

Water Committee Meeting
Thursday, July 2, 2020 7:30 AM
Lower Platte North NRD Office
P.O. Box 126

1. UNFINISHED BUSINESS

2. REGULATORY

A. GROUND WATER MANAGEMENT AREA

1. Variance Expanded Water Use with Allocation

The Committee heard from the staff on the changes shown on attached document. The changes are making the variance a 3 year commitment and establishing a deadline of March 15.

2. Well Permit Program

Larry Kaspar (Kaspar Tree Farms, west side of Hwy 77)) has applied for an additional well on Section 34-16N-8E, Yutan Subarea, Restricted Development Area. A review of DNR's Well Registration database indicates that the only high capacity well within 600 feet of the proposed new well is their existing well, G-122873. Kaspar has concerns about the continuing dry weather and needs second well for the trees. He would like to drill the well as soon as possible. Drip Irrigation will be used as the irrigation system for trees with 136 certified irrigated acres.

The Committee would like more information and deferred the decision to the Board Meeting on July 13.

After the Committee meeting, staff had Katie Cameron review the location. Her comments are shown below with detailed information attached with AEM information.

Katie's comments: After looking at the 2018 AEM Flight Line data and nearby registered well logs, it looks like the SE 1/4 of the NE 1/4 of Sec 34 T16N R8E would be as good as or possibly better than the current irrigation well in the NE1/4 of the NE1/4 based on the resistivity shown on the App. 1 Profiles as far as the sandstone saturated thickness that is potentially available. As usual there is not a line directly over the land we are looking at but based on the nearby information that is my opinion. It also looks like the logs are reporting the first deep thicker sandstone unit deeper than some of the images might make it

appear.

With this additional information staff doesn't see an issue with this new well permit.

a. Well Permits Approved

b. Wells Permits Approved: #

c. Landowner	d. Number of Wells	e. Number of New Irrigated Acres	f. Type
i.	j.	k.	
o.	p.	q.	
u.	v.	w.	
aa.	bb.	cc.	d.
gg.	hh.	ii.	

mm.

nn.

oo.

pp.

qq.

rr.

ss. The total number of approved permits for 2020 is #

Location of Approved Well Permits for 2020: Correct as of #####

tt. County	uu. Irrigation - New	vv. Irrigation - Replacement	ww. Total
bbb. Butler	ccc.	ddd.	eee.
jjj. Colfax	kkk.	lll.	mmm.
rrr. Dodge	sss.	ttt.	uuu.
zzz. Boone	aaaa.	bbbb.	cccc.
hhhh. Madison	iiii.	jjjj.	kkkk.
pppp. Platte	qqqq.	rrrr.	ssss.
xxxx. Saunders	yyyy.	zzzz.	aaaa.
ffff. Total	ggggg.	hhhhh.	

nnnnn.

3. Nitrogen Management Areas

Staff has been setting up demonstration field sites in the Schuyler-Richland Area. There are two fields with nitrogen test strips with different rates of fertilizer. There will be tissue samples taken with yield results recorded.

After harvest some deeper soil samples will be taken on both fields to examine nitrate movement. The one field is a gravity field in which soil moisture sensors were installed with a data logger on both ends of the field to track moisture through a 4 foot profile.

The other field is a pivot with equipment at the present time from Crop Metrics, Metos Company and Phytech. Servi-Tech is assisting in this project along with Aaron Nygren - UNL extension. Staff will be discussing the equipment with each firm on a weekly basis.

The 2019 NET grant had \$5,000 in its budget to assist in funding these projects along with an additional \$9,600 for soil probes. Staff is looking at taking some soil samples to analysis the soil particles and possibility a trench to see the depth of the corn roots.

Pictures are attached. Attached is a quad map showing the geological interpretation, which might explain the possibility for different management even within the area. Also attached is an quote for \$4,300 from EA Engineering which conducted the initial coring in this area. Staff would like the Committee to accept the contract so the NRD can collect the information from the fertilizer test strips.

4. Nitrate Management Grant

Projects for the Grant:

Cover Crops - \$160,000 (40 producer, maximin 80 acres, \$50/acre)

Tissue Sampling - \$2,000 (200 samples at \$10/sample)

Flow Meters - \$350,000 (350 meters at \$1000/meter)

Monitoring wells - \$100,000 (2 nested sites with 4 inch casing for sampling)

Field Mapping - \$10,000 (10 producers at \$1000/field)

High End Soil Moisture Sensors - \$20,000 (20 producers at \$1000/field)

Committee Suggestions?

The total amount of a NET grant would be \$642,000, which would be over 2 years and normally be about 25 percent for the LPNNRD. The LPNNRD requirement would be \$160,500 over a 2 year period. If the LPNNRD proceeds the Committee will need to set policy for how the cost-share will be distributed.

5. NRD Framework Project

Here is an updated version on the obligation for LPN. At last month's meeting staff inform the Committee that it would be around \$43,000. Shown below is another breakdown which shows LPN portion at \$49,000 to do this project. The difference is DNR could not come up with as much money as anticipated. This amount will be

done over 2 fiscal years and next year's budget is showing \$30,000. The Board agreed at last months meeting to participate in a WSF grant with the other 3 NRDs.

Papio has retained JEO to write the grant with this comment from Paul Woodward: Marlin Petermann is OK with us going ahead and retaining JEO to prepare the WSF grant for the \$9,000. If we are successful, he suggests splitting this per the Interlocal Agreement and if we are not Papio will eat the cost.

6. Alternative - FULL WSF SMALL GRANT - With Hydrogeo Assessment				
7. NRD	8. TOTAL	9. WSF Cos t- sha re	10. NRD Ma tch	11. NDNR Fund ing
12. Papio	13. \$ 180,0 00.00	14. \$ 93, 000	15. \$ 74, 000	16. \$ 13,0 00.0 0
17. LPS	18. \$ 177,0 00.00	19. \$ 92, 000	20. \$ 72, 000	21. \$ 13,0 00.0 0
22. LPN	23. \$ 126,0 00.00	24. \$ 64, 000	25. \$ 49, 000	26. \$ 13,0 00.0 0
27. Total	28. \$ 483,0 00.00	29. \$ 249, 00 0	30. \$ 195, 00 0	31. \$ 39,0 00.0 0
32.	33.	34. 52%	35. 40%	36. 8%

37. Cost Share Programs

a. Irrigation Well Sample Kits

b. Flow Meter Maintenance Program

Staff is going to start the process of collecting information from interested firms to conduct the meter maintenance for the District. Staff will be looking at a 3 year contract. Might even consider 2 firms if distance becomes a factor.

B. CHEMIGATION

C. For 2020 we have 686 renewals and 32 new permit applications for a current total of 718. Inspections for 189 renewal permits have been completed.

3. GROUNDWATER BUDGET 20-21

Recommended Groundwater Budget for 20-21 is attached.

4. SURFACE WATER PROGRAMS

A. STATE LAKES, FOR THE WEEK OF

Week of June 22nd, 2020

This week's beach Bacteria and Harmful Algal Bloom results are now posted on the NDEE web page (<https://deq-iis.ne.gov/zs/bw/>).

5. GROUND WATER PROGRAMS

A. DECOMMISSIONED WELL PROGRAM

1. Well Estimates

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

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

19.

20. Plugged Wells

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

22. Well Owner	23. Type of Well	24. Cost Share Estimate	25. County
26. Marvin Kasik	27. Irrigation	28. \$679.94	29. Colfax

30. David L. Grotelueschen	31. Irrigation	32. \$1,000	33. Platte
34. Reznicek Farms GP	35. Irrigation (2)	36. \$1,204.06	37. Dodge
38. Tommy E. King	39. Domestic	40. \$343.35	41.

42.

B. LOWER PLATTE NORTH NRD GROUND WATER STUDIES

1. Lower Platte River Basin Water Management Plan Coalition (LPRBC)

An agreement is attached from the Flatwater group to start the process of updating the information from 2012 to current. This data will be used for INSIGHT (An Integrated Network of Scientific Information & GeoHydrologic Tools) to help in determining water use in the basin. The Committee and Board already approved \$10,000 for LPN portion to be put into next year's budget to start this process.

NeDNR was at the Committee meeting but no presentation on INSIGHT.

2. Lower Platte River Consortium

As the Drought Plan has been completed and approved, the group is onto the next stage which is doing a desktop scenario with participating staff members. A complete breakdown of the cost is shown below, which LPN share would be \$2,849. This amount is included in next year's budget. A copy of original agreement (attached) states the cost for each NRD could be up to \$40,000. At this time the LPN has spend \$26,000 to assist in the contributing match on the initial grant. This agreement ends in September, with the group looking at a extension to complete and evaluate the desktop exercise.

The Committee asked what the desktop exercise will accomplish? This will allow the group to go through a drought scenario for the first time and an opportunity to evaluate each project identified in the plan for this type of situation.

Notes from Jennifer Schellpeper on the project:

The cost of the drought workshop scope of work is \$39,723. Those costs will be partially paid from remaining grant and consortium funds as well as new contributions from each party, according to the table below. This workshop is called for on page 81 of the Lower Platte River Drought Contingency Plan. Two focused tasks will be carried out at the workshop. The first task will focus on communication among the parties and with the public during a drought scenario, the second task will focus on actual responses of each party member to both a flash drought and extended duration drought scenario.

3. Remaining WSF funds	4. \$10,768
5. Remaining Consortium	6. \$3,104

Funds	
7. NeDNR Contribution	8. \$11,606
9. LPNNRD	10. \$2,849
11. PMRNRD	12. \$2,849
13. LPSNRD	14. \$2,849
15. LWS	16. \$2,849
17. MUD	18. \$2,849
19. Total	20. \$39,723

21.

22. TILE DRAINS

Staff read the comments from Jovan Lausterer and Dave Miesbach - Groundwater Section Supervisor/Water Well Standards. Committee then heard comments from the public in attendance:

- Tile drains are being collected in a holding container and then being pumped at higher flow than a normal tiled field. The higher volume of water is creating higher flows in Rawhide creek than previously. As these holding containers are being pumped should they be classified as a dewatering well and required to have a flow meter?
- The drainage attachment was discussed for liability.
- It was reported that the extra water ends up in the North Bend Drainage Ditch and is raising the groundwater levels in the area.
- Discussion on cleaning out the ditch and if a BOR permit would be required. The extra water is putting more silt in the ditch.
- A producer commented that the extra water would limit his ability to harvest his wheat crop.
- Responsibility in keeping the ditch clean was discussed as some of the creek goes through private property.
- A take away from the discussion is that the group would like to keep the ditch cleaned out for better flow. This is normally the County's responsibility.
- Another take away is they would like a flow meter installed to monitor the flow out of the holding container. The NRD requires flow meters on all high capacity wells pumping over 50 GPM. Dave Miesbach commented this would not be classified as a well.
- It was stated that the NRD is responsible for groundwater and should consider all water sources when looking at managing water.
- A couple of letters from landowners are attached.

23. Attached is some information on drainage laws along with some comments from Jovan Laustwerer on tile drains:

Jovan Comments:

I believe this does fall under the Natural Resource Districts authority as the term "ground water" is defined under the Nebraska Ground Water Management and Protection Act as "water which occurs in or **moves, seeps, filters,** or percolates through ground under the surface of the land." See Neb. Rev. Stat. 46-706(2).

That being said, NRCS also regulates tiling from the perspective of soil classifications and wetlands. The county also has authority under Neb. Rev. Stat. 31-101 et. seq. to regulate this as that statutory section allows the county board to require any "ditch" to be straightened, widened, altered or deepened if it will be conducive to the public health convenience or welfare. The term ditch is defined under Neb. Rev. Stat. 31-102 to include any "drain or watercourse." The county would also have permitting requirements if the pool is in the floodway/plain. The Department of Natural Resources might also be involved in this project if the project is designed as flood plain management under Neb. Rev. Stat. 31-1001. If the property is in the extraterritorial zoning jurisdiction of a city the property owner could also be required to obtain approval for its effort from the city.

All the above said, I would imagine the NRCS will bow out once they determine that the tiled ground doesn't run contrary to their wetland conservation compliance. Most counties aren't going to want to regulate a project like that when the pooling is used for irrigation purposes unless the pool of water is sizable enough to create a safety concern. It doesn't sound like the project is for flood plain management purposes and thus DNR wouldn't likely care unless we are dealing with a floodway or the project is adjacent to a natural watercourse. Most cities don't have zoning regulations that tie up these types of projects unless they are in a floodway/plain.

It's a difficult situation for the property owner though as arguably the project should be run by all the above to make sure they don't believe its contrary to their regulatory scheme.

Jovan W. Lausterer

Daryl,

We have looked at the pictures you sent showing the tile drain set up. Water Well Standards considers this set up similar to tiling around a house. The tile leads to a sump pit and is pumped to the surface. We would not consider this a well. Hope this helps.

David L. Miesbach, P.G.
GROUNDWATER SECTION SUPERVISOR/
WATER WELL STANDARDS
Nebraska Department of Environment and Energy
P.O. Box 98922
Lincoln, Nebraska 68509-8922
DIRECT (402) 471-4982 / MAIN OFFICE (402) 471-2186
FAX (402) 471-2909
david.miesbach@nebraska.gov
<http://dee.ne.gov>

24. Voluntary Integrated Water Management Plan - LPNNRD

NeDNR gave a presentation on the annual V-IMP update.

6. OTHER

A. COMMENTS FROM THE PUBLIC

VARIANCE REQUEST FOR EXPANDED WATER USE FROM EXISTING WELL WITH ACRE FEET ALLOTMENT WITHIN THE LOWER PLATTE NORTH NRD (LPNNRD)



Updated Form: May 2018

NRD USE ONLY	
Date Received _____	Paid: Cash or Check _____
Initial Review by NRD Representative _____	
Certified Acres _____ by NRD Representative _____	
Date of Water Committee Recommendation to the NRD Board _____	
Date NRD Board issues Conditional Approval or Denial of Variance Request _____	
Date of Approved Variance _____ by NRD Representative _____	
Acre Feet Allotment Issued _____ by NRD Representative _____	

- ALL APPLICANTS SEEKING A VARIANCE MUST COMPLETE SECTIONS 1, 2, 3 AND 4. (SECTION 5 IF OFFSET WATER IS USED)
- ALL APPLICANTS WILL BE ASSIGNED A ROLLING ACRE FOOT ALLOCATION. ADJUSTMENT CAN BE MADE BY BOARD POLICY ON DECEMBER 15.
- **IF THE VARIANCE IS APPROVED BY THE LPNNRD BOARD THE APPLICANT CAN'T APPLIED FOR EXPANDED ACRES VARIANCE ON THESE APPLIED ACRES FOR A MINIMUM OF THREE (3) YEARS FROM APPROVAL DATE.**
- **THIS TYPE OF VARIANCE WILL NOT BE APPROVED AFTER MARCH 15 OF EACH YEAR**
- ACRE FOOT CALCULATION WILL INCLUDE NUMBER OF CERTIFIED ACRES AS OF JANUARY 1, 2017.
- ADDITIONAL IRRIGATED ACRES CAN BE INCREASED BUT NO ADDITIONAL CONSUMPTION FROM ORIGINAL ALLOTMENT.
- A NON-REFUNDABLE \$75.00 FILING FEE PAYABLE TO THE DISTRICT IS REQUIRED FOR EACH VARIANCE APPLICATION.

1. NAME AND ADDRESS OF APPLICANT:

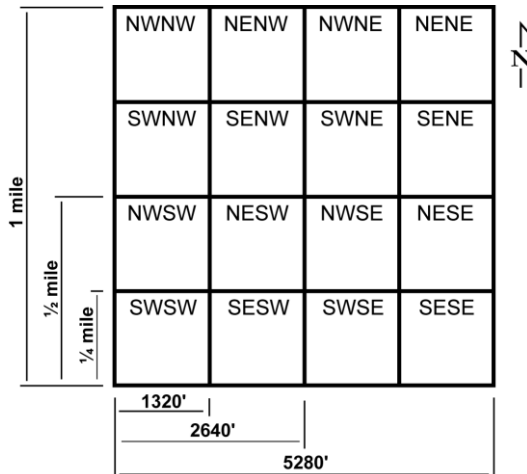
Home Phone: () - _____ - _____
 Cell Phone: () - _____ - _____
 Landowner Name: _____
(if other than applicant)

2. PURPOSE OF EXPANDED WATER USE:

Irrigation

3. LOCATION OF PROPOSED EXPANDED WATER USE:

- A. _____ County, _____ ¼ of the _____ ¼ of Section _____, Township _____ North, Range _____ East/West. (circle one)
 Minimum
- B. The box at the right represents one square mile, (section). Indicate with an "X", the proposed location of the water source. Outline the proposed water use area. If the water is to be used outside the above written legal description, give legal description of water use area,
 _____ ¼ of the _____ ¼ of Section _____, Township _____ North, Range _____ East/West.
- C. List the number of new irrigated acres _____
- D. List the number of previously irrigated acres _____



4. WATER SOURCE

Ground Water:
 Well Registration Number _____

Legal Description of well _____ County, ____ ¼ of the ____ ¼ of Section _____,
Township ____ North, Range ____ East/West. (circle one)
Is well be used in a system with other wells? __ Yes, __ No. If Yes, How many _____
Attach list of well registration number and legal description for each well.
Irrigation System Used _____

5. OFFSET WATER USE:

- A. Will proposed new water use be offset by retiring water use in this same aquifer system? __ Yes, __ No
 - B. If Yes, give legal description of that offsetting water use: _____ County, ____ ¼ of the ____ ¼ of Section _____, Township ____ North, Range ____ East/West. (circle one)
 - C. Landowner and Address of person(s) providing offset water _____

 - D. If using offset from irrigation, list number of acres at this 'offset' location _____
 - E. Original water source of this offset water: __ Ground Water, __ Surface Water, __ Reuse Water, mark all that apply.
 - F. Total annual amount of consumptive water use to be retired at this 'offset' location in
Acre Inches / Year _____ or Total Gallons / Year _____
- Please provide flow records for the last five years from this 'offset' location.

6. Addition information and requirements for Lower Platte North NRD review.

- Attach aerial photo showing location of water source(s) and area water or reuse water is to be used.
- All expanded water uses must install a District approved flow meter and report water pumped annually to the LPNNRD by December 15th.
- Additional variance conditions maybe required for approval by the Lower Platte North NRD.
- Variances will be reviewed annually.

7. I certify that I am familiar with the information contained in this application, and it's restrictions, rules and regulations and that to the best of my knowledge and belief such information is true, complete and accurate.

Date _____ Signature of Applicant _____
Signature of Well System Operator, if different than Applicant _____
NRD Certification Number of Landowner or Operator _____ (Required for irrigation, livestock, domestic (with irrigation on one acre or more of land), industrial, and public water supply wells.)

8.

If needed, Signature of Landowner providing Offset Water _____
Date _____

9. Lower Platte North NRD Use Only.

Comments by District Representative.

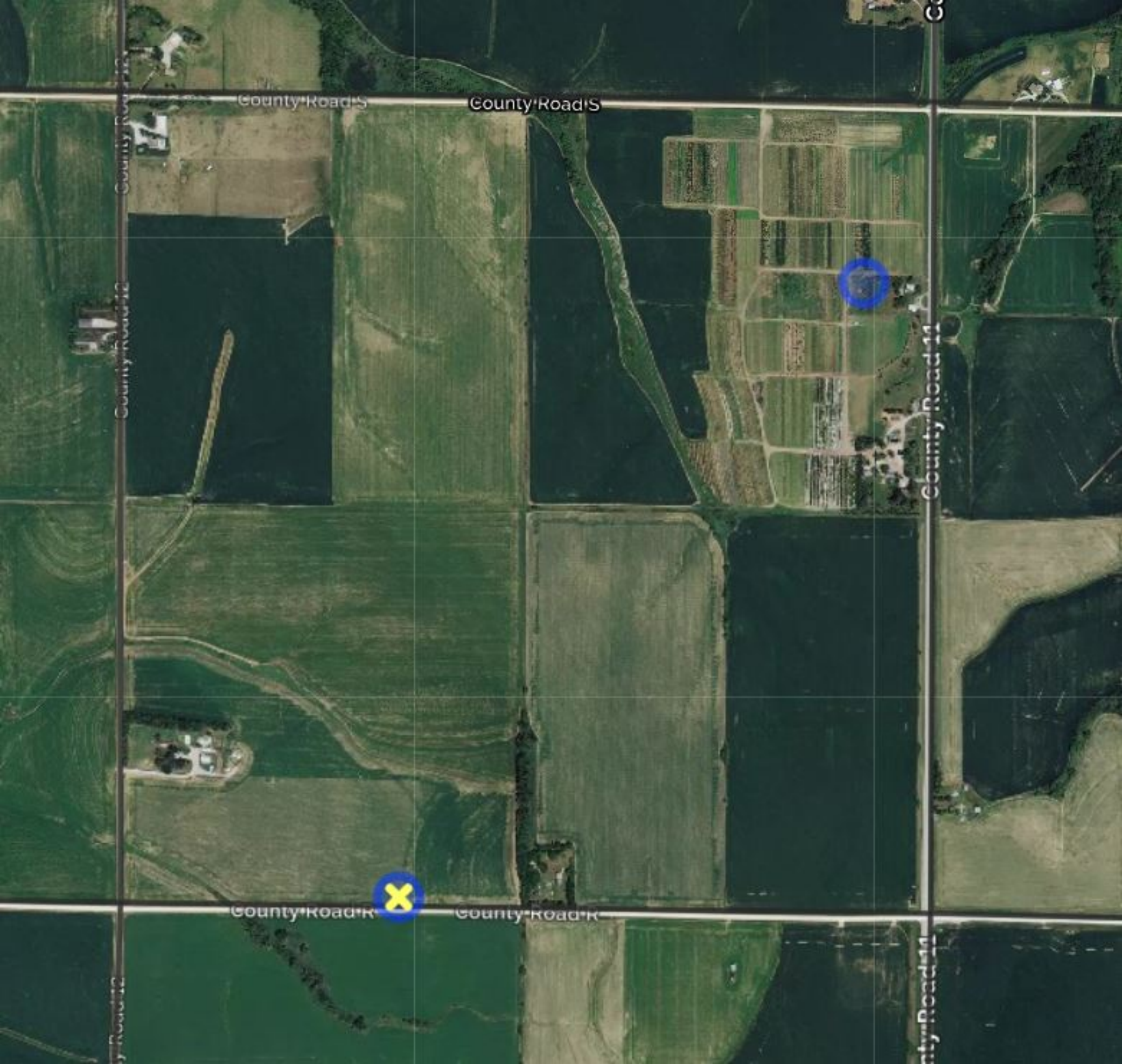
Landowners must list new irrigated acres with the County Assessor, update the DNR well registration, and comply with any additional conditions within 90 days of LPNNRD conditional approval of this Expanded Water Use Variance. LPNNRD staff may perform a site visit to verify information provided in the variance request. **

COMMENTS/RESTRICTIONS: Variance conditions required for approval by LPNNRD.

- 1. A Lower Platte North NRD approved flow meter needs to be installed following manufacturer's recommendations.**
- 2. Total annual water use pumped by the well will be reported to the Lower Platte North NRD on District approved forms by December 15 of each year.**

3. Landowner must have the correct number of irrigated acres listed with both the County Assessor and the Nebraska Department of Natural Resources.

File: VarianceExpandedWaterUse_05/14/18



County Road S

County Road S

County Road R

County Road R

County Road 12

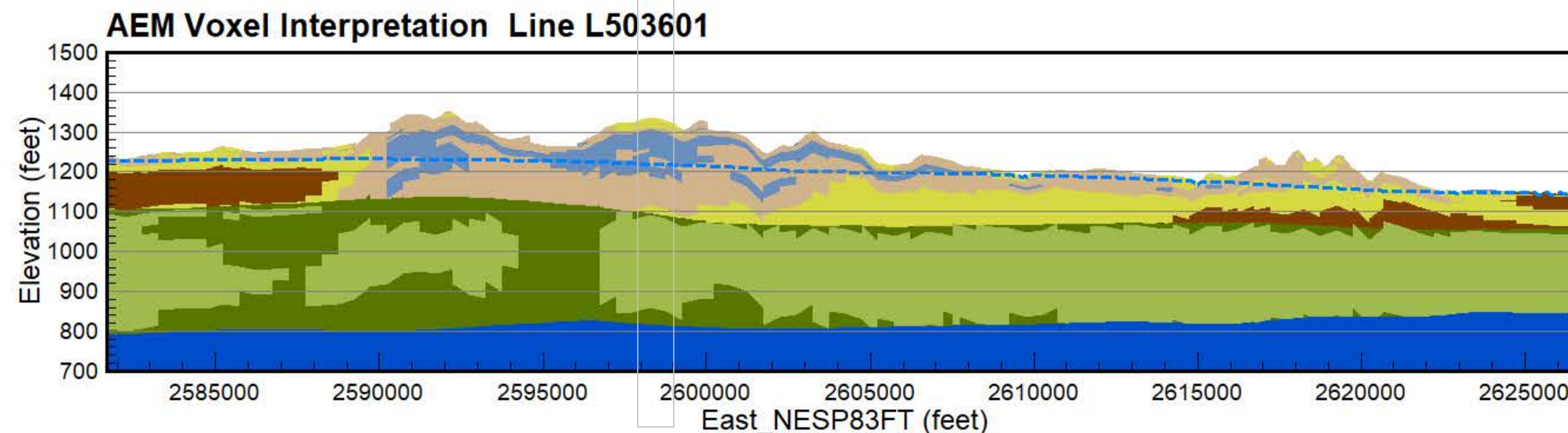
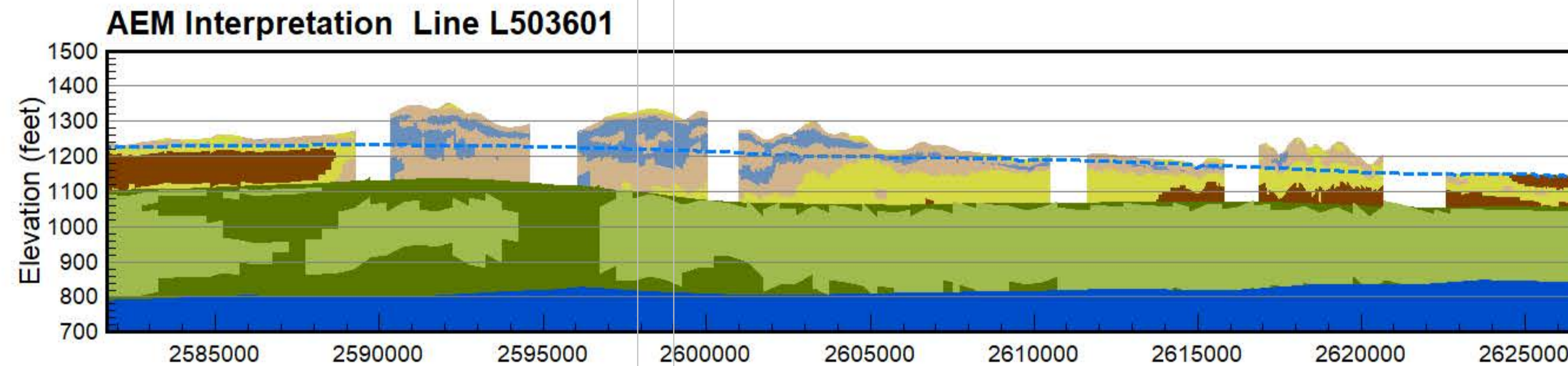
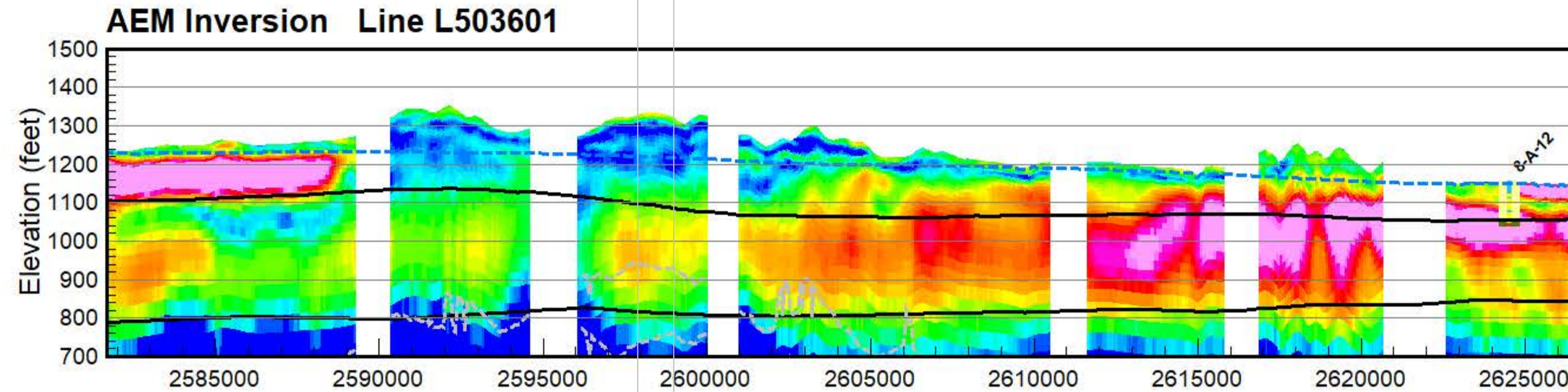
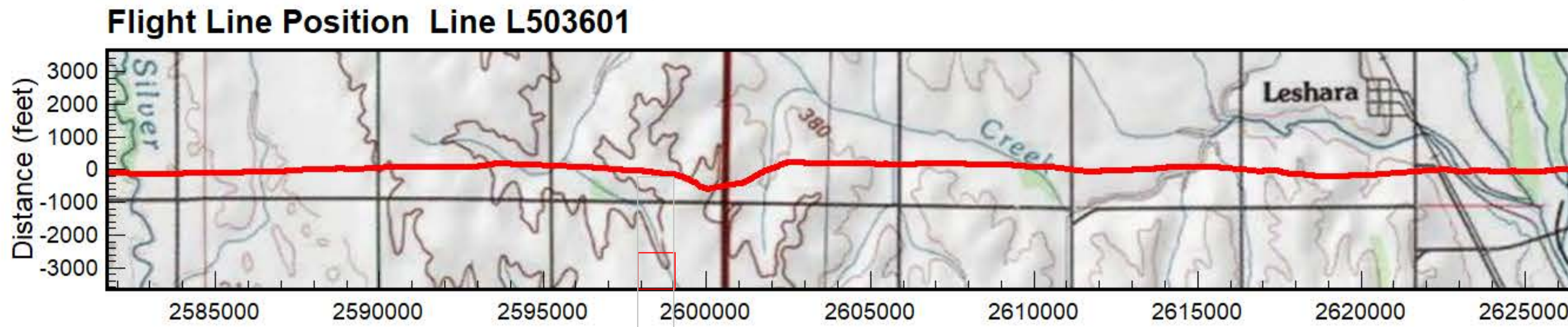
County Road 12

County Road 11

County Road 11

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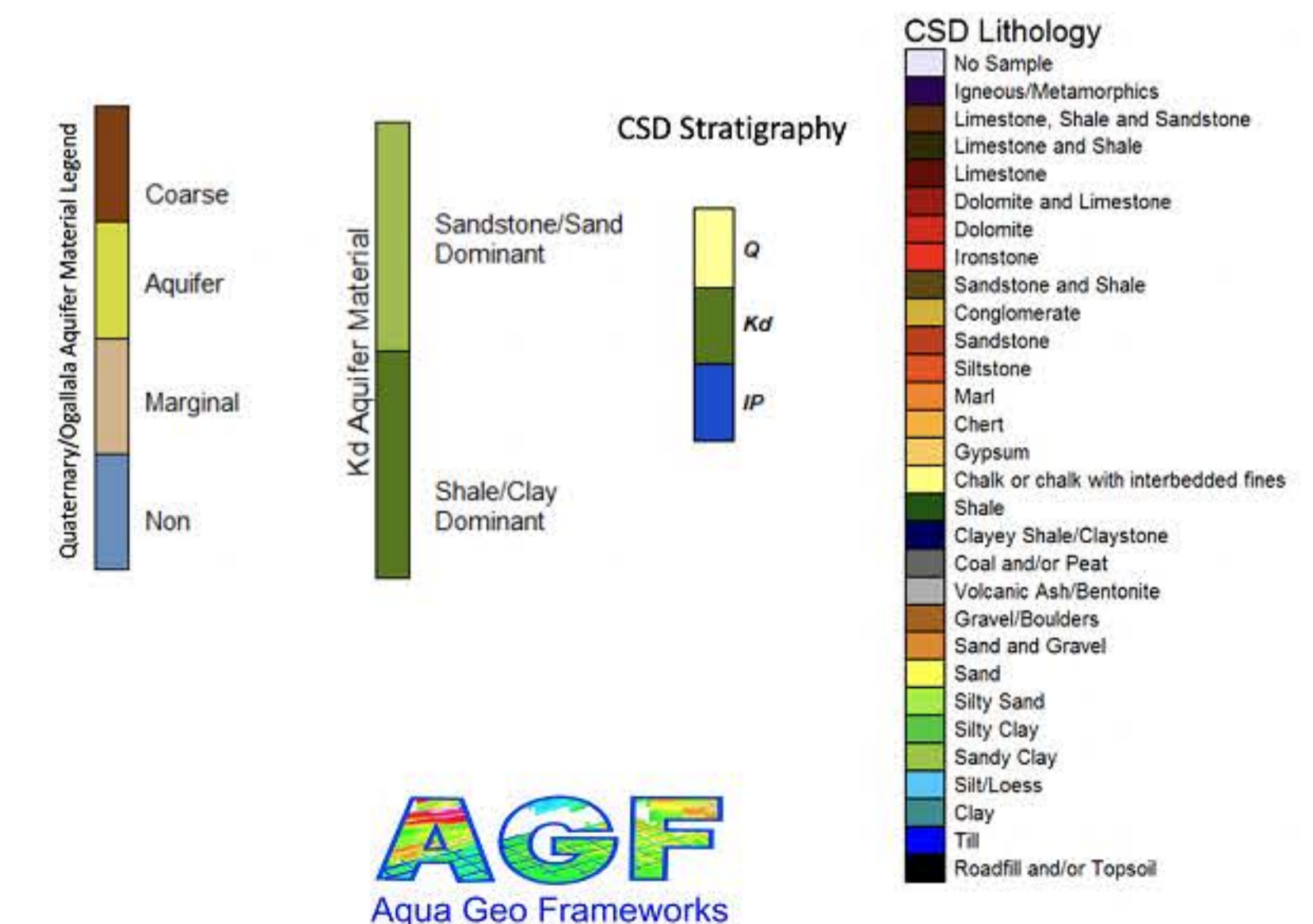
West-east line north of site



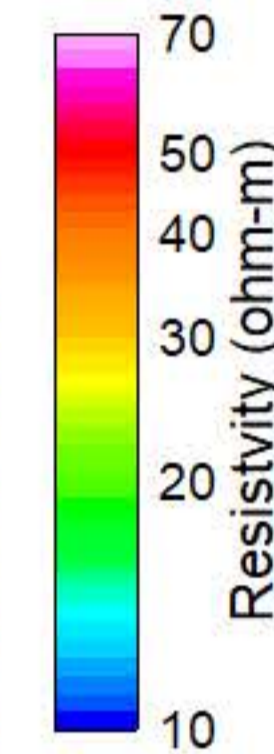
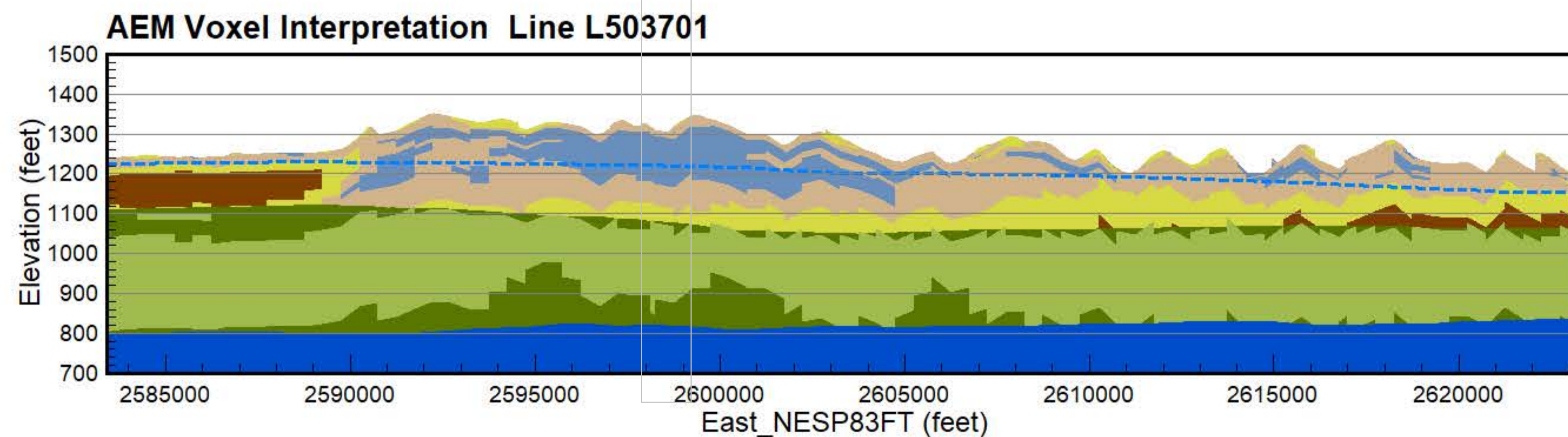
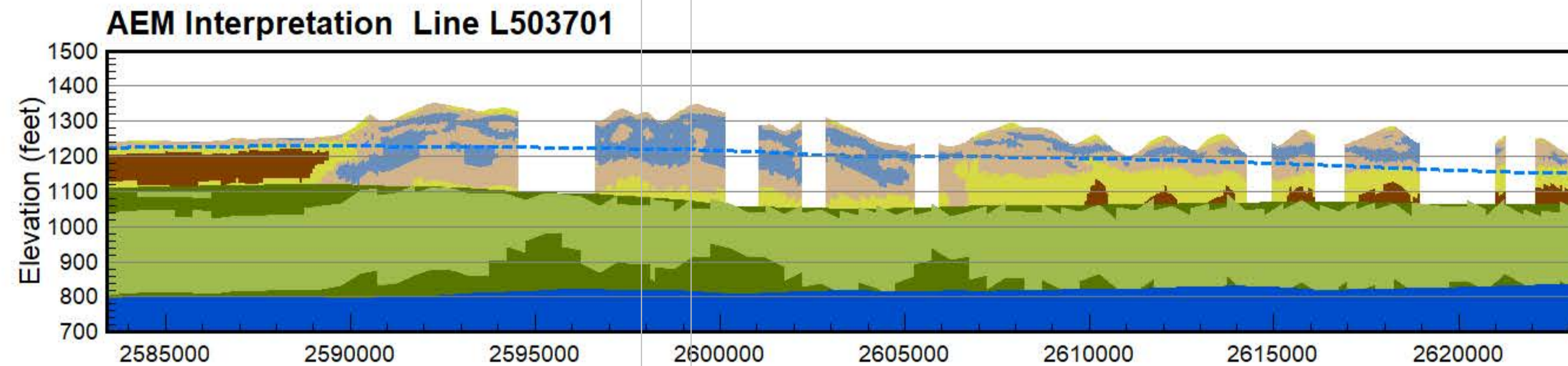
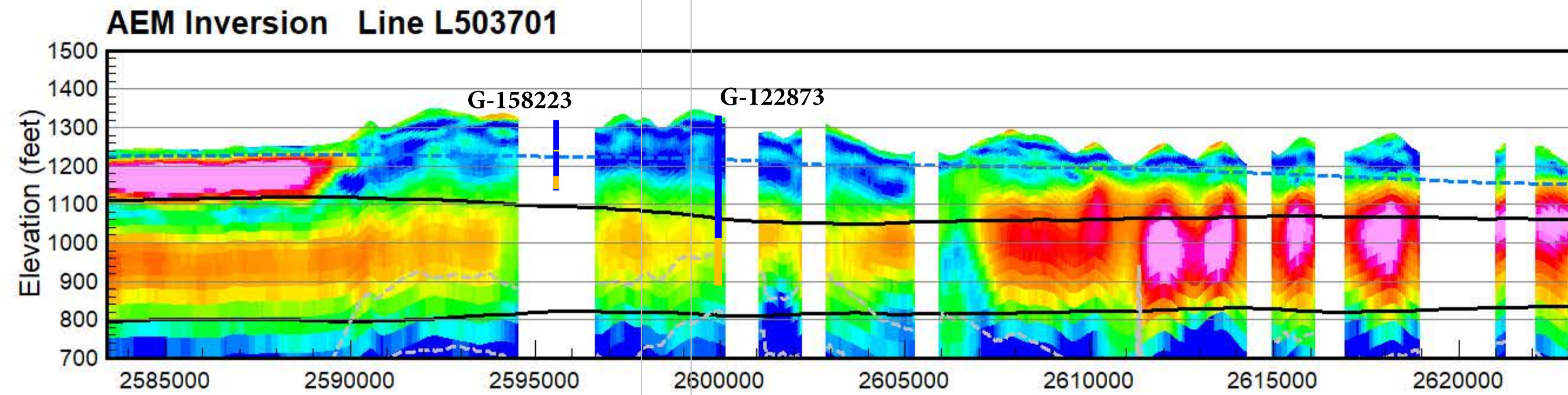
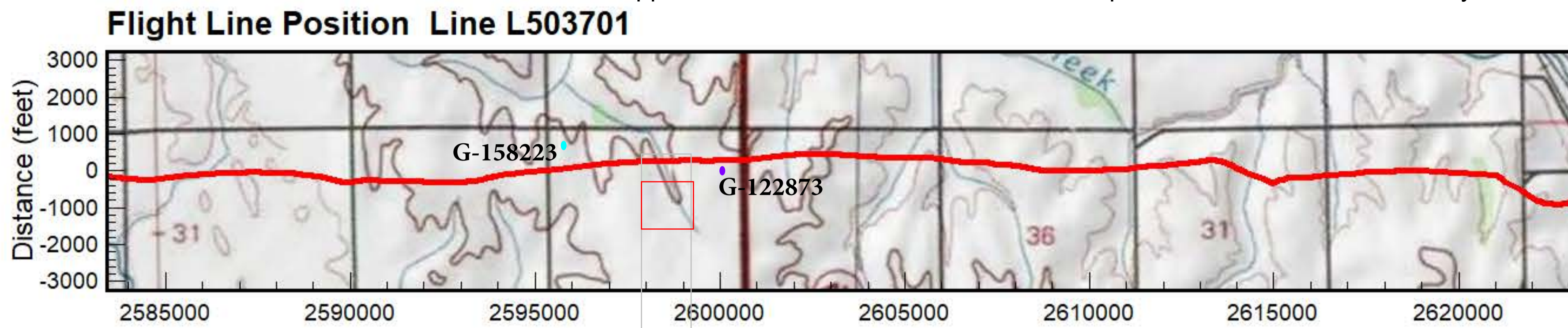
Results of the final inversion of Airborne Electromagnetic (AEM) data collected along flight lines within the Lower Platte North Natural Resources District (LPNNRD) June 22-July 14. The red line on the Flight Path Map (US Geological Survey 100K Topo) indicates the location of the data collection.

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 1/2 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. Solid-black lines on the AEM Inversion profile indicate interpreted stratigraphic contacts (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. Cretaceous units as well as the undifferentiated Pennsylvanian are indicated as continuous formations and are colored as indicated in the legend.

The AEM Voxel Interpolation Profile indicates a 500-foot cell size interpolation of the Quaternary materials classified into the four groups indicated by the legend. In addition to the interpreted 500-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.



West-east line north of site



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. The red line on the Flight Path Map (US Geological Survey 100K Topo) indicates the location of the data collection.

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Quaternary/Ogallala Aquifer Material Legend

- Coarse
- Aquifer
- Marginal
- Non

Kd Aquifer Material

- Sandstone/Sand Dominant
- Shale/Clay Dominant

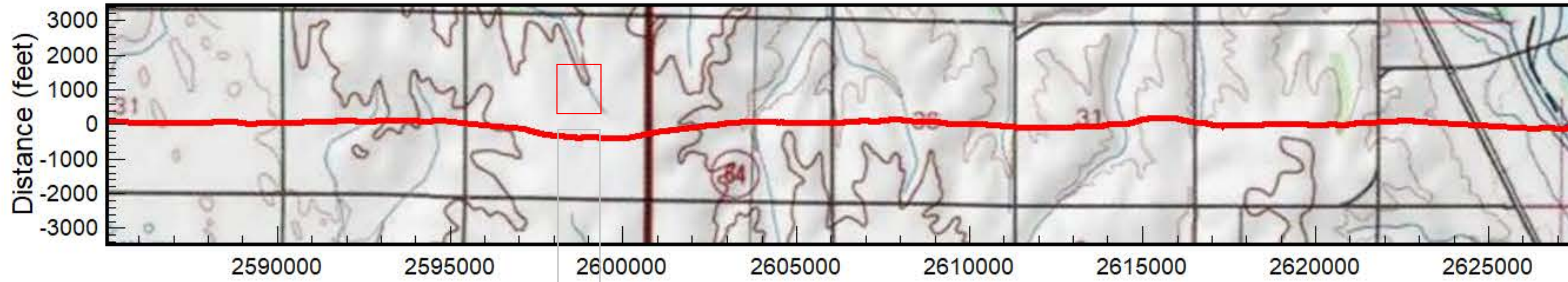
CSD Stratigraphy

- Q
- Kd
- IP

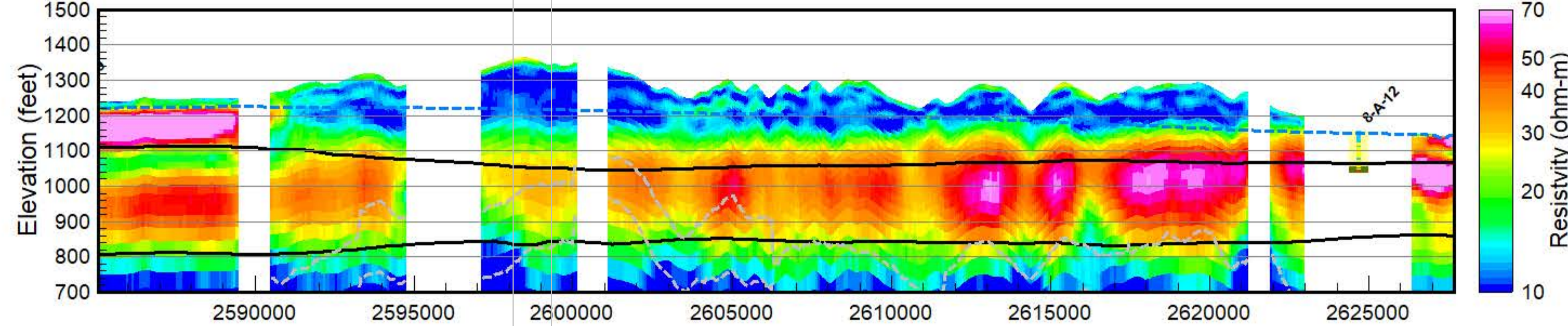
CSD Lithology

- No Sample
- Igneous/Metamorphics
- Limestone, Shale and Sandstone
- Limestone and Shale
- Limestone
- Dolomite and Limestone
- Dolomite
- Ironstone
- Sandstone and Shale
- Conglomerate
- Sandstone
- Siltstone
- Marl
- Chert
- Gypsum
- Chalk or chalk with interbedded fines
- Shale
- Clayey Shale/Claystone
- Coal and/or Peat
- Volcanic Ash/Bentonite
- Gravel/Boulders
- Sand and Gravel
- Sand
- Silty Sand
- Silty Clay
- Sandy Clay
- Silt/Loess
- Clay
- Till
- Roadfill and/or Topsoil

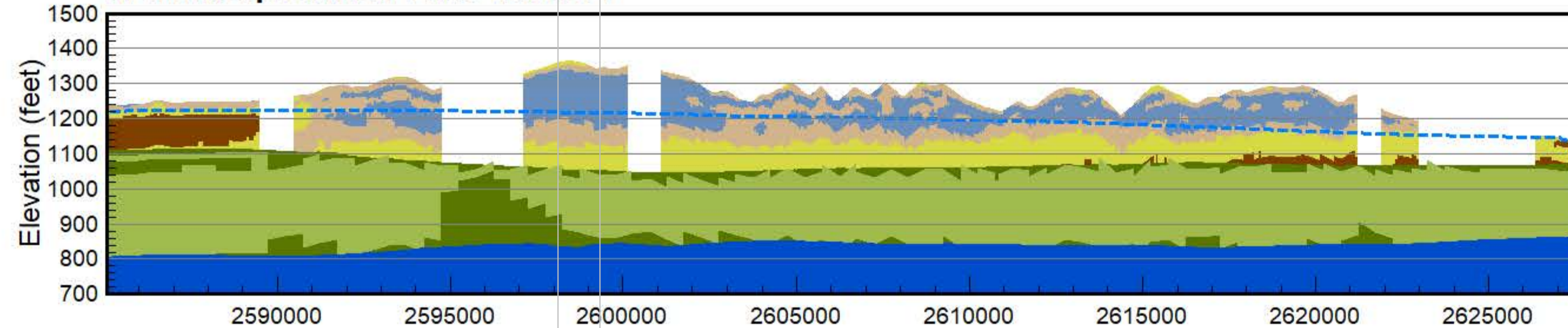
Flight Line Position Line L503801



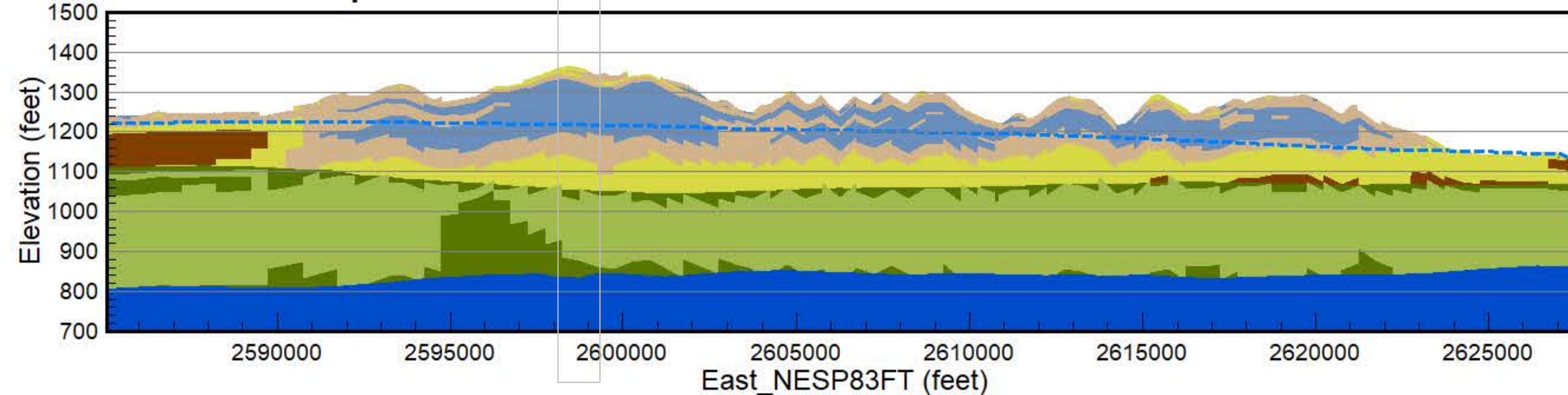
AEM Inversion Line L503801



AEM Interpretation Line L503801



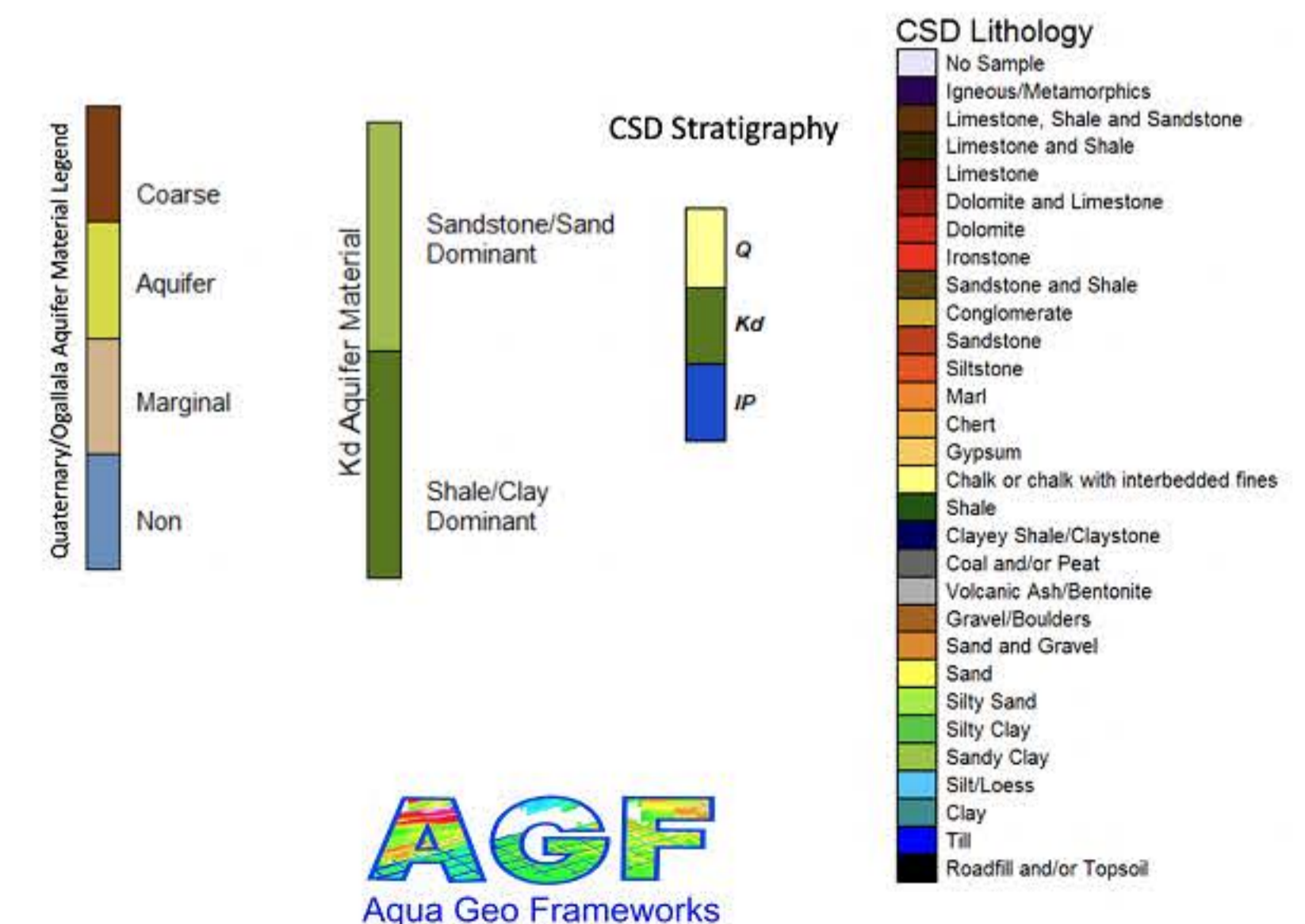
AEM Voxel Interpretation Line L503801



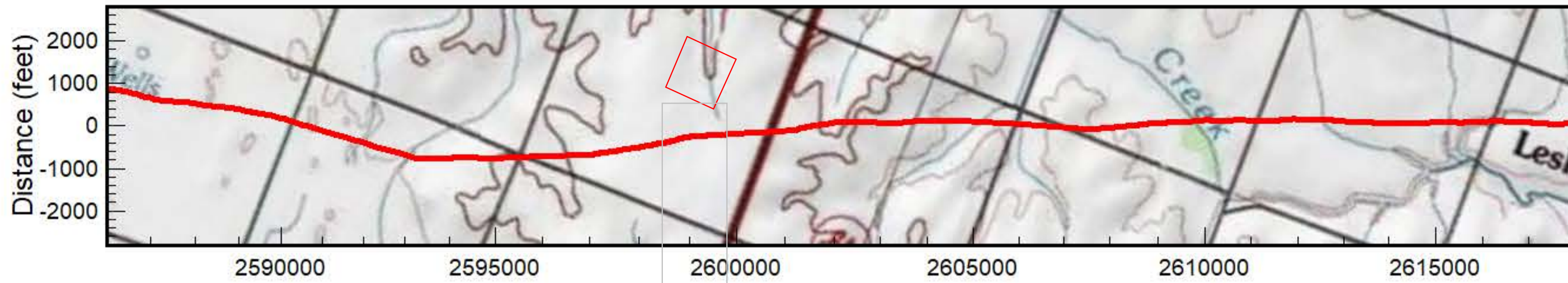
west-east line south of site

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. The red line on the Flight Path Map (US Geological Survey 100K Topo) indicates the location of the data collection.

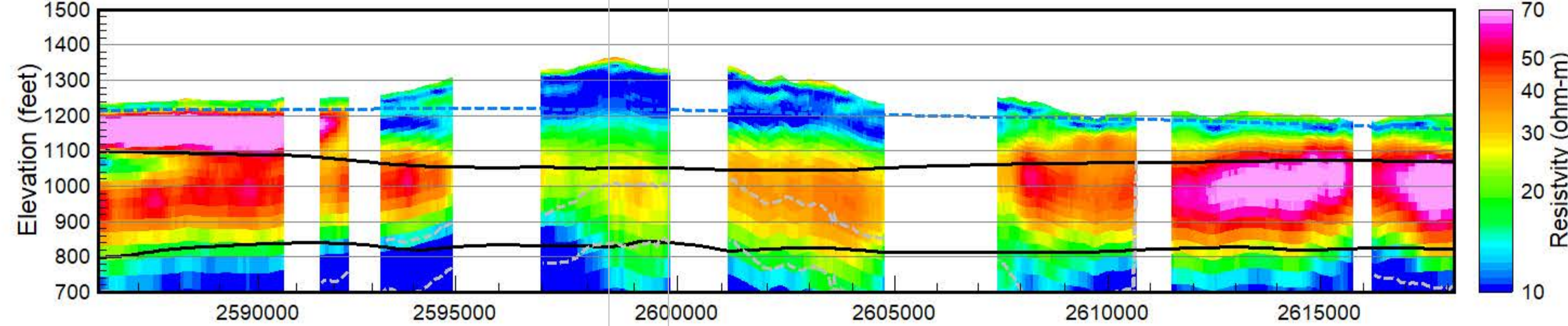
The AEM inversions shown are Spatially-Constrained using the Aarhus Geo Software Workbench version 5.8.3 in the indicated electrical resistivity color scale. Boreholes displayed on the AEM inversion profile are within 1/2 mile of the flight line are from the Conservation Survey Division (CSD) public 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. Solid-black lines on the AEM Inversion profile indicate interpreted stratigraphic contacts (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. Cretaceous units as well as the undifferentiated Pennsylvanian are indicated as continuous formations and are colored as indicated in the legend. The AEM Voxel Interpolation Profile indicates a 500-foot cell size interpolation of the Quaternary materials classified into the four groups indicated by the legend. In addition to the interpreted 500-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.



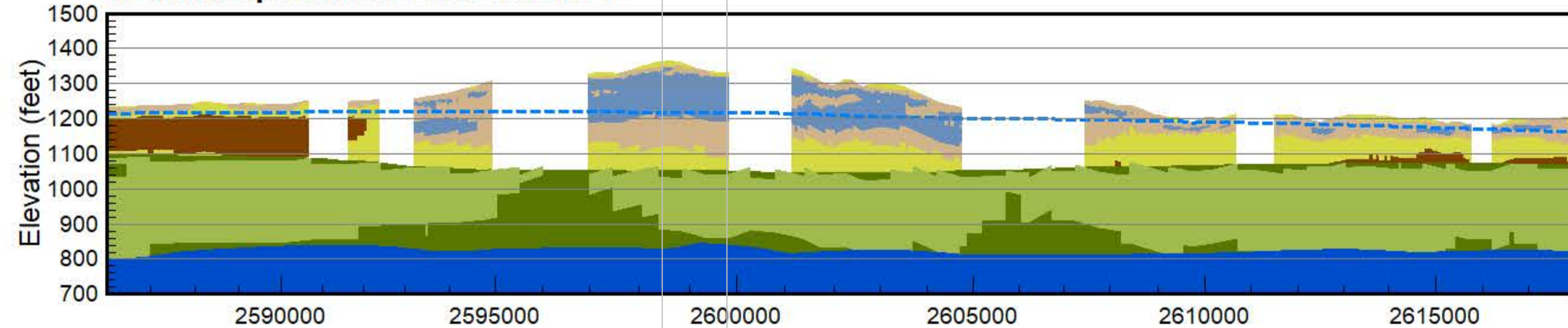
Flight Line Position Line L503501



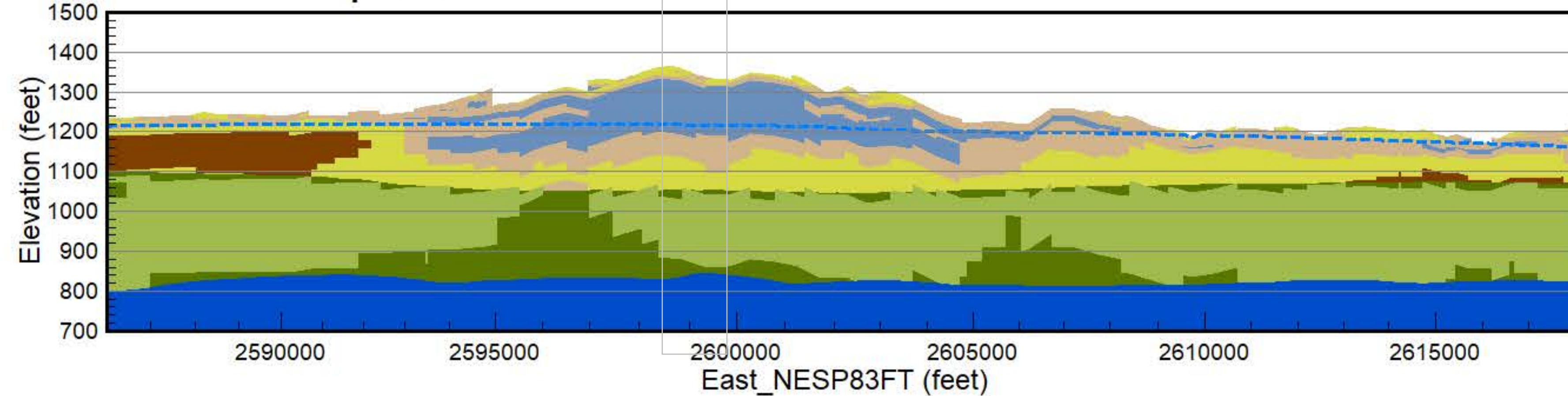
AEM Inversion Line L503501



AEM Interpretation Line L503501



AEM Voxel Interpretation Line L503501



diagonal line south of site

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. 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 1/2 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. Solid-black lines on the AEM Inversion profile indicate interpreted stratigraphic contacts (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. Cretaceous units as well as the undifferentiated Pennsylvanian are indicated as continuous formations and are colored as indicated in the legend.

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Quaternary/Ogallala Aquifer Material Legend

- Coarse
- Aquifer
- Marginal
- Non

Kd Aquifer Material

- Sandstone/Sand Dominant
- Shale/Clay Dominant

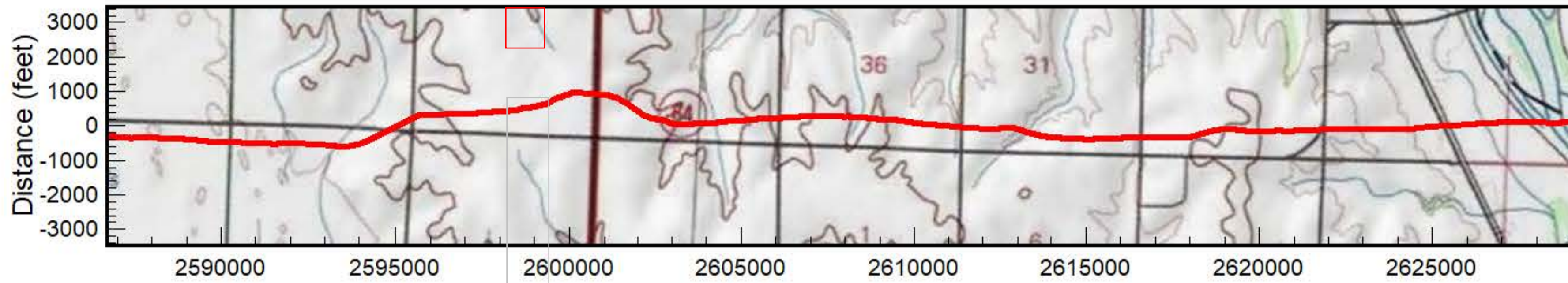
CSD Stratigraphy

- Q
- Kd
- IP

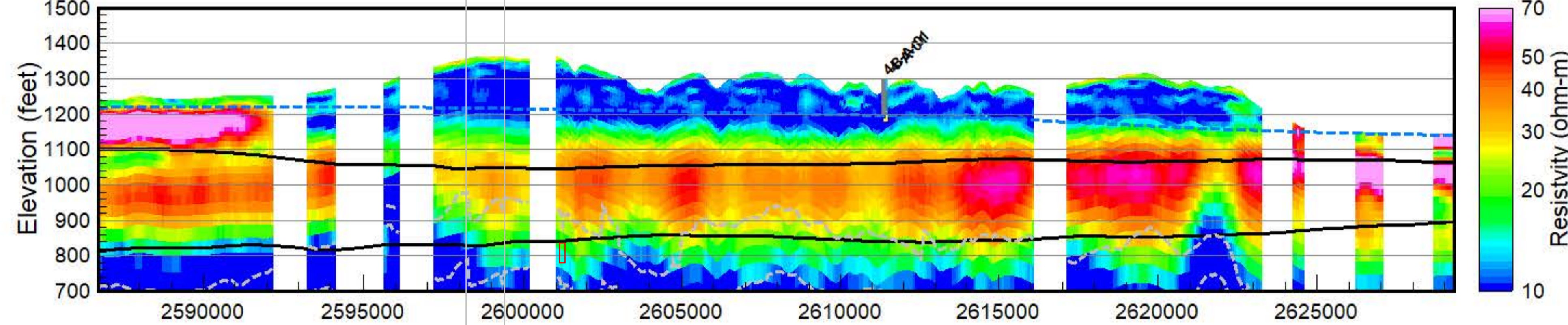
CSD Lithology

- No Sample
- Igneous/Metamorphics
- Limestone, Shale and Sandstone
- Limestone and Shale
- Limestone
- Dolomite and Limestone
- Dolomite
- Ironstone
- Sandstone and Shale
- Conglomerate
- Sandstone
- Siltstone
- Marl
- Chert
- Gypsum
- Chalk or chalk with interbedded fines
- Shale
- Clayey Shale/Claystone
- Coal and/or Peat
- Volcanic Ash/Bentonite
- Gravel/Boulders
- Sand and Gravel
- Sand
- Silty Sand
- Silty Clay
- Sandy Clay
- Silt/Loess
- Clay
- Till
- Roadfill and/or Topsoil

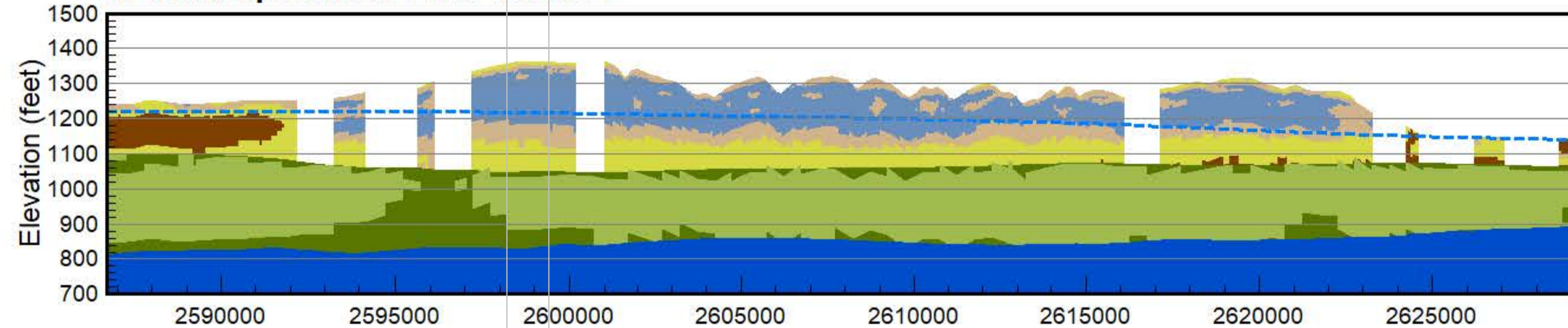
Flight Line Position Line L503901



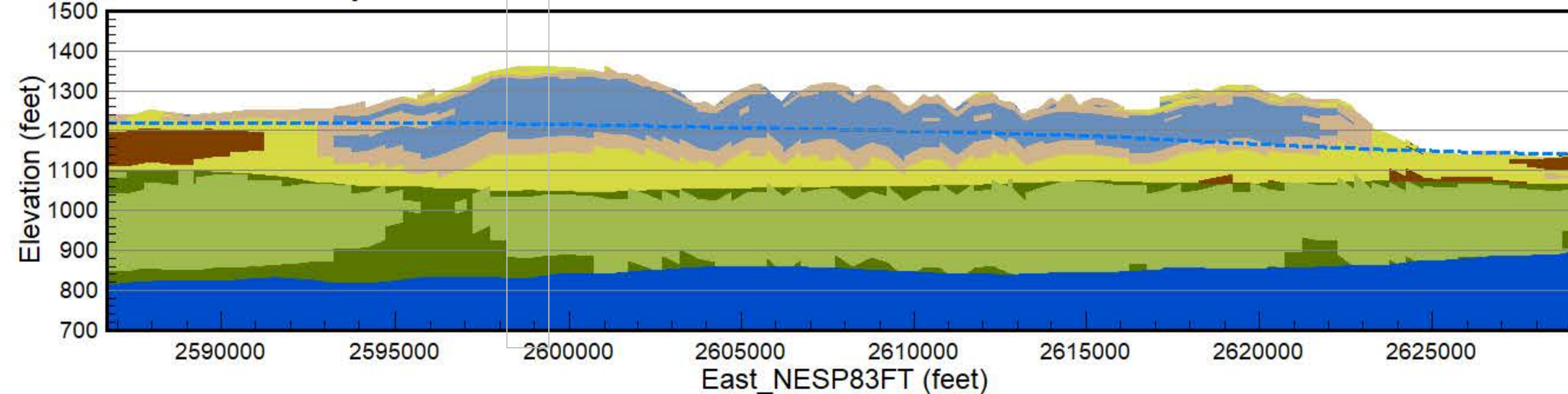
AEM Inversion Line L503901



AEM Interpretation Line L503901



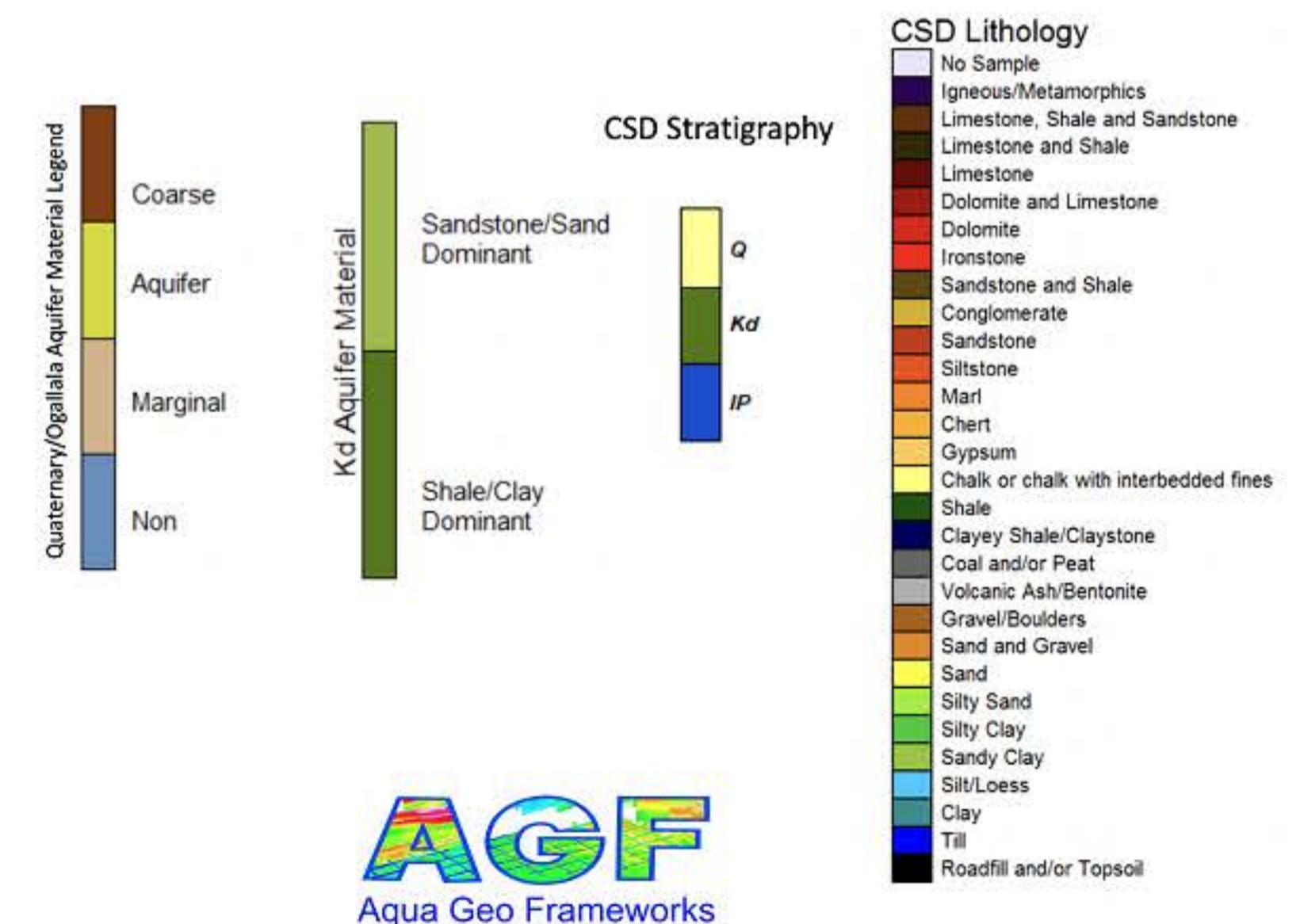
AEM Voxel Interpretation Line L503901



west-east line south of site

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. 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 1/2 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. Solid-black lines on the AEM Inversion profile indicate interpreted stratigraphic contacts (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. Cretaceous units as well as the undifferentiated Pennsylvanian are indicated as continuous formations and are colored as indicated in the legend. The AEM Voxel Interpolation Profile indicates a 500-foot cell size interpolation of the Quaternary materials classified into the four groups indicated by the legend. In addition to the interpreted 500-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.



Closest registered well northeast of the site

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	Owner's Name Owner's ID Address
G-122873 WellID: 150522 LPN-003433 View Details View Logs View Scans	I A	Saunders Lower Platte North 16N 8E 34 NENE 1188N 453E Map It 41°19' 5.80" 96°30' 15.00"	7/11/2003 8/14/2003 106071276828917	80 150 gpm 135 ft 150 ft PRO	3 in 315 ft 435 ft	Kaspar Tree Farms OwnerID: 72757 2151 County Road 11 Mead NE 68041

Registration Number G-122873, Well ID 150522

Geo Logs

1331 ft ground elevation

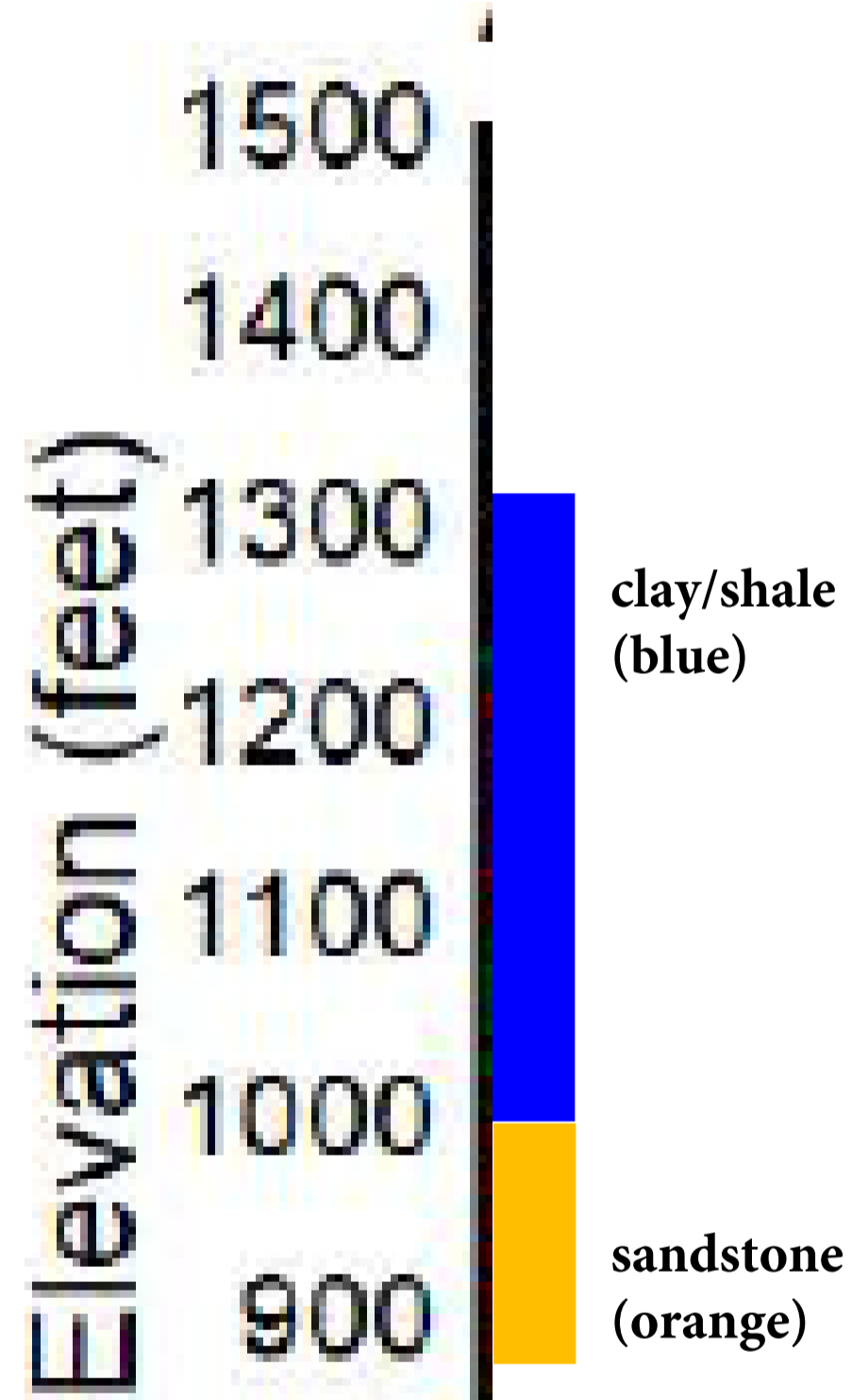
FromDepth	ToDepth	Description	Color	Density	Composition
0	3	top soil			Other
3	40	gray clay			Other
40	60	brown clay			Other
60	105	gray clay			Other
105	180	brown clay			Other
180	200	red & Gray clay			Other
200	210	Red clay			Other
210	225	Red & Gray clay			Other
225	240	shale w/clay			
240	245	shale			
245	250	gray clay			
250	300	red & gray clay			
300	320	gray clay			
320	440	sandstone			

Casing and Screen

FromDepth	ToDepth	CaseOrScreen	InsideDiam	OutsideDiam	CaseThickness	Material	ScrnSlotSize	ScreenTname	ScrnGuides	SubTableNo
0	415	casing	7.803	8.625	0.411	pvc		eagle		1
415	435	screen	7.803	8.625	0.411	pvc	0.018	monoflex		1

Grout and Gravel

FromDepth	ToDepth	GroutOrGravel	Material	Quantity	Volume	SubTableNo
5	10	grout	bentonite			1
10	410	gravel	gravel			1
410	415	grout	bentonite			1
415	435	gravel	sand			1



domestic well northeast of the site

1 Records Found

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	Owner's Name Owner's ID Address
G-175486 WellID: 236320 View Details View Logs View Scans	D A	Saunders Lower Platte North 16N 8E 35 NWNW Map It 41°19' 14.43" 96°30' 4.05"	1/15/2014 2/18/2015 14210839934020	--- 15 gpm 150 ft 170 ft PRO	1.25 in 180 ft 365 ft	John Glen OwnerID: 130264 1091 CR S Fremont NE 68025

Registration Number G-175486, Well ID 236320

Geo Logs

FromDepth	ToDepth	Description	Color	Density	Composition
0	3		Brown	Loose	Top Soil
3	65		Brown	Soft	Clay
65	80		Gray	Soft	Clay
80	95		Gray	Loose	Sand fine-med
95	140		Tan	Hard	Clay
140	260		Gray	Hard	Clay
260	290		Yellow	Hard	Clay
290	365		Brown	Hard	Sandstone

Casing and Screen

FromDepth	ToDepth	CaseOrScreen	InsideDiam	OutsideDiam	CaseThickness	Material	ScrnSlotSize	ScreenTname	ScrnGuides	SubTableNo
0	355	casing	4	4.5	0.21	PVC		CRESENT		1
355	365	screen	4	4.5	0.21	PVC	0.016	MONOFLEX		1

Grout and Gravel

FromDepth	ToDepth	GroutOrGravel	Material	Quantity	Volume	SubTableNo
5	15	grout	BENONITE	6.6 CUBIC YARDS	BENONITE	1
15	345	gravel	GRAVEL	217.8 CUBIC YARDS	GRAVEL	1
345	355	grout	BENONITE	6.6 CUBIC YARDS	BENONITE	1
355	365	gravel	PACKSAND	6.6 CUBIC YARDS	PACKSAND	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)	Acres Irrigated Gallons/Minute Static Level Pumping Level Series	Pump Column Diameter Pump Depth Well Depth	Owner's Name Owner's ID Address
G-158223 WellID: 208997 View Details View Logs View Scans	D A	Saunders Lower Platte North 16N 8E 34 NWNW 427N 197W Map It 41°19' 14.00" 96°31' 16.30"	10/19/2010 1/24/2011 129584576411089	--- 10 gpm 130 ft 145 ft PRO	1.25 in 180 ft 170 ft	Brian Streit OwnerID: 120111 2198 Co Rd 12 Mead NE 68041

domestic well west-northwest of the site

1331 ground level elev. feet

Registration Number G-158223, Well ID 208997

Geo Logs

FromDepth	ToDepth	Description	Color	Density	Composition	Clay (blue)	Sand (yellow)	Sandstone (orange)
0	2		Black	Soft	Clay			
2	80		Brown	Soft	Clay			
80	85		Brown	Soft	Sand fine-med			
85	100		Brown	Soft	Clay			
100	145		Brown	Soft	Clay			
145	170		Brown	Hard	Sandstone			
170	175		Blue	Soft	Clay			

Casing and Screen

FromDepth	ToDepth	CaseOrScreen	InsideDiam	OutsideDiam	CaseThickness	Material	ScrnSlotSize	ScreenTname	ScrnGuides	SubTableNo
0	155	casing	4.07	4.5	0.021	PVC		Eagle		1
155	170	screen	4.07	4.5	0.021	PVC	0.018	Monoflex		1

Grout and Gravel

FromDepth	ToDepth	GroutOrGravel	Material	Quantity	Volume	SubTableNo
0	10	grout	Bentonite		2 Bags Bentonite	1
10	145	gravel	Gravel	45.225		1
145	150	grout	Bentonite		1 Bag Bentonite	1
150	170	gravel	Gravel	6.700		1

Sec 34 well

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	Owner's Name Owner's ID Address
G-166100 WellID: 223208 View Details View Logs View Scans	D A	Saunders Lower Platte North 16N 8E 34 SWSE Map It 41°18' 28.02" 96°30' 41.16"	10/22/2012 2/15/2013 13608830227770	--- 25 gpm 135 ft 145 ft PRO	1.25 in 240 ft 385 ft	Jasper Wipf OwnerID: 123147 1162 County Rd R Mead NE 68041

Registration Number G-166100, Well ID 223208

Geo Logs

FromDepth	ToDepth	Description	Color	Density	Composition
0	2		Brown	Loose	Top Soil
2	40		Gray	Soft	Clay
40	60		Brown	Soft	Clay
60	110		Gray	Soft	Clay
110	180		Brown	Soft	Clay
180	225	GRAY	Red	Dense/Stiff	Clay
225	245		White	Hard	Shale
245	300	GRAY	Red	Hard	Clay
300	385		Tan	Hard	Sandstone

Casing and Screen

FromDepth	ToDepth	CaseOrScreen	InsideDiam	OutsideDiam	CaseThickness	Material	ScrnSlotSize	ScreenTname	ScrnGuides	SubTableNo
0	375	casing	4.026	4.5	0.21	PVC		CRESENT		1
375	385	screen	4.026	4.5	0.21	PVC	0.016	MONOFLEX		1

Grout and Gravel

FromDepth	ToDepth	GroutOrGravel	Material	Quantity	Volume	SubTableNo
5	15	grout	BENONIT	6.6 CUBIC YARDS	BENONIT	1
15	365	gravel	GRAVEL	231.00 CUBIC YARDS	GRAVEL	1
365	375	grout	BENONIT	6.6 CUBIC YARDS	BENONIT	1
375	385	gravel	PACK SAND	6.6 CUBIC YARDS	PACK SAND	1

Sec 34 well

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	Owner's Name Owner's ID Address
G-174210 WellID: 235095 LPN-0141524 View Details View Logs View Scans	I A	Saunders Lower Platte North 16N 8E 34 SESW 59S 1827W Map It 41°18' 26.10" 96°30' 55.00"	9/22/2014 10/27/2014 14114846775137	122 750 gpm 172 ft 300 ft PRO	8 in 300 ft 395 ft	David Carlson OwnerID: 128650 125 Devon Rd Paoli PA 19301

Registration Number G-174210, Well ID 235095

Geo Logs

FromDepth	ToDepth	Description	Color	Density	Composition
0	30		Tan	Soft	Clay
30	35		Brown	Soft	Clay
35	110		Gray	Soft	Clay
110	115		Gray	Loose	Shale
115	155		Brown	Soft	Clay
155	190		Yellow	Soft	Clay
190	200		Gray	Hard	Clay
200	201		Gray	Hard	Gravel
201	220		Blue	Hard	Clay
220	250		Brown	Hard	Clay
250	280		Gray	Hard	Fine Sand
280	300		Blue	Hard	Clay
300	395		Brown	Hard	Sandstone
395	400		Blue	Hard	Shale

Casing and Screen

FromDepth	ToDepth	CaseOrScreen	InsideDiam	OutsideDiam	CaseThickness	Material	ScrnSlotSize	ScreenTname	ScrnGuides	SubTableNo
0	100	casing	14.77	16	0.616	PVC		CERTAINTTEED		1
100	395	screen	14.77	16	0.616	PVC	0.051	CERTAINTTEED		1

Grout and Gravel

FromDepth	ToDepth	GroutOrGravel	Material	Quantity	Volume	SubTableNo
0	8	gravel	B-PACK	.0853 Cubic Yards		1
8	10	grout	BENTONITE CHIPS		40 Bags	1
10	395	gravel	B-PACK	42.111 Cubic Yards		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)	Acres Irrigated Gallons/Minute Static Level Pumping Level Series	Pump Column Diameter Pump Depth Well Depth	Owner's Name Owner's ID Address
G-185616 WellID: 253562 View Details View Logs View Scans	D I	Saunders Lower Platte North 16N 8E 34 SWSW 1040S 374W Map It 41°18' 38.00" 98°31' 14.00"	8/10/2018 8/13/2018 153418112213245	--- --- 128 ft --- PRO	--- --- 166 ft	Wylee & Hannah Anderson OwnerID: 139939 211 County Road 12 Mead NE 68041

Registration Number G-185616, Well ID 253562

Geo Logs

FromDepth	ToDepth	Description	Color	Density	Composition
0	20		Brown	Soft	Clay
20	75		Yellow	Dense/Stiff	Clay
75	85		Brown	Loose	Sand med-coarse
85	145		Yellow	Dense/Stiff	Clay
145	166		Orange	Hard	Sandstone

Casing and Screen

FromDepth	ToDepth	CaseOrScreen	InsideDiam	OutsideDiam	CaseThickness	Material	ScrnSlotSize	ScreenTname	ScrnGuides	SubTableNo
0	146	casing	4.072	4.5	0.214	PVC		TITAN	0	1
146	166	screen	4.072	4.5	0.214	PVC	0.018	TITAN	0	1

Grout and Gravel

FromDepth	ToDepth	GroutOrGravel	Material	Quantity	Volume	SubTableNo
0	5	open hole				1
5	10	grout	BETONITE		.67 CU FT	1
10	141	gravel	GRAVEL	103.49 CU YARDS		1
141	146	grout	BETONITE		.67 CU FT	1
146	166	gravel	PACK SAND	.13 CU YARDS		1

June 30, 2020

Daryl Andersen
Lower Platte North Natural Resources District
P.O. Box 126
Wahoo, NE 68066

RE: Proposal – Vadose Soil Sampling
EA Proposal No. 0702547

Dear Daryl:

The purpose of this letter is to provide EA Engineering, Science, and Technology, Inc., PBC's (EA's) requested project proposal based on your request for proposal on June 29, 2020. EA's proposal response consists of three elements: Scope of Work, Price Schedule, and EA's Standard Consulting Services Contract. EA proposes to perform the requested services as outlined in the attached documents for a fixed price of \$4,300.00.

Under EA's Consulting Services Contract format, this project will be identified as shown above as Contract No. 0702547. If additional projects/services are desired, follow-on work can be added by simply forwarding a proposal that references the Consulting Services Contract above, which will serve as a Basic Ordering Agreement. Follow-on projects will contain the same basic identifying number as above followed by a dash and a numerically increasing number. This will facilitate expedited proposal preparation, project setup, and execution.

As the first project, *Exhibit A-1: Scope of Work*, *Exhibit B-1: Price Schedule*, and *Exhibit C: Consulting Services Contract* are provided. Please review the attached exhibits to ensure that they meet your approval. To confirm your acceptance of EA's project approach and technical assumptions, pricing, and contract terms, please sign and date the acknowledgement of proposal in the "client" space provided on Page 3 of EA's Consulting Services Contract, and return this entire document to my attention. I will have the contract countersigned by the appropriate EA personnel and a copy immediately returned for your records. EA will begin work shortly after receiving the documents.

We thank you for the opportunity to be of service on this project. If we can be of any further assistance, please contact me at (402) 476-3766.

Sincerely,



Jamie Petersen

Attachments

Exhibit A-1: Scope of Work (Contract No. 0702547)

This Scope of Work is incorporated into the Consulting Services Contract referenced above between EA Engineering, Science, and Technology, Inc., PBC (EA) and Lower Platte North NRD (LPNNRD). EA will conduct the following activities for this project:

SCOPE OF WORK

EA will collect soil samples from 16 soil borings in two agricultural fields (eight borings/field) located near Schuyler, NE. One field uses gravity irrigation and the other uses pivot irrigation, both fields are being used for nitrate tests during the 2020 growing season. Sampling will occur in the fall/winter of 2020 after crops have been harvested, weather permitting. The vadose sampling will be conducted as follows:

- Soil samples from 16 borings will be collected using EA's small, truck-mounted rig with a two-person crew. EA will provide one field crew member and the LPNNRD will provide one field crew member for the samples collected with EA's truck-mounted rig. The EA field crew member will collect samples, note a detailed description of soil texture, and log the soil cores.
- Samples will typically be collected at 3-foot intervals to a maximum depth of 15 feet below ground surface. If soil properties change, 2 to 4-foot intervals may be necessary. The borings will be terminated once penetrating a water bearing formation, upon refusal, or upon reaching an unsaturated sand and gravel layer that prevents recovery of cores.
- Quality Assurance/Quality Control (QA/QC) procedures will include duplicate samples at a rate of one QA/QC sample per 10 samples collected (10%), for a total of approximately 10 samples.
- EA will conduct the one-call for utility clearance for the sites prior to sampling.
- Sample location coordinates will be documented using a sub-meter GPS.

Deliverables:

The primary deliverable for the Schuyler Vadose Zone Sampling will be the boring logs at each sample location.

ASSUMPTIONS

1. If a Quality Assurance Project Plan (QAPP) or Sampling and Analysis Plan (SAP) is necessary, EA assumes the LPNNRD will develop and provide it to EA prior to sampling.
2. LPNNRD will lead efforts to coordinate all site access with property owners.
3. LPNNRD will provide one field crew member to assist with sample collection using EA's small, truck-mounted rig.
4. Groundwater is expected to be approximately 8 feet below ground surface.
5. Soil samples will all be disturbed samples.
6. No analysis or narrative of the analytical results is required for this project.
7. Cost associated with shipping of soil samples and analytical analysis are not included in the scope of work.

Exhibit B-1: Price Schedule (Contract No. 0702547)

The following project price and/or rates apply to the services provided by EA Engineering, Science, and Technology, Inc., PBC for the project and contract referenced above.

EA proposes to perform the requested services as outlined for a fixed price of \$4,300.00. The labor and other direct costs necessary to complete work are included in the fixed price.

Exhibit C: EA's Consulting Services Contract

EA, as used herein, means **EA Engineering, Science, and Technology, Inc., PBC**.

Client as used herein means the other party to this Agreement.

WHEREAS, EA provides an extensive range of integrated and comprehensive consulting, engineering, scientific, and analytical services; and

WHEREAS, Client desires to utilize EA's services.

NOW, THEREFORE, for good and valuable consideration, EA agrees to provide the professional services described herein, and Client agrees to accept and pay for such services, all in accordance with the following terms and conditions:

1. **Definitions**—The following terms shall have the meanings set forth below whenever they are used in this Agreement:
 - a. "Scope of Work" (SOW) shall mean the description of the services to be provided by EA as mutually agreed upon by EA and Client and will be performed on either a firm fixed price (FFP) or time and materials (T&M) basis. The SOW and the Price will be set out in the attached Exhibit "A"(s) (or EA's Proposal) as described below, incorporated by reference into this Agreement.
 - b. "Documentation" shall mean deliverable documentation as described in the SOW.
 - c. "Equipment" shall mean all indoor and outdoor equipment used by EA at Client sites for the purpose of providing services as described in the SOW.
 - d. "Proprietary Information" shall mean all data, information, manuals, materials, trade secrets, patents, products, processes, plans, whether in written, graphic or oral form, and similar proprietary know-how of EA.
2. **Ordering**—EA services sought by the Client shall be ordered as follows:
 - a. In response to either a written or verbal request from Client, EA will prepare a written proposal that shall minimally contain a SOW, cost and form of compensation (FFP or T&M).
 - b. Each EA Proposal shall be dated and sequentially numbered as Exhibit A1, A2, A3, etc. and reference this EA Consulting Services Agreement number.
 - c. If acceptable, the Client will sign and date the EA proposal acknowledging acceptance of the costs of the services to be rendered by EA.
3. **Compensation/Billing**—EA's invoices will be issued at least monthly and are payable upon receipt. Invoices shall reference the appropriate EA Proposal Letter or Exhibit A numbers. Balances thirty (30) days past due are subject to interest at 1.5% per month. EA may suspend services under any Client Agreement until all past due accounts have been paid.

The SOW is often not fully definable prior to the execution of this Agreement as investigation may uncover additional facts and information requiring an alteration in the SOW and/or the Price for the services. For services on a time and materials basis, the proposed fees are EA's best estimate of the charges required to complete the SOW. EA will inform Client of any material changes to either the SOW or the Price that may be required and which may alter the terms of this Agreement.

Costs and schedule commitments are subject to renegotiation for unreasonable delays caused by Client's failure to provide free access to sampling areas, specified facilities, or information, or for delays caused by unpredictable occurrences, or force majeure, such as fires, floods, strikes, riots, unavailability of labor or materials or services, acts of God or of the public enemy, or acts or regulations of any governmental agency. Temporary work stoppage caused by any of the above may result in additional cost beyond that outlined in this Agreement.

In the event EA is required to respond to a subpoena, government inquiry, or other legal process related to the services in connection with a proceeding to which it is not a party, Client shall reimburse EA for its costs and compensate EA at its then standard rates for the time spent gathering information and documents. Client agrees to compensate EA at the rate of one and one-half times EA's then current hourly rates for time spent in any deposition, hearing, proceeding, or trial.

For services provided on a time and materials basis, the minimum time segment is four (4) hours for field work and one (1) hour for office work. The rental or use of EA's Equipment will be charged to the project in accordance with EA's "Corporate Equipment Rate Billing Schedule," which is either incorporated into the rates shown in Exhibit B or is available upon Client's request. Equipment rates are subject to annual adjustment each September. EA's labor rates for services provided on a time and materials basis are fixed for one year with annual adjustment upon notice to Client.

Expenses related to the services and reimbursable by Client ("Other Direct Costs") include without limitation, travel and living expenses, phone, FAX, overnight delivery services, postage, shipping, and production costs; identifiable drafting and word processing supplies; equipment usage and rental fees; and expendable materials and supplies. Other Direct Costs are reimbursable by Client and are billed at EA's cost plus 20%.

Subconsultant and/or subcontractor costs are reimbursable by Client and are billed at EA's cost plus 20%. Where applicable, any local or state taxes or fees (except state income taxes) are in addition to any quoted price/cost.

4. **Termination**—This Agreement may be terminated by either party in the event of substantial failure by the other party to fulfill its obligations under this Agreement through no fault of the terminating party. Such termination is effected upon providing: (1) not less than thirty (30) calendar days written notice, and (2) an opportunity for consultation with the terminating party prior to termination. Client will be responsible for all services and direct expenses associated with the project through the effective date of cancellation, plus reasonable fee(s) and/or expenses for reallocation and demobilization of personnel and equipment.
5. **Confidential Information/Inventions**—All Proprietary Information furnished by EA in connection with this Agreement, but not developed as a result of work under this Agreement or under prior agreements between Client and EA, shall be held confidential by Client, and returned to EA within thirty (30) days of the completion of the services or conclusion of the litigation wherein EA's services were provided.

All inventions, techniques, and improvements held by EA to be proprietary or trade secrets of EA prior to any use on behalf of Client, as well as all inventions, techniques, and improvements developed by EA independent of the services rendered to Client under this Agreement, remain the property of EA. Documents provided by Client will remain the Client's property, but EA may retain one confidential file copy.

6. **Standard of Care**—EA will prepare all work and provide services in accordance with generally accepted professional practices ordinarily exercised by reputable companies performing the same or similar services in the same geographic area. NO WARRANTIES OR GUARANTIES, EXPRESS OR IMPLIED, ARE MADE WITH RESPECT TO ANY GOODS OR SERVICES PROVIDED UNDER THIS AGREEMENT, AND ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED.

Client shall furnish documents and information reasonably within Client's control and deemed necessary by EA for proper performance of its services. EA may rely upon Client-provided documents and information in performing the services required under this Agreement and EA assumes no responsibility or liability for their accuracy.

Client agrees to advise EA, no later than upon the execution of this Agreement, of any hazardous substance or any condition, known or that reasonably should be known by Client, existing in, on, or near the site where EA's services are to be performed, that presents a potential danger to human health, the environment, or EA's equipment. Client agrees to a continuing obligation to provide EA related information as it becomes available to the Client. By virtue of entering into this Agreement or providing services hereunder, EA does not assume control of, or responsibility as an operator, waste generator or otherwise for the site or the person(s) in charge of

the site, or undertake responsibility for reporting to any federal, state, or local public agencies any conditions at the site that may present a potential danger to public health, safety or the environment. Client agrees to notify the appropriate federal, state, or local public agencies as required by law; or otherwise to disclose, in a timely manner, any information that may be necessary to prevent damage to human health, safety, or the environment.

Upon Client's request, EA's work product may be provided on magnetic media. By such request, Client agrees that the written copy retained by EA in its files shall be the official base document. The Client will retain one conformed written copy. EA makes no warranty or representation to Client that the magnetic copy is accurate or complete. Any modifications of such magnetic copy by Client shall be at Client's sole risk and without liability to EA. Such magnetic copy is subject to all conditions of this Agreement.

7. **Indemnification**— Each party shall indemnify, defend and hold harmless the other party from and against all liability, loss, cost, expense, or damage caused by the indemnifying party's negligent acts or negligent omissions in the performance of this Agreement. However, in the event of any loss, damage or liability, whether to person or to property, arising out of the sole negligence of either EA or Client, such party will assume full responsibility for any liability arising thereof and hold harmless the other party. EA and Client further agree that if either EA or Client engages in willful misconduct, such party shall assume full responsibility for any liability arising thereof irrespective of the nature and degree of the other party's negligence, and will indemnify and hold harmless the other party. In no event shall EA be liable for any special, incidental, economic, or consequential damages whatsoever, regardless of the legal theory under which such damages may be incurred. In no event will EA's liability under this provision or Agreement exceed the lesser of the fees actually paid to EA under this Agreement or \$50,000.

For claims related to or involving pollution, toxic substances, or hazardous wastes or for any other claims arising from underground hidden or undisclosed hazards, Client agrees to release, defend, indemnify and hold harmless EA and its officers, directors, employees, agents, consultants, and subcontractors from all claims, damages, losses, and expenses, including, but not limited to, reasonable fees and expenses of attorneys and consultants, and court costs, arising out of the performance of this Agreement. Such indemnification and release include claims which arise out of the actual, alleged, or threatened dispersal, escape, or release of chemicals, wastes, liquids, gases, or any other material, irritant, contaminant or pollutant regardless of the legal theory under which such damages may be incurred.

EA's field personnel will avoid hazards or utilities that are visible to them at the site. EA is not responsible for any damage or loss to property owned by Client or third parties due undisclosed or unknown surface or subsurface conditions, except to the extent such damage or loss is a direct result of EA's gross negligence.

8. **Severability**— If any term or provision of this Agreement is held or deemed to be invalid or unenforceable, in whole or in part, by a court of competent jurisdiction, this Agreement shall be ineffective to the extent of such invalidity or unenforceability without rendering invalid or unenforceable the remaining terms and provisions of this Agreement.
9. **Third Party Rights**—EA's services under this Agreement are being performed solely for the benefit of Client, and no other entity shall have any claim against EA because of this Agreement or the performance or nonperformance of services provided by EA hereunder.
10. **Entire Agreement**— This Agreement contains the entire agreement of the parties. It may not be modified or terminated orally. Any modification to these terms and conditions without the written approval of EA shall be null and void. In no event will the terms of any purchase order, work order or any other document provided by Client modify or amend this Agreement, even if it is signed by EA, unless EA signs a written statement expressly indicating that such terms supersede the terms of this Agreement. Any such terms are expressly rejected by EA.
11. **Assignment**—EA reserves the right to assign this Agreement to its affiliates, subsidiaries, or successors as necessary in order to effectively carry out and complete the services specified by this Agreement.
12. **Governing Law**— This Agreement shall be deemed made in, and in all respects interpreted, construed, and governed by, the laws of the State of Maryland, U.S.A. All disputes arising hereunder are to be resolved in the

state and federal courts having jurisdiction of such disputes sitting in the State of Maryland or hearing appeals therefrom. Both parties consent to the jurisdiction of such courts over them for the purposes of this Agreement, and agree to accept service of process by registered mail.

ATTACHMENTS

Exhibit A – Scope of Work
(May be added by reference to EA Proposal Letter[s])

Exhibit B – EA Price Schedule, and/or EA Labor Rates and, EA Equipment Cost Rate Schedule
(May be added by reference to EA Proposal Letter[s])

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC

By: _____

Name: _____

Title: _____

Date: _____

Lower Platte North Natural Resources District

By: _____

Name: _____

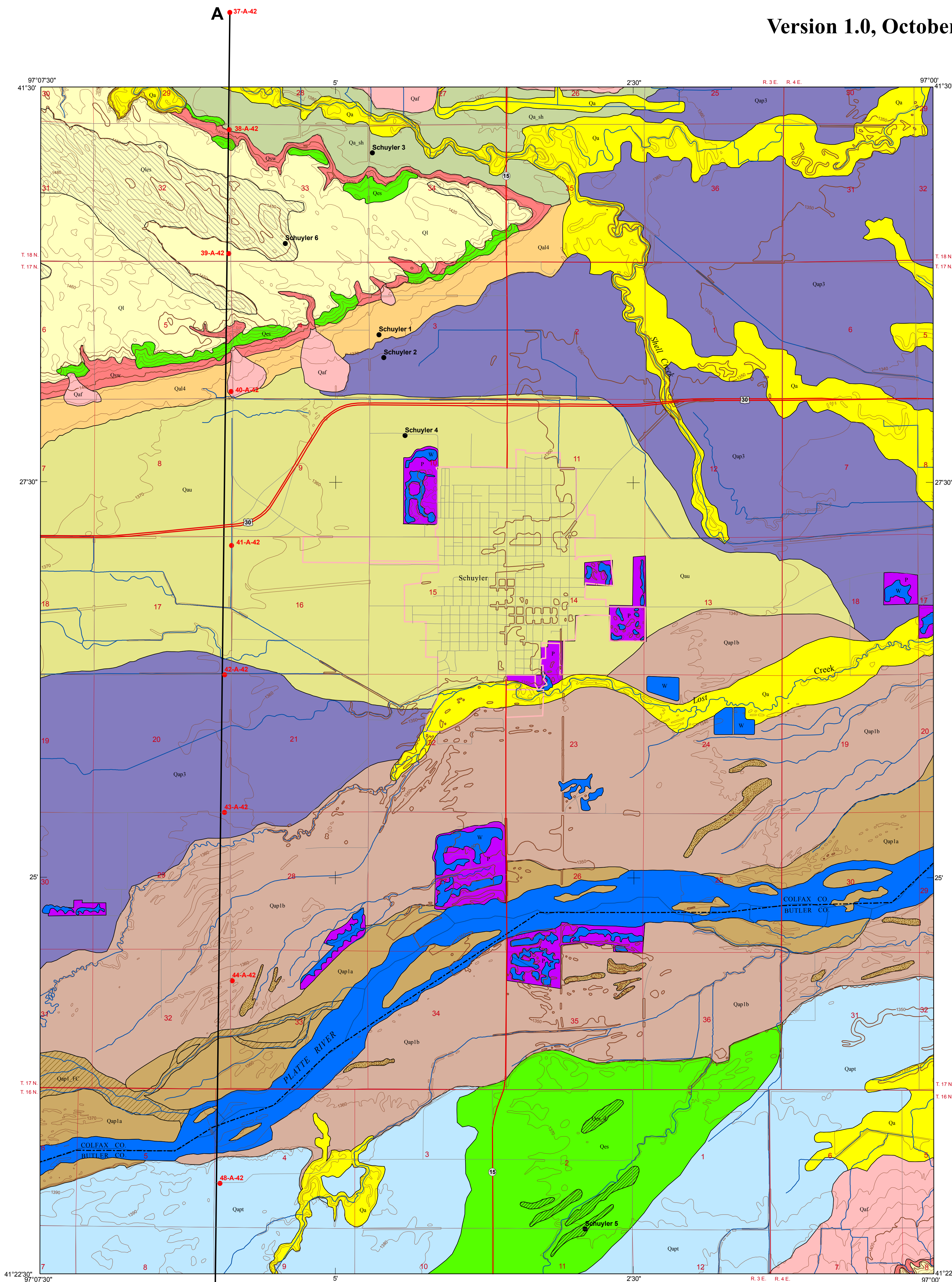
Title: _____

Date: _____

Surficial Geology and Interpretive Geologic Cross Section of the Schuyler 7.5 Minute Quadrangle, Nebraska

A. R. Young, P. R. Hanson and L. M. Howard, Conservation and Survey Division (Nebraska Geological Survey), School of Natural Resources, University of Nebraska-Lincoln

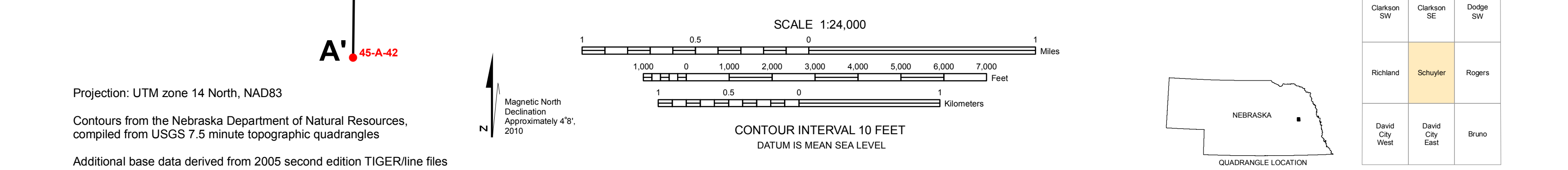
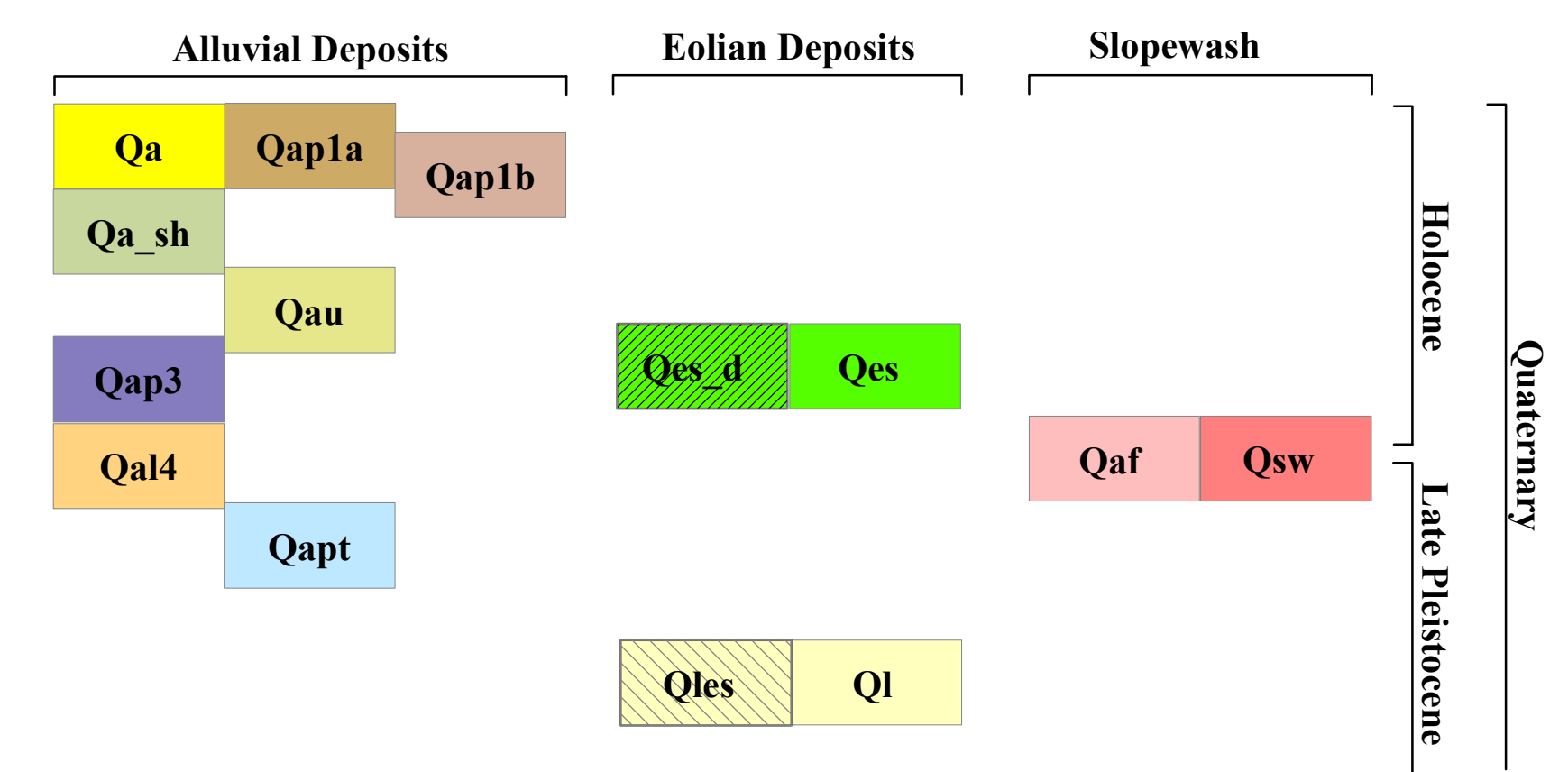
Version 1.0, October 2010



Surficial Geology of the Schuyler 7.5 Minute Quadrangle, Nebraska

Description of Mapping Units:

- Qa Alluvium (Holocene).**
Silt and clay with local sandy deposits
Predominantly Late Holocene sediments from smaller streams that are tributary to the Platte River or Shell Creek. These deposits are primarily Holocene to Late Holocene in age, and most are up to 5m (16.5ft) in thickness.
- Qa_sh Shell Creek alluvium (Holocene/Late Pleistocene)**
Silt or clay with local areas fine to coarse sand
Abandoned alluvium of Shell Creek. These deposits are likely Holocene to late Pleistocene in age. These deposits are generally 4 to 9m (13 to 29 ft.) thick and overlie much older alluvium that is Pliocene/Pleistocene in age. See accompanying interpretive geologic cross-section.
- Qaf Alluvial Fan Deposits (Late Pleistocene and Holocene)**
Silt and clay with local sandy deposits.
Predominately silt and clay deposits that gently slope away from the loess covered uplands from which these fans are sourced. The fan fills are 3-10m (10-30ft) thick.
- Qal4 Loup River Alluvium (Late Pleistocene)**
Silt and clay with local sandy deposits that overlie deeper sandy sediments
Late Pleistocene alluvium of the Loup River that is higher in elevation than the Holocene alluvium of the Platte River. These deposits are only located adjacent to a loess covered surface in the Northwestern corner of the map. The Qal4 alluvium is locally covered by slopewash and alluvial fan deposits from the loess covered uplands to the north.
- Qap1 Platte River alluvium, recent braided channel belt (Late Holocene).**
Fine to coarse sand with local areas of silt or clay
Late Holocene and largely historic sediments along the present Platte River. Bar and swale topography evident where not obscured by vegetation. These areas have a shallow water table and the lands are generally utilized as pasture or fallow ground. Much of the fallow ground is covered with a cottonwood/cedar forest. These deposits are approximately 10m (30 ft) thick over Pliocene/Pleistocene aged alluvial sand and gravel.
Qap1a Deposits have abundant bar and swale topography.
Qap1b Deposits have local bar and swale topography.
Qap1fc Flood Channel. Channels that are occupied during flooding events on the Platte River. These flood channels are usually occupied by small streams throughout the year.
Qap1sr Sand Ridges. Linear features that are composed predominantly of fine sand that stand approximately 2-4 m above the surrounding Qap1 surface.
- Qap3 Platte River alluvium (Holocene)**
Fine to medium sand with local areas of gravel
Alluvial sediments that are older and higher than Qap2 deposits. The water table is generally close to the surface (3-5 feet), however an intricate series of drainage ditches has lowered the water table to allow the ground to be extensively farmed. Secondary carbonates are present from the surface to the maximum depth cored of ~11m (35ft). These deposits are approximately 10m (30 ft) thick over Pliocene/Pleistocene aged alluvial sand and gravel.
- Qapt Platte River alluvial terrace (Late Pleistocene to Early Holocene).**
Fine to medium sand overlying pebbly sand
Alluvial sediments, commonly sand and pebbly sand, that are locally covered by thin eolian sand sheets and low relief eolian dunes. Based on the lack of loess cover, and numerical age estimates from other locations in the eastern Platte River Valley, these terraces are very late Pleistocene in age (~18-13ka). This unit is locally covered by alluvial fan deposits that are sourced from loess covered uplands to the south.
- Qau Undifferentiated Holocene alluvium (Holocene)**
Silt and clay with local sandy deposits
Undifferentiated alluvium of the Platte or Loup River system. The Qau sediments are silty to a depth of about 1m (3 ft) with secondary carbonates. Below 1m (3 ft) sediments consist of laminated sand with lenses of gravels. Generally, this unit is slightly lower (<1m or 3ft) than the Qap3 unit, however this change in elevation is too subtle to appear on the topo map.
- Qes Eolian sand (Holocene).**
Fine to medium sand
Greater than 1.5 m (~5ft) thick, this unit includes areas of both dunes and sand sheets that commonly overlie the Qapt terrace. Qes units are predominantly eolian sand sheets.
Qes_d Dunes with ~3m of relief. Numerical age control from other locations in the Eastern Platte River valley suggest these dunes are Late Holocene in age.
- Ql Peoria Loess (Late Pleistocene).**
Silt to silty clay.
Peoria loess in the mapping region ranges from 3-7 m (10-25ft) thick. The loess is generally massive silt or silty clay with secondary carbonates present locally. Peoria loess on this map directly overlies alluvial sand and gravel deposits that are likely Pleistocene in age.
- Qles Loess Covered Dunes (Late Pleistocene)**
Silt to silty clay
Sand dunes derived from older underlying alluvium. Dunes are covered by approximately 4 meters (~13ft) of Peoria Loess. Loess covered dunes have a maximum relief of about 10 meters (~30ft) in the mapping area. These dunes directly overlie alluvial sand and gravel deposits that are likely Late Pleistocene in age.
- Qsw Slopewash (Late Pleistocene and Holocene).**
Silt and silty clay, locally sandy
Predominantly silt and clay deposits that are located adjacent to, and sourced primarily from Peoria Loess. In other locations slopewash is sourced from sandy units.
- P Gravel Pits**
Includes deposits resulting from both active and inactive gravel mining operations
- W Water.**
Modern test hole locations
Test holes drilled during the 2009-2010 mapping season.
Historic test hole locations
Test holes drilled by the Nebraska Geological Survey. The last two digits of the test hole name represent the year drilled.
- City or town boundary.**



Overview and Interpretive Geologic Cross-Section of the Schuyler 1:24,000 Quadrangle

A. R. Young, P. R. Hanson, L. M. Howard, Conservation and Survey Division (Nebraska Geological Survey),
School of Natural Resources, University of Nebraska Lincoln
Version 1.0, October 2010

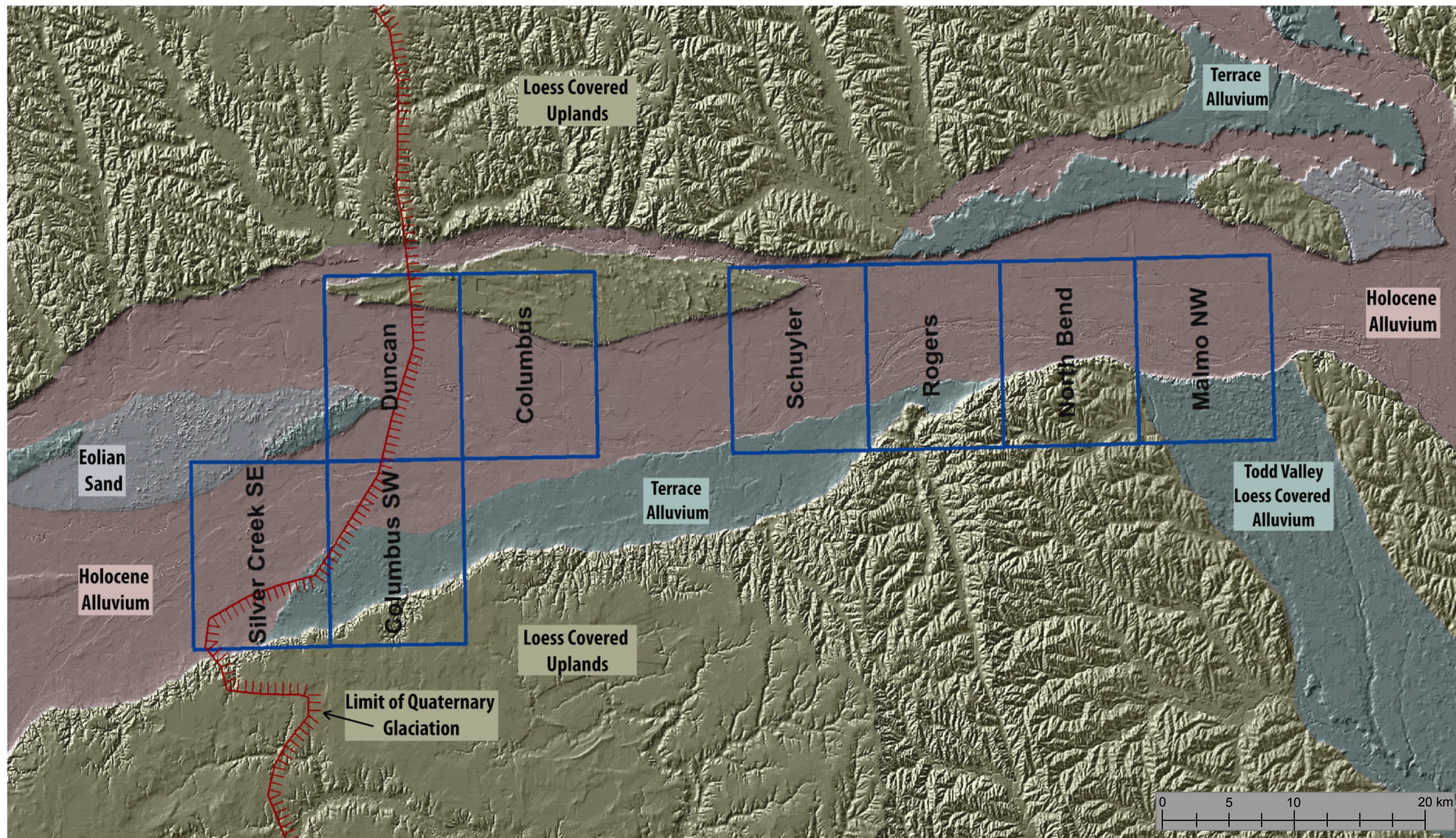


Figure 1. Surficial geology of the eastern Platte River valley over a hillshade of a digital elevation model (DEM). Shown are the 7.5-minute scale surficial geologic maps from the area. These include the Columbus (Hanson and Young, 2007), Columbus SW (Hanson and Young, 2007), Duncan (Hanson et al., 2009), Malmo NW (Joeckel and Mason, 2003), North Bend (Joeckel and Mason, 2003), Rogers (Hanson and Mason, 2003), Schuyler (Young et al., 2010), and Silver Creek SE (Hanson et al., 2008) 7.5-minute Quadrangles. The geology of uplands in the region are characterized as Pre-Illinoian glacial deposits that are covered by varying thicknesses of Quaternary age loess deposits. The lower elevation deposits are generally alluvial units of the Elkhorn, Loup, and Platte Rivers. These deposits are late Pleistocene to Holocene in age and are locally covered by eolian dunes and sand sheets.

Overview and Interpretive Geologic Cross-Section of the Schuyler 1:24,000 Quadrangle

The Schuyler 1:24,000 Scale Quadrangle lies within the Platte River valley in eastern Nebraska. The area's surficial geology is dominated by late Quaternary eolian and alluvial sediments that locally overlie glacial age sediments and Cretaceous bedrock.

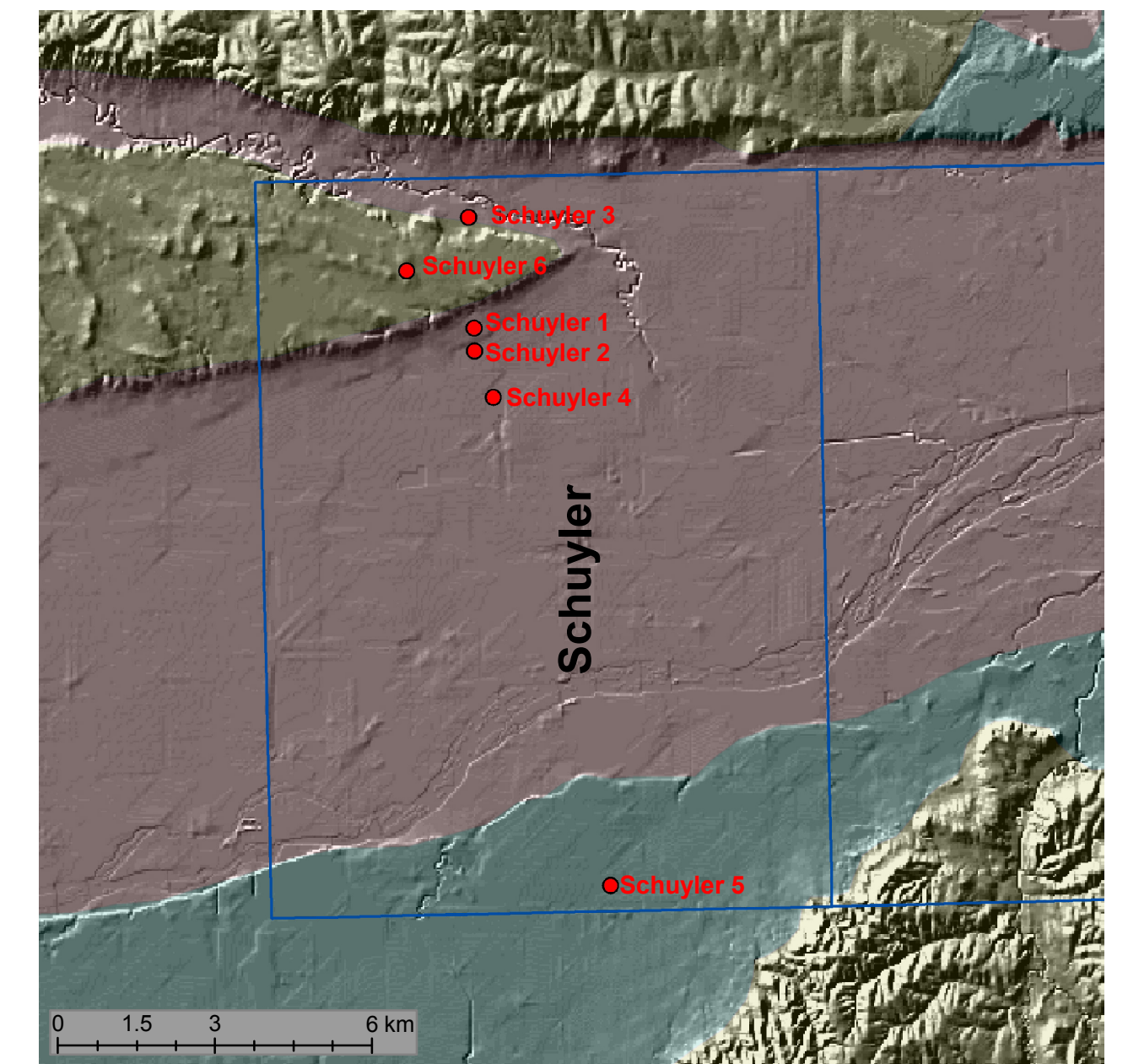


Figure 2. Surficial geology of the eastern Platte River valley over a hillshade of a digital elevation model (DEM). Shown are the locations of the Test Holes drilled with a Geoprobe coring device in the Schuyler 7.5-minute Quadrangle in the 2009 mapping year. The stratigraphy and particle size analysis of these cores are shown in Fig. 3.

Platte River Valley Geology

The Platte River Valley contains a complex fill of alluvial and eolian deposits that overlie Cretaceous bedrock. The majority of the alluvial deposits found in the valley were deposited by the Platte River in the past ~25 ka. The loess-covered landform located between the Platte River and Shell Creek in the northwestern portion of the map is interpreted as abandoned alluvium of the Platte River. The top of this landform lies ~26 to 33 meters (86 to 108 feet) above the present-day Platte River. After its abandonment, the terrace contained some active sand dunes locally and eventually the surface was covered with Peoria Loess. Based on the Peoria Loess cover, relative dating suggests the terrace tread was abandoned around 25 to 20 ka.

Two younger terrace fills are found in the Platte River valley and are located on the extreme southern edge of the map, and to the northwest of the town of Schuyler. The terrace on the southern edge of the map lies approximately 6 to 8 meters (20 to 25 feet) above the present Platte River. This terrace is locally draped with eolian sand sheets and sand dunes. Preliminary age estimates from optical dating of the terrace fill indicate that the alluvium was deposited between 16 to 14 ka. The other terrace is located along the loess-covered alluvium on the northwestern portion of the map and is also found 6 to 8 meters (20 to 25 feet) above the present Platte River. This terrace tread is locally covered with alluvial fan and colluvial deposits sourced from the Peoria Loess found upslope.

Recent alluvial deposits of the Platte River are generally sand and gravel-rich deposits that are locally capped by varying amounts of overbank floodplain deposits. These latter sediments are generally sand, silt and clay-rich sediments that range from 0.5 to 3 meters (2 to 10 feet) in depth. Preliminary results from optical dating indicate that the upper 10-15 meters (30-50 ft) of the alluvial fill in the Platte River valley was deposited within the past 40ka years, or is late Pleistocene to Holocene in age. Older sand and gravel silt and clay deposits are found between the recent Platte River alluvium and the Cretaceous bedrock. Because we have not recovered core from these deposits their depositional environment cannot be precisely determined. However, we attribute the deposits to alluvial and eolian sediments found in paleovalleys that may pre-date Pre-Illinoian glaciation.

Upland Geology

The dissected uplands found to the immediate north and south of the mapping area are draped with Peoria Loess. Based on historical CSD Test Holes, Peoria Loess ranges from approximately 26 to 40 feet (8-12 meters) in thickness in the area (Mason, 2001). Peoria Loess was deposited beginning around 25 ka, and loess deposition ended sometime between 15 to 13 ka (Bettis et al., 2003; Mason et al.,

2008). The Peoria Loess on the uplands is underlain by older loess units, locally including the Gilman Canyon Formation and the Loveland Loess. Combined these loess units are commonly at least 9-13 meters (29-43 feet). The older loess units overlie glacial deposits, including glacial till and associated sand and gravel rich outwash deposits. These glacial deposits are Pre-Illinoian in age and comprise approximately 30m (100 ft) of sediment. Locally sand, gravel, silt, or clay deposits are found below the glacial sediments. Cretaceous age bedrock is commonly found around 43m (140 ft) below the uplands. Bedrock is either the sandstones, shales, and siltstones Dakota Formation, or the shales and limestones of the Greenhorn, Graneros and Carlile Formations.

References Cited

- Bettis, E.A., III, Muhs, D.R., Roberts, H.M., Wintle, A.G., 2003, Last glacial loess in the conterminous USA, *Quaternary Science Reviews* 22, 1907-1946.
- Hanson, P.R., Young, A.R., Howard, L.M., 2009, Surficial Geologic Map and Interpretive Geologic Cross-Section of the Duncan, Nebraska 7.5-Minute Quadrangle, <http://snr.unl.edu/data/geologysoils/digitalgeologicmaps/digitalgeologicmaps.asp>
- Hanson, P.R., Young, A.R., 2008, Surficial Geologic map of the Silver Creek SE 7.5-Minute Quadrangle, <http://snr.unl.edu/data/geologysoils/digitalgeologicmaps/digitalgeologicmaps.asp>
- Hanson, P.R., Young, A.R., 2007, Surficial geologic map of the Columbus, Nebraska 7.5' Quadrangle, <http://snr.unl.edu/data/geologysoils/digitalgeologicmaps/digitalgeologicmaps.asp>
- Hanson, P.R., Young, A.R., 2007, Surficial geologic map of the Columbus SW, Nebraska 7.5' Quadrangle, <http://snr.unl.edu/data/geologysoils/digitalgeologicmaps/digitalgeologicmaps.asp>
- Hanson, P.R., Mason, J.A., 2003, Surficial Geologic Map of the Rogers, Nebraska 7.5' Quadrangle, <http://snr.unl.edu/data/geologysoils/digitalgeologicmaps/digitalgeologicmaps.asp>
- Hanson, P.R., Joeckel, R.M., Young, A.R., Horn, J., 2009, Late Holocene Dune Activity in the Eastern Platte River Valley, Nebraska, *Geomorphology* 103, 555-561.
- Joeckel, R.M., Mason, J.A., 2003, Surficial Geologic Map of the Malmo NW, Nebraska 7.5' Quadrangle.
- Joeckel, R.M., Mason, J.A., 2003, Surficial Geologic Map of the North Bend, Nebraska 7.5' Quadrangle.
- Mason, J.A., Miao, X., Hanson, P.R., Johnson, W.C., Jacobs, P.M., Goble, R.J., 2008, Loess record of the last Glacial-Interglacial transition on the northern and central Great Plains, *Quaternary Science Reviews* 27, 1772-1783.
- Miao, X., Mason, J.A., Swinehart, J.B., Loope, D.B., Hanson, P.R., Goble, R.J., Liu, X., 2007, A 10,000-year record of dune activity, dust storms, and drought in the central Great Plains, *Geology* 35, 119-122.
- Smith, F.A., Burchett, R.R., 1998, Colfax County Test-Hole Logs, Nebraska Water Survey Test-Hole Report No. 19, 20 p.
- Summerside, S.E., Burchett, R.R., 2003, Butler County Test-Hole Logs, Nebraska Water Survey Test-Hole Report No. 12, 75 p.

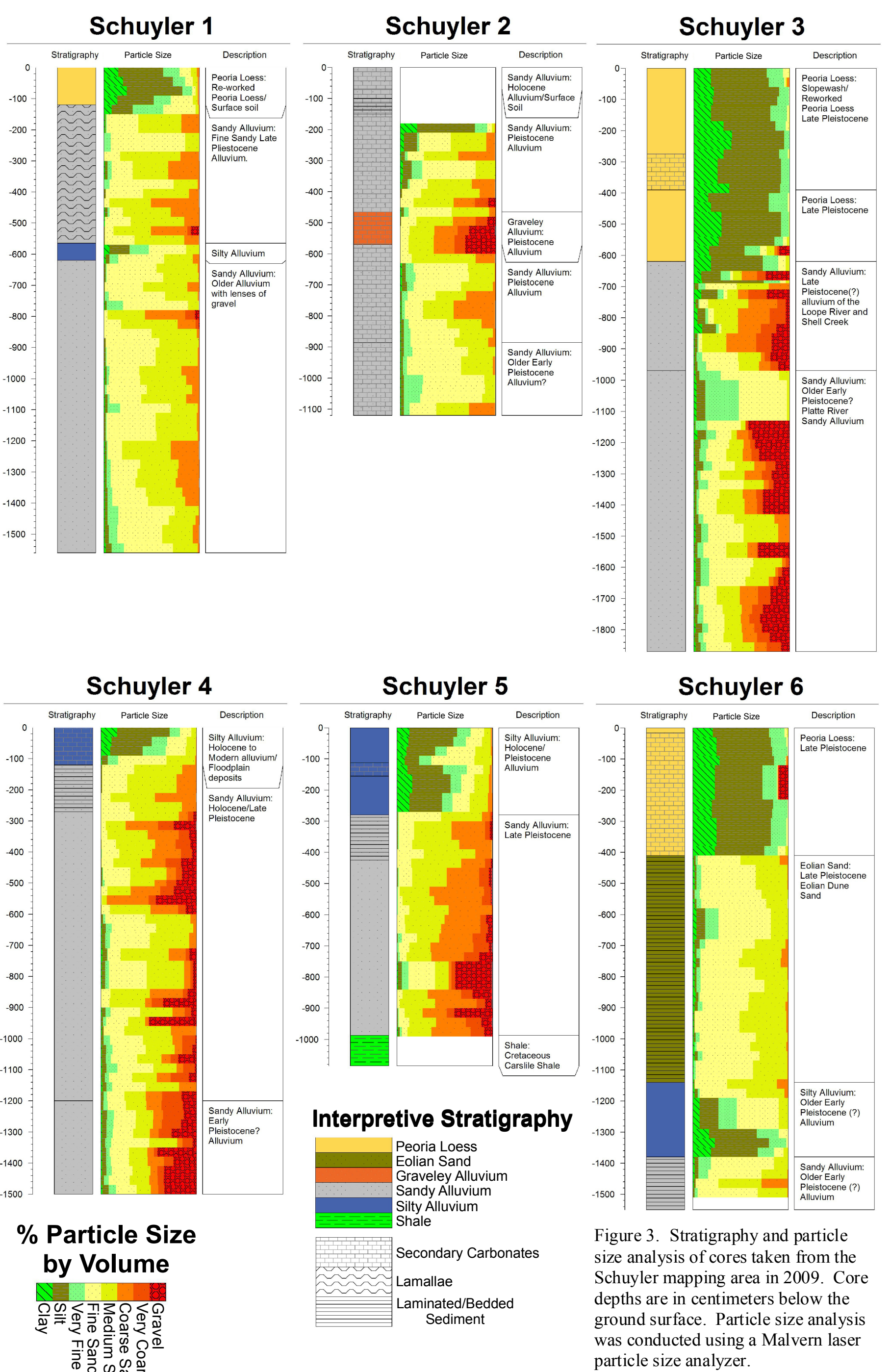


Figure 3. Stratigraphy and particle size analysis of cores taken from the Schuyler mapping area in 2009. Core depths are in centimeters below the ground surface. Particle size analysis was conducted using a Malvern laser particle size analyzer.

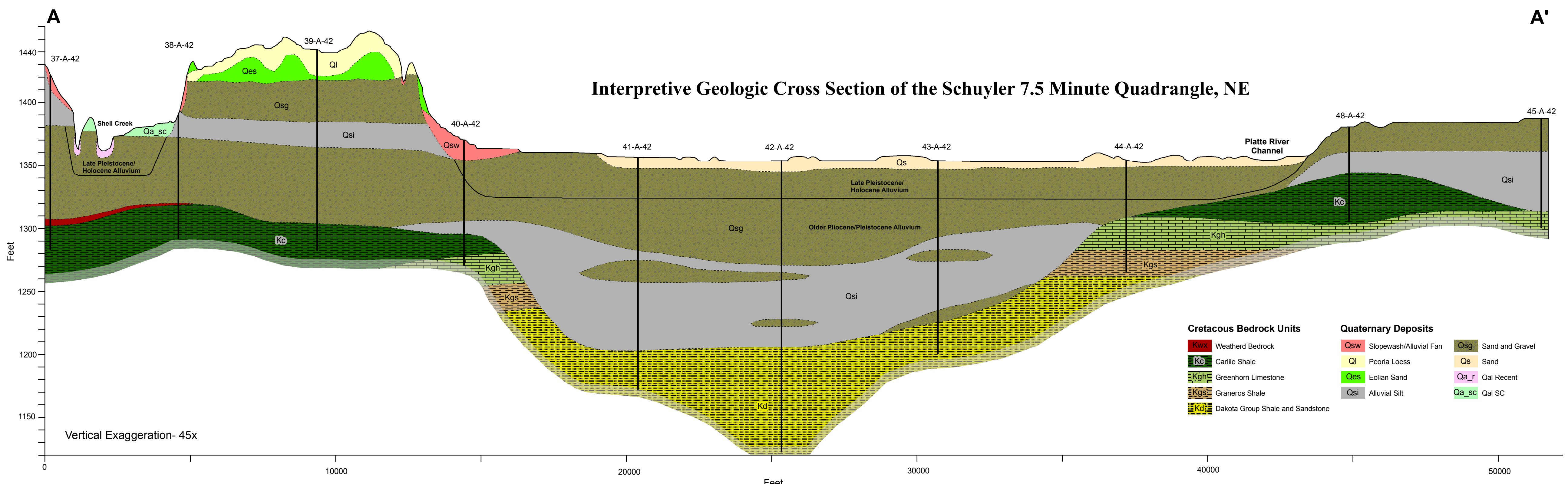


Figure 4. Interpretive geologic cross-section in the Schuyler Quadrangle. Stratigraphy is based on Conservation and Survey Division Test Hole borings drilled in 1942. These holes were drilled as to Cretaceous bedrock as part of a state-wide drilling program aimed at assessing water and other geologic resources. Dotted lines represent interpreted contacts.









**AGREEMENT
BETWEEN OWNER AND ENGINEER
FOR
PROFESSIONAL SERVICES**

THIS IS AN AGREEMENT effective as of 06-22-20 ("Effective Date") between Papio-Missouri River Natural Resources District ("Owner") and JEO Consulting Group, Inc. ("Engineer").

Owner's project, of which Engineer's services under this Agreement are a part, is generally identified as follows:

PMR/LPS/LPN Hydrogeologic Framework and Assessment WSF Application ("Project").

JEO Project Number: 200879.00

Owner and Engineer further agree as follows:

ARTICLE 1 - SERVICES OF ENGINEER

1.01 Scope

- A. Engineer shall provide, or cause to be provided, the services set forth herein and in Exhibit A.

ARTICLE 2 - OWNER'S RESPONSIBILITIES

2.01 Owner Responsibilities

- A. Owner responsibilities are outlined in Section 3 of Exhibit B.

ARTICLE 3 - COMPENSATION

3.01 Compensation

- A. Owner shall pay Engineer as set forth in Exhibit A and per the terms in Exhibit B.
- B. The Project is to be billed at a lump sum: \$9,000.00
- C. The Standard Hourly Rates Schedule shall be adjusted annually (as of approximately January 1st) to reflect equitable changes in the compensation payable to Engineer. The current hourly rate schedule can be provided upon request.

ARTICLE 4 - EXHIBITS AND SPECIAL PROVISIONS

4.1 Exhibits

Exhibit A – Scope of Services
Exhibit B – General Conditions

4.2 Total Agreement

- A. This Agreement (consisting of pages 1 to 2 inclusive, together with the Exhibits identified as included above) constitutes the entire agreement between Owner and Engineer and supersedes all prior written or oral understandings. This Agreement may only be amended, supplemented, modified, or canceled by a duly executed written instrument.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement.

Owner: Papio-Missouri River NRD

Engineer: JEO Consulting Group, Inc.

By: John Winkler

By: Kevin Kruse, PE

Title: General Manager

Title: Water Resources Operations Manager

Date Signed: 06-22-2020

Date Signed: 6-12-2020

Address for giving notices:
8901 S. 154th Street
Omaha, NE 68138

Address for giving notices:
JEO Consulting Group, Inc.
2700 Fletcher Ave.
Lincoln, Nebraska 68504



Exhibit A
SCOPE OF SERVICES
PMR/LPS/LPN Hydrogeologic Framework and Assessment WSF Application
Papio-Missouri River NRD
JEO Project No. 200879.00
June 2020

PROJECT DESCRIPTION:

PMRNRD is leading a collaborative effort among the three NRDs, also including Lower Platte North NRD and Lower Platte South NRD, to develop the hydrogeologic framework or conceptual hydrogeologic model for each of the NRDs, as a combined effort, using existing and future Airborne Electromagnetic (AEM) data, geologic logs, and other relevant available geologic and hydrogeological reports and data. The project will also include a detailed hydrogeologic assessment for Papio NRD and Lower Platte South NRD. This effort includes development and submittal of a Water Sustainability Fund (WSF) application to the Natural Resources Commission on, or before, July 31, 2020.

The NRD's have invested a significant amount of time and financial resources to better understand the hydrogeology by obtaining state-of-the art AEM survey data. Implementing a similar approach as used for the Lower Elkhorn NRD project will provide these NRDs with a consistent and comprehensive assessment deliverable that will include the most recent data, delivered in a user-friendly platform that can be utilized by the NRD's staff, management, and board members; regulators; producers and other high-capacity water users; public water suppliers; and, the general public for future groundwater quality and quantity evaluations, resource management, and educational purposes.

PROJECT TASKS:

Task 1 –Hydrogeologic Framework and Assessment WSF Application

JEO will assist Papio Missouri River NRD with writing a WSF application to the Natural Resources Commission, on or before July 31, 2020. Work includes grant writing, and coordination with the Lower Platte North NRD and Lower Platte South NRD. JEO will correspond with NeDNR and NRC committee members, as necessary.

Task Meetings:

- Multiple calls, conference calls, and regular correspondence to collect necessary data

Task Deliverables:

- Complete Water Sustainability Fund Application

Task Assumptions:

- Up to two progress meetings with Owner's project representative
- Owner will provide detailed reviews of the application
- Lower Platte South and Lower Platte North will receive committee and Board approval in July

PROPOSED PROJECT SCHEDULE:

The WSF application is due on July 31, 2020. The following schedule is proposed:

Notice to Proceed:	June 15, 2020
Submit Water Sustainability Fund Application:	July 31, 2020

PROJECT FEE AND PAYMENT SCHEDULE:

This scope of services will be performed for a lump sum fee, as shown below.

Task 1 – Water Sustainability Fund	\$ 9,000.00
------------------------------------	-------------

Total Project \$ 9,000.00

JEO will invoice monthly for services to date, due upon receipt. Invoices unpaid after 30 days will accrue interest at 12% per annum (1% per month), credited first to interest and then to principal.

SERVICES NOT INCLUDED:

If necessary, a fee for these services can be negotiated:

1. Board and committee meetings and public information efforts not previously noted.

SERVICES PROVIDED BY Papio Missouri River NRD:

1. Designate a team member as the project representative.
2. Provide available data and feedback.

Memorandum

To: Paul Woodward - Papio-Missouri River NRD
From: Dave Hume - LRE Water and Jonathan Mohr - JEO Consulting Group
Copy to: Daryl Anderson - Lower Platte North NRD, Dick Ehrman and Dan Schultz - Lower Platte South NRD
Reviewed by:
Date: June 11, 2020
Project: DEVELOPMENT OF LOWER PLATTE NRD's 3D HYDROGEOLOGIC FRAMEWORK AND ASSESSMENT USING AEM AND GEOLOGIC LOG DATA FOR FUTURE HYDROGEOLOGIC ASSESSMENT AND GROUNDWATER MODELING TASKS
Subject: REVISED - PRELIMINARY SCOPE OF WORK AND COST ESTIMATES

BACKGROUND AND OBJECTIVE

LRE Water, in partnership with JEO Consulting Group (JEO) (LRE/JEO team) have prepared this memorandum for the Lower Platte South Natural Resources District (LPSNRD), Papio Missouri River Natural Resources District (PMRNRD), and Lower Platte North Natural Resources District (LPNNRD), collectively referred to herein as the Lower Platte NRDs.

Paul Woodward with PMRNRD is leading a collaborative effort among the three NRDs, and on their behalf, is asking LRE/JEO team to provide the NRD's with a general approach, key tasks, estimated costs, and schedule for obtaining possible Water Sustainability Fund (WSF) support for developing the hydrogeologic framework or conceptual hydrogeologic model for each of the NRDs using existing and future Airborne Electromagnetic (AEM) data, geologic logs, and other relevant available geologic and hydrogeological reports and data. The Lower Platte NRDs are also in discussion with the Nebraska Department of Natural Resources as a project partner.

The LRE/JEO team understands the information provided below will be used by the NRDs for budgeting, scheduling, and identifying funding sources for potential projects in late-2020 or 2021. The LRE/JEO team has adjusted the cost estimate to reflective cost savings of a combined effort and the most recent cost-share amount from NeDNR. Please note, this cost estimate is intended for initial budgeting purposes, and therefore, is not to be construed as final cost estimates should the NRDs choose to move forward with a formal request for proposal(s) at a later date for all or portions of the tasks provided below. The project's budget will be dependent upon the final cost-share from NeDNR and the success of the WSF application.

GENERAL APPROACH AND SCOPE OF WORK

LRE/JEO's team's approach, key tasks, and costs are based on our work since 2018 on the Lower Elkhorn Natural Resource District (LENRD) pilot study (completed) and LENRD's district-wide hydrogeologic framework and district-scale numerical groundwater flow modeling project (in progress). This project provides a means for us to provide the NRDs with an approach that was successful and preliminary estimated costs if following the same general approach.

The LENRD project is the first in eastern Nebraska that has utilized AEM data and incorporation of borehole lithology data to develop a refined 3D conceptual hydrogeologic model that was used in a numerical groundwater flow model. The Nebraska Department of Natural Resources (NeDNR) is a partner with the LENRD on this project.

The NRD's have invested a significant amount of time and financial resources to better understand the hydrogeology by obtaining state-of-the art AEM survey data. Implementing a similar approach as used for the LENRD project will provide the NRDs with a consistent and comprehensive assessment deliverable that will include the most recent data, delivered in a user-friendly platform that can be utilized by the NRD's staff, management, and board members; regulators; producers and other high-capacity water users; public water suppliers; and, the general public for future groundwater quality and quantity evaluations, resource management, and educational purposes.

The 3D framework, when completed can be used for, but not limited to: better understanding the flow and connection of groundwater flow systems; evaluating existing and siting and assessing new well permit applications; completing aquifer vulnerability assessment for protection of groundwater resources and identifying areas for implementing best management practices; identifying potential areas for groundwater recharge; evaluating hydrologically connected surface and groundwater; and, constructing new and refining existing numerical groundwater flow models and other tools that can be used to assist with a number of the assessment needs above.

The AEM surveys provide excellent characterization of the hydrostratigraphy across the NRDs based on the electrical properties of earth materials from the land surface downward using electromagnetic induction. Based on our use of the AEM data from the LENRD project, it became apparent that defining some stratigraphic contacts from AEM data alone could benefit by using borehole lithology data to define specific geologic surfaces. The LENRD project team concluded that the borehole data was best suited to define the top of bedrock surface and bottom of principal aquifer, and to use the AEM data to define the hydrostratigraphy of the unconsolidated materials (i.e., Quaternary and Ogallala). This same approach and workflow will be applied to the NRDs datasets to capture the benefits of both borehole data and AEM data when building regional, NRD-wide, or localized 3D geological framework models and groundwater flow models.

The AEM resistivity data has been correlated to ranges of hydraulic conductivity of the aquifer and non-aquifer materials. The LRE/JEO team will obtain from the ENWRA website or directly from ENWRA personnel, or Nebraska's GeoCloud (in progress), the AEM data to create a robust 3D geological model using Leapfrog (3D geologic modeling software) to define 3D solids of resistivity zones that represent the hydrostratigraphy. These 3D resistivity zones can be used to evaluate the hydrogeologic framework, which could then be used to construct 3D numerical groundwater flow model grids with a range of hydraulic conductivity values. These files could then be exported to Groundwater Vistas, and pre- and post-processing program for MODFLOW.

Due to the geographic extent of the NRDs proposed projects, and the large datasets and required data analyses, ArcGIS and Leapfrog would be proposed to compile, manipulate, interpolate, and interpret the data. Once the Leapfrog model is developed, it will be provided to the NRDs to access and view with the free Leapfrog Viewer application. The Viewer application will allow NRD (or others) to “fly around and through” the interpolated AEM data, cut slices (profiles or cross-sections) through the AEM data, and view select saved “scenes” that could target certain areas of interest or near the hydrogeologic cross sections. LIDAR data will be used to define the top of the of the Leapfrog model and the bedrock surfaces used to define the unconsolidated-bedrock contact in the Leapfrog model. Additionally, well and test hole lithology data will be incorporated into the Leapfrog project to display the lithology as boreholes. A final deliverable will be provided to the NRDs in ESRI geodatabase format and hard copy and/or digital “map book, if desired.

KEY TASKS of the HYDROGEOLOGIC FRAMEWORK

- Provide guidance to the NRDs on funding sources and grant opportunities.
- Obtain and manage hydrogeologic AEM and borehole lithology datasets for GIS, Leapfrog, and groundwater modelling.
- Conduct GIS spatial analyses to develop key hydrostratigraphic surfaces for future spatial analyses, provide ESRI geodatabase deliverables, and create the top of bedrock hydrostratigraphic surface for constraining the AEM data.
- Create datasets from the processed AEM data for analyses and interpolation in Leapfrog from all existing and future AEM flight data.
- Complete a 3D visualization geologic model for the AEM data using Leapfrog, and provide the NRD with the data files for use in Leapfrog’s free downloadable Viewer that allows the user to use the 3D model.
- Prepare data sets for input and initial discretization and layers for a future groundwater flow model.
- Attend staff, committee, board and group progress meetings as necessary.

Detailed Hydrogeologic Assessment Mapping Option

**Requested by only LPS and Papio NRDs*

- Complete a detailed hydrogeologic assessment mapping the key hydrostratigraphic surfaces and construct cross sections across through each of the NRDs using the borehole lithology from all the test holes and wells logs.
- Provide a final geodatabase and other mapping files in an electronic and/or hard copy assessment report (i.e., “map book”) deliverable format. The assessment deliverable can be used in conjunction with the Leapfrog viewer to have the most up to date robust format to assist the NRDs with water management decisions.

PRELIMINARY FUNDING OPTIONS AND COSTS

Based upon input from Paul Woodward on June 2, 2020, NeDNR has initially offered up to \$30,000 cost-share, or \$10,000 per NRD. Please note, that any additional sources of funding, besides the local match, must come off the top of the project total for WSF. Therefore the WSF grant request would equal the final combined three NRD project total, minus the NeDNR share, then split 60% WSF and 40% NRD. Two project options are provided within this memo, and are subject to change based upon each NRD’s individual goals. Each option assumes NeDNR contributes \$10,000 per NRD.

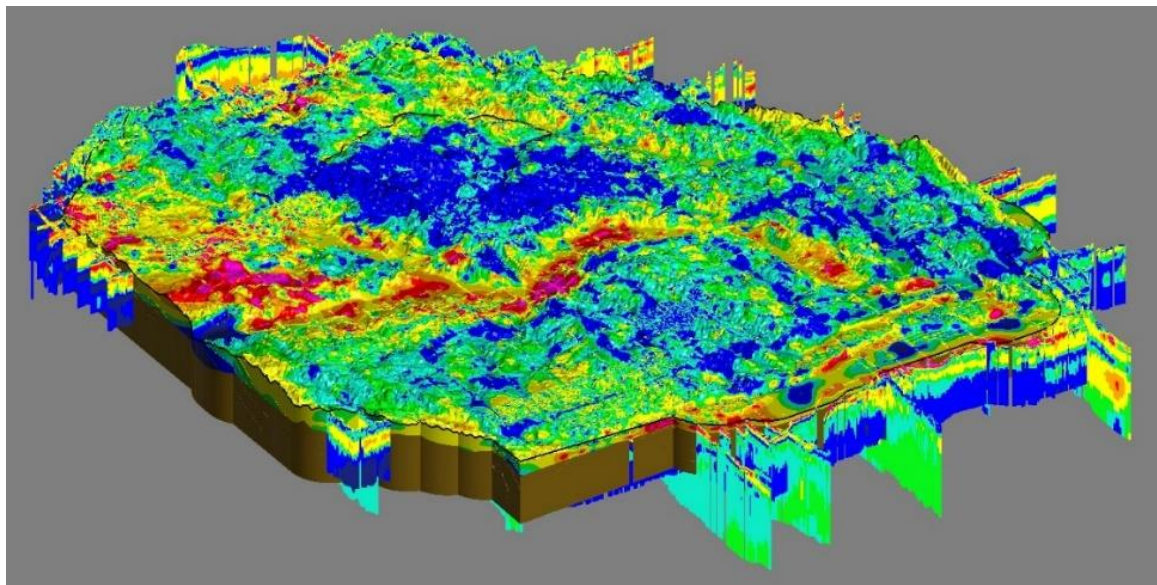
These revised project cost assume that one project will occur that covers three NRDs, which brings a significant cost savings due to efficiency in data processing, meetings, and management. The May 8, 2020, memo provided cost should each NRD proceed individually, using Lower Elkhorn NRD as a template.

Option One – Combined Effort Framework, along with Papio and LPS Detailed Mapping

NRD	Framework Cost	Detailed Hydrogeologic Mapping	Total	PM/Meetings	Grand Total	NDNR Cash	REMAINING	WSF 60%	NRD Remaining (40%)
Papio	\$ 100,000	\$ 65,000	\$ 165,000	\$ 16,500	\$ 181,500	\$ 10,000	\$ 171,500	\$ 102,900	\$ 68,600
LPS	\$ 97,000	\$ 65,000	\$ 162,000	\$ 16,200	\$ 178,200	\$ 10,000	\$ 168,200	\$ 100,920	\$ 67,280
LPN	\$ 130,000	\$ -	\$ 130,000	\$ 11,000	\$ 141,000	\$ 10,000	\$ 131,000	\$ 78,600	\$ 52,400
Total	\$ 327,000	\$ 130,000	\$ 457,000	\$ 43,700	\$ 500,700	\$ 30,000	\$ 470,700	\$ 282,420	\$ 188,280

Option Two – Combined Effort Framework Only

NRD	Framework Cost	Detailed Hydrogeologic	Total	PM/Meetings	Grand Total	NDNR Cash	REMAINING	WSF 60%	NRD Remaining (40%)
Papio	\$ 100,000	\$ -	\$ 100,000	\$ 11,000	\$ 111,000	\$ 10,000	\$ 101,000	\$ 60,600	\$ 40,400
LPS	\$ 97,000	\$ -	\$ 97,000	\$ 11,000	\$ 108,000	\$ 10,000	\$ 98,000	\$ 58,800	\$ 39,200
LPN	\$ 130,000	\$ -	\$ 130,000	\$ 11,000	\$ 141,000	\$ 10,000	\$ 131,000	\$ 78,600	\$ 52,400
Total	\$ 327,000	\$ -	\$ 327,000	\$ 33,000	\$ 360,000	\$ 30,000	\$ 330,000	\$ 198,000	\$ 132,000



LE NRD's 3D hydrogeologic Leapfrog framework model from AEM data created by LRE/JEO team.

CHEMIGATION – JULY 2020

TOTAL CHEMIGATION RENEWAL APPLICATIONS – 2020

NEW CHEMIGATION APPLICATIONS – 32

() Boone (8) Butler (9) Colfax (4) Dodge () Madison (3) Platte (8) Saunders

RENEWALS: 686

BOONE COUNTY – 54

BUTLER COUNTY – 100

COLFAX COUNTY – 57

DODGE COUNTY – 115

MADISON COUNTY – 8

PLATTE COUNTY – 111

SAUNDERS COUNTY – 241

RENEWAL INSPECTIONS:

() Boone () Butler () Colfax () Dodge () Madison () Platte () Saunders

NEW INSPECTIONS:

() Boone () Butler () Colfax () Dodge () Madison () Platte () Saunders

NEW CANCELLATIONS:

EMERGENCY: 0

Cancellations –Total

() Boone () Butler () Colfax () Dodge () Platte () Saunders

WATER PROGRAMS BUDGET							
20-21 BUDGET (Proposed) For planning next's year budget							
Account			(FY20-21)	(FY20-21)	(FY20-21)	(FY20-21)	(FY19-20)
Number	Program		Budget	Capital Improv.	Budget & Equipment	Reimbursements	Budget
6	WATER PROGRAMS BUDGET		286,000	75,000	361,000	143,000	495,750
100	Ground Water Management Area		34,000	0			26,500
	101 Cost Share		10,000			2,500	10,000
	102 Inform. and Ed.		500				2,000
	103 NRD Cert. Classes		1,000				2,000
	104 Permits						0
	105 Other						0
	106 Integrated Man. Plan						0
	107 Water Cons. Classes						0
	110 Basin Wide Plan		10,000				0
	111 Flow Meter Maintenance		12,500				12,500
200	Ground Water Programs		51,000	75,000			36,000
	201 Decommissioned Wells		15,000			2000	12,500
	202 GIS		0				
	203 GW Levels & Flow Meters		1,000				1,000
	204 GW Quality Program		15,000				15,000
	205 Mead-NOP		0				0
	206 Monitoring Wells Equipment		20,000	75,000			7,500
	207 Registered Wells		0				0
	208 Vadose Zone Samp.		0				0
	209 Other		0				0
	210 GW Sinking Fund		0				0
	211 CMAT		0				0
	212 GW Mointoring Equipment Dakota wells		0				0
300	Regulatory		500	0			1,000
	301 Chemigation		500			20,000	1,000
	302 Irrigation Runoff		0				0
	303 Other		0				0
400	Surface Water Programs		24,000	0			26,250
	401 Platte River Ice Mont		0				0
	402 Prec. Gauging Network		0				0
	403 Stream Flow (USGS)		24,000				26,000
	404 Other		0				0
	405 Ne-Rain Network		0				250
500	Special Projects		176,500	0			406,000
	501 GW Subarea		0				0
	502 Shell Creek WQ Proj.		0				0
	503 Test Holes		0				0
	504 ENWRA dues		0				33,500
	505 Saturated Thick. Map		0				0
	506 Hyrological Interpretion		30,000				0
	507 ELM		0				0
	512 AEM flights in selected subareas		0				150,000
	513 GW elevation Wann Subarea		0				0
	514 Tile drain study		0				0
	514 Update Farm Process model		0				0
	515 SENSE program		0				0
	516 Platte-Elkhorn Int. Water Mon.		0				0
	518 Lower Platte Consortium		3,000				500
	500 Master Database (Phoenix)		15,000				30,000
	NET Grant 2019-20		108,500			66,000	87,000
	WaterSmart Grant		20,000			52,500	105,000
600	Wellhead Protection		0				0
	601 Field Support		0				0
	602 Information Education		0				0
	603 Training		0				0
	604 Other		0				0

	(FY19-20)	(FY19-20)	(FY19-20)
(FY19-20)	Budget &	(FY19-20)	(FY19-20)
Capital Improv.	Equipment	Expenses	Reimbursements
10,000	505,750	406,172	119,488
0		10,322	
		5,039	2,670
		0	
		786	
		0	
		0	
0		0	
		0	
		0	
		4,498	
10,000		50,829	
		27,567	1798
		327	
		11,350	
		0	
		11,104	
		0	
		0	
		0	
		0	
0		0	
10,000		481	
0		94	
0		94	
		0	
		0	
0		17,109	
		0	
		0	
		17,109	
		0	
		0	
0		327,817	
		33,400	
		150,000	90,000
		18,275	
		32,224	25,020
		93,918	
		0	
		0	
		0	
		0	
		0	

cost for Leshara
6562 quality gauge
2450 monitoring well with Papio
17000 past years



June 18, 2020

RE: Lower Platte River Basin Coalition SOW – Intent to Proceed

Dear Mr. Groff,

This letter serves as notice of the Lower Platte River Basin Coalitions (Coalition) intent to proceed into a contract for services with The Flatwater Group (TFG) for the attached Scope of Work (SOW) and Cost Estimate titled, Lower Platte River Basin Coalition – INSIGHT Update Support.

The Coalition Management Committee (Committee) reviewed the SOW and unanimously supported proceeding with the term, services, schedule, and compensations as presented. Specific to the project components outlined in the SOW, the Committee asks that data collection tasks be prioritized, and at this time any tasks associated with running CROPSIM, or collecting model outputs, not be completed until notified to proceed.

The Committee requests that a kickoff meeting be held with the Coalition Technical Committee this summer. The Committee also requests that TFG work closely with the Technical Committee throughout the process to review the project schedule and evaluate project tasks.

As administrator for the Coalition, the contract will be through the Lower Loup NRD. Please let me know if you have any questions prior to proceeding with a contract for services.

Sincerely,

A handwritten signature in blue ink, appearing to read "Russell Callan", is written over a light blue horizontal line.

Russell Callan
Management Committee Chairman

THE FLATWATER GROUP, INC.

SERVICE AGREEMENT

TFG as used herein means **The Flatwater Group, Inc.**

Client as used herein means **Lower Platte Basin Coalition.**

WHEREAS, TFG provides an extensive range of integrated and comprehensive consulting, engineering, and scientific services; and

WHEREAS, Client desires to utilize TFG's services.

NOW, THEREFORE, for good and valuable consideration, TFG agrees to provide the professional services described herein, and Client agrees to accept and pay for such services, all in accordance with the following terms and conditions:

1. Definitions

The following terms shall have the meanings set forth below whenever they are used in this Agreement:

- a) "Scope of Work" (SOW) shall mean the description of the services to be provided by TFG as mutually agreed upon by TFG and Client, and will be performed on either a fixed price or time and materials basis. The SOW and the Price will be set out in the attached Exhibit "A" (or TFG's Proposal letter) incorporated by reference into this Agreement.
- b) "Documentation" shall mean deliverable documentation as described in the SOW.
- c) "Equipment" shall mean all indoor and outdoor equipment used by TFG at Client sites for the purpose of providing services as described in the SOW.
- d) "Proprietary Information" shall mean all data, information, manuals, materials, trade secrets, patents, products, processes, plans, whether in written, graphic or oral form, and similar proprietary know-how of TFG.

2. Compensation/Billing

TFG's invoices will be issued at least monthly and are payable upon receipt. Balances thirty (30) days past due are subject to interest at 1.5% per month. After five (5) days written notice, TFG may suspend services under any Client Agreement until all past due accounts have been paid.

The SOW is often not fully definable prior to the execution of this Agreement as investigation may uncover additional facts and information requiring an alteration in the SOW and/or the Price for the services. For services on a time and materials basis, the proposed fees are TFG's best estimate of the charges required to complete the SOW. TFG will inform Client of any material changes to either the SOW or the Price that may be required and which may alter the terms of this Agreement.

Costs and schedule commitments are subject to renegotiation for unreasonable delays caused by Client's failure to provide free access to project areas, specified facilities, or information, or for delays caused by unpredictable occurrences, or force majeure, such as fires, floods, strikes, riots, unavailability of labor or materials or services, acts of God or of the public enemy, or acts or regulations of any governmental agency. Temporary work stoppage caused by any of the above may result in additional cost beyond that outlined in this Agreement.

In the event TFG is required to respond to a subpoena, government inquiry or other legal process related to the services in connection with a proceeding to which it is not a party, Client shall reimburse TFG for its costs and compensate TFG at its then standard rates for the time spent gathering information and documents. Client agrees to compensate TFG at the rate of one and one-half times TFG's then current hourly rates for time spent in any deposition, hearing, proceeding or trial.

For services provided on a time-and-materials basis, the minimum time segment for field work is four (4) hours and one hour for work done at any TFG office. The rental or use of TFG's Equipment will be charged to the project in accordance with TFG's "Equipment Billing Rate Schedule" which is either incorporated into the rates shown in Exhibit B, or is available upon Client's request. Rates are subject to annual adjustment each January. TFG's labor rates for services provided on a time-and-materials basis, are fixed for one year with annual adjustment upon notice to Client.

Expenses related to the services and reimbursable by Client ("Other Direct Costs") include without limitation, travel and living expenses, phone, FAX,

overnight delivery services, postage, shipping, and production costs; identifiable drafting and word processing supplies; equipment usage and rental fees; and expendable materials and supplies. Other Direct Costs are reimbursable by Client and are billed at TFG's cost plus 15 percent.

Required subconsultant and/or subcontractor costs are reimbursable by Client and are billed at TFG's cost plus 15%. Any local or state taxes or fee costs (except state income taxes) are in addition to any quoted Price.

3. Termination

Either party may terminate this Agreement in the event of substantial failure by the other party to fulfill its obligations under this Agreement through no fault of the terminating party. Such termination is effected upon providing: (1) not less than thirty (30) calendar days written notice, and (2) an opportunity for consultation with the terminating party prior to termination. Client will be responsible for all services and direct expenses associated with the project through the effective date of cancellation, plus reasonable fee(s) and/or expenses for reallocation and demobilization of personnel and equipment.

4. Confidential Information/Inventions

All Proprietary Information furnished by TFG in connection with this Agreement, but not developed as a result of work under this Agreement or under prior agreements between Client and TFG, shall be held confidential by Client, and returned to TFG within thirty (30) days of the completion of the services or conclusion of the litigation wherein TFG's services were provided.

All inventions, techniques, and improvements held by TFG to be proprietary or trade secrets of TFG prior to any use on behalf of Client, as well as all inventions, techniques, and improvements developed by TFG independent of the services rendered to Client under this Agreement, remain the property of TFG. Documents provided by Client will remain the Client's property, but TFG may retain one confidential file copy.

5. Governing Law

This Agreement shall be deemed made in, and in all respects interpreted, construed, and governed by, the laws of the State of Nebraska, U.S.A. All disputes arising hereunder are to be resolved in the state and federal courts having jurisdiction of such disputes sitting in the State of Nebraska or hearing appeals therefrom. Both parties consent to the jurisdiction of such courts over them for the purposes of this Agreement, and agree to accept service of process by registered mail.

6. Standard of Care

TFG will prepare all work and provide services in accordance with generally accepted professional practices ordinarily exercised by reputable companies performing the same or similar services in the same geographic area. **NO WARRANTIES OR GUARANTIES, EXPRESS OR IMPLIED, ARE MADE WITH RESPECT TO ANY GOODS OR SERVICES PROVIDED UNDER THIS AGREEMENT, AND ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSES ARE EXPRESSLY DISCLAIMED.**

Client shall furnish documents or information reasonably within Client's control and deemed necessary by TFG for proper performance of its services. TFG may rely upon Client-provided documents in performing the services required under this Agreement and TFG assumes no responsibility or liability for their accuracy.

Client agrees to advise TFG, no later than upon the execution of this Agreement, of any hazardous substance or any condition, known or that reasonably should be known by Client, existing in, on, or near the site where TFG's services are to be performed, that presents a potential danger to human health, the environment, or TFG's equipment. Client agrees to a continuing obligation to provide TFG related information, as it becomes available to the Client. By virtue of entering into this Agreement or providing services hereunder, TFG does not assume control of, or responsibility as an operator or otherwise for, the site or the person(s) in charge of the site, or undertake responsibility for reporting to any federal, state or local public agencies any conditions at the site that may present a potential danger to public health, safety or the environment. Client agrees to notify the appropriate federal, state or local public agencies as required by law; or otherwise to disclose, in a timely manner, any information that may be necessary to prevent damage to human health, safety, or the environment.

Upon Client's request, TFG's work product may be provided on magnetic media. By such request, Client agrees that the written copy retained by TFG in

THE FLATWATER GROUP, INC.

SERVICE AGREEMENT

its files shall be the official base document. The Client will retain one conformed written copy. TFG makes no warranty or representation to Client that the magnetic copy is accurate or complete. Any modifications of such magnetic copy by Client shall be Client's risk and without liability to TFG. Such magnetic copy is subject to all conditions of this Agreement.

7. Indemnification

Each party shall indemnify, defend and hold harmless the other party from and against all liability, loss, cost, expense, or damage caused by the indemnifying party's negligent acts or negligent omissions in the performance of this contract. However, in the event of any loss, damage or liability, whether to person or to property, arising out of the sole negligence of either TFG or Client, such party will assume full responsibility for any liability arising thereof and hold harmless the other party. TFG and Client further agree that if either TFG or Client engages in willful misconduct, such party shall assume full responsibility for any liability arising thereof irrespective of the nature and degree of the other party's negligence, and will indemnify and hold harmless the other party. In no event shall TFG be liable for any special, incidental, economic, or consequential damages whatsoever, regardless of the legal theory under which such damages may be incurred. In no event will TFG's liability under this provision or Agreement exceed the lesser of the fees actually paid to TFG under this Agreement or \$50,000.

For claims related to or involving pollution, toxic substances or hazardous wastes or for any other claims arising from underground hazards, Client agrees to release, defend, indemnify and hold harmless TFG and its officers, directors, employees, agents, consultants, and subcontractors from all claims, damages, losses, and expenses, including, but not limited to, reasonable fees and expenses of attorneys and consultants, and court costs, arising out of the performance of this Agreement. Such indemnification and release includes claims which arise out of the actual, alleged, or threatened dispersal, escape, or release of chemicals, wastes, liquids, gases or any other material, irritant, contaminant or pollutant regardless of the legal theory under which such damages may be incurred.

TFG's field personnel will avoid hazards or utilities that are visible to them at the site. TFG is not responsible for any damage or loss to property owned by Client or third parties due to undisclosed or unknown surface or subsurface conditions except to the extent such damage or loss is a direct result of TFG's negligence.

8. Severability

If any term or provision of this Agreement is held or deemed to be invalid or unenforceable, in whole or in part, by a court of competent jurisdiction, this Agreement shall be ineffective to the extent of such invalidity or unenforceability without rendering invalid or unenforceable the remaining terms and provisions of this Agreement.

9. Third Party Rights

TFG's services under this Agreement are being performed solely for the benefit of Client, and no other entity shall have any claim against TFG because of this Agreement or the performance or nonperformance of services provided by TFG hereunder.

10. Entire Agreement

This Agreement contains the entire agreement of the parties. It may not be modified or terminated orally. Any modification to these terms and conditions without the written approval of TFG shall be null and void. In no event will the terms of any purchase order, work order or any other document provided by

Client modify or amend this Agreement, even if it is signed by TFG, unless TFG signs a written statement expressly indicating that such terms supersede the terms of this Agreement. Any such terms are expressly rejected by TFG.

11. Assignment

TFG reserves the right to assign this Agreement to its affiliates, subsidiaries, or successors as necessary in order to effectively carry out and complete the services specified by this Agreement.

12. Insurance

TFG agrees to purchase and maintain during the life of this Contract the following types of insurance: (1) General Liability [\$2,000,000.00] Per Occurrence - General Aggregate [\$2,000,000.00], Products - Comp/OPS Aggregate [\$2,000,000.00], Personal and Advertising Injury [\$2,000,000.00], Fire Damage (any one fire) [\$100,000.00], Medical Expense (any one person) [\$5,000.00]; (2) Automobile Liability - Bodily Injury and Property Damage Liability including owned, non-owned, and hired autos, Combined single limit [\$1,000,000.00]; and (3) Worker's Compensation and Employer's Liability, Statutory Limits [\$1,000,000.00] Each occurrence, Policy Limit [\$1,000,000.00].

ATTACHMENTS

Exhibit A - Scope of Work

Exhibit B - Price Schedule

THE FLATWATER GROUP, INC.

By: *Marc Groff*

Name: Marc Groff

Title: Senior Engineer

Date: 6/22/2020

Lower Platte Basin Coalition

By: *Russell Callan*

Name: Russell Callan

Title: Chairman Manager Committee LPBC

Date: 6/19/20

Exhibit A - Scope of Work
Lower Platte River Basin Coalition – INSIGHT Update Support
5 May 2020

This Scope of Work (SOW), referenced in Contract No. 4606_001 between The Flatwater Group, Inc. (TFG) and the Lower Platte River Basin Coalition (Coalition), describes the services TFG will provide the Coalition for the INSIGHT Update Support project. TFG understands that the Coalition desires to analyze and adapt current water planning and integrated water resources management efforts within the Lower Platte River Basin (Basin). TFG's primary role in this project will be to provide assistance as requested by the Coalition to achieve this objective.

TERM

This Agreement shall be for a term beginning on 22 June, 2020 and continuing thereafter until 31 Dec 2021, unless the parties agree to renew the Agreement by written amendment signed by all parties for an additional period of time to be specified in the amendment.

TFG understands that the Coalition needs to have this update finalized by 12/31/2021; however, the analysis needs to be functionally completed and presentable by August 2021 to allow for proper discussions between the Nebraska Department of Natural Resources (NeDNR) and affected Natural Resource Districts (NRDs) to occur.

SERVICES

Services conducted under this Agreement shall be performed in accordance with the work description provided in the Project Components section below. Billings shall be on a time and materials basis in accordance with the rates specified in Exhibit B – Price Schedule.

Project Components

1) Task 100: Project Coordination.

TFG understands that successful completion of this project will require effective project communication and interaction with NeDNR and NRD technical staff. Project progress meetings / conference calls will occur as part of this task. For planning purposes, TFG anticipates two in person/remote access group meetings. Those meetings would be:

- a. Kick-off meeting to finalize roles / staff coordination / schedules
- b. Final INSIGHT Update Review
 - i. Review of all INSIGHT elements prior to Basin meetings

2) **Task 200: Assist with assigned INSIGHT Calculations.**

NeDNR's INSIGHT Methodology document (<https://dnr.nebraska.gov/sites/dnr.nebraska.gov/files/doc/water-planning/INSIGHT/2015INSIGHTMethods.pdf>) provides a description of the broad-based methods and data used previously to develop the required hydrologic analyses for INSIGHT. Based on the methodologies and procedures outlined in this document, TFG will assist NeDNR technical staff with updating the specific items indicated on Table 1.

To facilitate sufficient time for necessary planning discussion between NeDNR and affected NRDs, TFG will initially update the specified items through 8/31/2019. It is anticipated that this update will be completed in December 2020. As part of this initial update, TFG will develop procedures for creating annual updates going forward. TFG will use those procedures beginning in January 2021 to develop the 2020 update which will reflect data from 9/1/2019 through 8/31/2020.

As part of this task, TFG anticipates one in person/remote access group meeting to review the developed annual update process at the conclusion of the 8/31/2020 data update.

3) **Task 300: Update Lower Platte/Missouri Tributaries (LPMT) Model Inputs.**

TFG will update the current LPMT model using the existing calibration. This update will be done in two phases similar to Task 200 – an initial update through 8/31/2019 will be completed by December 2020 and a subsequent update covering 9/1/2019 through 8/31/2020 will be completed beginning in January 2021.

SCHEDULE

The overall project is scheduled to be completed by 31 Dec 2021, unless the parties agree to renew the Agreement by written amendment signed by all parties for an additional period of time to be specified in the amendment.

COMPENSATION

The rates at which TFG will be compensated by the Coalition are set forth in Exhibit B – Price Schedule. The total contract amount shall not exceed \$86,240 unless the parties agree to adjust the Agreement by written amendment signed by all parties.

TABLE 1: INSIGHT Update Tasks

Task Name	Task Lead	Apr 20
		S M T W T F S
Streamflow	TFG	
USGS Streamgauge data collection - entire period of record through 2020	TFG	
06799000, Elkhorn River at Norfolk, Nebr.	TFG	
06800500, Elkhorn River at Waterloo, Nebr.	TFG	
06785000, Middle Loup River at Saint Paul, Nebr.	TFG	
06790500, North Loup River near Saint Paul, Nebr.	TFG	
06784000, South Loup River at Saint Michael, Nebr.	TFG	
06792500, Loup River Power Canal near Genoa, Nebr.	TFG	
06793000, Loup River near Genoa, Nebr.	TFG	
06794000, Beaver Creek at Genoa, Nebr.	TFG	
06796000, Platte River at North Bend, Nebr.	TFG	
06805500, Platte River at Louisville, Nebr.	TFG	
06774000, Platte River near Duncan, Nebr.	TFG	
06794500, Loup River near Columbus, Nebr. (1934-1978)	TFG	
DNR Streamgages	TFG	
06794500, Loup River near Columbus, Nebr. (2008-2020)	TFG	
Analysis to fill any gaps	TFG	
06794500, Loup River near Columbus, Nebr. (2008-2020)	TFG	
Calculate stream reach gain/loss for subbasins	TFG	
5% exceedence probability capping	TFG	
Summarize to monthly, seasonal totals	TFG	
SWCU	DNR/TFG	
Get canal diversion, return, field delivery, etc data - Pull all data for USBR Federal Canals. DNR gage	TFG	
Farwell Main Canal	TFG	
Farwell Central Canal	TFG	
Farwell South Canal	TFG	
Mirdan Canal	TFG	
Sargent Canal	TFG	
Burwell-Sumter Canal	TFG	
Ord-North Loup Canal	TFG	
Taylor-Ord Canal	TFG	
Middle Loup Canal 1	TFG	
Middle Loup Canal 2	TFG	
Middle Loup Canal 3	TFG	
Middle Loup Canal 4	TFG	
Get SW acres data for small pumpers	DNR	
Get SW administration records for small pumpers	DNR	
Review administration adjustment methodology to make sure still best approach	TFG	
Generate Com NIR (same as what will use for GWCU) - assuming all small pumper acres are com	TFG	
Calculate consumptive use	DNR	
Equation 1	DNR	
Equation 2	DNR	
Equation 3	DNR	
Equation 4	DNR	
reservoir adjustment - revisit this approach	Jen, Jesse, Jessie	
Equation 5	DNR	
apply SW administration adjustment	DNR	
summarize to monthly, seasonal totals	DNR	
GW Depletions	DNR	
Which models will we use?	DNR	
Update GW models (bring forward)	DNR	
Update CENEB data - CROPSIM pumping and recharge	TFG	
Pumping and recharge for ELM Phase 3?	DNR	
model runs	DNR	
list models	DNR	
summarize to monthly, seasonal totals	DNR	
SW Demand	DNR	
Equations 1-4 same as SWCU	DNR	
Equation 5 same as SWCU without administration adjustment	DNR	
reservoir adjustment - revisit this approach	DNR	
SW Evaporation	TFG	
Get reservoir evaporation data and reservoir storage data	TFG	
Calamus Reservoir	TFG	
Davis Creek Reservoir	TFG	
Shenman Reservoir	TFG	
summarize to monthly, seasonal totals	TFG	
GWCU	DNR	

Task Name	Task Lead	Mar 29						
		S	M	T	W	T	F	S
Irrigation	DNR							
Update GW irrigated acres	DNR							
NASS statistics/other method to distribute crop type	DNR							
NIR for corn, soybeans, alfalfa, small grains	TFG							
Municipal and industrial	TFG							
Look at data collected by NRDs for basin reporting	TFG							
HDR database/WJDR grant work	DNR							
SW Loss	DNR							
canal seepage	DNR							
Instream Flows	DNR							
Cap gage data at permit amount	TFG							
also represent level of use?	DNR							
Take off groundwater development	DNR							
Hydropower	DNR							
Cap gage data at permit amount	TFG							
also represent level of use?	DNR							
Downstream Demands	DNR							
Required Inflows	DNR							
Precipitation	TFG							
Should be the same data that is going in to the modeling	TFG							
Baseflow indices	TFG							
Runoff	TFG							
calculated based on baseflow indices	TFG							
Recharge	TFG							
calculated based on baseflow indices	TFG							
Irrigated acres	DNR							
what was irrigated, what could be irrigated (actual/potential)	DNR							
Sort out Upper Platte connection - important for required inflows and downstream demands	DNR							

Exhibit B - Price Schedule

THE FLATWATER GROUP, INC. Labor Price Schedule December 1, 2019 through December 31, 2020

Labor Category	Hourly Rate
Senior Engineer	190.00
Senior Hydrogeologist	165.00
Project Manager	175.00
Senior Environmental Planner	175.00
Senior Construction Engineer	165.00
Mid-level Engineer	125.00
Senior Water Resources Specialist	150.00
Water Resources Specialist	125.00
Designer/GIS Specialist	100.00
Mid-level Environmental Planner	100.00
Junior Engineer	90.00
Construction Inspector	85.00
CADD/Graphics Technician	75.00
Engineering Technician	75.00
Administrative Assistant	55.00

These rates are firm through 31 December 2020.

Exhibit B - Price Schedule

THE FLATWATER GROUP, INC.

ODC Price Schedule

January 1, 2020 through December 31, 2020

Non-salary expenses may include but are not limited to the following:

- Project related transportation
- Out of town travel and subsistence
- Long distance services, dedicated data and communication services, telefax services, tel
- Project web sites
- Fees paid for securing approval of authorities having jurisdiction over the Project
- Printing, reproductions, plots, documents, scanning
- Handling and delivery of Instruments of Service
- Postage, handling, and delivery charges
- Expense of overtime work requiring higher than regular rates
- Renderings, models, mock-ups, professional photography, and presentation materials
- Expenses related to additional professional liability insurance required by the Project
- Taxes levied on professional services and reimbursible expenses
- Site office expenses
- Project related equipment, supplies, and materials
- Subcontractor/subconsultant charges
- Testing by commercial laboratories

TABLE OF SELECTED NON-SALARY EXPENSES

<u>ITEM</u>	<u>Unit</u>	<u>Unit Price</u>
<u>Internal Expenses</u>		
Reproduction/Plotting		
B & W Prints (8.5x11)	each	\$0.10
B & W Prints (11x17)	each	\$0.20
Color Prints (8.5x11)	each	\$1.00
Color Prints (11x17)	each	\$2.00
Large Plots	square foot	\$1.00
Communication		
Faxes	sheet	\$0.25
Telephone Long Distance	minute	\$0.25
Transportation		
Company Vehicle	day	\$75.00
Vehicle Mileage	mile	*
Survey Equipment		
Hand-held GPS	day	\$10.00
Surveying Level	day	\$25.00
Total Station	day	\$150.00
GPS & Rover System	day	\$325.00
Other		
DVDs	each	\$5.00
Compact Discs	each	\$2.00
Diskettes	each	\$1.00

External Expenses

External expenses charged at 1.1 times the actual cost.

Current Federal IRS Reimbursement Rate

LOWER PLATTE RIVER CONSORTIUM

This Agreement (hereinafter "this Agreement") is entered into by and between the following members, all of which are political subdivisions of and are situated in the State of Nebraska or an Agency of the State of Nebraska, and are collectively referred to as "Parties".

The Parties to this Agreement are identified as follows:

Nebraska Department of Natural Resources
Lower Platte South Natural Resources District
Lower Platte North Natural Resources District
Papio-Missouri River Natural Resources District
City of Lincoln
Metropolitan Utilities District

WHEREAS, the Lower Platte River Basin is geographically large and diverse in its geology, land use, ground and surface water supplies, and water uses. Each of the parties is charged with responsibilities for planning, managing, and/or supplying water resources. These Parties are located and carry out their functions in the lower sub-basin of the Lower Platte River Basin, but much of the water supplies that support these functions are derived from the upper sub-basins of the Lower Platte River Basin. The Parties desire to work together to evaluate the water supplies available to the Lower Platte River subbasin during times of shortage.

Therefore, in consideration of the mutual covenants expressed herein, good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties agree as follows:

1. AUTHORITY:

This Agreement is made and entered into by the Parties pursuant to the certain authorities conferred upon each under the Interlocal Cooperation Act; Neb. Rev. Stat. S13-801 through S13-827, specifically 13-807 for forming joint contracts.

2. CONSORTIUM:

The Parties hereby create the Lower Platte River Consortium (hereinafter referred to as "Consortium"). The Consortium shall be governed by the terms of this Agreement and pursue the purposes described in Section 3. The Consortium shall not be an entity separate and distinct from the respective Parties hereto, but rather a collaborative working arrangement of the Parties.

3. PURPOSE:

The purpose of this Agreement is for the Parties to form a Consortium to study long-term water supplies available to the lower sub-basin for enhancing stream flows or aquifer storage to support sustainable public water systems.

This Agreement shall provide the organizational and administrative structure and enumeration of the powers, privileges and authority of the Consortium and the financial cooperative effort necessary to carry out its purpose. The powers, privileges and authorities of the Consortium shall not be used in a manner that is in violation of any of the Parties' public purposes.

4. POWERS :

The Consortium shall have such powers, privileges and authority as authorized by the Parties as necessary to achieve the purposes of the Consortium as set forth in this Agreement. Such powers, privileges and authority shall include but not be limited to the following authorities:

- i. Schedule and conduct meetings to transact business
- ii. To hold public meetings
- iii. To enter into contracts and agreements with other public agencies and private sector vendors except that a contract or agreement with any subject matter under the Department of Natural Resources (Department) jurisdiction shall be approved or disapproved by the Director of the Department (Director) and if approved shall be concurrently executed by the Director and the Lead Party or the contract or agreement shall be void or voidable.
- iv. To assess, collect and expend funds from the members, from grants, or other financial sources.
- v. To undertake studies, investigations or surveys and do research as may be necessary, and publish and disseminate the results.
- vi. To retain legal and other professional services

5. CONSORTIUM :

The Consortium shall be responsible for the administrative, technical, and financial affairs of the Consortium. The Consortium shall be composed of one representative from each of the Parties.

- i. Each Party shall designate a representative and an alternate to the Consortium and shall notify the Lead Party in writing of such appointments and of any subsequent changes in appointments.
- ii. Each Party shall be entitled to one vote, cast by either the representative or alternate for the Party.
- iii. All decisions shall be made by unanimous consensus of the Consortium members. A quorum, which shall be the presence of a representative or alternate representative of each Party shall be required to transact any official discussions or business.
- iv. Meetings shall follow the requirements of the Public Meeting Act.
- v. Meetings of the Consortium shall be held at least quarterly, or at the call of the Consortium Chair.
- vi. The representatives of the Consortium shall select from among the Consortium members a "Consortium Chair" and "Consortium Vice-Chair"
- vii. The Consortium may also retain professional and legal services, if needed.

6. LEAD PARTY:

The Lower Platte South Natural Resources District shall serve as the Lead Party for the Consortium. As Lead, its responsibilities include:

- i. Serving as the administrator, to include collecting and holding the contributions from members and other revenues, making the disbursements for expenses related to the Consortium activities, and as grant applicant and administrator.

- ii. Serving as contracting member along with the Department on behalf of the Consortium.
- iii. Serving as day-do-day administration for the Consortium, including information dissemination to members and the general public, scheduling and organization of meetings, record-keeping, and coordination of study participants including consultants and legal counsel.

7. FINANCES AND BUDGET:

The Consortium shall be applying for grants to assist in the cost of preparing the Lower Platte River Drought Contingency Plan. Successful grant determinations will lower each Party's pro-rata share of contributory funds. Each Party's total contribution under this agreement will not exceed \$40,000, with the exception of the Department of Natural Resources whose share will not exceed \$100,000.

The Consortium shall have the authority to authorize applications for financial grants, to include use of Consortium funds and in-kind services for match. Such applications shall be made by the Lead on behalf of the Consortium.

8. DURATION:

This Agreement shall become effective and binding upon its approval by appropriate action of all of the Parties. The term of this Interlocal Agreement shall be three (3) years from the effective date, unless further extended by the mutual agreement of all Parties.

9. WITHDRAWAL:

Any party to this Agreement may withdraw from this Agreement and from representation on the Consortium upon written notification to the Chair of the Consortium. Such withdrawal shall be effective upon receipt of the written notification. There will be no financial reimbursement of remitted funds unless specifically authorized by the Consortium .

10. NEW MEMBERS:

New members can be added to the Consortium with a vote of the Consortium. Eligible entities would be limited to political subdivisions charged with responsibilities for planning, managing, and/or supplying water resources for public water systems in the Lower Platte River Sub-basin.

11. PARTIAL OR COMPLETE TERMINATION :

This Agreement and the Consortium created hereby shall be terminated upon the earlier of the completion of its purposes and objectives described herein or upon the vote of two-thirds of the then constituted Consortium for the complete or partial termination of the Consortium and this Agreement. Upon action to terminate the Consortium, all outstanding debts and obligations of the Consortium shall be paid and all unused funds and appropriations shall be returned to the remaining Parties in such proportions as represented by the pro rata share paid by each Party.

12. AMENDMENT AND MODIFICATION:

For all matters other than membership, this Agreement may be amended or modified upon the approval of written modifications by all then current Parties hereto in writing, signed by and duly adopted and approved by each of the current Parties hereto.

13. DUPLICATE COUNTERPARTS

This Agreement may be executed in any number of counterparts, each of which shall be an original, but all such counterparts shall constitute one and the same instrument. This Agreement is hereby approved and executed by the following Parties on the dates shown below.

NEBRASKA DEPARTMENT OF NATURAL RESOURCES

BY: _____

DATE: _____

CITY OF LINCOLN

BY:  _____

DATE: 9/27/16 _____

METROPOLITAN UTILITIES DISTRICT

BY: _____

DATE: _____

LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

PAPIO-MISSOURI RIVER NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

13. DUPLICATE COUNTERPARTS

This Agreement may be executed in any number of counterparts, each of which shall be an original, but all such counterparts shall constitute one and the same instrument. This Agreement is hereby approved and executed by the following Parties on the dates shown below.

NEBRASKA DEPARTMENT OF NATURAL RESOURCES

BY: _____

DATE: _____

CITY OF LINCOLN

BY: _____

DATE: _____

METROPOLITAN UTILITIES DISTRICT

BY: Scott S. Kuep

DATE: 9-8-16

Approved as to form:

Ronald E. Bucher 9-8-16
Ronald E. Bucher, General Counsel

LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

PAPIO-MISSOURI RIVER NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

13. DUPLICATE COUNTERPARTS

This Agreement may be executed in any number of counterparts, each of which shall be an original, but all such counterparts shall constitute one and the same instrument. This Agreement is hereby approved and executed by the following Parties on the dates shown below.

NEBRASKA DEPARTMENT OF NATURAL RESOURCES

BY: _____

DATE: _____

CITY OF LINCOLN

BY: _____

DATE: _____

METROPOLITAN UTILITIES DISTRICT

BY: _____

DATE: _____

LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

PAPIO-MISSOURI RIVER NATURAL RESOURCES DISTRICT

BY: _____

DATE: 8-15-16

13. DUPLICATE COUNTERPARTS

This Agreement may be executed in any number of counterparts, each of which shall be an original, but all such counterparts shall constitute one and the same instrument. This Agreement is hereby approved and executed by the following Parties on the dates shown below.

NEBRASKA DEPARTMENT OF NATURAL RESOURCES

BY: _____

DATE: _____

CITY OF LINCOLN

BY: _____

DATE: _____

METROPOLITAN UTILITIES DISTRICT

BY: _____

DATE: _____

LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT

BY: John Hancock

DATE: 9/28/2016

PAPIO-MISSOURI RIVER NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

13. DUPLICATE COUNTERPARTS

This Agreement may be executed in any number of counterparts, each of which shall be an original, but all such counterparts shall constitute one and the same instrument. This Agreement is hereby approved and executed by the following Parties on the dates shown below.

NEBRASKA DEPARTMENT OF NATURAL RESOURCES

BY: *London W. Jewett*
DATE: 9/9/16

CITY OF LINCOLN

BY: _____

DATE: _____

METROPOLITAN UTILITIES DISTRICT

BY: _____

DATE: _____

LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT

BY: *[Signature]*
DATE: August 17, 2016

LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

PAPIO-MISSOURI RIVER NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

APPROVED
BY NDNR LEGAL COUNSEL
RF DATE 9/7/16

LOWER PLATTE RIVER CONSORTIUM AMENDMENT

DNR Contract # 918

This Amendment to the original agreement is entered into by and between the following members, all of which are political subdivisions of and are situated in the State of Nebraska or an Agency of the State of Nebraska, and are collectively referred to as "Parties".

The Parties to this Amendment are identified as follows:

Nebraska Department of Natural Resources
Lower Platte South Natural Resources District
Lower Platte North Natural Resources District
Pappio-Missouri River Natural Resources District
City of Lincoln
Metropolitan Utilities District

WHEREAS, the Lower Platte River Basin is geographically large and diverse in its geology, land use, ground and surface water supplies, and water uses. Each of the parties is charged with responsibilities for planning, managing, and/or supplying water resources. These Parties are located and carry out their functions in the lower sub-basin of the Lower Platte River Basin, but much of the water supplies that support these functions are derived from the upper sub-basins of the Lower Platte River Basin. The Parties desire to work together to evaluate the water supplies available to the Lower Platte River subbasin during times of shortages.

WHEREAS the original three-year term of this Interlocal Agreement will expire but may be extended by mutual agreement of the Parties pursuant to Provision 8 of the original Agreement, the Parties wish to extend the term.

Therefore, in consideration of the mutual covenants expressed herein, good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties agree to Amendment of the original Agreement as follows:

1. DURATION:

This Agreement to extend the term shall become effective and binding upon its approval by appropriate action of all of the Parties. The term of this Interlocal Agreement shall be one (1) year from the effective date of this amendment, unless further extended by the mutual agreement of all Parties.

2. All other provisions of the original Agreement remain in force.

LOWER PLATTE RIVER CONSORTIUM AMENDMENT

DNR Contract # 918

3. DUPLICATE COUNTERPARTS

This Agreement may be executed in any number of counterparts, each of which shall be an original, but all such counterparts shall constitute one and the same instrument. This Agreement Is hereby approved and executed by the following Parties on the dates shown below.

NEBRASKA DEPARTMENT OF NATURAL RESOURCES

APPROVED

BY: Norman W. Janseth

BY NDNR LEGAL COUNSEL

DATE: 9/27/2019

RT DATE 9/27/2019

METROPOLITAN UTILITIES DISTRICT

BY: _____

DATE: _____

CITY OF LINCON

BY: _____

DATE: _____

LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

PAPIO-MISSOURI RIVER NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

LOWER PLATTE RIVER CONSORTIUM AMENDMENT

DNR Contract # 918

3. DUPLICATE COUNTERPARTS

This Agreement may be executed in any number of counterparts, each of which shall be an original, but all such counterparts shall constitute one and the same instrument. This Agreement Is hereby approved and executed by the following Parties on the dates shown below.

NEBRASKA DEPARTMENT OF NATURAL RESOURCES

BY: _____

DATE: _____

METROPOLITAN UTILITIES DISTRICT

BY: _____

DATE: _____

CITY OF LINCON

BY: _____

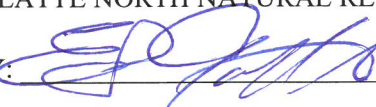
DATE: _____

LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT

BY:  _____

DATE: 10/3/19 _____

PAPIO-MISSOURI RIVER NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

LOWER PLATTE RIVER CONSORTIUM AMENDMENT

DNR Contract # 918

3. DUPLICATE COUNTERPARTS

This Agreement may be executed in any number of counterparts, each of which shall be an original, but all such counterparts shall constitute one and the same instrument. This Agreement is hereby approved and executed by the following Parties on the dates shown below.

NEBRASKA DEPARTMENT OF NATURAL RESOURCES

BY: _____

DATE: _____

METROPOLITAN UTILITIES DISTRICT

BY: Mark A. Mendenhall

DATE: 9/30/2019

Approved as to form:

Mark A. Mendenhall
Mark A. Mendenhall, General Counsel

CITY OF LINCOLN

BY: _____

DATE: _____

LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

PAPIO-MISSOURI RIVER NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

LOWER PLATTE RIVER CONSORTIUM AMENDMENT

DNR Contract # 918

3. DUPLICATE COUNTERPARTS

This Agreement may be executed in any number of counterparts, each of which shall be an original, but all such counterparts shall constitute one and the same instrument. This Agreement Is hereby approved and executed by the following Parties on the dates shown below.

NEBRASKA DEPARTMENT OF NATURAL RESOURCES

BY: _____

DATE: _____

METROPOLITAN UTILITIES DISTRICT

BY: _____

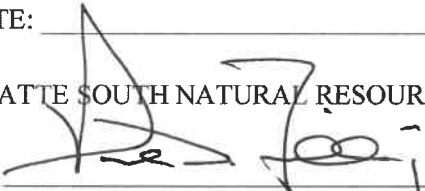
DATE: _____

CITY OF LINCON

BY: _____

DATE: _____

LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT

BY:  _____

DATE: 9/27/2019 _____

LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

PAPIO-MISSOURI RIVER NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

LOWER PLATTE RIVER CONSORTIUM AMENDMENT

DNR Contract # 918

3. DUPLICATE COUNTERPARTS

This Agreement may be executed in any number of counterparts, each of which shall be an original, but all such counterparts shall constitute one and the same instrument. This Agreement Is hereby approved and executed by the following Parties on the dates shown below.

NEBRASKA DEPARTMENT OF NATURAL RESOURCES

BY: _____

DATE: _____

METROPOLITAN UTILITIES DISTRICT

BY: _____

DATE: _____

CITY OF LINCON

BY: _____

DATE: _____

LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____

LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT


BY: _____

DATE: _____

PAPIO-MISSOURI RIVER NATURAL RESOURCES DISTRICT

BY: _____

DATE: _____


9-27-2019


LOWER PLATTE RIVER CONSORTIUM AMENDMENT

DNR Contract # 918

3. DUPLICATE COUNTERPARTS

This Agreement may be executed in any number of counterparts, each of which shall be an original, but all such counterparts shall constitute one and the same instrument. This Agreement Is hereby approved and executed by the following Parties on the dates shown below.

CITY OF LINCON

BY: 
DATE: 10-9-2019



31-201. Drainage by landowner; to what extent allowed.

Owners of land may drain the same in the general course of natural drainage by constructing an open ditch or tile drain, discharging the water therefrom into any natural watercourse or into any natural depression or draw, whereby such water may be carried into some natural watercourse; and when such drain or ditch is wholly on the owner's land, he shall not be liable in damages therefor to any person or corporation.

Source:Laws 1911, c. 142, § 1, p. 466; R.S.1913, § 1771; C.S.1922, § 1718; C.S.1929, § 31-301; R.S.1943, § 31-201.

Annotations

1. Drainage on own land
2. Discharge on other land
3. Natural watercourse
4. Miscellaneous

1. Drainage on own land

Owners of land will not be held liable for damages to landowners downstream for draining waters into a natural drainage way that begins on the owner's property, as long as this is done in a reasonable and careful manner. *Romshek v. Osantowski*, 237 Neb. 426, 466 N.W.2d 482 (1991).

To relieve from liability, ditch or drain must be wholly on owner's land. *Bussell v. McClellan*, 155 Neb. 875, 54 N.W.2d 81 (1952).

Owner has right to discharge waters from a temporary pond or basin by means of an artificial channel on his own property in the natural course of drainage. *Pospisil v. Jessen*, 153 Neb. 346, 44 N.W.2d 600 (1950).

Drainage by landowner must be wholly on own land. *Skolil v. Kokes*, 151 Neb. 392, 37 N.W.2d 616 (1949).

Owner of land may dig ditches on his own land to relieve against seepage without liability for damages to adjoining landowners because of lowering of water table. *Halligan v. Elander*, 147 Neb. 709, 25 N.W.2d 13 (1946).

Owner has right to drain lagoons into natural drains on his own land, though same is then carried over other's land. *Arthur v. Glover*, 82 Neb. 528, 118 N.W. 111 (1908); *Aldritt*

v. Fleischauer, 74 Neb. 66, 103 N.W. 1084 (1905); Todd v. York County, 72 Neb. 207, 100 N.W. 299 (1904).

2. Discharge on other land

A possessor of land may not divert water onto the land of another by means of a drainageway which did not exist in a state of nature. Jameson v. Nelson, 211 Neb. 259, 318 N.W.2d 259 (1982).

Waters which may be discharged hereunder without liability do not include waste irrigation waters in quantities which are injurious to neighboring land. Peters v. Langrehr, 188 Neb. 480, 197 N.W.2d 698 (1972).

Owner cannot cut channel across natural embankment and cause water to flow into basin partly on his land and partly on land of another to his damage. Yocum v. Labertew, 145 Neb. 120, 15 N.W.2d 384 (1944).

Construction of an open ditch enlarging a natural waterway will not be enjoined unless it is clearly shown that water normally carried will be diverted upon another's land to his damage. Miksch v. Tassler, 108 Neb. 208, 187 N.W. 796 (1922).

Owner cannot dam up natural drain so as to injure neighbor's land. Mapes v. Bolton, 89 Neb. 815, 132 N.W. 386 (1911).

Owners cannot collect and discharge surface water, contrary to natural drainage, upon another's land. Shavlik v. Walla, 86 Neb. 768, 126 N.W. 376 (1910).

The right of the upper proprietor to discharge water is not absolute; but the discharge must be done in a reasonable and careful manner and without negligence. Hickman v. Hunkins, 1 Neb. App. 25, 489 N.W.2d 316 (1992).

3. Natural watercourse

This section permits a landowner to divert water into a natural watercourse, which runs through his or her land, even if the water would otherwise never have reached the watercourse. Bierbower v. Hanson, 228 Neb. 716, 424 N.W.2d 132 (1988).

Under facts in this case, defendant obstructed waters that ran in the equivalent of a natural watercourse and plaintiff was entitled to injunction and consideration of issue relating to damages. Paasch v. Brown, 190 Neb. 421, 208 N.W.2d 695 (1973).

Proprietor of land cannot dam up and permanently obstruct a natural drain. Town of Everett v. Teigeler, 162 Neb. 769, 77 N.W.2d 467 (1956).

Where water is impounded by natural conditions, owner has no right to remove impediment to its flowage. Rudolf v. Atkinson, 156 Neb. 804, 58 N.W.2d 216 (1953).

Regardless of deed or contract, owner of land may exercise right to drain basin into natural watercourse as provided herein, and where such drain is wholly on owner's land, there is no liability for damages. *Bures v. Stephens*, 122 Neb. 751, 241 N.W. 542 (1932).

4. Miscellaneous

When a landowner substitutes a permanent artificial drainageway crossing his or her own land for a natural one obstructed by that landowner, the landowner impresses the artificial drainageway with a servitude in favor of the land drained thereby, and the upper proprietor (the owner of the land drained) may enforce this servitude against the substituting landowner and its successors in interest; the mere fact that the land through which the easement runs is later subdivided does not destroy the easement. *Nu-Dwarf Farms v. Stratbucker Farms*, 238 Neb. 395, 470 N.W.2d 772 (1991).

The protection afforded a defendant by this section is not absolute. A defendant can still be held responsible if plaintiff alleges and proves defendant acted negligently or without reasonable care. *Stuthman v. Adelaide D. Hull Trust*, 233 Neb. 586, 447 N.W.2d 23 (1989).

Alteration of natural drainage is acceptable where interests of good husbandry are served, circumstances are such that the alteration is necessary, and the particular alteration is reasonable under all the circumstances present. *Bohaty v. Briard*, 219 Neb. 42, 361 N.W.2d 502 (1985).

Construction of ditch from natural lake was not authorized. *Lackaff v. Bogue*, 158 Neb. 174, 62 N.W.2d 889 (1954).

This section does not control the drainage of natural lakes covering an area in excess of twenty acres. *Lackaff v. Department of Roads & Irrigation*, 153 Neb. 217, 43 N.W.2d 576 (1950).

City discharging water from its sewage disposal plant into a gully or creek for a period of over ten years, in open, notorious, peaceful, uninterrupted, and adverse manner, may acquire an easement for that purpose. *Hall v. City of Friend*, 134 Neb. 652, 279 N.W. 346 (1938).

Evidence in case did not bring it within provisions of above section. *Warner v. Berggren*, 122 Neb. 86, 239 N.W. 473 (1931).

When drainage districts are organized under this article and statutory notice is not given to mortgagees of record, special assessments are subject to liens of mortgages. *Board of Commissioners of Hamilton County v. Northwestern Mut. Life Ins. Co.*, 114 Neb. 596, 209 N.W. 256 (1926).





July 1, 2020
COMMODITY SOLUTIONS INC.

To Lower Platte NRD.

My concerns as landowner in SE corner of Section 29, is the tile drainage is effecting my acres.

Before I owned the property I remember they used to farm through the Rawhide. The past 5 years they have not been able to farm through the Rawhide.

Tilting farm ground from the wood of my property has taken away about 4 acres creating water draining constantly on my property.

Bernadine Baumert
PO Box 356
Howells NE 68641

3202 Koenigstein Ave., Norfolk, NE 68701 26741 State Hwy 91, Humphrey, NE 68642
Ph 402-371-3151 Fax 402-371-3145 Ph 402-923-0264 Fax 402-923-0269

www.commoditiesolutions.com


July 01, 2020

Lower Platte North Natural Resources District Board of Directors
511 Commercial Park Road
PO Box 126
Wahoo, NE 68066

Dear Board Members,

We farm 80 acres of ground in Section 25 and 150 acres of ground in Section 28 in Colfax precinct located in Colfax County, NE. The farmland in this area is becoming saturated to the point that we are unable to plant 10 acres furthermore, what we are able to plant is being adversely affected from the constant pumping of ground water into the Rawhide Creek from a pump in Section 30 in Colfax precinct and another located in Section 25 in Grant precinct. We urge you to stop this unfair and irresponsible practice that affects neighboring farmers and landowners without consideration. We also feel it is imperative that existing pumps be regulated.

Sincerely,

A handwritten signature in cursive script that reads "Joe and Sue Heavican".

Joe & Sue Heavican

cc: Lower Platte North Natural Resources Water Committee, Lower Elkhorn Natural Resources District Board of Directors

Lower Platte North NRD

Voluntary Integrated Management Plan

Annual Review of 2019 Activities

Reporting period: 7/15/2018-12/31/2019

July 2, 2020

LPNNRD:

Daryl Andersen, Water Resources
Manager

NeDNR:

Melissa Mosier, Integrated Water
Management Coordinator



Lower Platte North
Natural Resources District

NEBRASKA

Good Life. Great Water.

DEPT. OF NATURAL RESOURCES

Overview

- Integrated Management Planning-What is it?
- 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

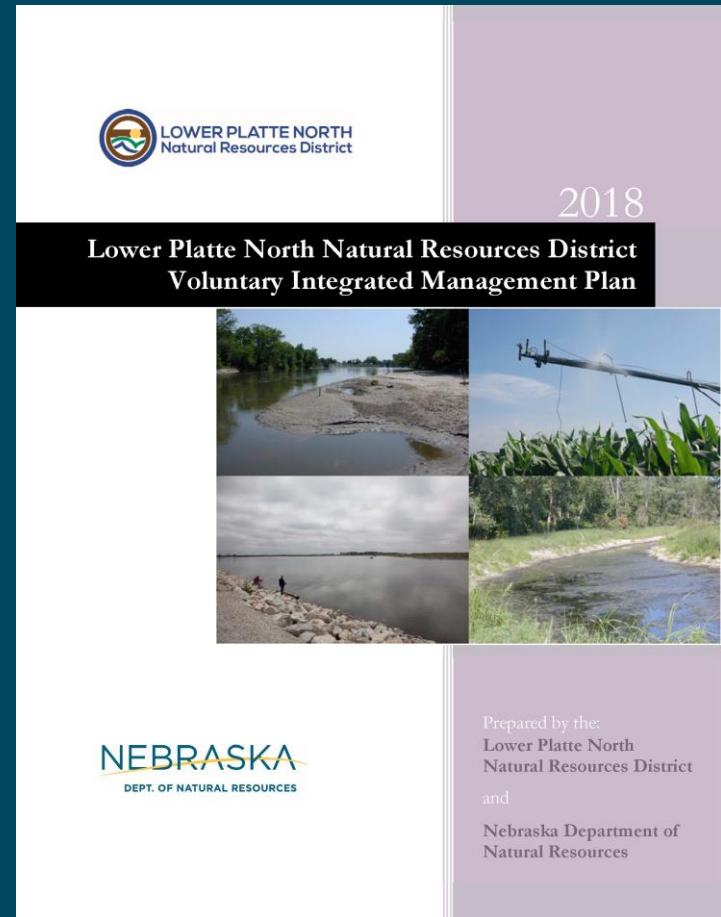
Integrated Management Planning

What is it?

Integrated Management Planning

➤ What is it?

- Proactive approach
- Surface water and groundwater management
- Jointly developed by NeDNR and the NRD
- Suited to local conditions
- Protects existing users
- Uses adaptive management approach

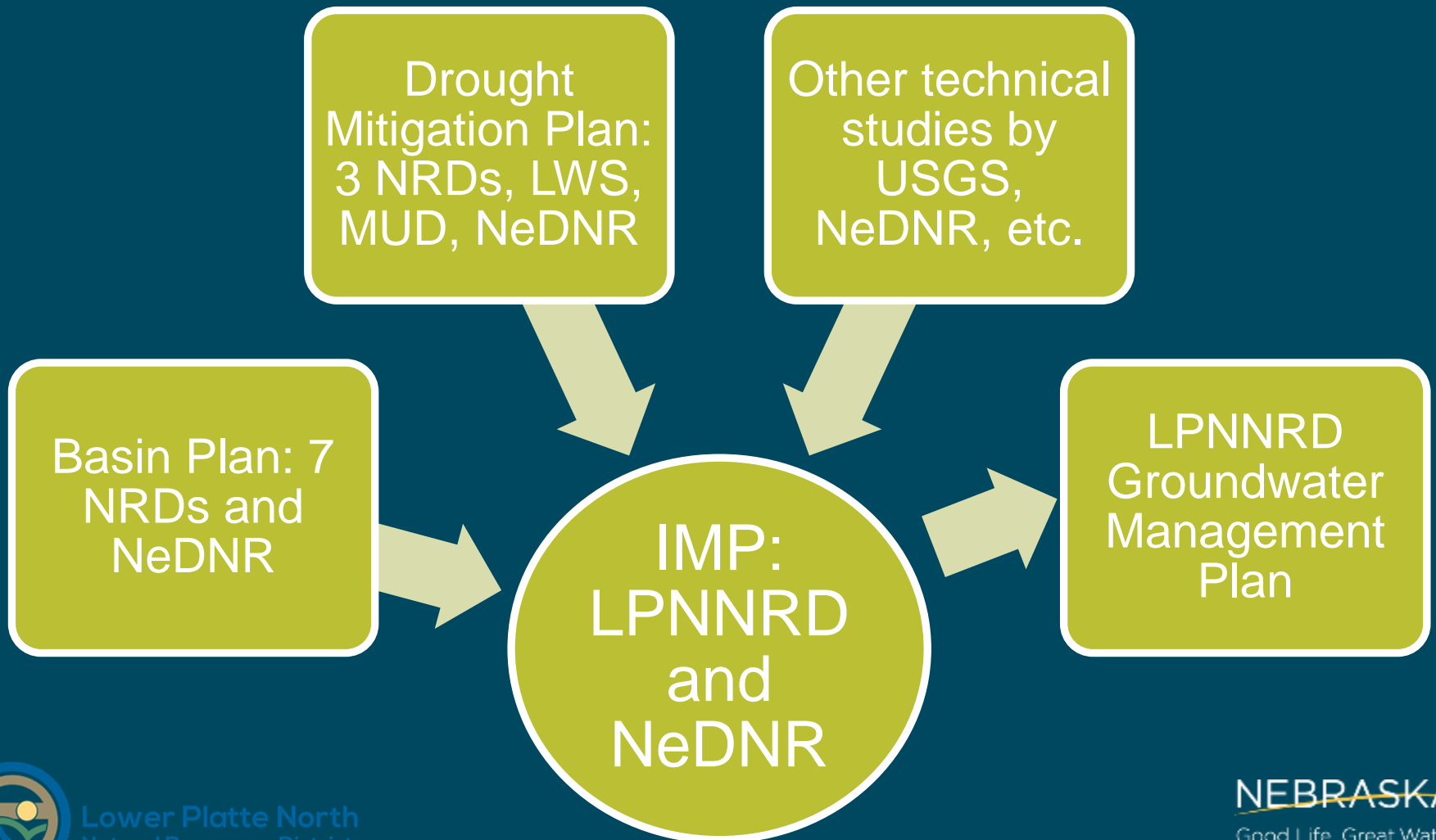


Why Do We Conduct Annual Reviews of the IMP?

- Joint management of hydrologically connected (HC) groundwater and surface water
 - Identify new opportunities and challenges
 - Increase understanding of HC areas (data, studies)
 - Evaluate and convey progress towards goals and objectives
 - Prioritize joint management actions for upcoming years



How do multiple plans work together?



LOWER PLATTE RIVER BASIN-WIDE ACTIVITIES

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

New Depletions Accounting

Lower Platte River Basin 2016-2019

TABLE 1 - PEAK SEASON DEPLETIONS

NRD	PEAK SEASON 5-YR ALLOWABLE DEPLETION (AF)	Prior Years NRD Reported Depletion (AF)	2019 NRD Reported NET Depletion (AF)	Total NRD Reported Depletion (AF)	NRD - Percent of Allowable	Prior Years NeDNR Reported Depletion (AF)	2019 NeDNR Reported Depletion (AF)	Total NeDNR Reported Depletion (AF)	NeDNR - Combined Allowable	Percent of Allowable	Prior Groundwater Acres Allocated 2016-2018	New Groundwater Acres Allocated 2019
Upper Loup NRD	2768	318.7	107.1	425.7	15.4%	463.6	-65.0	398.6	14.4%	29.8%	2,540	1,325
Lower Loup NRD	5883	467.0	226.2	693.2	11.8%	305.0	130.0	435.0	7.4%	19.2%	6,092	2,367
Upper Elkhorn NRD	1504	158.7	13.6	172.3	11.5%	0.0	0.0	0.0	0.0%	11.5%	2,050	275
Lower Elkhorn NRD	4514	515.0	292.2	807.3	17.9%	214.0	70.0	284.0	6.3%	24.2%	4,819	2,510
Papio-Missouri River NRD	869	1.5	0.0	1.5	0.2%	67.3	10.0	77.3	8.9%	9.1%	11	0
Lower Platte South NRD	993	5.5	18.0	23.6	2.4%	75.0	-10.0	65.0	6.5%	8.9%	64	70
Lower Platte North NRD	2276	768.3	128.4	896.7	39.4%	0.0	0.0	0.0	0.0%	39.4%	5,271	837
TOTALS	18,807	2,235	786	3,020	16%	1124.9	135	1,260	7%	23%	20,848	7,384

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 - Peak Season Consumptive Use (AF)	NeDNR Reported 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	425.7	398.6	1033.8	398.6	824.3	1432.4	1943.7	70.2%
Lower Loup NRD	5883	693.2	435.0	1619.6	435.0	1128.2	2054.6	4754.8	80.8%
Upper Elkhorn NRD	1504	172.3	0.0	408.3	0.0	172.3	408.3	1331.7	88.5%
Lower Elkhorn NRD	4514	807.3	284.0	1619.3	284.0	1091.3	1903.3	3422.7	75.8%
Papio-Missouri River NRD	869	1.5	77.3	1.8	77.3	78.8	79.1	790.2	90.9%
Lower Platte South NRD	993	23.6	65.0	30.2	65.0	88.6	95.2	904.4	91.1%
Lower Platte North NRD	2276	896.7	0.0	1292.2	0.0	896.7	1292.2	1379.3	60.6%
TOTALS	18,807	3,020	1,260	6,005	1,260	4,280	7,265	14,527	77%

New Depletions Accounting

LPNNRD: FIRST INCREMENT + PROJECTED 5-YEAR EXTENSION

Year	Total Available Depletion (AF)	Available Groundwater Depletion (AF)	Available Surface Water Depletion (AF)	Used Groundwater Depletion (AF)	Used Surface Water Depletion (AF)	Total Used Depletion (AF)	Remaining Depletion for Next Year (AF)
2016	2,276	1,138	1,138	187.0 ¹	0	187.0	2,089
2017	2,089	1,044	1,044	369.2 ¹	0	369.2	1,720
2018	1,720	860	860	214.9 ²	0	214.9	1,505
2019	1,505	752	752	111.5 ³	0	111.5	1,393
2020	1,393	697	697	220.7 ⁴	0	220.7	1,173
2021	1,173	586	586	220.7 ⁴	0	220.7	952
2022	952	476	476	220.7 ⁴	0	220.7	731
2023	731	366	366	220.7 ⁴	0	220.7	511
2024	511	255	255	220.7 ⁴	0	220.7	290
2025	290	145	145	220.7 ⁴	0	220.7	69

¹From Daryl Andersen's October 2019 email to Amy Zoller

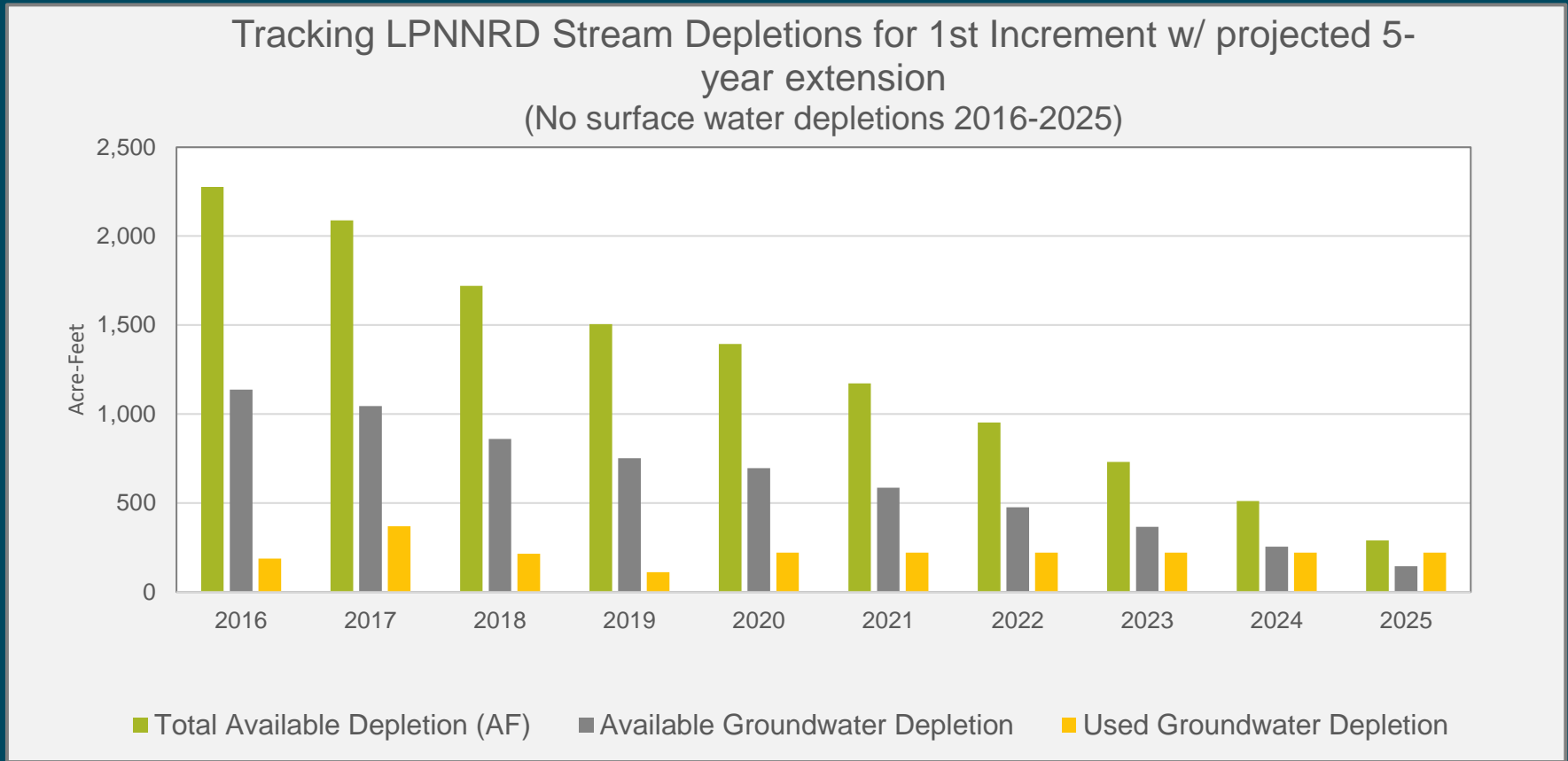
²From LPNNRD's 2019 Annual Report

³From LPNNRD's 2020 Annual Report

⁴Average Annual Used Groundwater Depletion (2016-2020)

New Depletions Accounting

LPNNRD: FIRST INCREMENT + PROJECTED 5-YEAR EXTENSION



LPNNRD/NeDNR Quarterly Meetings Update

➤ Meetings held on:

- October 3, 2019
- January 7, 2020
- May 5, 2020

➤ Meeting topics:

- Modeling updates
 - LPNNRD hydrogeologic framework study (UNL-CSD)
 - Lower Platte Basin hydrologically connected area refinement
- Data collection
- Lower Platte River Basin Coalition
 - 5 year review/extension of 1st increment

Modeling Updates

- LPNNRD hydrogeologic framework study with UNL-CSD
 - SQS2 Area
 - Jesse Korus at UNL – CSD leading the work
 - Evaluation of AEM data
- Lower Platte Basin Missouri-Tribs Model
 - Coordinated effort with NeDNR and Lower Platte Basin NRDs
 - Incorporation and evaluation of AEM data
- LPNNRD data collection efforts
 - Automation of data collection for data loggers already installed throughout LPNNRD

Education & Outreach Activities in 2019

➤ NeDNR

- Nebraska State Fair
- Sandhill's Ranch Expo
- Husker Harvest Days
- Women in Ag
- Women for Water
- American Water Resources Association, Spring Conference

➤ LPNNRD

- Nitrogen Certification Classes
- Spring Conservation
- School Presentations



LPNNRD Data Collection and Monitoring

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 April 2020 & in LPNNRD Annual Lower Platte Basin Plan Report
- Flow meter data (if meter data is collected)
 - 814 flow meters reported for an average of 2.42 in/acre
- Certified irrigated groundwater acres
 - 387,343.23 acres
- Municipal and industrial groundwater uses
 - 23 communities reported
- New groundwater consumptive uses (agricultural, municipal, industrial)
- Retirement of groundwater consumptive uses (agricultural, municipal, industrial)

NRD Data Collection and Monitoring*

- Well drilling permits approved, cancelled, or denied
 - 23 irrigation wells, 5 stock wells, 1 municipal well and 2 others
- Variances for new water uses granted, cancelled, or denied
 - 13 new variances were approved
- 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.)
 - No new
- New depletions accounting report
 - 111.488 irrigated depletion and 16.91 livestock depletion
- Streamflow accretion activities (new projects, conjunctive management projects, etc.)
- Water banking activities (if bank exists)



NeDNR Data Collection and Monitoring

IMP Requires Data Collection and Monitoring

➤ NeDNR Monitoring

- Surface water irrigation use
- Transfers/cancellations of surface water appropriations
- New surface water appropriations granted (natural flow, storage, groundwater recharge, 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.)

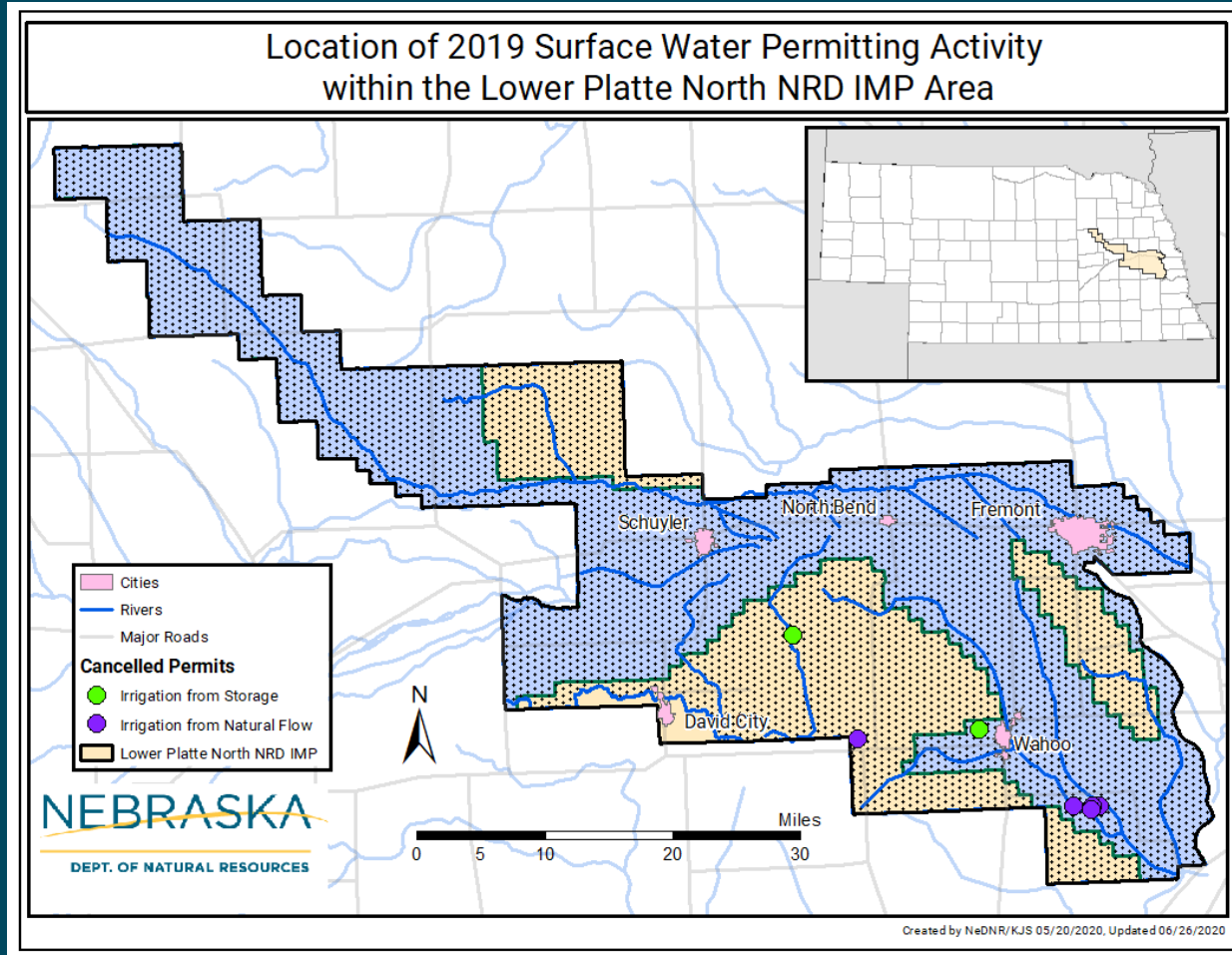
NeDNR Surface Water Permitting Actions

- New surface water applications approved = 0 (zero)
- Surface water appropriations cancelled = 7 (seven)

Surface Water Appropriations Cancelled in Full from July 15, 2018, to December 31, 2019

Appropriation Number	Date Cancelled	Source	NeDNR Action	Use	Begin Acres	Cancelled Acres	Cancelled Grant in cfs	Cancelled Grant in af	Basis for NeDNR Action
A-19349	11/8/2018	Robert's Reservoir 254	Cancelled in Full	Irrigation from Storage	72.3	72.6	NA	72.6	BUC-7185
A-19330	12/18/2018	Fendrich Lake	Cancelled in Full	Irrigation from Storage	6.6	6.6	NA	2.2	BUC-799
A-10862	1/9/2019	Dunlap Creek, Trib. To	Cancelled in Full	Irrigation from Natural Flow	35.5	35.5	0.51	NA	REL-7209
A-17997	10/9/2019	Wahoo Creek	Cancelled in Full	Irrigation from Natural Flow	197.0	197.0	2.81	NA	REL-7622
A-17998	10/9/2019	Silver Creek	Cancelled in Full	Irrigation from Natural Flow	67.0	67.0	0.96	NA	REL-7621
A-18124	10/9/2019	Wahoo Creek	Cancelled in Full	Irrigation from Natural Flow	71.0	71.0	1.01	NA	REL-7623

NeDNR Surface Water Permitting Actions



NeDNR Groundwater Permitting Actions

- Groundwater permits cancelled = 0 (zero)
- Groundwater permits issued = 0 (zero)

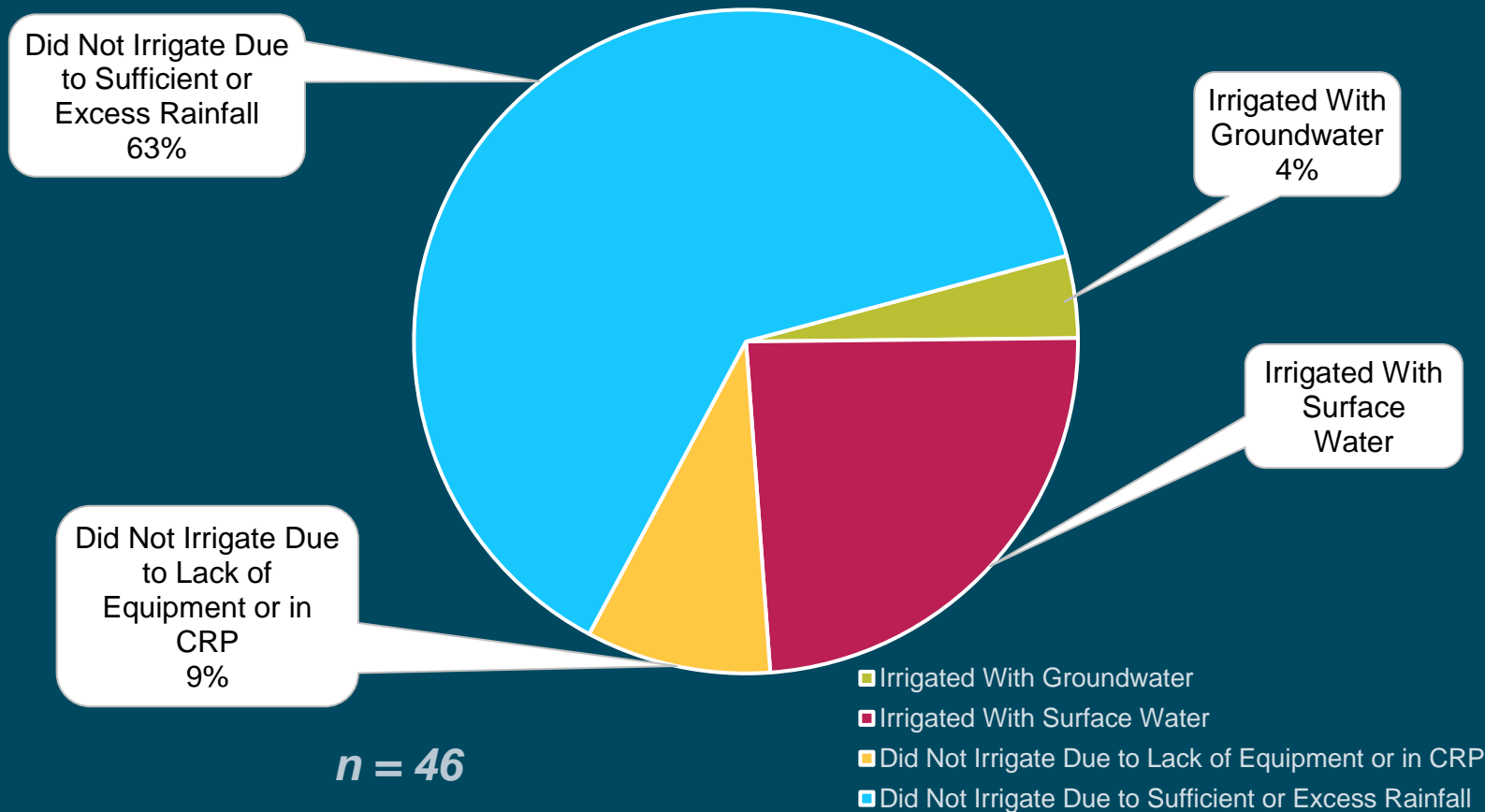
Includes groundwater permits for the following uses

- *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*

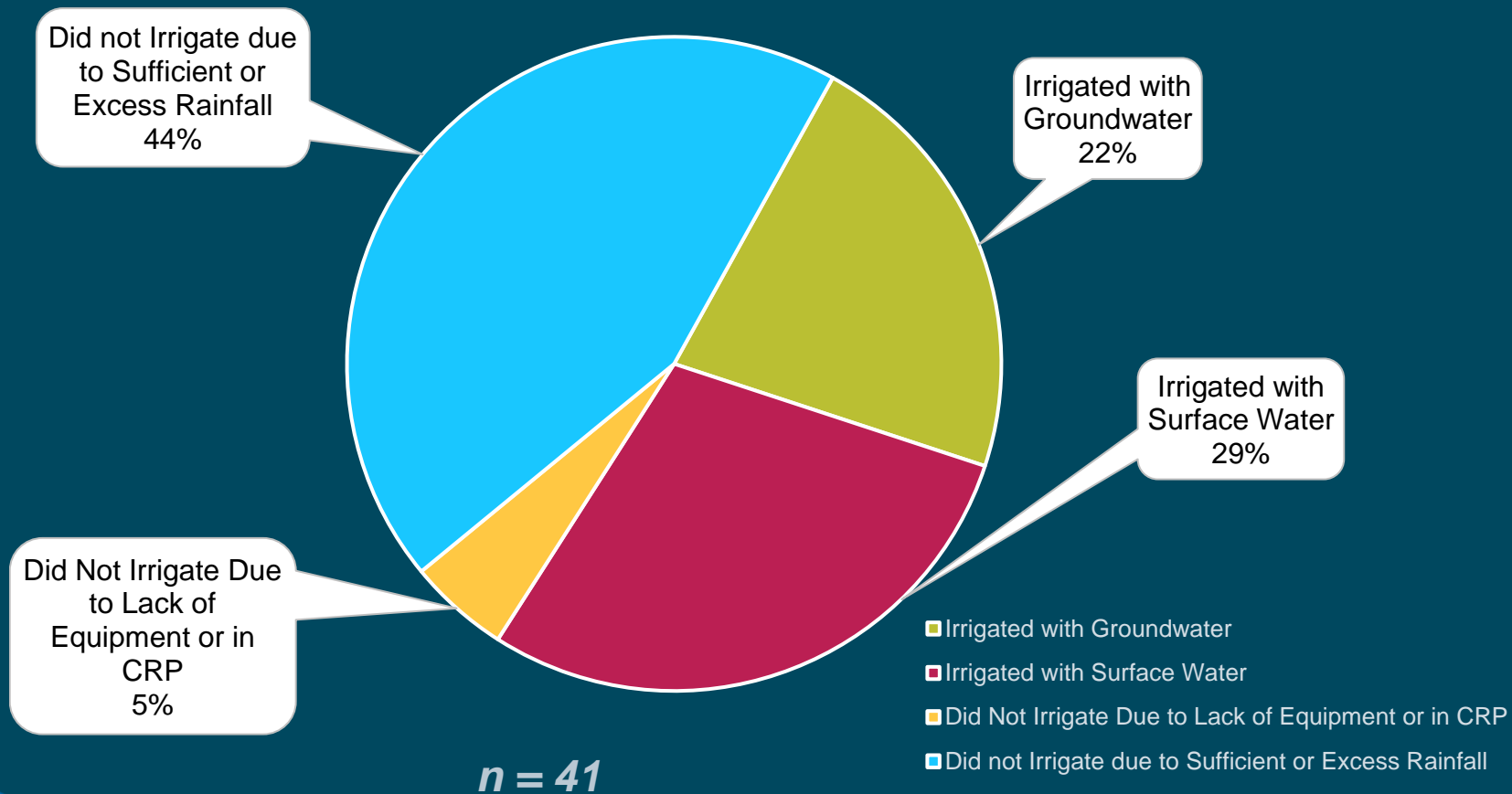
Municipal & Industrial Surface Water Uses

- New surface water applications for municipal or industrial uses approved = 0 (zero)
 - A-17097, a permit for dust control
 - This appropriation is under investigation and may be subject to cancellation for nonuse.

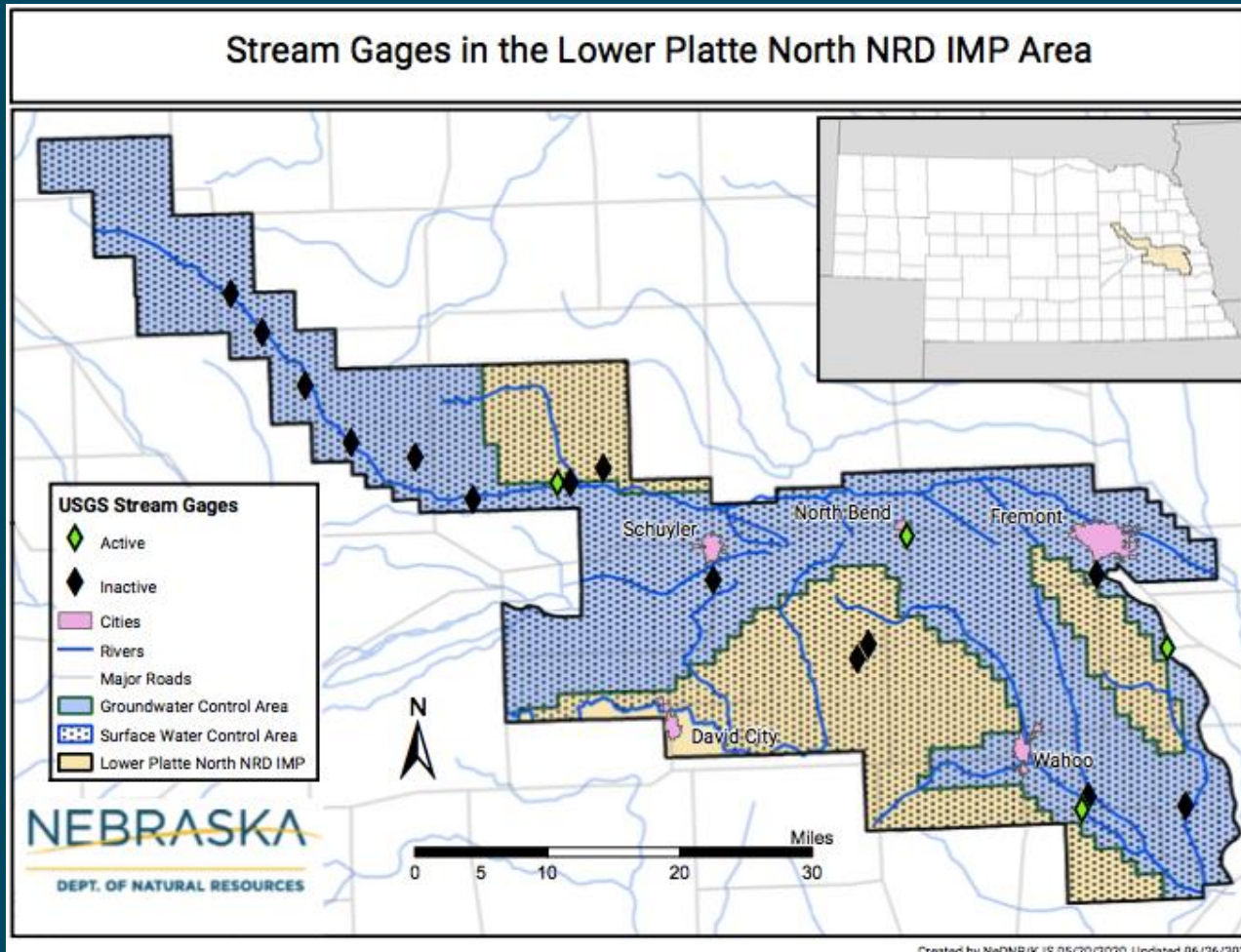
NeDNR Voluntary Surface Water Use Reporting (2018)



NeDNR Voluntary Surface Water Use Reporting (2019)

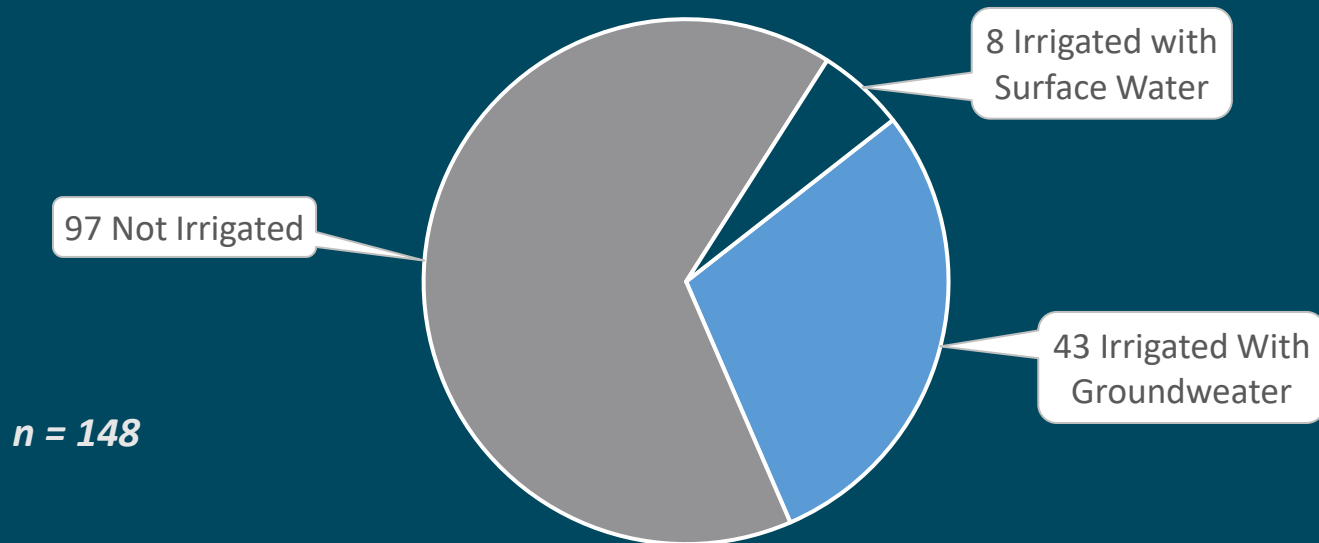


NeDNR Streamgaging



NeDNR Surface Water Pumpsite Inspections (2018)

NeDNR Pumpsite Inspections in 2018 in LPNNRD
Data Set = All Inspections
Number of Sites Irrigating with:



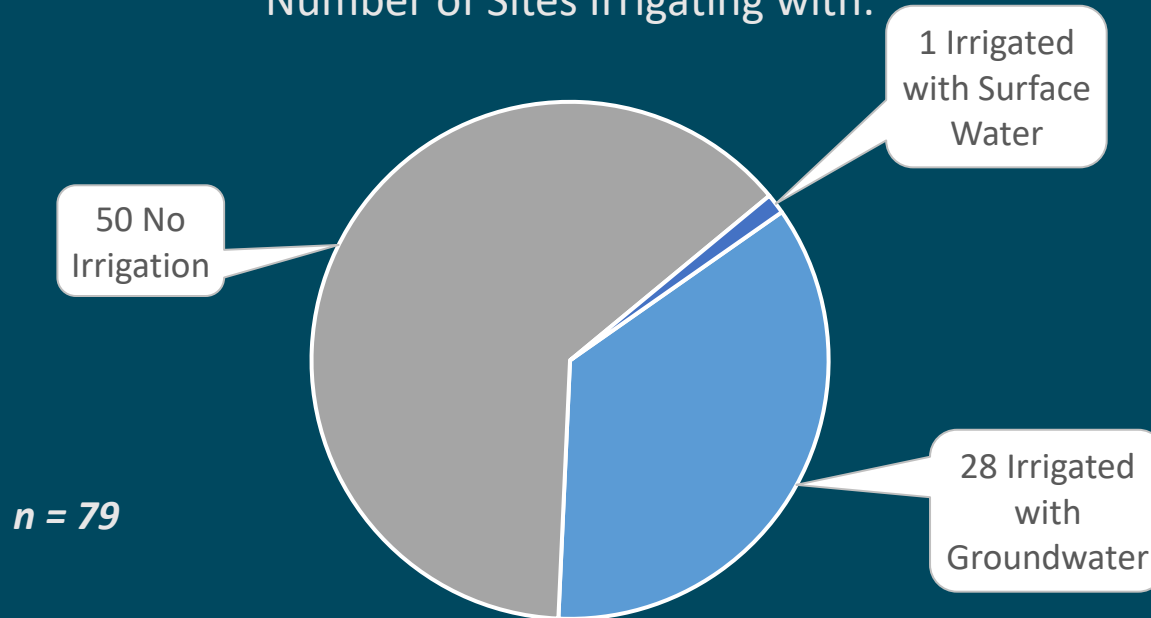
■ Irrigated With Groundwater

■ Not Irrigated

■ Irrigated with Surface Water

NeDNR Surface Water Pumpsite Inspections (2019)

NeDNR Pumpsite Inspections in 2019 in LPNNRD
Data Set = All Inspections
Number of Sites Irrigating with:

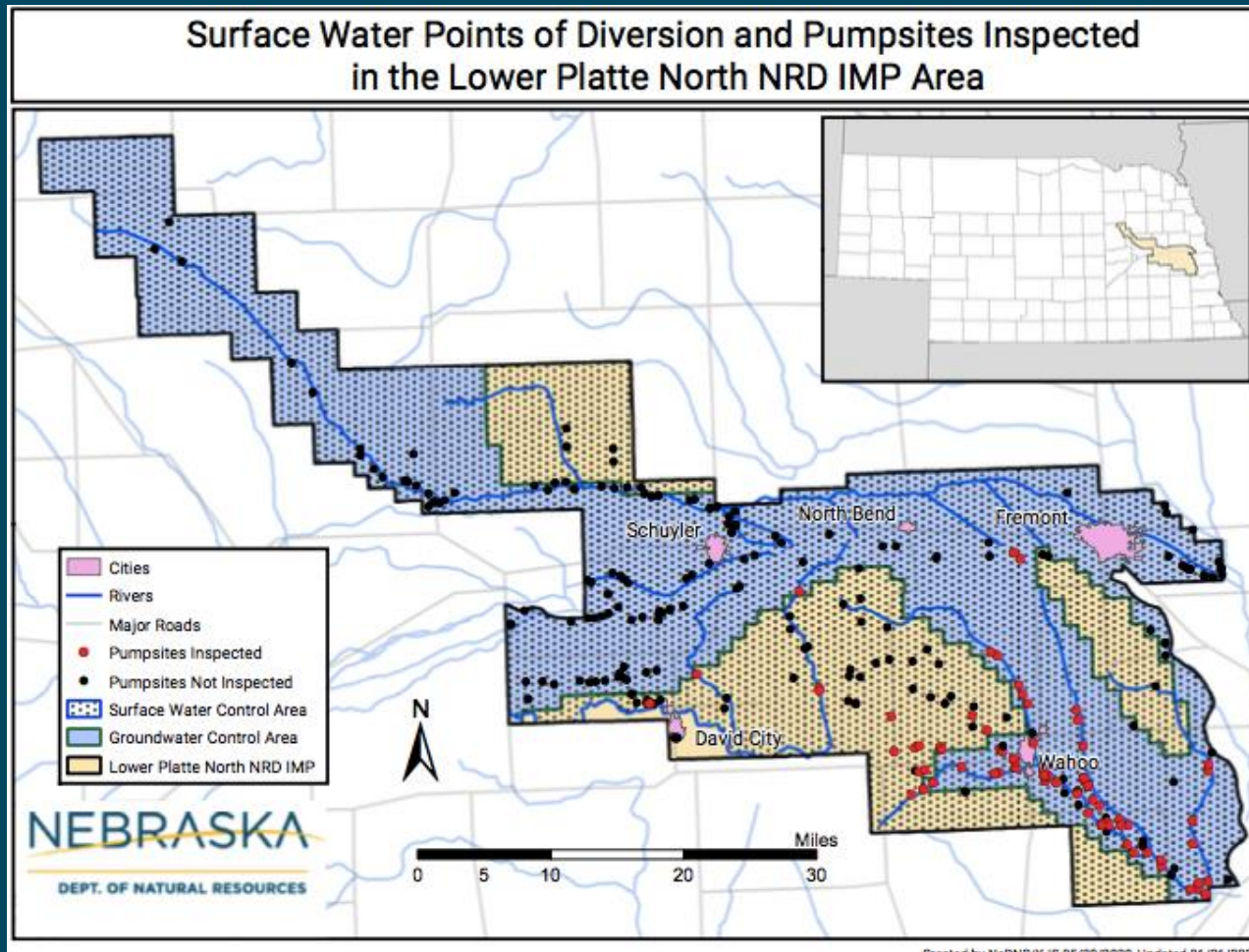


■ Irrigated with Groundwater

■ No Irrigation

■ Irrigated with Surface Water

NeDNR Surface Water Pumpsite Inspections (2019)



NeDNR Surface Water Administration

- NeDNR surface water administration actions* taken = 0 (zero)
 - In water years 2018 and 2019, surface water supplies were sufficient for all permitted uses in LPNNRD

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

New Depletions Accounting

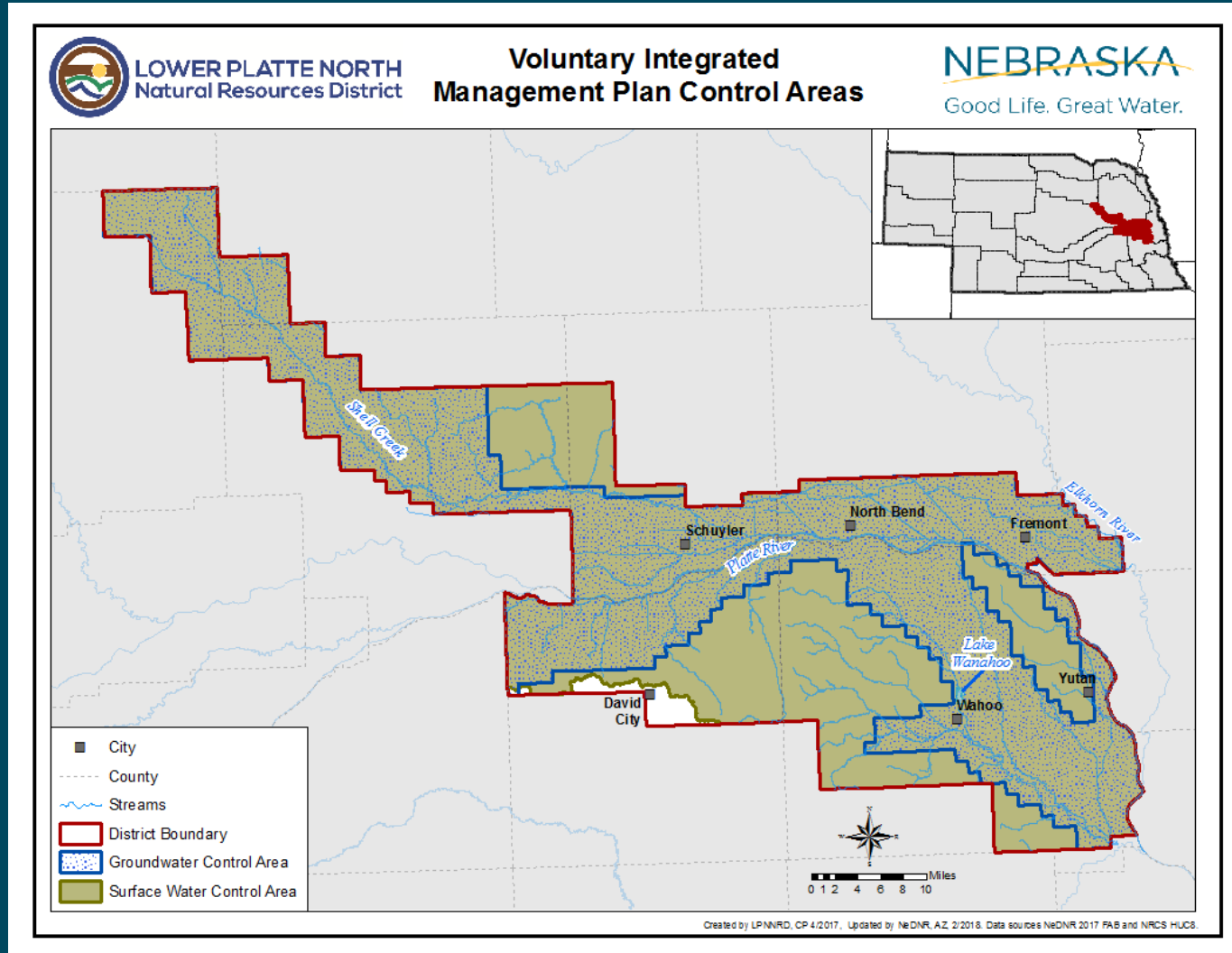
NeDNR Actions 2016-2019

Estimated Stream Depletions from NeDNR actions in LPNNRD Since 2016							
2016-2017		2018		2019		Net Total Depletions	
Peak	Non-Peak	Peak	Non-Peak	Peak	Non-Peak	Peak	Non-Peak
0	NA	0	0	0	0	0	0

REVIEW OF IMP GOALS/OBJECTIVES/ACTION ITEMS

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

Goal 1

Goal 1: Develop and maintain a District-wide water supply inventory		
Objective	Action Item	Assigned To
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.	1.1.1 Maintain a database of current ground and surface water supplies.	District and Department
	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
	1.1.3 Maintain a database of current water quality problem areas.	District
	1.1.4 Use best available data and methods to refine delineations of hydrologically connected surface water and groundwater.	District and Department
	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
	1.1.6 Evaluate short and long term climate variability and potential effects on water supply.	District and Department
	1.1.7 Evaluate new technologies and methods of water accounting that support water management goals.	District and Department
	1.1.8. Coordinate District and Department databases to better utilize staff time, improve water management efficiencies, and assist with public outreach.	District and Department
Objective 1.2: Determine the District's inflows and outflows of surface water and groundwater and changes in storage	1.2.1 Continue surface water and groundwater monitoring across the District.	District and Department
	1.2.2 Use surface water and groundwater measurements and models to estimate District inflows and outflows.	District and Department
	1.2.3 Identify data gaps in monitoring networks (precipitation, stream flow, groundwater level networks, etc.).	District and Department



Goal 2

Goal 2: Develop and maintain a District-wide water demand inventory		
Objective	Action Item	Assigned To
Objective 2.1: Evaluate current and future water demands that may be influenced by municipal, agricultural, industrial, hydropower, and instream flow requirements	2.1.1 Develop standard protocols to ensure municipal water supply reports and forecasts are integrated into the District-wide and Department databases.	District and Department
	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
	2.1.3 Continue certification of irrigated acres, well metering, and reporting requirements to track current water demands.	District
	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
	2.1.5 Coordinate with the Department to identify surface water rights for potential prioritization in Department adjudication investigations.	District and Department
	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
	2.1.7 Evaluate potential water demands for hydropower.	District and Department
Objective 2.2: Evaluate current water demands and estimate future impacts concerning surface or groundwater quality	2.2.1 Estimate effects on demands due to environmental mitigation activities that utilize large quantities of water.	District
	2.2.2 Estimate effects on demands in scenarios where municipal wells are moved to hydrologically connected areas to improve quality.	District and Department
	2.2.3 Continue mapping and tracking surface water irrigated acres and voluntary water use reporting to monitor surface water demands.	Department

Goal 3

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	Action Item	Assigned To
Objective 3.1: Update policies, practices, and programs to maintain and improve water supply and water quality as it affects supply	3.1.1. Where feasible, promote practices focused on reuse of rain, storm, waste, industrial, or irrigation water.	District
	3.1.2. Develop a District-wide water banking program to minimize water conflicts between different water users and sources.	District and Department
	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
	3.1.4. Periodically review rules and regulations, ensuring they are up-to-date with current data, technologies, and the IMP.	District and Department
Objective 3.2: Develop programs and guidelines to conserve water within municipalities, the agricultural sector, and industrial applications	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
	3.2.2 Use new, and existing, studies and data to establish specific guidelines for sustainable development of major, minor, and pocket aquifers.	District
	3.2.3 Collaborate with municipalities and industrial users on development or refinement of water conservation plans.	District

Goal 4

Goal 4: Communicate to the public that Nebraska has a great supply of water, and we need to continue to manage it well		
Objective	Action Item	Assigned To
Objective 4.1: Maintain existing public outreach activities and programs	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
	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
	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
Objective 4.2: Incorporate new data, technologies, and programs to enhance public outreach	4.2.1 Develop new materials and activities to educate the public on the benefits and limitations of riparian vegetation management.	District and Department
	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
	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
	4.2.4 Quantify water use efficiencies and disseminate through public education programs to enhance productivity.	District
	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

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	Action Item	Assigned To
Objective 5.1: Continue active participation in Lower Platte River Basin Coalition (Coalition) water management planning activities	5.1.1 Cooperate on water management studies and planning with the Coalition.	District and Department
	5.1.2 Evaluate federal, statewide, and local funding options for basin-wide water management activities.	District and Department
	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
	5.1.4 Evaluate proposed transfers utilizing methodology consistent with other Lower Platte NRDs, as specified in the basin-wide plan.	District
Objective 5.2: Coordinate to expand conjunctive management opportunities to mitigate new uses	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
	5.2.2 Evaluate benefits and limitations of potential conjunctive management projects	District and Department
Objective 5.3: Coordinate with ENWRA to increase knowledge about existing groundwater supplies and connection to surface water	5.3.1 Continue active participation in ENWRA meetings, studies, and activities.	District and Department
	5.3.2 Evaluate whether ENWRA data can improve modeling of hydrologically connected areas on a large scale.	District and Department
Objective 5.4: Strengthen coordination with other agencies about efforts to sustain or increase Lower Platte River flows	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
	5.4.3 Continue to coordinate with other agencies on riparian vegetation management activities.	District and Department

Long-Term Study

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

Jointly Identified Actions for Next Two Years

- Review potential IMP amendments to be consistent with Basin Plan
- 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 process for Lower Platte-Missouri Tributaries groundwater model evaluation of 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

Questions or Comments?



Lower Platte North
Natural Resources District

NEBRASKA

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