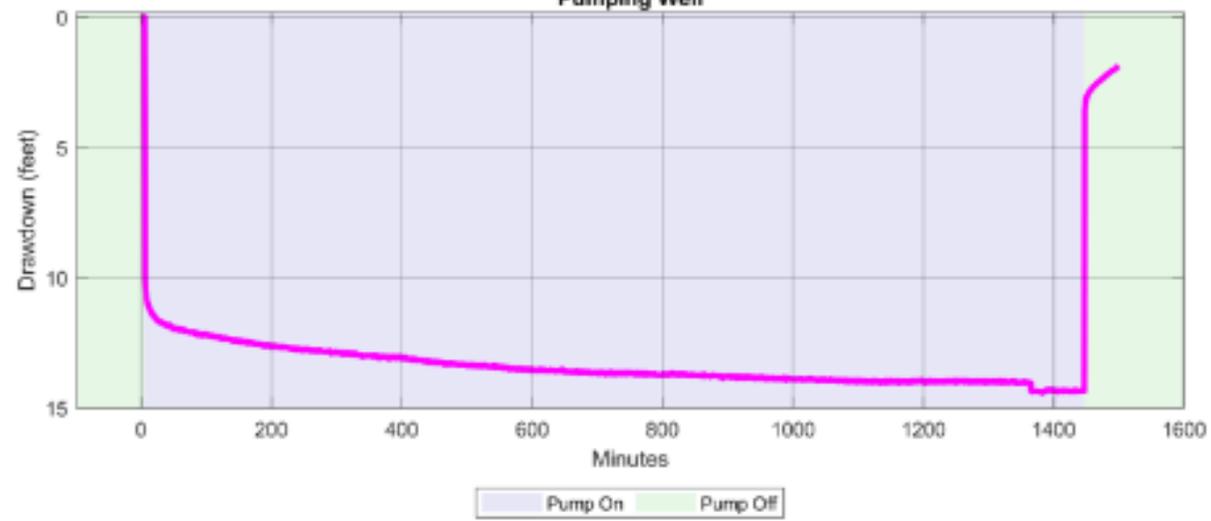


24-hour pump test at Site 1  
Observation Wells

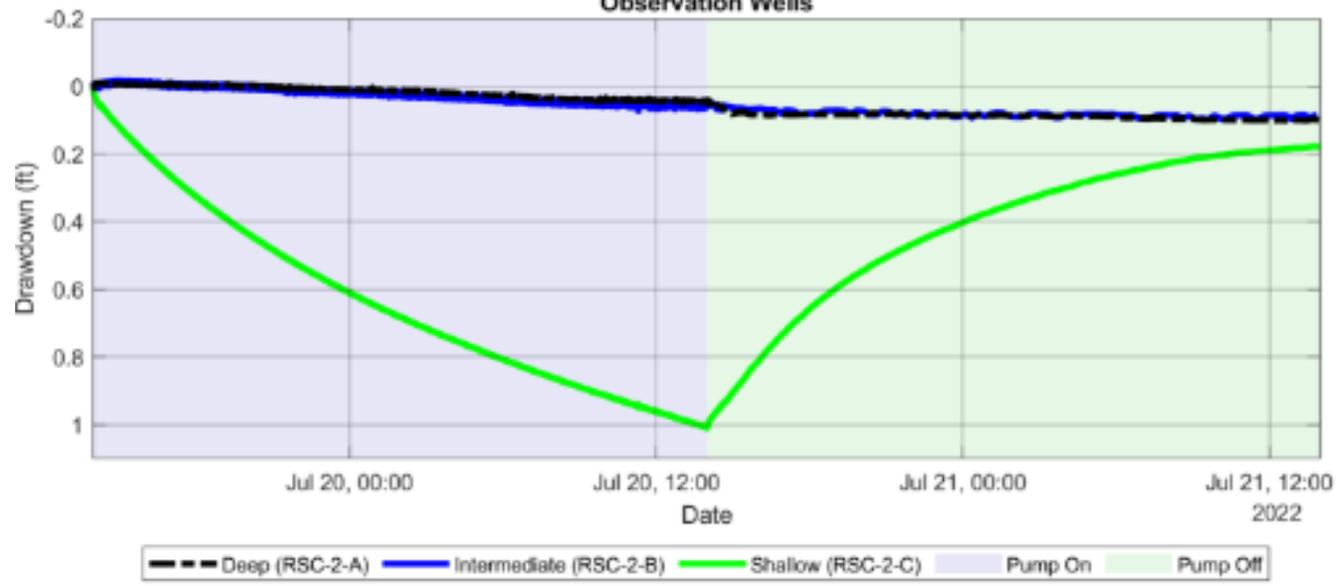




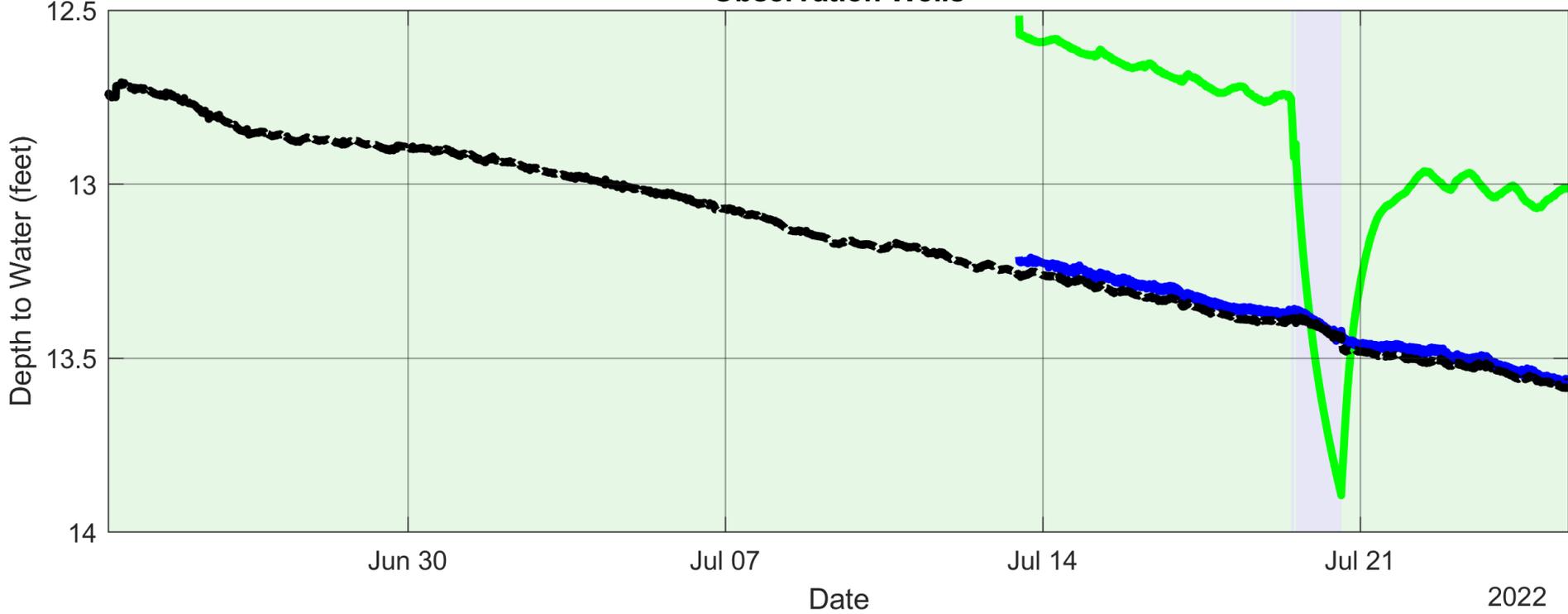
24-hour pump test at Site 2  
Pumping Well

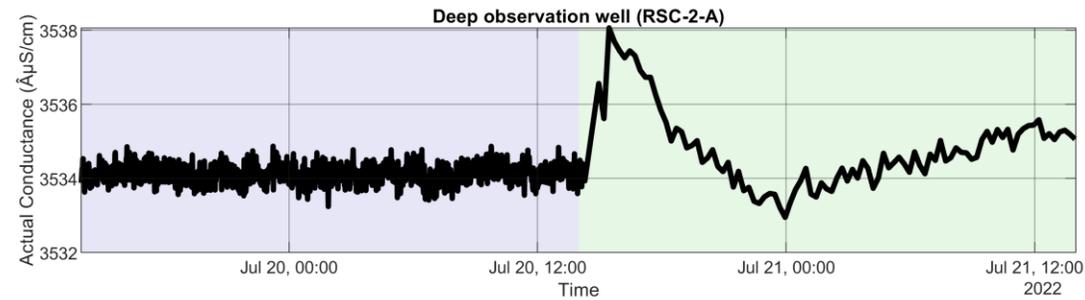
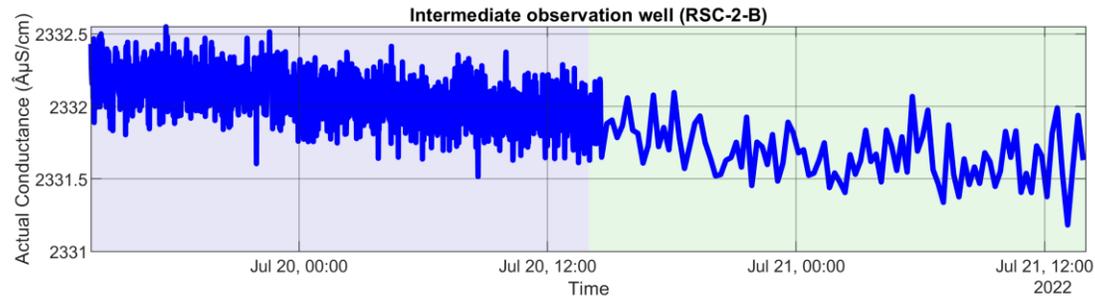
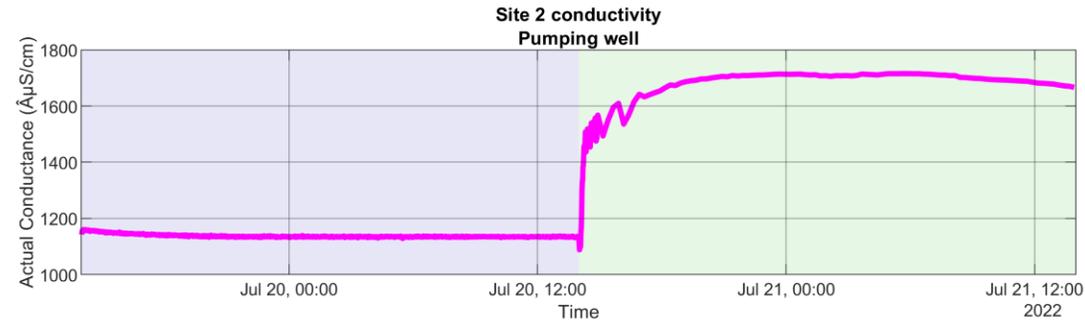


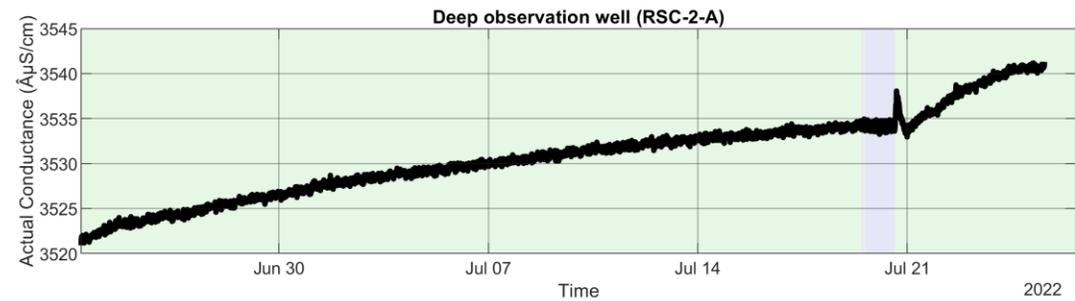
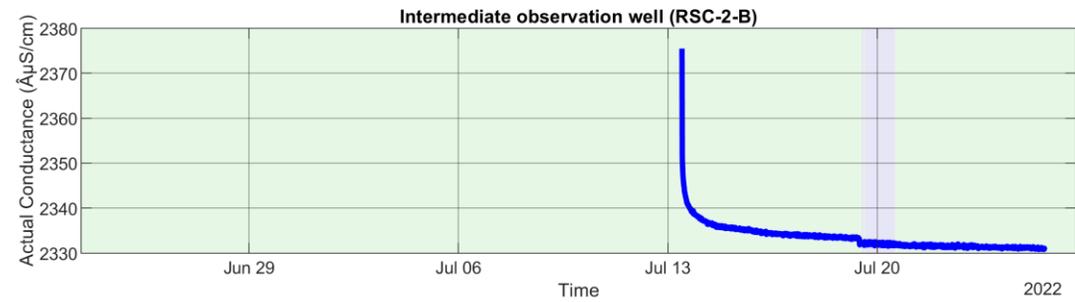
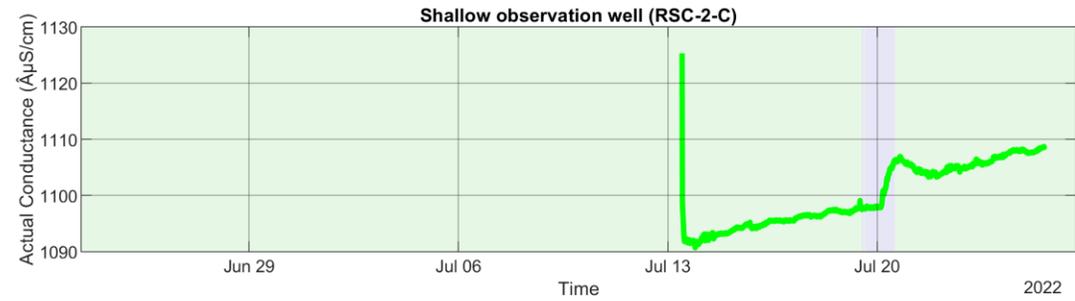
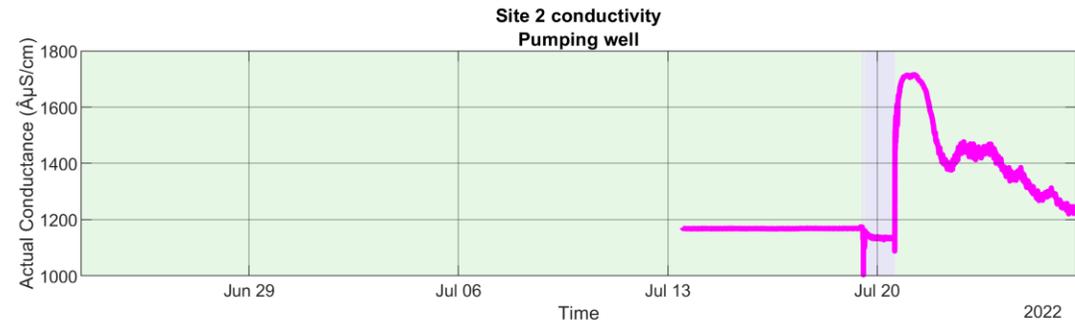
24-hour pump test at Site 2  
Observation Wells



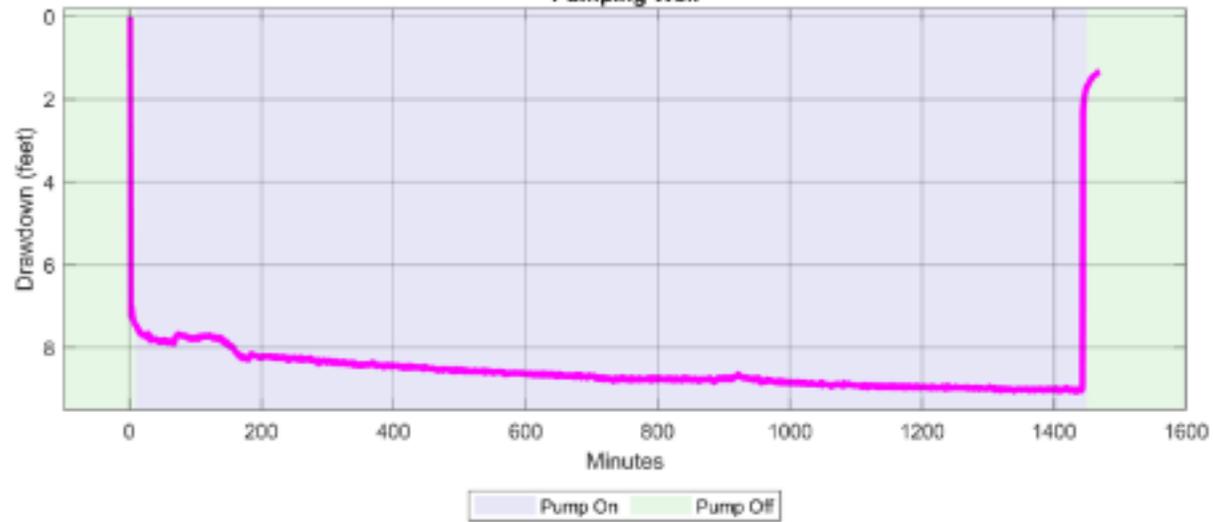
### Site 2 Depth to Water Monitoring Observation Wells



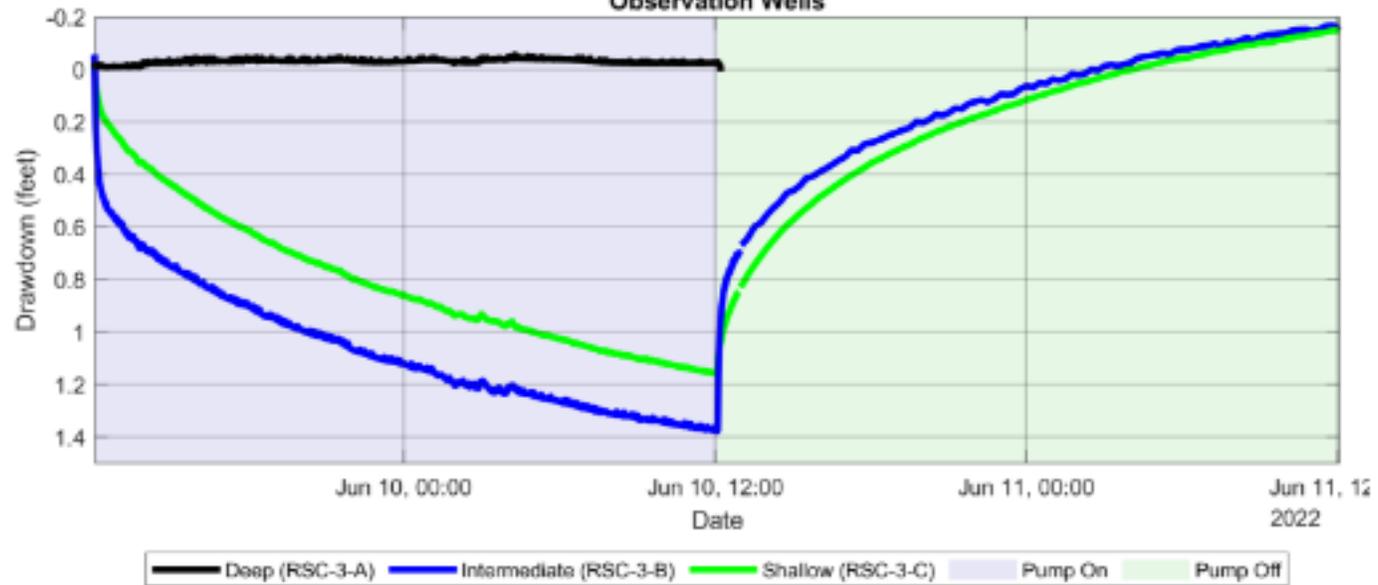


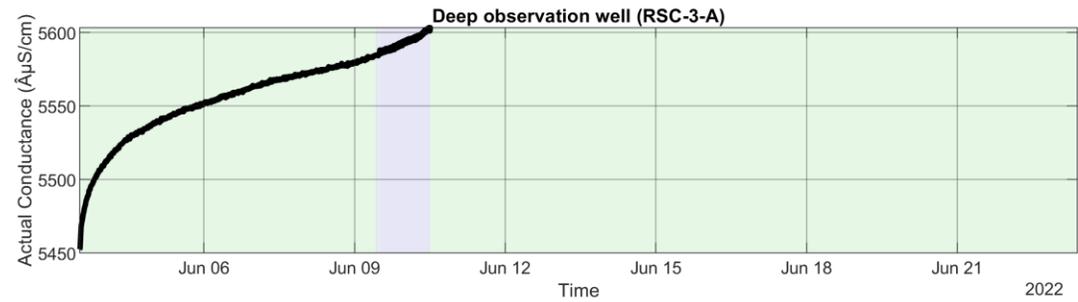
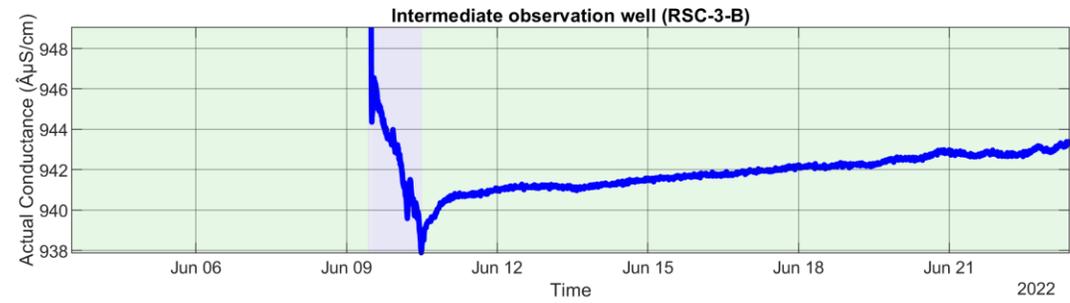
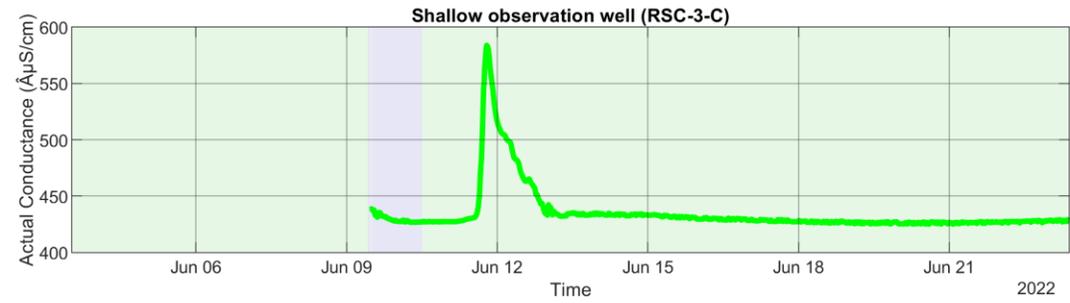
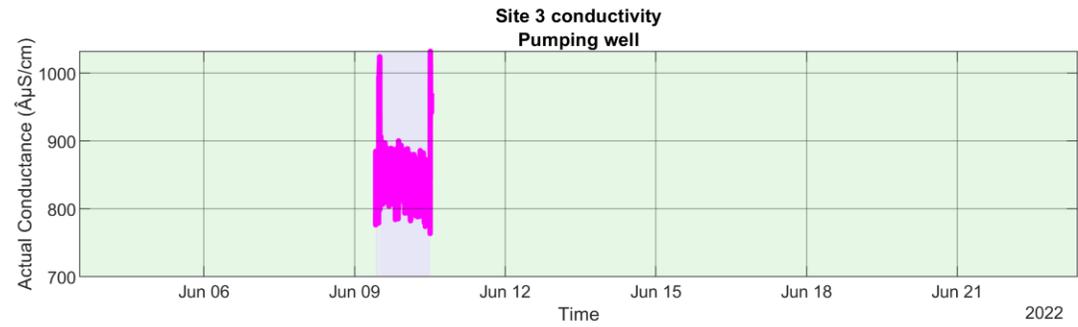


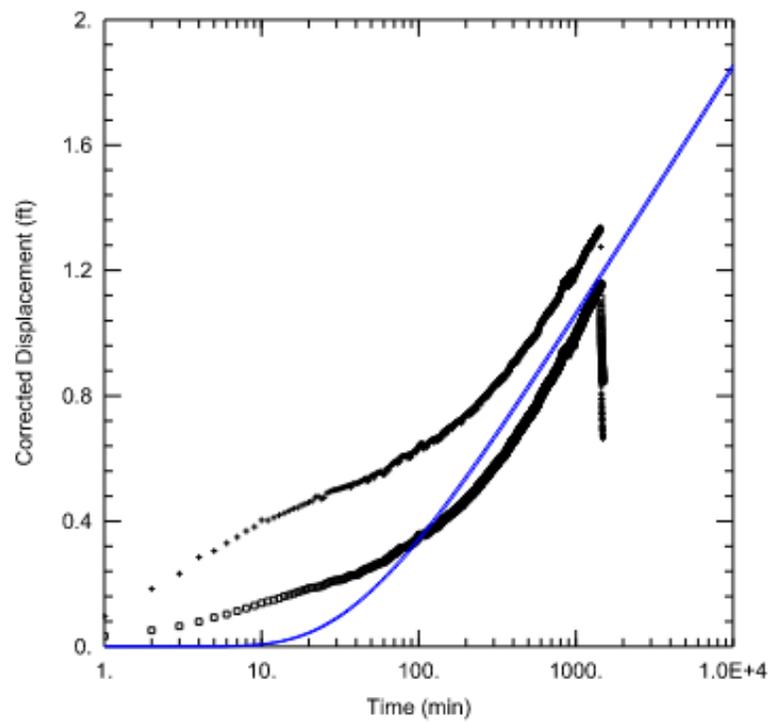
24-hour pump test at Site 3  
Pumping Well



24-hour pump test at Site 3  
Observation Wells







WELL TEST ANALYSIS

Data Set:  
Date: 06/22/22

Time: 11:03:45

PROJECT INFORMATION

Company: Olsson  
Client: GMD5  
Project: 021-00451  
Location: Stafford KS  
Test Well: Site 3  
Test Date: 06/09/2022

WELL DATA

Pumping Wells			Observation Wells		
Well Name	X (ft)	Y (ft)	Well Name	X (ft)	Y (ft)
RSC-3 PW	0	0	• RSC-3-C	300	0
			• RSC-3-B	306	0

SOLUTION

Aquifer Model: Unconfined  
T = 15.34 ft<sup>2</sup>/min  
Kz/Kr = 1

Solution Method: Theis  
S = 0.01808  
b = 120 ft

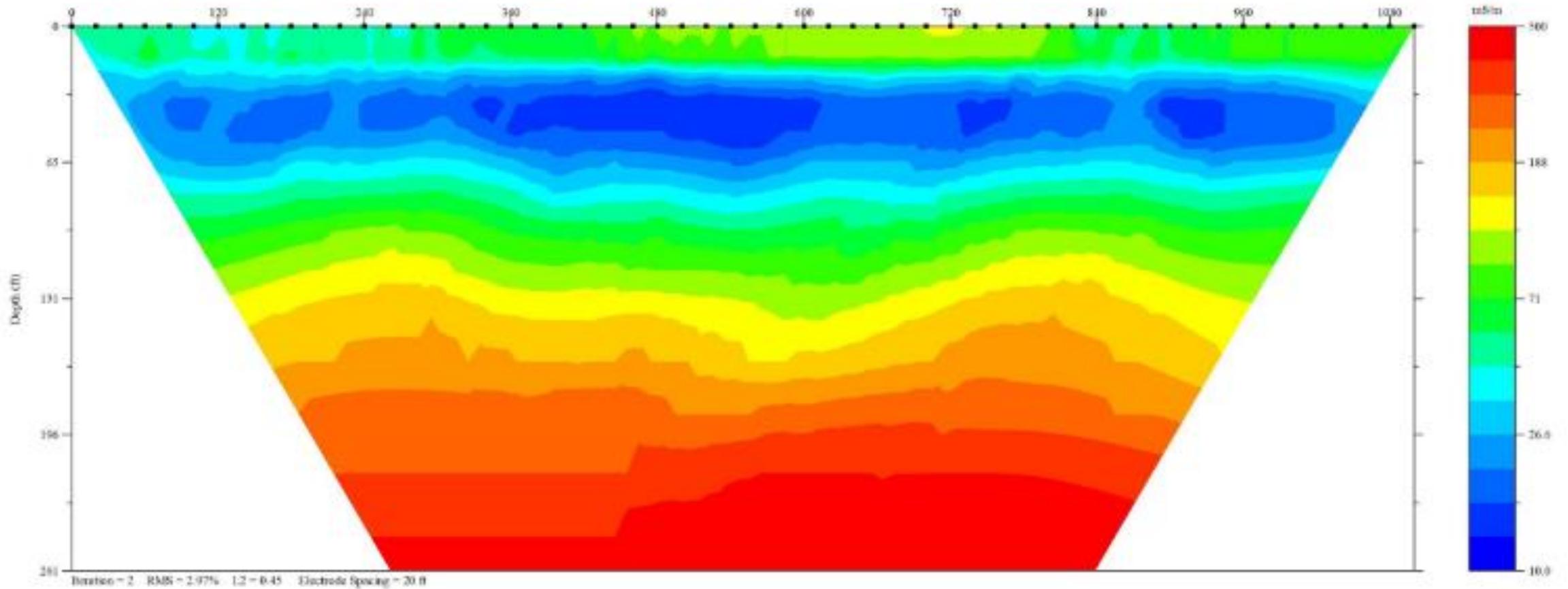
# Electrical Resistivity Surveys





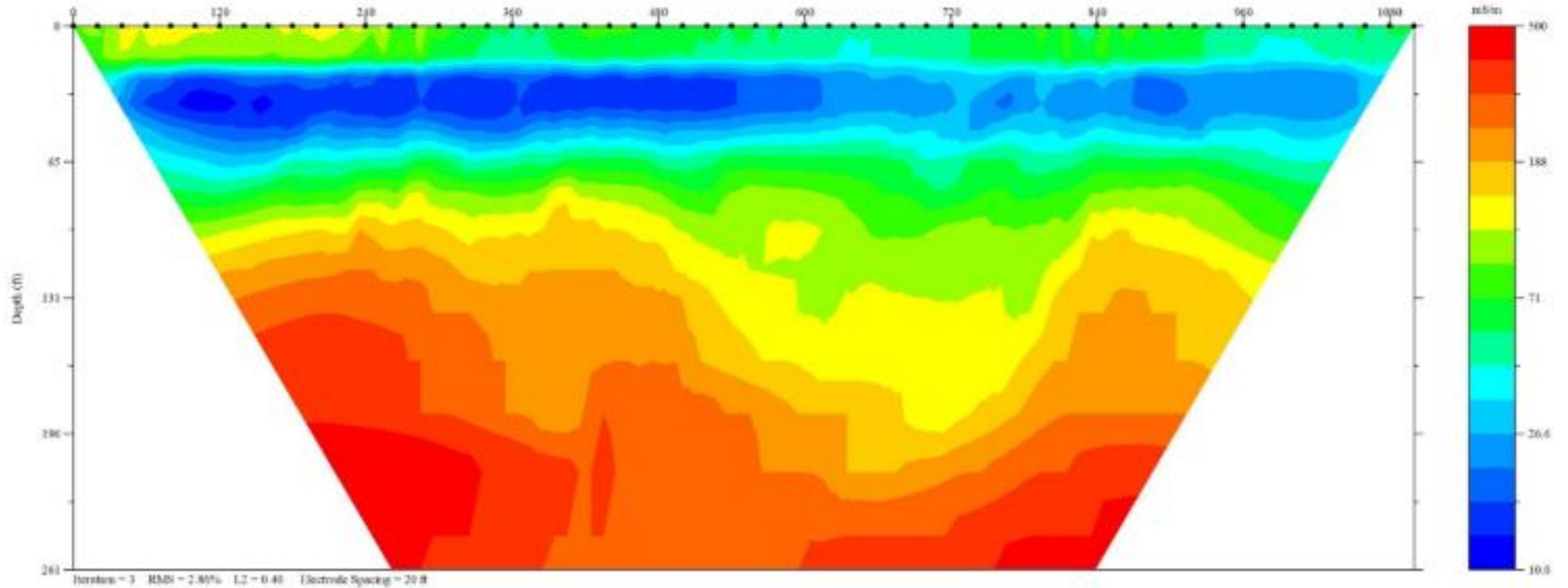
# Site 3

Inverted Conductivity Section

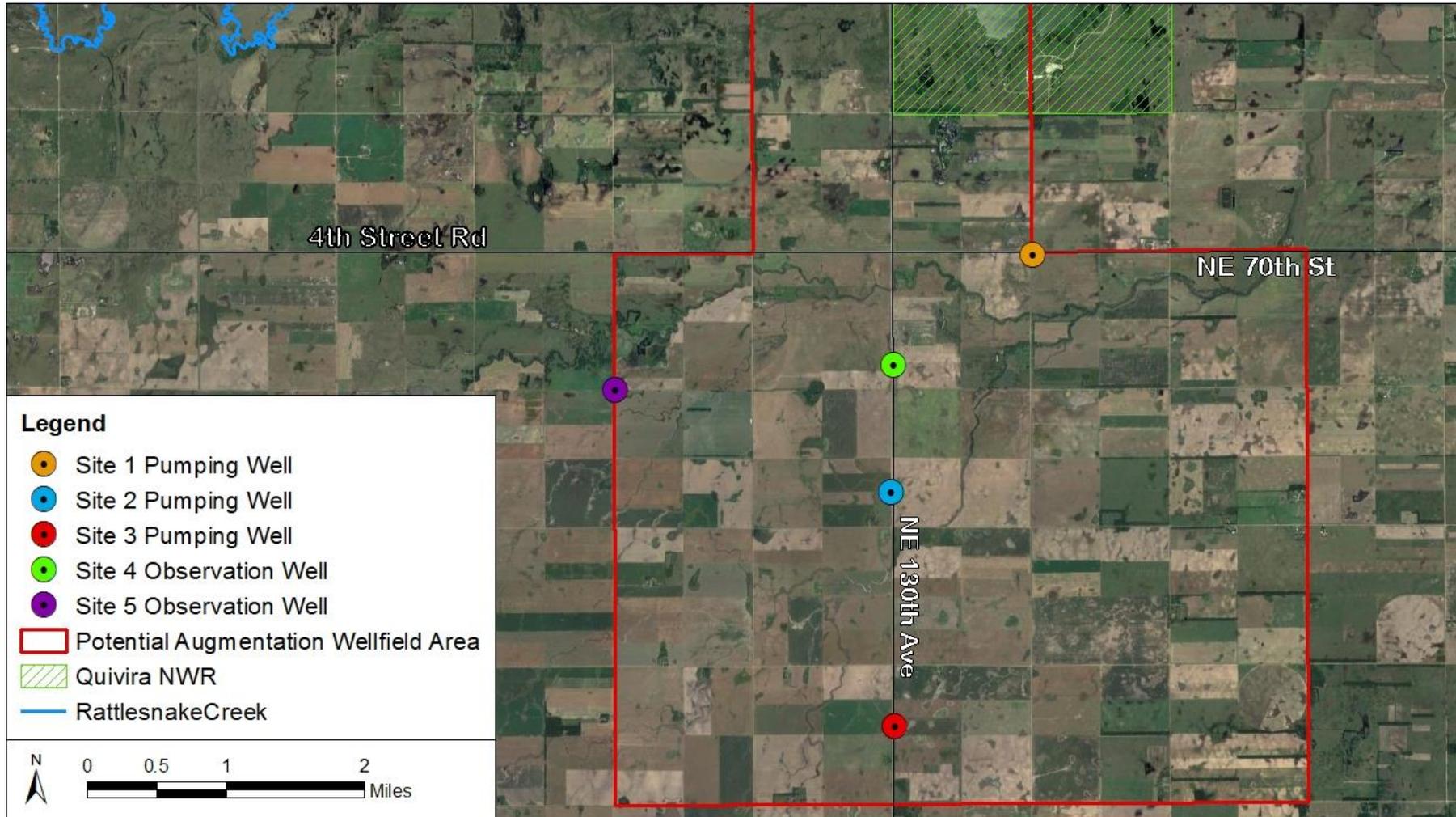


# Site 6

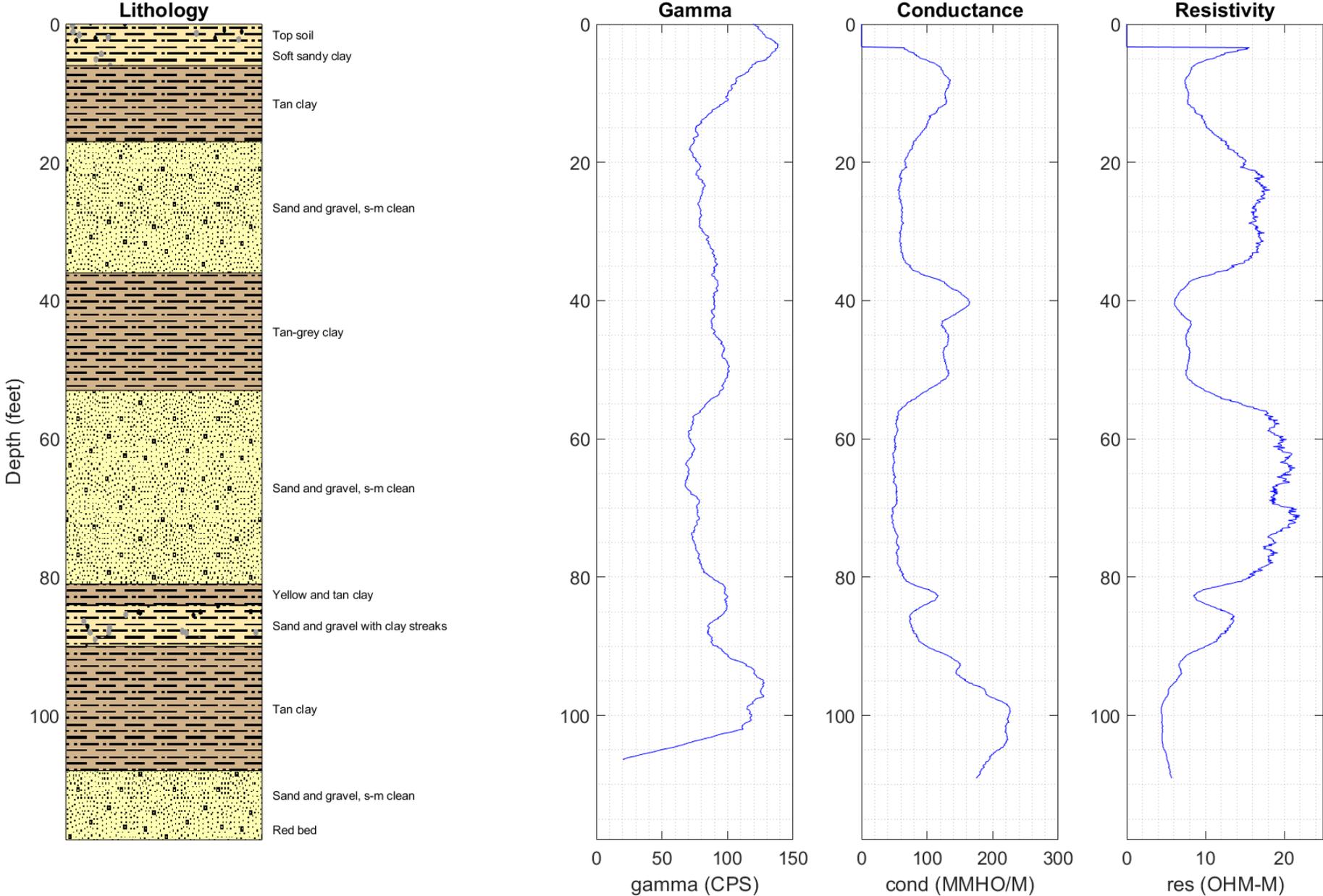
Inverted Conductivity Section



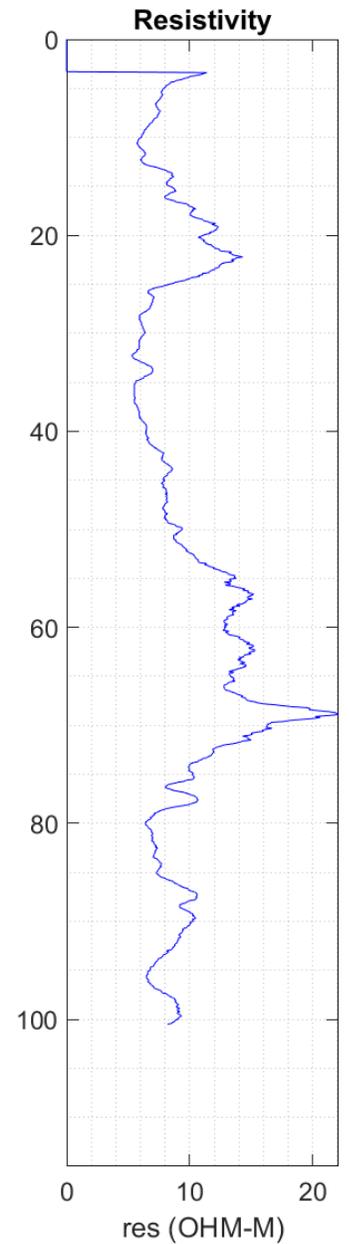
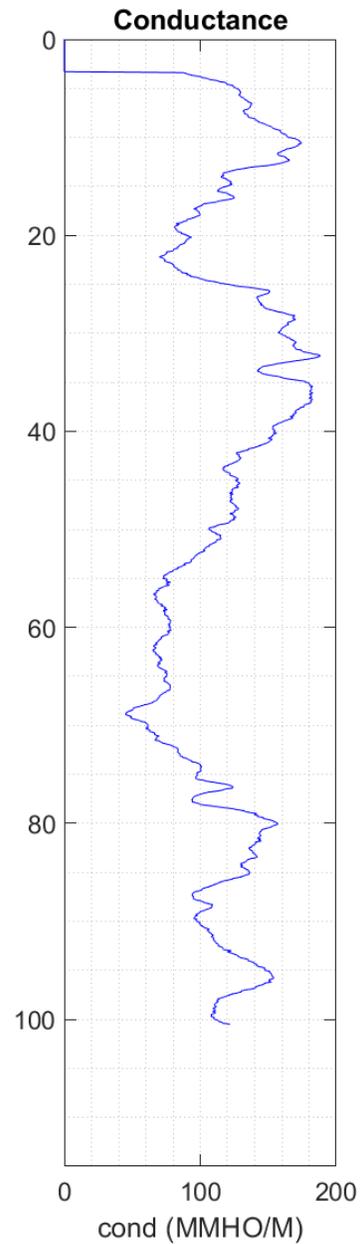
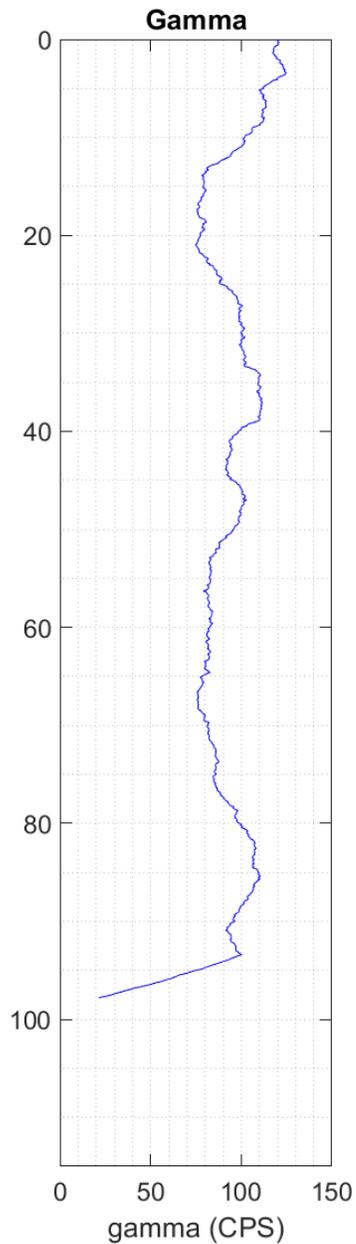
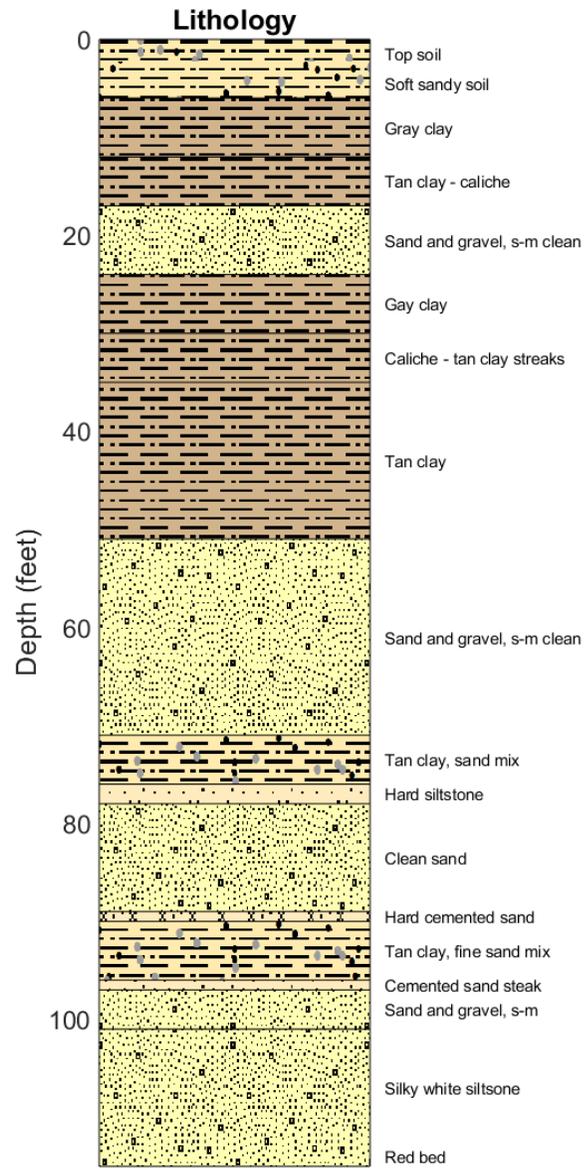
# Additional Test Wells



# Site 4 Well Log (RSC-4-A)



# Site 5 Well Log (RSC-5-A)





# Stay Tuned



Collected good data



Working towards final watershed plan EA



No decisions have been made yet