Water Committee Meeting
Wednesday, August 31, 2022 6:00 PM
Lower Platte North NRD Office
P.O. Box 126
Wahoo, NE 68066

1. UNFINISHED BUSINESS

2. REGULATORY

2.A. GROUND WATER MANAGEMENT AREA

2.A.1. Voluntary Integrated Water Management Plan - LPNNRD
The annual V-IMP update was presented jointly by NeDNR and LPN. Discussion on the next 5-year allocation, modeling progress and future plans.

2.A.2. Lower Platte River Consortium
Shown below is an update email sent out by NeDNR on August 29th that highlights the Lower Platte Basin Drought Plan Triggers:

The current summer season's high demand for both irrigation and domestic water along with hot and dry weather and predicted climatic conditions means that more frequent monitoring of drought conditions is sensible.

As of August 29, 2022, at 12am Central Time:
the PDSI at Ashland is **-2.93** and
Platte River mean flow at Ashland is **984 cfs mean discharge**
According to the Plan, these conditions place the Consortium into **"Severe Drought."**

Plan Drought Triggers

2.A.3. **Category**	2.A.4. **Level**	2.A.5. **Palmer Drought Severity Index (PDSI)**	2.A.6. **P River Stream at Ash**
2.A.7. Mild Drought	2.A.8. Level 0	2.A.9. -1.0 to -1.99	2.A.10. --
2.A.11. Moderate Drought	2.A.12. Level 1	2.A.13. **-2.0 to -2.99**	2.A.14. 3 1,500 c
2.A.15. **Severe Drought**	2.A.16. Level 2	2.A.17. -3.0 to -3.99	2.A.18. **1 500 cfs**
2.A.19. Extreme Drought	2.A.20. Level 3	2.A.21. -4.0 and below	2.A.22. L than 50

Additional climate conditions can be found at, the LPDC Drought Dashboard:

https://gis.ne.gov/portal/apps/experiencebuilder/experience/?id=c0b751c512a24b83a6ad1c3214941ea8.

The Plan is available here: https://dnr.nebraska.gov/water-planning/lower-platte-river-basin.

Both indicator values for the Plan exceeds a trigger value, so a virtual call between Consortium members may be warranted. Please respond Yes or No to this email if a virtual call will be necessary *based on conditions within your jurisdiction*. If any Consortium member replies Yes, a virtual call will be held.

NeDNR will coordinate and schedule needed virtual calls via Zoom and a calendar invitation for the call will be sent. NeDNR will provide a recording of calls for all members.

We anticipate that any scheduled call will have a focused and short discussion on these topics:

1. discuss drought monitor triggers that exceed identified values,
2. discuss current water supply issues being encountered by members, and
3. discuss the need for coordinated communication with the press, social media outlets and the like.

2.A.23. Please reach out to NeDNR if you have questions or concerns or there are other factors you would like included in the status update or the virtual calls.

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The Omaha/Valley National Weather Service Office on Thursday August 25th put out a drought update packet for the region that you may find informative, particularly the historical comparisons and soil moisture information.

The Omaha/Valley NWS link: https://www.weather.gov/oax/
OR
Direct to the report here:
https://www.weather.gov/media/oax/Climate/Drought/drought.pdf

2.A.24. Variance Request in the Hydrologically Connected Area (Limited Development Area)
Deadline for applications is September 15.

2.A.25. Variance Requests in the Non-Hydrologically Connected Area (Normal Development Area)
No applications were submitted for these areas.

2.A.26. Variance Requests in the Restricted Development Areas
Last year, the LPN had 6 variances that were in the Restricted Area (Red). The legal descriptions of these sites are:
SW Section 1-16-5E (south of Morse Bluffs) 74 acres - scored 302
SE Section 17-15-7E (northwest of Wahoo) 45 acres - scored 252.5
SW Section 29-15-7E (northwest of Wahoo) 45 acres - scored 252.5
NW Section 30-16N-7E (northwest of Wahoo) 45 acres - scored 265
SW Section 28-15N-6E (between Malmo and Weston) 131 acres - scored 296

SE 34-15N-9E (south of Yutan) 68 acres - scored 342.5

Even though applications were scored, the stream depletion factor(which is part of the scoring system) utilizes the adjoining section. All of these applications were ranked with other applications either in the HCA (blue) or NHCA (white) last year, but were not approved.

2.A.27. Well Interference Complaints

Staff have received complaints about domestic wells running low on water in 3 areas of the District.

4. 2 miles west of Bruno
5. 2 miles west, 1 mile north of Bruno
6. 2 miles SW of Wahoo
7. 4 miles north of Ames right before going up the bluffs.

2.A.28. Attached is some information from the Bruno Area, along with SW of Wahoo. The Ames area map shows an irrigation well G-151426 close to the domestic well. This well was completed in 1960 and registered in 2008 as shown by NeDNR records.

2.A.29. Special Quantity Subareas

Some producers have asked about developing more acres with new wells in SQS 2. UNL/CSD has been studying this area and has shown some extinct hydrogological boundaries, as shown in the attachment. If changes are going to occur in this area, the Board will have to make a decision by December 15.

The Committee will discuss management changes at a potential water retreat in the latter part of November.

2.A.30. Cost Share Programs

2.A.30.a. Irrigation Well Sample Kits

325 kits to producers so far in 2022. 280 of these have been returned - eleven of these were in today's mail.

2.A.30.b. Flow Meter Maintenance Program

2.A.30.c. **Routine required flow meter maintenance is scheduled for Mid-late November in Zone 3 which includes the following Townships: 18-1W, 18-2W, 18-3W, 19-1W, 19-2W, 19-3W, 20-3W, 20-4W, 20-5W, 21-4W, 21-5W, 22-5W, 22-6W. There are approximately 350 flow meters that will be maintained this Fall/Winter. Tri-city also records the flow meter readings so it also serves as a QA/QC.**

2.A.31. Bellwood Phase 2 Area

2.A.32. 2022 is the twentieth year for this Phase 2 Area.

2.	2.A	2.A	2.A	2.A	2.A

	2.A	2.A	2.A	2.A	2.A
	2.A	2.A	2.A	2.A	2.A
	2.A	2.A	2.A	2.A	2.A
2.	2.A	2.A	2.A	2.A	2.A
2.	2.A	2.A	2.A	2.A	2.A
2.	2.A	2.A	2.A	2.A	2.A

2.	2.A	2.A	2.A	2.A	2.A
2.	2.A	2.A	2.A	2.A	2.A
2.	2.A	2.A	2.A	2.A	2.A
2.	2.A	2.A	2.A	2.A	2.A
2.	2.A	2.A	2.A	2.A	2.A
2.	2.A	2.A	2.A	2.A	2.A

2.	2.A	2.A	2.A	2.A	2.A
2.	2.A	2.A	2.A	2.A	2.A
2.	2.A	2.A	2.A	2.A	2.A
2.	2.A	2.A	2.A	2.A	2.A
2.	2.A	2.A	2.A	2.A	2.A
2.	2.A	2.A	2.A	2.A	2.A

2.	2.A	2.A	2.A	2.A	2.A
2.	2.A	2.A	2.A	2.A	2.A
2.	2.A	2.A	2.A	2.A	2.A
2.	2.A	2.A	2.A	2.A	2.A
2.	2.A	2.A	2.A	2.A	2.A

2.	2.A	2.A	2.A	2.A	2.A

2.A.162.

37 sample results have not yet been received from the lab.

2.A.163. Richland - Schuyler Phase 3 Area

2.A.164. 2022 is the seventh year of this Phase 3 Area. This Phase 3 area went into effect September 1, 2015. The 55 sections of this area first went into a Phase 2 Area in 2004. The ten sections that were in Phase 2 are now in Phase 3. As such, the 2020, 2021 and 2022 numbers (at bottom of table) are for 65 sections.

2.A.165. **Year**	2.A.166. **Nitrate-nitrogen Range**	2.A.167. **Percent** 2.A.168. **Nitrate-nitrogen** 2.A.169. **0 to 8.0 ppm**	2.A.170. **Percent** 2.A.171. **Nitrate-nitrogen** 2.A.172. **8.01 to 10.00 ppm**
2.A.179. 2004	2.A.180. 0 to 47 ppm	2.A.181. 30% (42 of 139)	2.A.182. 10% (14 of 139)
2.A.185. 2005	2.A.186. 0 to 120 ppm	2.A.187. 31.3% (74 of 236)	2.A.188. 10.2% (24 of 236)
2.A.191. 2006	2.A.192. 0 to 53 ppm	2.A.193. 28% (50 of 181)	2.A.194. 14% (26 of 181)
2.A.197. 2007	2.A.198. 0 to 99 ppm	2.A.199. 32% (75 of 231)	2.A.200. 10% (22 of 231)
2.A.203. 2008	2.A.204. 0 to 46 ppm	2.A.205. 28% (53 of 190)	2.A.206. 12% (23 of 190)
2.A.209. 2009	2.A.210. 0 to 57 ppm	2.A.211. 33% (72 of 216)	2.A.212. 6% (13 of 216)

2.A.215. 20 10	2.A.216. 0 to 57.5 ppm	2.A.217. 31% (70 of 229)	2.A.218. 7% (15 of 229)
2.A.221. 20 11	2.A.222. 0 to 65.8 ppm	2.A.223. 28% (67 of 241)	2.A.224. 9% (21 of 241)
2.A.227. 20 12	2.A.228. 0 to 52.6 ppm	2.A.229. 29% (70 of 241)	2.A.230. 9% (21 of 241)
2.A.233. 20 13	2.A.234. 0 to 94.0 ppm	2.A.235. 25% (63 of 252)	2.A.236. 9% (23 of 252)
2.A.239. 20 14	2.A.240. 0 to 101.0 ppm	2.A.241. 27% (68 of 251)	2.A.242. 9% (22 of 251)
2.A.245. 20 15	2.A.246. 0 to 53.3 ppm	2.A.247. 23% (55 of 238)	2.A.248. 12% (29 of 238)
2.A.251. 20 16	2.A.252. 0 to 50.5 ppm	2.A.253. 25% (58 of 228)	2.A.254. 10% (22 of 228)
2.A.257. 20 17	2.A.258. 0 to 53.4 ppm	2.A.259. 25% (60 of 238)	2.A.260. 6% (1 4 of 238)
2.A.263. 20 18	2.A.264. 0 to 56.9 ppm	2.A.265. 26.5% (50 of 189)	2.A.266. 6.3% (12 of 189)
2.A.269. 20 19	2.A.270. 0 to 39.4 ppm	2.A.271. 25% (53 of 209)	2.A.272. 11% (22 of 209)
2.A.275. 20 20	2.A.276. 0 to 50.8 ppm	2.A.277. 26% (69 of 261)	2.A.278. 6% (1 5 of 261)
2.A.281. 20 21	2.A.282. 0 to 43.0 ppm	2.A.283. 25.5% (67 of 263)	2.A.284. 8.4% (22 of 263)
2.A.287. 20 22	2.A.288. 0 to 58.5 ppm	2.A.289. 16% (20 of 129)	2.A.290. 3% (4 of 129)

86 sample results have not been received from the lab.

2.A.293. Lower Platte River Basin Water Management Plan Coalition (LPRBC)

The technical group met on August 24th to discuss a drought matrix within the coalition. Each NRD will review what they have in place for drought plans and meet again in the first part of October.

Does LPN want to develop a drought plan or discuss what would be involved?

The committee and staff discussed what other NRDs have done with drought plans. A lot of drought plans emphasis awareness and education, which LPN is already doing.

2.B. CHEMIGATION

For 2022, there are 676 active renewals, 56 active new permits, and 1 active emergency permit application for a current total of 733 total Active Chemigation permits. Inspections for 280 permits have been completed.

2.C. GROUND WATER ENERGY LEVELS

LPN, Baywest, LWS and USGS staff conducted summer water level measurements on August 30 in WANN Basin. Attached is LPN water level measurements showing a 2.209 foot average decline.

2.D. GROUND WATER QUALITY SAMPLING

Encourage you to view the following videos.

Videos on water quality in Nebraska:

Greetings from Nebraska WAVES!

We are excited to announce the release our latest video in a series regarding water quality in Nebraska. Entitled, "Managing Nebraska's Water Quality for Nonpoint Source Pollution", this short video explores how management differs between surface water (rivers, lakes), groundwater, and drinking water and how agencies and NRDs are involved. Thank you to our colleagues at NDEE, DHHS, CPNRD, and LBBNRD for their assistance with script review, edits, and photos. You can view it at: https://youtu.be/j7ZVc3ldad8

We are also very happy to announce that our video released earlier this year, "Nitrate in Nebraska - The Basics" was the National Winner in the National Association of County Agricultural Agents Communications awards in 2022. The video is part of a broader Nebraska WAVES effort to provide NRD Board Members and other water management leaders with the knowledge needed to make nitrogen management decisions through education about the role of nitrogen in Nebraska, the current state of nitrate in groundwater, the impacts of high nitrate concentrations, and a preview of how Nebraskan's are addressing nitrate challenges. This is the first of three videos about nitrate in Nebraska released in 2022. You can watch it at: https://www.youtube.com/watch?v=9koZIifdIGY

Please feel free to use and share these resources and let us know if you do! To view any of our other videos, interactive modules and more, visit: https://nebraskawaves.org/

Many thanks to our partners at NET, NARD, NDEE, NDNR, UNMC and

UNL. For more information about how we could assist with use of our materials or a facilitated group session/training with Nebraska WAVES, email me at carla.mccullough@unl.edu. Let me know if you have any feedback or questions, have found this to be useful, or have suggestions for future topics!

Regards,
Carla

Carla McCullough
Extension Educator - Watershed Science
University of Nebraska-Lincoln
School of Natural Resources

3. GROUND WATER PROGRAMS

3.A. DECOMMISSIONED WELL PROGRAM

3.A.1. Well Estimates

3.A.2. # new wells has been reviewed and approved for decommissioning since the last Committee meeting.

3.A.3. **Well Owner**	3.A.4. **Type of Well**	3.A.5. **Cost Share Estimate**	3.A.6. **County**
3.A.7.	3.A.8.	3.A.9.	3.A.10.
3.A.11.	3.A.12.	3.A.13.	3.A.14.
3.A.15.	3.A.16.	3.A.17.	3.A.18.

3.A.19. Plugged Wells

3.A.20. # wells have been plugged, reviewed, and ready for cost share payment approval this month.

3.A.21. **Well Owner**	3.A.22. **Type of Well**	3.A.23. **Cost Share Payment**	3.A.24.
3.A.25. Meadowbrook MHC	3.A.26. Domestic	3.A.27. $1,000.00	3.A.28.
3.A.29.	3.A.30.	3.A.31.	3.A.32

3.A.33.	3.A.34.	3.A.35.	3.A.36

3.B. LOWER PLATTE NORTH NRD GROUND WATER STUDIES

3.B.1. Cover Crop Project Update

All of the sites in Lower Platte North have been completed.

LPNNRD has been assisting UNL with doing some inter-seeding of cover crops with a Highboy throughout Wahoo and Shell Creek Watersheds. If you are interested in watching and even riding along through the field, here is an upcoming schedule.

8. Tuesday, August 30, starting at 10 am. Field site is East side of Section 35-18N-2E or just North of the intersection of Road 6 and G in Colfax County.
9. Wednesday, August 31, starting at 10 am. Field site is SW1/4 of Section 29-17N-3E or turn South onto Road 8A about 3/4 of a mile off of Road C in Colfax County.
10. Thursday, September 1, starting at 10 am. Field site is NW1/4 of the NE1/4 of Section 32-17N-2E or 1/2 miles west of the intersection of Road 3 and A1 in Colfax County.
11. Friday, September 2, starting at 2:30 pm. Field site is SW1/4 of Section 18-16N-7E or NE of the intersection of Road 20 and U in Saunders County.
12. Tuesday, September 6, starting at 10 am. Field site is Center of S1/2 of Section 2-14N-2E (Saunders County) or 1 mile west of Starlite Event Center on Hwy 92. The field is on the North side of Hwy 92.
13. Tuesday, September 6, starting at 2 pm. Field site is E1/2 NE1/4 of Section 13-14N-5E or the intersection of Road 26 and J in Saunders County.

3.B.2.

The week of September 6-9 there will be more sites in the Wahoo Watershed. An update will be sent out on these locations.

3.B.3. Long Range Plan

Draft version is attached.

4. SURFACE WATER PROGRAMS

4.A. STATE LAKES, FOR THE WEEK OF

No lakes are on the list from LPN District.

This week's beach Bacteria and Harmful Algal Bloom results are now posted on the NDEE web page (Current Health Alerts and Sampling Results For This Week).

5. OTHER

Reminder that Fall Conference registration is September 1. Fall Conference will be held Sept 26-28.

5.A. COMMENTS FROM THE PUBLIC

Lower Platte North NRD

Voluntary Integrated Management Plan

Annual Review of 2021 Activities

Reporting period: 1/1/2021-12/31/2021

August 31, 2022

LPNNRD:

Daryl Andersen, Water Resources Manager

NeDNR:

Jennifer J. Schellpeper, Water Planning Division Head

Lower Platte North Natural Resources District

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Overview

- Lower Platte River Basin Coalition Activities
- Reporting of LPNNRD Data
- Reporting of NeDNR Data
- Review of IMP Goals/Objectives/Action Items
  - Any changes needed moving forward
- Evaluation of data reporting & communication

Lower Platte River Basin-Wide Activities

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Lower Platte Basin Drought Consortium -

Drought Triggers and Response Actions

Plan Excerpt:
5.3 Response Actions
(pg. 84)

In this first increment of the Drought Plan, potential mitigation measures (Table 18 and Table 19), have been evaluated, but preferred measures have not been determined or constructed; therefore, **the primary drought response action available to the Consortium at this time is communication and outreach.**

Consistent and coordinated messaging to basin water users (municipal, industrial, domestic, irrigation, etc.) as well as the general public, raises awareness of the current water supply conditions, allows water users to proactively alter their demand and usage based on limited water supplies, and defines expectations of forecasted conditions and potential actions in response to the drought.

Communication in 2022

- Monthly check-in calls
- Weekly email communication
- Press releases
- Realtime updates via drought dashboard:

https://gis.ne.gov/portal/apps/experiencebuilder/experience/?id=c0b751c512a24b83a6ad1c3214941ea8

Drought Triggers (pg. 58)

Category	Level	Palmer Drought Severity Index (PDSI)	Platte River Streamflow at Ashland
Mild Drought	0	-1.0 to -1.9	--
Moderate Drought	1	-2.0 to -2.9	3,000-1,500 cfs
Severe Drought	2	-3.0 to -3.9	1,500-500 cfs
Extreme Drought	3	-4.0 and below	Less than 500 cfs

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Lower Platte River Basin Activities

- Both LPNNRD and NeDNR participate in the Lower Platte River Basin Coalition (LPRBC)
  - Managers' and Technical Team meetings
  - Annual reporting (see next slide)
  - Annual Reporting Database
    - Tool to report and store annual water use data
  - Lower Platte Missouri Tributaries Model
    - Tool to analyze aquifer-stream interactions
  - Geological Framework Project with Papio, NeDNR and LPNNRD
    - Completion deadline of January 1, 2022 was met

New Depletions Accounting

Lower Platte River Basin 2016-2021

TABLE 1 - PEAK SEASON DEPLETIONS

NRD	PEAK SEASON 5-YR ALLOWABLE DEPLETION (AF)	NRD Prior Years Reported Depletion (AF)	2021 NRD Reported NET Depletion (AF)	NRD Total Reported Depletion (AF)	NRD - Percent of Allowable	Prior Years NeDNR Reported Depletion (AF)	2021 NeDNR Reported Depletion (AF)	Total NeDNR Reported Depletion (AF)	NeDNR - Percent of Allowable	Combined Percent of Allowable
Upper Loup NRD	2768	417.9	-84.9	333.0	12.0%	369.6	0.0	369.6	13.4%	25.4%
Lower Loup NRD	5883	360.1	255.7	615.8	10.5%	481.0	35.9	516.9	8.8%	19.3%
Upper Elkhorn NRD	1504	220.0	64.4	284.4	18.9%	85.0	0.4	85.4	5.7%	24.6%
Lower Elkhorn NRD	4514	1093.7	292.0	1385.7	30.7%	180.4	94.7	275.1	6.1%	36.8%
Papio-Missouri River NRD	869	30.0	4.0	34.0	3.9%	67.0	0.0	67.0	7.7%	11.6%
Lower Platte South NRD	993	23.6	0.0	23.6	2.4%	67.0	12.9	79.9	8.0%	10.4%
Lower Platte North NRD	2276	1093.8	208.5	1302.2	57.2%	0.0	7.5	7.5	0.3%	57.5%
TOTALS	**18,807**	**3,239**	**740**	**3,979**	**21.2%**	**1250**	**151.33**	**1,401**	**7.5%**	**28.6%**

TABLE 2 - PEAK SEASON DEPLETIONS AND CONSUMPTIVE USE

NRD	PEAK SEASON 5-YR ALLOWABLE DEPLETION (AF)	NRD - Peak Season Depletion (AF)	NeDNR Reported Depletion (AF)	NRD Prior Years Peak Season Consumptive Use (AF)	2021 NRD Peak Season Consumptive Use (AF)	NRD Total Peak Season Consumptive Use (AF)	NeDNR Total Peak Season Consumptive Use (AF)	Total New Peak Season Depletions	Total New Peak Season Consumptive Use	Remaining 5-YR Allowable Depletion (AF)	Percent of Remaining 5-YR Allowable Depletion
Upper Loup NRD	2768	333.0	369.6	1069.5	Pending	Pending	369.6	702.6	Pending	2065.4	74.6%
Lower Loup NRD	5883	615.8	516.9	1550.5	Pending	Pending	516.9	1132.7	Pending	4750.3	80.7%
Upper Elkhorn NRD	1504	284.4	85.4	509.8	Pending	Pending	85.4	369.8	Pending	1134.2	75.4%
Lower Elkhorn NRD	4514	1385.7	275.1	2216.2	Pending	Pending	275.1	1660.7	Pending	2853.3	63.2%
Papio-Missouri River NRD	869	34.0	67.0	53.6	Pending	Pending	67.0	101.0	Pending	768.0	88.4%
Lower Platte South NRD	993	23.6	79.9	30.2	Pending	Pending	79.9	103.5	Pending	889.5	89.6%
Lower Platte North NRD	2276	1302.2	7.5	1620.2	Pending	Pending	7.5	1309.7	Pending	966.3	42.5%
TOTALS	**18,807**	**3,979**	**1,401**	**7,050**	**-**	**-**	**1,401**	**5,380**	**-**	**13,427**	**71%**

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New Depletions Accounting

LPNNRD: Second Increment

TOTAL ALLOWABLE NEW DEVELOPMENT BY NRD FOR THE SECOND INCREMENT			
NRD	Allowable Depletions by NRD		
	New 2nd Increment	Carryover from 1st Increment	Total
Upper Loup NRD	3,369	2,065	5,435
Lower Loup NRD	7,160	4,750	11,910
Upper Elkhorn NRD	1,831	1,134	2,965
Lower Elkhorn NRD	5,493	2,853	8,346
Papio-Missouri River NRD	1,058	768	1,826
Lower Platte South NRD	1,209	890	2,098
Lower Platte North NRD	2,770	966	3,736
Total	22,889	13,427	36,316

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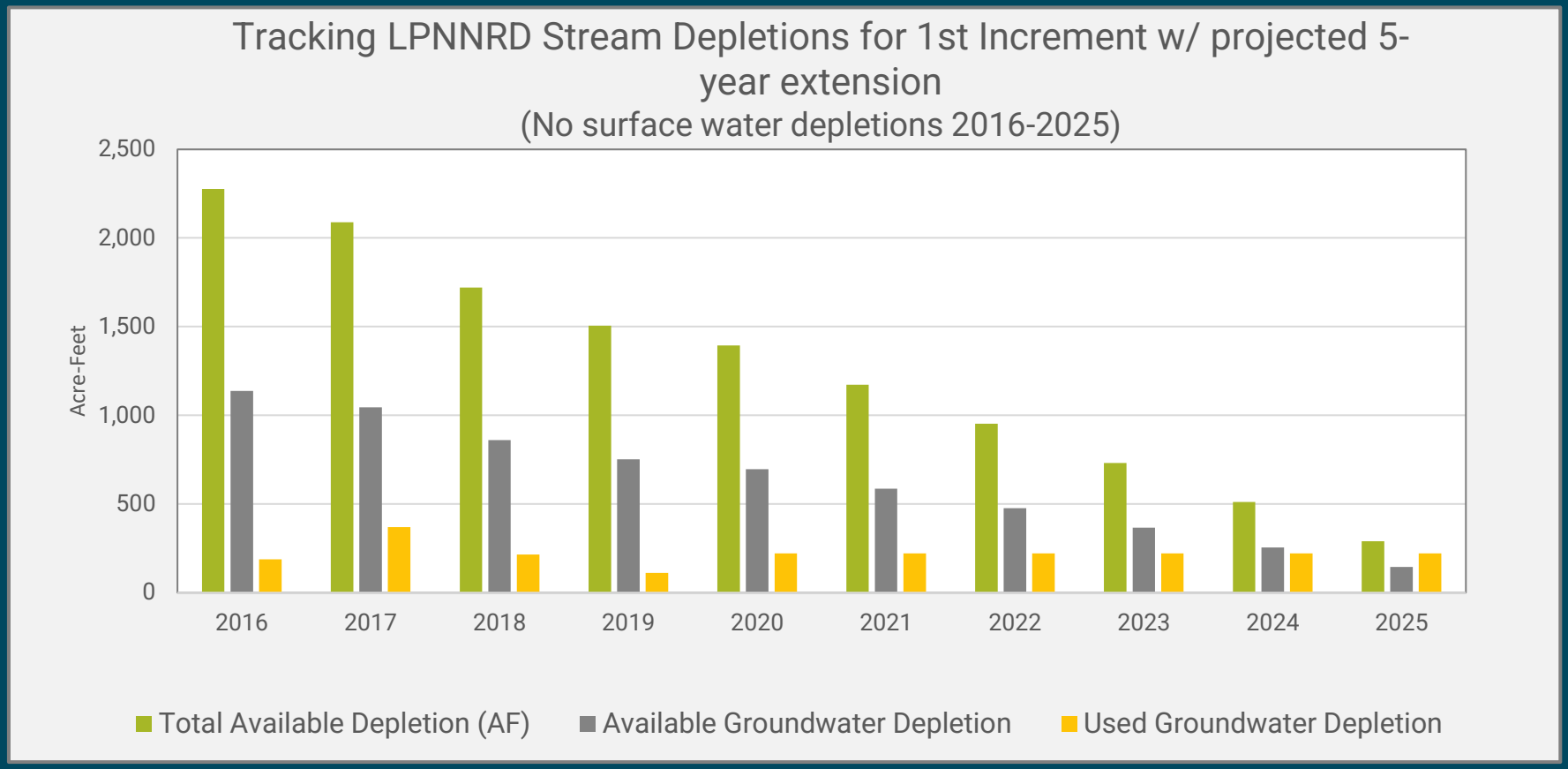
New Depletions Accounting



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Basin-wide Modeling Efforts

- Lower Elkhorn NRD Model
- CENEB Model
  - Loup NRDs and Upper Elkhorn NRD
- Lower Platte Basin Missouri-Tribs Model
  - The Lower Platte Basin NRD water board managers met with NeDNR April 27th and June 15th this year to begin discussion on the construction of district models, similar to what was done with LENRD
  - Most of the discussion centered around model objectives for the each NRD and NeDNR so that the final model product would be beneficial to both NeDNR and the NRDs
  - The decision was made to apply for WSF funding so that State funds could be leveraged against model construction costs
  - Currently awaiting WSF approval, after which model objectives and design will be discussed with the partnership and prospective contractors

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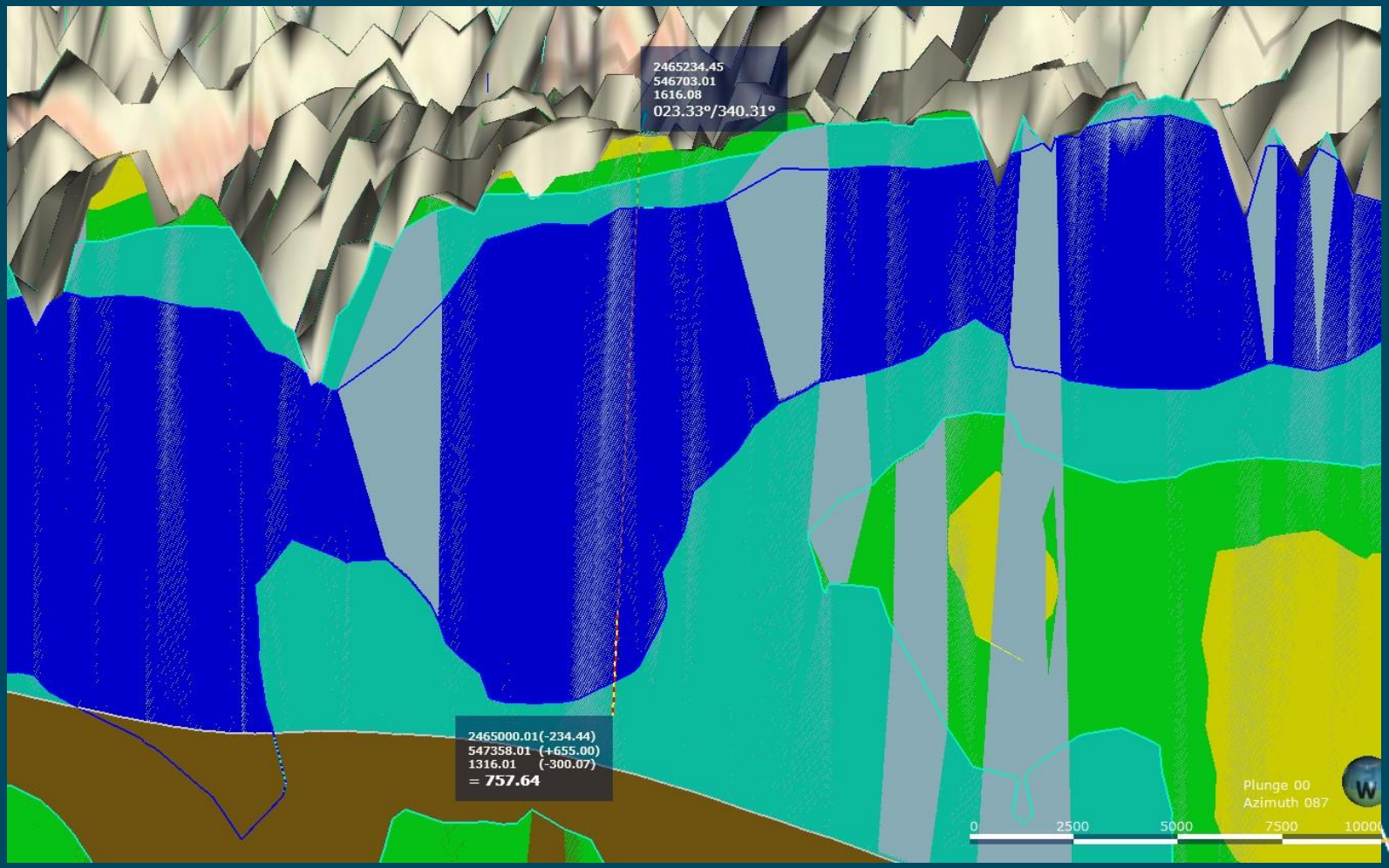
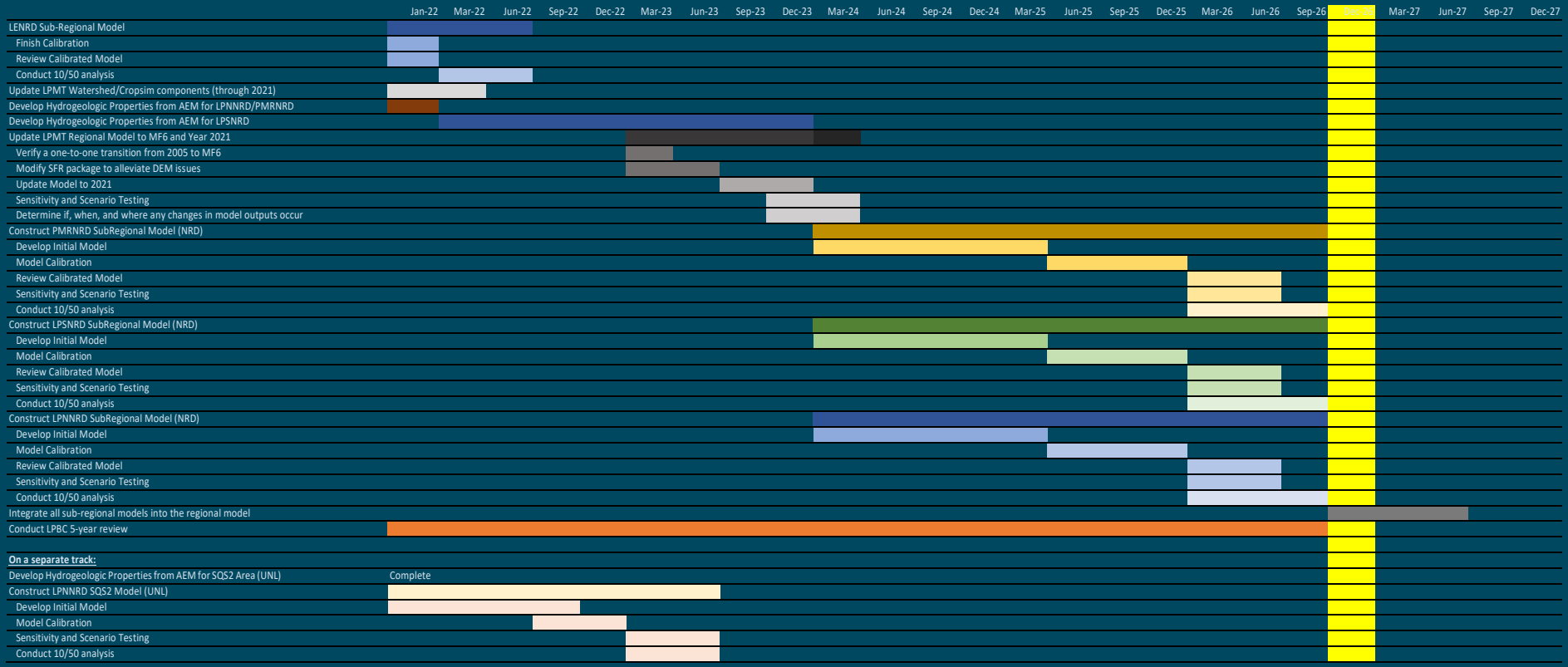
AEM Data Cross Section



Modeling Updates



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IMP Overview & Activities

Lower Platte North
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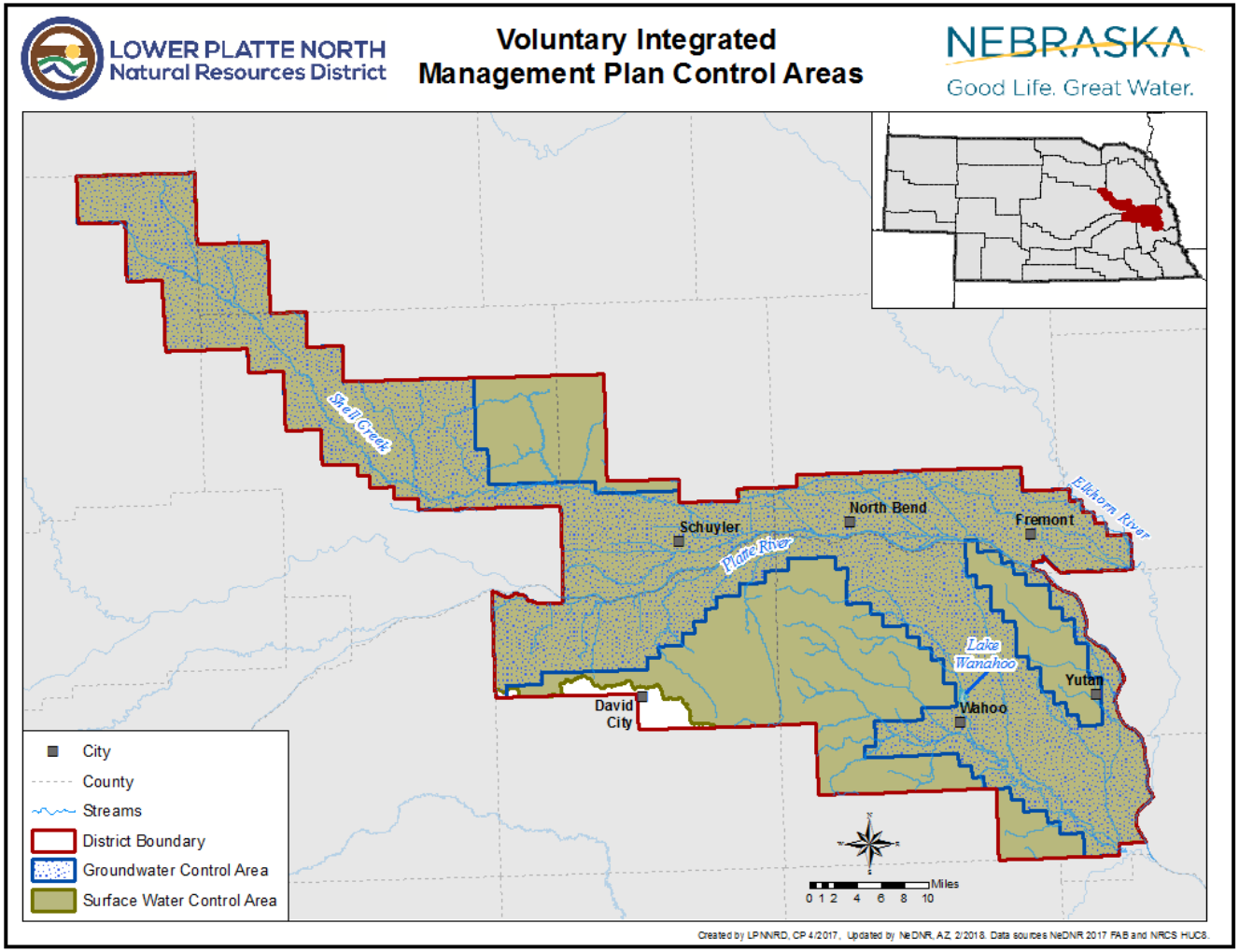
LPNNRD Integrated Management Plan Area

Groundwater and surface water control areas



Controls

- Groundwater
  - Limit new groundwater uses to 50% of the annually available stream depletions over the Basin Plan's first five-year increment
  - Require annual use reports for municipal groundwater users

- Surface water
  - Limit new groundwater uses to 50% of the annually available stream depletions over the Basin Plan's first five-year increment
  - Require annual use reports for municipal surface water permit holders and municipal groundwater transfer permit holders

IMP Goals

1) Develop and maintain a District-wide water supply inventory.
2) Develop and maintain a District-wide water demand inventory.
3) Develop and implement water use policies and practices with the purpose of achieving and sustaining a balance between water uses and supplies.
4) Communicate to the public that Nebraska has a great supply of water, and we need to continue to manage it well.
5) Coordinate with Lower Platte River Basin NRDs, and appropriate groups and agencies, to develop a water management plan for the Lower Platte River Basin that maintains a balance between current and future water supplies and demands.

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LPNNRD & NeDNR 2021 Meetings

- Meetings held on:
  - February 21, 2021
  - December 20, 2021
- Meeting topics:
  - Modeling updates
    - LPNNRD hydrogeologic framework study
    - Lower Platte Basin hydrologically connected area refinement
  - Lower Platte River Basin Coalition
    - INSIGHT Analysis
    - Data Collection
    - New 5-year ILCA to continue Plan

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IMP Modeling Updates

- LPNNRD hydrogeologic framework study with UNL-CSD
  - AEM raw data has been converted to sand probabilities. Jesse Korus and Nafyad are generating hydraulic conductivity estimates based on those probabilities, which will be used for initial model parameters
  - Jesse and Nafyad are converting the LPMT Regional Model data to fit into the refined grid model being developed
- LPNNRD data collection efforts
  - Automation of data collection for data loggers already installed throughout LPNNRD

Education & Outreach Activities in 2021

- NeDNR
  - State Fair
  - Husker Harvest Days

- LPNNRD
  - Nitrogen Certification Classes
  - Spring Conservation
  - School Presentations

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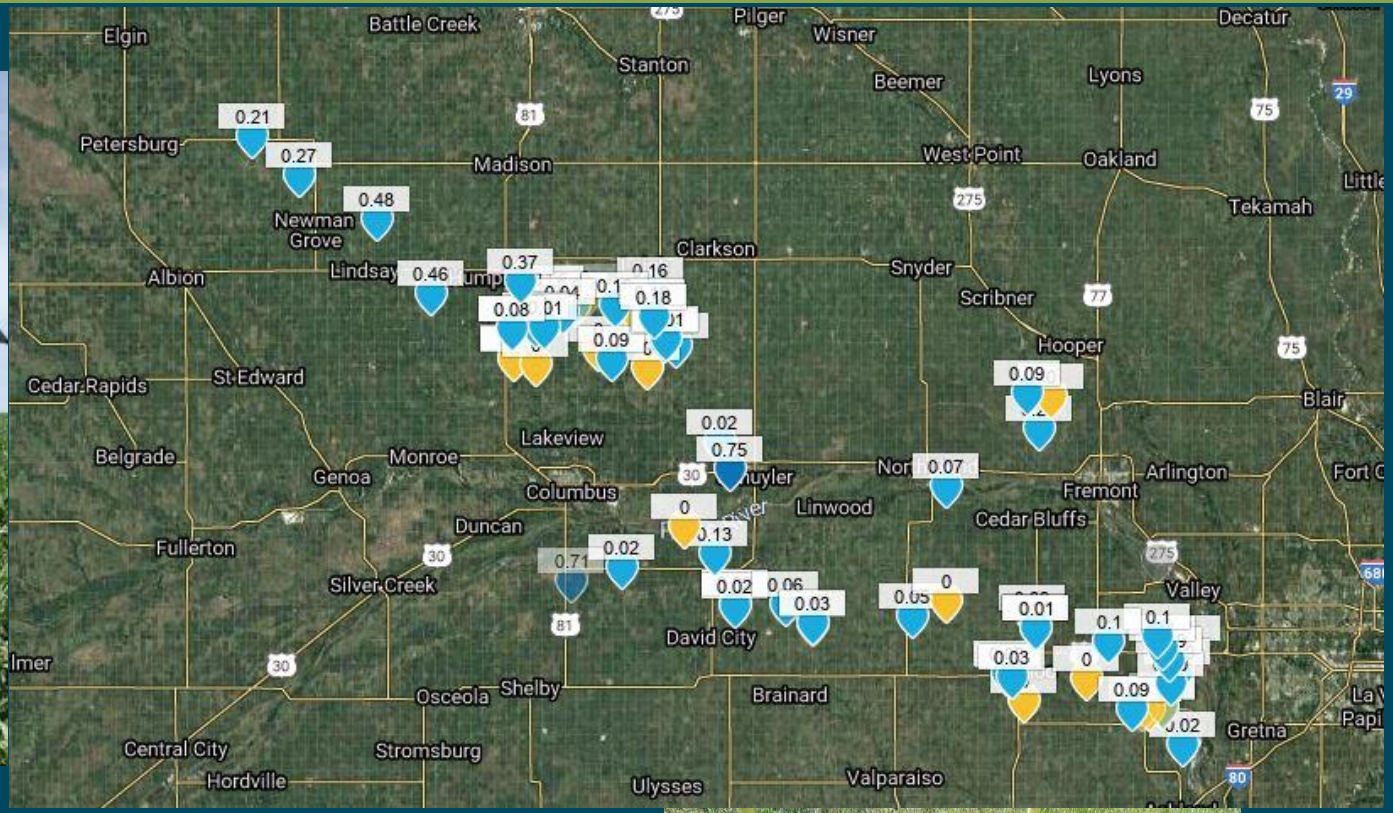

LPNNRD Data Collection and Monitoring

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IMP Required Data Collection and Monitoring

- NRD Monitoring
  - Groundwater elevation data
  - Flow meter data (if meter data is collected)
  - Certified irrigated groundwater acres
  - Municipal and industrial groundwater uses
  - New groundwater consumptive uses (agricultural, municipal, industrial)
  - Retirement of groundwater consumptive uses (agricultural, municipal, industrial)
  - Well drilling permits approved, cancelled, or denied
  - Variances for new water uses granted, cancelled, or denied
  - Water transfer permits granted, cancelled, or denied
  - Stream gage measurements on District maintained gages
  - District regulations/management activities (designated groundwater management areas, use restriction, etc.)
  - New depletions accounting report
  - Streamflow accretion activities (new projects, conjunctive management projects, etc.)
  - Water banking activities (if bank exists)

NRD Data Collection and Monitoring*

- Groundwater elevation data
  - Report was given to Committee/Board May 2021 & in LPNNRD Annual Lower Platte Basin Plan Report
- Flow meter data (if meter data is collected)
  - 1040 flow meters reported for an average of 5.88 in/acre
- Certified irrigated groundwater acres
  - 387,343.23 acres
- Municipal and industrial groundwater uses
  - 22 communities reported
- New groundwater consumptive uses (agricultural, municipal, industrial)
- Retirement of groundwater consumptive uses (agricultural, municipal, industrial)

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**Data can be accessed in the LPNNRD's 2019 Report for the Lower Platte River Basin-Wide Management Plan*

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NeDNR Data Collection and Monitoring

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IMP Required Data Collection and Monitoring

- NeDNR Monitoring
  - Surface water irrigation use
  - Transfers/cancellations of surface water appropriations
  - New surface water appropriations granted (irrigation from natural flow, storage, irrigation from storage, etc.)
  - New groundwater permits issued
  - Voluntary water use reporting
  - Municipal and industrial surface water uses
  - Streamgage measurements from Department maintained gages
  - Surface water pump investigations
  - Surface water administrative actions taken
  - New depletions accounting
  - New data acquisitions, model and/or study results (conservation measures, riparian, evapotranspiration, etc.)

NeDNR Surface Water Permitting Actions

- New surface water applications approved = 1

Surface Water Applications Approved Within the LPNNRD Between January 1, 2021, to December 31, 2021								
Appropriation Number	**Date Approved**	**Source**	**Sub-basin**	**Use**	**Grant in cfs**	**Grant in af**	**Acres**	**New Acres**
A-19753	3/8/2021	Platte River, Trib. to	Lower Platte River Above North Bend	Divert Water from Natural Flow for Irrigation	0.17	NA	NA	11.9

- Transfers = 2

Surface Water Appropriations Approved for an Expedited Transfer from January 1, 2021 to December 31, 2021								
Permit Number	Approval Date	Source	Use	Diversion Location	Acres Transferred	Grant (cfs) Transferred	Increase in Acres?	Application Number
A-4726	5/25/2021	Platte River, Trib. to	IR	S32-T17N-R2E	45.0	0.32	No	EXT-9330
A-17623	5/25/2021	Platte River, Trib. to	IR	S32-T17N-R2E	45.0	0.32	No	EXT-9331

NeDNR Surface Water Permitting Actions

- Surface water appropriations cancelled = 1

Surface Water Appropriations Cancelled in Full Within the LPNNRD from January 1, 2021, to December 31, 2021									
Appropriation Number	**Cancelled Date**	**Source**	**NeDNR Action**	**Use**	**Begin Acres**	**Cancelled Acres**	**Cancelled Grant in cfs**	**Cancelled Grant in af**	**Basis for NeDNR Action**
A-19778	7/26/2021	Clear Creek	Dismissed	Storage of Water	NA	NA	NA	550	NA

- Dismissed because it was filed incorrectly as an Application for a Permit to Appropriate Water, rather than as an Application for a Permit to Impound Water.

NeDNR Surface Water Permitting Actions

NeDNR's basis for cancellation pertains to one of the following authorities:

- **BUC (Beneficial Use Cancellation):** The field offices conduct an investigation for all new appropriations after the time period given in the approval order to perfect the water right. If for any reason the appropriation had not been perfected, and water has not been put to beneficial use as stated in the approval order, it may be cancelled in full or in part.
  - ✓ Authority upon which the action was based: Neb. Rev. Stat. §46-229.02(7) "A water appropriation that has not been perfected pursuant to the terms of the permit may be canceled by the department without complying with sections 46-229.01 to 46-229.04 if the owner of such appropriation fails to comply with any of the conditions of approval in the permit, except that this subsection does not apply to appropriations to which subsection (2) of section 46-237 applies."
- **REL (Relinquishment):** Appropriator filed a voluntary relinquishment of water appropriation.
  - ✓ Authority upon which the action was based: Department of Natural Resources Rules for Surface Water, Neb. Admin. Code. Title 457, Chapter 3, which specifies that any appropriation, or part of any appropriation, may be voluntarily relinquished.

Municipal & Industrial Surface Water Uses

- New surface water applications for municipal or industrial uses approved = 0

NeDNR Groundwater Permitting Actions

Groundwater permits cancelled = 0
Groundwater permits issued = 0

Includes groundwater permits for the following uses:

- Application to Drill Without Regard to Spacing
- Industrial Groundwater Transfers
- Industrial Transfer Notice
- Municipal Groundwater Transfers
- Municipal Notice of Intent
- Permit to Violate Well Spacing
- Permit to Transfer to Adjoining State

NeDNR Voluntary Surface Water Use Reporting (2021)

2021 Voluntary Water Use Reporting - Acres and Source				
Purpose of Surface Water Appropriation	Respondents using Surface Water Only (acres)	Respondents using Groundwater Only (acres)	Respondents using Surface Water and Groundwater (acres)	Respondents that did Not Irrigate (acres)
Irrigation from a naturally flowing source	18 (1,403.1)	2 (270)	4 (324.2)	15 (903.5)

2021 Voluntary Water Use Reporting - Estimated Water Use*			
Purpose of Surface Water Appropriation	Respondents using Surface Water Only (acres)	Respondents using Surface Water and Groundwater (acres)	Estimated Average Inches per Acre Applied
Irrigation from a naturally flowing source	3 (348.1)	2 (270)	4.9”

*The estimated water applied is reported by a sub-set of the total voluntary responses. The estimate here represents those who included water use data in their response.

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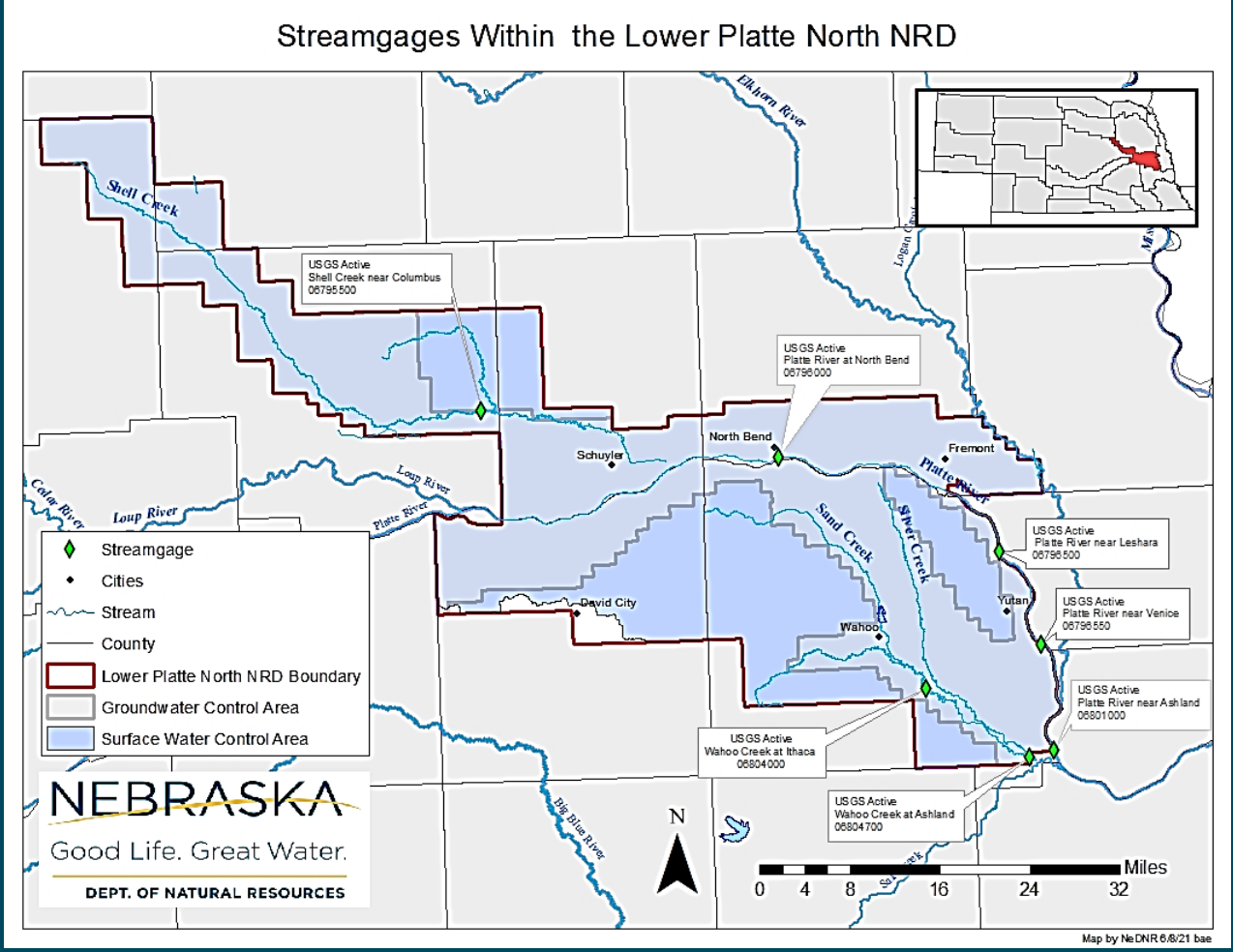
Streamgage Locations in LPNNRD



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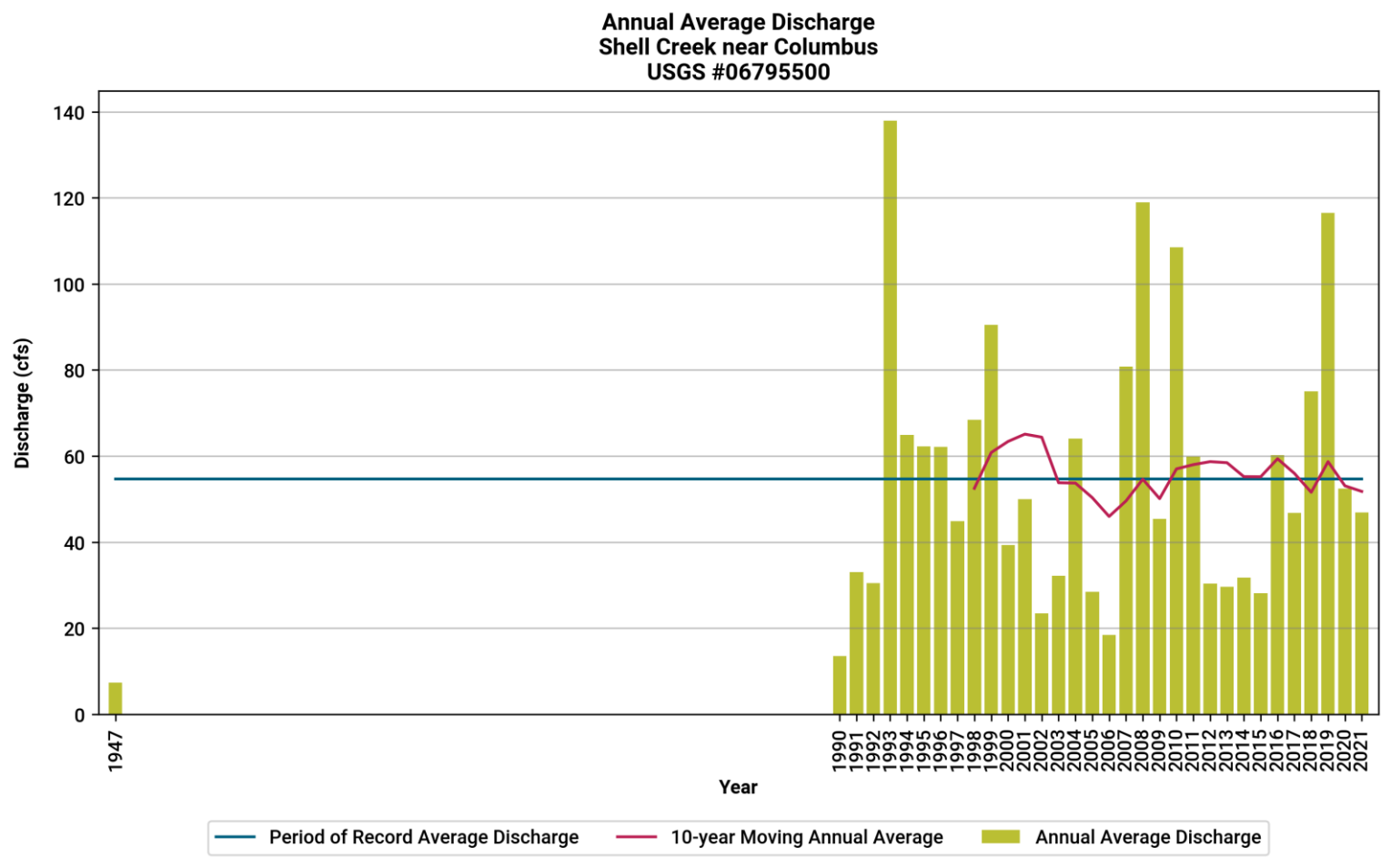
Streamgage Measurements
Shell Creek near Columbus (USGS) 1947-2021



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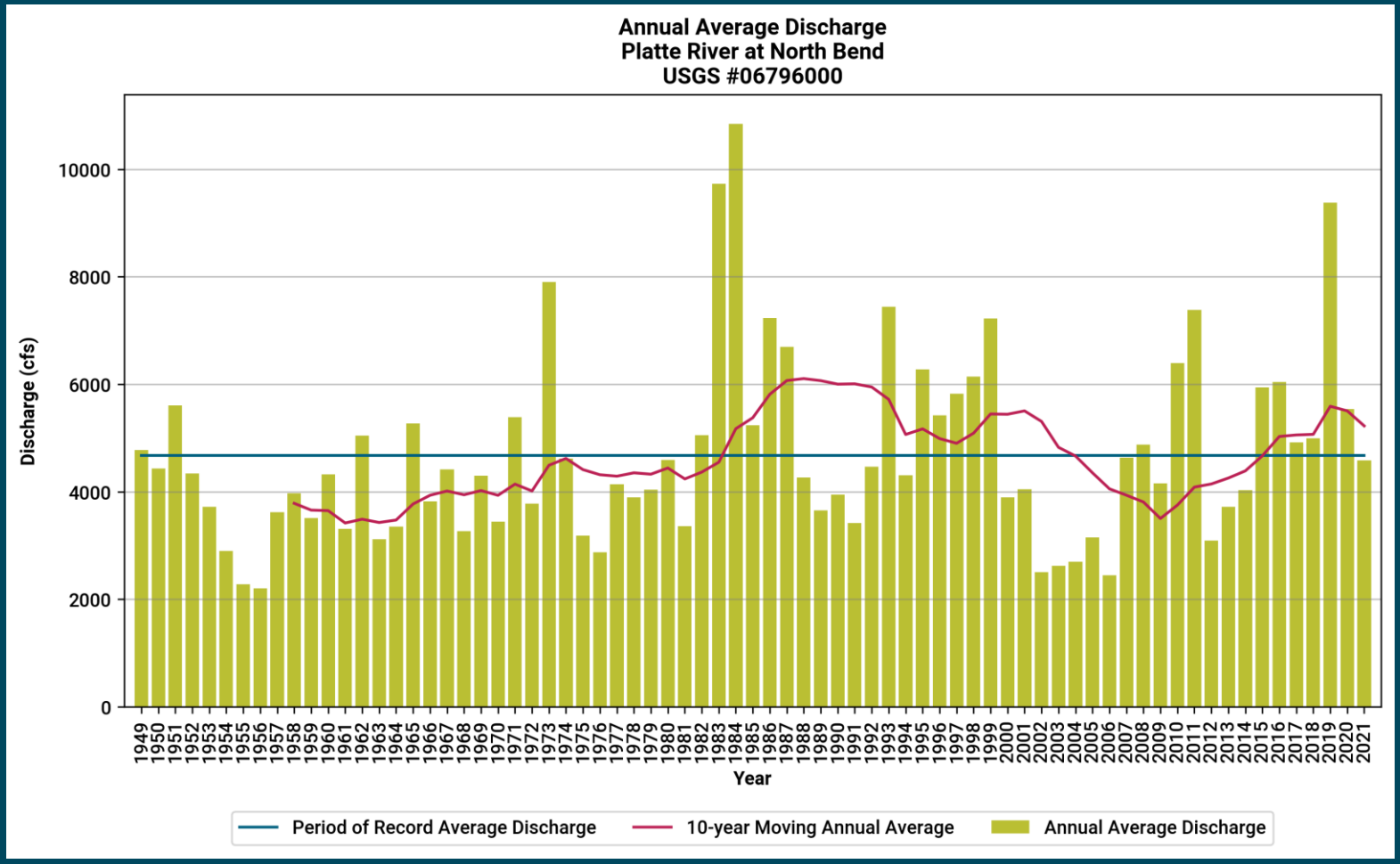
Streamgage Measurements
Platte River at North Bend (USGS) 1949-2021



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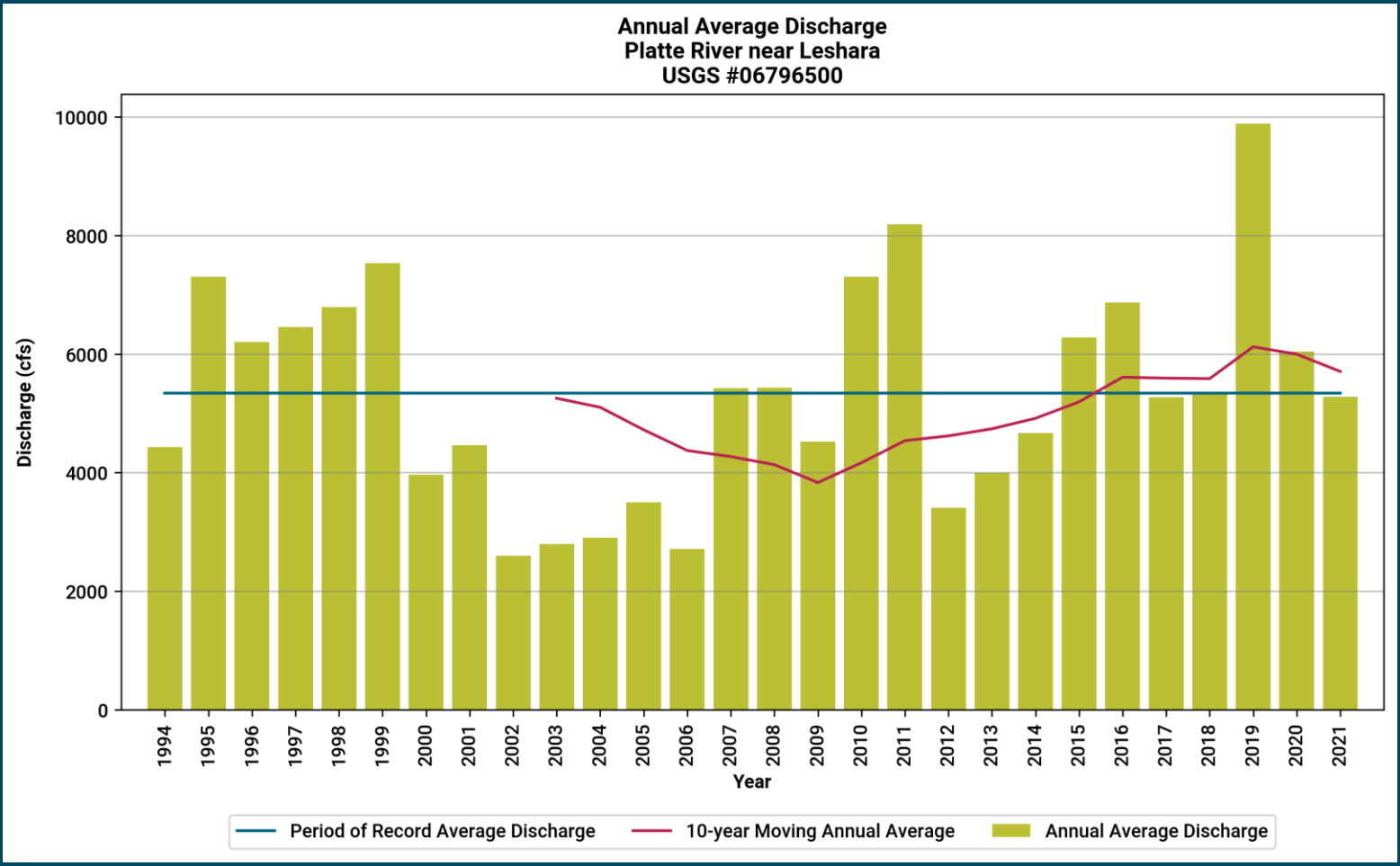
Streamgage Measurements
Platte River near Leshara (USGS) 1994-2021



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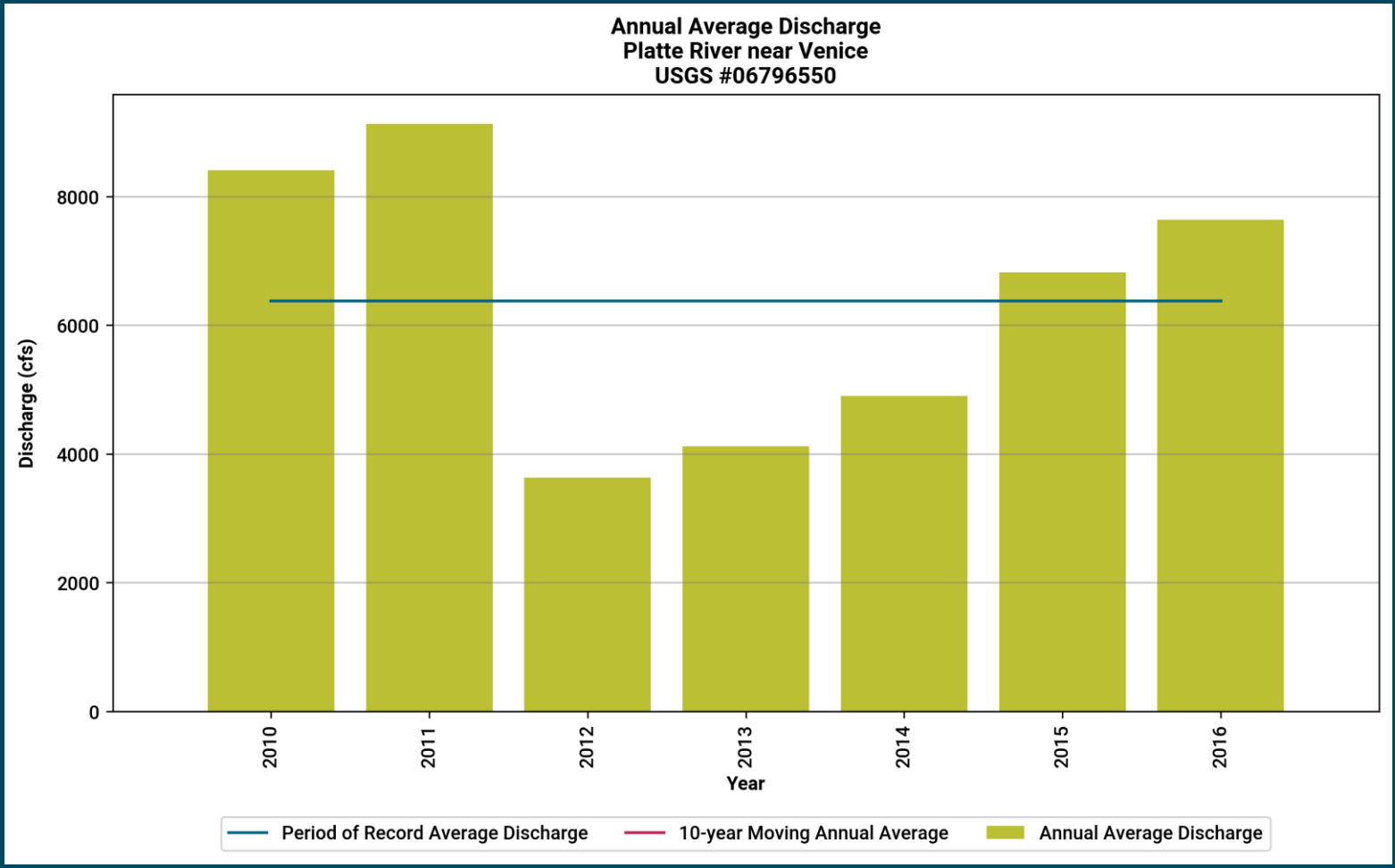
Streamgage Measurements
Platte River near Venice (USGS) 2010-2016



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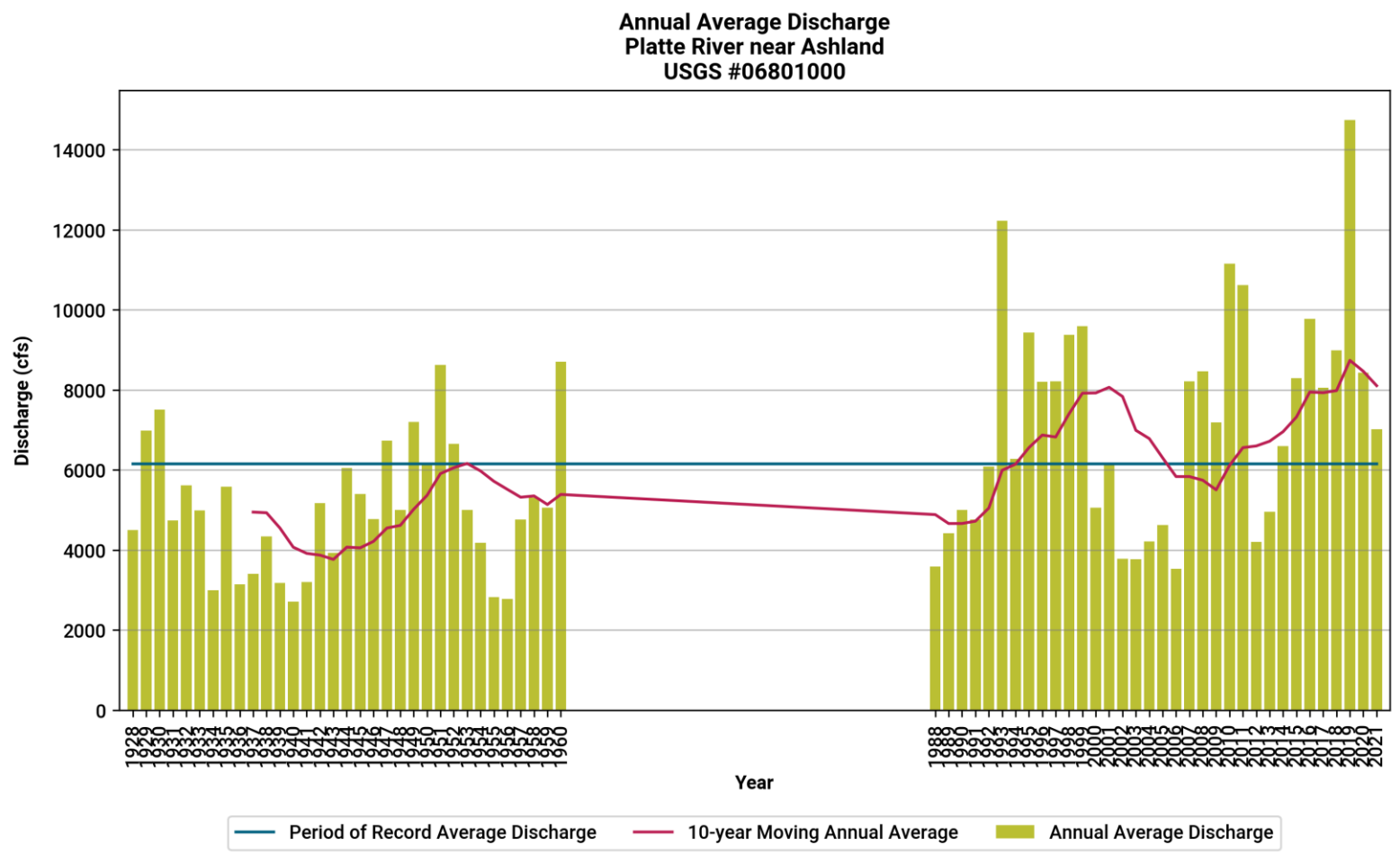
Streamgage Measurements
Platte River near Ashland (USGS) 1928-2021



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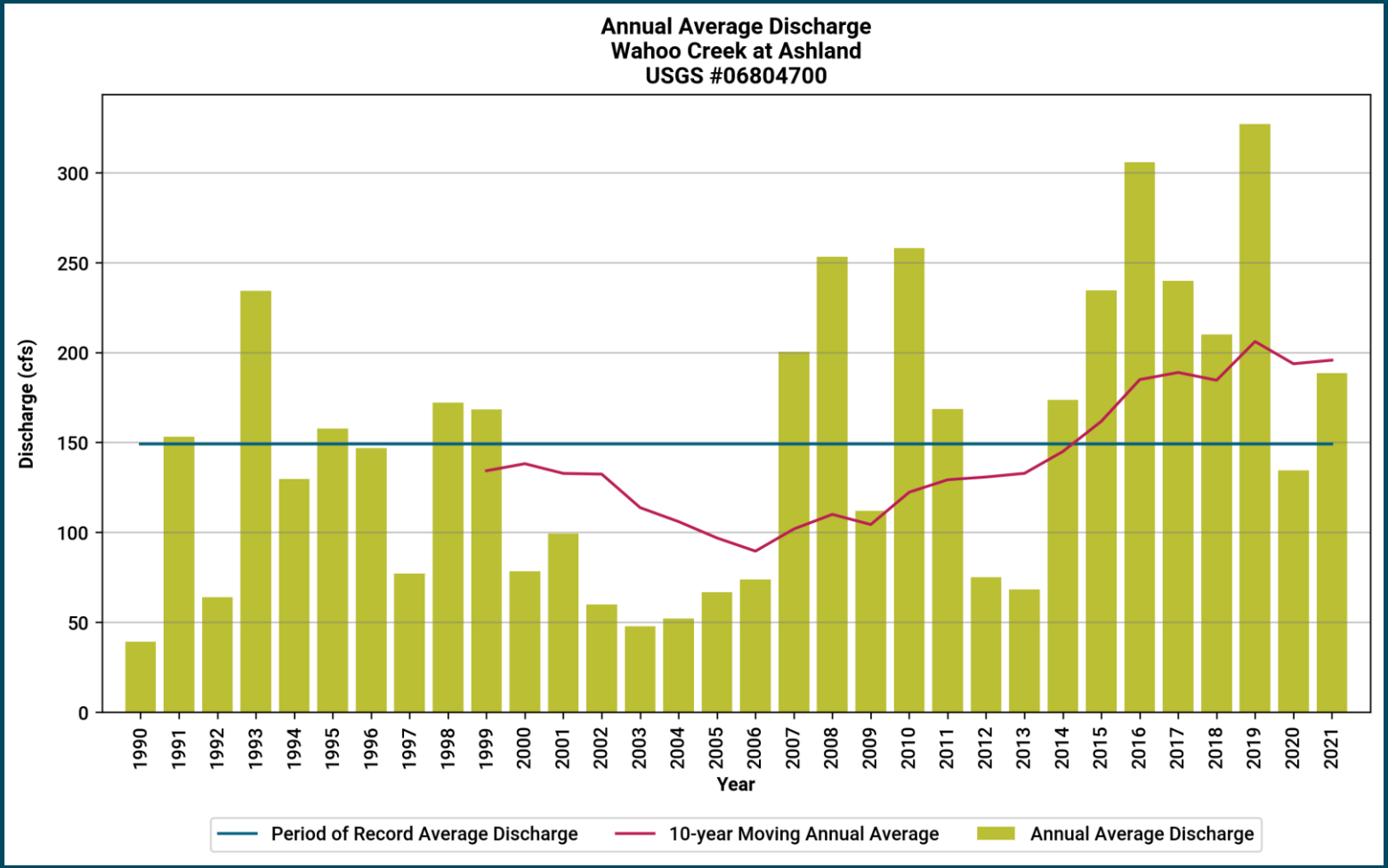
Streamgage Measurements
Wahoo Creek at Ashland (USGS) 1990-2021



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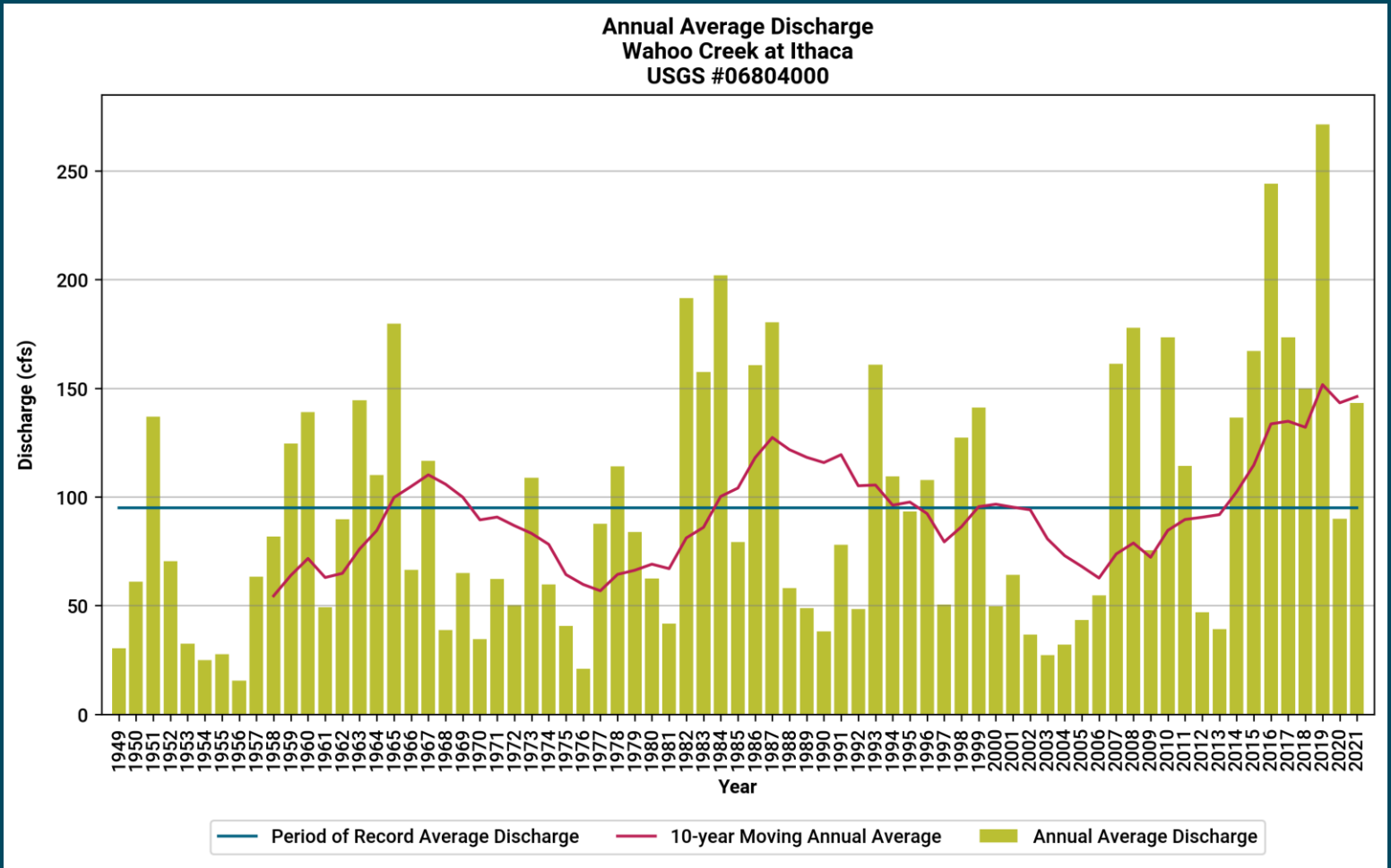
Streamgage Measurements
Wahoo Creek at Ithaca (USGS) 1949-2021



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NeDNR Surface Water Pumpsite Inspections (2021)

As time and conditions allow, the NeDNR field office staff visit pumpsites for each appropriation to check for compliance and collect various data.

In July, August and September of 2021, the Department inspected 141 pumpsites within the LPNNRD.

- Of the sites visited, 15 had pumpsites set up and one of those was running.
- Of the 65 sites without a pumpsite set up, 22 appeared to be using or had access to groundwater, and 43 appeared to not have access to groundwater.

NeDNR 2021 Surface Water Administration*

Surface Water Administration in the Loup River Basin in 2021						
Notice Type	Field Office	Water Division	Permit Type	Effective Date	Reason for Admin Action	Number of Appropriations
Close	Norfolk	2A	NF	12-Aug	Instream flow (NGPC and CPNRD)	58
Close	Norfolk	2A	Storage	13-Aug	Instream flow (NGPC and CPNRD)	5
Close	Norfolk	2A	Storage	13-Aug	Instream flow (NGPC and CPNRD)	5
Close	Norfolk	2A	NF	13-Aug	Instream flow (NGPC and CPNRD)	3
Close	Norfolk	2A	NF	13-Aug	Instream flow (NGPC and CPNRD)	76
Close	Norfolk	2A	Storage	13-Aug	Instream flow (NGPC and CPNRD)	22
Open	Norfolk	2A	NF	30-Aug	Instream flow (NGPC and CPNRD)	58
Open	Norfolk	2A	Storage	30-Aug	Instream flow (NGPC and CPNRD)	5
Open	Norfolk	2A	Storage	30-Aug	Instream flow (NGPC and CPNRD)	5
Open	Norfolk	2A	NF	30-Aug	Instream flow (NGPC and CPNRD)	3
Open	Norfolk	2A	NF	30-Aug	Instream flow (NGPC and CPNRD)	76
Open	Norfolk	2A	Storage	30-Aug	Instream flow (NGPC and CPNRD)	22

*Enforcement of the prior appropriation doctrine principals of first in time, first in right, in times of shortage

Lower Platte North Natural Resources District

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Jointly Identified Actions for Next Two Years

- Continue cooperative efforts to increase sources of available surface and groundwater data
- Continue hydrogeologic investigations of the LPNNRD through collaborative work with UNL's Conservation and Survey Division
- Continue updating Lower Platte-Missouri Tributaries groundwater model with AEM data
- Continue to participate in basin-wide and regional planning efforts such as ENWRA, the Lower Platte River Consortium (drought planning), and Lower Platte River Basin Coalition (LPRBC)
- Continue effort to develop depletion/consumptive use tracking database as a part of LPRBC
- Participate in education and outreach events in the LPNNRD, as available
- Review data from local studies, as available

Review of IMP Goals/Objectives/Action Items

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Goal 1

- Develop and maintain a District-wide water supply inventory.
- Objective 1.1: Conduct data collection and analyses of current and potential water supplies using best available information, data, science, and considering future technological advances.
  - Action Item 1.1.1: Maintain a database of current ground and surface water supplies (District and Department).
  - Action Item 1.1.2: Use best available science to identify District-wide aquifer distribution, including the distribution of bedrock, perched, and pocket aquifers (District and Department).
  - Action Item 1.1.3: Maintain a database of current water quality problem areas (District).
  - Action Item 1.1.4: Use best available data and methods to refine delineations of hydrologically connected surface water and groundwater (District and Department).

Goal 1

- Develop and maintain a District-wide water supply inventory.
- Objective 1.1: Conduct data collection and analyses of current and potential water supplies using best available information, data, science, and considering future technological advances.
  - Action Item 1.1.5: Evaluate the potential to augment existing supplies by accessing additional waters within and outside of the District, including recharge projects, improving existing and adding new water storage/conveyance infrastructure, or through brackish water supplies (District and Department).
  - Action Item 1.1.6: Evaluate short and long term climate variability and potential effects on water supply (District and Department).
  - Action Item 1.1.7: Evaluate new technologies and methods of water accounting that support water management goals (District and Department).
  - Action Item 1.1.8: Coordinate District and Department databases to better utilize staff time, improve water management efficiencies, and assist with public outreach.

Goal 1

- Develop and maintain a District-wide water supply inventory.
- Objective 1.2: Determine the District's inflows and outflows of surface water and groundwater and changes in storage.
  - Action Item 1.2.1: Continue surface water and groundwater monitoring across the District (District and Department).
  - Action Item 1.2.2: Use surface water and groundwater measurements and models to estimate District inflows and outflows (District and Department).
  - Action Item 1.2.3: Identify data gaps in monitoring networks (precipitation, stream flow, groundwater level networks, etc.) (District and Department).

Goal 2

- Develop and maintain a District-wide water demand inventory.
- Objective 2.1: Evaluate current and future water demands that may be influenced by municipal, agricultural, industrial, hydropower, and instream flow requirements.
  - Action Item 2.1.1: Develop standard protocols to ensure municipal water supply reports and forecasts are integrated into the District-wide and Department database (District and Department).
  - Action Item 2.1.2: Evaluate how population growth and potential water reuse could influence per capita water consumption to estimate future water demands (District and Department).
  - Action Item 2.1.3: Continue certification of irrigated acres, well metering, and reporting requirements to track current water demands (District).

Goal 2

- Develop and maintain a District-wide water demand inventory.
- Objective 2.1: Evaluate current and future water demands that may be influenced by municipal, agricultural, industrial, hydropower, and instream flow requirements.
  - Action Item 2.1.4: Evaluate how historical and future land use/cover changes, urban growth, or adoption of conservation practices affects water demand (District and Department).
  - Action Item 2.1.5: Coordinate with the Department to identify surface water rights for potential prioritization in Department adjudication investigations (District and Department).
  - Action Item 2.1.6: Evaluate current and project future water demands of all water users to assess instream flow within the district and comply with downstream requirements (District and Department).
  - Action Item 2.1.7: Evaluate potential water demands for hydropower (District and Department).

Goal 2

- Develop and maintain a District-wide water demand inventory.
- Objective 2.2: Evaluate current water demands and estimate future impacts concerning surface or groundwater quality.
  - Action Item 2.2.1: Estimate effects on demands due to environmental mitigation activities that utilize large quantities of water (District).
  - Action Item 2.2.2: Estimate effects on demands in scenarios where municipal wells are moved to hydrologically connected areas to improve quality (District and Department).
  - Action Item 2.2.3: Continue mapping and tracking surface water irrigated acres and voluntary water use reporting to monitor surface water demands (Department).

Goal 3

- Develop and implement water use policies and practices with the purpose of achieving and sustaining a balance between water uses and supplies.
- Objective 3.1: Update policies, practices, and programs to maintain and improve water supply and water quality as it affects supply.
  - Action Item 3.1.1: Where feasible, promote practices focused on reuse of rain, storm, waste, industrial, or irrigation water (District).
  - Action Item 3.1.2: Develop a District-wide water banking program to minimize water conflicts between different water users and sources (District and Department).
  - Action Item 3.1.3: Cooperate with other entities to identify, evaluate, and prioritize locations and types of conjunctive water management and water use projects (District and Department)
  - Action Item 3.1.4: Periodically review rules and regulations, ensuring they are up-to-date with current data, technologies, and the IMP (District and Department).

Goal 3

- Develop and implement water use policies and practices with the purpose of achieving and sustaining a balance between water uses and supplies.
- Objective 3.2: Develop programs and guidelines to conserve water within municipalities, the agricultural sector, and industrial applications.
  - Action Item 3.2.1: Where feasible, implement cost-share programs for irrigation conservation by partnering with producers in technologies that improve irrigation efficiency and track water usage over time (District and Department).
  - Action Item 3.2.2: Use new, and existing, studies and data to establish specific guidelines for sustainable development of major, minor, and pocket aquifers (District).
  - Action Item 3.2.3: Collaborate with municipalities and industrial users on development or refinement of water conservation plans (District).

Goal 4

- Communicate to the public that Nebraska has a great supply of water, and we need to continue to manage it well.
- Objective 4.1: Maintain existing public outreach activities and programs.
  - Action Item 4.1.1: Maintain District certification classes to update producers on current water conditions, best management practices, potential state legislation, and changes in District and state water management issues (District).
  - Action Item 4.1.2: Maintain public education programs including county fairs, newsletters, newspaper articles, radio spots, public notices, fliers, social media, and District and Department websites (District and Department).
  - Action Item 4.1.3: Continue to cooperate with UNL Extension to utilize and explore the use of mobile applications to assist producers with different water conservation practices (District and Department).

Goal 4

- Communicate to the public that Nebraska has a great supply of water, and we need to continue to manage it well.
- Objective 4.2: Incorporate new data, technologies, and programs to enhance public outreach.
  - Action Item 4.2.1: Develop new materials and activities to educate the public on the benefits and limitations of riparian vegetation management (District and Department).
  - Action Item 4.2.2: Educate homeowners on ways to conserve water in the home, garden, and lawn, through planting of more drought-resistant plants or different landscaping practices (District).
  - Action Item 4.2.3: Explore information-sharing systems between District personnel and water users in the District. These systems could be used to track precipitation patterns, crop evapotranspiration (ET) requirements, soil moisture levels, rotation of pumping between water users to reduce peak aquifer demands, real-time groundwater energy level sites in important aquifers or subareas, and current stream flow conditions (District).

Goal 4

- Communicate to the public that Nebraska has a great supply of water, and we need to continue to manage it well.
- Objective 4.2: Incorporate new data, technologies, and programs to enhance public outreach.
  - Action Item 4.2.4: Quantify water use efficiencies and disseminate through public education programs to enhance productivity (District).
  - Action Item 4.2.5: Explore public education through television and social media to inform the public about current programs and elicit feedback for projected District programs (District).

Goal 5

- Coordinate with Lower Platte River Basin NRDs, and appropriate groups and agencies, to develop a water management plan for the Lower Platte River Basin that maintains a balance between current and future water supplies and demands.
- Objective 5.1: Continue active participation in Lower Platte River Basin Coalition (Coalition) water management planning activities.
  - Action Item 5.1.1: Cooperate on water management studies and planning with the Coalition (District and Department).
  - Action Item 5.1.2: Evaluate federal, statewide, and local funding options for basin-wide water management activities (District and Department).
  - Action Item 5.1.3: Coordinate to develop and implement transfer and water banking systems that are compatible between the District and the Coalition (District and Department).
  - Action Item 5.1.4: Evaluate proposed transfers utilizing methodology consistent with other Lower Platte NRDs, as specified in the basin-wide plan (District).

Goal 5

- Coordinate with Lower Platte River Basin NRDs, and appropriate groups and agencies, to develop a water management plan for the Lower Platte River Basin that maintains a balance between current and future water supplies and demands.
- Objective 5.2: Coordinate to expand conjunctive management opportunities to mitigate new uses.
  - Action Item 5.2.1: Review and analyze existing studies of water storage opportunities in the Lower Platte River Basin and conduct additional multi-agency studies, as appropriate (District and Department).
  - Action Item 5.2.2: Evaluate benefits and limitations of potential conjunctive management projects (District and Department).

Goal 5

- Coordinate with Lower Platte River Basin NRDs, and appropriate groups and agencies, to develop a water management plan for the Lower Platte River Basin that maintains a balance between current and future water supplies and demands.
- Objective 5.3: Coordinate with ENWRA to increase knowledge about existing groundwater supplies and connection to surface water.
  - Action Item 5.3.1: Continue active participation in ENWRA meetings, studies, and activities (District and Department).
  - Action Item 5.3.2: Evaluate whether ENWRA data can improve modeling of hydrologically connected areas on a large scale (District and Department).

Goal 5

- Coordinate with Lower Platte River Basin NRDs, and appropriate groups and agencies, to develop a water management plan for the Lower Platte River Basin that maintains a balance between current and future water supplies and demands.
- Objective 5.4: Strengthen coordination with other agencies about efforts to sustain or increase Lower Platte River flows.
  - Action Item 5.4.2: Coordinate to review and assess benefits and limitations of protecting Lower Platte River flows through existing instream flow water rights (District and Department).
  - Action Item 5.4.3: Continue to coordinate with other agencies on riparian vegetation management activities (District and Department).

Long-Term Study

- Long-term study 1.1: Increase understanding of tile drainage systems in the District and their impact on water supply.
  - Action Item 1.1.1: Conduct a tile drainage study based upon review of existing data and funding (District).
  - Action Item 1.1.2: Seek voluntary data from landowners pertaining to tile drain locations (District).
  - Action Item 1.1.3: Evaluate the potential to develop modeling scenarios that predict the impact of tile drainage on streamflow and recharge (District and Department).
  - Reporting/Exchange: Discuss solutions to obstacles pertaining to action items listed at annual meeting.

Questions or Comments?

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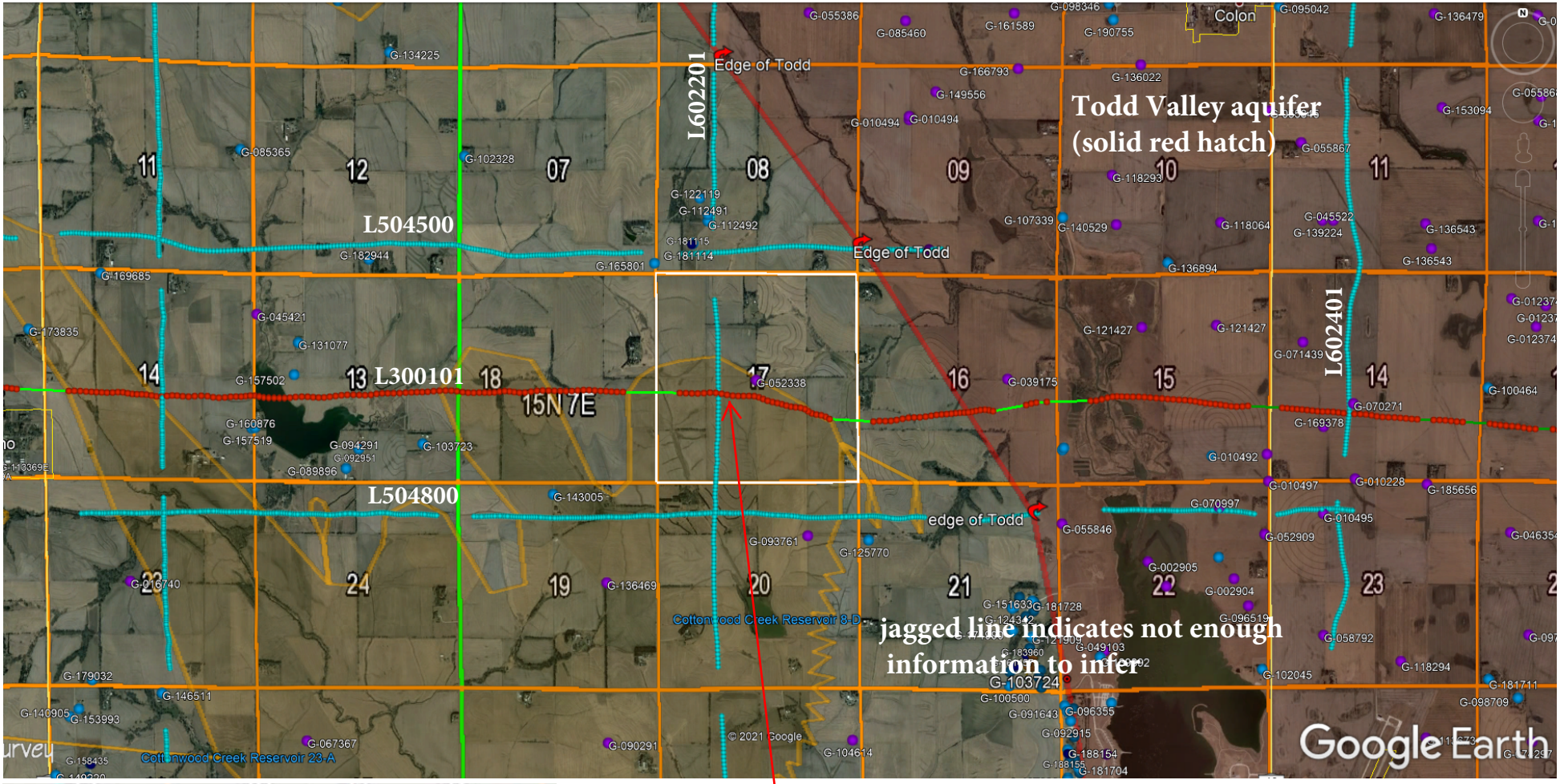
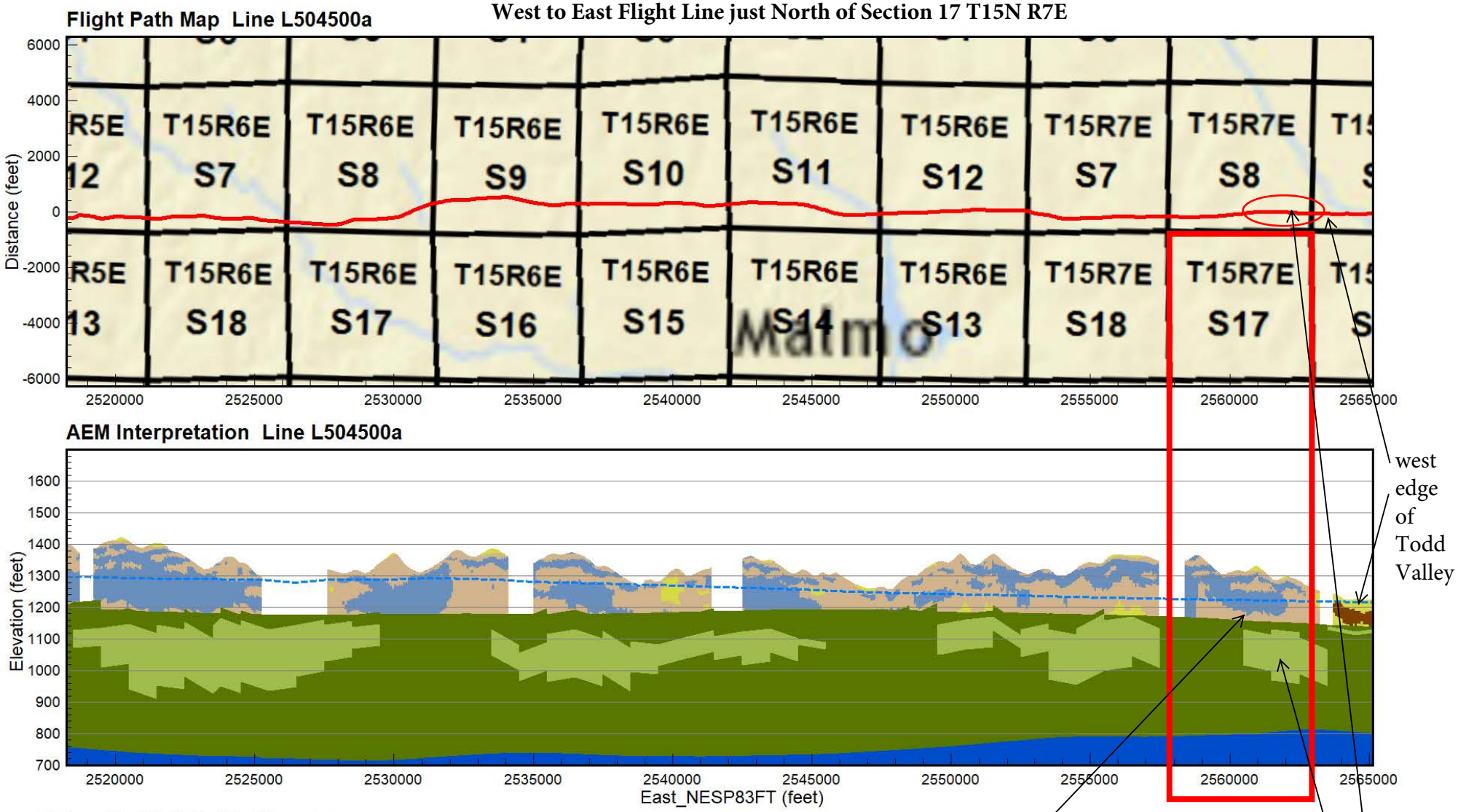
Google Earth Map with AEM Flight Lines Registered Wells and Estimated Presence of Aquifer Units



There is a thicker resistive aquifer material deposit in the central portion of Section 17 observed on flight lines L 602201 and L300101 which apparently thins out to the south and west. The Dakota bedrock character (sandstone/shale dominant) and top surface are apparantly variable below Section 17.

West to East Flight Line just North of Section 17 T15N R7E



west edge of Todd Valley

Quaternary/Ogallala Aquifer Material Legend

Non Aquifer (<12 ohm-m)	Marginal Aquifer (12-20 ohm-m)	Aquifer (20-50 ohm-m)	Coarse Aquifer (>50 ohm-m)

Stratigraphy Interpretation

IP | Kd | Kgg | Kc | Kn | To | Q

Kd Aquifer Material

Shale/Clay Dominant | Sandstone/Sand Dominant

Interpreted geological sections from AEM data and flight path location map provided in conjunction with the Google Earth kmz file. The projected downline distance is equal for the flight path (top image) and the AEM data interpretation (bottom image). The flight path is displayed as a red line on the flight path map. The 1995 Conservation and Survey Division (CSD) water table is shown as a dashed blue line on the AEM data interpretation profile. The Quaternary (Q) section is divided into aquifer material categories as indicated by the legend. The Cretaceous Dakota Group (Kd) is split into Sandstone/Sand dominant and Shale/Clay dominant sections as indicated by the legend. The Tertiary Ogallala Group (To), Cretaceous Niobrara Formation (Kn), Cretaceous Carlile Shale (Kc), Cretaceous Greenhorn Limestone and Graneros Shale (Kgg), and the undifferentiated Pennsylvanian (IP) are indicated by the legend. Additional information regarding the use of this figure and the AEM data may be found in the report titled "Airborne Electromagnetic mapping and Hydrogeologic Framework of Selected Areas of the Eastern Nebraska Water Assessment Area" chapter on the Lower Platte North Natural Resources District.

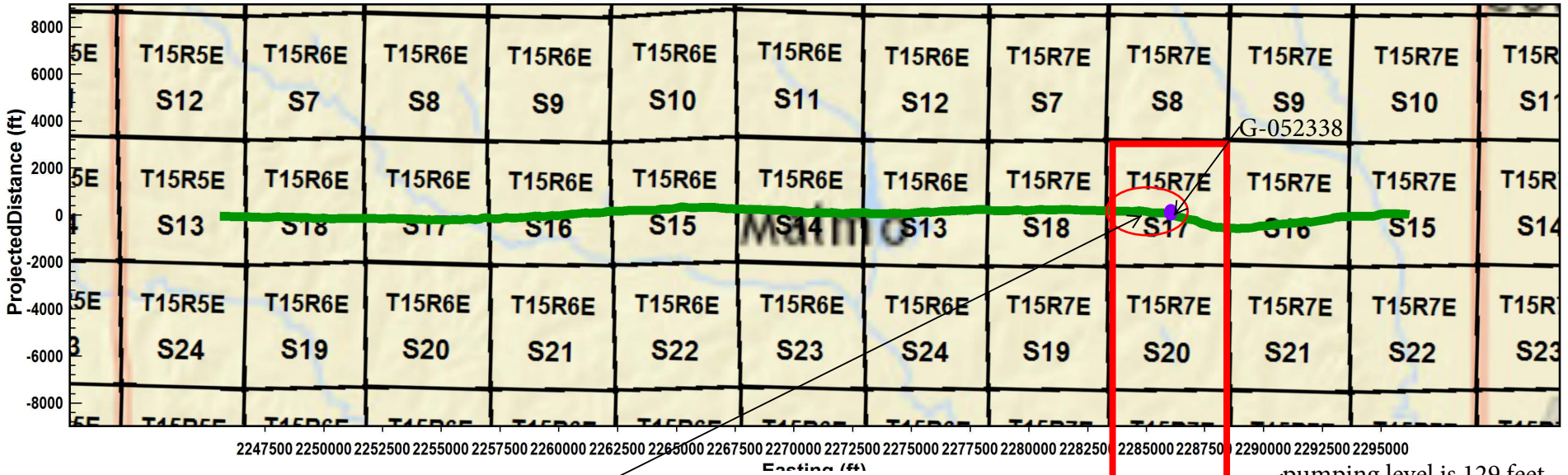
LOWER PLATTE NORTH Natural Resources District

ENWRA Eastern Nebraska Water Resources Assessment

predominantly non-aquifer material and marginal aquifer material interpreted above bedrock.
Some deeper (200+ ft) sandstone dominant Dakota bedrock indicated on this line in the SE corner of Section 8 T15N R7E

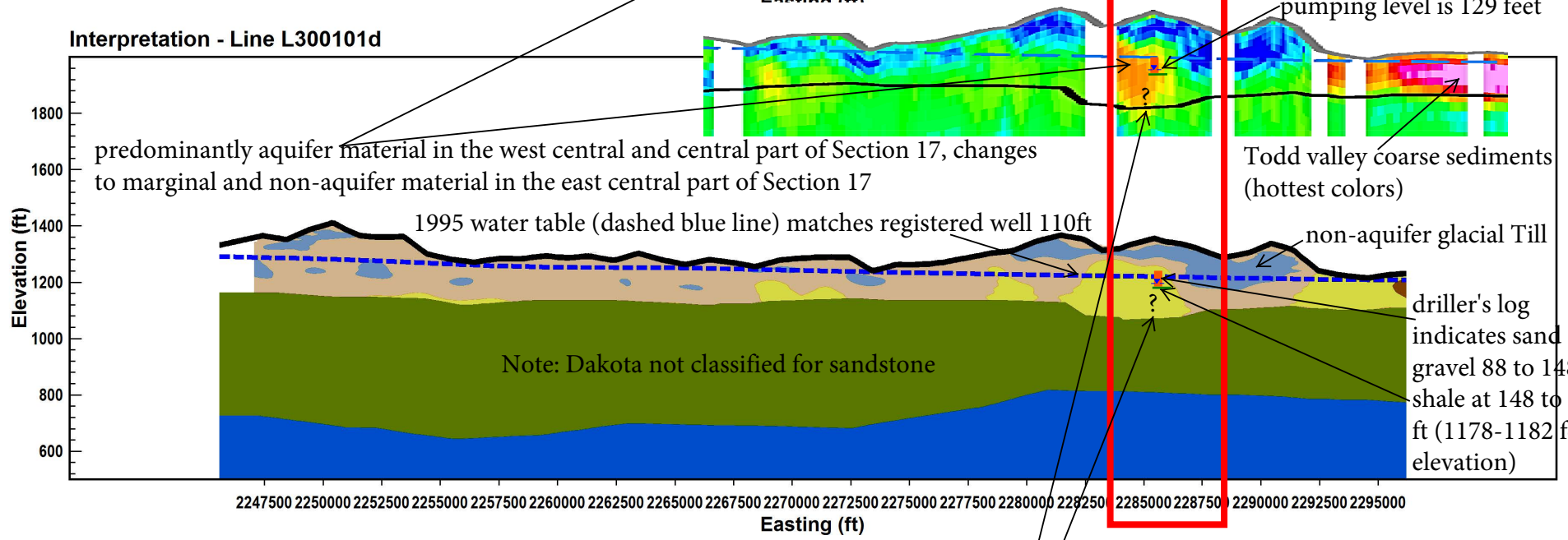
Location Map - Line L300101d

West to East Flight Line through Section 17 T15N R7E (2015 deeper sensing system, resistivity profile added)



G-052338

Interpretation - Line L300101d



pumping level is 129 feet

predominantly aquifer material in the west central and central part of Section 17, changes to marginal and non-aquifer material in the east central part of Section 17

Todd valley coarse sediments (hottest colors)

1995 water table (dashed blue line) matches registered well 110ft

non-aquifer glacial Till

Note: Dakota not classified for sandstone

driller's log indicates sand and gravel 88 to 148 ft, shale at 148 to 152 ft (1178-1182 feet elevation)

Quaternary/Ogallala Aquifer Material Legend

Non Aquifer (<12 ohm-m)	Marginal Aquifer (12-20 ohm-m)	Principal Aquifer (20-50 ohm-m)	Coarse Aquifer (>50 ohm-m)

Stratigraphy Interpretation

P	Kd	Kc/Kgg

1976 pumping level reported as 129 feet, bottom of sand and gravel just 19 feet below that

Interpreted geologic sections from AEM data and flight line location map provided in conjunction with Google Earth kmz file. Interpreted sections and flight lines have been broken into 10 mile (or shorter) segments. The projected downline distance is equal for the flight line (top image) and the AEM data interpretation (bottom image). The CSD 1995 water table is shown as a dashed blue line on the interpretation image. Additional information regarding the use of these figures and the AEM data may be found in the report titled "Airborne Electromagnetic Geophysical Surveys and Hydrogeologic Framework Development for Selected Sites in the Eastern Nebraska Water Resources Assessment".

ENWRA Eastern Nebraska Water Resources Assessment

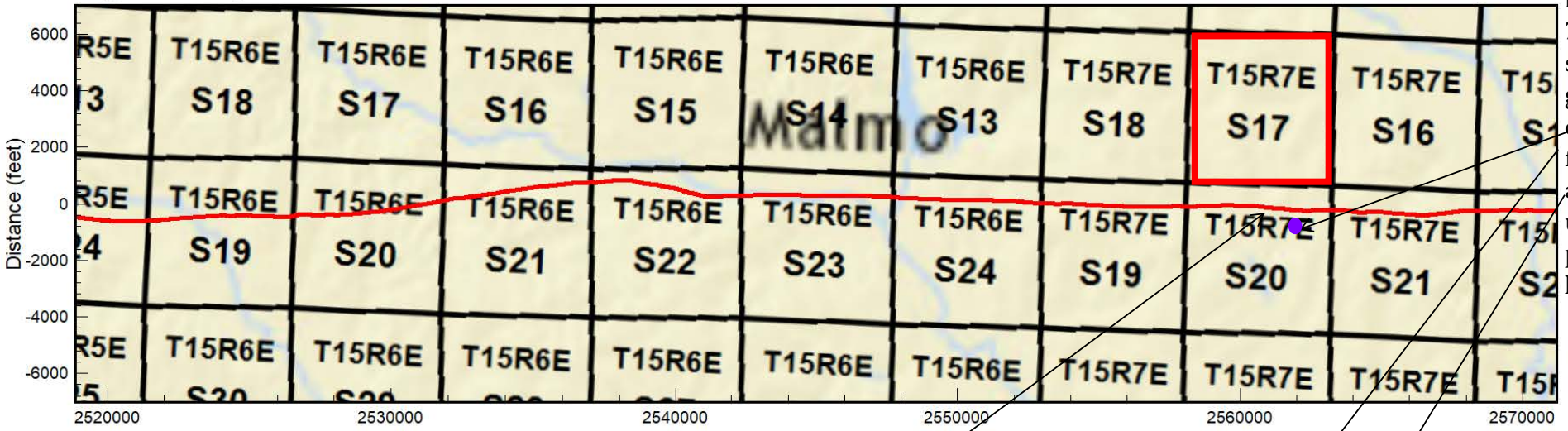
XRI Exploration Resources International

maybe sandstone dominant Dakota is present under the shale layer?

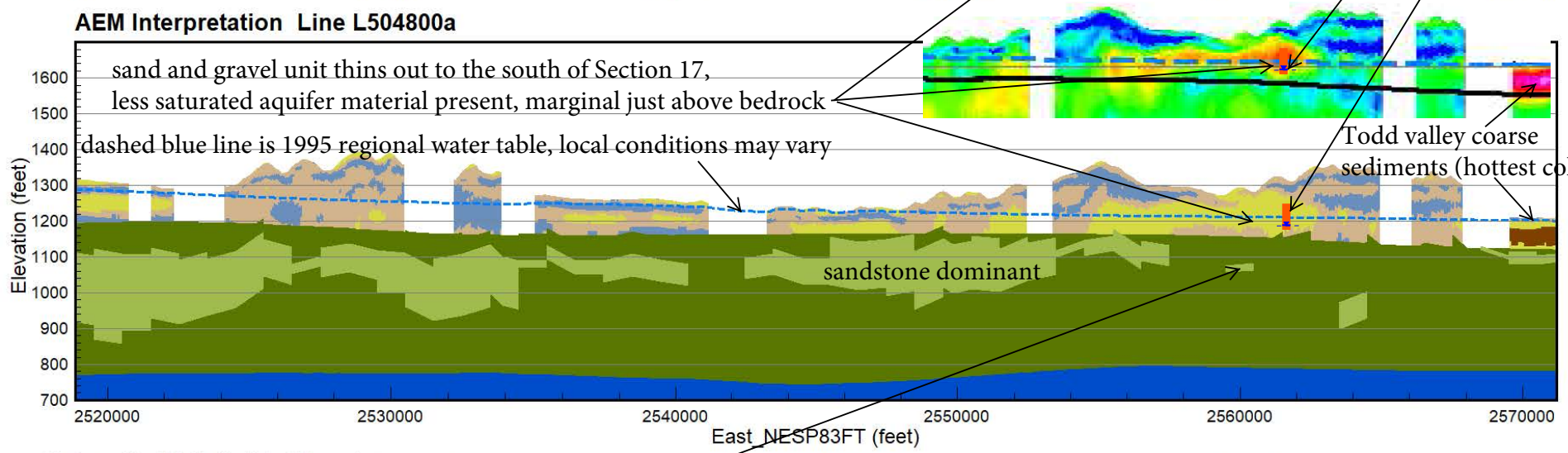
West to East Flight Line just south of Section 17 T15N R7E (resistivity profile added)

G-093761 indicates 75 feet sand and gravel but only 10 feet available under the pumping level

Flight Path Map Line L504800a



AEM Interpretation Line L504800a



sand and gravel unit thins out to the south of Section 17, less saturated aquifer material present, marginal just above bedrock

dashed blue line is 1995 regional water table, local conditions may vary

Todd valley coarse sediments (hottest colors)

sandstone dominant

Quaternary/Ogallala Aquifer Material Legend

Non Aquifer (<12 ohm-m)	Marginal Aquifer (12-20 ohm-m)	Aquifer (20-50 ohm-m)	Coarse Aquifer (>50 ohm-m)

Stratigraphy Interpretation

IP	Kd	Kgg	Kc	Kn	To	Q

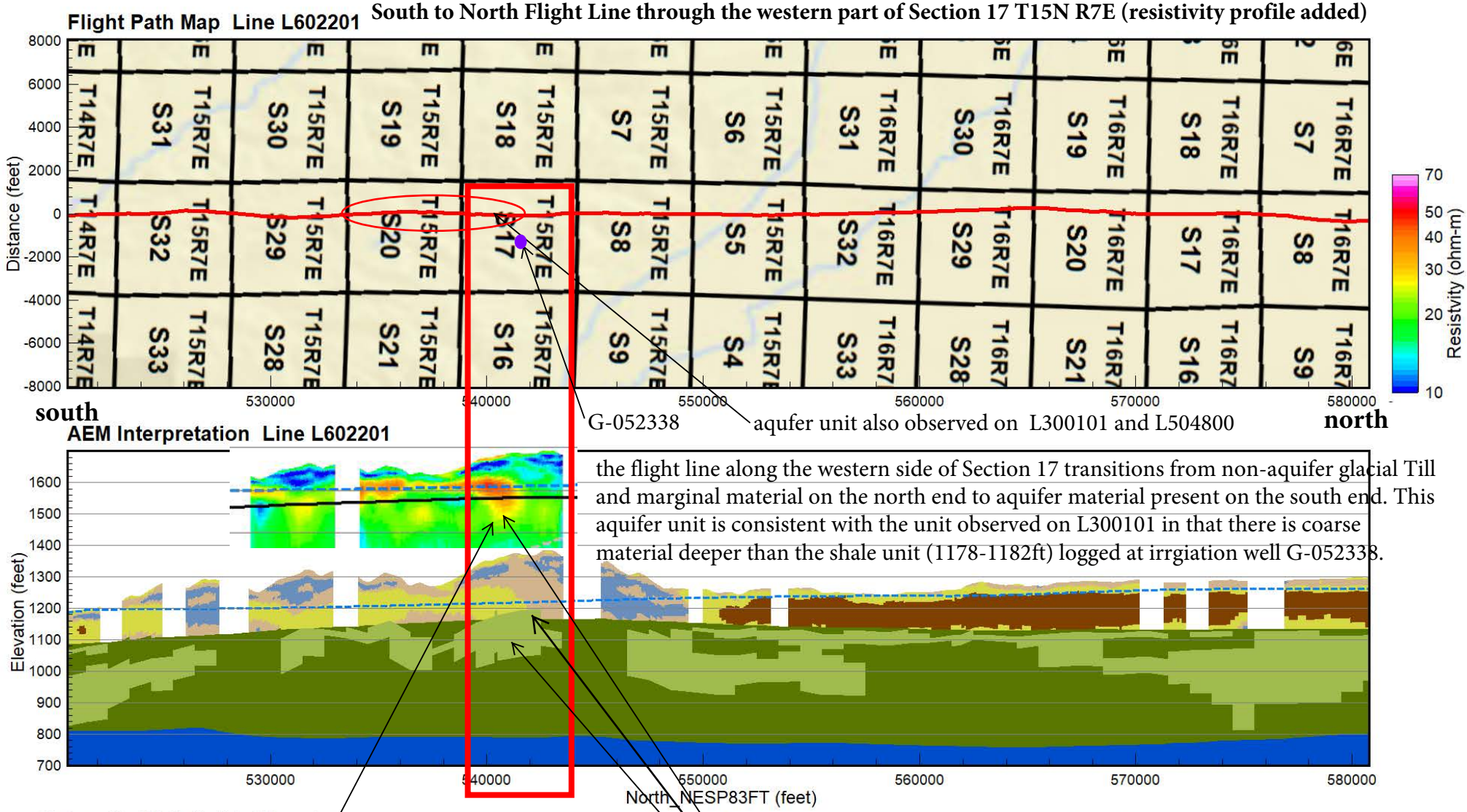
Kd Aquifer Material

Shale/Clay Dominant	Sandstone/Sand Dominant

Interpreted geological sections from AEM data and flight path location map provided in conjunction with the Google Earth kmz file. The projected downline distance is equal for the flight path (top image) and the AEM data interpretation (bottom image). The flight path is displayed as a red line on the flight path map. The 1995 Conservation and Survey Division (CSD) water table is shown as a dashed blue line on the AEM data interpretation profile. The Quaternary (Q) section is divided into aquifer material categories as indicated by the legend. The Cretaceous Dakota Group (Kd) is split into Sandstone/Sand dominant and Shale/Clay dominant sections as indicated by the legend. The Tertiary Ogallala Group (To), Cretaceous Niobrara Formation (Kn), Cretaceous Carlile Shale (Kc), Cretaceous Greenhorn Limestone and Graneros Shale (Kgg), and the undifferentiated Pennsylvanian (IP) are indicated by the legend. Additional information regarding the use of this figure and the AEM data may be found in the report titled "Airborne Electromagnetic mapping and Hydrogeologic Framework of Selected Areas of the Eastern Nebraska Water Assessment Area" chapter on the Lower Platte North Natural Resources District.

LOWER PLATTE NORTH Natural Resources District

ENWRA Eastern Nebraska Water Resources Assessment



the flight line along the western side of Section 17 transitions from non-aquifer glacial Till and marginal material on the north end to aquifer material present on the south end. This aquifer unit is consistent with the unit observed on L300101 in that there is coarse material deeper than the shale unit (1178-1182ft) logged at irrgiation well G-052338.

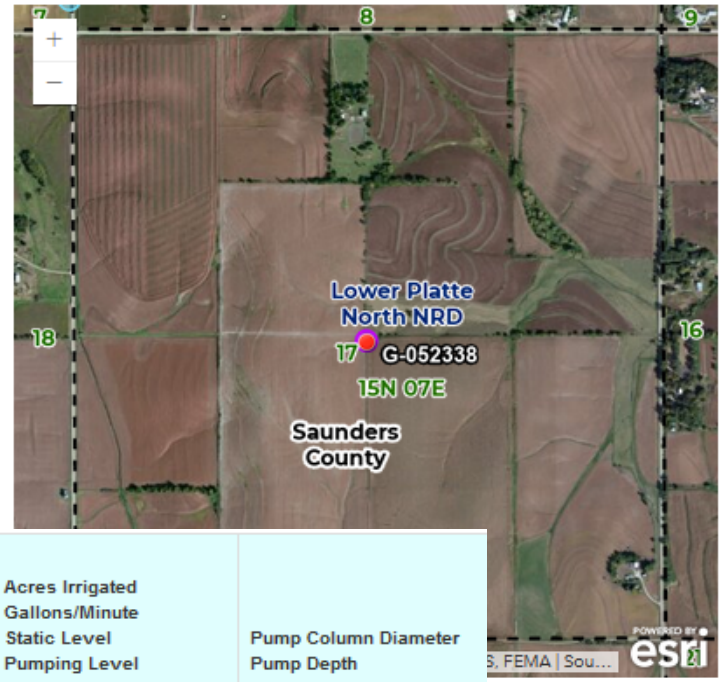
Interpreted geological sections from AEM data and flight path location map provided in conjunction with the Google Earth kmz file. The projected downline distance is equal for the flight path (top image) and the AEM data interpretation (bottom image). The flight path is displayed as a red line on the flight path map. The 1995 Conservation and Survey Division (CSD) water table is shown as a dashed blue line on the AEM data interpretation profile. The Quaternary (Q) section is divided into aquifer material categories as indicated by the legend. The Cretaceous Dakota Group (Kd) is split into Sandstone/Sand dominant and Shale/Clay dominant sections as indicated by the legend. The Tertiary Ogallala Group (To), Cretaceous Niobrara Formation (Kn), Cretaceous Carlile Shale (Kc), Cretaceous Greenhorn Limestone and Graneros Shale (Kgg), and the undifferentiated Pennsylvanian (IP) are indicated by the legend. Additional information regarding the use of this figure and the AEM data may be found in the report titled "Airborne Electromagnetic mapping and Hydrogeologic Framework of Selected Areas of the Eastern Nebraska Water Assessment Area" chapter on the Lower Platte North Natural Resources District.

LOWER PLATTE NORTH Natural Resources District

ENWRA Eastern Nebraska Water Resources Assessment

It appears that the sandstone dominant material in the Dakota is highly variable under Section 17. Shale logged at 1182 elevation at irrigation well G-052338 just east of this flight line in the center of Section 17.

1976 Registered irrigation well in Section 17 T15N R7E



Registration# Well ID Permit Number	Use Status	County Name NRD Name Well Location Footage Latitude Longitude	Completion Date Filing Date Decommission Date Times Replaced Online Registration ID (NOLID)	Acres Irrigated Gallons/Minute Static Level Pumping Level Series	Pump Column Diameter Pump Depth Well Depth
G-052338 WellID: 59892 View Scans	I - Irrigation A - Active Registered Well	Saunders Lower Platte North 15N 7 17 NWSE 41°16' 15.500" -96°39' 3.870"	8/19/1976 10/6/1976 ---	180 1200 gpm 110 ft 129 ft PRO - Single Project	8 in --- 158 ft

Owner ID	Name/Entity	Address	Address 2	City, State, Zip
143486	Pamela K Goudie Living Trust	324 N 1st St		Elmwood, NE 68349

Geo Logs

ELEV (ft)	FromDepth	ToDepth	Description	Color	Density	Composition
1330	0	3 1327	TOP SOIL			Other
1327	3	7 1323	FILL DIRT			Other
1323	7	52 1278	GRAY CLAY			Other
1278	52	88 1242	GRAY CLAY WITH SAND STREAKS			Other
1242	88	97 1233	COARSE SAND AND FINE GRAVEL			Other
1233	97	148 1182	COARSE SAND AND MEDIUM TO COARSE GRAVEL			Other
1182	148	152 1178	SHALE			Other

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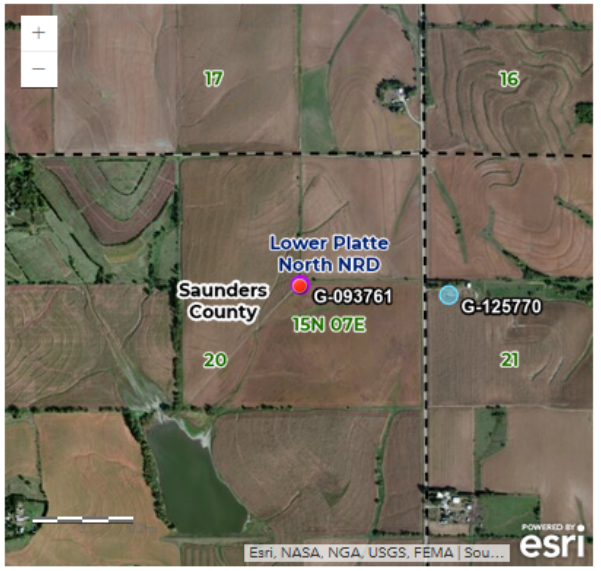
Database Through: 7/7/2021

Processed: 7/7/2021 11:57:15 AM

Registration number G-093761

Note: Missing Data Indicates that the Information is Not Available Electronically.



1996 Registered irrigation well G-093761 in Section 20 T15N R7E

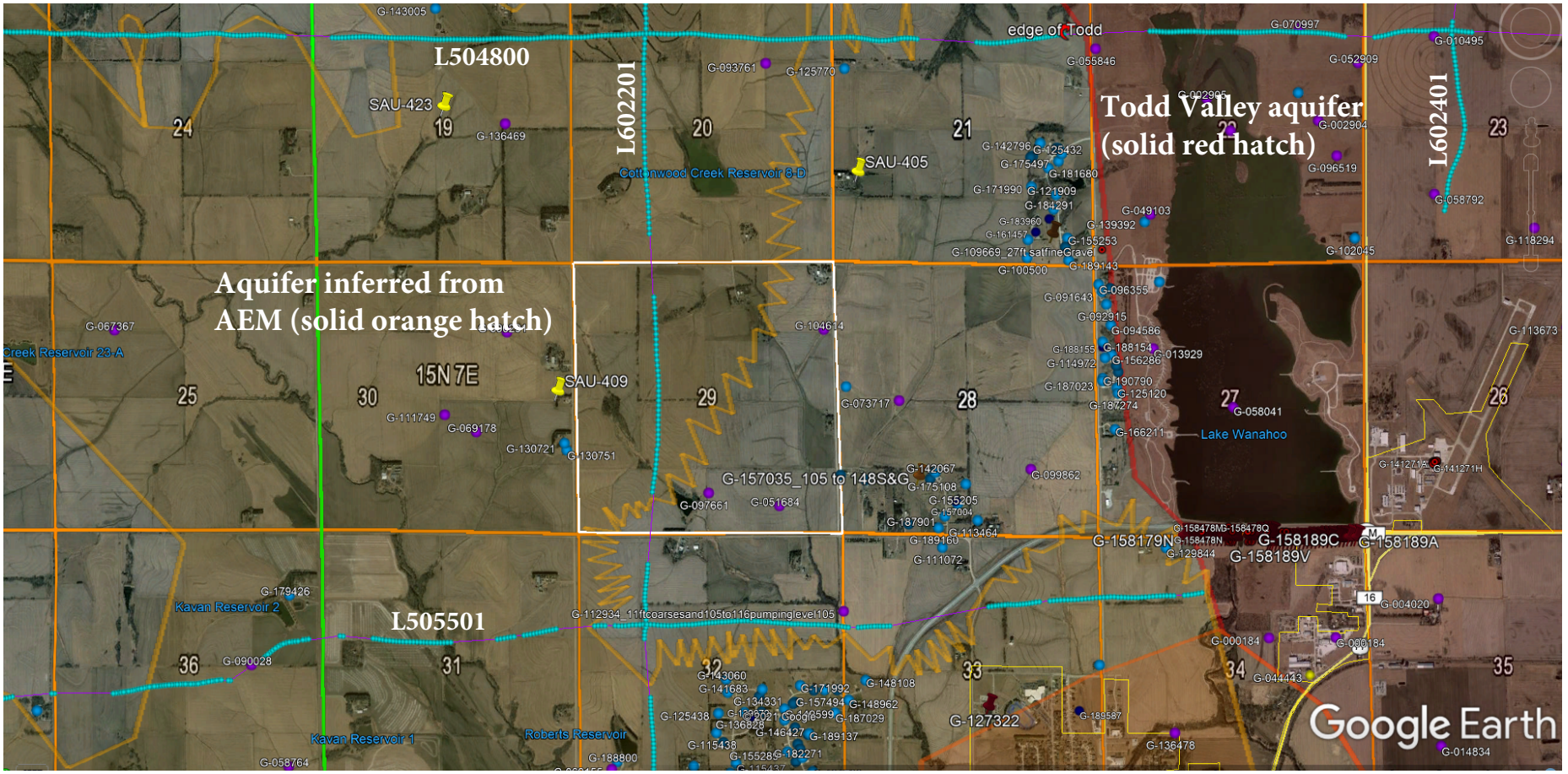
Registration# Well ID Permit Number	Use Status	County Name NRD Name Well Location Footage Latitude Longitude	Completion Date Filing Date Decommission Date Times Replaced Online Registration ID (NOLID)	Acres Irrigated Gallons/Minute Static Level Pumping Level Series	Pump Column Diameter Pump Depth Well Depth
G-093761 WellID: 109544 View Scans	I - Irrigation A - Active Registered Well	Saunders Lower Platte North 15N 7 20 SENE 41°15' 36.170" -96°38' 46.500"	7/24/1996 12/8/1997 ---	127 650 gpm 91 ft 120 ft PRO - Single Project	7 in 125 ft 140 ft

Owner ID	Name/Entity	Address	Address 2	City, State, Zip
59307	Richard K Gustafson	1949 County Road O		Malmo, NE 68040

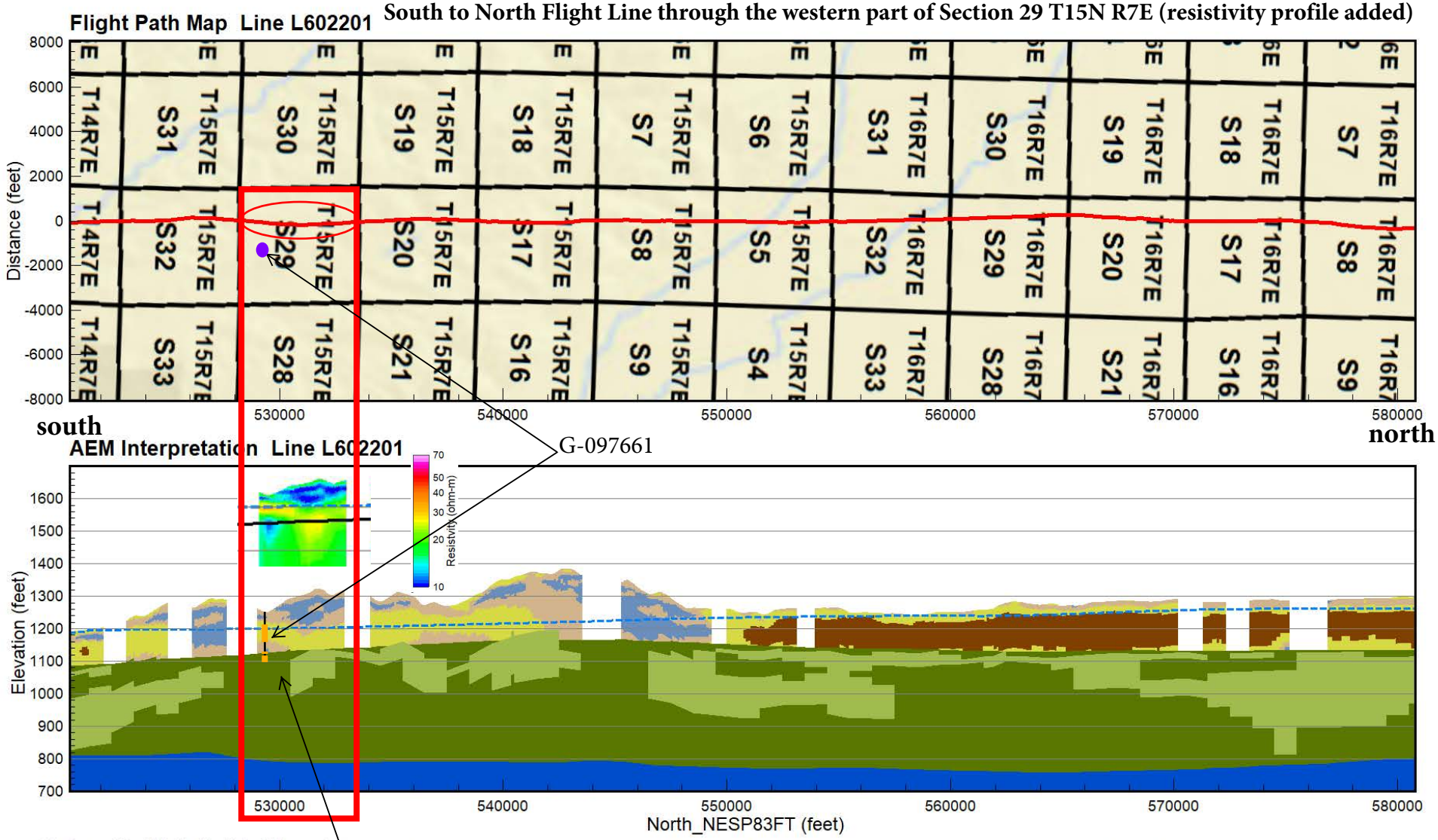
Geo Logs

	FromDepth	ToDepth	Description
1305 elev	0	50	CLAY
1255	50	55	COARSE SAND
1250	55	115	GRAVEL
1190	115	120	CLAY
1185	120	130	GRAVEL
1175	130	140	CLAY

Google Earth Map with AEM Flight Lines Registered Wells and Estimated Presence of Aquifer Units



Note: jagged lines on orange hatch indicate estimated boundary with not enough information to infer beyond OR areas beyond are likely Sand and Gravel mixed with significant Clay layers



Interpreted geological sections from AEM data and flight path location map provided in conjunction with the Google Earth kmz file. The projected downline distance is equal for the flight path (top image) and the AEM data interpretation (bottom image). The flight path is displayed as a red line on the flight path map. The 1995 Conservation and Survey Division (CSD) water table is shown as a dashed blue line on the AEM data interpretation profile. The Quaternary (Q) section is divided into aquifer material categories as indicated by the legend. The Cretaceous Dakota Group (Kd) is split into Sandstone/Sand dominant and Shale/Clay dominant sections as indicated by the legend. The Tertiary Ogallala Group (To), Cretaceous Niobrara Formation (Kn), Cretaceous Carlile Shale (Kc), Cretaceous Greenhorn Limestone and Graneros Shale (Kgg), and the undifferentiated Pennsylvanian (IP) are indicated by the legend. Additional information regarding the use of this figure and the AEM data may be found in the report titled "Airborne Electromagnetic mapping and Hydrogeologic Framework of Selected Areas of the Eastern Nebraska Water Assessment Area" chapter on the Lower Platte North Natural Resources District.

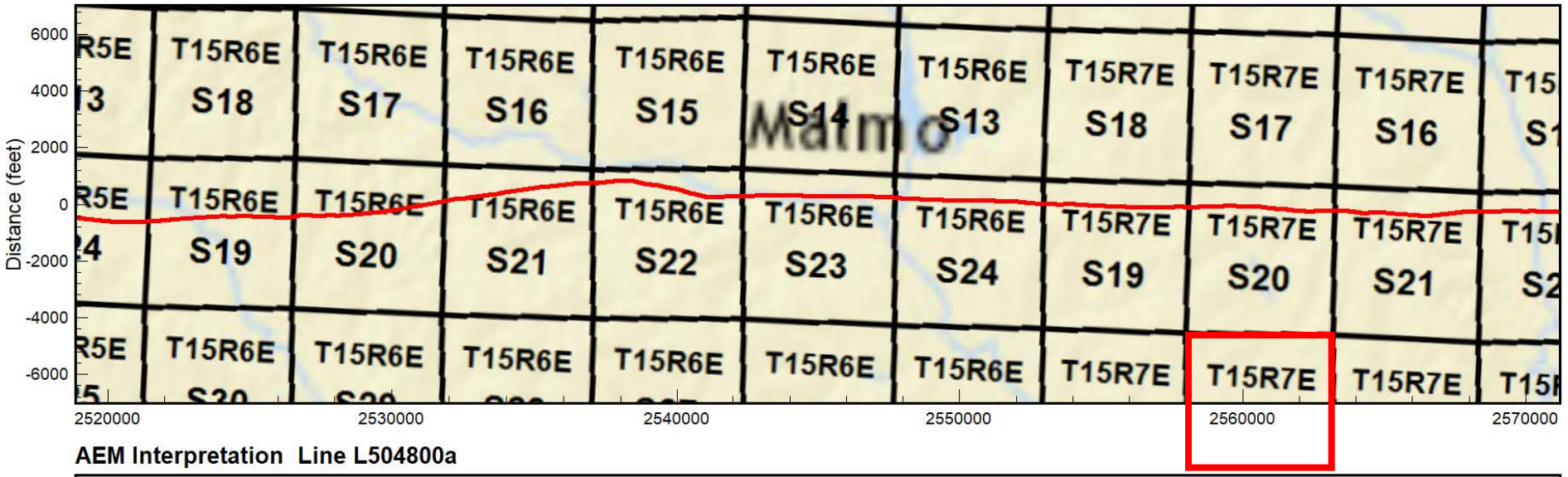
LOWER PLATTE NORTH Natural Resources District

ENWRA Eastern Nebraska Water Resources Assessment

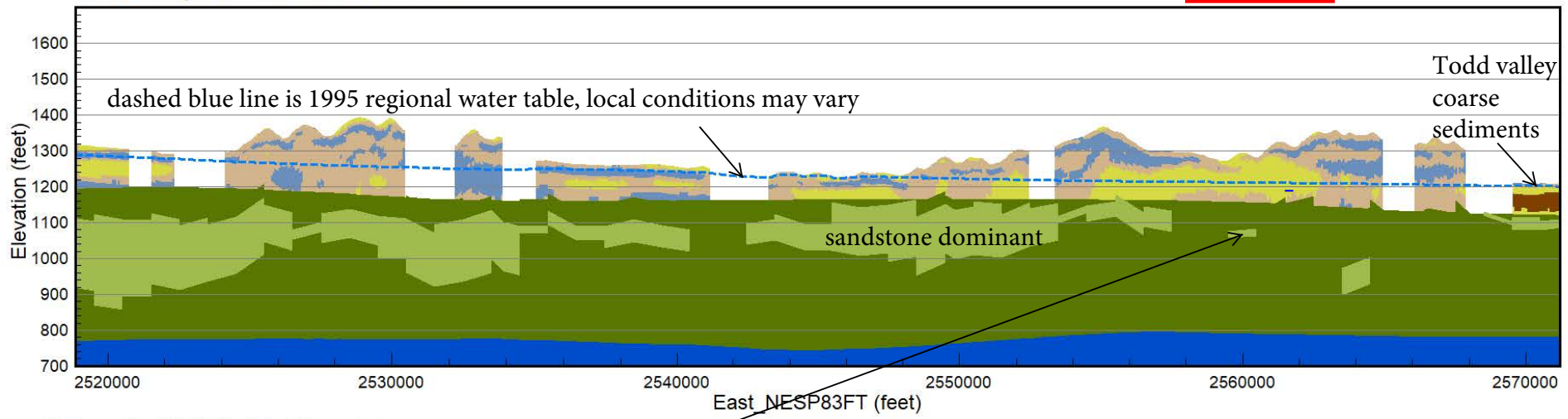
It appears that the sandstone dominant material in the Dakota is highly variable under Section 29 and the top of Dakota surface elevation is also potentially variable.

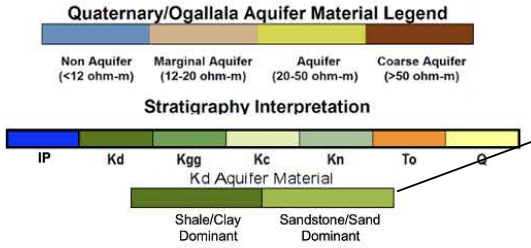
West to East Flight Line Almost a mile North of Section 29 T15N R7E, Saunders Co. - too far away see 602201

Flight Path Map Line L504800a



AEM Interpretation Line L504800a





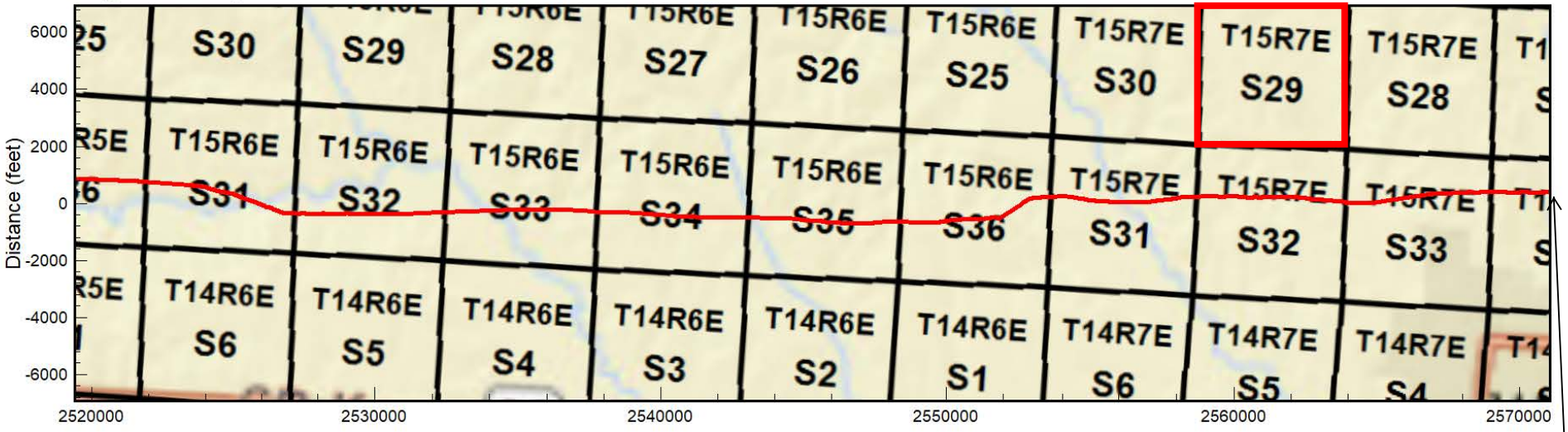
Interpreted geological sections from AEM data and flight path location map provided in conjunction with the Google Earth kmz file. The projected downline distance is equal for the flight path (top image) and the AEM data interpretation (bottom image). The flight path is displayed as a red line on the flight path map. The 1995 Conservation and Survey Division (CSD) water table is shown as a dashed blue line on the AEM data interpretation profile. The Quaternary (Q) section is divided into aquifer material categories as indicated by the legend. The Cretaceous Dakota Group (Kd) is split into Sandstone/Sand dominant and Shale/Clay dominant sections as indicated by the legend. The Tertiary Ogallala Group (To), Cretaceous Niobrara Formation (Kn), Cretaceous Carlile Shale (Kc), Cretaceous Greenhorn Limestone and Graneros Shale (Kgg), and the undifferentiated Pennsylvanian (IP) are indicated by the legend. Additional information regarding the use of this figure and the AEM data may be found in the report titled "Airborne Electromagnetic mapping and Hydrogeologic Framework of Selected Areas of the Eastern Nebraska Water Assessment Area" chapter on the Lower Platte North Natural Resources District.

LOWER PLATTE NORTH Natural Resources District

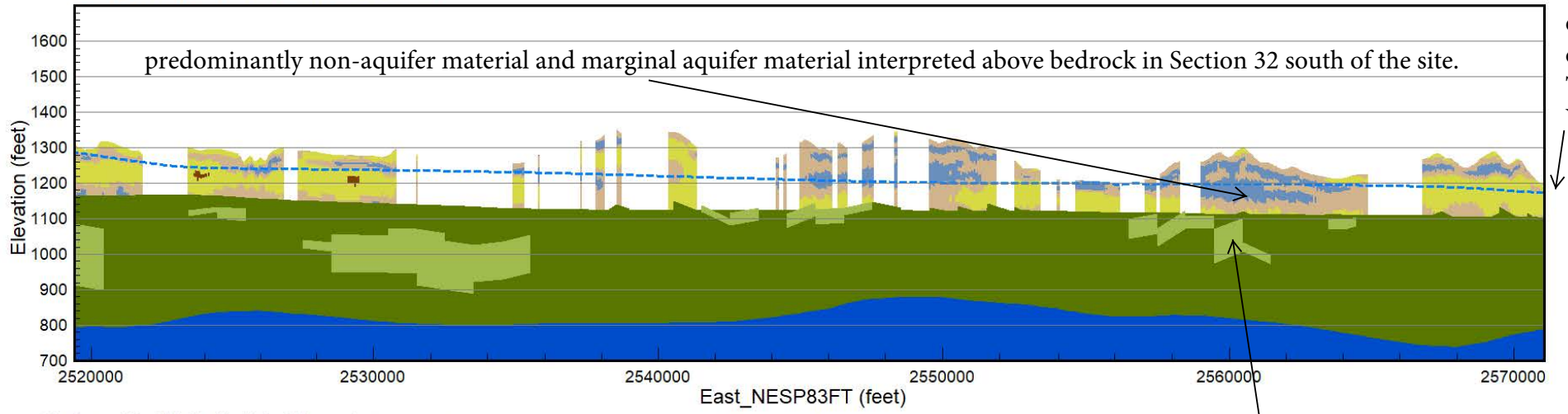
ENWRA Eastern Nebraska Water Resources Assessment

West to East Flight Line ~1/4 mile South of Section 32 T15N R7E, Saunders Co. - too far away see 602201

Flight Path Map Line L505501



AEM Interpretation Line L505501



west edge of Todd Valley

Quaternary/Ogallala Aquifer Material Legend

Non Aquifer (<12 ohm-m)	Marginal Aquifer (12-20 ohm-m)	Aquifer (20-50 ohm-m)	Coarse Aquifer (>50 ohm-m)

Stratigraphy Interpretation

IP	Kd	Kgg	Kc	Kn	To	Q

Kd Aquifer Material

Shale/Clay Dominant	Sandstone/Sand Dominant

Interpreted geological sections from AEM data and flight path location map provided in conjunction with the Google Earth kmz file. The projected downline distance is equal for the flight path (top image) and the AEM data interpretation (bottom image). The flight path is displayed as a red line on the flight path map. The 1995 Conservation and Survey Division (CSD) water table is shown as a dashed blue line on the AEM data interpretation profile. The Quaternary (Q) section is divided into aquifer material categories as indicated by the legend. The Cretaceous Dakota Group (Kd) is split into Sandstone/Sand dominant and Shale/Clay dominant sections as indicated by the legend. The Tertiary Ogallala Group (To), Cretaceous Niobrara Formation (Kn), Cretaceous Carlile Shale (Kc), Cretaceous Greenhorn Limestone and Graneros Shale (Kgg), and the undifferentiated Pennsylvanian (IP) are indicated by the legend. Additional information regarding the use of this figure and the AEM data may be found in the report titled "Airborne Electromagnetic mapping and Hydrogeologic Framework of Selected Areas of the Eastern Nebraska Water Assessment Area" chapter on the Lower Platte North Natural Resources District.

LOWER PLATTE NORTH Natural Resources District

ENWRA Eastern Nebraska Water Resources Assessment

Some deeper (200+ ft) sandstone dominant Dakota bedrock indicated on this line in the NW corner of Sec. 32 T15N R7E

1998 Registered irrigation well in Section 29 T15N R7E

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Nebraska Department of Natural Resources

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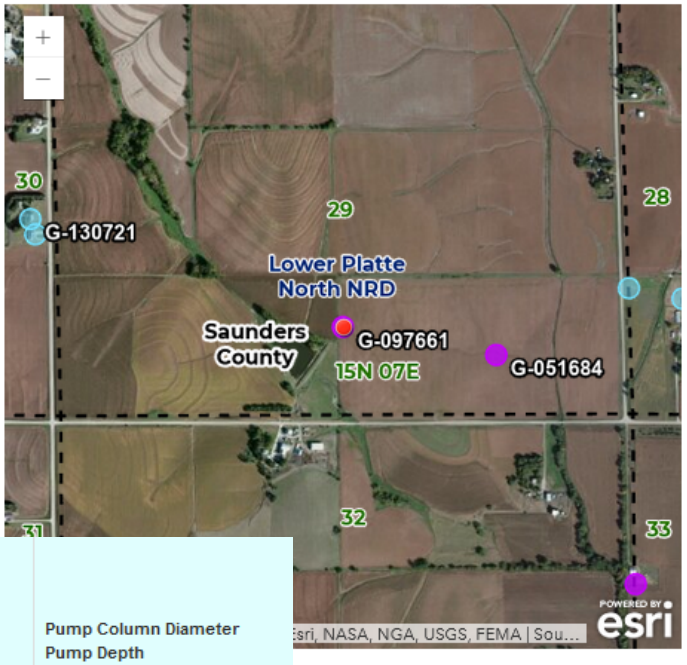
Registration number G-097661

Note: Missing Data Indicates that the Information is Not Available Electronically.



Registration# Well ID Permit Number	Use Status	County Name NRD Name Well Location Footage Latitude Longitude	Completion Date Filing Date Decommission Date Times Replaced Online Registration ID (NOLID) Well Driller License Number	Acres Irrigated Gallons/Minute Static Level Pumping Level Series	Pump Column Diameter Pump Depth Well Depth
G-097661 WellID: 110688 980073 View Scans	I - Irrigation A - Active Registered Well	Saunders Lower Platte North 15N 7 29 SESW 800S 2600W	7/1/1998 9/1/1998 --- 39295	140 800 gpm 62 ft 130 ft PRO - Single Project	9 in 140 ft 157 ft

Owner ID	Name/Entity	Address	Address 2	City, State, Zip
59520	Ernest Chapek	1865 County Road M		Wahoo, NE 68066

Geo Logs Print Friendly Geo Logs

ELEV (ft)	FromDepth		ToDepth	Description	Color
1253	0	1215	38	Clay	
1215	38	1160	93	Gravel	
1160	93	1131	122	Clay	
1131	122	1123	130	Gravel	
1123	130	1118	135	Clay	
1118	135	1096	157	Gravel	

Registered irrigation well in Section 29 T15N R7E

G-051684

Geo Logs Print Friendly Geo Logs

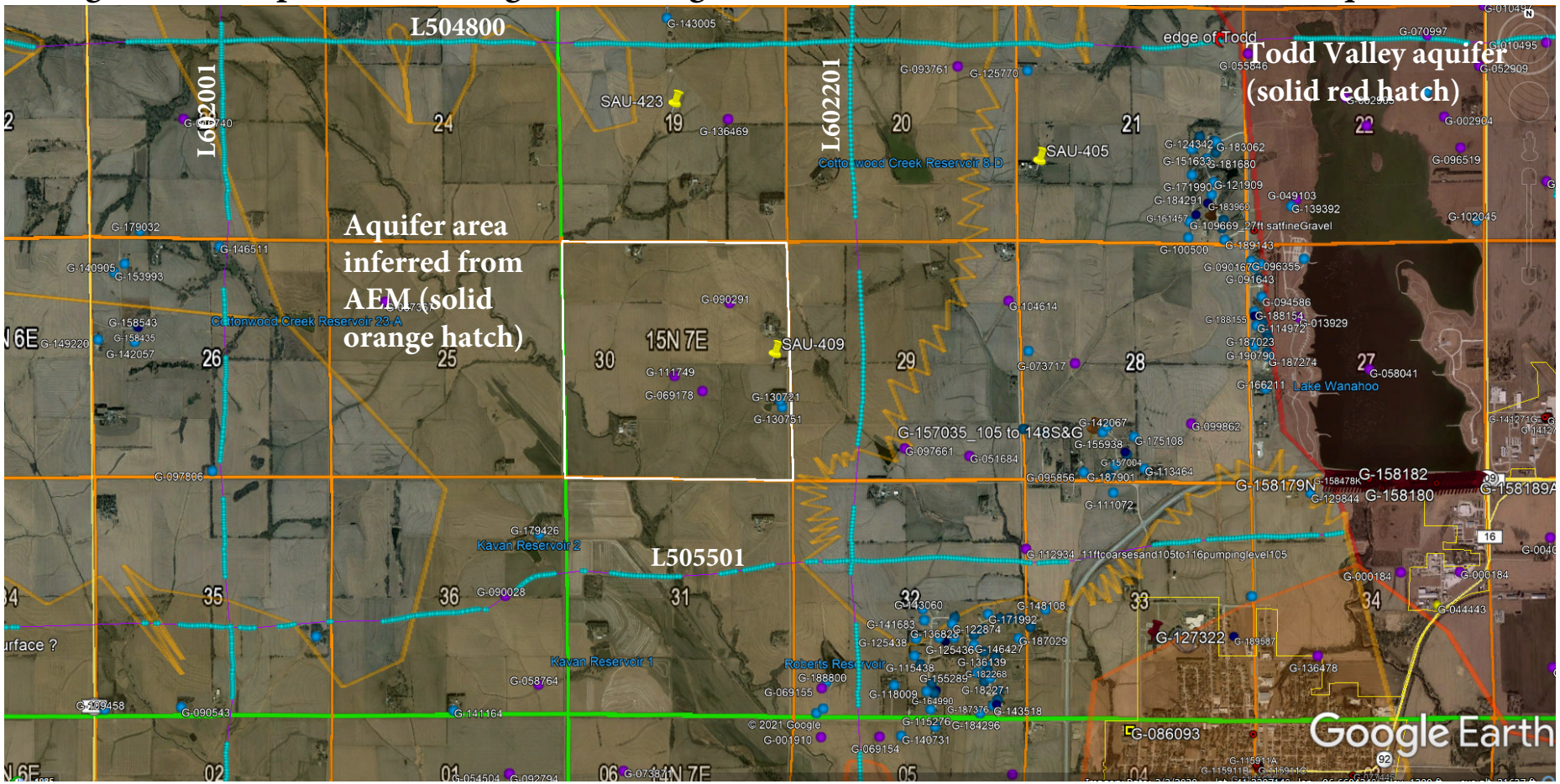
1228 elev

FromDepth		ToDepth		Description
0	1228	2	1226	TOP SOIL
2	1226	30	1198	CLAY
30	1198	56	1172	SAND AND MEDIUM GRAVE
56	1172	63	1165	CLAY
63	1165	64	1164	SAND AND GRAVEL
64	1164	67	1161	CLAY
67	1161	97	1131	SAND AND GRAVEL
97	1131	99	1129	CLAY

Registration# Well ID Permit Number	Use Status	County Name NRD Name Well Location Footage Latitude Longitude	Completion Date Filing Date Decommission Date Times Replaced Online Registration ID (NOLID) Well Driller License Number	Acres Irrigated Gallons/Minute Static Level Pumping Level Series	Pump Column Diameter Pump Depth Well Depth
G-051684 WellID: 59222 View Scans	I - Irrigation A - Active Registered Well	Saunders Lower Platte North 15N 7 29 SESE 41°14' 10.000" -96°38' 42.890"	8/14/1976 8/30/1976 ---	68 900 gpm 29 ft 60 ft PRO - Single Project	8 in --- 99 ft

Owner ID	Name/Entity	Address	Address 2	City, State, Zip
10557	Erik B Alm	1391 County Road N		Wahoo, NE 68066

Google Earth Map with AEM Flight Lines Registered Wells and Estimated Presence of Aquifer Units



Legend

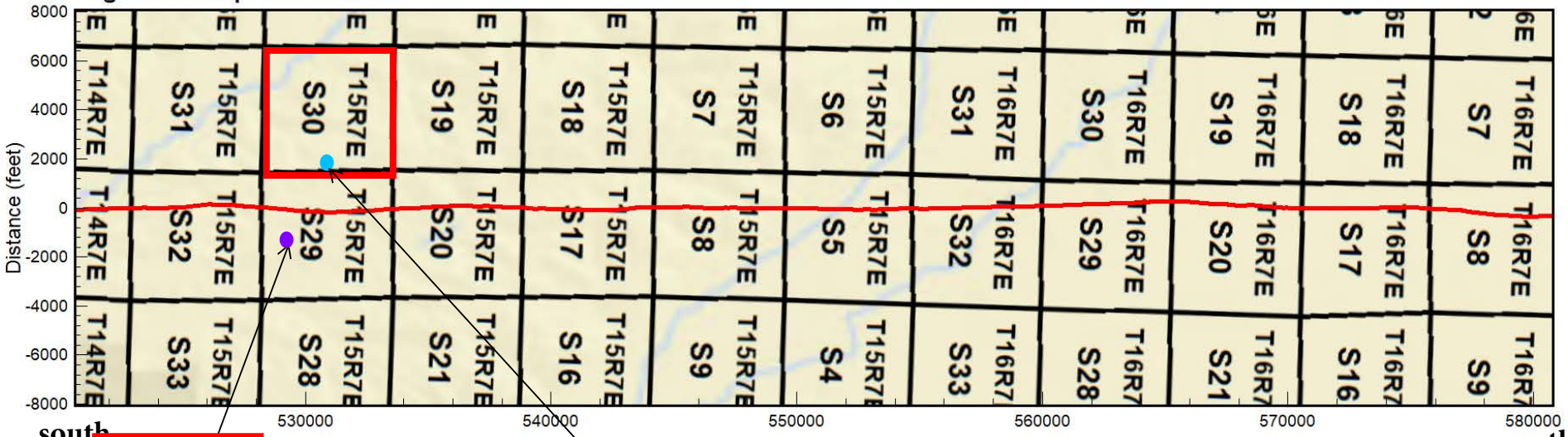
- CSD Archive File
- 2018 AEM Data Dot
- Commercial Well
- Domestic Well
- estimated aquifer material presence on AEM
- Heat Exchange Well
- Irrigation Well
- Public Water Supply Well
- Variance Request
- Todd Valley Aquifer

Note: jagged lines on orange hatch indicate estimated boundary with not enough information to infer beyond OR areas beyond are likely Sand and Gravel mixed with significant Clay layers

Section 30 has no flight lines through it. Based on surrounding flight lines to the east, north and south and registered well logs, Section 30 is inferred to be within a main aquifer unit. However, lines L504800 and L505501 may be too far away to infer this as a continuous unit from north to south as depicted. the aquifer material is also likely thinner in Sec. 30 than L602201 shows in Sec. 29, also it is likely the top of Dakota bedrock is shallower in Sec. 30).

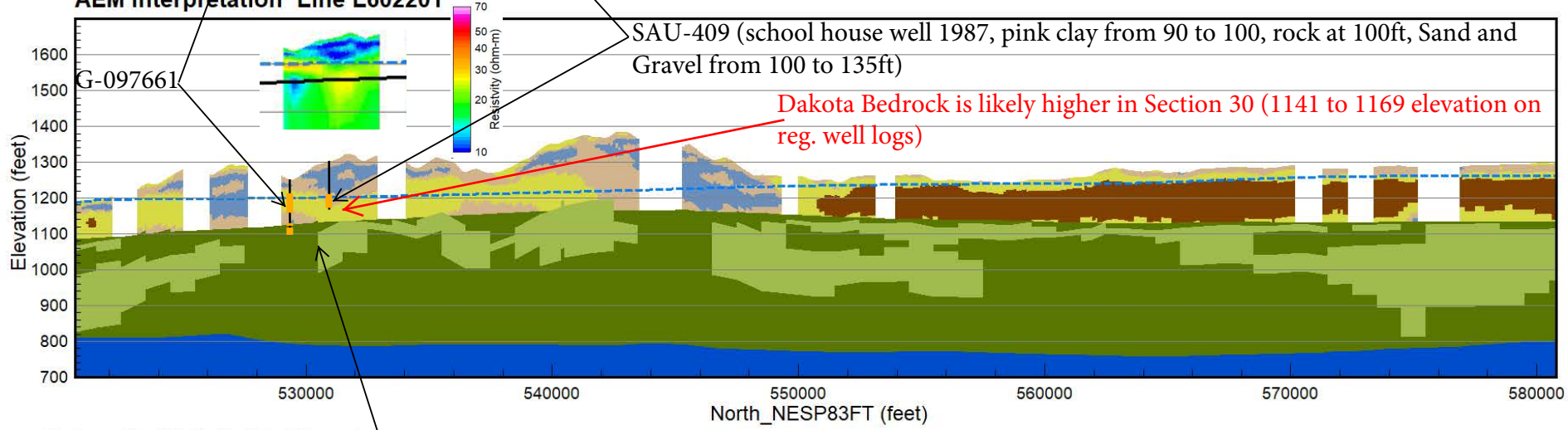
G-090291 has 19.5 feet of sand and gravel with minor clay layers from the reported pumping level (150ft) down to bedrock (169.5ft)
G-111749 has estimated 24 feet of saturated sand and gravel below the reported pumping level (101ft) down to bedorck (est. 139 feet)

Flight Path Map Line L602201 **South to North Flight Line through the western part of Section 29 T15N R7E (resistivity profile added)**



south **north**

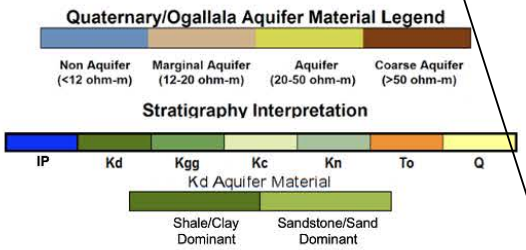
AEM Interpretation Line L602201



G-097661

SAU-409 (school house well 1987, pink clay from 90 to 100, rock at 100ft, Sand and Gravel from 100 to 135ft)

Dakota Bedrock is likely higher in Section 30 (1141 to 1169 elevation on reg. well logs)



Interpreted geological sections from AEM data and flight path location map provided in conjunction with the Google Earth kmz file. The projected downline distance is equal for the flight path (top image) and the AEM data interpretation (bottom image). The flight path is displayed as a red line on the flight path map. The 1995 Conservation and Survey Division (CSD) water table is shown as a dashed blue line on the AEM data interpretation profile. The Quaternary (Q) section is divided into aquifer material categories as indicated by the legend. The Cretaceous Dakota Group (Kd) is split into Sandstone/Sand dominant and Shale/Clay dominant sections as indicated by the legend. The Tertiary Ogallala Group (To), Cretaceous Niobrara Formation (Kn), Cretaceous Carlile Shale (Kc), Cretaceous Greenhorn Limestone and Graneros Shale (Kgg), and the undifferentiated Pennsylvanian (IP) are indicated by the legend. Additional information regarding the use of this figure and the AEM data may be found in the report titled "Airborne Electromagnetic mapping and Hydrogeologic Framework of Selected Areas of the Eastern Nebraska Water Assessment Area" chapter on the Lower Platte North Natural Resources District.

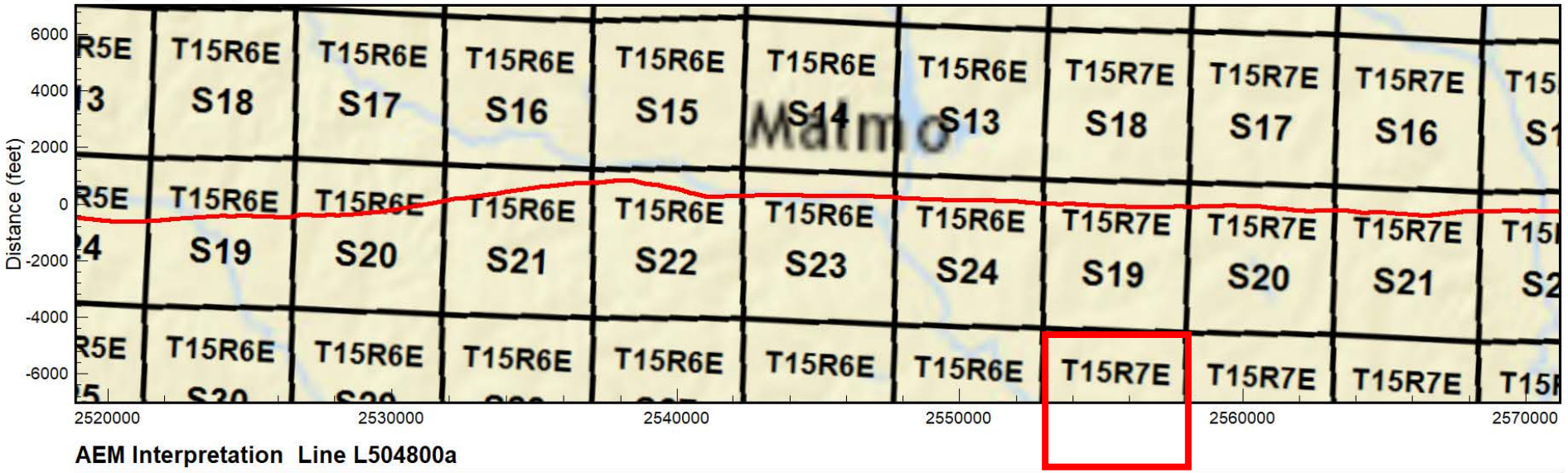
LOWER PLATTE NORTH Natural Resources District

ENWRA Eastern Nebraska Water Resources Assessment

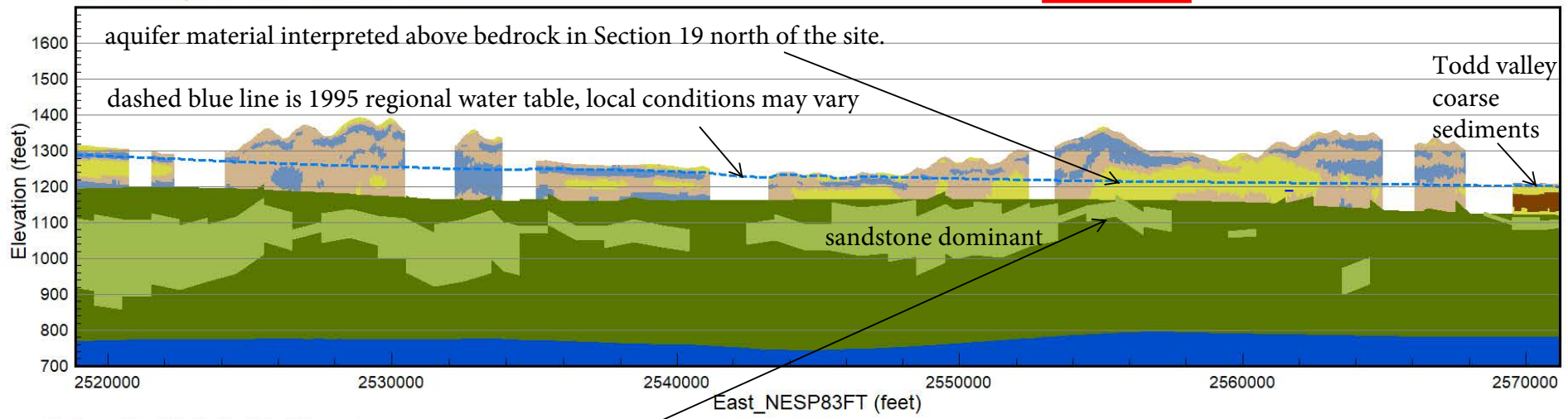
It appears that the sandstone dominant material in the Dakota is highly variable under Section 29.

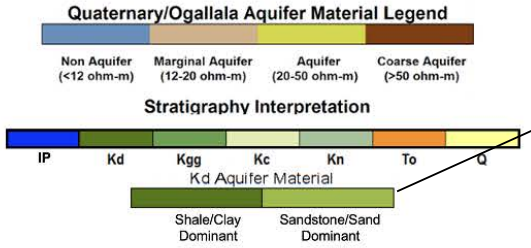
West to East Flight Line Almost a mile North of Section 30 T15N R7E, Saunders Co.

Flight Path Map Line L504800a



AEM Interpretation Line L504800a



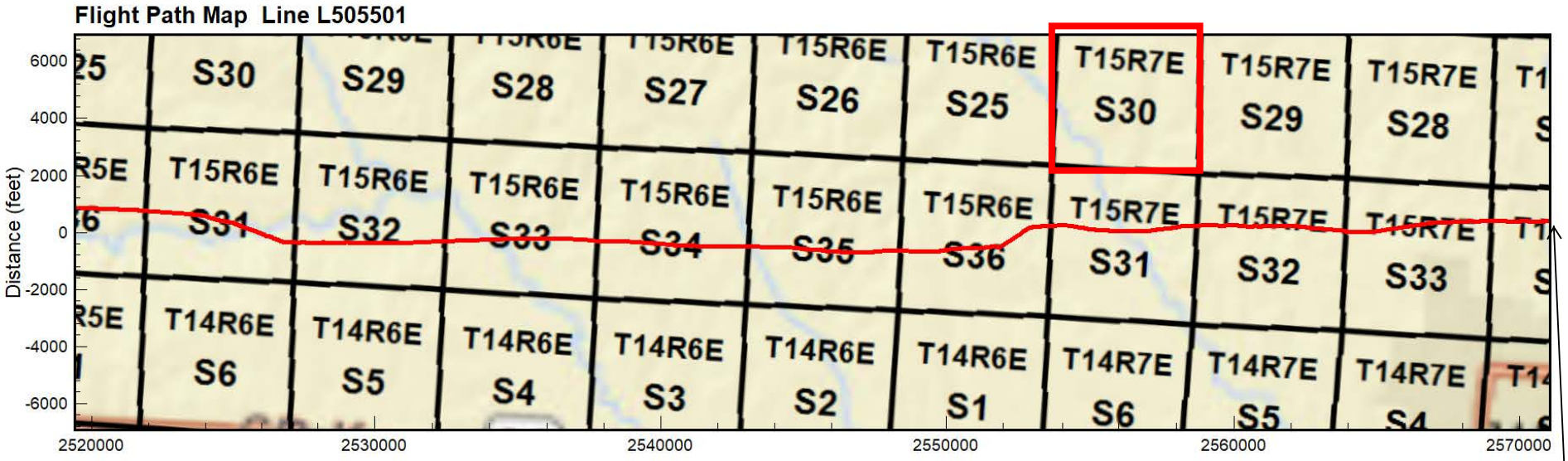


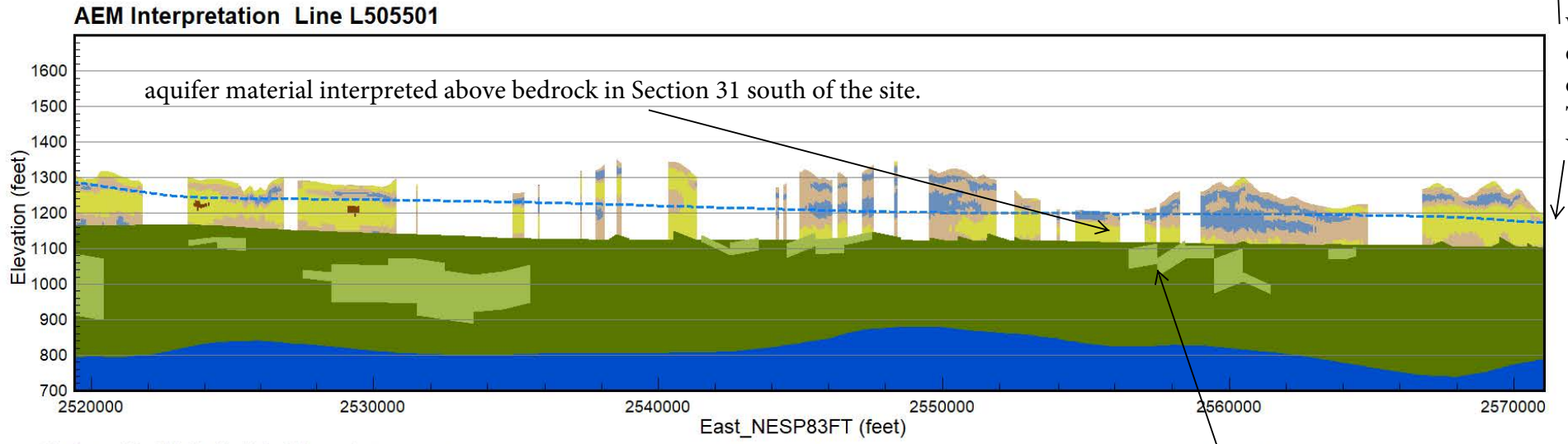
Interpreted geological sections from AEM data and flight path location map provided in conjunction with the Google Earth kmz file. The projected downline distance is equal for the flight path (top image) and the AEM data interpretation (bottom image). The flight path is displayed as a red line on the flight path map. The 1995 Conservation and Survey Division (CSD) water table is shown as a dashed blue line on the AEM data interpretation profile. The Quaternary (Q) section is divided into aquifer material categories as indicated by the legend. The Cretaceous Dakota Group (Kd) is split into Sandstone/Sand dominant and Shale/Clay dominant sections as indicated by the legend. The Tertiary Ogallala Group (To), Cretaceous Niobrara Formation (Kn), Cretaceous Carlile Shale (Kc), Cretaceous Greenhorn Limestone and Graneros Shale (Kgg), and the undifferentiated Pennsylvanian (IP) are indicated by the legend. Additional information regarding the use of this figure and the AEM data may be found in the report titled "Airborne Electromagnetic mapping and Hydrogeologic Framework of Selected Areas of the Eastern Nebraska Water Assessment Area" chapter on the Lower Platte North Natural Resources District.

LOWER PLATTE NORTH Natural Resources District

ENWRA Eastern Nebraska Water Resources Assessment

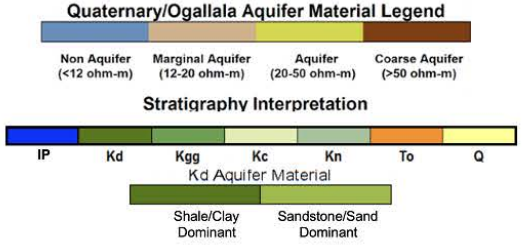
West to East Flight Line ~1/4 mile South of Section 30 T15N R7E, Saunders Co.





west edge of Todd Valley

Some deeper (100+ ft) sandstone dominant Dakota bedrock indicated on this line in Sec. 31 T15N R7E



Interpreted geological sections from AEM data and flight path location map provided in conjunction with the Google Earth kmz file. The projected downline distance is equal for the flight path (top image) and the AEM data interpretation (bottom image). The flight path is displayed as a red line on the flight path map. The 1995 Conservation and Survey Division (CSD) water table is shown as a dashed blue line on the AEM data interpretation profile. The Quaternary (Q) section is divided into aquifer material categories as indicated by the legend. The Cretaceous Dakota Group (Kd) is split into Sandstone/Sand dominant and Shale/Clay dominant sections as indicated by the legend. The Tertiary Ogallala Group (To), Cretaceous Niobrara Formation (Kn), Cretaceous Carlile Shale (Kc), Cretaceous Greenhorn Limestone and Graneros Shale (Kgg), and the undifferentiated Pennsylvanian (IP) are indicated by the legend. Additional information regarding the use of this figure and the AEM data may be found in the report titled "Airborne Electromagnetic mapping and Hydrogeologic Framework of Selected Areas of the Eastern Nebraska Water Assessment Area" chapter on the Lower Platte North Natural Resources District.

LOWER PLATTE NORTH Natural Resources District

ENWRA Eastern Nebraska Water Resources Assessment

HANSON WELL CO.

WATER WELLS
TEST DRILLING & SAMPLING
CLOSED LOOP HEAT PUMPS
P.O. BOX 9
ITHACA, NE 68033
(402) 623-4293

DWIGHT HANSON
CERTIFIED PUMP INSTALLER*
CERTIFIED WELL DRILLER*
VICTOR HANSON
CERTIFIED MASTER WATER
WELL CONTRACTOR*
*Certification by National Water Well Assn.

Date: 6/17/87

Owner: School Dist #70

Driller: Victor Hanson

Well location: west of School House

NE ¼ of the SE ¼ of Section 30,

Township 15 North, Range 7 (East)/West,

Saunders County.

Total Depth 140 Finished Depth 125

Bore hole Dia. 9"

Casing Dia. 4" Type PVC Weight SDR26

Length 110'

Screen Dia. 4" Type PVC Weight Sch 40

Length 15' Slot .030

Gravel Pack material ~~Grits~~ 125 to 27

Bentinite Seal(s) 27'

Top Seal, length 27', material clay

Static water level 106' elevation

Pumping water level _____ at _____ gpm

Capacity 10+ gpm Estimate ☑ Actual ☐

DRILLING LOG

DEPTH IN FEET FROM	TO	MATERIAL DRILLED
1304		
0	3	Brown Soil
3	7	Yellow clay
7	22	Gray silty Clay
22	26	Brown clay
26	40	Tan clay
40	42	gray clay
42	50	Tan clay
50	51	Sand
51	54.5	Lt Tan Clay
54.5	55	Rock
55	85	Yellow + Gray Clay
85	86.5	Gravel
86.5	90	Gray clay
90	100	Pink clay
100		Rock

DEPTH IN FEET FROM	TO	MATERIAL DRILLED
1204		
100	124.5	Gravel
124.5	131	Gravel w/clay lenses
131	135	1169 Sand + Gravel
1169	140	1164 Lt. Gray Clay

SAUNDERS 15N 7E Sec. 30

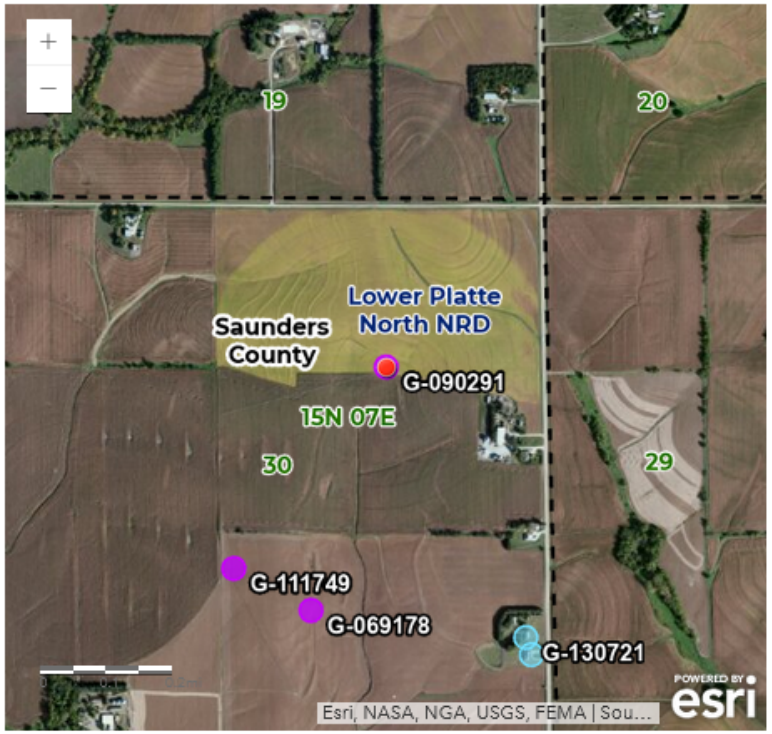
Geo Logs Print Friendly Geo Logs

1315 elev

FromDepth	ToDepth	Description
0	2	TOP SOIL
2	18	YELLOW BROWN CLAY
18	29	BROWN CLAY
29	40	YELLOW BROWN CLAY SLIGHTLY HARDER
40	53	YELLOW BROWN CLAY MED SOFT
53	65	LIGHT GRAYISH BROWN CLAY MEDIUM HARD
65	85	BROWN CLAY SOFT
85	101	BROWN CLAY WITH GRAY CLAY STREAKS
101	106	GRAY CLAY SOFT
106	109	BROWN CLAY MED HARD
109	114	COARSE GRAVEL RUSTY RED
114	114.5	CLAY LAYER
114.5	121	COARSE GRAVEL
121	151	FINE GRAVEL UNIFORM
151	156	CLAY AND GRAVEL LAYERS
156	164	COARSE SAND
164	169.5	NICE GRAVEL
169.5	174	REDDISH YELLOW BROWN CLAY MED HARD

1206 1201 1200.5 1164 1159 1150.5 1145.5 1141

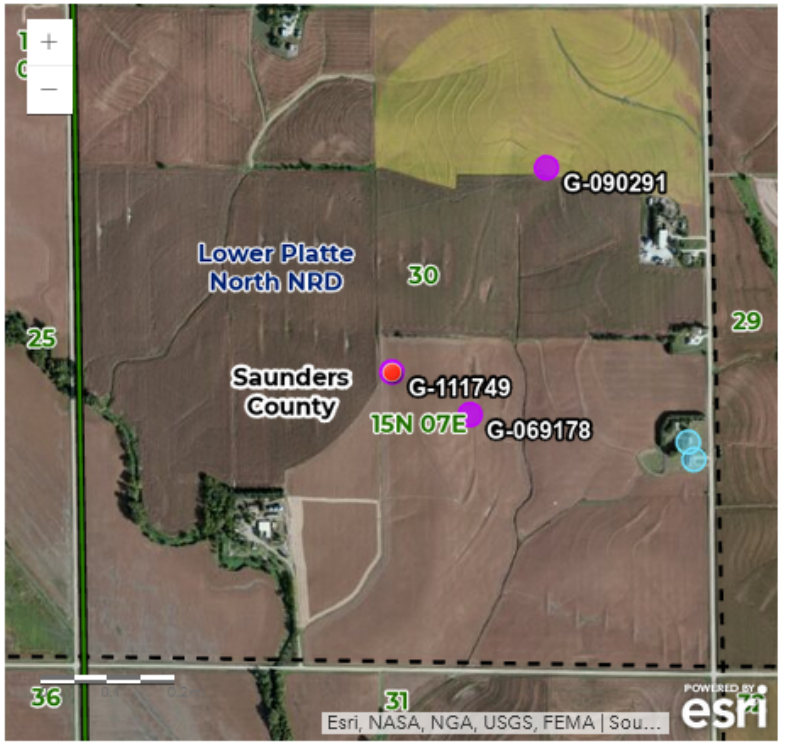
Registered irrigation well in Section 30 T15N R7E



Registration# / Well ID / Permit Number	Use / Status	County Name / NRD Name / Well Location / Footage / Latitude / Longitude	Completion Date / Filing Date / Decommission Date / Times Replaced / Online Registration ID (NOLID) / Well Driller License Number	Acres Irrigated / Gallons/Minute / Static Level / Pumping Level / Series	Pump Column Diameter / Pump Depth / Well Depth
G-090291 WellID: 105420 View Scans	I - Irrigation A - Active Registered Well	Saunders Lower Platte North 15N 7 30 NE	4/20/1996 1/9/1997 ---	140 650 gpm 115 ft 150 ft PRO - Single Project	1 in 160 ft 169 ft

Owner ID	Name/Entity	Address	Address 2	City, State, Zip
57100	Terry W Swanson	RR 1 Box 337		Wahoo, NE 68066

2001 Registered irrigation well in Section 30 T15N R7E



Geo Logs Print Friendly Geo Logs

	FromDepth	ToDepth	Description
1279 elev	0	15	TOPSOIL & CLAY
	15	60	CLAY
	60	75	CLAY LYR & SAND, HARD LYR, 5' GRAVEL
1204	75	90	5' GRAVEL, 4' CLAY, 5' CRS SAND & GRVL, THIN CLY STK
1189	90	105	12' GRAVEL, THIN CLAY LAYERS MIXED
1174	105	120	3' GRAVEL, 12' CLAY
1159	120	135	2' CLAY, COARSE SAND & GRAVEL
1144	135	150	4' GRAVEL, CLAY & OCHER

32ft sat. S&G

Casing and Screen Print Friendly Case Screens

FromDepth	ToDepth	CaseOrScreen	InsideDiam	OutsideDiam	CaseThickness	Material	ScrnSlotSize	ScreenTname	ScrnGuides	SubTableNo
0	84	casing	14.74	16	0.652	PVC				1
84	144	screen	14.74	16		PVC	0.085	JET STREAM	20	1

Registration# Well ID Permit Number	Use Status	County Name NRD Name Well Location Footage Latitude Longitude	Completion Date Filing Date Decommission Date Times Replaced Online Registration ID (NOLID) Well Driller License Number	Acres Irrigated Gallons/Minute Static Level Pumping Level Series	Pump Column Diameter Pump Depth Well Depth
G-111749 WellID: 134265 001248 View Scans	I - Irrigation A - Active Registered Well	Saunders Lower Platte North 15N 7 30 NWSE 2310S 2600E	7/10/2001 8/15/2001 --- 39194	350 700 gpm 83 ft 101 ft PRO - Single Project	8 in 130 ft 144 ft

Owner ID	Name/Entity	Address	Address 2	City, State, Zip
49350	William Kremlacek	1970 County Road M		Wahoo, NE 68066

1983 Registered irrigation well in Section 30 T15N R7E

Return to Search Page

Nebraska Department of Natural Resources

Database Through: 7/30/2021

Processed: 7/30/2021 3:40:23 PM

Registration number G-069178

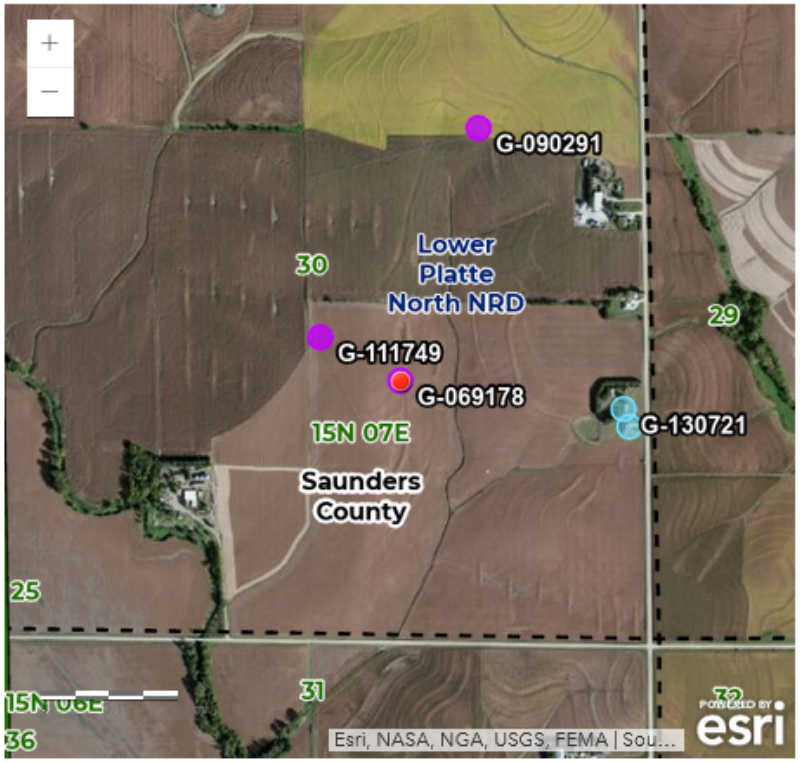
Note: Missing Data Indicates that the Information is Not Available Electronically.

Geo Logs Print Friendly Geo Logs

1285ft? ground elev.

unknown exact location

FromDepth	ToDepth	Description
0	7	CLAY
7	113 9ft (104-113)	GRAVEL
113	128	CLAY
128	140 12ft	GRAVEL
140	143	CLAY



Registration# / Well ID / Permit Number	Use / Status	County Name / NRD Name / Well Location / Footage / Latitude / Longitude	Completion Date / Filing Date / Decommission Date / Times Replaced / Online Registration ID (NOLID) / Well Driller License Number	Acres Irrigated / Gallons/Minute / Static Level / Pumping Level / Series	Pump Column Diameter / Pump Depth / Well Depth
G-069178 WellID: 77318 View Scans	I - Irrigation A - Active Registered Well	Saunders Lower Platte North 15N 7 30 NWSE	11/15/1983 12/28/1983 ---	350 1000 gpm 80 ft 104 ft PRO - Single Project	8 in --- 143 ft

Owner ID	Name/Entity	Address	Address 2	City, State, Zip
49350	William Kremlacek	1970 County Road M		Wahoo, NE 68066

Return to Search Page

Nebraska Department of Natural Resources

Database Through: 7/30/2021

Processed: 7/30/2021 4:17:32 PM

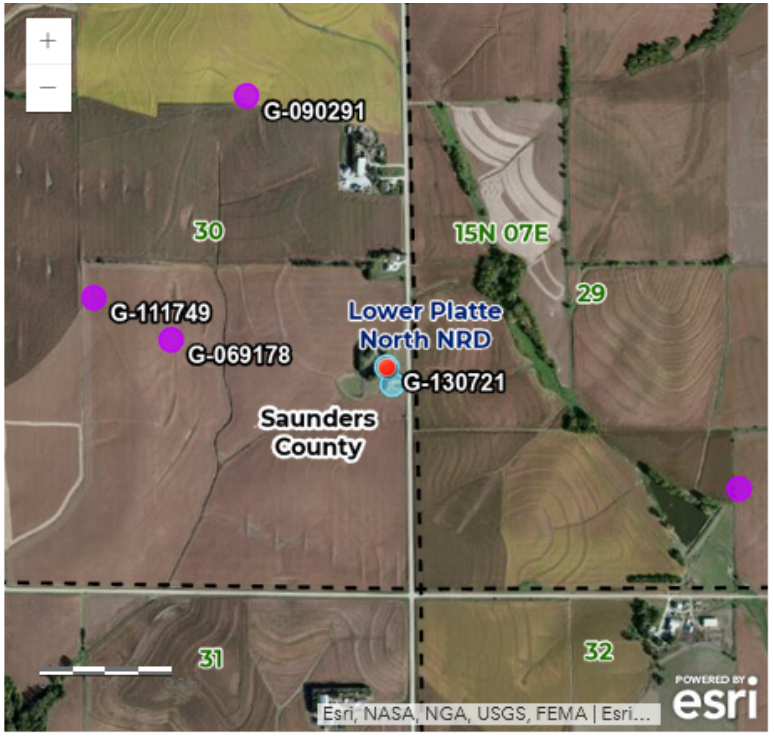
Registration number G-130721

Note: Missing Data Indicates that the Information is Not Available Electronically.

Geo Logs Print Friendly Geo Logs

1294ft ELEV

FromDepth	ToDepth	Description
0	2	Top Soil
2	53	Tan/Brown Clay
53	125	Fine to Medium Sand & Clay Layers
125 1169	138 1156	Medium to Coarse Gravel 13ft



Registration# / Well ID / Permit Number	Use / Status	County Name / NRD Name / Well Location / Footage / Latitude / Longitude	Completion Date / Filing Date / Decommission Date / Times Replaced / Online Registration ID (NOLID) / Well Driller License Number	Acres Irrigated / Gallons/Minute / Static Level / Pumping Level / Series	Pump Column Diameter / Pump Depth / Well Depth
G-130721 WellID: 162524 004593 View Scans	D - Domestic I - Inactive Well (Well is not Pumping)	Saunders Lower Platte North 15N 7 30 NESE 1788S 236E	10/11/2004 11/9/2004 109994906126789 3907004	--- 12 gpm 85 ft 105 ft PRO - Single Project	--- --- 138 ft

Owner ID	Name/Entity	Address	Address 2	City, State, Zip
78937	Paul Kremlacek	1645 County Road 19		Wahoo, NE 68066

Return to Search Page

Nebraska Department of Natural Resources

Database Through: 7/30/2021

Processed: 7/30/2021 4:21:54 PM

Registration number G-130751

Geo Logs Print Friendly Geo Logs

FromDepth	ToDepth	Description
0	2	Top Soil
2	40	Brown Clay
40	41	Rock (Big)
41	56	Brown Clay
56	63	Blue to Gray Clay
63	89	Tan Clay w/ Some Sand
89	120	Medium to Coarse Gravel

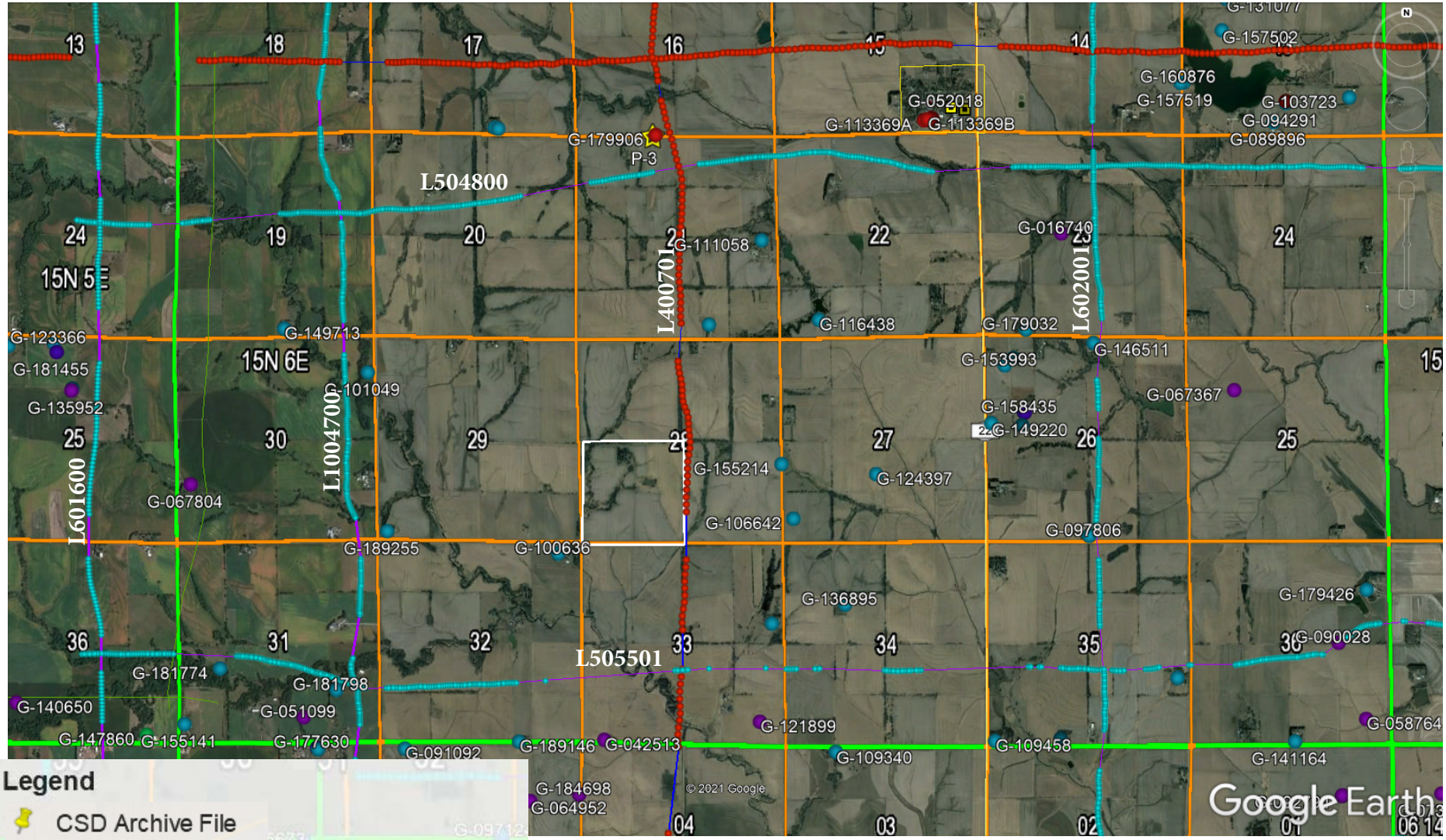
1301

1181

Registration# Well ID Permit Number	Use Status	County Name NRD Name Well Location Footage Latitude Longitude	Completion Date Filing Date Decommission Date Times Replaced Online Registration ID (NOLID) Well Driller License Number	Acres Irrigated Gallons/Minute Static Level Pumping Level Series	Pump Column Diameter Pump Depth Well Depth
G-130751 WellID: 163130 View Scans	D - Domestic I - Inactive Well (Well is not Pumping)	Saunders Lower Platte North 15N 7 30 NESE 1650S 194E	8/23/2003 11/10/2004 10999511769159 3907004	--- 10 gpm 96 ft 115 ft PRO - Single Project	--- --- 120 ft only 5 ft left

Owner ID	Name/Entity	Address	Address 2	City, State, Zip
78937	Paul Kremlacek	1645 County Road 19		Wahoo, NE 68066

Google Earth Map with AEM Flight Lines Registered Wells and Estimated Presence of Aquifer Units



Legend

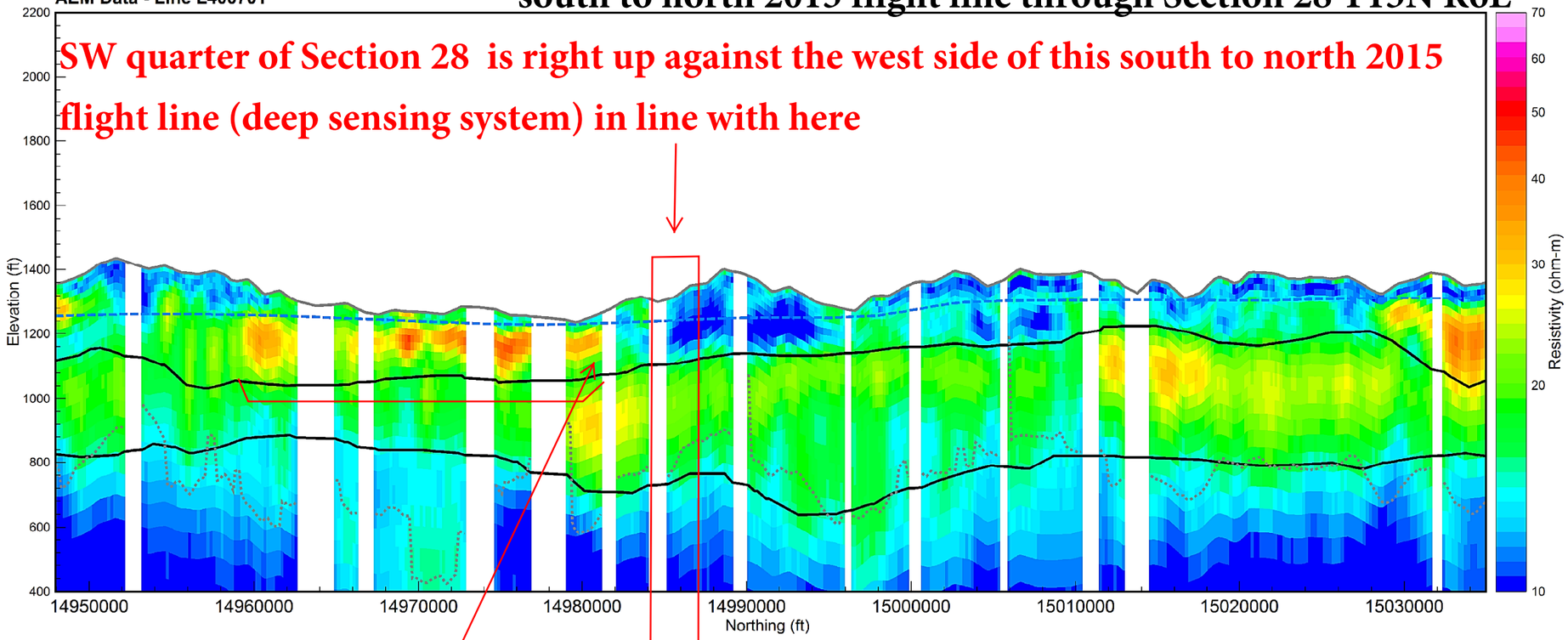
- CSD Archive File
- 2018 AEM Data Dot
- Commercial Well
- Domestic Well
- estimated aquifer material presence on AEM
- Heat Exchange Well
- Irrigation Well
- Public Water Supply Well
- Variance Request
- Todd Valley Aquifer

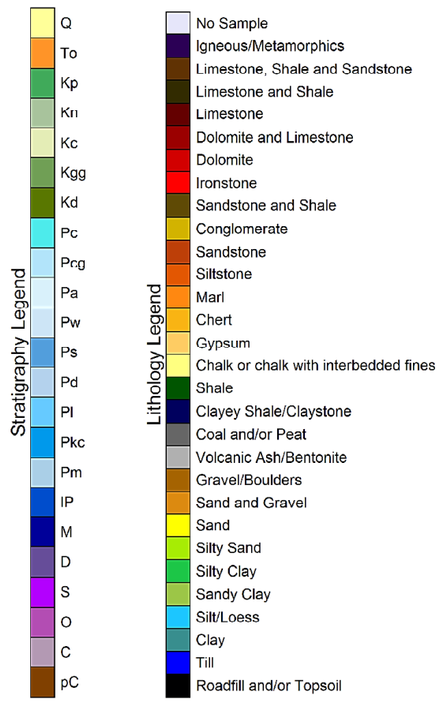
There was no aquifer material interpreted along L400701 in Section 28, T15N R6E above the Dakota. However, the Dakota appears to be resistive indicating some sandstone dominant material below 1,100 feet elevation (below around 200 feet deep).

south to north 2015 flight line through Section 28 T15N R6E

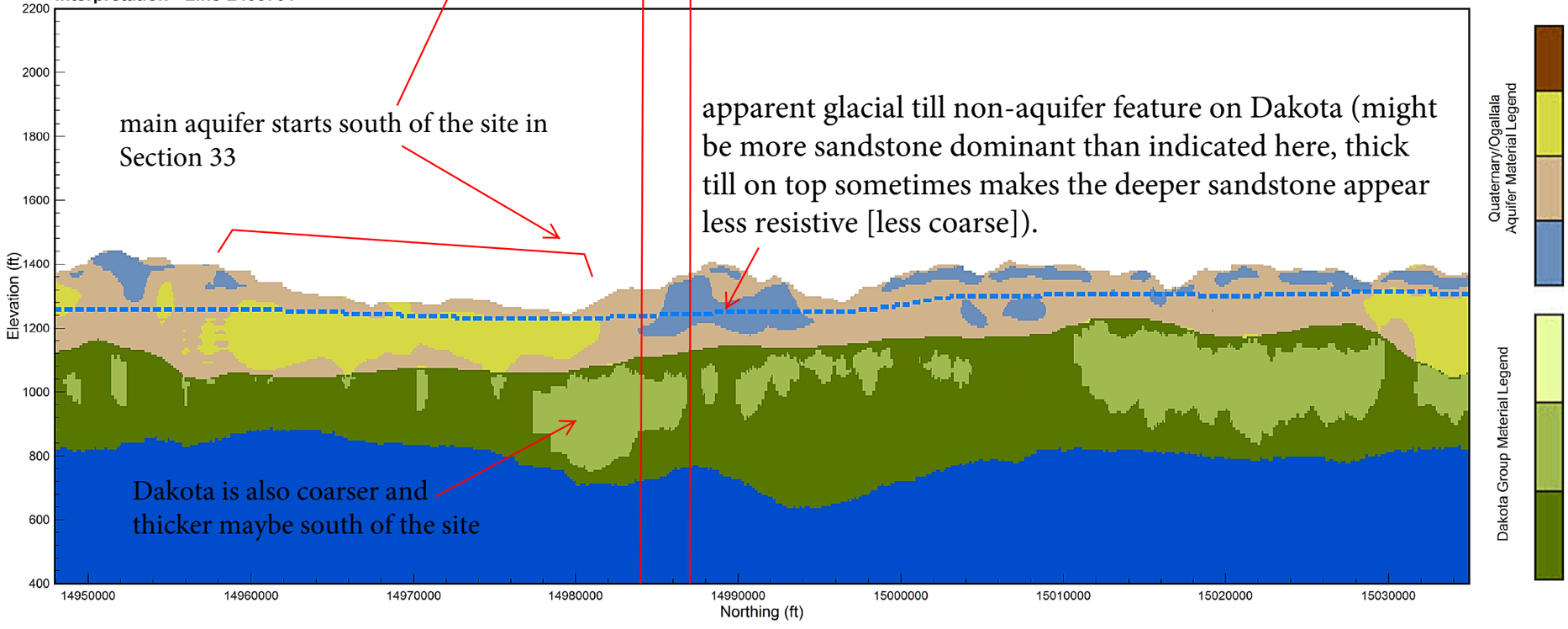
AEM Data - Line L400701

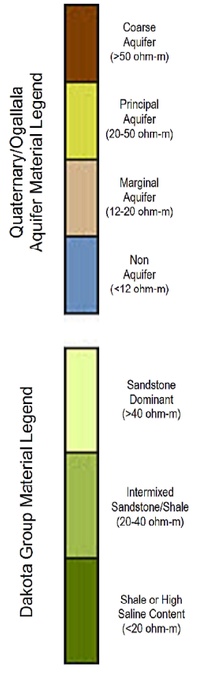
SW quarter of Section 28 is right up against the west side of this south to north 2015 flight line (deep sensing system) in line with here





Interpretation - Line L400701





Explanation: The top panel shows the inverted AEM sections from the southern project area flight lines. The x-axis is shown as Easting or Northing coordinates along the flight line in NAD83 UTM Zone 14 using feet. See the Line Location map for specific line location. White space in the top panel shows where data were removed due to coupling or were not flown due to FAA regulations. CSD boreholes within 1 mile of the flight line are also shown with lithology and stratigraphy. The stratigraphy data overlays the lithology data at each borehole. The CSD 1995 water table is shown on both panels as a dashed blue line. The interpreted geologic units are shown on the top panel as solid black lines. The less conservative, calculated DOI is shown as a dotted gray line on the top panel. The bottom panel shows the interpreted geologic units using the Stratigraphy Legend based on analysis of the AEM and borehole data. Potential aquifer material in the Quaternary sediments and the underlying Ogallala Group (where resent) are color-coded using the Quaternary/Ogallala Aquifer Material Legend. Locations where the Ogallala Group is interpreted, the top of the group is indicated by an orange line. The Dakota Group has been differentiated by resistivity values to indicate interpreted material type. The Kc and Kgg units have been combined and re displayed using the Kc stratigraphic color designation. The Paleozoic units are undifferentiated and displayed using the IP stratigraphic color designation.

Eastern Nebraska Water Resources Assessment

Airborne Geophysical Surveys Resistivity and Geologic Interpretation Sections

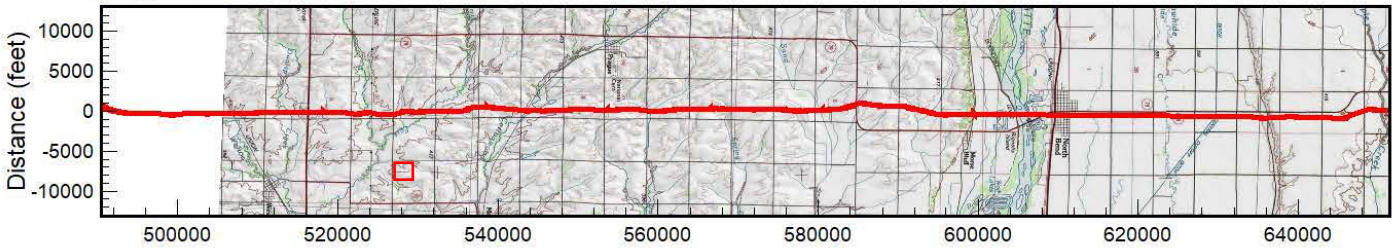
Southern ENWRA Project Area

Flight Line L400701

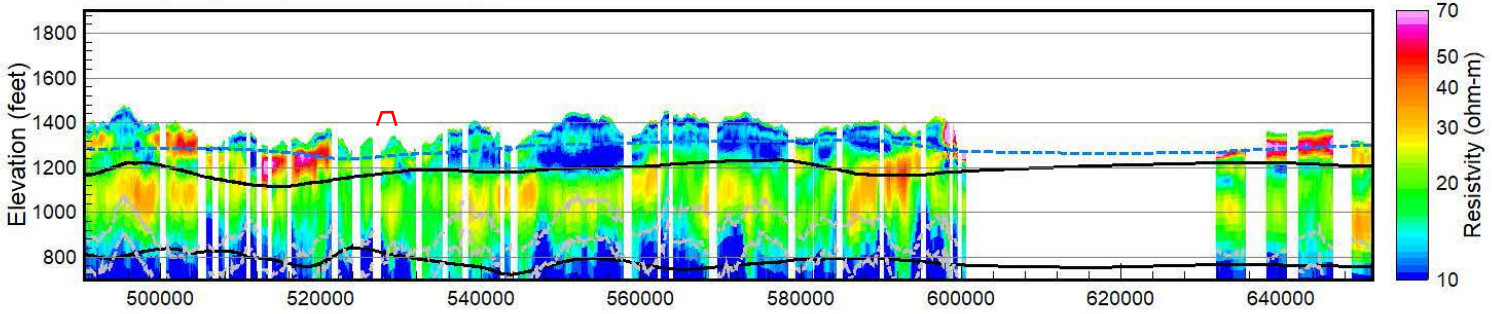
south to north 2018 flight line - one mile west, too far maybe

Appendix 1: 2D Profiles – 2018 LPNNRD Inverted AEM Resistivity and Interpretation

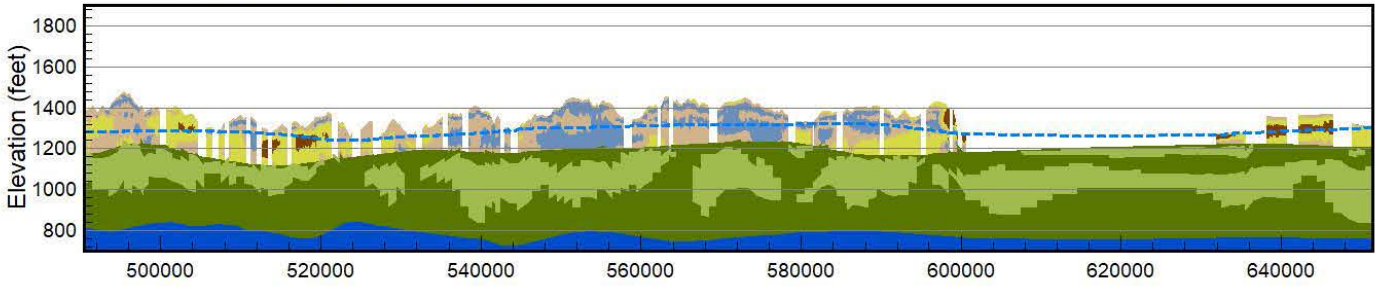
Flight Line Position Line L1004700



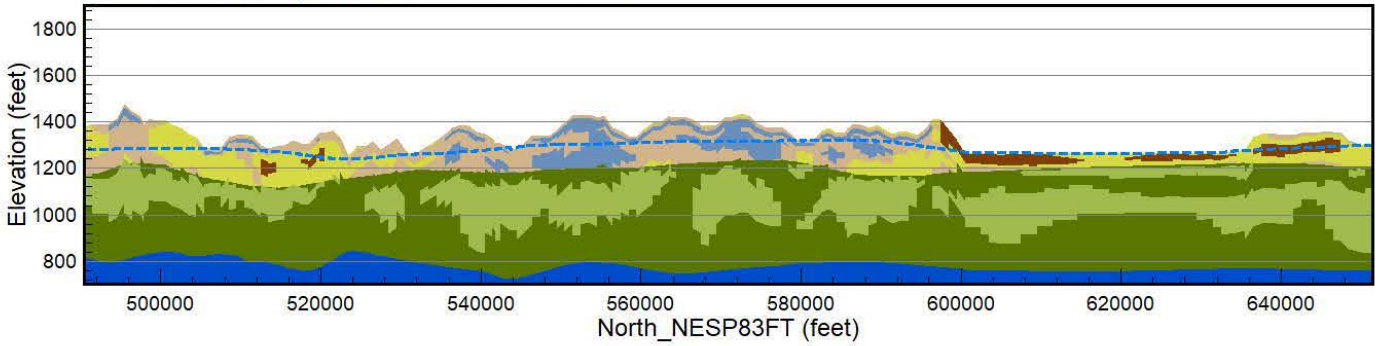
AEM Inversion Line L1004700



AEM Interpretation Line L1004700



AEM Voxel Interpretation Line L1004700



LOWER PLATTE NORTH Natural Resources District

ENWRA Eastern Nebraska Water Resources Assessment

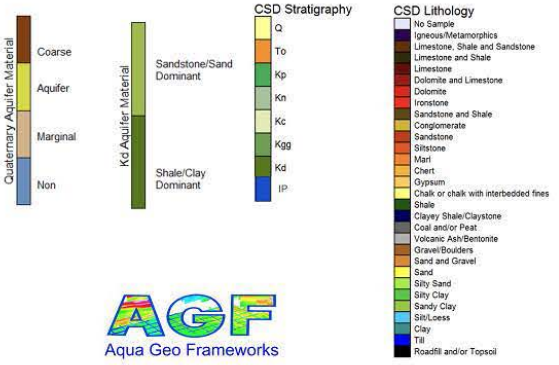
Results of the final inversion of Airborne Electromagnetic (AEM) data collected along flight lines within the Lower Platte North Natural Resources District (LPNNRD) June 22-July 14, 2018. The red line on the Flight Path Map (US Geological Survey 100K Topo) indicates the location of the data collection.

The AEM inversions shown are Spatially-Constrained using the Aarhus Geo Software Workbench version 5.8.3 in the indicated electrical resistivity color scale. Boreholes displayed on the AEM inversion profile are within ½ mile of the flight line are from the Conservation Survey Division (CSD) public website downloaded on September 9, 2018. Lithology and stratigraphy are indicated by the legends. Gray-dashed lines when visible on the AEM inversions profile indicate the estimated depth of investigation (DOI). White gaps in the AEM inversion profile indicate gaps in data coverage due to electromagnetic coupling or areas that were not flown due to infrastructure. To=Tertiary Ogallala Group estimated contact is represented by a dashed-black line. Solid-black lines on the AEM Inversion profile indicate interpreted stratigraphic contacts (Kp= Cretaceous Pierre Shale; Kn=Cretaceous Niobrara Formation; Kc= Cretaceous Carlile Shale; Kgg= Cretaceous Greenhorn Limestone and Graneros Shale; Kd= Cretaceous Dakota Group; and IP= undifferentiated Pennsylvanian formations/groups. The 1995 CSD water table is represented by a dashed blue line.

The AEM interpretation profiles shows Q=Quaternary materials classified into the four groups indicated by the legend. Gaps in the quaternary materials are due to electromagnetic coupling or areas that were not flown due to infrastructure. To=Tertiary Ogallala Group estimated contact is represented by a dashed-orange line. Cretaceous units as well as the undifferentiated Pennsylvanian are indicated as continuous formations and are colored as indicated in the legend. The depth extent of the profile is optimized to illustrate the Quaternary materials.

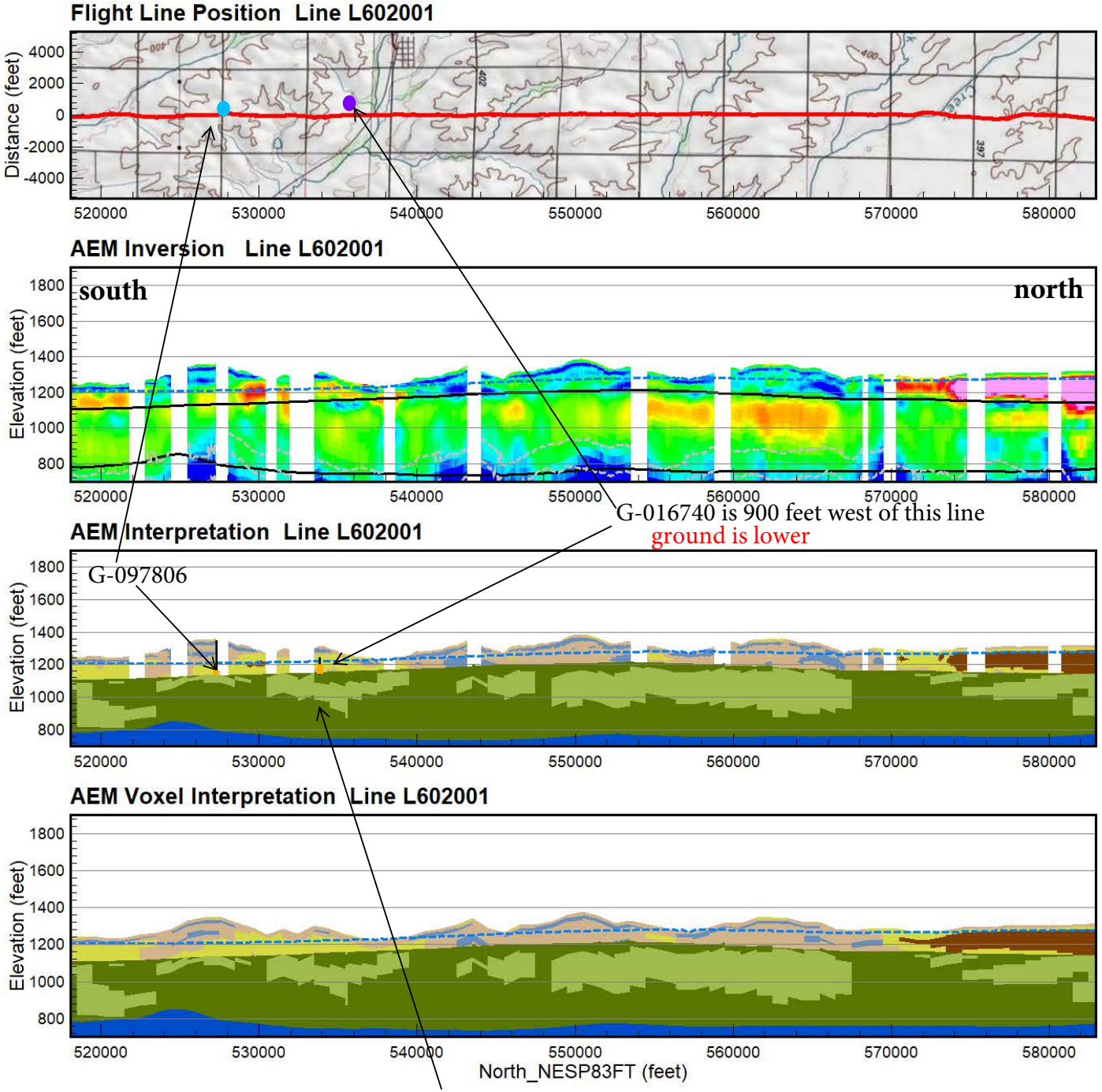
The AEM Voxel Interpolation Profile indicates a 1,000-foot cell size interpolation of the Quaternary materials classified into the four groups indicated by the legend. In addition to the interpreted 1,000-foot cell size interpolation, sand/sandstone-dominant sections of the Cretaceous Dakota Group are indicated in the legend.

Prepared for the LPNNRD and the Eastern Nebraska Water Resources Assessment (ENWRA) by Aqua Geo Frameworks., LLC.



AGF Aqua Geo Frameworks

South to North Flight Line through Section 26 T15N R6E 2 miles east of Site (well logs just for reference) with AEM - too far



LOWER PLATTE NORTH Natural Resources District

ENWRA Eastern Nebraska Water Resources Assessment

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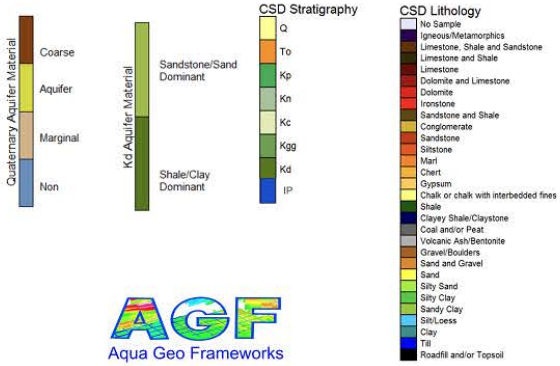
The AEM inversions shown are Spatially-Constrained using the Aarhus Geo Software Workbench version 5.8.3 in the indicated electrical resistivity color scale. Boreholes displayed on the AEM inversion profile are within ½ mile of the flight line are from the Conservation Survey Division (CSD) public website downloaded on September 9, 2018. Lithology and stratigraphy are indicated by the legends. Gray-dashed lines when visible on the AEM inversions profile indicate the estimated depth of investigation (DOI). White gaps in the AEM inversion profile indicate gaps in data coverage due to electromagnetic coupling or areas that were not flown due to infrastructure. To=Tertiary Ogallala Group estimated contact is represented by a dashed-black line. Solid-black lines on the AEM Inversion profile indicate interpreted stratigraphic contacts (Kp= Cretaceous Pierre Shale; Kn=Cretaceous Niobrara Formation; Kc= Cretaceous Carlile Shale; Kgg= Cretaceous Greenhorn Limestone and Graneros Shale; Kd= Cretaceous Dakota Group; and IP= undifferentiated Pennsylvanian formations/groups. The 1995 CSD water table is represented by a dashed blue line.

The AEM interpretation profiles shows Q=Quaternary materials classified into the four groups indicated by the legend. Gaps in the quaternary materials are due to electromagnetic coupling or areas that were not flown due to infrastructure. To=Tertiary Ogallala Group estimated contact is represented by a dashed-orange line. Cretaceous units as well as the undifferentiated Pennsylvanian are indicated as continuous formations and are colored as indicated in the legend. The depth extent of the profile is optimized to illustrate the Quaternary materials.

The AEM Voxel Interpolation Profile indicates a 1,000-foot cell size interpolation of the Quaternary materials classified into the four groups indicated by the legend. In addition to the interpreted 1,000-foot cell size interpolation, sand/sandstone-dominant sections of the Cretaceous Dakota Group are indicated in the legend.

Prepared for the LPNNRD and the Eastern Nebraska Water Resources Assessment (ENWRA) by Aqua Geo Frameworks., LLC.

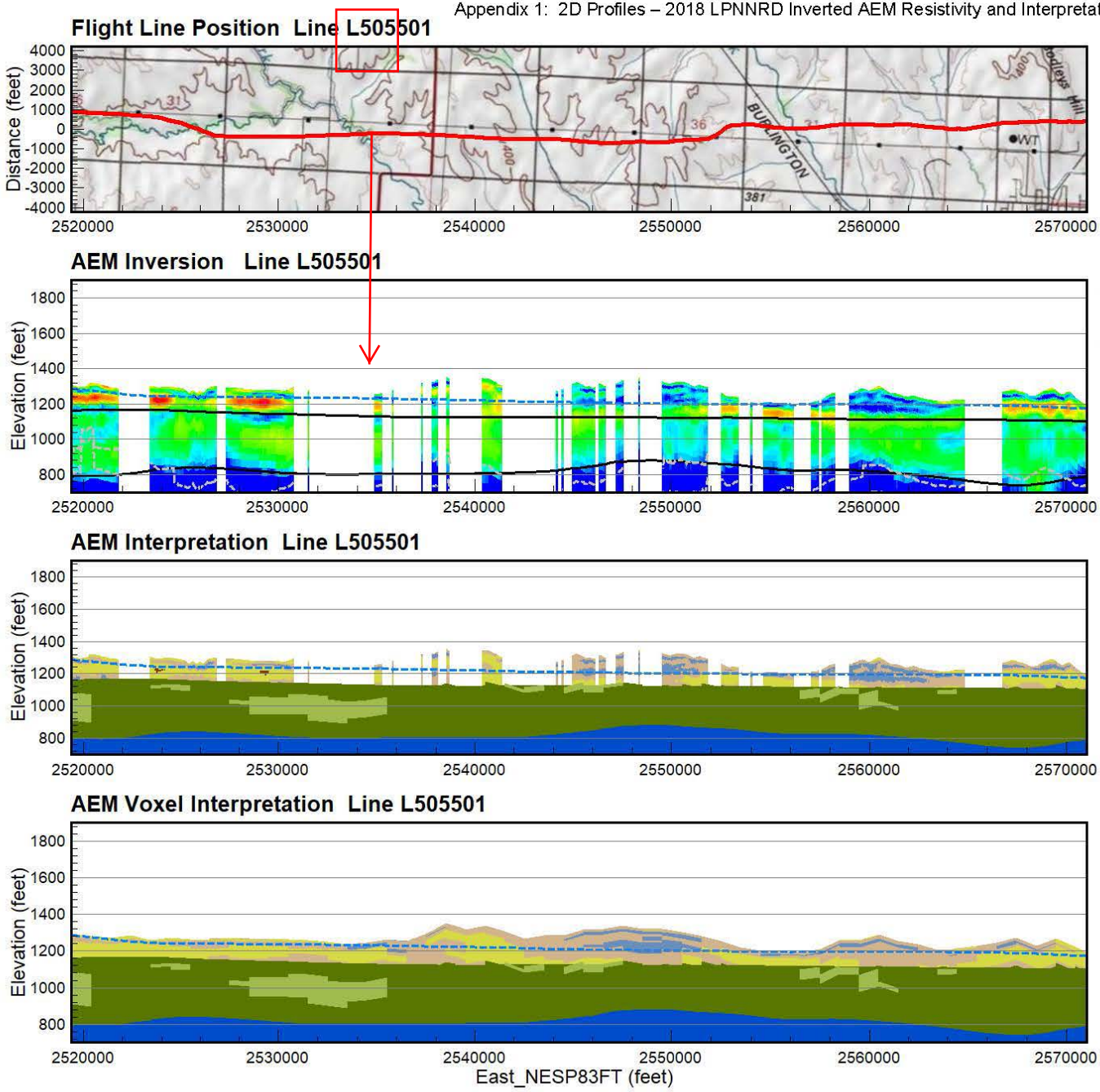


AGF Aqua Geo Frameworks

It appears that the sandstone dominant material in the Dakota is highly variable under Section 26.

West to East Flight Line through Section 33 T15N R6E 1/2 mile south of Site - too far

Appendix 1: 2D Profiles – 2018 LPNNRD Inverted AEM Resistivity and Interpretation



LOWER PLATTE NORTH Natural Resources District

ENWRA Eastern Nebraska Water Resources Assessment

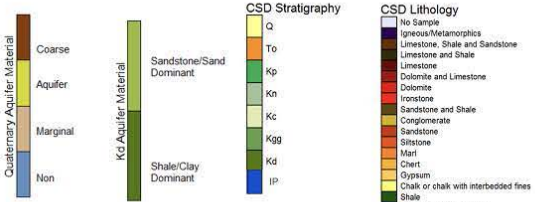
Results of the final inversion of Airborne Electromagnetic (AEM) data collected along flight lines within the Lower Platte North Natural Resources District (LPNNRD) June 22-July 14, 2018. The red line on the Flight Path Map (US Geological Survey 100K Topo) indicates the location of the data collection.

The AEM inversions shown are Spatially-Constrained using the Aarhus Geo Software Workbench version 5.8.3 in the indicated electrical resistivity color scale. Boreholes displayed on the AEM inversion profile are within ½ mile of the flight line are from the Conservation Survey Division (CSD) public website downloaded on September 9, 2018. Lithology and stratigraphy are indicated by the legends. Gray-dashed lines when visible on the AEM inversions profile indicate the estimated depth of investigation (DOI). White gaps in the AEM inversion profile indicate gaps in data coverage due to electromagnetic coupling or areas that were not flown due to infrastructure. To=Tertiary Ogallala Group estimated contact is represented by a dashed-black line. Solid-black lines on the AEM Inversion profile indicate interpreted stratigraphic contacts (Kp= Cretaceous Pierre Shale; Kn=Cretaceous Niobrara Formation; Kc= Cretaceous Carlile Shale; Kgg= Cretaceous Greenhorn Limestone and Graneros Shale; Kd= Cretaceous Dakota Group; and IP= undifferentiated Pennsylvanian formations/groups. The 1995 CSD water table is represented by a dashed blue line.

The AEM interpretation profiles shows Q=Quaternary materials classified into the four groups indicated by the legend. Gaps in the quaternary materials are due to electromagnetic coupling or areas that were not flown due to infrastructure. To=Tertiary Ogallala Group estimated contact is represented by a dashed-orange line. Cretaceous units as well as the undifferentiated Pennsylvanian are indicated as continuous formations and are colored as indicated in the legend. The depth extent of the profile is optimized to illustrate the Quaternary materials.

The AEM Voxel Interpolation Profile indicates a 1,000-foot cell size interpolation of the Quaternary materials classified into the four groups indicated by the legend. In addition to the interpreted 1,000-foot cell size interpolation, sand/sandstone-dominant sections of the Cretaceous Dakota Group are indicated in the legend.

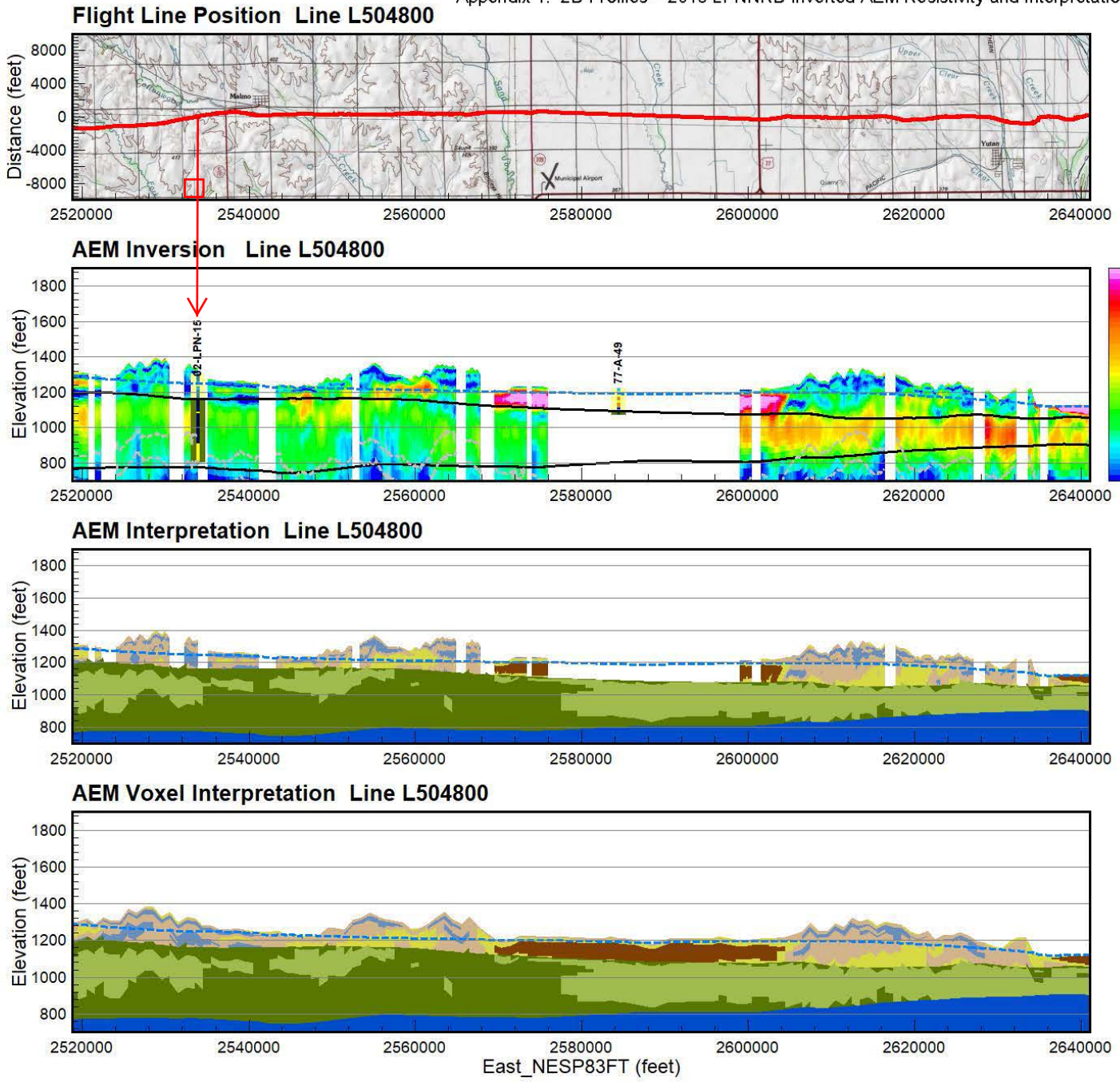
Prepared for the LPNNRD and the Eastern Nebraska Water Resources Assessment (ENWRA) by Aqua Geo Frameworks., LLC.



AGF Aqua Geo Frameworks

West to East Flight Line through Section 21 T15N R6E ~1 mile north of Site - too far

Appendix 1: 2D Profiles – 2018 LPNNRD Inverted AEM Resistivity and Interpretation



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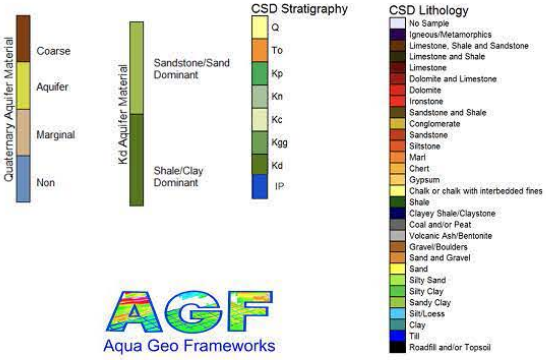


AGF Aqua Geo Frameworks

Return to Search Page

Nebraska Department of Natural Resources

Database Through: 8/16/2021

Processed: 8/16/2021 9:19:00 AM

Registration number G-100636

Note: Missing Data Indicates that the Information is Not Available Electronically.

Registration# Well ID Permit Number	Use Status	County Name NRD Name Well Location Footage Latitude Longitude	Completion Date Filing Date Decommission Date Times Replaced Online Registration ID (NOLID) Well Driller License Number	Acres Irrigated Gallons/Minute Static Level Pumping Level Series	Pump Column Diameter Pump Depth Well Depth
G-100636 WellID: 118393 View Scans	D - Domestic A - Active Registered Well	Saunders Lower Platte North 15N 6 32 NENE 300N 600E	3/22/1999 5/18/1999 --- 19153	--- 5 gpm 46 ft 120 ft PRO - Single Project	1 in 138 ft 148 ft

Owner ID	Name/Entity	Address	Address 2	City, State, Zip
62736	Melvin Prochaska	2411 County Road M		Malmo, NE 68040

Domestic Well in Section 32 just SW of site:

Geo Logs Print Friendly Geo Logs

FromDepth	ToDepth	Description
0 1355 elev	22	brown clay
22	36	sand
36	50	brown clay
50	60	gray clay
60	77	sandy clay
77 1278	86 1269	gravel
86	102	gray clay
102	115	fine sand to clay
115	122	gray sandy clay
122 1233	126 1229	sand
126	130	gray clay
130 1225	132 1223	sand
132	137	clay
137	148 1207	gravely clay

Casing and Screen Print Friendly Case Screens

FromDepth	ToDepth	CaseOrScreen	InsideDiam	OutsideDiam	Ca
0	78	casing	4		0.
78	88	screen	4	4.5	
88	128	casing			
128	148	screen			

Grout and Gravel Print Friendly Grout Gravel

FromDepth	ToDepth	GroutOrGravel	Mate
5	11	grout	Bento
75	95	gravel	
95	100	grout	Bento
100	148	gravel	

Return to Search Page

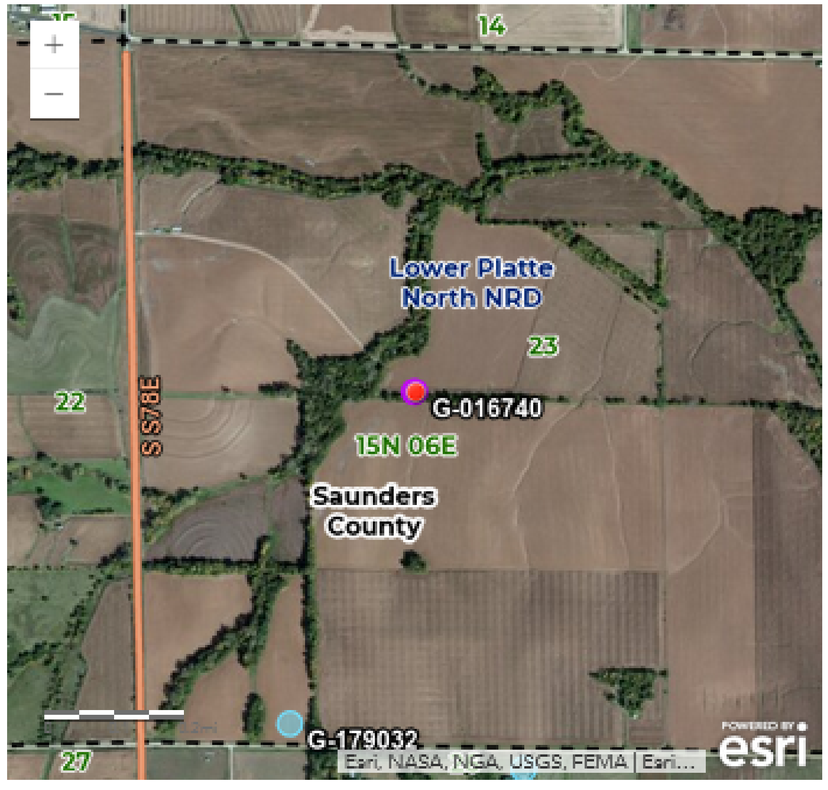
Nebraska Department of Natural Resources

Database Through: 8/16/2021

Processed: 8/16/2021 11:38:38 AM

Registration number G-016740

Note: Missing Data Indicates that the Information is Not Available Electronically.



Irrigation Well in Section 23 along L602001 NW of site just to compare with 2018 AEM (too far to be relavant):

Registration# Well ID Permit Number	Use Status	County Name NRD Name Well Location Footage Latitude Longitude	Completion Date Filing Date Decommission Date Times Replaced Online Registration ID (NOLID) Well Driller License Number	Acres Irrigated Gallons/Minute Static Level Pumping Level Series	Pump Column Diameter Pump Depth Well Depth
G-016740 WellID: 22530 View Scans	I - Irrigation A - Active Registered Well	Saunders Lower Platte North 15N 6 23 SENW 2620N 2140W	4/5/1957 12/30/1958 ---	40 1500 gpm 43 ft 50 ft PRO - Single Project	8 in --- 99 ft

Geo Logs Print Friendly Geo Logs

FromDepth	ToDepth	Description
0 1253	12	TOP SOIL
12	24	CLAY AND SAND
24	42	SAND
42 1211	100 1153	GRAVEL GOOD
100	100.1	CLAY

Casing and Screen Print Friendly Case Screens

Grout and Gravel Print Friendly Grout Gravel

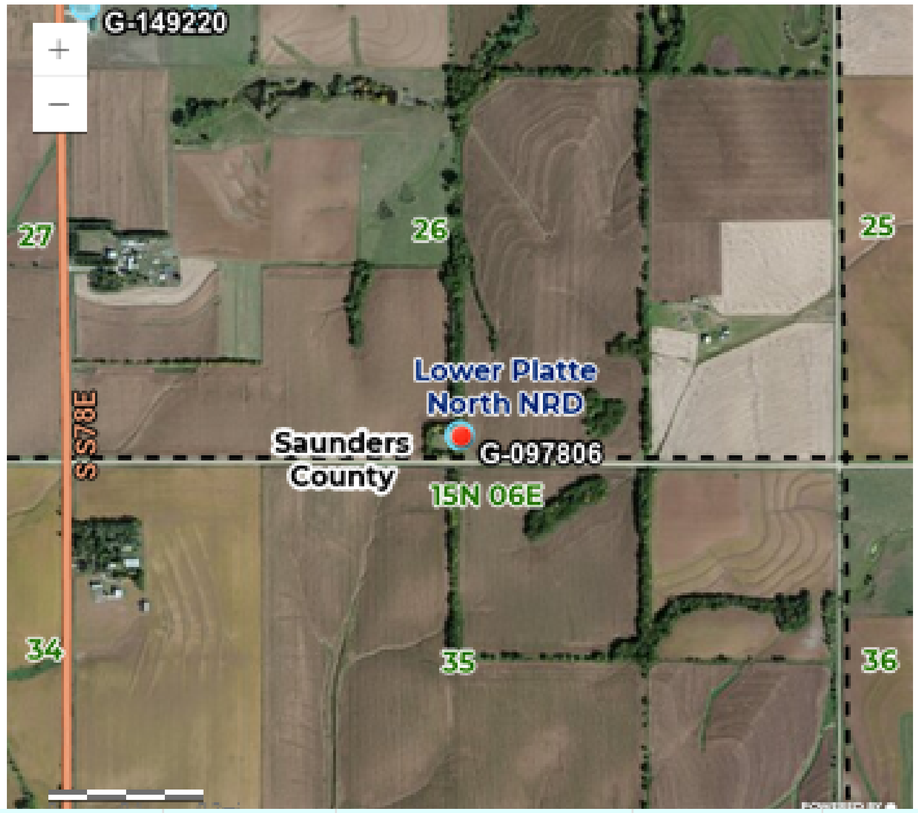
[Return to Search Page]

Nebraska Department of Natural Resources

Database Through: 8/16/2021
Processed: 8/16/2021 1:14:23 PM

Registration number G-097806

Note: Missing Data Indicates that the Information is Not Available Electronically.



Geo Logs Print Friendly Geo Logs

FromDepth	ToDepth	Description
0 1355	2	Topsoil
2	35	Brown Clay
35	45	Brown Clay with Limestone Present, Slightly Harder
45	55	Medium Yellow-Brown Clay
55	100	Medium Gray-Brown Clay
100	104	Reddish Gravel
104	117	Gray-Brown Clay
117	117.5	Sand, Thin Layer
117.5	121	Gray-Brown Clay Layer
121	137	Tight Sand, Coarse
137	148	Gravel
148	150	Clay Layer
150 1205	165	Coarse Sand & Gravel 1190
165	166	Clay Layer
166 1189	170	Coarse Sand & Gravel
170	206	Gravel, Nice 1149
206	211	Clay, Light Brown
211	215	Coarse Sand with Major Rocks

Registration# Well ID Permit Number	Use Status	County Name NRD Name Well Location Footage Latitude Longitude	Completion Date Filing Date Decommission Date Times Replaced Online Registration ID (NOLID) Well Driller License Number	Acres Irrigated Gallons/Minute Static Level Pumping Level Series	Pump Column Diameter Pump Depth Well Depth
G-097806 WellID: 114633 View Scans	D - Domestic A - Active Registered Well	Saunders Lower Platte North 15N 6 26 150S 2640E	6/19/1998 9/15/1998 --- 39221	--- 14 gpm 138 ft 150 ft PRO - Single Project	1 in 180 ft 208 ft

Owner ID	Name/Entity	Address	Address 2	City, State, Zip
61339	William McLochlin	3202 South 54th		Omaha, NE 68106

Casing and Screen Print Friendly Case Screens

FromDepth	ToDepth	CaseOrScreen	InsideDiam	OutsideDiam	CaseThickness
0	188	casing	4		0.25
20	208	screen	4	4.5	

Grout and Gravel Print Friendly Grout Gravel

FromDepth	ToDepth	GroutOrGravel	Material
7	11	grout	Chunk Bentonite
180	208	gravel	

Lower Platte North NRD Groundwater Development Areas: March 2018

Limited Development Area Within the Groundwater Control Area (Up to 200 New Acre Feet Per Year)

Limited Development Area Outside Groundwater Control Area (Up to 75 New Acre Feet Per Year)

Restricted Development Area (Potential For New Irrigated Acres Within One Mile of Border)

Special Quantity Subarea (Allocation on Groundwater Withdrawls/No New Irrigated Acres)

R6W R5W R4W R3W R2W R1W R1E R2E R3E R4E R5E R6E R7E R8E R9E R10E

T22N T21N T20N T19N T18N T17N T16N T15N T14N T13N

Newman Grove Lindsay Tarnov Platte Center Schuyler Rogers North Bend Morse Bluff Cedar Bluffs Fremont Leshara Linwood Bellwood Octavia Abie Prague Colon Bruno Malmo Yutan Mead Weston Wahoo Ithaca Memphis Ashland David City Richland

Boone Platte Colfax Dodge Butler Saunders

Geographic Features
- Towns
- Sections
- Counties
- Townships
- LPN Boundary

Quality Management Areas
- Bellwood Phase 2
- Richland Schuyler Phase 3

Quantity Management Areas
- SQS Areas
- Groundwater Control Area
- Restricted Development Area
- Outside Groundwater Control Area

Sources: Lower Platte North Natural Resources District, Nebraska Department of Natural Resources
04.02.2018
Created by: Chris Poole

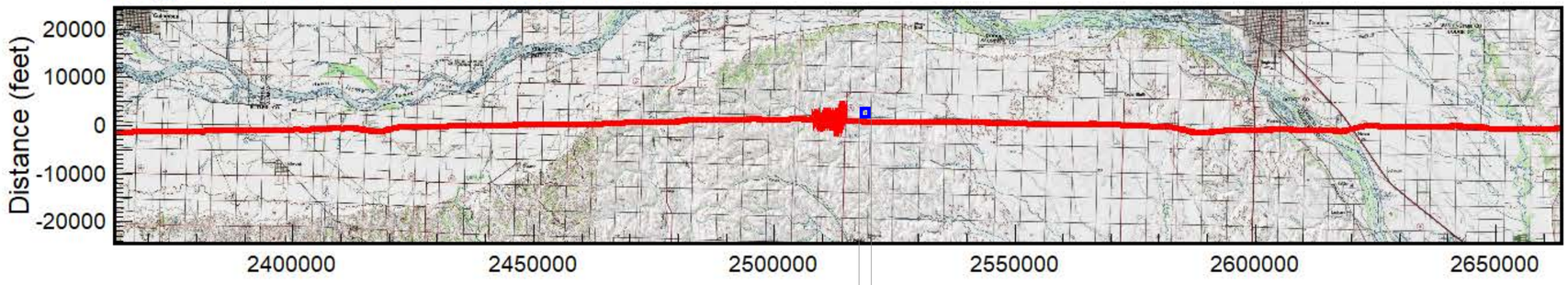
N

0 3 6 12 18 24 Miles

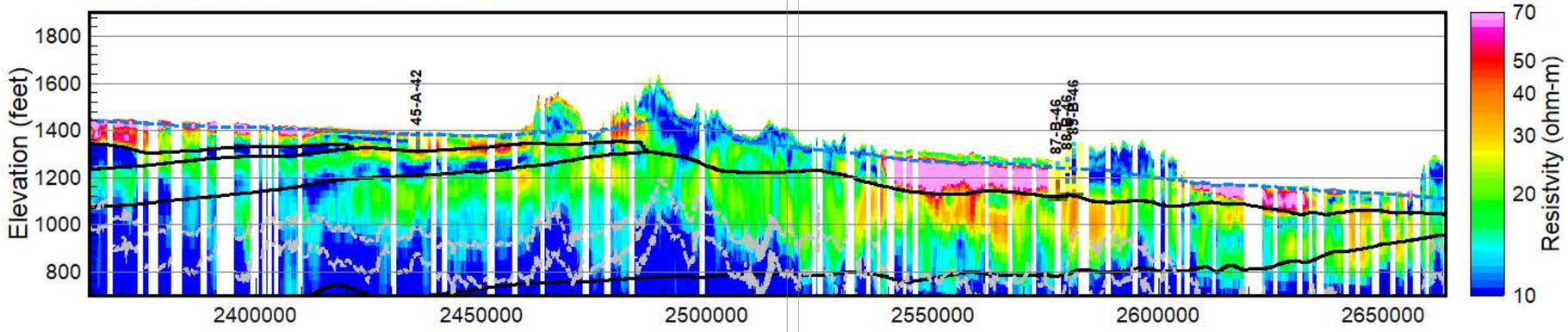
VarianceNumber	Applicant	ApplicationType	County	SubArea	RankingScore	Acres	Acre Feet	Twn	Rng	Dir	Section
LPN-V-021-0531	Chad Sukstorf	expansion	Saunders	Todd Valley	510.8	20	2.570	16	7	E	16
LPN-V-021-0550	Norman A Kavan, Jr	expansion	Saunders	Todd Valley	469.12	25	3.010	15	8	E	23
LPN-V-021-0557	Damaxco LLC	new	Dodge	North Bend	462.5	91	12.539	18	6	E	32
LPN-V-021-0548	John Gladem	new	Boone	Upper Newman Grove	459	135	12.010	22	5	W	17
LPN-V-021-0561	Norman A Kavan, Jr	expansion	Saunders	Todd Valley	456.26	25	4.681	16	7	E	23
LPN-V-021-0551	John B Ruzicka	expansion	Saunders	Todd Valley	453	15	2.850	16	7	E	33
LPN-V-021-0556	Roland D Kavan	expansion	Saunders	Morse Bluff	442.5	6	0.890	16	6	E	6
LPN-V-021-0534	KPM Farms LLC	new	Platte	Middle Shell Creek	434.7	137	17.640	19	2	W	22
LPN-V-021-0530	Jack W. Nagel	new	Saunders	Todd Valley	426.54	135	27.240	15	8	E	5
LPN-V-021-0536	University of Nebraska	new	Saunders	Todd Valley	414.4	25	3.290	14	9	E	19
LPN-V-021-0560	Laska Land LLC	expansion	Platte	Middle Shell Creek	410	12.38	2.181	19	3	W	9
LPN-V-021-0554	Tyler Mensik	new	Saunders	North Bend	405	63.44	12.470	17	6	E	27
LPN-V-021-0529	Cale Went	new	Platte	Middle Shell Creek	404.3	40	5.720	19	2	W	27
LPN-V-021-0535	Colleen Wachal	expansion	Colfax	Schuyler	396	15	2.750	17	2	E	16
LPN-V-021-0538	Brian Sanderson	expansion	Saunders	Todd Valley	396	226	39.560	16	8	E	20
LPN-V-021-0549	Gene O Novak	expansion	Colfax	Lower Shell Creek	394.2	65	13.060	18	3	E	33
LPN-V-021-0533	Larry & Jeanne Kurtenbach	expansion	Platte	Lower Newman Grove	393.1	10.169	1.530	20	4	W	26
LPN-V-021-0528	Conner Fujan	new	Saunders	Todd Valley	390.4	80	14.210	17	7	E	28
LPN-V-021-0558	Ken Korus	expansion	Platte	Platte Center	388.34	22	3.670	18	3	W	2
LPN-V-021-0559	Kristine J Kosch	new	Platte	Middle Shell Creek	387.64	34	4.139	19	2	W	15
LPN-V-021-0552	Hayden Sabatka	new	Saunders	Todd Valley	377	80	13.759	15	7	E	23
						1261.989	199.769				
LPN-V-021-0553	Gary Torczon	new	Platte	Middle Shell Creek	368.18	90	11.220	19	2	W	25
LPN-V-021-0555	Rolland Otte	new	Saunders	Morse Bluff	360	31.44	5.790	17	5	E	23
LPN-V-021-0541	Larry D Karloff Tree	new	Saunders	Yutan South	342.5	68	13.790	15	9	E	34
LPN-V-021-0532	Kent Lee	new	Madison	Upper Newman Grove	340.66	133	20.270	21	4	W	17
LPN-V-021-0540	Kody Karloff	new	Saunders	Yutan South	325	68	12.420	14	9	E	11
LPN-V-021-0537	Josh Faltys	expansion	Colfax	Lower Shell Creek	319	91	18.360	18	3	E	27
LPN-V-021-0539	Kody Karloff	new	Saunders	Todd Valley	315.4	68	12.701	14	9	E	14
LPN-V-021-0545	Roland D Kavan	new	Saunders	Morse Bluff	302.5	74	10.990	16	5	E	1
					Totals=	1885.429	305.310				
LPN-V-021-0546	Scott Loseke	expansion	Platte	Platte Center	265.68	130	23.300	19	2	W	33
LPN-V-021-0542	Jeffrey J. Brabec	new	Saunders	Prague	265	45	8.800	16	7	E	30
LPN-V-021-0543	Jeffrey J. Brabec	new	Saunders	Prague	252.5	45	9.720	15	7	E	29
LPN-V-021-0544	Jeffrey J. Brabec	new	Saunders	Prague	252.5	45	9.640	15	7	E	17
LPN-V-021-0547	Jeremy Janssen	expansion	Platte	Platte Center	249.7	34	7.158	18	2	W	10
						299	58.618				
						2184.429	363.928				

LPN-V-021-0526	Roland D Kavan	expansion	Saunders	Uplands	Morse Bluff	NHCA	401.8	10	2.25		36	17	5	E
LPN-V-021-0523	Douglas K Ritthaler	expansion	Saunders	Uplands	Leshara Uplands	NHCA	378.8	20	4.5		4	16	8	E
LPN-V-021-0520	Douglas K Ritthaler	expansion	Saunders	Uplands	Leshara Uplands	NHCA	335.2	14	3.15		26	17	7	E
LPN-V-021-0521	Douglas K Ritthaler	expansion	Saunders	Uplands	Leshara Uplands	NHCA	326.2	26.54	5.97		9	16	8	E
LPN-V-021-0522	Douglas K Ritthaler	new	Saunders	Uplands	Leshara Uplands	NHCA	320	84	18.9		15	16	8	E
LPN-V-021-0525	Randall Fendrich	expansion	Butler	Uplands	David City	NHCA	320	31	6.975		17	15	3	E
LPN-V-021-0527	Randy Robeson	new	Saunders	Uplands	Weston	NHCA/RDA	296	131	29.475		28	15	6	E
LPN-V-021-0524	Reichmuth Ag Real Estate LLC	expansion	Platte	Shell Creek	Lower Shell Creek	NHCA	251.4	19	4.275	60% HEL	18	18	1	E
							Total New Depletion		**41.745**					

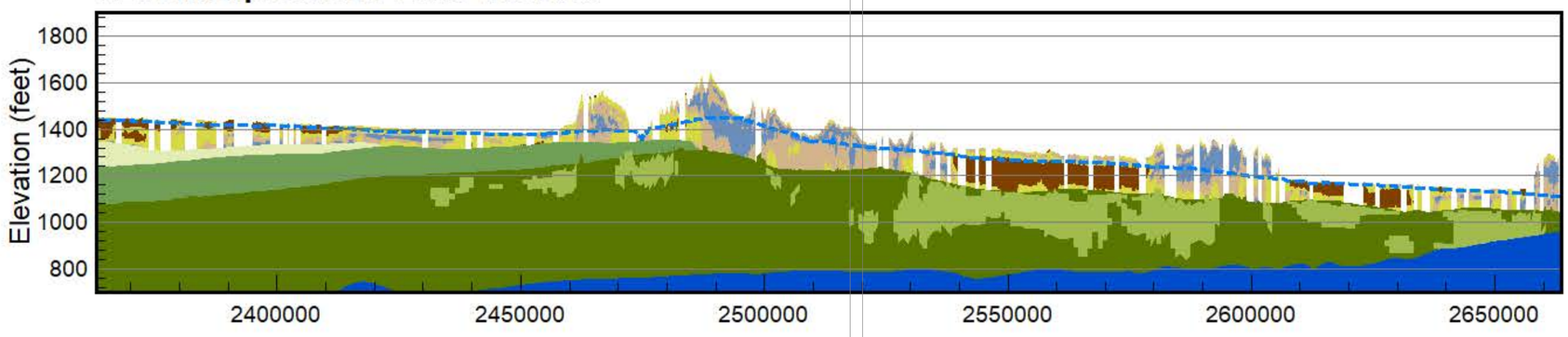
Flight Line Position Line L501500



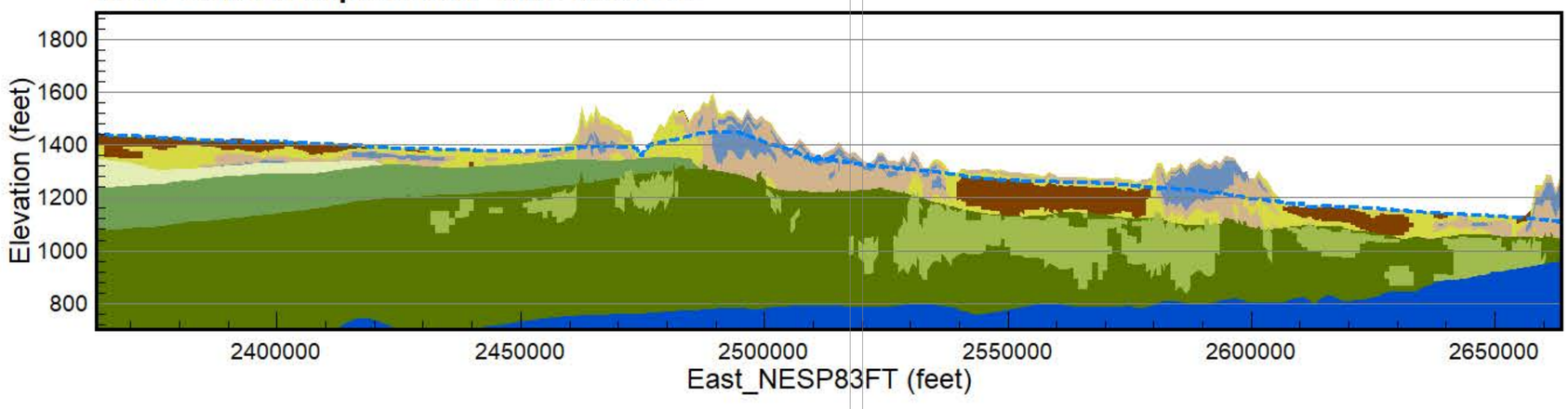
AEM Inversion Line L501500



AEM Interpretation Line L501500



AEM Voxel Interpretation Line L501500



LOWER PLATTE NORTH Natural Resources District

ENWRA Eastern Nebraska Water Resources Assessment

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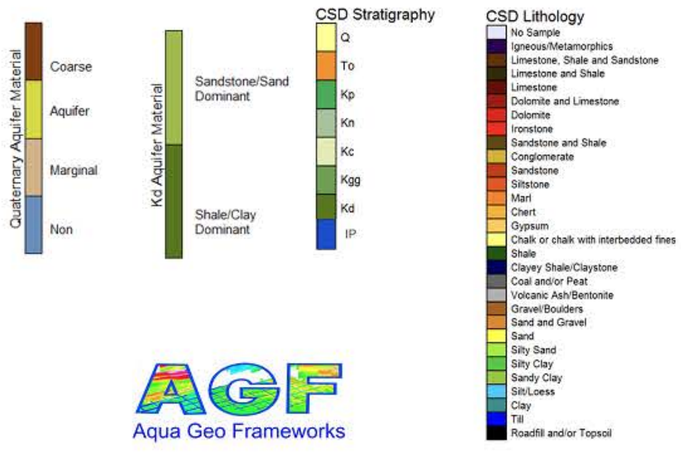
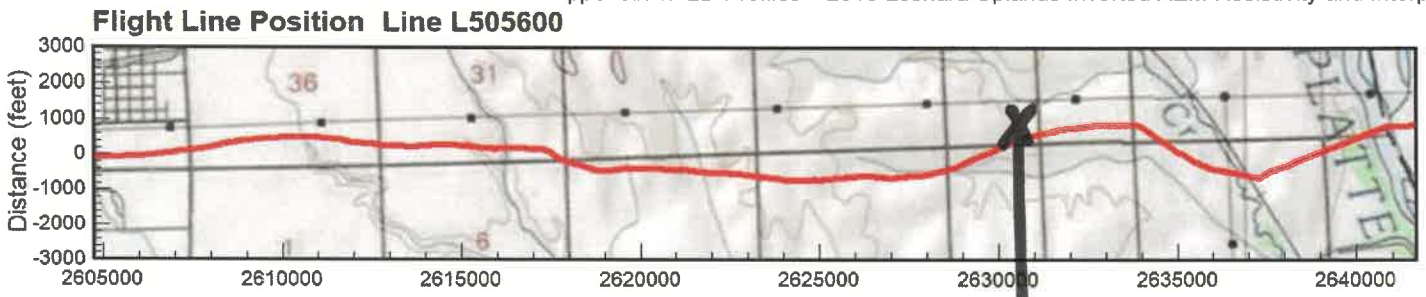
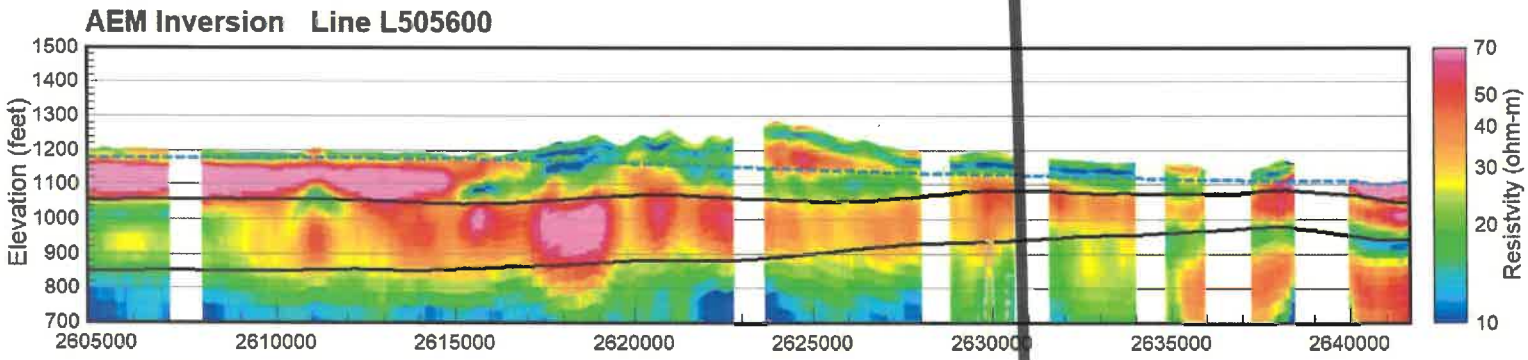
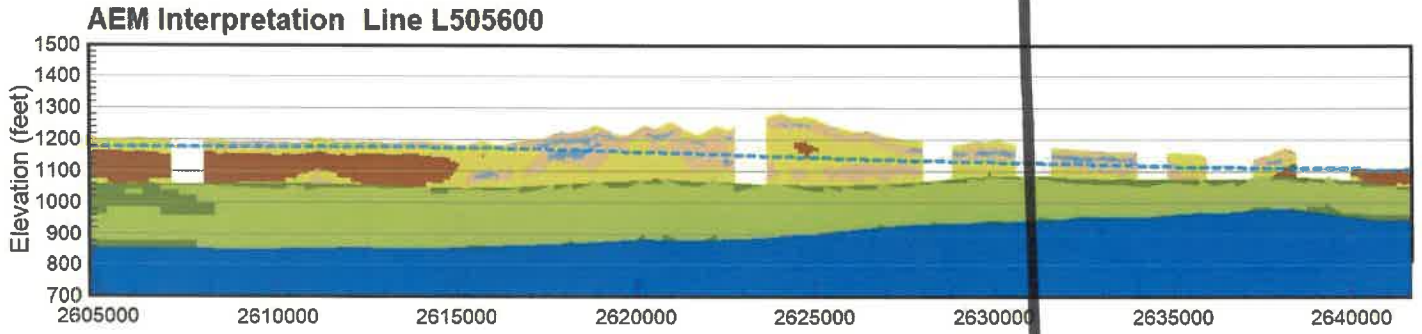
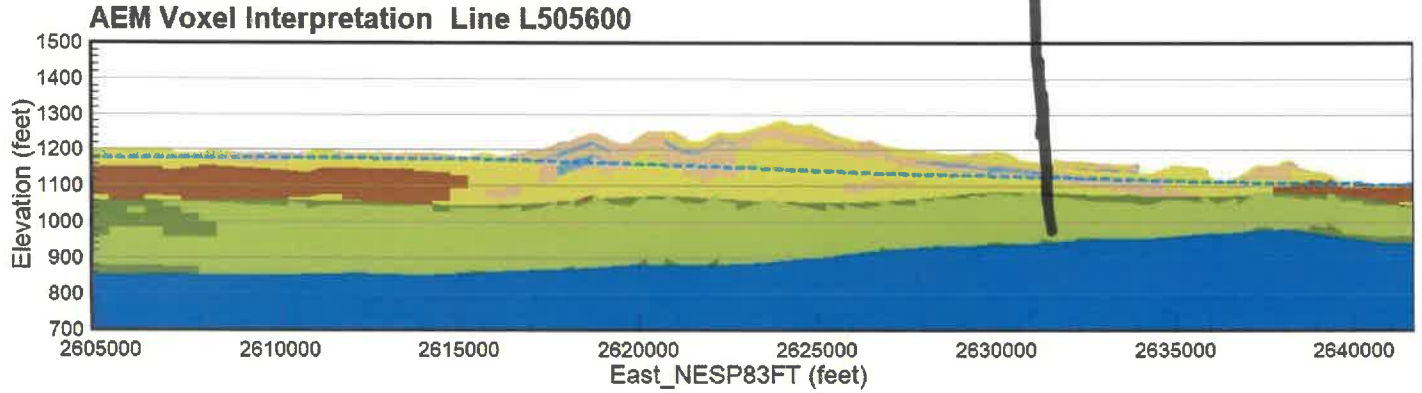


AGF Aqua Geo Frameworks









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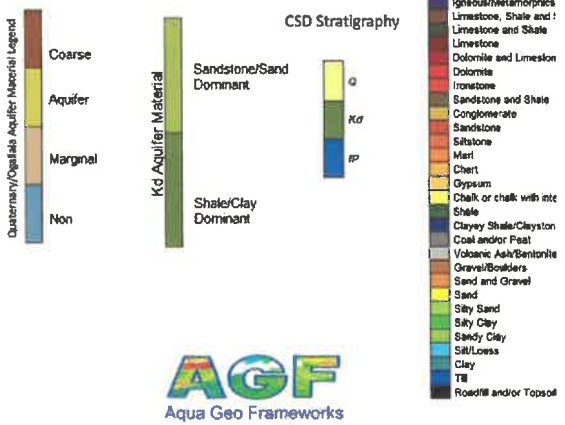
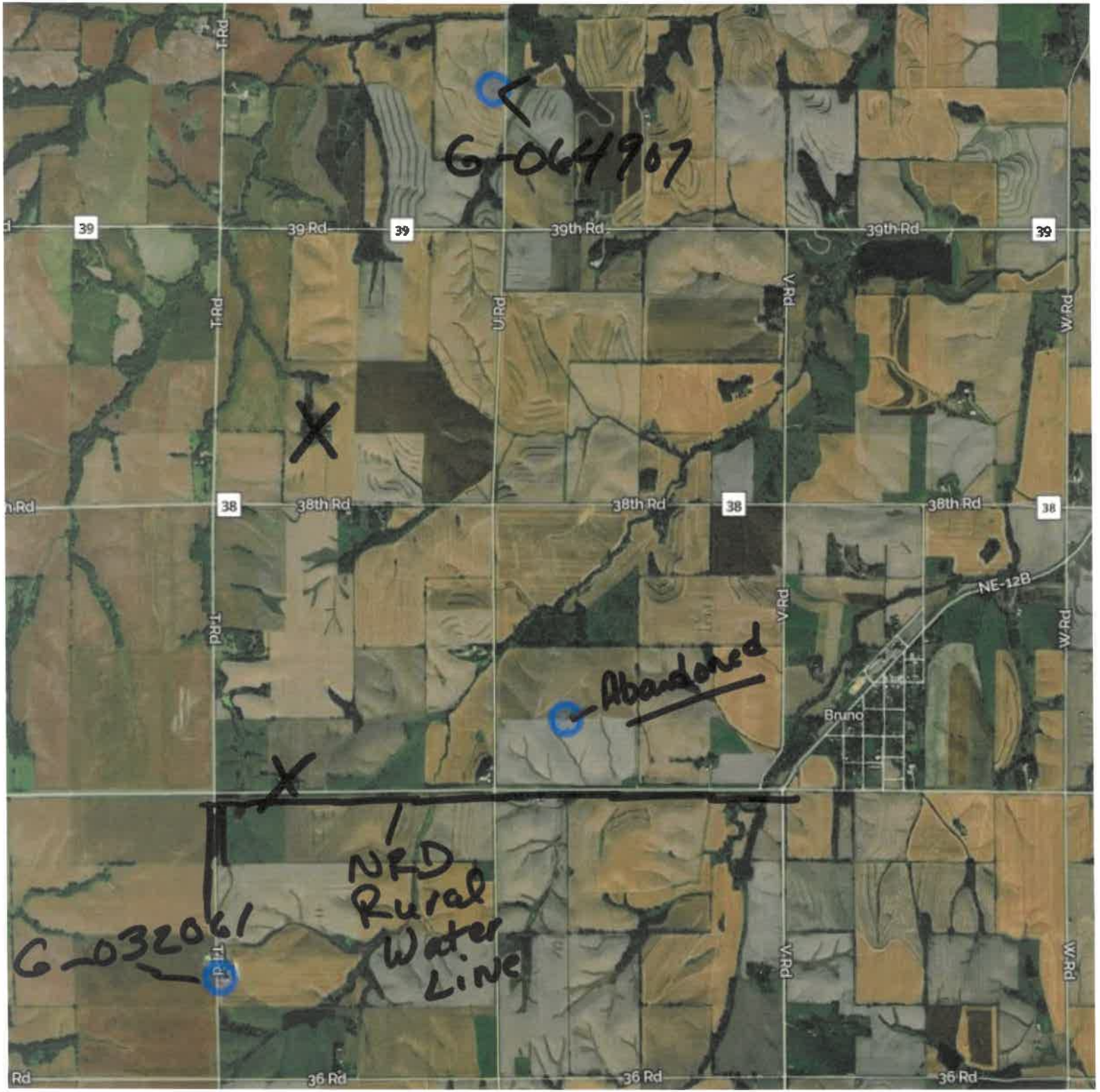
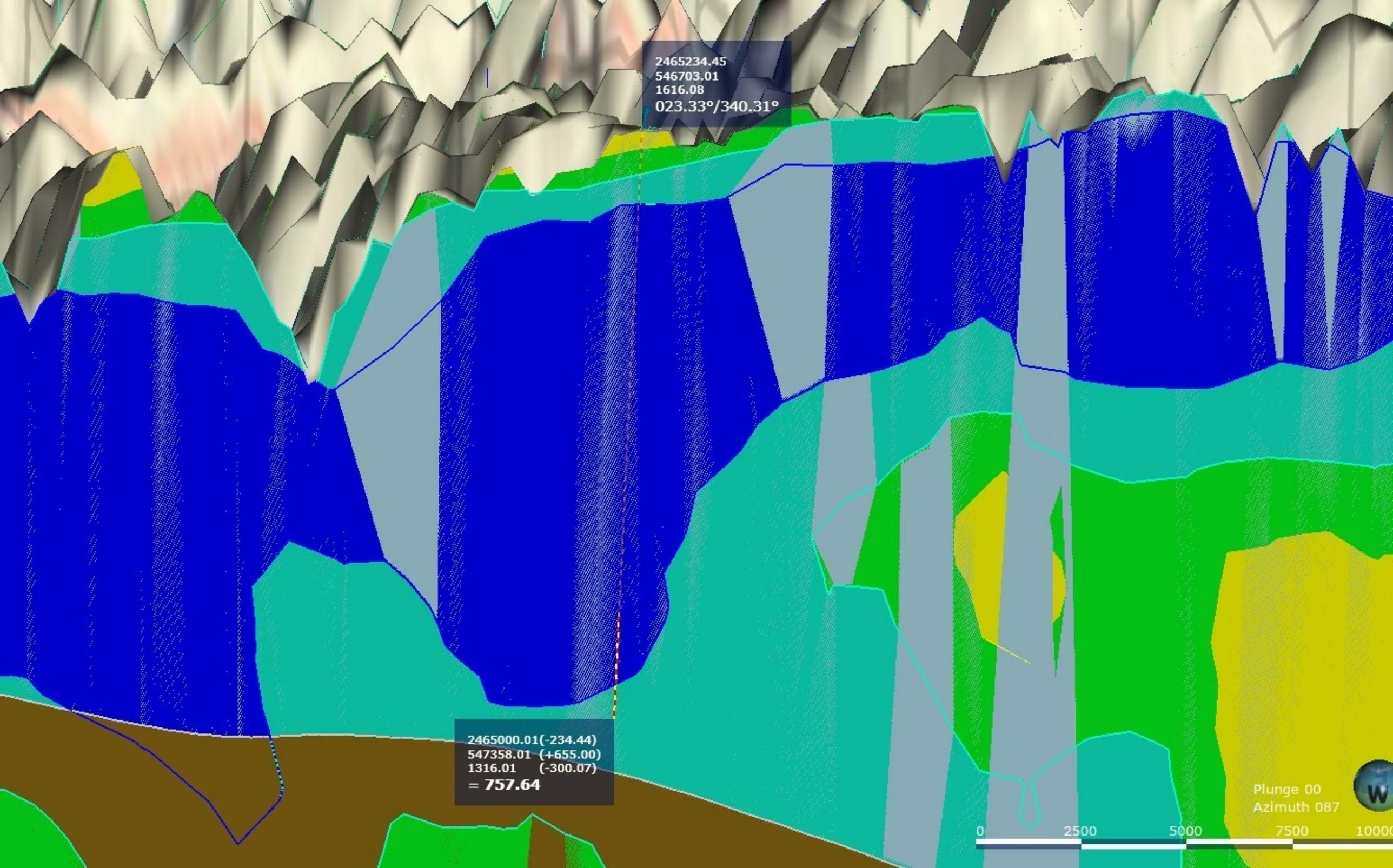
The AEM Voxel Interpolation Profile indicates a 500-foot cell s
interpolation of the Quaternary materials classified into the fou
groups indicated by the legend. In addition to the interpreted
500-foot cell size interpolation, sand/sandstone-dominant sec
of the Cretaceous Dakota Group are indicated in the legend.
Prepared for the LPNNRD and the Eastern Nebraska Water
Resources Assessment (ENWRA) by Aqua Geo Frameworks
LLC.



AGF
Aqua Geo Frameworks

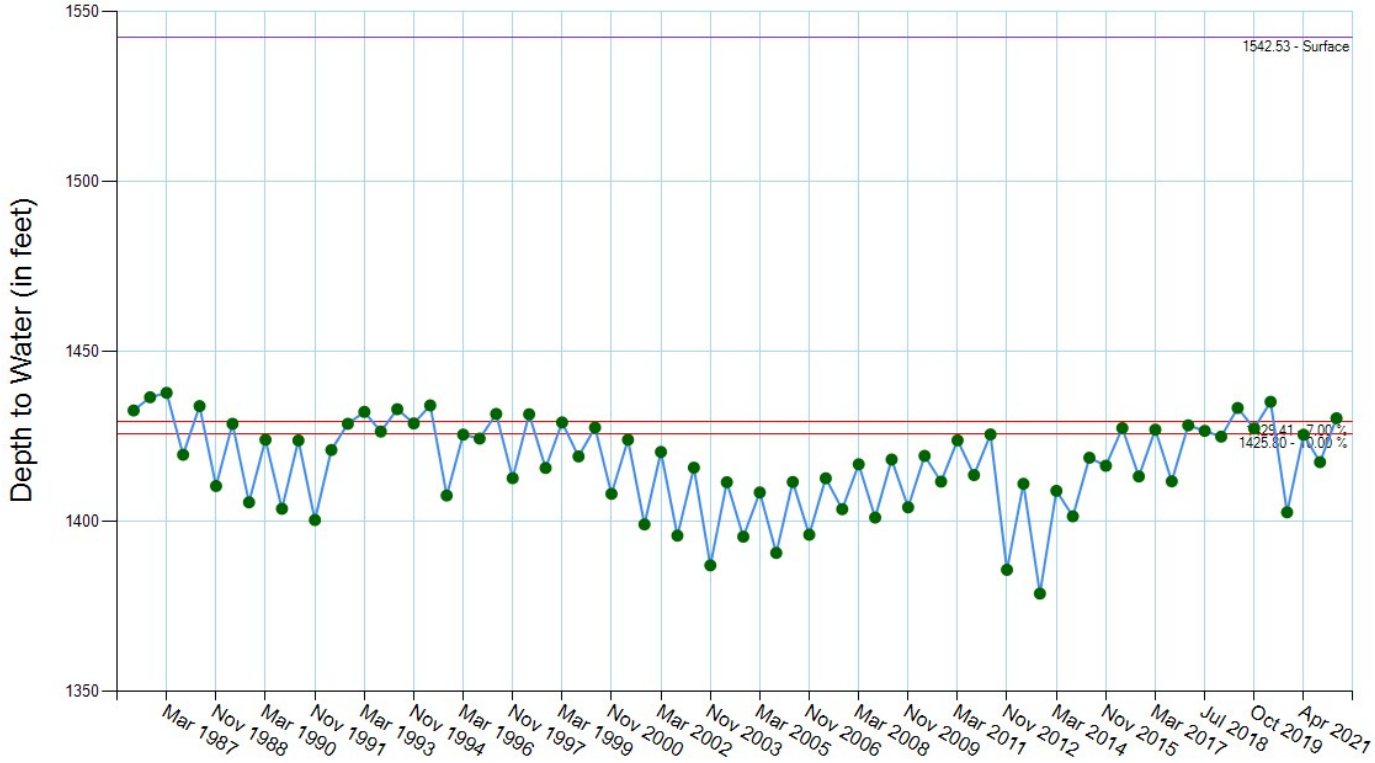

G-064907
39
39 Rd
39th Rd
T Rd
U Rd
V Rd
W Rd
38
38th Rd
NE-12B
Abandoned
Bruno
G-032061
NRD
Rural
Water
Line
36 Rd

Plunge +
Azimuth
0
5000
10000
15000
+2480958.50, +567844.33, +1460.04
Full Acceleration
39 FPS
Z-
8:40

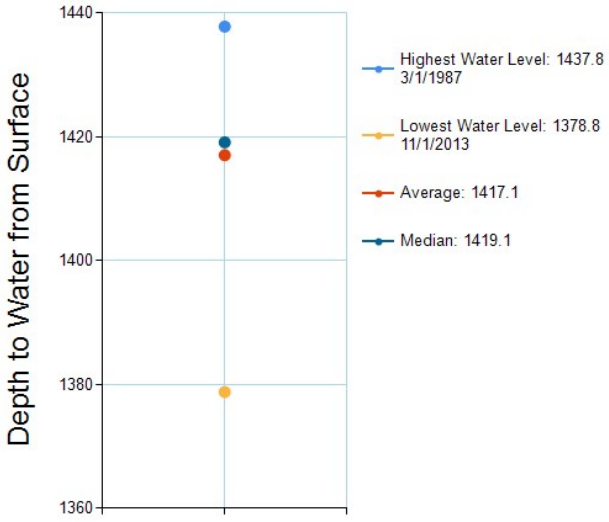

2465234.45
546703.01
1616.08
023.33°/340.31°
2465000.01(-234.44)
547358.01 (+655.00)
1316.01 (-300.07)
= 757.64
Plunge 00
Azimuth 087
0
2500
5000
7500
10000

RegCD: G-064907 **Well #:** UP-14A SWN 20
Region: Uplands **County:** Butler
Legal: 16-4E-32 **Owner Name:** Terry Vavrina

Water Level Readings



Record Results



Historical Readings (date - reading)

11/01/1985 - 1432.6	11/01/1995 - 1407.6	11/01/2004 - 1395.5	03/01/2014 - 1409
03/01/1986 - 1436.5	03/01/1996 - 1425.5	03/01/2005 - 1408.5	11/01/2014 - 1401.5
03/01/1987 - 1437.8	11/01/1996 - 1420.9	11/01/2005 - 1390.7	03/01/2015 - 1418.7
11/01/1987 - 1419.6	11/01/1996 - 1427.8	03/01/2006 - 1411.6	11/01/2015 - 1416.4
03/01/1988 - 1433.9	03/01/1997 - 1431.6	11/01/2006 - 1396.1	03/01/2016 - 1427.5
11/01/1988 - 1410.4	11/01/1997 - 1412.7	03/01/2007 - 1412.7	11/01/2016 - 1413.2
03/01/1989 - 1428.7	03/01/1998 - 1431.5	11/01/2007 - 1403.6	03/01/2017 - 1427
11/01/1989 - 1405.6	11/01/1998 - 1415.7	03/01/2008 - 1416.8	10/24/2017 - 1411.8
03/01/1990 - 1424	03/01/1999 - 1429.1	11/01/2008 - 1401.1	03/21/2018 - 1428.3
11/01/1990 - 1403.7	11/01/1999 - 1419.1	03/01/2009 - 1418.2	07/24/2018 - 1426.6
03/01/1991 - 1423.8	03/01/2000 - 1427.6	11/01/2009 - 1404.2	10/19/2018 - 1424.9
11/01/1991 - 1400.4	11/01/2000 - 1408.1	03/01/2010 - 1419.3	03/28/2019 - 1433.4
03/01/1992 - 1421	03/01/2001 - 1424	11/01/2010 - 1411.7	10/22/2019 - 1427.4
11/01/1992 - 1428.7	11/01/2001 - 1399.1	03/01/2011 - 1423.9	03/24/2020 - 1435.2
03/01/1993 - 1432.2	03/01/2002 - 1420.4	11/01/2011 - 1413.6	10/30/2020 - 1402.7
11/01/1993 - 1426.4	11/01/2002 - 1395.8	03/01/2012 - 1425.6	04/01/2021 - 1425.5
03/01/1994 - 1433	03/01/2003 - 1415.8	11/01/2012 - 1385.8	10/20/2021 - 1417.4
11/01/1994 - 1428.8	11/01/2003 - 1387.1	03/01/2013 - 1411.1	03/18/2022 - 1430.4
03/01/1995 - 1434.1	03/01/2004 - 1411.5	11/01/2013 - 1378.8	

Revised April 1967
Irr. 57-1

1

Registration No. G-32061 County of ..... Date Filed October 16, 1969

STATE OF NEBRASKA
IRRIGATION WELL REGISTRATION

I, ERNEST YINDRICH (Name of Person registering well) of DAVID CITY (Postoffice Address)

County of BUTLER State of NEBRASKA, do hereby certify:

1st. That the name of the owner of the land upon which the irrigation well is located is ERNEST YINDRICH, of Street, DAVID CITY (City or Village) County of BUTLER State of NEBRASKA

2nd. That the irrigation well is located on the W½ N½ Quarter of the SW¼ Quarter of Section 17 Township 15 5, Range 4 of the Sixth P. M., Butler County, and is 60 feet from the WEST line and 490 feet from the SOUTH line of said tract.

3rd. That the well was installed with the intention of irrigating all or parts of the following described land: W½ N½ SW¼ 17 15 4 (Give Quarter, Section, Township and Range)

amounting in all to approximately 70 acres.

(If installation consists of a battery of wells with one outlet, give details on a sheet to be attached hereto.)

4th. That the capacity of said well under normal operating conditions is 1000 gallons per minute.

5th. That the depth of the well is 382 feet, measured from the surface of the ground.

6th. That the inside diameter of the casing is 17 inches.

7th. That the static water level in the well is 265 feet below ground surface.

8th. That the depth to water under normal pumping conditions is 305 (Pumping Level) feet below ground surface.

9th. That the diameter of the pump column is 8 inches. That the diameter of the 9 (Give number of bowls) bowl or bowls is 10 D inches.

10th. That the type and size of impeller is as follows:

9 STAGE 10 D H IMPELLER

11th. That the well was completed on or about the 10 day of OCTOBER, 19 68.

Revised April 1, 1966
Irr. 67-3

Registration No. G-32061 County of ..... Date Filed October 16, 1969

STATE OF NEBRASKA
CERTIFICATE OF WELL DRILLER

I, WILLIAM STYSKAL (Name of Driller) of EXETER (Postoffice Address)

County of FILLMORE State of NEBRASKA, do hereby certify that:

1. I am the driller of a well located on the W½ N½ SW¼ Quarter, Section No. 17 Township 5 North, Range 4, owned by ERNEST YINDRICH whose postoffice address is DAVID CITY State of NEBRASKA.

2. That the drilling was begun on the 26 day of SEPTEMBER, 19 68, and completed on the 10 day of OCTOBER, 19 68.

3. That the well is cased and screened in the following manner: (Give kind of casing, lengths and position of plain and screen casing, weight of metallic casing, etc.)

4. That the diameter of drilled hole is 32 inches.

5. That REVERSE HYDRAULIC type of drilling machinery was used.

6. That the drilled hole is/is not sealed, as follows: GRAVEL PACKED

7. That the following is an accurate log of the depth, thickness and character of the different strata penetrated, and the location of water-bearing strata:

DEPTH IN FEET FROM	TO	MATERIAL DRILLED	FROM	TO	MATERIAL DRILLED
0	100	CLAY	286	320	BLUE CLAY
100	115	HARD WHITE CLAY	320	345	GRAVEL
115	120	HARD BLUE CLAY	345	348	CLAY
120	150	SOFT BLUE CLAY	348	352	FINE SAND
150	164	SOFTBLUE CLAY	352	378	GRAVEL
164	205	BROWN CLAY	378	382	WHITE CLAY
205	247	FINE SAND			
247	252	CLAY			
257	286	FINE SAND			

Date Signed 10-16-69 William Styskal (Driller)

(If more space is required please use reverse side of this page.)

12th. That attached hereto are three copies of the log of the well certified to by the driller of the well.

13th. That the driller of this well is WILLIAM STYSKAL, whose address is EXETER, NEBRASKA.

14th. That the name of the tenant or operator, if other than the owner, is ....., whose address is .....

15th. That the relation which the subscriber to this instrument bears to said registrant is that of .....

(State whether owner, tenant or agent for land on which well is located)

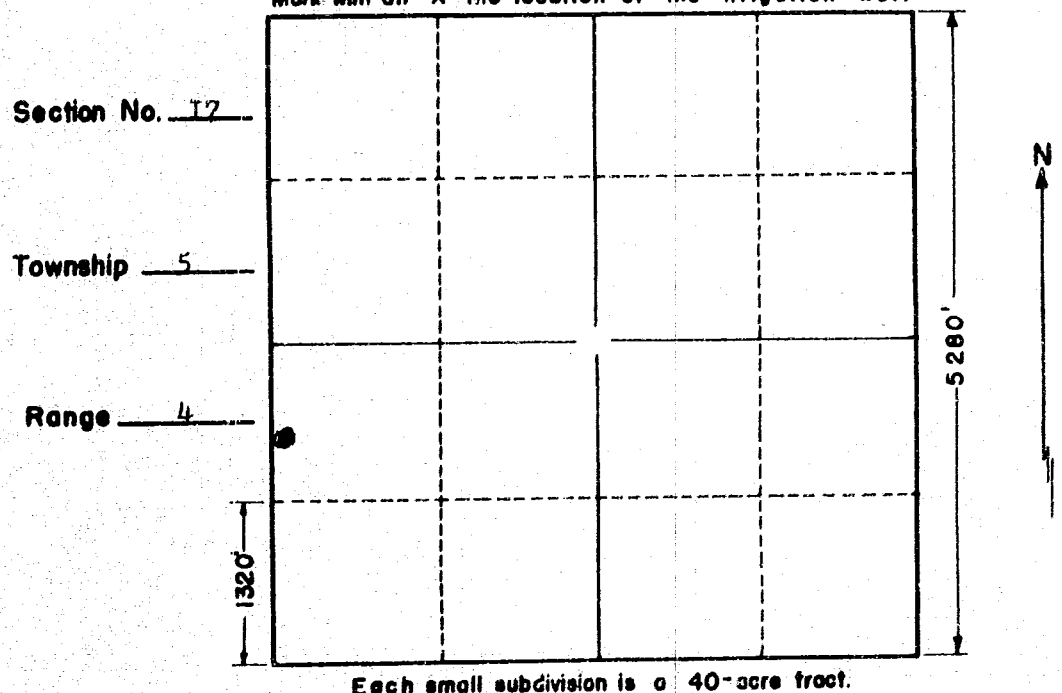
and that he is authorized to sign this instrument in behalf of the interest affected.

Signed: Ernest Gmdsicls

Dated: Oct 10 69

This drawing represents one Section

Mark with an "X" the location of the irrigation well



Each small subdivision is a 40-acre tract.

State of Nebraska
Department of Water Resources } ss.

This instrument was filed for record at 8:15 o'clock A. M., on the 16th day of October 19 69

Dan S. Smith, Jr.
Director of Water Resources

Well Registration or Area Permit

Fee Paid: $110.00 HHSS Fee: $70.00
DNR Cash Fund: $18.50 WWDF: 21.50
Billing ID: 37037

Source:	Nebraska On Line	Import Status:	Accepted	Use:	Irrigation	Owner ID:	108247
Import ID:	135281489627724	Status:	Suspense (Replacement well, original well not yet abandoned)	Decommission Date:	__	Registration Number:	G-064907
Well ID:	218174	NRD:	Lower Platte North			Registration Date:	11/29/2012
Last Change User:	hsparks	Call Up Code:	__	Call Up Date:	__	Last Change Date:	11/29/2012

Owner:

Select Contact

	ContactID	Type	SeqNum	Begin Date	End Date	Name	
Edit	Display 108247	Owner	1	11/29/2012		Vavrina Farms Inc, Terry	Delete

Contractor:

Certificate ID	FirstName	LastName
39221	James R	Minarick

Drilling Firm:

	EmployerID	Employer
Delete	159451	Webster Well Services, Inc

A. Well Location: NE1/4SE1/4 of Section 32
Township 16 North, Range 4 (East E/W), Butler County
B. Natural Resource District: Lower Platte North

	Latitude	Longitude	
Well GPS Coordinates:	41° 18' 51.54''	-096° 59' 11.04''	GPS Required
Lat/Long DD	41.31432	-96.98640	

C. The well is: 2644 feet from the S Section line and 236 feet from the E section line.
D. Street address or block, lot and subdivision: Addr/Sub Div __ Block No __ Lot __
E. Location of water use, if applicable (give legal description): SE32-16-4E
G. Well reference letter(s) if applicable: __

Well In A Series

Well Part of a Series with Site Plan: No

Series	# of Wells	Reg Total #	Wells Acres	Acres Cert	NRD Appr	StartDate	EndDate	Comment	Series Reg Num (External Source)	Code	Description
216838			66.79	No	No	7/30/2012				PRO	Single Project

Wells in the Series

WellID	RegCD	StartDate	EndDate
218174	G-064907	7/30/2012	

Permits

			Aprvd Date(s)			Aprvd Date(s)
Area Permit	LPN-	0121274	7/16/2012	SWater App Code	__ __	__
GeoPermit	__	__	__	Industrial	__ __	__
MWF	__	__	__	Transfer	__ __	__
WSP	__	__	__	Swater Conduct Code	__ __	__
HHSS		__		Other	__	__
HHSS PWS ID		__		ITN	__	__
NDEQ		__				

5. Purpose of Well Irrigation
Other Use __
Notes __

7. Replacement well information. Well Considered a replacement by NRD(WellID, RegCD)

A. Is this well a Replacement well? Yes Repl No 1 NRD Approval Date __ Well Replacement Reg CD
B. Registration number of abandoned well: G-064907 If not registered, date abandoned well was constructed __
C. Abandoned well last operated 9/15/2011 D. Replacement well is 20 feet from abandoned well.
E. Original well pump column size: __ inches.
F. [X] Original water well decommissioned 8/2/2012
[ ] I hereby certify that the original water well will be decommissioned within 180 days after such construction of the replacement water well.
[ ] I hereby certify that the original water well will be modified and equipped to pump 50 gallons per minute or less within 180 days after such construction of the replacement water well.
[ ] Livestock
[ ] Monitoring
[ ] Observation

[ ] Nonconsumptive or de minimus use approved by the applicable natural resources district. __

[ ] Decommission/Modification certification form is submitted by landowner (Must be submitted before registering well)

G. Location of water use of original well: SE 32-16-4E

Decommission Information

Decommission Date: __ By

8. Pump Information.

A. Is Pump installed at this time? Yes

Pump present but Well Inactive: No

Free Flowing Well: No

Well active, no pump installed: No

B. License No.

CertificateID	FirstName	LastName	Employer
39221	James R	Minarick	Webster Well Services, Inc

C. Pumping Rate 800 gallons per minute.

D. Pumping water level 175 feet.

E. Drop pipe diameter 8 inches.

F. Length of pipe 210 in feet.

G. Pump equipment installed: 7/31/2012

H. Pump Brand/Type 7STG 12CH FULL DIA.

I. This well wll be used to pump less than 50 gpm? No

9. Well Construction Information

A. Total well depth: 225 feet.

B. Static water level 140 feet.

C. Well Construction began: 7/27/2012

D. Well Construction Completed: 7/30/2012

E. Bore hole diameter in inches. Top 26 Bottom 26

F. Casing and Screen Joints are: Glued

Other Joints description: __

H. Total Estimate Capacity of Well 1200 gallons per minute.

I. Pumping water level at capacity: 190 feet.

10. Well Construction (Casing & Screen) - c, d, e & f measurements should be in inches to three decimal places

Record Count = 3

WellID	FromDepth*	ToDepth*	Case/Screen	InsideDiam	OutsideDiam	CaseThickness	ScrnSlotSize	Material	ScreenTname
218174	0	170	casing	15	16	0.5		PVC SDR26	PW
218174	170	190	screen	15	16	0.5	0.035	PVCSDR26	ROBERTS
218174	190	225	screen	15	16	0.5	0.05	PVCSDR26	PW

* are in Feet, all else is in inches

11. Grout and Gravel Pack

Record Count = 2

WellID	FromDepth	ToDepth	Grout/Gravel	Material Description[1]	Quantity Gravel[2]	Volume &Type Grout[3]
218174	0	10	grout	CHUNK BENTONITE		22.5CUFT
218174	10	225	gravel	80% #10	484 CUFT	

* are in Feet, all else is in inches

[1]Description of gravel pack, i.e. engineered gravel pack, or gravel pit description (1/4 down) or brand name (best sand) natural formation, drilling cuttings, soil backfill

[2]Quantity #cubic yards, #Tons, #Sacks - (for drilling cuttings and soil backfill estimate quantity) Calculation assistance available on web

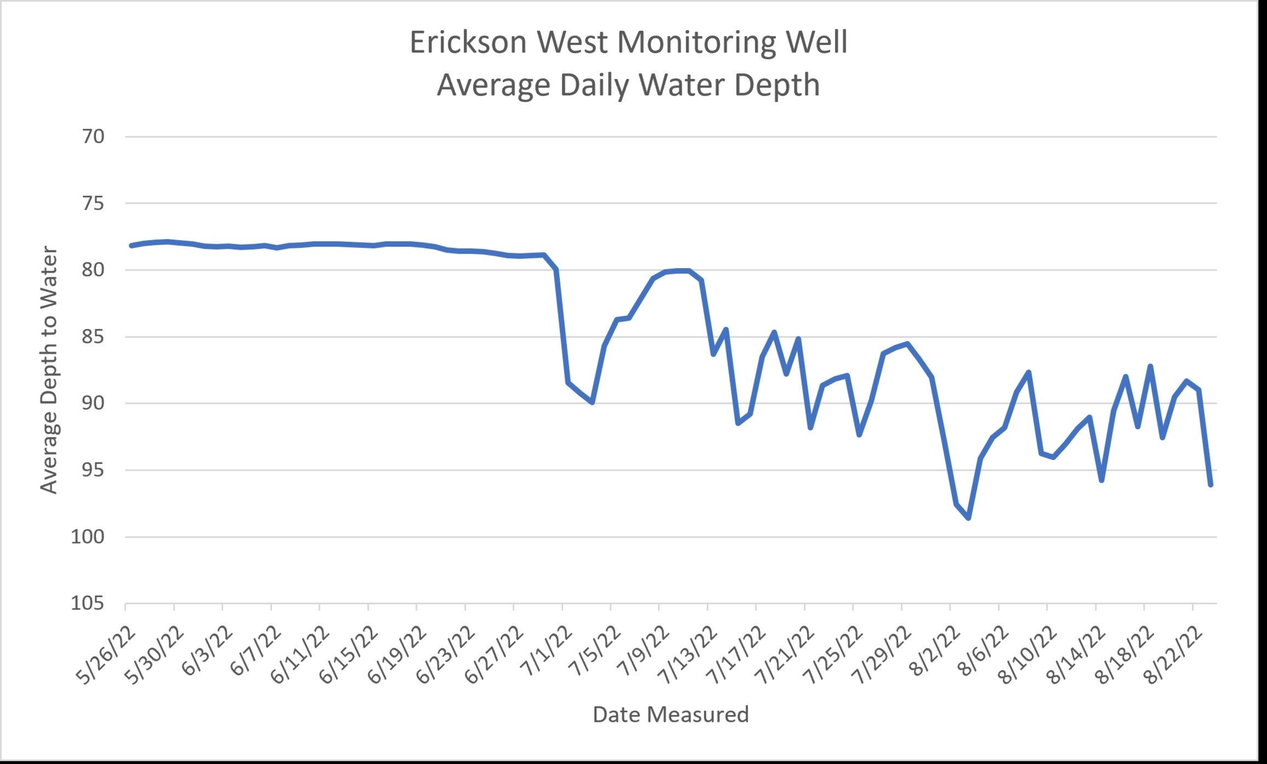
[3]Volume & Type: #gallons of a slurry, #Barrels of a slurry, #sacks used in the slurry, #Bags of non-slurry bentonite (chip-pellet-granular)

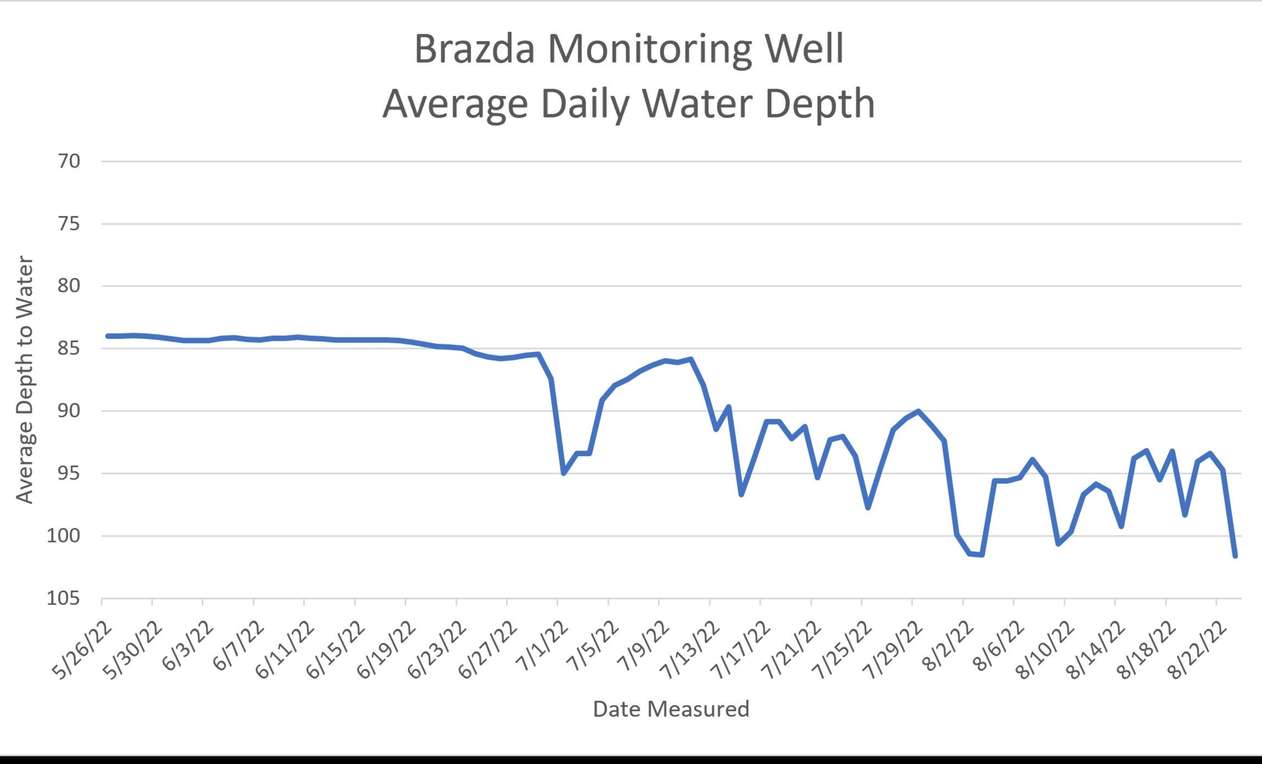
12. Well Geologic Materials Logged

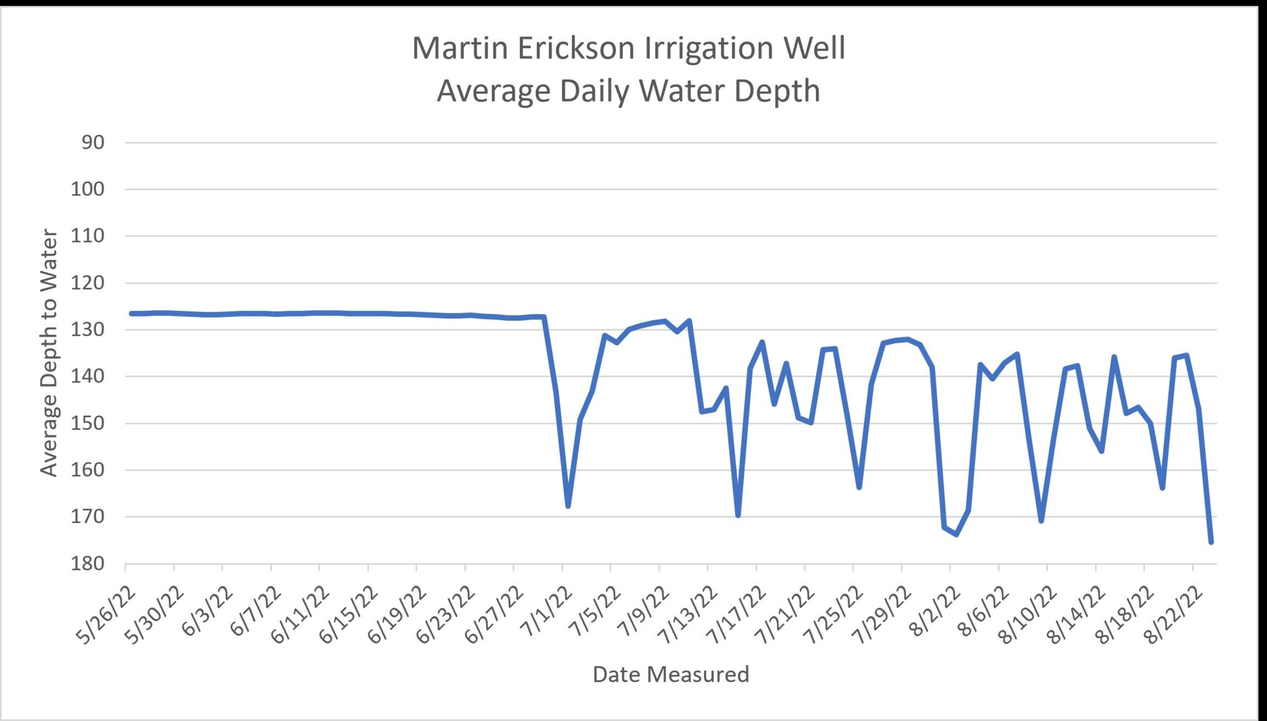
WellID	FromDepth*	ToDepth*	Type	Hardness	Color	Other/Drilling Action
218174	0	51	Clay	Dense/Stiff	Brown	
218174	51	52	Clay Stone	Hard	Brown	
218174	52	66	Clay	Dense/Stiff	Brown	
218174	66	67	Clay Stone	Hard	Brown	
218174	67	85	Clay	Dense/Stiff	Brown	
218174	85	88	Clay	Dense/Stiff	Gray	
218174	88	91	Gravel	Loose	Green	ROCKS-MAJOR
218174	91	94	Clay	Dense/Stiff	Green	
218174	94	120	Clay	Dense/Stiff	Gray	LIMESTONES
218174	120	122	Clay Stone	Hard	Gray	ROCKS
218174	122	149	Clay	Dense/Stiff	Blue	GRAY STICKY
218174	149	150	Clay Stone	Hard	Gray	ROCK
218174	150	154	Clay	Dense/Stiff	Blue	GRAY
218174	154	155	Clay Stone	Hard	Gray	ROCKS
218174	155	162	Clay	Dense/Stiff	Gray	
218174	162	163	Clay Stone	Hard	Gray	ROCK
218174	163	170	Clay	Dense/Stiff	Gray	DARK
218174	170	171	Clay Stone	Hard	Gray	ROCKS
218174	171	175	Clay Stone	Hard	Gray	ROCKS& CLAY
218174	175	184	Sand fine-med	Loose	Green	

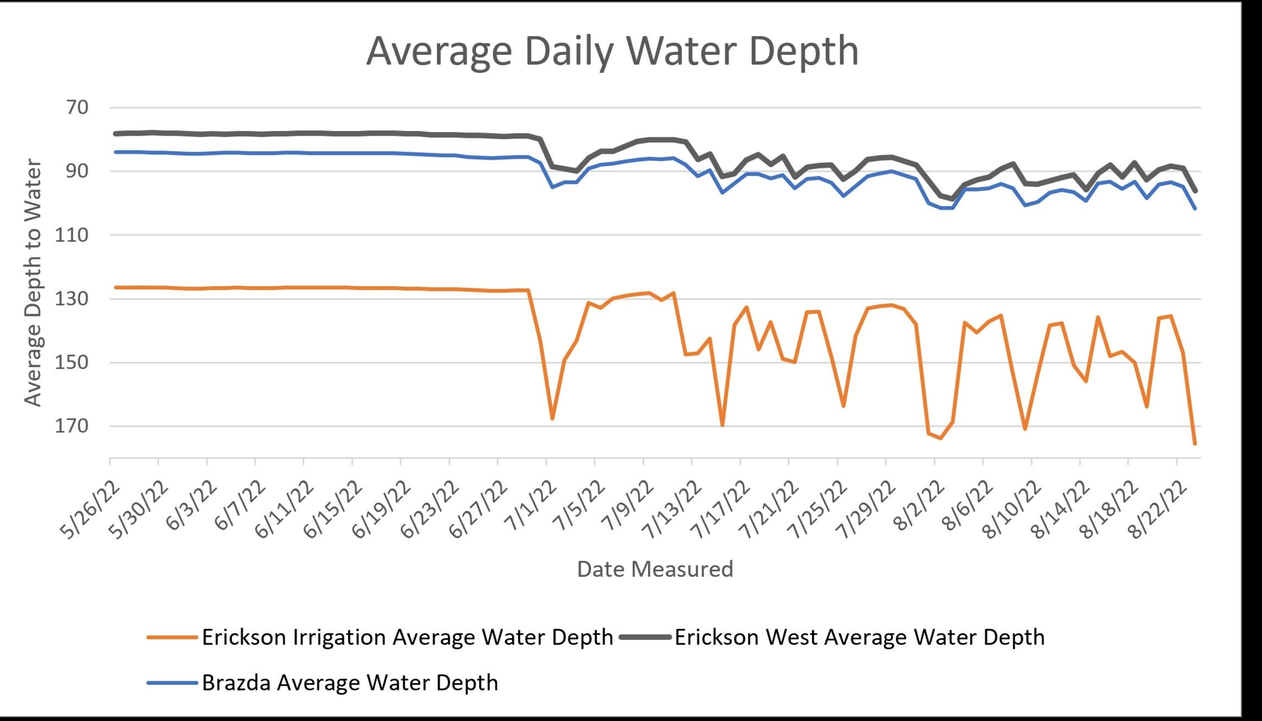
218174	184	185	Gravel	Loose	Green
218174	185	189	Clay	Dense/Stiff	Gray LT
218174	189	212	Sand with gravel	Loose	Green ROCKS MANY
218174	212	223	Gravel	Loose	Green
218174	223	225	Shale	Hard	Black

* are in Feet.

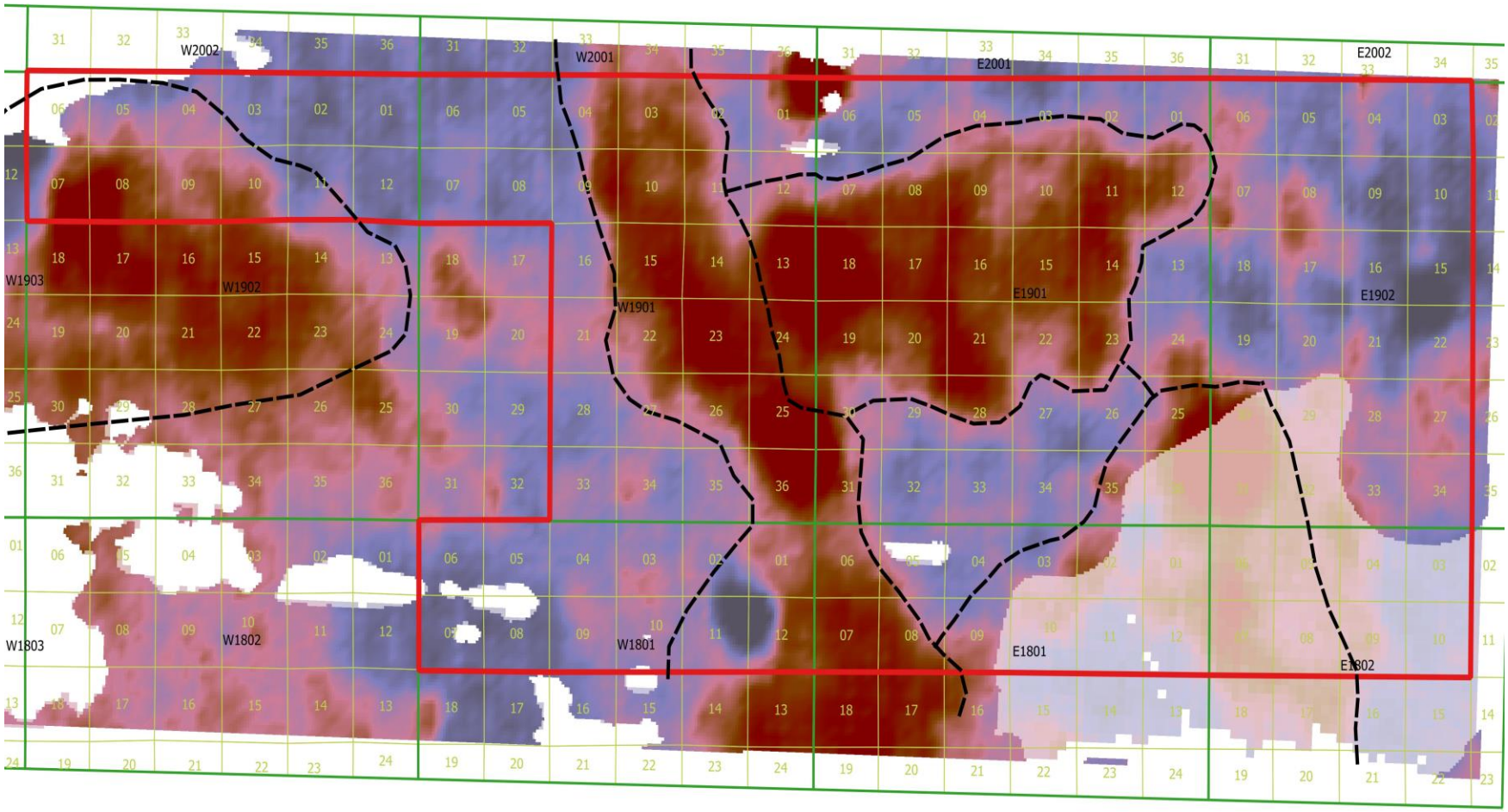

Erickson West Monitoring Well
Average Daily Water Depth
Average Depth to Water
70
75
80
85
90
95
100
105
5/26/22
5/30/22
6/3/22
6/7/22
6/11/22
6/15/22
6/19/22
6/23/22
6/27/22
7/1/22
7/5/22
7/9/22
7/13/22
7/17/22
7/21/22
7/25/22
7/29/22
8/2/22
8/6/22
8/10/22
8/14/22
8/18/22
8/22/22
Date Measured


Brazda Monitoring Well
Average Daily Water Depth
Average Depth to Water
70
75
80
85
90
95
100
105
5/26/22
5/30/22
6/3/22
6/7/22
6/11/22
6/15/22
6/19/22
6/23/22
6/27/22
7/1/22
7/5/22
7/9/22
7/13/22
7/17/22
7/21/22
7/25/22
7/29/22
8/2/22
8/6/22
8/10/22
8/14/22
8/18/22
8/22/22
Date Measured


Martin Erickson Irrigation Well
Average Daily Water Depth
Average Depth to Water
90
100
110
120
130
140
150
160
170
180
5/26/22
5/30/22
6/3/22
6/7/22
6/11/22
6/15/22
6/19/22
6/23/22
6/27/22
7/1/22
7/5/22
7/9/22
7/13/22
7/17/22
7/21/22
7/25/22
7/29/22
8/2/22
8/6/22
8/10/22
8/14/22
8/18/22
8/22/22
Date Measured


Average Daily Water Depth
Average Depth to Water
70
90
110
130
150
170
5/26/22
5/30/22
6/3/22
6/7/22
6/11/22
6/15/22
6/19/22
6/23/22
6/27/22
7/1/22
7/5/22
7/9/22
7/13/22
7/17/22
7/21/22
7/25/22
7/29/22
8/2/22
8/6/22
8/10/22
8/14/22
8/18/22
8/22/22
Date Measured
Erickson Irrigation Average Water Depth
Erickson West Average Water Depth
Brazda Average Water Depth

County Road 12
County Road 13
County Road 14
County Road 16
County Road 17
County Road R
County Road S
County Road O
County Road P
County Road P Blvd
Cutoff Rd


W2002
W2001
E2001
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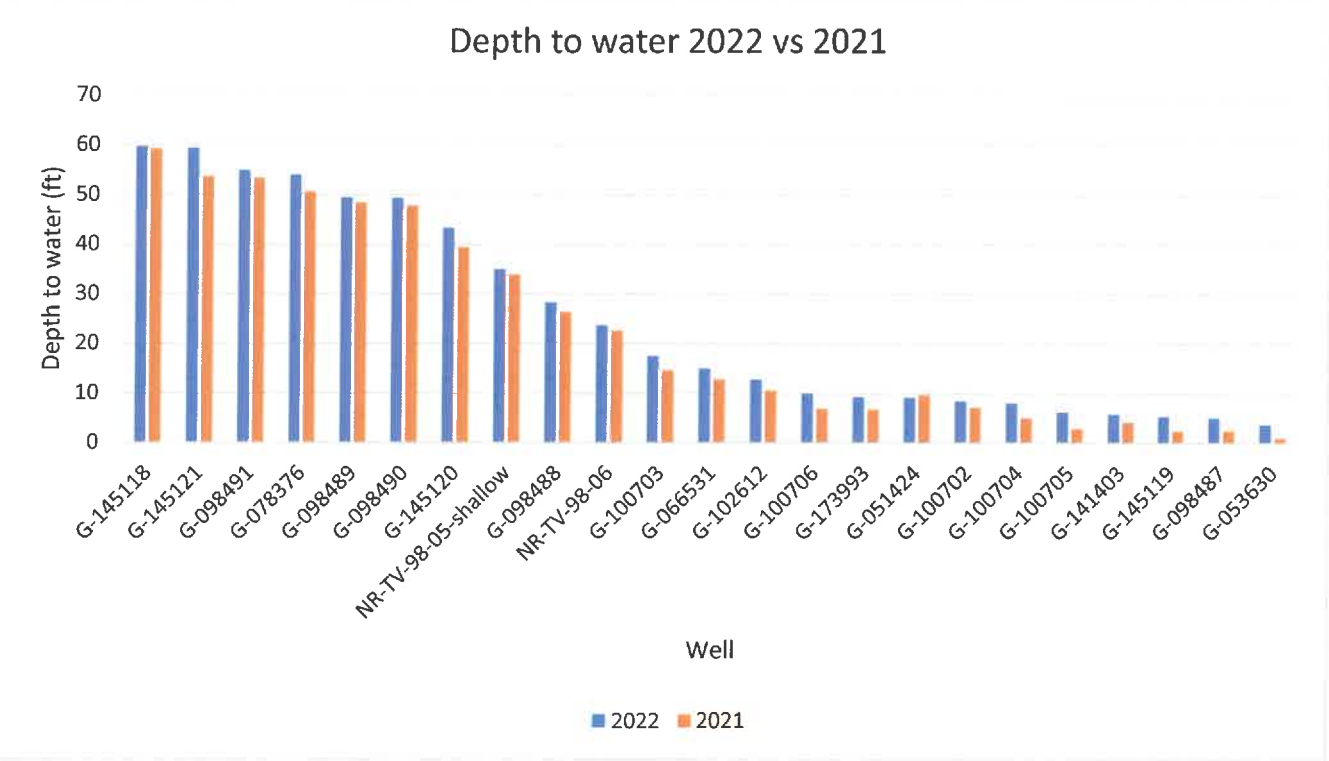
W1903
W1902
W1901
E1901
E1902
W1803
W1802
W1801
E1801
E1802



well numb	2022	2021	depth change 2021 to 2022
G-145118	59.77	59.29	-0.48
G-145121	59.47	53.74	-5.73
G-098491	54.99	53.51	-1.48
G-078376	54.07	50.67	-3.4
G-098489	49.5	48.43	-1.07
G-098490	49.36	47.83	-1.53
G-145120	43.32	39.46	-3.86
NR-TV-98-(	35	33.91	-1.09
G-098488	28.29	26.38	-1.91
NR-TV-98-(	23.68	22.64	-1.04
G-100703	17.47	14.68	-2.79
G-066531	14.97	12.83	-2.14
G-102612	12.74	10.59	-2.15
G-100706	9.9	6.89	-3.01
G-173993	9.24	6.74	-2.5
G-051424	9.1	9.65	0.55
G-100702	8.38	7.17	-1.21
G-100704	7.97	4.99	-2.98
G-100705	6.18	2.92	-3.26
G-141403	5.75	4.22	-1.53
G-145119	5.36	2.48	-2.88
G-098487	5.08	2.5	-2.58
G-053630	3.71	0.96	-2.75
	Average Change		-2.20957

HIGHBOY COVER CROP INTERSEEDING DEMONSTRATION

WEDNESDAY, SEPTEMBER 7TH
11 AM - 12 PM

Interested in interseeding cover crops into corn?Come check out this project and consider signing up for interseeding your field in future years!
go.unl.edu/highboycovercrops

SCHEDULE

11	Project Introductions
11:10	Cover Crop Overview
11:15	Highboy Interseeding - Machine Running
11:30	Field Evaluation - walk through the field and investigate the immediate results of interseeding
11:45	Conclusion - Sign up for future years, questions and consider a ride a-long

FIELD SITE

LARRY CHAPEK FARM

Southeast corner of the intersection at Highway 109 & S Road

Please park S Road
(no highway parking)

LOWER PLATTE SOUTH natural resources district

UPPER BIG BLUE NATURAL RESOURCES DISTRICT

LOWER PLATTE NORTH Natural Resources District

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Long Range Plan - DRAFT

FY2023

Introduction

The Lower Platte North Natural Resources District (LPNNRD) is one of 23 Natural Resources Districts created in 1969 with the passage of LB 1357 by the Nebraska Unicameral. Since its formation in 1972, the LPNNRD has been assisting people in the Lower Platte North River Basin in the development and protection of our soil and water resources. Nebraska Statutes require that Natural Resources Districts develop a Long Range Implementation Plan. The purpose of this plan is to summarize accomplishments during fiscal year 2021 (July 1, 2021 to June 30, 2022) and planned District activities for fiscal year 2023. There are also objectives for a five-year period from fiscal years 2024 to 2028. The plan serves as an implementation tool of the district's Master Plan, which is updated every ten years.

Authority and Responsibilities

The Natural Resources Districts have been given statutory responsibility outlined in Sections 2-3229, R.R.S. 1943. In this section it states that "The purposes of the Natural Resources Districts shall be to develop and execute, through the exercise of powers and authorities contained in this act, plans, facilities, works and programs relating to: (1) erosion prevention and control, (2) prevention of damages from flood water and sediment, (3) flood prevention and control, (4) soil conservation, (5) water supply for any beneficial uses, (6) development, management, utilization, and conservation of groundwater and surface water, (7) pollution control, (8) solid waste disposal and sanitary drainage, (9) drainage improvement and channel rectification, (10) development and management of fish and wildlife habitat, (11) development and management of recreational and park facilities, and (12) forestry and range management."

Lower Platte North NRD programs and projects are available to meet the goal of properly developing our water and related land resources.

Description of the District

The Lower Platte North Natural Resources District is located in the Lower Platte River Basin in eastern Nebraska and includes 1,031,000 acres of land. A portion of Saunders, Butler, Platte, Dodge, Colfax, Boone and Madison Counties are within the district (see Appendix A), which includes twenty-eight cities, towns and villages. Besides the Platte River, other notable tributaries

in the district include Wahoo Creek, Skull Creek, Bone Creek, Loseke Creek, Taylor Creek, Shell Creek, Elm Creek, Clear Creek, Rawhide Creek, Silver Creek, Sand Creek, and Duck Creek.

The population of the district is approximately 62,000, of which about half is rural and half urban. The Lower Platte North NRD is financed by a tax levy which may be up to four and one-half cents per $100 valuation for general purposes and another one cent for water programs. The FY 2023 tax levy is * _____ (* Will be approved at September Board Meeting) cents per $100 valuation.

Governing Body

The Lower Platte North Natural Resources District (LPNNRD) is governed by a 19-member Board of Directors. The directors are elected at the general election for a term of four years, with half of the members up for election every two years.

The district is divided into nine (9) subdistricts. Two board members are elected from each of the nine subdistricts, and one board member is elected at large every four years.

The district operates by a set of bylaws which are kept on file at the district headquarters at Wahoo, Nebraska.

FY 2022 Platte River Basin Activities

One of the great natural resources of Nebraska is the Platte River. It is the feature that attracted early settlers to our state and guided the wagon trails. Today, we look at the Platte River differently. It is a water source for agriculture and cities like Fremont, Lincoln and Omaha, a haven for wildlife, and a place for recreation. Issues surrounding the Platte are a top priority at the LPNNRD, since approximately 72 miles of the river flow directly through, or border, the district.

Ice Jam Agreement

In 1994, the LPNNRD entered into an agreement with the Papio-Missouri River NRD, Lower Platte South NRD, and Cass, Douglas, Sarpy and Saunders Counties to more effectively deal with ice jams and their resulting flood damages along the Lower Platte River. This area of concern is primarily from Fremont, Nebraska to the mouth of the Platte River. This group has pooled funds of $150,000 to retain a contractor to use explosives when needed, to remove ice jams in a timely manner.

During the winter of 2021-22, there were no ice issues of concern on the lower Platte River..

Rock & Jetty Program

This program was developed to offer cost-share assistance to landowners to construct erosion control devices for stream bank stabilization and to assist Dike and Drainage Districts with maintenance of dikes along the Platte and Elkhorn rivers and perennial streams. In FY21, $25,000 was budgeted for projects on rivers & streams. We assisted one landowner on a maintenance project in FY 21-22 at a cost of $4,000.

FY 2023 Platte River Basin Objectives

- Administer $20,000 in the Rock & Jetty Program to assist with priority stream bank stabilization for cooperators on the Platte and Elkhorn Rivers and Perennial streams. This includes assisting cooperators with meeting the regulations of the Clean Water Act and 404 permits.

- As a member of the Joint Water Management Advisory Board, provide leadership and assistance to move forward with exploring flood reduction solutions for the lower one-third of Dodge County within the District.

- Support the Lower Platte Weed Management Area financially and technically in controlling noxious and invasive weeds.

- Support the Nebraska Land Trust in acquiring easements for the protection and preservation of quality lands.

- Support the Lower Platte River Corridor Alliance by becoming an active voting member

FY 2024-2028 Long Range Platte River Basin Objectives

- Continue to budget cost-share funds for priority bank stabilization along the Platte and Elkhorn rivers and other perennial streams in the district.
- Continue to be an active member on the Joint Water Management Advisory Board.
- Promote riparian buffer zones along the Platte River and other perennial streams.
- Continue to explore new, innovative and cost-effective ways to protect against stream bank erosion.
- Provide education on stream bank protection and regulations.
- Support and budget annually, as needed, for the Ice Jam Agreement Fund.
- Keep up to date on Clean Water Act and Endangered Species Act regulations.

- Continue to participate with the City of Fremont to study potential nonstructural measures to reduce flooding and economic losses from the Lower Platte River.
- Work with the City of Schuyler as they evaluate the need for future federal funding for completing structural and non-structural approaches to reduce flooding and economic losses from the Platte River through the LPNNRD District-Wide Hazard Mitigation Plan.
- Encourage cities and counties to initiate floodplain management planning to promote wise floodplain development.
- Assist dike and drainage districts within the LPNNRD to properly repair and maintain levy projects.
- Budget annually as needed to support the Lower Platte Weed Management group in controlling noxious weeds.
- Continue to support the Lower Platte River Corridor Alliance as an active, voting member.

FY 2022 Ground & Surface Water Activities

One of the Lower Platte North NRD's major responsibilities is to conserve and protect our ground and surface water supplies. To accomplish this goal, the Lower Platte North continues to participate in water quality studies, ground water level monitoring, and water resource educational activities.

Groundwater Management Area

LPNNRD implemented a District-wide Groundwater Management Area (GWMA) on January 1, 1997, to address both water quality and quantity concerns. This action was based on data gathered since 1985 indicating where groundwater quality conditions have deteriorated beyond those established as health standards, such as nitrate nitrogen. On that date, groundwater quality Phase I (education) regulations became effective for the entire District. One primary rule in Phase I requires certification for fertilizer and water use. The District has developed a groundwater program emphasizing a protection-based approach rather than a reactive, corrective approach. Since that time, advanced Phase areas have been determined by trigger levels listed in the rules and regulations of the GWMA. The District has two Phase groundwater quality control areas, those being Bellwood and Richland/Schuyler. The Bellwood Phase 2 Area was established in 2003 and presently covers approximately 30 square miles in the western portion of the Platte Valley in Butler County and includes the town of Bellwood. In 2015 nitrate levels decreased to a point that the trigger levels were not being achieved, so this area was decreased to 20 square miles. The Richland/Schuyler Phase 2 Area was established in 2004. In 2015 this area was raised to Phase 3 because of the rising nitrates. This area covers approximately 55 square miles in the Platte Valley of Colfax County and includes the towns of Richland and Schuyler. In 2015, 10 additional sections north of the Richland/Schuyler Area became a Phase 2 area and in 2020

raised to Phase 3. Elevated nitrate-nitrogen levels continue to be the major concern in both Phase areas. Emphasis on awareness is a priority to the District with numerous grants being considered.

In June 2018, the District updated its Groundwater Rules and Regulations by adding a Phase Four under Water Quality and managing water by consumptive use or acre feet limitations. As of July 1, 2021, the District had 9302 registered active wells with 4589 irrigation wells and 190 wells in our GWEL network.

In Summer of 2012, the District saw mid-summer declines in the Bruno area and the uplands of Platte and Colfax Counties. These are now designated as the Butler-Saunders and Platte-Colfax Special Quantity Subareas. The District mandated water flow meters, rolling allocations and annual reports in these areas starting in 2016.

In 2012 seven NRD's agreed to develop a Lower Platte Basin plan, which is a cooperative agreement for the Basin Plan. This plan was approved in December of 2017 with each district assigned a depletion allotment within the Basin. The allotment is in 5-year increments starting in 2016 with a formula to determine the acre feet used for new water uses. The District completed its V-IMP in June of 2018 by adding an additional rule of requiring municipalities to report yearly water use, with an annual report due to NDNR. The Coalition and NRD Boards approved the next 5 years increment thru 2026 in Spring 2022.

In 2016 the Lower Platte River Consortium, made up of the Lower Platte South NRD, the Lower Platte North NRD, the Papio-Missouri River NRD, Lincoln Water System (LWS), Metropolitan Utilities District (MUD), and the Nebraska Department of Natural Resources (DNR), embarked on an effort to develop a drought contingency plan to maintain/mitigate sustainable water supplies to the Lower Platte River during drought conditions. The final report was finalized in the Spring of 2020. The group is in the process of ranking the projects to be considered for supplying water into the Platte River. Summer of 2022 the group met monthly to discuss drought conditions and to determine if other actions might be needed.

Current rules and regulations of the GWMA are available at the LPNNRD headquarters in Wahoo and via the district website at www.lpnnrd.org.

Ground Water Quality Sampling

The Lower Platte North NRD continues efforts to develop a ground water quality inventory. The District has been divided into four primary aquifer regions: Todd Valley, Platte Valley, Shell Creek and the Uplands, and further divided into 26 subareas. Staff samples the same 53 wells each summer, weather permitting, to determine long term trends for nitrate-nitrogen. This is referred to as the Statewide Network. The data collected is provided to the Nebraska Department of Environment and Energy (NDEE). NDEE in turn provides this to the Nebraska Legislature on an annual basis.

In 2021 samples were collected from all 53 sites.

Year	Nitrate-Nitrogen Range	% Nitrate-nitrogen 0-8.0 ppm	% Nitrate nitrogen 8.01-10.0 ppm	% Nitrate nitrogen > 10 ppm
2021	0 - 23.1 ppm	69.8% (37 of 53)	7.6% (4 of 53)	22.6% (12 of 53)

Samples for pesticide analysis were collected from seven of these sites (18%). The pesticide analysis was for a suite of 25 parameters, and all results were less than reporting level.

Ground Water Energy Level Monitoring Network

One of the responsibilities of the NRDs in the State is to monitor fluctuations in groundwater levels. With the help of area cooperators, a ground water energy level monitoring network has been established in the LPNNRD. This monitoring network has been established to obtain a better understanding of the groundwater levels throughout the District. As of Spring 2021, the LPNNRD had 190 wells in the groundwater energy level monitoring network. These wells are monitored each spring and fall, with selected wells also measured in late August.

The LPNNRD compares the latest spring reading to the 1987 base-year to determine if a subarea needs to be declared a Level 2 or Level 3 groundwater management area. Level 2 and 3 management areas require flow meters on wells, annual reporting of water use, and establishment of acre-inch allocations. For the 26 sub areas within the District, 24 subareas are currently at Level 1 management, while the other 2 sub areas still need additional information before these can be designated. The District prefers at least three years of data before the subarea can be designated as a Level 1, 2, or 3 management area.

Fall readings in 2021 and Spring of 2022 showed a decline from the previous year's measurement. This change was likely the effects of less rainfall and recharge from snowfall amounts in the winter months of 2021-22. Spring readings in 2022 showed 59% of the wells measured had levels lower in Spring 2022 compared to Spring of 2021. There was a 22% rise in 39 wells from a year ago.

Chemigation

o the water line of an irrigation system that is then applied onto the crops. It is considered to be one of the most efficient ways of applying essential nutrients in times when the crop is uptaking the most amount of nitrogen through its growing stages. In order to use chemigation, a licensed permit holder must obtain a permit through the Lower Platte North NRD. Special equipment must be installed to protect Nebraska's groundwater from possible back-flow of chemicals into the groundwater source. To obtain this permit, administered by NDEE you must pass the Chemigation Certification test taught through UNL Water. There is an online test producers may take due to the recent COVID-19 protocols. The chemigation equipment must be properly equipped, inspected and approved by the NRD before applying any chemicals. The number of chemigation permits continues to slowly rise throughout the district due to chemigation's efficient application rate when the crops are in the most need of nutrients. In sandier soil types, chemigation is extremely effective due to the soil's incapability to hold essential nutrients in the root zone after heavy rainfall events.

Chemigation Permits	Total	Renewal	New	Emergency
November 2021	704	658	46	0
November 2022	733	676	56	1

In 2014, the Legislature approved changes to Title 195 that would allow individual NRDs to set chemigation fees. Chemigation fees for LPNNRD are: $90 for a New permit, $30 for a Renewal permit, and $300 for an Emergency permit. New permits are to be inspected each year they are permitted and renewal permits are to be inspected on a 3 year rotation. Failure to renew by June 1st of the following year the permit was obtained will cause the permit to lapse. If a renewal permit lapses and the producer decides to use chemigation as a practice of crop application the individual must obtain a new permit and an inspection is required.

Decommissioned (Abandoned) Wells

Decommissioned (Abandoned) wells are a health and safety concern and have been ruled as illegal by the Nebraska Legislature. A well not used for three consecutive years or one which is no longer useful is considered to be abandoned and needs to be properly decommissioned.

The Lower Platte North NRD offers up to 75% cost share assistance to landowners to properly decommission abandoned water wells. In addition, the district will assist with up to 75% of the cost for pump and obstruction removal on domestic and stock wells. To receive cost share assistance, the actual decommissioning must be performed by a certified well driller or pump installer. The landowner has six months from the time of application to accomplish this task unless good cause is shown.

Since 1992 the district has administered local and state cost-share dollars to decommission 724 wells. Through this program in FY 21-22, a total of $13,930.12 was administered by LPNNRD for the plugging of 17 wells. The district will administer approximately $15,000 of state and local funds to plug additional wells during the current fiscal year.

Flow Meter Maintenance Program/ Flow Meter Readings

Since 2008, the LPNNRD has implemented the requirement of installing a District approved flow meter on any new or replacement well. Thereafter in 2012, the District also required the installation of a flow meter on any expansion of acres from an existing well. This pumping information is invaluable to the District to know what has been pumped during years of extended drought. It is vital that the LPNNRD keeps track of this going forward into the future. In order to know the volume of water within our aquifer systems, we need to know the water that is being extracted.

In 2016, the district chose to contract with a private company through the bidding process. The company was scheduled to maintain the flow meters within the LPNNRD's SQS areas for the first four years. Since that was completed the District has chosen to open the flow meter maintenance program district wide in 2020. Maintenance on the flow meters will be performed once every four years. The district is in charge of the labor and site visit at each meter. Each mechanical meter site visit is $60 and each battery operated site visit is $75. This maintenance includes the regular greasing of the mechanical meters and changing the batteries on the digitally read meters. Along with the regular maintenance the private company also ensures that the meter is not damaged from water or vibration. There are approximately 1,100 irrigation well flow meters that are getting routine maintenance once every four years.

Along with the irrigation wells, the LPNNRD also records meter readings from all of the municipality wells within the District including MUD, Lincoln and Fremont. Livestock wells and commercial wells are required to report if the well was drilled after the 2012 requirement date. Over 1,200 readings are recorded annually throughout the LPNNRD District. This Fiscal year the LPNNRD budgeted $17,500 for the meter maintenance program.

Registered Wells

The Nebraska Legislature declared that the conservation and the beneficial use of ground water are essential to the future well-being of the State. State Law requires that all water wells in the State of Nebraska be registered with the Department of Water Resources. Wells that are not registered are illegal and should be registered as soon as possible. A breakdown by decade from 1970 to present shows the growth of active irrigation wells in the District.

Table of Active Irrigation Wells within LPNNRD compiled by Completion Date

Date	Number of Active Irrigation Wells in the District
December 31, 1970	**1,428**
December 31, 1980	**2,756**
December 31, 1990	**3,241**
December 31, 2000	**3,686**
December 31, 2010	**4,307**
December 31, 2020	**4,554**
July 1, 2022	**4,586**

Well Permits

In May of 2008, the LPNNRD placed a flow meter and water reporting condition on well permits for all permits issued after that date. All well permits require well owners to install a flow meter

and report their water use for the calendar year to the LPNNRD by December 15 of each year. This reporting requirement is effective the year the well is drilled and for each year thereafter, until the well is decommissioned. As of July 1st, 2022, the District has issued 18 well permits with 8 new irrigation wells, 8 replacement irrigation wells, 1 stock well and 1 commercial well.

Special Studies

The LPNNRD has done a number of studies within the District. The following is a list of studies that is currently being conducted within the District.

Aquifer Vulnerability Mapping and Analysis

The Lower Platte North has been working with UNL to collect and analyze data within the LPN Water Quality Management Areas. The first stage involved some intensive water sampling of irrigation wells for nitrates. A few samples were collected for isotope nitrate samples for the purpose of determining if the nitrates were organic or inorganic sources. This was followed-up with vadose soil sampling analysis to assist in determining the amount of nitrates in soil and pore water present in the unsaturated zones above the water table. A nitrate tool was developed utilizing this data, along with geological information to assist in determining vulnerability. This project will be wrapping up later in 2021 with informational meetings in the area.

3D Airborne Electromagnetic (AEM) Hydrogeologic Framework and Assessment

Papio-Missouri River NRD, NeDNR and LPN started a study in January 2021 to assess AEM survey information, well logs and other geological information. The data will be used to characterize different geological layers and assign variables such as hydraulic conductivity. This data could be used in a groundwater model to better understand, assess and forecast groundwater flow within the geographical areas. This study should be completed in January 2022.

Lower Platte River Consortium Study

Municipal wellfields in the Lower Platte River Basin depend on the Platte River to recharge the groundwater for their use. This study looked at long term water supplies in the Lower Platte River Basin, and the ability to enhance streamflow, especially in drought conditions, to sustain these municipal water systems. Sustaining water in the river would also provide a benefit to wildlife and agriculture by lessening the likelihood of a ‘call’ on the river. Due to different hydrologic conditions in the Platte River, such as gaining and losing segments, siting of future reservoirs, groundwater storage projects, etc. becomes important in order to most effectively move water to a desired location downstream. The plan was completed in Spring 2020 with the group now in the process of conducting a desktop exercise on determining which projects are feasible.

Eastern Nebraska Water Resources Assessment

LPNNRD is a partner in the Eastern Nebraska Water Resources Assessment (ENWRA). The ENWRA study has been utilizing Airborne Electromagnetic (AEM) over eastern Nebraska to better model the geology of the glaciated portion of the State. It has opened several questions concerning bedrock aquifers both in water quantity and water quality such as salinity. New flights were conducted in the summer of 2018 with the final report received in summer 2019. A study is being conducted in the Platte-Colfax Area (SQS#2) utilizing the AEM, additional data loggers and other geologic logs to determine the relationship between confining and unconfining layers along with determining drawdown levels for management decisions. The flights and the results can be found on the ENWRA website at (www.enwra.org).

Elkhorn-Loup Model

The Elkhorn-Loup Model (ELM) project is a study of surface water and groundwater resources in the Elkhorn River basin upstream of Norfolk, Nebraska and the Loup River basin upstream of Columbus, Nebraska. Parts of this basin overlap and cover portions of upper Shell Creek.

Certifying Acres

In July 2009, the District signed a contract with GIS workshop to develop a database of county assessor records as the preliminary step to certifying irrigated acres. Using these records, LPNNRD staff mailed out letters to landowners to verify irrigated ground. As of January 2022, the majority of the irrigation in the district has been cataloged. The District is still granting new irrigation development. Those new acres are not entered into the certification database until such time as they show up on aerial photography and can be accurately modeled. In March of 2021, the District went through all the approved new irrigations and modeled out all those that had yet to be counted. Acre certification provides a true inventory of the irrigation needs of the District, which is an important part of present and future groundwater management and planning. In addition to cataloging irrigated acres, LPNNRD staff have been actively working with the Nebraska Department of Natural Resources (NeDNR), as well as local landowners, to bring all irrigation wells in LPNNRD into compliance with Nebraska Revised Statute 46-602 (7).

Nebraska Ordnance Plant Water Pollution Clean Up at Mead

During the 1940s, 1950s and 1960s, an Army Ordnance Plant near Mead was used to assemble bombs and served as an early Atlas Missile ICBM site. Over time, the soil and groundwater at the plant site became polluted with various explosive residues and solvents. The cleanup has been divided into three basic project areas: Soils (OU1), Ground Water (OU2), and Building contamination (OU3). This area has been under study by the Army Corps of Engineers (COE) since 1988. An open house was held by the Corp, May 2022, with annual tours and open houses conducted regularly.

Wellhead Protection Program

The LPNNRD implemented a wellhead protection program in FY 2001. The goal of the program is to minimize potential polluting activities on the land surrounding a community's public water supply well(s). The District has identified 22 communities with public supply wells and they have been encouraged to become involved in the program. The Cities of David City and Wahoo have completed the re-evaluation and approved their wellhead management areas. Both communities are in the process of decommissioning wells within these areas.

Rural Water Districts

In recent years, the District has worked with communities who have had difficulties with water quality and quantity by forming two rural water systems. The Butler County system linked the village of Bruno in 2006, who was having water quality and quantity problems, to David City. Also in 2006, the Saunders County system linked the village of Colon, who was experiencing water quality concerns, to Wahoo. The LPNNRD operates both of these systems. The District purchases water from the larger communities and delivers it to the smaller communities; RW staff manage and maintain Colon's system and billing while Bruno manages their infrastructure and household billing. Both systems are designed to serve rural customers along each service route. Combined, the two systems serve over 135 households in Saunders and Butler Counties. To address fiscal concerns both RWDs have implemented a phased rate increase strategy to more diligently manage the financial standings of both districts. The District has been in contact with several other communities and anticipates several more communities and rural customers to be serviced by rural water systems in the future. Both systems are greater than 10 years old and repairs/replacements of meters is expected to take up RWD staff's time in 2022-23 as a number of meters and components are showing the signs of wearing out.

Geographic Information System (GIS) and Global Positioning System (GPS)

LPNNRD has used Geographic Information System (GIS) technology since 1996. GIS is an automated system combining database information and maps. Features on a map, created with GIS technology, contain attribute or feature descriptions that are referenced by location. The data used by a GIS system consists of Vector and Raster Data. Vector data consists of point (wells), line (roads) and polygon data (irrigation boundaries); with Raster data consisting of pixels, where each pixel on the screen corresponds to a data point. Raster data includes aerial photography and elevation data such as LiDAR (a highly accurate elevation dataset). The District has incorporated the use of GIS into most district functions, including the certification of irrigated acres, maintenance, project planning, modeling of groundwater availability, and the movement of contaminants such as nitrates through the soil profile.

In addition to in-house GIS activities, LPNNRD GIS staff assist a variety of partners, including projecting FSA aerial photography into Nebraska State Plane Feet coordinates for NeDNR, custom

authoring of maps for the Nebraska Land Trust, coordination of helicopter flight lines for invasive species control with the Lower Platte Weed Management Area, and helping other NRDs with GIS questions as they emerge.

LPNNRD entered into an agreement with Phoenix Web Group to create a robust, relational database. GIS will be the backbone of this database and will allow LPNNRD to quickly, and efficiently, look up any information pertaining to any project or cost share that has been completed for any constituent with land in LPNNRD.

The Global Positioning System (GPS) relies on 28 NAVSTAR satellites, which provide world wide positioning and navigation information around the clock. Receivers acquire signals from satellites to determine precise locations on earth. The data obtained from taking GPS positions can be downloaded and mapped with GIS, making the two technologies complemen-tary. LPNNRD partnered with NRCS on the purchase of a sub-centimeter GPS base station. This allows NRCS and NRD staff to quickly and efficiently perform a variety of tasks in the field with survey level precision.

As drone technology continues to evolve, LPNNRD has added a SkyDio2 Autonomous Drone to its inventory. LPNNRD staff are working towards the completion of a Part 107 license through FAA to fly the drone without the need for waivers, as not all activities fall under a waiver category.

FY 2023 Ground and Surface Water Objectives

- Continue to monitor changes in groundwater levels and quality in the district.
- Continue with LPNNRD Groundwater Management Area (GWMA) programs to help avoid the Lower Platte Basin being designated “fully appropriated.”
- Continue to implement Voluntary Integrated Water Management Plan (V-IMP) for the District and basin-wide plan. Utilize acre feet allotments assigned to the District for the benefit of the basin.
- As part of the GWMA, continue with LPNNRD certification classes, demonstration plots, generation of maps indicating problem areas, and evolving the development of a master database.
- Continue to cooperate with the United States Geological Survey (USGS) in monitoring groundwater levels at two sites.
- Continue to cooperate with the United States Geological Survey (USGS) in monitoring surface water levels at four sites and one site for contamination evaluation.
- Use the Subarea Delineation Study to identify ‘small pocket aquifers’ in the Swedeburg, Prague, Yutan, and Yutan South subareas. Review other aquifer subareas to determine if Stay Management Areas are justified in other portions of our District.
- Continue sampling of approximately 53 wells in our District that are part of the Nebraska State-wide Network.
- Continue to monitor the Phase Areas in Richland-Schuyler and Bellwood for nitrate and elevate these areas as needed.

- To continue Implementing extensive sampling of soil and water in the Phase Areas for the purpose of identifying workable best management practices for curbing the rising nitrate trend.
- To implement best management practices within the Phase Areas for the purpose of decreasing nitrate levels.
- Administer $19,000 of state and local cost-share funds to decommission abandoned water wells, and provide 100% cost-share assistance within Wellhead Protection Areas to communities that are actively doing projects within its management area.
- Maintain a multi-agency groundwater energy level monitoring network in the Wann Basin of the Platte Valley north of Ashland to pool information from different agencies collecting water level data. This information is being used by the COE and MUD to refine their groundwater modeling efforts.
- Continue to implement the Chemigation Program to inspect safety equipment on permitted irrigation systems in the district.
- Continue with the District's Well Permitting Program and Variance Process throughout the District.
- Continue to review water use reports submitted to the LPNNRD as part of the well permitting process from new and replacement wells.
- Provide information and education on water conservation and safe disposal of farm and household chemicals.
- Continue to site registered and unregistered wells in the district using GPS.
- Promote and sponsor LPNNRD's Spring Conservation Sensation
- Provide information on Integrated Pest Management in news releases and the "Viaduct" newsletter to encourage reduced use of pesticides.
- Support and promote urban water conservation and chemical disposal throughout the District.
- Assist in organizing the annual NRD Water Programs Conference held each year to update the NRD's on activity of State and Federal Agencies, new research and Legislative issues.
- Continue to install flow meters on irrigation wells that are part of our Ground Water Energy Level (GWEL) Network.
- Expand the GWEL network to monitor aquifer sub-areas as designated in the 2009 Subarea Delineation Study. This will be done by incorporating additional high capacity wells and the drilling of new monitoring wells.
- Continue to monitor clean up efforts by the COE at the Former Ordnance Plant at Mead, Nebraska.
- Work with the COE to establish spacing requirements for future high capacity irrigation, industrial, and/or municipal wells that are requesting to be installed near known contaminant plumes from the Former Ordnance Plant near Mead, so these wells will not interfere with the COE's clean up efforts.
- Continue to monitor clean up efforts by the University of Nebraska at the Eastern Nebraska Research and Extension Center (ENREC) facilities east of Ithaca, Nebraska.
- Maintain transducers placed in District monitoring wells to record changes in groundwater energy levels and to continue the process of installing real-time remote reads.

- Declare Level 2 or Level 3 Management areas as warranted caused by declining groundwater energy levels in 50% or more of the monitoring wells reaching their trigger levels after three consecutive spring readings.
- Review livestock permits from DEE.
- Investigate irrigation runoff and groundwater management area complaints as needed.
- Expand the NeRain program within our District.
- Continue to be a sponsor member of the Elkhorn-Loup Model (ELM)
- Continue groundwater studies with the University and NeDNR in the SQS areas. Study will focus on confined and unconfined aquifers and drawdowns within these areas.
- Communicate with well drillers and pump installers on water concerns within the District.
- Continue to assist the Eastern Nebraska Water Resources Assessment (ENWRA) with the use of AEM (Airborne Electromagnetic) to study the eastern glaciated portions of Nebraska to provide a geologic framework map.
- Improve irrigation efficiency by working with UNL Extension on the Nebraska Agricultural Water Management Network (NAWMN) to install Watermark sensors and ET gauges with producers each year in our District.
- Continue with the process of updating Irrigated Acre Certification within the District.
- Continue working on projects identified within the Shell Creek Watershed Water Quality Plan.
- Update water quality objectives as identified in the Wahoo Creek Watershed and the Shell Creek Watershed Water Quality Plans.
- To continue to increase producer participation in online reporting for entering their data to improve efficiency and quality of data.
- To analyze the real-time water level measurement network in Special Quantity Areas for in-season management decisions for determining warning triggers.
- To start the groundwater modeling process jointly with PMRNRD, LPS and NeDNR within the Lower Platte Basin for updating the Hydrological Connected Area (HCA) and assist in the well permitting process.
- To work with UNL and NDEE on an interseeding cover crop project in the Shell and Wahoo Creek Watersheds.

FY 2024-2028 Long Range Ground and Surface Water Objectives

- Continue groundwater quality sampling throughout the LPNNRD, both the State-wide network and intensive sampling of selected regional aquifers.
- Continue water quality education programs based on the goals and objectives of the LPNNRD Groundwater Management Area, which includes LPNNRD certification classes for landowners, municipal and industrial water users.
- If needed, designate further Phase II, III & IV boundaries for the Groundwater Quality Management Areas.
- To educate the need for check valves in protecting the aquifer from contamination.
- Continue with nitrogen application demonstrations and participate with demonstrations on integrated pest management and sustainable agriculture.
- Assist in the proper decommissioning of water wells in the district.
- Continue to use GPS to site registered and unregistered wells within the district.

- If necessary, designate Level II and III boundaries within the district to manage declining groundwater levels.
- If necessary, designate new Special Quantity Subareas (SQS) within the district to manage mid summer declines of groundwater energy levels in aquifers that operate under large pressure swings.
- Continue measurement of ground water energy levels in the district.
- Develop a groundwater model for each sub-area. Additional information on water use from all wells will be needed for accurate information.
- Continued partnership with the Eastern Nebraska Water Resources Assessment (ENWRA) and apply information to the glaciated portions of our District.
- Additional studies to identify vulnerable aquifers and modify GWMA rules and regulations to protect these aquifers and their long term sustainability. Continue geophysical work, installation of monitoring wells and test holes to better define these vulnerable sub-areas. Additional AEM flights with ¼ to ⅓ mile spacing would gratefully assist in defining such areas. Eventually cover the entire District with these detailed AEM investigations.
- Continue using AEM (airborne electromagnetic) information to analyze bedrock aquifers both in water quantity and water quality. Test holes and monitoring wells will have to be installed and sampled to determine these as a possible source of usable groundwater. New management strategies need to be developed for these aquifers such as summer trigger levels for confined bedrock aquifers, especially if these are hydrologically isolated from overlying alluvial aquifers. This could develop into three dimensional management where aquifers at different depths are treated by a separate set of rules for each one. This could become very complex but will likely be the only way to sustain the use of these aquifers far into the future.
- Install precipitation gauges near monitoring wells in important sub-areas.
- Utilize the completed Lower Platte River Consortium Study for possible locations for recharge and reservoir sites to better convey water downstream to municipal wellfields.
- Complete water quality objectives as identified in the Watershed Quality Plans.
- Continue to update the Groundwater Management Plan to include Integrated Management of surface and ground water. It may be necessary to install additional surface water gauging sites coupled with nearby groundwater monitoring wells as tools for integrated water management.
- Expand the GWEL network to have continuous recording monitoring wells in each sub-area to better manage the resource with the ability for remote real-time readings. This is especially important in confined aquifers.
- Continue to update the certification of irrigated acres.
- Continue to assist District communities who have difficulties with water quality and quantity by helping determine rural water system feasibility.
- Keep the Saunders County Rural Water System study as an alternative in the event of changing federal regulations governing municipal water supplies.
- Keep abreast of updates and new iterations of the Elkhorn-Loup Model (ELM) to determine which areas in the Shell Creek watershed are in hydrologic connection with the Elkhorn or Loup River basins.

In summary the LPNNRD needs to focus on five areas in the next five years:

1. Using information from the AEM flights and test holes, establish a monitoring well network in these confined aquifers to record continuous ground water energy levels. It is midsummer declines (late July to mid-August) when large drops in aquifer pressure can cause some wells to run low on water. Map locations of potential recharge sites. More flights, test holes and/or monitoring wells might be necessary in areas to provide the necessary information.

2. Establish ground water management rules to better address confined aquifers. This could involve comparing spring to summer ground water energy levels and comparing this to the potentiometric aquifer thickness and the depth of bedrock. The current management rules for unconfined aquifers should be adequate for future conditions. These controls are based on three consecutive spring readings at or below their trigger levels in at least 50% of the GWEL wells in a given subarea.

3. AEM flights have given a new interest in bedrock aquifers such as the Dakota formation. Monitoring wells in selected areas are needed to determine the water quality and quantity of these bedrock aquifers. Also are these bedrock aquifers in hydrologic connection to any overlying aquifers? If this is the case and new high capacity wells are being established in these bedrock aquifers then management should shift focus to the more vulnerable aquifer to sustain long term viability of both aquifers. If these bedrock aquifers are isolated from the overlying aquifer then "three dimensional management" where wells are managed differently due to their depth may be in order. This could get complex but management needs to take the chemical and physical characteristics of the aquifer in account. For example, what is the salinity of the groundwater and is the bedrock aquifer cemented, unconsolidated, sandstone, limestone, or shale.

4. Horizontal wells. In the immediate future horizontal high capacity irrigation water wells will likely be established in thin aquifers to increase well output or yield. On the plus side, these could replace several vertical wells that are used in series and therefore be a cost savings to the well owner. On the negative side these could quickly dry up thin aquifers less than 20 feet in thickness and affect nearby wells. How do you manage such a system? At the least you could require 600 feet spacing from any point of the lateral to a neighbor's well but again this may not provide much protection in thin aquifers such as the area immediately west of Fremont. Other management options would be to restrict the number of acres irrigated, restrict the length and direction of the laterals, restrict well output such as limit the gallons per minute, establish water allocation, install monitoring wells such as near the end of the laterals to track groundwater levels, etc.

5. Integrated Water Management. Siting of potential recharge sites, storage reservoirs (both surface and groundwater), and potential water reuse projects to enhance the water supply in the District. Additional monitoring wells, streamflow gauging, and precipitation sites will likely be

necessary. Effects of climate change will also need to be considered as part of integrated water management.

Soil Conservation

In response to the Erosion and Sediment Control Act (LB 474), passed in 1986, the Natural Resources Commission developed the Nebraska Soil and Water Conservation Strategy. This strategy outlines a course of action for efficiently conserving and managing the state's natural resources.

The Lower Platte North NRD administers the Erosion and Sediment Act and has patterned its local program after the state strategy. The district administers state and local cost-share funds through Soil and Water Conservation Programs (SWCP) to offer incentives to farmers for installation of land treatment practices. LPNNRD staff also worked with NRCS staff to utilize Farm Bill Programs to repair erosion problems.

FY 2022 Soil Conservation Activities

Soil and Water Conservation Programs (SWCP)

Under Soil and Water Conservation Programs (SWCP), the LPNNRD allocated $83,029.99 of state funds for land treatment practices during fiscal year 2022 in cooperation with 15 different landowner projects. In addition, 3 Buffer Strip contracts were administered with $ 12,258 in state funds.

For fiscal year 2023, $86,748.17 of state funds (from the Nebraska Department of Natural Resources) and $25,000 of local funds will be allocated for soil and water conservation practices.

Wahoo Creek Water Quality Land Treatment Efforts

Wahoo Creek in Saunders County, Nebraska, has resided on the Environmental Protection Agency's (EPA) Section 319 list of impaired water bodies. To address the impaired status of Wahoo Creek, LPNNRD in partnership with the U.S. Environmental Protection Agency (EPA) and the Nebraska Department of Environment and Energy (NDEE) developed the Wahoo Creek Watershed Water Quality Management Plan in 2013. These plans are updated every 5 years and the District is completing another update in 2022. This plan identifies goals to reduce excess phosphorus, nitrogen, soil sediments and E. coli bacteria in the Wahoo Creek Watershed. This plan meets the EPA requirement of containing "Nine Elements" of an effective

watershed plan. The plan identifies water quality goals to protect and enhance the quality of all water resources within the Wahoo Creek. Sub-watersheds within the Wahoo Creek Watershed were prioritized for future water quality projects. LPNNRD in partnership with EPA, NDEQ and the Natural Resource Conservation Service (NRCS) identified four Wahoo Creek sub-watersheds as Water Quality Initiative (WQI) areas to receive special EQIP and EPA 319 funding for landowners to complete conservation practices to help achieve the numerous identified water quality goals.

Approximately $36,458 of 319 Grant Funds in FY 2022 were spent in the Wahoo Creek watershed. These cost-share monies helped construct practices including approximately 5,000 linear feet of terraces, 3,000 linear feet of tile outlets. The Wahoo Creek Grant also included approximately 135 acres in the Lands for Conservation program that helps generate Summer work in the watershed.

In FY 2022, we completed the Wahoo Creek Watershed Water Quality Plan Phase II, Part B, which combined $177,250 of remaining EPA 319 grant funds and $43,000 of the remaining Nebraska Environmental Trust grant funds. These funds were used to complete a large Shoreline/Road Stabilization Project at Czechland Lake, Lands for Conservation landowner payments, and for the Wahoo Creek Watershed Plan Update. For example, septic systems that are over 30 years old or have an open discharge are eligible for up to $15,000 of cost-share assistance to bring the system up to EPA/NDEE code. The NRD cost-shared on two septic system upgrades within the Wahoo Creek Watershed in FY22. To accomplish water quality goals, as outlined in the EPA Water Quality Watershed Plan, is to continue this partnership effort for many years to come. The Railroad Road/Czechland Lake Shoreline Stabilization Project was completed in the Fall of 2021. This was a cooperative effort between LPNNRD and Saunders County.

Shell Creek Watershed EPA Section 319 Water Quality Improvement Efforts

Shell Creek is a major tributary of the Lower Platte River. Land use in the approximately 305,000 acre watershed is predominantly row crop agriculture. The designated beneficial uses (Primary Contact Recreation and Aquatic Life) of some segments of Shell Creek are impaired by elevated levels of Escherichia coli (E. coli) bacteria, selenium, Atrazine and excessive erosion from storm water flow.

The Shell Creek Watershed Improvement Group (SCWIG) is a volunteer committee that formed in 1999 to lead local efforts to identify problems and to promote implementation of conservation practices to improve water quality in Shell Creek. This evolved into an advisory group to LPNNRD continuing to provide local leadership toward reducing erosion and quality impairments in the watershed. A community-based planning approach was used to gather input from the citizens of the watershed for development of the Shell Creek Watershed Environmental Enhancement Plan that emphasizes combinations of practices that improve water quality. Efforts have been underway on the plan update to be completed by the end of 2022.

Over the past 22 years, the Shell Creek Watershed has benefited with over $2 million in EPA Section 319 funds combined with approximately $4 million in partnering federal and local funds for assisting landowners in establishing Best Management Practices on their farms. These efforts resulted in Shell Creek becoming the first watershed in the nation to be delisted for atrazine contamination in FY 2018.

In FY 2022, in cooperation with Colfax County, the Shell Creek Channel and Bank Stabilization Project near Schuyler south of the Union Pacific Railroad bridge replacement near Colfax County Road 15 was completed. In addition, a large bank stabilization Project was completed in the summer of 2022, in cooperation with a private Platte County landowner. The District is planning with local and state partners for establishing local, state and federal grant assistance for the next five year period.

Erosion and Sediment Complaints

The LPNNRD responds to occasional erosion and sediment complaints. In most cases, these complaints are resolved before going through the formal complaint process. Many cases are drainage issues that are resolved between the District and landowners. During FY 2022 NRD staff was subpoenaed on a case between two neighbors that could not be resolved amicably.

FY 2023 Soil Conservation Objectives

- Use technical assistance from the NRCS in the planning, design, construction, and maintenance of conservation measures applied to the land.
- Use Federal, state and local funds to promote and implement land and water treatment projects in the Dunlap Creek, North Branch and Miller Branch of Wahoo Creek, along with Cottonwood Creek Watershed and Shell Creek Watershed, to reduce erosion and improve water quality.
- Continue encouraging the implementation of summer conservation construction utilizing federal funding within the Wahoo Creek Watershed through the Lands for Conservation program; for FY23 the NRD has approved $28,800 for the set aside of 150 acres.
- Administer $86,748.18 of State NSWCP funds and $25,000 of local cost-share and grant funds to landowners for the construction of terraces, tile outlets, waterways, diversions, small dams, planting of permanent vegetation, and maintaining water quality.
- Continue to promote conservation tillage measures, pasture & range management, sustainable agriculture, and the Conservation Reserve Program (CRP), through news releases and the district's newsletter.
- Recognize the Outstanding Soil and Water Conservationists.
- Continue to assist landowners in resolving soil erosion and sediment complaints.
- Provide financial support and staff time to conservation education activities.
- Continue to work closely with locally-led conservation groups to promote soil and water conservation throughout the district.
- Partner with the Shell Creek Watershed Improvement Group (SWIG), EPA/NDEE and NET toward continuing implementation of Best Management Practices in the Shell Creek Environmental Enhancement Plan Implementation.

- Work with NRCS, NDEQ, NET, and Saunders County and the Wahoo Creek locally led Steering Committee in pursuing additional federal and state funds to assist with land treatment practices as defined in water quality objectives in the Wahoo Creek Watershed Water Quality Plan.
- Assist with the formation of local landowner advisory steering committees in the Wahoo and Bone/Skull Creek Watersheds for planning soil & water conservation practices and flood reduction.

FY 2024-2028 Soil Conservation Long Range Objectives

- Maintain existing land treatment practices and programs.
- Continue to work with all counties in the district to reduce roadside erosion.
- Administer NET and NDEE/EPA 319 Grant Programs to improve water quality throughout Wahoo Creek, Shell Creek, and the Lower Platte River Corridor priority watersheds.
- Look for new and innovative soil and water conservation methods.
- Partner with NRCS, UNL Extension and landowners to improve all aspects of their water and soil quality.
- Continue to support the Land and Range Judging Contests.
- Continue targeting SWCP land treatment program funds for priority watersheds in the District.
- Use existing and new technology and GIS software programs for implementing and promoting soil conservation practices.
- Promote the use of and make available soil surveys and land use information.
- Continue to support Locally Led Landowner Groups to promote and implement soil and water conservation practices.

FY 2022 Flood Control and Damage Reduction Activities

Watershed projects have been completed in five of eleven sub-watersheds (see Appendix E) in the LPNNRD to help reduce floodwater and provide grade stabilization. These completed projects include Bellwood, Clear Creek, Cottonwood Creek, Sand and Duck Creek and Swedeburg watersheds, along with Rawhide Creek. Current high priority flood reduction areas include Shell Creek, Wahoo Creek, Skull Creek and Bone Creek watersheds. On federal and state projects where the LPNNRD acts as project sponsor, the district obtains land rights and mitigates for loss of trees, wildlife habitats and fences destroyed by project construction. The LPNNRD is also responsible for operation and maintenance activities on these projects after they are built.

The LPNNRD offers local assistance for the construction of small dams that can help counties and/or landowners protect county roads, control erosion and provide water for livestock and wildlife.

Wahoo Creek Flood Reduction Efforts

In 2017, the Natural Resource Conservation Service (NRCS) approved $1.5 million under their Regional Conservation Partnership Program (RCPP) to assist with construction of three Wahoo Creek flood reduction dams, sites 26a, 26b & 27. These dam sites were originally identified as potential projects in the NRCS Wahoo Creek Watershed Plan completed in 1998. The total estimated cost to complete the three dams is $4.1 million. In addition to RCPP funding, there is another $2.3 million of state funds approved through the Nebraska Department of Natural Resources Water Sustainability Fund. It is anticipated that approved funding through LB 406 will assist with the estimated $1.1 million needed from local sources.

In the fall of 2017, NRCS approved additional funding for the Wahoo Creek Watershed under the federal Watershed Flood Prevention Operations Program (WFPO), historically referred to as P.L. 566. LPNNRD then entered into a three year agreement with NRCS to use federal funds for watershed planning to include sites 26a, 26b, 27 plus an additional seven remaining Wahoo Creek Watershed flood reduction dam sites (55, 66, 77, 82, 84, 85 & 86). FYRA Engineering was hired to assist LPNNRD with completing the Wahoo Creek Watershed plan which was submitted to NRCS for final review in December 2021. It is anticipated we will receive formal plan approval by the fall of 2022. WIth the approval of $22 million from LB 406 funding, LPNNRD has hired Olsson (Engineering) for completing the design, permitting, bid letting and construction oversight for all ten dam sites by the end of calendar year 2026.

Sand Creek Environmental Restoration Project (Lake Wanahoo)

With the invaluable assistance of numerous local, state and federal partners, 2011 witnessed the completion of construction on Lake Wanahoo's earth embankment. The breakwater feature and the fisheries component were completed a few years prior to the embankment. Recreation components were completed for Lake Wanahoo in FY 2011. Construction of seven upstream flood reduction/environmental enhancement structures were completed in FY 2012 - FY 2014.

In FY19, LPNNRD assumed Lake Wanahoo's recreation management responsibilities from the Nebraska Game and Parks Commission.

Operation and Maintenance

District staff completed inspections on 45 watershed structures and special projects in the NRD in FY 22. These inspections help detect problems before they become serious. Also during the 2022 fiscal year, noxious weeds and volunteer trees were sprayed on 45 dams, Clear Creek Levee and the Rawhide Ditch System. Annual maintenance activities such as removing debris, repairing fences and unplugging risers were completed at many of the dam locations.

Army Corps of Engineers 205 and GI Flood Studies

Over the past few years, the District has partnered with local entities and the US Army Corps of Engineers to study flood protection alternatives for their areas. In 2004, LPNNRD partnered with Fremont, Inglewood and Dodge County to look at a potential levee project to remove areas from the Platte River 100-year ice induced floodplain. In FY 2017, the Fremont study evolved into a General Investigation (GI) Study which determined that there is not a feasible structural solution (levee) to the City of Fremont's flood threat from the Platte River. In 2018 the GI Study evolved back to a 205 Non-Structural Study for the City of Fremont and Dodge County. This effort will continue in FY 2023.

In 2005, LPNNRD entered into an interlocal agreement with the City of Schuyler to evaluate levee protection options to protect the city from flooding from the Platte River and Shell Creek. In FY 2012, the Schuyler 205 Study was completed and entered into the project design phase. In FY 2014 the design phase was completed and LPNNRD assisted Schuyler with obtaining needed land rights for the Shell Creek Levee portion of the project which began construction activities in the spring of 2014 and most construction activities were completed in the fall of 2015. LPNNRD continued to assist Schuyler in FY 2018 with closing out the project with the Army Corps of Engineers. Schuyler continues to do a good job in maintaining the levee.

FY 2023 Flood Control and Damage Reduction Objectives

- Continue with accelerated land treatment efforts in identified priority watersheds in the District.
- Complete biennial inspections on 45 watershed structures; spray noxious weeds & cut and treat trees on 45 dams, Clear Creek Levee and Rawhide ditch; complete regular maintenance activities at all sites.
- Continue to be an active partner on the Joint Water Management Advisory Board to explore flood reduction and drainage solutions in the lower one-third of Dodge County within LPNNRD.
- Partner with the City of Fremont, Dodge County and Papio-Missouri River NRD to fund operation and maintenance of established USGS cameras and water gauges at five locations along the Lower Platte River.
- Partner with Dodge County, City of Fremont, Dodge County, City of North Bend and the North Bend Drainage District toward an eventual FEMA Drainage Improvement Project.
- Partner with City of Fremont, Dodge County and the Fremont Rod & Gun Club on completing the Platte River Levee Breach Repair Project.
- Continue to educate the public on watershed management and flood reduction in LPNNRD newsletters, news releases and our website.
- Cooperate with landowners and counties in evaluating small dam sites for cost-share throughout the district.
- Continue to partner with the Army Corps of Engineers, FEMA, City of Fremont, Englewood and Dodge County on exploring non-structural opportunities for feasible flood control solutions.
- Support the City of Schuyler for exploring non-structural opportunities for feasible flood control solutions from the Platte River through the LPNNRD District-wide Hazard Mitigation Plan.

- Work with Communities, Counties and other entities on projects identified in our District-wide All Hazard Mitigation Plan.
- Obtain final formal NRCS approval on the Wahoo Creek Watershed Plan that identifies the future completion of ten flood water reduction dams.
- Complete engineering designs on Wahoo Creek Dam Sites 26a, 26b and 27.
- Complete engineering designs on Wahoo Creek Dam Sites 55, 66, 77, 82, 84, 85, 86.
- Begin the process using approved federal and state funds for constructing all ten Wahoo Creek flood water reduction dams.
- Begin the process of updating LPNNRD's district-wide All Hazard Mitigation Plan.
- Work with Dodge County and City of Fremont and other JWMAB members toward the completion of the Rawhide Watershed WFPO Planning efforts.

FY 2024-2028 Flood Control and Damage Reduction Long Range Objectives

- Continue to commit funds and staff time toward completing flood water control/reduction structures in the Wahoo Creek Watershed.
- Continue to budget staff time and funds to maintain and operate completed flood control structures that are sponsored by the LPNNRD.
- Continue to explore flood reduction opportunities for Shell Creek and Skull Creek Watersheds.
- Continue to encourage cities and counties in the district to accept and implement Floodplain Management Authorities.
- Assist Fremont, Inglewood and Dodge County with non-structural flood protection projects as identified by the Army Corps of Engineers study and the Hazard Mitigation Plan Flood Resiliency study.
- Assist Schuyler with non-structural Platte River flood protection project opportunities as they become available.
- Assist District Communities in evaluating future flood protection for their communities through updating the District's Hazard Mitigation Plan and assisting with identified projects.
- Construct ten approved Wahoo Creek flood water reduction dams by the end of 2026.
- Continue to work with JWMAB members on the numerous projects identified as flood reduction/drainage improvement projects.

FY 2022 Forestry, Range, Wildlife Habitat, Recreation & Drainage Activities

The district administers several programs designed to enhance the region's forest, range, and wildlife land, including the Tree Planting Program, Wildlife Habitat Programs with Game & Parks and Pheasants Forever, SWCP Program, and Mitigation Program. The district also sponsors educational activities such as Range Judging and Land Judging contests, and other school-oriented activities.

Tree Program

One of the most visible and popular programs offered by the LPNNRD is the district's tree planting program. As a direct result of this program, begun in 1973, an estimated 862,750 trees and shrubs have been planted in the district. Trees and shrubs may be obtained from the NRD for windbreaks, shelterbelts, wildlife habitat, woodlots, and Christmas tree plantings. Besides providing a planting service, the NRD also designs tree plans and offers technical advice on ground preparation for tree sites.

During the spring of 2022, 17,875 trees and shrubs were distributed to District residents. Of this total, 5,908 were planted by the NRD field crew at 12 sites.

Wildlife Programs

Lower Platte North continues to encourage landowners to set aside land for wildlife habitat by using Federal Programs and Programs provided by Nebraska Game & Parks and Pheasant Forever. Programs such as Corners For Wildlife and Wild Nebraska.

Community Forestry Program

In FY 2021-2022 LPNNRD donated 950 seedlings schools in Fremont, Richland, Columbus and Newman Grove and provided trees to Conservation Sensation and Fremont EcoFair for educational purposes The District budgets $2,000 for Community tree development projects. The District did not assist a Community during the fiscal year..

FY 2023 Forestry, Range and Wildlife Habitat Objectives

- Plant and distribute conservation trees and shrubs through the district's Tree Planting Program.
- Continue to include tree planting as an eligible cost-share practice under the SWCP program.
- Offer trees and give staff presentations to elementary students across the district.
- Assist cooperators to sign up for Wildlife Programs.

- Cooperate with the Extension Service and the NRCS in obtaining tree orders from District residents.
- Provide cost-sharing for the conversion of cropland to grassland through the SWCP program.
- Cooperate with Pheasant Forever Chapters to enhance wildlife habitat and establish windbreaks.

FY 2024-2028 Forestry, Range and Wildlife Habitat Long Range Objectives

- Sell as many trees and shrubs each year through the district's Tree Planting Program, and to plant as many trees and shrubs for qualified property owners.
- Provide information and education on tree planting, woodland management, grassland management, and proper wildlife habitat enhancement through the media, tours, and schools.
- Continue to administer Wildlife Habitat programs in cooperation with the Nebraska Game and Parks Commission and other partnering entities as opportunities arise.

FY 2022 Recreation Activities

Czechland Lake Recreation Area

Czechland Lake Recreation Area is a multipurpose project located one mile north of Prague, Nebraska on Highway 79. Flood control, recreation and education are the main benefits of the project. Located at a convenient distance from Omaha, Lincoln, Fremont and Wahoo, the 85 surface acre lake is situated on 265 acres of public access land operated and maintained by the LPNNRD.

State park permits and fees are not required for entrance to the area. Czechland Lake has 11 electrical camper pads at an $18/night fee for the use of a camping pad. There are also three non-electrical pads. A Nebraska Fishing License is required for anglers. The lake fishery is managed by the Nebraska Game and Parks Commission, which stocks and monitors fish populations. Catfish, Bluegill, Northern Pike and Largemouth Bass were initially stocked in Czechland Lake.

Originally built as one of twelve floodwater structures in the Cottonwood Creek Watershed, Czechland Lake has developed into one of the area's most popular recreation spots. The reservoir and recreation area development was built at a total cost of $1.8 million. Funding for the project was shared by the Nebraska Natural Resources Commission, Saunders County, USDA Natural Resources Conservation Service and LPNNRD. Grant monies from the U.S. Environmental Protection Agency have been used to reduce non-point source pollution entering the lake and to provide educational resources.

The Czechland recreation area was used extensively during FY 2022 generating approximately $20,000 in camping revenue. Mowing, trash removal, repair and upkeep of park equipment, and thistle control kept LPNNRD park staff very busy during the spring and summer.

Homestead Lake (Skull Creek Site #55)

Construction was completed on Homestead Lake in 2001. The dam offers flood control for nearby communities, and has been developed for public recreation. Recreation facilities include a shelter, restroom, picnic areas, a boat ramp, and hunting areas. FY 2022 proved to be another very popular year for recreationists as the area was extensively used.

Lake Wanahoo

Work was completed on recreation facilities at Lake Wanahoo one mile north of Wahoo in FY 2012. Recreation facilities at the 1,600 acre site straddle the 662-acre lake, with camping and boating access on the west side and a day use area on the east. A rocked hiking/biking trail winds throughout the park, linking the east and west side recreation areas over a breakwater levee one mile north of the dam. Mowed trails north of the levee provide access to undeveloped areas set aside for wildlife habitat.

The camping area contains 75 camper pads, 54 tent camping sites and 6 primitive cabins. All camper pads are equipped with electrical hookups and are rock surfaced. All sites, electrical, cabin and tent have fire rings and picnic tables.

The recreation area offers access to two large boat ramps wide enough to accommodate four boats at a time. Boating on the entire lake is no-wake only.

The day use area on the east side of the lake has two large picnic shelters and two smaller ones, all offering scenic views of the lake. In FY 2017 a dump station for RV's was constructed on the east day use area as well as a disc golf course/nature educational trail.

Both the camping and day use areas provide excellent fishing access, with a total of seven fishing jetties. One jetty on each side has an attached handicapped pier. The lake was stocked with largemouth bass, bluegill, blue catfish, crappie, northern pike, and walleye beginning in 2008.

Limited hunting opportunities will continue to be available at Lake Wanahoo through the Game & Parks Commission PATH Program, where adults can schedule a time to mentor a youth hunter at designated hunting sites north of the recreation area.

The Lake Wanahoo Recreation Area was opened to the public in spring 2012. An operation and maintenance plan was developed with the assistance of the Nebraska Game and Parks

Commission and Pheasants Forever in FY 2014 which identified activities that were implemented in 2015 .

In FY 2019, LPNNRD assumed the responsibilities of administering Lake Wanahoo as a public recreation area from the Nebraska Games & Park Commission.

In FY 2020, the Clint Johannes Education Building was completed on the day use portion of the recreation area. This facility provides a protected outdoor education space for LPNNRD education activities, as well as a rentable event facility for the public. Also in FY 2020, six new primitive cabins were installed in the primitive camping portion of the park to give visitors a unique alternative to tent camping.

FY 2023 Recreation Objectives

- Continue to budget funds for maintenance, including grass mowing, tree trimming, grading roads, outhouse cleaning, trash removal, painting and noxious weed control, at Lake Wanahoo, Czechland Lake and Homestead Lake Recreation Areas.
- LPNNRD will continue managing all recreation at the Lake Wanahoo recreation area.

FY 2024-2028 Recreation Long Range Objectives

- Continue to evaluate the development of new outdoor public recreational opportunities as they arise.
- Continue to assist NE Game & Parks and Pheasant Forever in developing new areas offering public access.

Drainage Improvement and Channel Rectification FY 2023 Drainage Improvement & Channel Rectification Objectives

It is the general policy of the LPNNRD not to provide financial assistance for drainage improvement and channel rectification unless a project has public benefit and is sponsored by a county, city, Drainage District or a group of landowners through an established Improvement

Project Area. Under this policy, the district has cooperated on several projects that have provided public benefit.

- Work with Colfax County to complete new Shell Creek South Channel Improvement/Benching Projects
- In partnership with Dodge County and Fremont, support drainage improvements east of Fremont through FEMA.
- In partnership with the North Bend Drainage District, Dodge County and City of Fremont, support the drainage improvement project assessment of the North Bend drainage ditch through FEMA.

- Continue to oversee the Rawhide Creek West Branch Project to ensure that landowners control vegetation on Rawhide Creek to help it stay clean.

- Provide continued assistance to Platte Center with stabilizing segments of Elm Creek.

FY 2024-2028 Drainage Improvement & Channel Rectification Long Range Objectives

- Evaluate potential technical and funding assistance to counties, cities and other entities in the district that sponsor sound drainage and channel improvement projects.

FY 2022 Waste Disposal & Pollution Objectives

Over 30 years ago, vast changes occurred in Nebraska's solid waste regulations. Landfills that weren't properly designed, operated or sited were required to shut down, as were unauthorized dumps. In order for a landfill to operate, it must be approved by the State and receive a permit. If a permit is not issued, the landfill cannot legally operate. Currently, the only permitted landfill in the Lower Platte North NRD is a facility near David City.

FY 2023 Waste Disposal & Pollution Objectives

- Promote recycling efforts in the district through education programs, newsletters, and news releases.

- Participate in education efforts to promote the reduction of pollution to our air, water, and soil resources.

- Cooperate and be supportive of other group and agency pollution control efforts, education, and/or regulation.

FY 2024-2028 Waste Disposal & Pollution Long Range Objectives

- Assist and encourage all District communities in establishing collection locations for recyclable wastes.

- Assist District cities and counties in establishing pickup days for hazardous household and farmstead wastes as opportunities arise.

- Promote waste reduction efforts in the district through education and incentives.

FY 2022 Information & Education Activities

A major responsibility of the Lower Platte North NRD is to keep the public aware of the district's various projects and programs, and to inform and educate children and adults about the wise use and management of our natural resources.

During fiscal year 2022, the Lower Platte North NRD conducted many activities to help residents learn the importance of our soil and water resources and to stay informed of issues and concerns regarding natural resources. Some of the highlights included:

Publications and Marketing

The NRD distributes two newsletters each fiscal year. The Winter issue of "The Viaduct" newsletter includes an additional page that contains the Annual Report. In FY 2012, the district switched distribution of "The Viaduct" newsletter from direct mail subscriptions to inserts in area newspapers. In FY 2022, more than 21,000 copies of each newsletter were distributed in area newspapers and via email.

Various brochures describing LPNNRD programs and services were updated as needed in FY 2022. These brochures are displayed in the office and distributed during LPNNRD sponsored events and exhibit booths. A fact sheet for use with the Nebraska Association of Resources District's public relations campaign at public events is updated yearly.

Press releases are distributed to district newspapers, email lists and radio stations. Numerous ads spotlighting different NRD programs and upcoming deadlines air on KTIC Radio throughout the year. Digital ads on the Wahoo newspaper website continued in FY 2022. In FY 2020, the LPNNRD began airing 30-second program commercials on News Channel Nebraska. With the success of these videos, the NRD continued airing the Lake Wanahoo video, the Projects video, Operations and Maintenance video, and newly produced Information and Education video.

The NRD continues to maintain information and education outreach for the district through the use of social media outlets on Facebook, Twitter, and YouTube. These outlets are maintained weekly and provide information along with photos and videos about district activities and events.

Website

The NRD's website at www.lpnnrd.org contains information on nearly all of the district's projects and programs, along with staff and director information, committee and board meeting minutes, and more. Online application and registration forms for various projects and programs are available as well. Online payment capabilities continue to allow customers to pay for trees, rural water bills, and Lake Wanahoo permits. In 2019, the district began tracking the activity on the website including which pages are viewed to help keep current information available online. The website continues to be updated to allow for different types of viewing devices – desktop, mobile and tablet devices.

Video Promotion

During FY 2018, the district worked with redthread to create a 1 minute, and 30 second video that promotes the conservation efforts of the district. A past director, current director, and current staff are featured in the video. The children of a current employee and a current director were also featured in the video.

During FY 2019, redthread created a promotional video for the Lake Wanahoo NRD Recreation Area. With the need to bring nature and outdoor recreation to people during the pandemic, the commercial was featured in 30-second spots on News Channel Nebraska during the summer of 2020.

KLKN produced a video to promote LPNNRD's water conservation efforts. The video featured LPNNRD Water Department staff and various water quality and quantity efforts.

During FY 2020, redthread created a promotional video for the duties and responsibilities of the Operations & Maintenance department, and a video to promote the activities of the Projects department. The videos featured current staff, and the video was narrated by a current LPNNRD director.

During FY 2022, the LPNNRD worked with News Channel Nebraska to create a video for the Information and Education departmen. This video focuses on the district's information outreach efforts and environmental education. Some of the footage was taken throughout the year from education events. The video also features current staff and was narrated by the Information Coordinator.

With the completion of the Information and Education video, clips from all of the department videos are combined to create one video that features all of the programs at the LPNNRD. These videos are shown as educational purposes for presentations, the LPNNRD website, commercials through area television stations, and featured on social media platforms.

Education Programs

During FY 2022, the district continued with two year-long programs. The St. Wenceslaus Pre-kindergarten students learn about wildlife, trees, birds, recycling and water conservation through books, pictures, stories, and hands-on activities. The students also came out to Lake Wanahoo at the end of the year for a field trip filled with nature hikes, nature crafts, and disc golf. The district teamed up with Wahoo Public 8th Grade students for the Survival Club program, making a total of three full school years of the program. LPNNRD staff and other outdoor enthusiasts meet monthly with students during the school year to learn about hiking, knot tying, 2-legged predators, 4-legged predators, fishing, first aid, foraging for wild foods, fire building and other outdoor survival skills. Unfortunately, student involvement was very low and we didn't end up finishing out the school year due to no student involvement (March). Efforts to renew and rejuvenate the survival club are being made for the upcoming school year.

The district continues to participate in the Career Exploration Opportunities (CEO) Program with Wahoo Public Schools. During the Spring semester of 2022, LPNNRD staff hosted one high school senior and he rotated between each department to learn about the LPNNRD responsibilities. The district will host another student during the fall of FY 2023. He will be with the LPNNRD from August to December and is looking forward to getting hands-on experience.

The Clint Johannes Education Building is utilized for events of all kinds. Local teachers and other organizations will use it for their students and staff as a meeting space with a great view and amenities. The LPNNRD utilizes the building for educational events every single month. The monthly event, Coffee Lakeside, has impacted over 100 people. Topics included shorebirds, migration, frogs and toads, prairie plant ID walk, wetlands, and more. Six new events were also held at the LPNNRD with two of them repeating. The first annual Wildflowers and Wine event discussed prairie ecosystems, cost-share programs available, and ended with sampling local wine from Cellar 426. This event brought in 42 people. Two rain barrel workshops were held, one in August and one in April. Eight attendees and then eighteen attendees respectively, attended the 'make and take' event where they learned about conserving water and then constructed a full sized rain barrel. The January, Bees and Brews workshop, brought in 65 people. This workshop was an informational night on honeybees and starting your own beehives. Infusion Brewing Company partnered with us to create a locally sourced Honey and Lavender Saison specifically for the event; it was rightfully named "Honey Momma". Presenters also came from UNL Master Beekeepers. Science and Scenes was a night of learning about the science of pollination and then a step by step, acrylic landscape painting lesson. Fifteen people attended this event led by a local studio art student. Partnering with UNL Extension Staff, we held a lawn care, composting, and greenhouse event; 18 people attended. This event showcased water conservation and species selection for lawn care needs; learning to compost; and an introduction to greenhouses. Nocturnal nights were held in May and August with 50 attendees and 22 attendees respectively. Families attending this event could learn all about nocturnal animals by dissecting owl pellets, listening to night time sounds, identifying tracks and more. A night time nature walk around the lake and smores to end the night made this event a highlight of attendees' summers.

The Lower Platte North NRD and Lower Platte South NRD rotate in hosting the East Central Land Judging Contest. Land Judging is a competition for high students that challenges them to gain a better understanding of soil structure and land evaluation. The Lower Platte North NRD works with local NRCS employees to choose a site location and help with site preparation. The Lower Platte North NRD staff and NRCS staff will assist in the preparation, contest monitoring, and scoring efforts during the contest. The East Central Land Judging Contest will be held by Lower Platte North NRD on October 5th, 2022.

The annual LPNNRD Spring Conservation Sensation was held on May 4th at Lake Wanahoo. Fifth and sixth grade students from Saunders, Butler, and Dodge Counties participated in various activities. Hands-on activities were presented by LPNNRD staff, additional personnel from various agencies and organizations, and volunteers to teach students about the environment, natural resources, tree planting, lake ecosystems, wildlife education and more. 231 students attended this amazing event.

The first annual LPNNRD Natural Resources Camp was held at Lake Wanahoo. For one week, attendees learned how to fish; how to go birding; about the amphibians and reptiles of Nebraska; and insects and their life cycles. Four boys ages 7, 10, 10, and 11 attended the week long camp. The hands-on activities were the students favorite parts per their evaluations and they are looking forward to returning next summer. The goal for FY 2023 is 3 consecutive weeks of camp for 3 different age ranges.

Test Your Well Event is a program that partners with area FFA chapters to host public events, providing nitrate testing of water samples from private wells at no cost to the attendees. The district held 4 events (East Butler, Platte Center, Schuyler, and Mead) that involved 40 students and over 50 wells sampled.

Staff at the LPNNRD visited 11 different schools with 27 classroom visits. Every single grade except 2nd, was visited for a natural resources lesson or activity. All day field trips for 1st and 3rd graders were conducted at Lake Wanahoo and in partnership with Live Well Go Fish. The LPNNRD has a great partnership with Live Well Go Fish.

District staff provided various presentations and activities during natural resources festivals, field days, out-of-school time programs, school classrooms, online activities on the LPNNRD website, and adult education events. As a result of the district's educational outreach efforts, there was interaction with approximately 1531 youth and 371 adults in FY 2022.

Awards, Contests, and Events

In addition to marketing efforts, the Lower Platte North NRD provides a physical presence with exhibit booths at local county fairs, agriculture expos and other events across the district. The NRD provided an exhibit booth in the Spring along with the Dodge County USDA/NRCS at the Fremont Eco Fair. The NRD dispersed Ponderosa Pine tree seedlings for 4th grade students in attendance. The NRD also provided an exhibit booth at the Butler County Fair and a parade during

the Saunders County Fair. Promotional materials at the events included broches of the NRD's projects and programs, information about Nebraska's NRDs, career opportunities in natural resources, magnets, stickers, frisbees and coasters filled with wildflower seeds. The LPNNRD plans to provide displays at up to five area county fairs, and agriculture related events in the district in the future.

Nebraska's NRDs celebrated their 50 Year Anniversary in July of 2022. The Lower Platte North NRD held an open house at the office to celebrate.

FY 2023 Information & Education Objectives

- Publish the district newsletter "Viaduct" biannually in an electronic format and as a printed newspaper insert in 10 area newspapers.
- Send timely news releases to the local media on various LPNNRD programs, projects, and activities.
- Disperse pamphlets and other publications about LPNNRD programs.
- Update the district's website frequently.
- Continue to provide a display at county fairs or agriculture events (up to five major counties) within the district.
- Continue information and education outreach for the district through the use of tools such as local radio stations, local TV stations, and social media outlets (Facebook, Twitter, YouTube, etc.).
- Continue with the annual awards and recognition program.
- Provide district elementary students with free trees, as requested, in the spring.
- Provide LPNNRD staff as requested to speak to community organizations and schools on NRD activities and environmental topics.
- Provide various education programs, events, and activities to area schools and out-of-school time programs.
- Host the East Central Region Land Judging Contest in the fall of 2022.
- Host the 32nd Spring Conservation Sensation in May 2023.
- Develop new programs and promotional projects to aid in outreach efforts of the district.
- Develop a video for the three recreation areas in the district.
- Provide assistance and publications for the students involved in the Shell Creek Watershed Monitoring Program.
- Continue to provide a scholarship for graduating seniors in the Shell Creek Watershed Monitoring Program who plan to pursue higher education relating to science or natural resources.

FY 2024-2028 Information & Education Long Range Objectives

- Search for new and effective ways to inform and educate the public on the NRD purpose and programs.
- Participate with the Information & Education Staff Group to coordinate statewide I&E activities and produce statewide products.
- Increase participation in activities sponsored by other agencies relating to the NRD's responsibilities.
- Seek to have conservation/environmental education as a part of the school curriculum.
- Support environmental education activities and events throughout the district, and neighboring NRDs.
- Provide assistance for the East Central Region Land Judging Contest in the fall of 2023, hosted by Lower Platte South NRD.
- Assist in the development of an outdoor classroom for a district school.
- Partner with district schools to host Test Your Well Events annually.

LPNNRD Staff

The staff of the Lower Platte North NRD includes 17 full-time and part-time employees stationed at the district office in Wahoo. The NRD administers a full-time field technician, four field office assistants in Natural Resource Conservation Service county offices, and a Recreation Facilitator for Czechland & Homestead Lake Recreation Areas.

Current staff as of September 1, 2022:

Sydney Abbott, **Education Coordinator**

Daryl Andersen, **Water Resources Manager**

Tyler Benal, **Water Resources Specialist**

Jill Breunig, **Bookkeeping Department Head/Administrative Assistant**

Will Brueggemann, **Water Resources Specialist**

Ryan Chapman, **Assistant General Manager**

Duke Dokulil, **Operations & Maintenance Technician**

Sean Elliott, **Projects/Rural Water Manager**

Noah Franzen, **Water Resources Technician**

Eric Gottschalk, **General Manager**

Bob Heimann, **Operations & Maintenance Manager**

David Moore, **Operations & Maintenance Technician**

Russell Oaklund, **Lead Water Resources Specialist**

Dave Odvody, **Recreation Facilitator**

Chris Poole, **Grants/GIS Department Head**

Karen Rezac, **Department/Administrative Assistant**

Lacey Sabatka, **Information Coordinator**

Bret Schomer, **Wanahoo Recreation Supervisor/Water Resources Specialist**

Staff Support for NRCS Offices:

Vacant, **Conservation Technician**

Kimberly Piitz, **NRD/NRCS Field Office Assistant (Butler County)**

Kristin Miller, **NRD/NRCS Field Office Assistant (Colfax County)**

Vacant, **NRD/NRCS Field Office Assistant (Dodge County)**

Marla Milliken, **NRD/NRCS Field Office Assistant (Saunders County)**

Melissa Foreman, **Shell Creek Watershed (LPNNRD & SCWIG Volunteer)**

In addition to the listed full-time and part-time positions, the district employs seasonal conservation technicians to assist in the layout of land treatment structures. There are also seasonal summer employees hired to help with Lake Wanahoo, water sampling, tree planting and maintenance of LPNNRD projects. Personnel positions and assigned responsibilities could increase in the future as increased project and program responsibilities increase.

Financial

FY 2023 Financial Objectives

Funding required for the LPNNRD projects and programs for Fiscal Year 2021 requires a general operating budget of $ (PUT NEW NUMBER HERE) of which $ Put new number here is required from the district's local tax levy. The FY 2023 tax levy of .033457 cents per $100 actual valuation is required from District property. Projected expenses and income for FY 2023-2028 are shown in Appendix F.

A tax levy of Put new levy number here means that an owner of a $150,000 home will pay $ Put new number here in NRD taxes in FY 2023. An owner of farm land valued at $7,000 per acre will pay $Put new number here an acre/year to the NRD in FY 2023. The LPNNRD levy represents about two percent of the total property tax collected.

FY 2024-2028 Long Range Financial Objectives

Although it is expected that the amount of revenue from all sources will fluctuate during the next few years, it is anticipated that the LPNNRD will operate at a mill levy between $0.035 and $0.055 per $100 actual valuation as the District continues to assist with flood reduction project priorities and to address our responsibilities with groundwater water quality and quantity management.